

# Regional Operations Plan

Southeastern Region | District 6-0



 **pennsylvania**  
DEPARTMENT OF TRANSPORTATION

 **TSMO**

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## Executive Summary

This Regional Operations Plan (ROP) has been developed to cover the Pennsylvania Department of Transportation (PennDOT) Southeastern Region. This region is comprised of PennDOT Engineering District 6-0. This region is centered around the Regional Traffic Management Center (RTMC) located in King of Prussia, PA.

The previous ROP process for this region was completed in 2007.

This ROP has been compiled based on guidance from the *TSMO Guidebook, Part I: Planning*, a PennDOT document developed in 2018 which describes how to implement the statewide approach to Transportation Systems Management and Operations (TSMO). TSMO is a set of integrated strategies used to increase the reliability and mobility of existing roadway infrastructure without adding capacity. This is accomplished primarily in three ways: Incorporating state of the art intelligent systems, improving management of incidents and events, and encouraging modal shift.

The ROP will complement the statewide TSMO Program Plan by identifying the regional approach to traffic operations and sets the stage for regional implementation of TSMO strategies.

This document will help to enable the Southeastern Region of Pennsylvania to:

- Meet federal requirements related to Intelligent Transportation System (ITS) planning (23 CFR 940)
  - Incorporate statewide TSMO goals for operations planning at the regional level
  - Utilize objectives-driven, performance-based planning processes for operations and congestion management planning
- Integrate operations into the transportation planning and programming process. The Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) promote the use of an objectives-driven, performance-based approach to planning for operations as an effective way to integrate operations into planning and programming
- Identify and prioritize TSMO capital projects as part of the Transportation Improvement Program (TIP)
  - Manage funds for the TSMO operations and maintenance (O&M) in future years

It is anticipated that this ROP will be updated every four years with a mid-cycle update to the project list every two years. Similar to the Long Range Transportation Plan (LRTP), the ROP should, at a minimum, identify which projects could be undertaken within the first four years, aligning these projects for potential inclusion in the Transportation Improvement Program (TIP).

The Stakeholder Groups included PennDOT Bureau of Operations (BOO), PennDOT District 6-0, Delaware Valley Regional Planning Commission (DVRPC) and the Federal Highway Administration (FHWA). Stakeholder Groups met three times to present information on the ROP process and to receive valuable input from the assembled stakeholders on each phase of the plan's development.

A summary of the Long Range Transportation Plan (LRTP) is provided in this document, as well as a discussion of the regional demographics and key transportation elements. Significant transportation corridors are identified, including the region's interstates, as well as most US routes, and a few of the most important Pennsylvania state routes.

Currently, District 6 has a robust TSMO program with nearly full ITS device coverage, incident management task forces (IMTF), and freeway service patrols (FSP) on all interstates, freeways and expressways, where they regularly monitor traffic, respond to incidents, and provide traveler information.

In the future, District 6 would like to fill in the missing coverage gaps on the expressways and expand the limited capabilities that exist on the arterials, with a goal of managing arterials the same as the expressways, with the ability to monitor and improve traffic signal performance, perform incident management, and provide traveler information of arterial roadway conditions and transit information.

Long term, District 6 sees the use of emerging technologies such as artificial intelligence (AI), connected and autonomous vehicles (CAVs) and active traffic management (ATM) key components of maximizing capacity and enhancing operator’s abilities to manage traffic.

The main goal of the ROP is to identify TSMO-related projects that currently do not have funding. Through data analysis and stakeholder input, a list of the region’s transportation needs and operation issues was developed. These needs and issues were organized into seven priority areas (project abbreviations are in parentheses):

- Freeway and Arterial Operations (FA)
- Traffic Incident Management (TIM)
- Traveler Information (TI)
- Communications Network (CN)
- Multimodal Connectivity (MC)
- Operational Teamwork/Institutional Coordination

Projects were then developed for identified hotspots based on these issues and needs. Locations that already have projects in construction or design or funded on the TIP or LRTP were excluded from the list to help identify locations that are in need of funding. Of particular focus in this ROP are Integrated Corridor Management (ICM) projects which seek to improve incident management and maximize use of available capacity on important parallel corridors. There are also a number of signal improvement projects and traffic incident management projects.

Projects were prioritized based on stakeholder input and discussion into “High Priority” and “Medium Priority” groups. The following tables show the complete list of recommended projects for the Southeastern Region.

#### HIGH PRIORITY PROJECTS

Project #	Project	Priority Area	Stakeholders	Planned Improvements
CN.01	Battery Backup System for Communications Hub	Communications Network	PennDOT District 6-0, DVRPC	Install battery backup system for communications hub to provide resiliency during major storms and other power outages
FA.01	I-676 (Vine Street Expressway) Active Traffic Management	Freeway and Arterial Operations	City of Philadelphia, PennDOT District 6-0, DVRPC	Implementation of appropriate active traffic management and other operational strategies
FA.02	I-76 Philadelphia Active Traffic Management	Freeway and Arterial Operations	City of Philadelphia, PennDOT District 6-0, DVRPC	Part time shoulder use and other operational strategies

# Regional Operations Plan (ROP)

## Southeastern RTMC Region

Project #	Project	Priority Area	Stakeholders	Planned Improvements
FA.03	I-95 Delaware County Active Traffic Management	Freeway and Arterial Operations	Delaware County, PennDOT District 6-0, DVRPC	Part time shoulder use and other operational strategies
FA.04	US 202 (Section 200) Active Traffic Management	Freeway and Arterial Operations	Chester County, PennDOT District 6-0, DVRPC	Implementation of appropriate active traffic management and other operational strategies
FA.05	US 422 Active Traffic Management	Freeway and Arterial Operations	Chester County, Montgomery County, PennDOT District 6-0, DVRPC	Part-time shoulder use, emergency access points and other operational strategies
FA.06	US 1 (Roosevelt Boulevard) from Broad Street to Bensalem Township	Freeway and Arterial Operations	City of Philadelphia, PennDOT District 6-0, DVRPC	Operational improvements and TSMO enhancements
FA.07	I-76 ITS Enhancements on Adjacent Arterials	Freeway and Arterial Operations	Montgomery County, City of Philadelphia, PennDOT District 6-0, DVRPC	Install arterial CCTV, DMS, Fiber Communications and traffic signal enhancements at strategic locations on parallel corridors to support to I-76 ICM
FA.08	District 6-0 RTMC Staffing	Freeway and Arterial Operations	PennDOT District 6-0, DVRPC	Additional RTMC staffing to support increased ITS deployments and traffic signal operation and maintenance responsibilities
FA.09	Queue Warning and Variable Speed Limits	Freeway and Arterial Operations	PennDOT District 6-0, DVRPC	Deployment of queue warning and variable speed limits at spot locations on freeways and expressways, including works zones
FA.10	Ramp Metering	Freeway and Arterial Operations	PennDOT District 6-0, DVRPC	Deployment of ramp metering system at on ramps to congested interstates, freeways, or expressways to control the merge conflicts
FA.11	Dynamic Curve Warning	Freeway and Arterial Operations	PennDOT District 6-0, DVRPC	Deployment of dynamic curve warning system at spot locations on interstates, freeways, expressways or principal arterials
FA.12	ITS Gaps Along Freeways or Expressways	Freeway and Arterial Operations	PennDOT District 6-0, DVRPC	Expand coverage of CCTV, DMS, TT Detectors, Fiber Communications along regional freeways and expressways
FA.13	Antiquated ITS Infrastructure Replacements	Freeway and Arterial Operations	PennDOT District 6-0, DVRPC	Replace antiquated ITS infrastructure at locations TBD
MC.01	Multimodal Connections	Multimodal Connectivity	PennDOT District 6-0, DVRPC, SEPTA	Bike lanes, bus lanes, park and rides, transit signal priority, actively managed connection routes (eg. signal corridors that lead to SEPTA stations)

Project #	Project	Priority Area	Stakeholders	Planned Improvements
TI.01	Transit Traveler Information	Traveler Information	PennDOT District 6-0, DVRPC	Provide transit traveler information such as next train arrival, travel time, parking availability or bus schedules to encourage multimodal use
TIM.01	Freeway Service Patrol	Traffic Incident Management	PennDOT District 6-0, DVRPC	Expand coverage areas and/or hours of operation of existing freeway service patrols
TIM.02	Incident Management Task Forces	Traffic Incident Management	PennDOT District 6-0, DVRPC	Additional support for 5 county Traffic Incident Management (TIM) Teams
TIM.03	Digital Alert System for Emergency Response	Traffic Incident Management	PennDOT District 6-0, DVRPC	Deploy R2V technology to allow emergency responders and roadside workers to automatically alert nearby motorists of their position.
TIM.04	Ramp Management Gates	Traffic Incident Management	PennDOT District 6-0, DVRPC	Install ramp management gates at strategic locations on freeways and expressways to remotely control the flow of traffic during events
TIM.05	Freeway Emergency Access Points	Traffic Incident Management	PennDOT District 6-0, DVRPC	Construct emergency access points along regional freeways and expressways to improve incident response times
TIM.06	Median Gates	Traffic Incident Management	PennDOT District 6-0, DVRPC	Install median gates along freeways and expressways for incident management

### MEDIUM PRIORITY PROJECTS

Project #	Project	Priority Area	Stakeholders	Planned Improvements
FA.14	US 202 (Section 100) TSMO Enhancements	Freeway and Arterial Operations	Chester County, Delaware County, PennDOT District 6-0, DVRPC	Improve operational efficiency, deployment of TSMO strategies, including traffic signal improvements
FA.15	US 1 TSMO Enhancements	Freeway and Arterial Operations	Delaware County, City of Philadelphia, PennDOT District 6-0, DVRPC	Deployment of TSMO strategies, ICM, Multimodal Connections, Transit Traveler Information, transit signal priority, traffic signal enhancements
FA.16	PA 3 (Chestnut Street) TSMO Enhancements	Freeway and Arterial Operations	City of Philadelphia, PennDOT District 6-0, DVRPC	Deployment of TSMO strategies, ICM, Multimodal Connections, Transit Traveler Information, transit signal priority, traffic signal enhancements
FA.17	PA 3 (Walnut Street) TSMO Enhancements	Freeway and Arterial Operations	City of Philadelphia, PennDOT District 6-0, DVRPC	Deployment of TSMO strategies, ICM, Multimodal Connections, Transit Traveler Information,

Project #	Project	Priority Area	Stakeholders	Planned Improvements
				transit signal priority, traffic signal enhancements
FA.18	PA 3 (West Chester Pike) TSMO Enhancements	Freeway and Arterial Operations	Delaware County, PennDOT District 6-0, DVRPC	Deployment of TSMO strategies, including traffic signal enhancements add fiber and connect to RTMC for remote monitoring
FA.19	US 30 (Lancaster Avenue) TSMO Enhancements	Freeway and Arterial Operations	Chester County, PennDOT District 6-0, DVRPC	Deployment of TSMO strategies, including traffic signal enhancements add fiber and connect to RTMC for remote monitoring
FA.20	US 30 (Girard Avenue) TSMO Enhancements	Freeway and Arterial Operations	City of Philadelphia, PennDOT District 6-0, DVRPC	Deployment of TSMO strategies, including traffic signal enhancements
FA.21	PA 41 (Gap Newport Pike) TSMO Enhancements	Freeway and Arterial Operations	Chester County, PennDOT District 6-0, DVRPC	Deployment of TSMO strategies, including truck traffic improvements
FA.22	PA 73 (Skippack Pike) TSMO Enhancements	Freeway and Arterial Operations	Montgomery County, PennDOT District 6-0, DVRPC	Deployment of TSMO strategies, including traffic signal enhancements add fiber and connect to RTMC for remote monitoring
FA.23	PA 132 (Street Road) TSMO Enhancements	Freeway and Arterial Operations	Bucks County, PennDOT District 6-0, DVRPC	Deployment of TSMO strategies, including traffic signal enhancements
FA.24	Baltimore Pike TSMO Enhancements	Freeway and Arterial Operations	Delaware County, PennDOT District 6-0, DVRPC	Deployment of TSMO strategies, including traffic signal enhancements, add fiber and connect to RTMC for remote monitoring
FA.25	Market Street TSMO Enhancements	Freeway and Arterial Operations	City of Philadelphia, PennDOT District 6-0, DVRPC	Deployment of TSMO strategies, ICM, Multimodal Connections, Transit Traveler Information, transit signal priority, traffic signal enhancements
FA.26	ITS Gaps/Enhancements on Adjacent Arterials and Parallel Corridors	Freeway and Arterial Operations	PennDOT District 6-0, DVRPC	Expand arterial ITS and fiber communications networks
TI.02	Truck Parking	Traveler Information	PennDOT District 6-0, DVRPC	Study of truck parking needs and/or development of additional truck parking facilities, traveler information of parking availability



## Acronyms and Abbreviations

Abbreviation/Acronym	Term
511PA	511 Pennsylvania Traveler Information System
AADT	Average Annual Daily Traffic
ADA	Americans with Disabilities Act
ARLE	Automated Red Light Enforcement
ATSPM	Automated Traffic Signal Performance Measures
BOO	Bureau of Operations
CCTV	Closed-Circuit Television
CMP	Congestion Management Process
CN	Communications Network
CRS	Crash Record System
DMS	Dynamic Message Sign
DVRPC	Delaware Valley Regional Planning Commission
FA	Freeway and Arterial Operations
FFY	Federal Fiscal Year
FHWA	Federal Highway Administration
FSP	Freeway Service Patrol
GIS	Geographic Information System
GPS	Global Positioning System
HAR	Highway Advisory Radio
HOT	High Occupancy Toll
HOV	High Occupancy Vehicle
HSR	Hard Shoulder Running
ICM	Integrated Corridor Management
IMTF	Incident Management Task Forces
ITS	Intelligent Transportation System
LRTP	Long Range Transportation Plan
MaaS	Mobility as a Service
MC	Multimodal Connectivity
MPMS	Multimodal Project Management System
MPO	Metropolitan Planning Organization
NHS	National Highway System
O&M	Operations and Maintenance
OBU	On Board Unit
OEM	Office of Emergency Management
PCIT	Pennsylvania Crash Information Tool
PennDOT	Pennsylvania Department of Transportation

# Regional Operations Plan (ROP)

## Southeastern RTMC Region

PennTIME	Pennsylvania Traffic Incident Management Enhancement
PTC	Pennsylvania Turnpike Commission
PTI	Planning Time Index
R2V	Responder to Vehicle
RITIS	Regional Integrated Transportation Information System
RMS	Roadway Management System
ROP	Regional Operations Plan
RTMC	Regional Traffic Management Center
RWIS	Roadway Weather Information System
SEPTA	Southeastern Pennsylvania Transportation Authority
SERTMC	Southeastern Regional Traffic Management Center
SGR	State-of-good repair
TI	Traveler Information
TIM	Traffic Incident Management
TIP	Transportation Improvement Program
TSMO	Transportation Systems Management and Operations
TTI	Travel Time Index
TNC	Transportation Network Companies
TSP	Transit Signal Priority
VMT	Vehicle Miles Traveled

## Chapter 1. Overview of the Region

This ROP has been compiled based on guidance from the *TSMO Guidebook, Part I: Planning*, a PennDOT document developed in 2018 which describes how to implement the statewide approach to Transportation Systems Management and Operations (TSMO). TSMO is a set of integrated strategies used to increase the reliability and mobility of existing roadway infrastructure without adding additional lane miles. The ROP will complement the TSMO Program Plan by identifying the regional approach to traffic operations and sets the stage for regional implementation of TSMO strategies.

This document will help to enable the Southeastern Region of Pennsylvania to:

- Meet federal requirements related to Intelligent Transportation System (ITS) planning (23 CFR 940)
- Incorporate statewide TSMO goals for operations planning at the regional level
- Utilize objectives-driven, performance-based planning processes for operations and congestion management planning
- Integrate/mainstream ITS and operations planning into the overall transportation planning process, per Federal Highway Administration (FHWA) guidance
- Identify and prioritize TSMO capital projects as part of the Transportation Improvement Program (TIP)
- Manage funds for the TSMO operations and maintenance (O&M) in future years

The previous ROP process for this region was completed in 2007. Moving forward, it is anticipated that this ROP will be updated every four years with a mid-cycle update to the project list every two years. Similar to the Long Range Transportation Plan (LRTP), the ROP should, at a minimum, identify projects that currently do not have funding and could be undertaken within the first four years, aligning these projects for potential inclusion in the TIP.

### Synopsis of the Region

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For Transportation Systems Management and Operations (TSMO) planning, Pennsylvania is broken into four regions whose borders coincide with Pennsylvania Department of Transportation's (PennDOT) Regional Traffic Management Center (RTMC) operational areas. These regions can be seen in Figure 1 (next page). The Southeastern Region is comprised exclusively of PennDOT Engineering District 6-0 and includes five counties (Bucks, Chester, Delaware and Montgomery and Philadelphia). The RTMC for the Southeastern Region is located in King of Prussia, PA. The region has a population of 4.2 million people across 2,155 square miles (32% of the statewide population compared to just 5% of the total land area). The transportation network consists of 15,460 linear miles and over 3,700 bridges including both state and locally owned (12.8% and 11.7% of the statewide total, respectively).

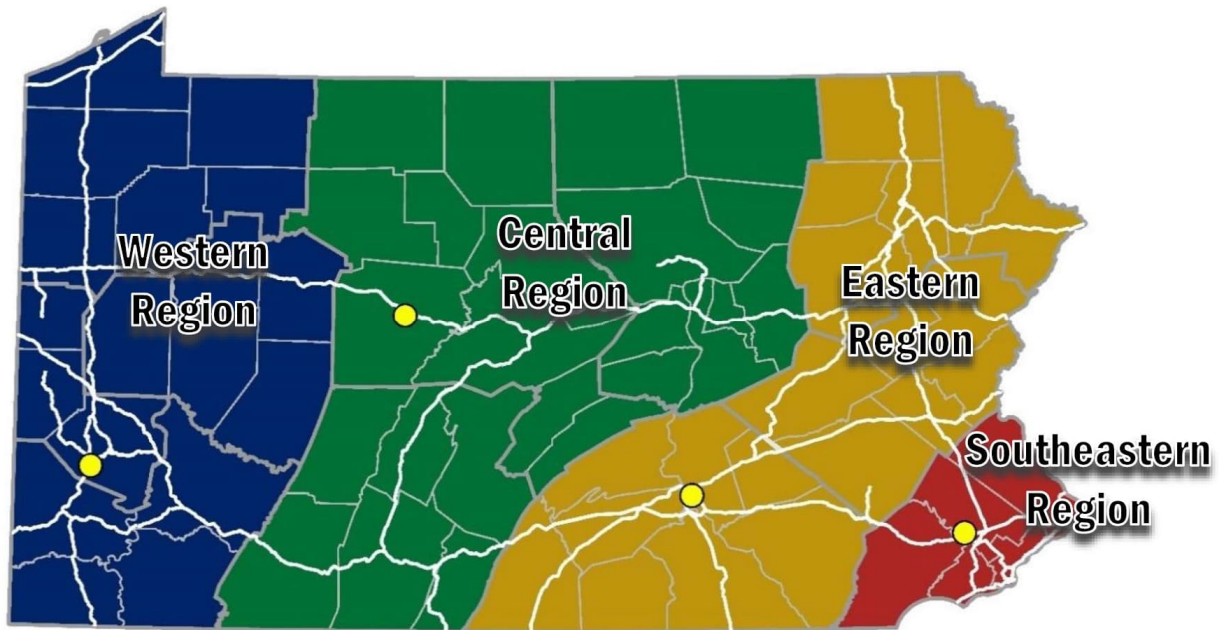


FIGURE 1: TSMO REGIONS WITHIN PENNSYLVANIA

## District 6-0

The District 6-0 region includes the Philadelphia Metropolitan Area, which provides major commercial and tourist attractions. Outside of the City, the region is largely suburban. Interstates and freeways provide regional travel along the east coast from Washington DC to New York City and beyond. There is also a comprehensive multimodal transportation network stemming out from Center City consisting of buses, trolleys, subways, regional rail, commuter rail, freight rail, airports and maritime ports, and pedestrian and bicycle networks.

Due to the dense urban nature and high number of daily commuters, recurring congestion is the largest source of traffic congestion in the region. However, special events like conventions, concerts, or sporting events, weather events like snow or flooding, work zones due to aging infrastructure and crashes are also major contributors to area congestion.

The Southeastern Region Metropolitan Planning Organization (MPO) is the Delaware Valley Regional Planning Commission (DVRPC), which consists of all five counties in the region, plus four counties in southern New Jersey. In addition to DVRPC, the following Transportation Management Associations (TMAs) are active partners in the region as well – Bucks County TMA, Central Philadelphia TMA, TMA of Chester County, Delaware County TMA, Greater Valley Forge TMA and the Partnership TMA of Montgomery County.

## Key Regional Stakeholders

As part of this ROP update, the project management team developed a ROP stakeholder group which consisted of key organizations that participate in transportation operations planning and implementation within the region. The following provides a listing of the 2022/2023 ROP stakeholders invited to participate:

- FHWA
- PennDOT Central Office / BOO
- PennDOT District 6-0
- DVRPC

Stakeholder meetings were held in person at PennDOT District 6-0. The meetings were structured as working sessions to receive input from the assembled stakeholder, especially with regards to the list of projects to be included in the ROP. Table 1 shows the list of stakeholder activities.

TABLE 1: SUMMARY OF STAKEHOLDER ACTIVITIES

Stakeholder Round	Summary of Activities	Location	Date
1	<ul style="list-style-type: none"> <li>• Overview of TSMO, the previous ROP, and process for the current ROP</li> <li>• Introduction to PennDOT One Map</li> <li>• Discussion of previously prepared documents</li> </ul>	PennDOT District 6-0	September 6, 2022
2	<ul style="list-style-type: none"> <li>• Discussion of tools and strategies from the TSMO Guidebook</li> <li>• Discussion of regional issues and needs and tools and strategies that can be applied</li> <li>• Development of a draft list of projects</li> </ul>	PennDOT District 6-0	October 17, 2022
3	<ul style="list-style-type: none"> <li>• Review of proposed projects</li> <li>• Review of maps</li> </ul>	PennDOT District 6-0	January 12, 2023

## Region’s ITS and Operations Vision and Planning Process

Currently, District 6 has a robust TSMO program with nearly full ITS device coverage, incident management task forces (IMTF), and freeway service patrols (FSP) on all interstates, freeways and expressways, where they regularly monitor traffic, respond to incidents, and provide traveler information.

In the future, District 6 would like to fill in the missing gaps on the expressways and expand the limited capabilities that they currently have on the arterials to manage the state highways and parallel corridors the same as the expressways, with the ability to monitor and improve traffic signal performance, perform incident management, and provide traveler information of arterial roadway conditions and transit information.

Long term, District 6 sees the use of emerging technologies such as artificial intelligence (AI), connected and autonomous vehicles (CAVs) and active traffic management (ATM) key components of maximizing capacity and enhancing operator’s abilities to manage traffic.

Unique to the Southeastern RTMC Region, there is only one MPO encompassing all five counties – the DVRPC. As such, the Region’s ITS and Operations Vision and Planning Process is consistent with planning documents previously developed by DVRPC. The following section contains excerpts from the most recent documents:

[DVRPC 2019 Congestion Management Process](#)

Objectives:

- Minimize growth in recurring congestion and improve mobility
- Improve the reliability of the transportation system and provide transit where it is most needed for accessibility
- Maintain the existing core transportation network
- Improve safety and reduce nonrecurring congestion due in part to crashes
- Maintain movement of goods by truck
- Maintain transportation preparedness for major events, especially ones that call for interregional movements
- Integrate national performance management PM3 measures
- Ensure that all transportation investments support DVRPC Long Range Plan (LRP) principals

[DVRPC Long Range Plan Connections 2050](#)

Principals:

- Prioritizing transportation investments in less sensitive environmental areas
- Investing to support land use centers first, then infill and redevelopment areas, and then emerging growth areas
- Sustaining the environment
- Developing livable communities
- Expanding the economy
- Advancing equity and fostering diversity
- Creating and integrated, multimodal transportation network

Vision is an equitable, resilient and sustainable Greater Philadelphia region that:

- Preserves and restores the natural environment,
- Develops inclusive, healthy and walkable communities,
- Grows an innovative and connected economy with broadly shared prosperity, and
- Maintains an integrated, safe, multimodal transportation network that serves everyone.

Transportation goals include:

- Rebuild and modernize the region’s transportation assets to achieve and maintain a state-of-good repair (SGR), including full Americans with Disabilities Act (ADA) accessibility.
- Achieve vision zero – no fatalities or serious injuries from traffic crashes by 2050.

- Integrate existing and emerging transportation modes into an accessible, multimodal mobility as a service (MaaS) network, which collects real-time data, and uses it to plan and pay for travel using the best option available. Transit, walking and biking – including the Circuit Trails system – are integral components of this network.
- Increase mobility and reliability, while reducing congestion and vehicles miles traveled (VMT).
- Strengthen transportation network security and cybersecurity.

Key Strategies related to plan principals, focus areas and goals:

- Maintain existing transportation infrastructure and facilitate the equitable deployment of new modes and technologies
- Safely accommodate transit, walking and biking, and transportation network users of all abilities
- Promote equitable access to opportunity

## Chapter 2. Existing Regional Demographics and Transportation Elements

### Existing Key Transportation Elements

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The DVRPC has a wealth of information on regional demographics and transportation elements that encompasses the whole Southeastern RTMC Region. A summary of the data is provided below with links provided for additional information.

#### Roadway Network

The roadway network in the Southeastern RTMC Region includes interstates, freeways, arterials, collectors, local, municipal, and other agency roads. As reported in [PennDOT's 2021 Highway Statistics](#), the Southeastern RTMC Region contains 15,460 linear miles of roadway, encompassing 12.8% of the Commonwealth's total linear mileage.

#### Transit Service

The [Southeastern Pennsylvania Transportation Authority](#) (SEPTA) provides transit service to all five counties in the region including 14 regional rail lines (that extend as far as West Trenton, NJ and Newark, DE), two subway lines (the north-south Broad Street line and the east-west Market-Frankford line), seven trolley lines, the Norristown High Speed Line, 156 bus lines and a customized community transportation (CCT) program.

In addition to SEPTA, regional passenger train service is provided by Amtrak. There are multiple intercity bus companies such as Greyhound or MegaBus. Taxis and ride sharing services like Uber and Lyft are readily available in the five county area, but especially so in Philadelphia.

#### Active Transportation Network

[The Circuit](#) is Greater Philadelphia's multi-use trail network. Major existing trails on The Circuit include: The Schuylkill River Trail, Valley Forge Trails, Chester Valley Trail, Perkiomen Trail and Pennypack Trail). DVRPC has also conveniently mapped the regions sidewalks, crosswalks and ramps in the [Pedestrian Portal](#).

There are three designated PA Bike Routes (Routes E, L and S) on the PennDOT Bicycle PA network. PennDOT District 6-0 and the City of Philadelphia Streets Department are continually looking for more opportunities to increase the on-street bicycle infrastructure and incorporate Complete Streets practices. In 2015, The City of Philadelphia launched the Indego bike share initiative that now has over 130 stations and 1,000 self-service bikes available 24/7.

#### Intermodal Facilities

Major intermodal facilities and service providers for air, rail and maritime that support passenger and freight are outlined on DVRPC's [Philly Freight Finder](#) and include:

- Philadelphia International Airport
- Northeast Philadelphia Airport



- Norfolk Southern Morrisville Intermodal Facility
- Port of Bucks
- Tioga Marine Terminal
- Port of Philadelphia
- Penn Terminals
- CSX Twin Oaks Auto Terminal
- CSX Transflo Facility

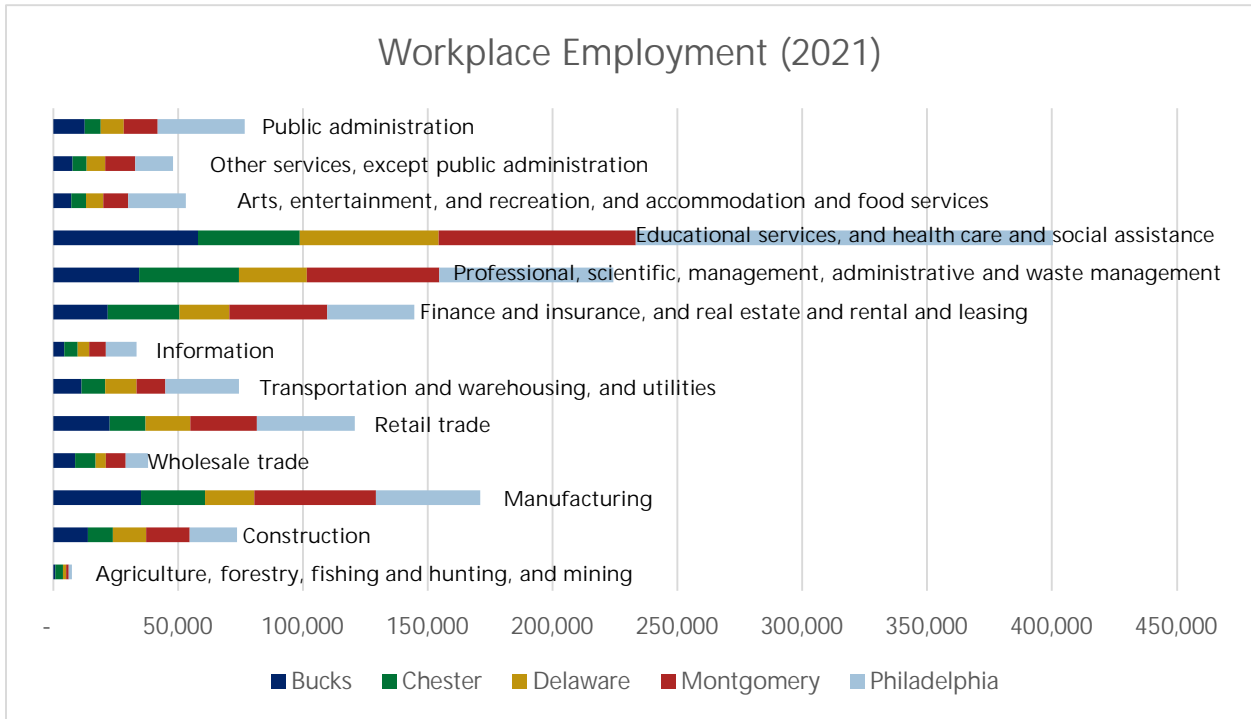
## Tourist and Travel Destinations

The Southeastern region is home to a multitude of stadiums, entertainment venues, and tourist and travel destinations such as:

- Philadelphia Sports Complex (Lincoln Financial Field, Citizens Bank Park, Wells Fargo Center)
- Amtrak's 30<sup>th</sup> Street Station
- Philadelphia International Airport
- Pennsylvania Convention Center
- Independence National Historic Park
- King of Prussia Mall
- Numerous Colleges and Universities

## Major Employers

Figure 2 displays the number of employees in various industries, based on the U.S. Census Bureau, 2020. Educational services, health care, and social assistance are the top industries in the region by a large margin. This group is led by a number of colleges and universities as well as strong healthcare systems like University of Pennsylvania/Penn Medicine, Thomas Jefferson University/Jefferson Health, Temple University and Health System and the Children's Hospital of Philadelphia. Other major employers include Giant Food Stores, Comcast, Aramark, Johnson & Johnson, Dupont, Merck and Rite Aid.



Source: [U.S. Census Bureau, 2020](#)

FIGURE 2: MAJOR INDUSTRIES IN THE REGION

## Demographics

The following tables, also based on the U.S. Census Bureau 2020, show the demographics and commuting patterns of the region. Data is based on workers' place of residence, not employment. On average, the percentage of workers who drove to work in the four suburban counties was similar to the statewide and US average. In Philadelphia, the share of transit and time spent commuting are both higher than statewide and US averages. The region as a whole has a significantly higher percentage of people who worked from home than the statewide and US averages.

TABLE 2: COUNTY POPULATIONS

County	Population	Land Area
Bucks County	646,538	604
Chester County	534,413	750
Delaware County	576,830	184
Montgomery County	856,553	483
City of Philadelphia	1,603,797	134
Southeast Region Total	4,218,131	2,155
Statewide	13,002,700	44,742
Southeast Region %	32.4%	4.8%

Source: [U.S. Census Bureau, 2020](#)

TABLE 3: COMMUTING PATTERNS

Commuting Pattern	Bucks	Chester	Delaware	Mont	Phila	PA	United States
Number of Workers							
16 years and over	325,462	280,530	272,488	444,104	701,705	6,072,593	154,314,179
Means of transportation							
Drove alone	67.9%	61.2%	62.6%	60.5%	44.6%	66.8%	67.8%
Carpooled	5.6%	5.6%	6.6%	5.8%	7.0%	7.0%	7.8%
Public transportation	1.0%	0.5%	5.1%	1.6%	14.0%	2.8%	2.5%
Walked/Biked	1.0%	2.0%	2.5%	2.0%	8.1%	3.3%	2.6%
Other means	1.1%	1.5%	1.6%	1.4%	2.0%	1.3%	1.5%
Worked from home	23.4%	29.1%	21.6%	28.6%	24.3%	18.7%	17.9%
Travel time to work							
Mean time (minutes)	27.7	25.3	27.0	27.4	31.1	25.7	25.6

Source: [U.S. Census Bureau, 2020](https://www.census.gov)

## TSMO Roadway Tiering System

As with any planning effort, it is important to define the scope of the roadway network. With input from statewide and District-level PennDOT representatives, as well as from planning partners, a roadway tiering system was developed to facilitate TSMO planning efforts, shown in the following table.

TABLE 4: ROADWAY TIERING SYSTEM


Road Type	Tier	Criteria
Limited Access (NHS)	1A	AADT > 75,000
	1B	AADT between 50,000 and 75,000
	1C	AADT < 50,000
Non-Limited Access (NHS)	2A	AADT > 25,000
	2B	AADT between 10,000 and 25,000
	2C	AADT < 10,000
Non-NHS	3A	AADT > 10,000
	3B	AADT between 2,000 and 10,000
	3C	AADT < 2,000












The intent of the tiering system is to organize the roadway network into groups with similar characteristics and operational needs. This helps to consistently define expectation for management and operations across the state. While the National Highway System (NHS) roadway types are higher-order roadways with generally higher traffic volumes, the tiering classifications are not intended to dictate specific solutions or levels of funding.




## Corridors and Areas of Transportation Significance

The major highway corridors identified in Table 5 are all part of the NHS and connect the core population centers of the region with each other as well as providing links to key areas outside of the area. Average Daily Traffic was retrieved from PennDOT One Map RMS data. Roads identified as part of the 511PA Core Network are ones which PennDOT has identified as having reliable speed data, road condition reporting, and traffic cameras. Note, the PA Turnpike is not included in the ROP analysis, but it functions as a key roadway in the region interconnected with many PennDOT roads. Figure 3 displays a map of the significant corridors in the region.

TABLE 5: CORRIDORS AND AREAS OF TRANSPORTATION SIGNIFICANCE

Class	Route	County	Average Daily Traffic	TSMO Tier	511 Network	Notes and Considerations
Interstates		Chester Montgomery Bucks	34k – 54k 49k – 122k 33k – 71k	1B, 1C 1A, 1B, 1C 1B, 1C	Yes	East-west Pennsylvania Turnpike Commission toll facility connecting New Jersey to Ohio
		Montgomery Philadelphia	69k – 155k 108k – 249k	1A, 1B 1A	Yes	East-west interstate connecting King of Prussia to Philadelphia
		Bucks Montgomery	41k – 51k 46k – 68k	1B, 1C 1B	Yes	North-south Pennsylvania Turnpike Commission toll facility connecting Greater Philadelphia region with Allentown and Scranton
		Montgomery Delaware	51k – 164k 77k – 141k	1A, 1B 1A	Yes	North-south interstate connecting PA Turnpike with I-95
		Philadelphia	121k – 173k	1A	Yes	East-west interstate connecting I-76 with I-95 through the center of Philadelphia

Class	Route	County	Average Daily Traffic	TSMO Tier	511 Network	Notes and Considerations
		Delaware Philadelphia Bucks	79k – 208k 80k – 231k 43k – 138k	1A 1A 1A, 1B, 1C	Yes	North-south interstate connecting Washington DC to New York and beyond
U.S. Routes		Chester Delaware Philadelphia Bucks	13k – 41k 22k -59k 29k – 125k 37k – 95k	1C, 2A, 2B 1B, 1C, 2A, 2B 1A, 1B, 1C, 2A 1A, 1B, 1C, 2A	Partial	North-south route connecting Maryland to New Jersey
		Delaware Philadelphia Bucks	6k – 31k 7k – 25k 12k – 25k	2A, 2B, 2C 2B, 2C 2B	No	North-south route paralleling I-95 through the region
		Chester Delaware Montgomery Philadelphia	12k – 87k 17k – 28k 21k – 30k 8k – 24k	1A, 1B, 1C, 2A, 2B 2A, 2B 2A, 2B 2B, 2C	Partial	East-west route connecting Lancaster to Philadelphia
		Delaware Chester Montgomery Bucks	43k – 51k 29k – 128k 9k – 110k 12k – 24k	2A 1A, 1B, 1C, 2A 1A, 1B, 1C, 2A, 2B, 2C 2B	Partial	North-south route that spans the length of the region surrounding Philadelphia
		Delaware Chester	21k – 56k 9k – 20k	1B, 2A, 2B 2B, 2C	No	East-west route connecting Harrisburg to New Jersey
		Chester Montgomery	37k – 56k 19k – 128k	1B, 1C 1A, 1B, 1C	No	East-west route connecting Reading to the Greater Philadelphia region
PA State Routes		Chester Delaware Philadelphia	10k – 46k 22k – 58k 4k – 21k	2A, 2B 2A, 2B 2B, 2C	No	East-west route connecting West Chester to Philadelphia
		Montgomery Philadelphia	4k – 36k 64k	2A, 2B, 2C 1B	No	East-west route connecting upper Montgomery County to Northeast Philadelphia and I-95
		Montgomery Chester	18k – 31k 11k – 53k	2A, 2B 1B, 1C, 2A, 2B	No	North-south route from upper Montgomery County to West Chester
		Bucks	13k – 61k	2A, 2B	No	East-west route through Bucks County providing connections to I-95, PA Turnpike, US 1, PA 611

Class	Route	County	Average Daily Traffic	TSMO Tier	511 Network	Notes and Considerations
		Bucks Montgomery	31k – 52k 27k – 124k	1B, 1C, 2A 1A, 1B, 1C, 2A	Partial	North-south route connecting upper Montgomery County to Philadelphia and the PA Turnpike
		Bucks Montgomery	4k – 46k 5k	2A, 2B, 2C 2C	No	East-west route connecting Montgomery County to New Jersey with connections to I-95
		Bucks Montgomery Philadelphia	4k – 43k 22k – 52k 16k – 49k	1C, 2A, 2B, 2C 2A, 2B 2A, 2B	No	North-south route connecting Upper Bucks County to Philadelphia

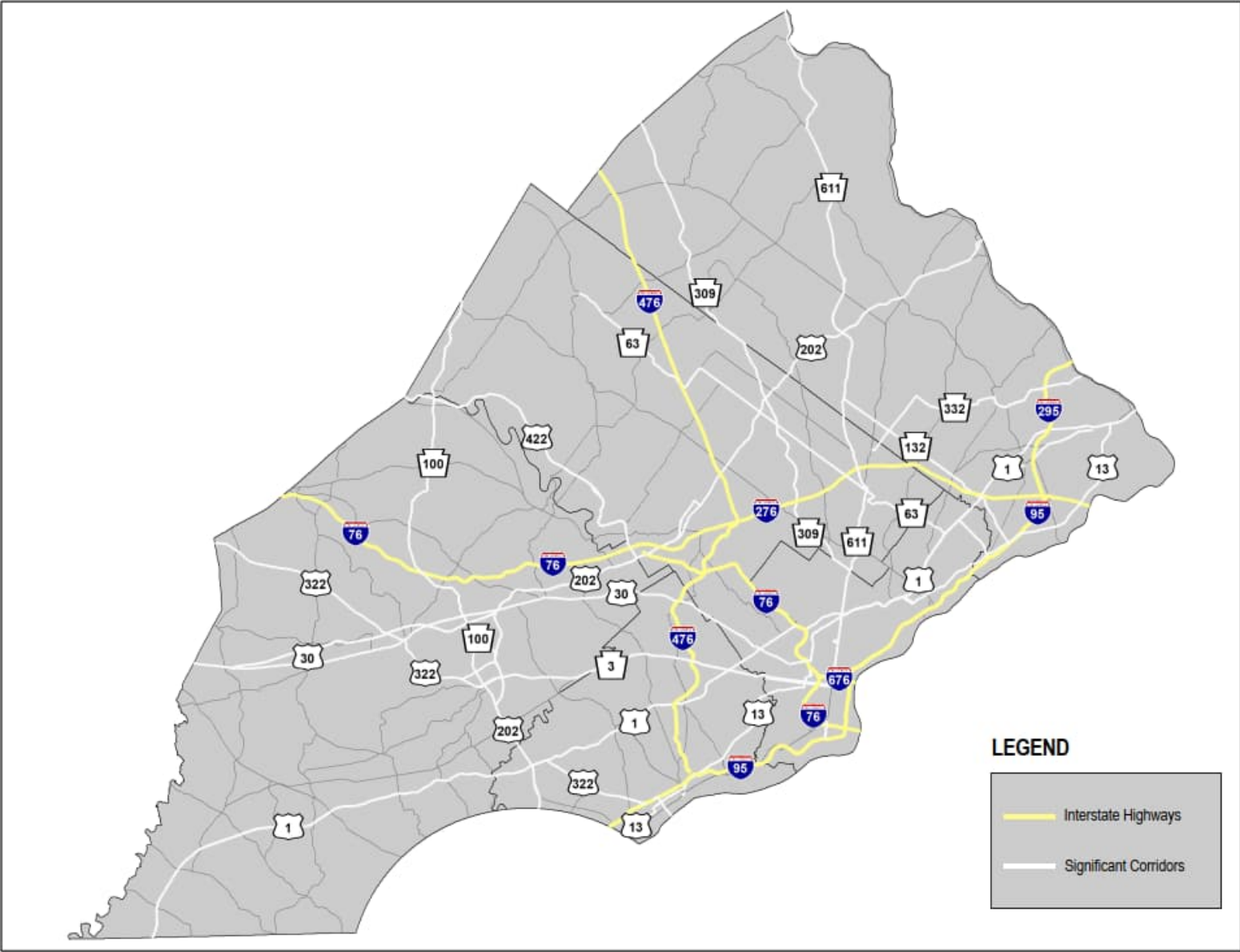


FIGURE 3: SIGNIFICANT CORRIDORS IN THE REGION

## Regional TSMO Elements

The Southeastern Region has a comprehensive deployment of ITS devices throughout the district including Closed-Circuit Television (CCTV) cameras, dynamic message signs (DMS), variable speed limits (VSLs) and traffic detectors. A small number of Roadway Weather Information Systems (RWIS) are also in use. Additionally, PennDOT District 6-0 has robust fiber network and has recently assumed ownership of 60 traffic signals in Montgomery County as part of a pilot program for the I-76 parallel corridors

The newly constructed Southeastern RTMC, located at PennDOT District 6-0 in King of Prussia, PA, operates these devices. The Southeastern RTMC oversees the operations of the freeway and major arterial system through ITS devices, traffic signals, freeway service patrols, communication with emergency responder agencies, and close coordination with the other PennDOT Districts. A summary of the PennDOT ITS devices in the region can be found in Table 6. CCTV, DMS and fiber locations are provided on the maps in Appendix B.

**TABLE 6: SOUTHEASTERN REGION ITS ELEMENTS**

ITS Devices	CCTV	DMS	Detectors	VSL	Traffic Signals
District 6-0 Total	483	209	755	72	6,688
Statewide	1132	654	938	72	14,759
District 6-0 %	43%	32%	80%	100%	45%

*(SOURCE: PENNDOT ATMS, FEBRUARY 2023)*



## Chapter 3. Existing and Future Operations

### TSMO Mapping

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This section provides information documenting and summarizing the region's existing and future operations performance. Much of this data has been gathered from PennDOT One Map, a web-based interactive GIS mapping application ([gis.penndot.gov/OneMap](http://gis.penndot.gov/OneMap)). Through this website, PennDOT has aggregated traffic operations metrics, crash clusters, and many other data from a variety of sources. This powerful tool provides PennDOT and their planning partners with the ability to identify and investigate problem areas in a continuing process, planning for new and changing needs as they develop. DVRPC's 2019 CMP was also used to determine congested corridors and major intersection bottlenecks.

### Existing Corridor Performance

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#### Mobility

The Southeastern region is a mix of dense urban and suburban areas with heavy recurring congestion. Multiple sources of information were reviewed to identify focus areas. Measures of traffic congestion are calculated from third party probe data, which aggregates speed and travel time data from a sampling of vehicles throughout the roadway network. Two distinct measures of congestion are Major Traffic Bottlenecks and TomTom Travel Time Ratios, which have been aggregated in One Map.

The 2021 Major Traffic Bottlenecks, depicted in Figure 4 were derived from the RITIS PDA Suite based on INRIX probe speed data, with a bottleneck occurring whenever the speed is less than 60% of the estimated free flow speed. To augment the bottleneck data, travel time ratio data was also considered, derived from anonymized data pulled from TomTom's navigation devices, in-dash systems, and apps. The travel time ratio compares actual travel times to free-flow travel times.

However, the primary data source for determining projects for this ROP was the DVRPC 2019 CMP. This document identified congested corridors based on travel time index (TTI), planning time index (PTI) and other congestion performance measures. The main source of this data was INRIX XD travel time data. The top 20 most congested corridors in the Southeastern Region are shown below, ranked by both peak travel time vehicle and volume delay.

- I-676 (Vine Street Expressway), Philadelphia
- I-76, Philadelphia
- PA 3 (Walnut Street), Philadelphia
- US 1 (City Avenue), Montgomery County & Philadelphia
- PA 3 (Chestnut Street), Philadelphia
- I-95, Philadelphia
- US 30 (Girard Avenue), Philadelphia
- I-476, Delaware County

- I-76, Montgomery County
- PA 611 (Broad Street), Philadelphia
- PA 3 (West Chester Pike), Delaware County
- Market Street, Philadelphia
- US 1 (Roosevelt Boulevard), Philadelphia
- Baltimore Pike, Delaware County
- US 202, Delaware County
- US 202, Montgomery County
- US 30 (Lancaster Avenue), Philadelphia
- US 322, Delaware County
- I-95, Delaware County
- US 1, Delaware County

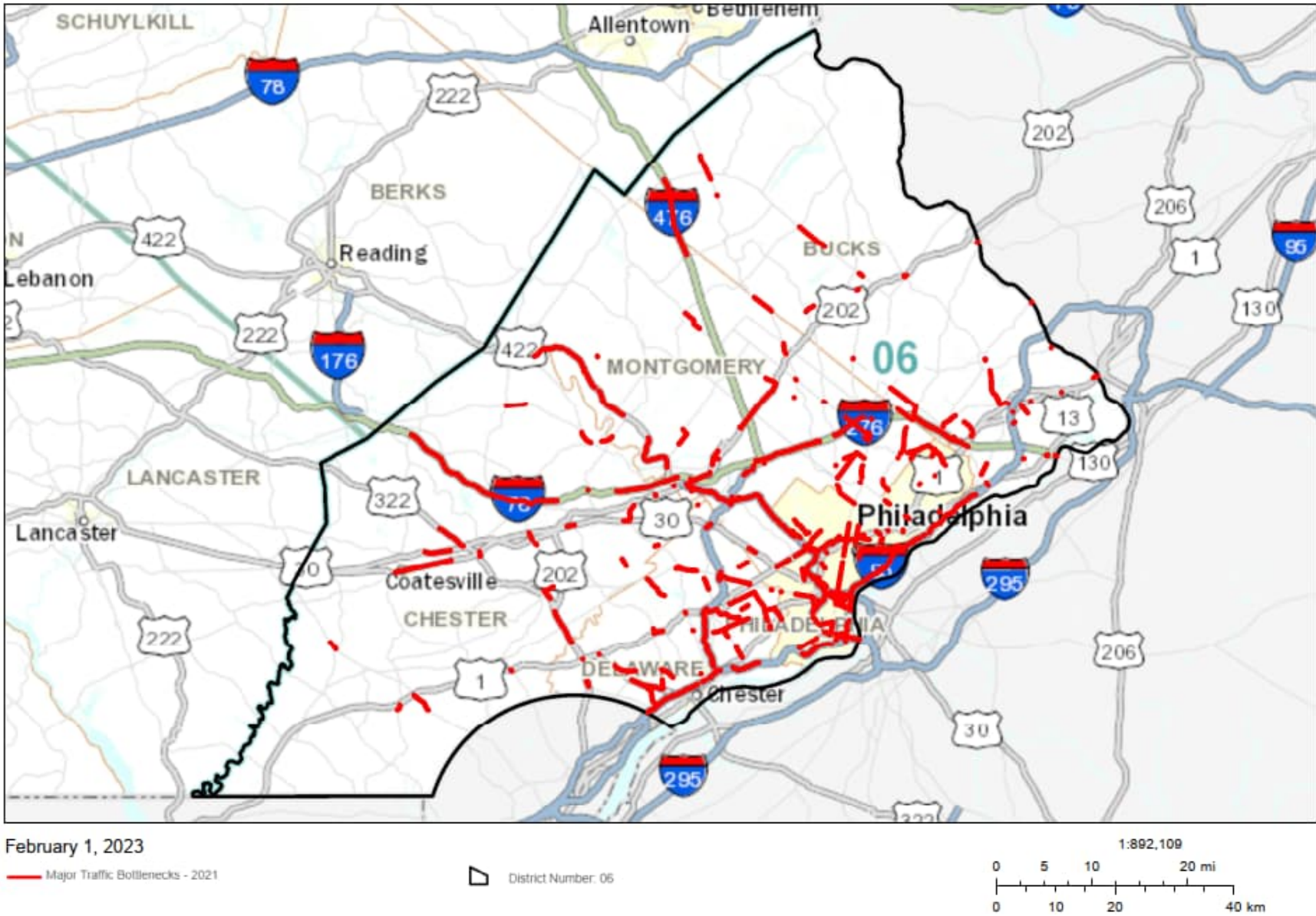


FIGURE 4: SOUTHEASTERN REGION CONGESTION MAP OF 2021 MAJOR TRAFFIC BOTTLENECKS

## Traveler Information and Situational Awareness

While much of the congestion in the urban and suburban areas of the region is recurring in nature, non-recurring congestion due to weather, incidents, and special events also has great impacts on mobility throughout the region. In these cases, getting information to the operators in the Southeastern RTMC and to the travelers on the roadways is vital to minimize impacts. The ITS device deployment for the region covers a majority of the interstates, freeways and expressways. PennDOT District 6-0 is now focused on providing traveler information and gaining additional situational awareness on the parallel corridors and arterial detour routes during incidents, especially with the operations of traffic signals.

## Safety

Safety is a primary concern for PennDOT, and operational improvements will not be instituted at the detriment to safety. Crash issues are a concern throughout the region and a frequent cause of congestion. PA OneMap was reviewed for locations with high crash rates and crash clusters. The data is based on source information from the Pennsylvania Crash Information Tool (PCIT). This is a web-based query tool that pulls together detailed information on reportable crashes. Reportable crashes are classified as incidents that result in an injury or where at least one of the involved vehicles must be towed from the scene. The latest PCIT data is available in One Map for authorized users.

Rear-end, intersection, heavy truck related, curve road, and wet weather related crash clusters are all prevalent in the region. This data was used to help identify sources of congestion and issues along congested corridors, as well as determine potential TSMO solutions to reduce crashes and increase reliability.

## Organizational Issues

Maintenance of existing ITS elements is vital to the success of the Southeastern RTMC and the ITS system throughout the region. This includes performing routine preventative maintenance inspections, fixing problems in a timely manner when they do arise, and ensuring that devices are replaced as they approach the end of their lifecycles.

Training in the operation of ITS equipment is also important. RTMC personnel receive training to operate and gather data from the various ITS devices at their disposal and maintenance personnel should also be familiar with the devices so that they can monitor and diagnose problems in the field.

One major upcoming focus for the Southeastern Region is RTMC staffing. The newly construction RTMC has the capacity for 23 operators per shift in the future, as well as an expanded ITS and traffic signal unit. The ITS projects currently in development, such as the I-76 ICM, I-95 GR-8, US 422 M1B, I-95 CAP, I-476 HSR and others, all include a large number of new devices. Based on a review of ITS and Traffic Signal Operator staffing as part of the new RTMC development and planned ITS and signal integration, it was estimated that a total of 37 operators (based on national recommendations for 1 ITS Operator per 150 devices and 1 Traffic Signal Operator per 300 signals) would be required to provide operations and maintenance of the system on a 24/7 basis in accordance with national best practices on opening day.

## Diagnosing Congestion Sources

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In 2005, FHWA published the original "congestion pie charts," which provided visual representation of the suspected causes of congestion for rural and urban areas. These charts showed that non-recurring

congestion such as traffic incidents and inclement weather account for the large majority of rural congestion, while the largest portion of urban congestion is caused by bottlenecks.

Recently, PennDOT's Traffic Systems and Performance Unit set out to create Pennsylvania-specific pie charts for the different regions, districts, and corridors throughout the state. The goal of the effort is to enhance TSMO congestion management strategies. The various causes of congestion (and their sources/definitions), as determined by PennDOT, are as follows:

- Roadwork: RCRS Roadwork, Maintenance Database, or Waze Roadwork event
- Weather: Inclement weather conditions from RWIS or Waze weather event
- Recurring: Congestion where speed drop is no more than 10% greater than the historical average speed
- Minor Crash: Non-reportable crash from RCRS or Waze
- Other Incident: Non-crash traffic hazard from Waze (i.e. disabled/car stopped on shoulder, hazard on roadway)
- Crash: Reportable crash from the Crash Record System (CRS)
- Unknown: cause could not be identified with current data sources
- Rubbernecking: any previously identified congestion pie chart incident cause is linked to one side of the road, and no incident is correlated to the other side of the road in the same area, but still experiences a speed drop below historical norm

Figure 5 shows the congestion pie chart for the Southeastern Region. This chart is from [PennDOT's Transportation Systems Management and Operations Performance Report, April 2021](#). Data was limited to PennDOT's Core Roadway Network, which is predominantly limited-access, though there are limited signalized areas. Recurring congestions accounts for the largest source of congestion, which is much higher than the statewide average, as expected in urban areas. Roadwork and crashes also account for a large portion of the congestion in the region.

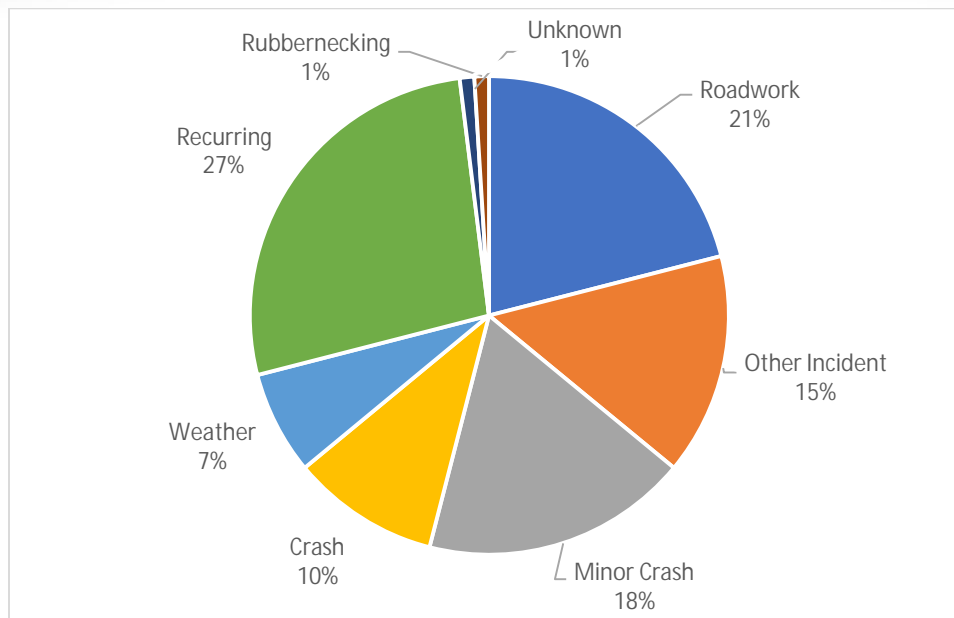


FIGURE 5: 2019 CONGESTION PIE CHART – SOUTHEASTERN REGION

## Recently Completed Projects

Within the Southeastern RTMC region, a number of major transportation projects with significant impact on regional traffic operations have been completed recently.

### Highway Projects

I-95 / PA Turnpike Interchange (Bucks County) – The flyover ramps from I-95 Northbound to I-276 Eastbound and vice versa were opened to traffic in September 2018, providing much needed regional connectivity, reducing traffic on the arterial network and finalizing the critical link to complete I-95 along the eastern seaboard.

### Traffic Signal Projects

Traffic Signal Ownership Transfer (Montgomery County) – PennDOT gained ownership and maintenance of 60 signals along various critical corridors parallel to I-76 in three municipalities. This transfer of ownership from the municipalities to the Department provides PennDOT with an opportunity to remotely control the signal timings during high demand periods such as incidents on I-76. This pilot program was deemed a success by the PennDOT Secretary, enabling the Department to transfer ownership of additional signals in the future.

### ITS Projects

I-76 VSLs (Montgomery County) – Queue detection and variable speed limits (VSL) were deployed on the Schuylkill Expressway (I-76) in Montgomery County in May 2021 in an effort to provide advanced queue warning, homogenize speeds to increase capacity and reduce rear end crashes along the corridor. This is the first phase of the larger integrated corridor management (ICM) project and the first deployment of a

major active traffic management (ATM) system in the District, opening the door to future ICM and ATM projects in the region.

## Planned Infrastructure Changes

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The following provides a sample of some of the currently planned infrastructure changes throughout the region that could have a notable impact on traffic operations based on PA OneMap, DVRPC FY2023 Transportation Improvement Program (TIP), and the Long Range Transportation Plan (LRTP) Connections 2050. Since all of these projects are either in design, construction, or have dedicated funding allocated, they are listed here for reference, but are excluded from the ROP Projects. The largest project by far is the I-95 Reconstruction, including Sectors A, B, C and D all in various stages of planning, design and construction. A map of the different sector limits is provided in Figure 6.

### Under Construction

- I-95, Sector A (Philadelphia) – \$2.7B long-term, multi-phase initiative to rebuild and improve 8 miles of I-95 from I-676 to Cottman Avenue. Sector A includes Sections GIR, CPR, BSR, BRI and AFC, which are broken out into over 40 individual sub-projects with separate MPMS numbers, some of which are completed, some are currently under construction and some are still in development. In addition to reconstructing mainline I-95, interchange ramps, numerous bridges and local arterial improvements, there are traditional ITS devices (such as CCTV cameras under GR8) and early stage ATM strategies. See below for a map of the I-95 Sectors.
- US 1, Section RC2 (Bucks County) – Reconstruction of US 1, including the Neshaminy and Pennel Interchanges.
- US 1, Section H02 (Chester County) – Roadway widening of 2.2 miles of US 1 to 6 lanes from Kennett Square Bypass to Bayard Road in East Marlborough Township.
- US 202, Section 65S (Montgomery County) – Reconstruction and widening from Morris Road to Hancock Road in Upper Gwynedd, Lower Gwynedd, Upper Dublin and Whitpain Townships.
- US 202, Section 61S (Montgomery County) – 2.4 miles of widening to 5 lanes from Johnson to Swede Road in Norristown Borough, East Norriton and Whitpain Townships.
- US 322, Section SP2 (Chester County) – Corridor safety improvements to reduce the high frequency of angle and rear end crashes on the West Chester Bypass in West Goshen Township.
- SR 3013, Section TF2 (Philadelphia) – Island Avenue signal improvements and pavement marking enhancements from Woodland Avenue to Bartram Avenue.
- SR 0073, Section MWT (Montgomery County) – Skippack Pike Signal System Upgrades in Whitpain Township.
- SR 0013, Section SP2 (Philadelphia) – Frankford Avenue corridor safety improvements including traffic signal, pedestrian, signing and pavement marking upgrades from York Street to Morrell Avenue.
- SR 4001, Section SI2 (Philadelphia) – Henry Avenue Congested Corridor Phase 2 Safety Improvements from Ridge Avenue to Roberts Avenue.

In Development

- I-95 Sector B (Philadelphia) – Sector B includes sections CAP and CSP that span approximately 6 miles from Spring Garden Street to the Girard Point Bridge. Over the next 10 years, the two projects plan to improve multi-modal connections by providing a new bridge structure that will span over I-95 and Columbus Boulevard between Chestnut Street and Walnut Street to provide a direct access to the waterfront. Additional TSMO strategies include VSLs and lane control.
- I-95 Sector C (Philadelphia, Delaware County) – Sector C includes the I-95 and US 322 Interchange Improvement and the I-476 Active Traffic Control and Hard Shoulder Running project, as well as some other reconstruction and noise abatement.
- I-76, Section ICM (Montgomery County) – The I-76 Integrated Corridor Management project includes overhead gantries for managed lane control, flex lanes, queue detection and variable speed limits as well as multimodal strategies such as transit traveler information.
- US 422, Sections M1B, M2B, M03, ITS (Chester & Montgomery Counties) – Reconstruction of US 422 from the Schuylkill River to Evergreen Road including bringing lane widths, shoulder widths and acceleration lanes and deceleration lanes up to current standards, and rehabilitation of overhead bridges. Full ITS coverage including CCTV cameras, DMS and arterial parallel corridor signal improvements.
- SR 0001, Section RC1/RC3 (Bucks County) – 3R project to widen and reconstruct the roadway to current design standards. Includes upgrading and relocating existing ITS devices signal improvements, sidewalks and other improvements for pedestrians, investigation of new bus stops and enhanced bus services.
- SEPTA's King of Prussia Rail Project – Proposed extension of the Norristown High Speed Line 4 miles to King of Prussia. Currently in project development including project documentation, identifying funding and applying for Federal Transit Administration's (FTA) Engineering Phase of the New Starts grant program.
- Traffic Signal Ownership Transfer – As noted in the above section, through Act 101 (2016) PennDOT now has authority to own, operate, and maintain traffic signals throughout the Commonwealth. There has been varying levels of interest for expanding the ownership program beyond the initial pilot deployment associated with the I-76 Integrated Corridor Management program.



Source: I-95 Concept of Operations, Jacobs



FIGURE 6: I-95 RECONSTRUCTION MAP

## TSMO Capital Funding Initiative

The TSMO Capital Funding Initiative was introduced in 2018 with the first project awards announced in 2019. This program provides a funding source for TSMO-related projects, including replacement of antiquated ITS devices, new ITS devices, communications system upgrades, and other TSMO efforts. The second round of funding was announced in 2020, including 31 projects statewide totaling \$10 million. The three awarded projects in the Southeastern RTMC Region can be found in Table 7.

TABLE 7: TSMO FUNDING INITIATIVE FFY 2021 PROJECTS

Planning Partner	District	Description	Category
DRVPC	6	Replacement of Antiquated Dynamic Message Signs	Antiquated Devices
DVRPC	6	I-476 Ramp Meter Upgrades	Antiquated Devices
DVRPC	6	Henry Avenue CCTV Cameras	New Devices

## Future Land Use Changes

Future land use changes are regularly monitored by DVRPC and regional County Planning Commissions. For more information on future land use changes, please refer to the following sources:

- [DVRPC Land Use and Environment](#)
- [DVRPC Smart Growth](#)
- [Bucks County Comprehensive Plan 2011](#)
- [Landscapes 3, Chester County's Comprehensive Plan](#)
- [Delaware County 2035](#)
- [Montco 2040 Comprehensive Plan](#)
- [Philadelphia 2035](#)

## Chapter 4. Transportation Needs and Operational Issues

Through evaluation of data and stakeholder engagement, the transportation needs and operational issues of the Southeastern RTMC Region were identified. These issues and needs have been organized into the following six Focus Areas:

- Freeway and Arterial Operations (FA)
- Traffic Incident Management (TIM)
- Traveler Information (TI)
- Communications Network (CN)
- Multimodal Connectivity (MC)

Under each Focus Area, a variety of TSMO solutions and strategies have been identified to help reduce congestion and increase travel reliability. This document is focused on identifying needs and operational issues that do not have any funding allocated; existing projects in construction or design or funded projects on the TIP or LRTP were excluded from these lists. Only potential future corridors or projects with no associated funding are listed below.

### Freeway and Arterial Operations

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Freeways and arterials act as the backbone of the roadway network, transporting the majority of people and goods within and through the region. Reducing congestion and improving traffic flow along these routes is essential to facilitate the region's economic development. A number of TSMO-related strategies are available to improve operations on these important roadways, maximizing throughput and improving the flow of traffic.

### Traffic Signal Improvements

Traffic signals can improve the safety and efficiency of roadway networks for motorists, as well as for transit, cyclists, and pedestrians. However, poor signal timing and/or poor coordination between signalized intersections can negatively impact traffic flow and the effectiveness of the signals.

An important funding mechanism for traffic signal improvements is PennDOT's Green Light-Go. This is a municipal signal partnership program that provides state funds for operational improvements and equipment upgrades at signalized intersections along designated critical corridors of state highways.

Traffic signal funding is also provided by the Automated Red Light Enforcement (ARLE) program, established by Pennsylvania state legislature in 2002. Camera technology is used to monitor and automatically enforce red light running at signalized intersections. The net revenue of this program is then utilized for a state-administered competitive grant program focused on safety improvements, particularly at signalized intersections. Currently, ARLE technology is only installed at a relatively small number of intersections in the Philadelphia area.

Through these funding sources and others, a number of traffic signal improvements can be implemented that provide improvements to traffic flow without roadway widening or other costly improvements.

- Optimization and coordination of signal timing
- Integrating signal systems across adjacent jurisdictions to improve arterial progression

- Adaptive traffic signal control to smoothly adjust timings to account for actual traffic volumes where volumes are less predictable
- Traffic responsive operations for corridors where traffic volumes fall into typical patterns, but the volumes vary daily
- The statewide unified command and control platform allows RTMC operators to remotely alter signal timings during periods of increased demand via fiber optic cable or other network infrastructure.
- Automated Traffic Signal Performance Measures (ATSPMs) use data from traffic signal controllers to analyze and optimize the performance of traffic signals. ATSPMs can reduce the need for manual data collection, increasing the ease and efficiency of deploying improved traffic signal timing.
- Emergency vehicle preemption to halt general traffic movements so that emergency vehicles may pass through
- Removal of unwarranted traffic signals
- Monitoring traffic signals using automated traffic signal performance measures developed from high resolution data logs
- Transit Signal Priority (TSP), which provides special treatment to transit vehicles at signalized intersections

The vast majority of traffic signals in Pennsylvania are currently owned by each individual municipality. This can create issues when operations and maintenance of signals varies along the same corridor that might run through a number of different municipalities. To combat this problem, PennDOT has piloted state ownership of a small number of corridors where they unify signal systems and provide consistent operations and maintenance. Some of the corridors identified as needing signal improvements or other initiatives are:

- US 202 (Section 100), Chester & Delaware Counties
- US 1, Delaware County & City of Philadelphia
- PA 3 (Chestnut Street), City of Philadelphia
- PA 3 (Walnut Street), City of Philadelphia
- PA 3 (West Chester Pike), Delaware County
- US 30 (Lancaster Avenue), Chester County
- US 30 (Girard Avenue), City of Philadelphia
- PA 41 (Gap Newport Pike), Chester County
- PA 73 (Skippack Pike), Montgomery County
- PA 132 (Street Road), Bucks County
- PA 611, Bucks & Montgomery Counties & City of Philadelphia
- Baltimore Pike, Delaware County
- Market Street, City of Philadelphia

## Variable Speed Limits

Variable speed limits, also known as variable speed displays, are posted by variable message speed limit signs. These speed limits can be changed remotely by a traffic management center or automatically in response to congestion, incidents, work zones, or road weather conditions. Variable speed displays may be used to slow vehicles based on weather conditions, prior to entering a work zone, before they enter an area

of slow-moving traffic, or when they are traveling relatively fast based on vehicle density and headways to reduce rear-end collisions and maintain traffic flow.

The following corridors were noted for potential variable speed limit deployments:

- I-676 (Vine Street Expressway), City of Philadelphia
- I-76 (Schuylkill Expressway), City of Philadelphia
- I-95, Delaware County
- US 30, Chester County

## Queue Detection

Queue detection and warning systems alert drivers to downstream slow-moving traffic, especially in cases where the congestion would be unexpected. Queue warnings are typically delivered to motorists through DMS, though some advanced ITS applications involve in-vehicle queue warnings. Queue warning systems can be used in conjunction with portable DMS ahead of work zones with lane closures in effect or other temporary conditions which will cause atypical congestion. Queue warning systems can also be paired with variable speed limits to improve their effectiveness.

- I-676 (Vine Street Expressway), City of Philadelphia
- I-76 (Schuylkill Expressway), City of Philadelphia
- I-95, Delaware County
- US 202 (Section 200), Chester County
- US 422, Chester & Montgomery Counties
- US 30, Chester County

## Flex Lanes

Flex lanes change the use of space within a corridor to accommodate changing travel demand at various times of the day. A number of methods can be used including reversible lanes and contraflow lanes. The discussion in the Southeastern RTMC Region focused on part-time shoulder use, or hard shoulder running, which converts roadway shoulders to travel lanes during specified hours of the day or in response to specified levels of congestion to increase capacity.

To actively manage these types of flex lanes, ITS systems need to be installed, including automatic data collection (traffic volume sensors) and lane assignment gantries. Extensive coordination is also required to ensure that incident response isn't negatively impacted as well as enforcement so that the shoulders are only in use when allowed and safe to travel. Some corridors recommended for flex lanes include:

- I-76 (Schuylkill Expressway), City of Philadelphia
- I-95, Delaware County
- US 422, Chester & Montgomery Counties
- US 30, Chester County

## Managed Lanes

Managed lanes can use either real-time data or a fixed schedule to control the use of individual freeway lanes to move traffic more efficiently in those lanes, including High Occupancy Vehicle (HOV) lanes, High Occupancy Toll (HOT) lanes, Express Lanes, and Truck/Bus lanes. The goal of managed lanes is to increase

vehicle occupancy and/or incentivize off-peak travel by charging tolls which are higher during peak periods. They are most effective for heavy freeway congestion that frequently affects travel time and travel time reliability.

- I-676 (Vine Street Expressway), City of Philadelphia
- I-76 (Schuylkill Expressway), City of Philadelphia
- I-95, Delaware County

## Junction Control

Junction Control regulates or closes specific lanes on a freeway mainline upstream of an interchange where high traffic volumes are present and the relative demand on the mainline and ramps changes throughout the day with different peak times. Junction control is most effective for facilities with underutilized capacity on the mainline lanes upstream of the interchange. Junction control can also be used to provide a two-lane ramp with the left lane merging into the outside lane of the freeway. As an alternative, an additional on-ramp lane can be extended using the shoulder lane. Areas identified for junction control include:

- I-676 (Vine Street Expressway), City of Philadelphia
- I-76 (Schuylkill Expressway), City of Philadelphia
- I-95, Delaware County

## Ramp Metering

Ramp metering is used at on ramps to congested interstates, freeways or expressways to control the merge conflicts. Ramp metering improves highway flow and safety by increasing the space between merging vehicles by controlling ramp traffic with a red/green signal. Some potential corridors to install ramp metering include:

- I-676 (Vine Street Expressway), City of Philadelphia
- I-76 (Schuylkill Expressway), City of Philadelphia
- I-95, Delaware County
- US 202 (Section 200), Chester County
- US 422, Chester & Montgomery Counties

## Dynamic Curve Warning

Dynamic Curve Warning systems provide feedback to individual vehicles approaching a horizontal curve at unsafe speeds. Vehicle speeds are detected upstream of the curve by radar or other ITS devices and trigger a controller that activates electronic sign elements and/or DMS to warn the speeding driver to slow down prior to the curve.

In most cases, Dynamic Curve Warning should be installed only after other, more low-cost, improvements have been installed and have not achieved the desired reduction in crashes. Low-cost improvements would include signage, delineation treatments, high friction surface treatments, and other similar solutions.

Dynamic Curve Warning needs were identified by evaluating curved road crash clusters within PennDOT One Map. The following locations were found to be good candidates for Dynamic Curve Warning:

- I-76 (Schuylkill Expressway), City of Philadelphia
- I-95, Delaware County

- US 202 (Section 200), Chester County
- US 422, Chester & Montgomery Counties
- PA 73 (Skippack Pike), Montgomery County
- US 1 at Adams Avenue, City of Philadelphia

## Integrated Corridor Management

Integrated Corridor Management (ICM) is a strategy to improve the movement of people and goods through institutional collaboration and integration of existing infrastructure along major corridors. Transportation corridors often contain underutilized capacity such as parallel roadways, unoccupied seats in vehicles, and parallel transit services which could be leveraged to maximize person throughput and reduce congestion. ICM implementation includes many of the different Freeway and Arterial Operations strategies previously mentioned, along with Traveler Information, Multimodal Connectivity and interagency coordination.

These types of ICM improvements could be very beneficial on a number of corridors throughout the region, including:

- I-676 (Vine Street Expressway), City of Philadelphia
- I-76 (Schuylkill Expressway), City of Philadelphia
- I-95, Delaware County
- US 202 (Section 200), Chester County
- US 422, Chester & Montgomery Counties

## Traffic Incident Management

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The ability to detect, verify, and respond to incidents throughout the regional transportation system is vital to maintain operations and minimize the impact of incidents. The central objective of traffic incident management is to improve the safety of emergency responders, crash victims, and other motorists. Additionally, good Traffic Incident Management reduces the duration and impacts of traffic incidents. Improved management of incidents can improve safety as well as mobility.

### TIM Task Forces

Traffic Incident Management (TIM) is a multi-agency, coordinated effort to minimize the impact of traffic incidents so that traffic flow can be restored as safely and quickly as possible. TIM requires planning and coordination between multiple entities, including local transportation departments, law enforcement, fire departments, emergency medical services, towing and recovery companies, and hazardous materials clean-up contractors. Each entity has its own diverse priorities and cultures that need to be addressed through a unified set of TIM strategies to better interagency coordination and training. A successful TIM Task Force can lead to reduced incident response cost, decreased travel delay, and improved safety through faster, better organized incident clearance.

Pennsylvania Traffic Incident Management Enhancement (PennTIME) was organized in 2017 as a statewide organization to provide structure, guidance, and consistency to incident management efforts throughout the commonwealth. More information can be found at [www.penntime.org](http://www.penntime.org).

The Southeastern RTMC region currently has five established incident management task forces (IMTF) [managed by the DVRPC](#). Additional support and resources for all five teams has been identified as a need in the region:

- Bucks County IMTF
- Chester County IMTF
- Delaware County IMTF
- Montgomery County IMTF
- Philadelphia IMTF

## Freeway Service Patrols

Freeway service patrols (FSP) involve roving tow trucks systematically patrolling freeways and providing free assistance to motorists. FSP can provide basic services such as towing, jump starts, furnishing fuel, and flat tire repair for disabled vehicles. FSP assistance can clear minor incidents from travel lanes to quickly reopen the roadway and minimize congestion and risk of secondary crashes. For major incidents, FSP can deploy temporary traffic control devices to divert traffic around incidents and increase safety at the scene prior to arrival of emergency services.

Currently, FSP operates on all the major limited access roadways in the region during peak hours. The Pennsylvania Turnpike Commission (PTC) also has their own FSP program, sponsored by Geico, covering the Turnpike roadways in the region. Expanded coverage areas on additional roadways and/or additional hours of operation of existing freeway service patrols was identified as a need. Existing freeway service patrol include:

- PA Turnpike (I-276/I-76/I-476)
- I-76
- I-95 / I-295
- I-476
- I-676
- US 1
- US 30
- US 202
- US 422
- PA 309

## Emergency Access Points

Emergency access points are supplemental ramps onto limited access freeways and expressways exclusively for emergency responder use during an incident. These emergency access points are beneficial in decreasing emergency response times and reducing the duration and impact of traffic incidents. They are most applicable in areas with major congestion due to crashes and roadways with narrow shoulders and long interchange spacing. Potential corridors include:

- US 422, Chester & Montgomery Counties
- PA 309, Montgomery County

## Median Gates

Median gates are movable gates that separate two-directional traffic at a median point. The gates can be remotely or physically opened during a major incident that closes the roadway for an extended period to allow traffic to turn around and exit and/or allow emergency responders to approach an incident from the opposite direction. Applicable locations could include limited access roadways with major congestion, high crash locations and long interchange spacing with no crossovers. One potential roadway is:

- I-476, Delaware County

## Ramp Management Gates

Ramp management gates are different than ramp meters in that they are only used during major incidents to remotely control, or prohibit, access to the freeway or expressway. Potential areas to install ramp management gates include roadways with a history of extended closures, with long interchange spacing, and no medians to turn traffic around. One potential use case could be for roadway flooding:

- I-76, Montgomery County

## Digital Alert System

Using responder-to-vehicle (R2V) technology, a digital alert system allows emergency responders and roadside workers to automatically alert nearby motorists of their position. A transponder with GPS in the emergency vehicle will turn on automatically when the vehicle's emergency lights are activated, providing messages to motorists in their vehicle through traveler information systems, navigation providers, smartphone apps or a connected vehicle on-board unit (OBU). Increasing the time and distance a motorist is aware of incident responders can provide them with greater opportunities to move over and slow down. This is currently being used on the PA Turnpike and in PennDOT District 11-0.

- Responder to Vehicle (R2V) digital alert system

## Traveler Information

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Traveler information is vital to improving the efficiency of the transportation system. When drivers are notified of real-time operating conditions, they can make informed decisions. This leads to a better distribution of traffic across the roadway system and maximizes efficiency. Timely information can also keep queues from continuing to build when closures occur due to crashes or weather conditions, increasing safety for all road users.

The focal point of traffic operations and traveler information dissemination for the Southeastern Region is the Southeastern RTMC, located at the PennDOT District 6-0 office in King of Prussia. Through the Southeastern RTMC, travelers can be informed of roadway conditions, incidents and crashes, construction and maintenance activities, and weather conditions. Southeastern RTMC operators utilize DMS to disseminate this traveler information. In addition, the information is also distributed via the 511 Pennsylvania Traveler Information System (511PA) website and smart phone application.

In recent years, the distribution of traveler information from third party developers has greatly increased. Now many drivers use apps such as Waze as part of their daily commuting habits. Despite this development, ITS devices still provide an easy and widely used source of traveler information.



## ITS Device Gaps or Replacements

Along the region's interstates, freeways and expressways, an array of traveler information devices has already been installed and a network of CCTV cameras provides the RTMC with reliable situational awareness. In the District 6-0 region, some ITS device gaps still exist along the limited access roadway network, but the larger need is for arterial ITS deployments on parallel corridors and pre-entry locations or antiquated ITS infrastructure replacements.

- Locations to be determined as needed

## TMC Operations

With the increasing number of ITS devices, the traffic signal ownership transfer and the added capacity of the newly completed Southeastern RTMC building, additional staffing is the number one need in the District. During the development of the Concept of Operations for the new Southeastern RTMC staffing projections were completed based on recommendations in the Statewide Traffic Operations Assessment and Regional Traffic Signal Operations Guidance and Process Document. Those projections indicated that, in order to operate a 24/7 RTMC assuming the ITS and integrated traffic signal growth projections based on programmed projects, approximately 70 staff will be required to operate and maintain the system on an ongoing basis (projected estimate in 2030 including supervisors, operators, maintenance and IT support, based on RTMC Systems Engineering Report staffing projections).

- District 6-0 RTMC Staffing

## Transit Traveler Information

Transit traveler information is intended to enable current or potential travelers to make better informed decisions about the route they take, the time they leave, and especially, the mode they choose. Useful information can include real-time transit vehicle arrival times, travel times, routes and schedules, alerts and parking availability to encourage multimodal use. Potential areas for deployment include areas with transit running parallel to a major corridor that could provide an alternate mode of transportation during major congestion, such as:

- US 1, Delaware County & City of Philadelphia
- PA 611, Bucks & Montgomery Counties & City of Philadelphia
- US 30, Chester County & City of Philadelphia
- PA 309, Montgomery County

## Truck Parking

Truck parking is a major issue not unique to the Southeastern region. Across Pennsylvania and the Mid-Atlantic, the lack of available truck parking causes unnecessary congestion and safety concerns and the problem will only become more challenging as our reliance on goods movement continues to grow. Areas identified for further study, development of additional truck parking facilities and/or traveler information of parking availability are based on the Major Truck Bottlenecks on PA OneMap and information from the [PA 2045 Freight Movement Plan](#) and the [Truck Parking in PA Final Report, Dec 2007](#):

- I-95, Delaware County & City of Philadelphia
- I-76, Montgomery County & City of Philadelphia
- I-476, Delaware & Montgomery Counties

## Communications Network

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In order to best operate many of the ITS devices and traffic signals needed throughout the region, a robust communications network is required.

### Fiber Network

A fiber optic backbone currently exists along many of the interstates, freeways and expressways in District 6-0 with HUB locations strategically placed to integrate field devices, connect corridors, and provide a diverse and resilient communications network. As part of an ongoing project, the District is upgrading the communications network switches in each hub cabinet to provide Layer 3 networking capabilities. This upgrade will provide for additional network reliability and scalability in the future. An ongoing priority for the region is to expand the fiber network to increase reliability, speed and quality of the communications, especially as more traffic signals are connected to the PennDOT network and monitored and controlled by the RTMC. The following corridors have been identified as regional fiber network needs:

- I-76 Adjacent Arterials, Montgomery County & City of Philadelphia
- PA 3 (West Chester Pike), Delaware County
- US 30 (Lancaster Avenue), Chester County
- PA 73 (Skippack Pike), Montgomery County
- Baltimore Pike, Delaware County

## Multimodal Connectivity

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The core philosophy of TSMO is to maximize the existing roadway capacity available to improve operations. With that in mind, enhancing non-single occupant vehicle mode choices can provide significant improvements. In addition to improving congestion, multimodal investment can also decrease fuel consumption, minimize the impacts of emissions thereby improving air quality, and provide economic development through an equitable transportation network.

In order for modes of transportation to be successful, connectivity between each mode should be safe, efficient, and convenient. Transportation alternatives include walking, bicycling, rail, bus transit, carpooling, vanpooling, and other options.

In recent years, on-demand transportation options have grown. This new growth in shared mobility includes the Indego bike share in Philadelphia. Transportation Network Companies (TNCs) such as Uber and Lyft provide ride-hailing services which can replace personal vehicle trips but also have detrimental effects on transit ridership and congestion. Other shared mobility options have become popular in cities throughout the country and could come to the region in the future, including dockless networks of shared bikes and scooters.

The City of Philadelphia and SEPTA are major partners in multimodal connectivity. There is enormous opportunity for multimodal transportation hubs centered around regional rail stations, major subway stops or bus terminals. While there is no shortage of transit needs in the Greater Philadelphia area, the following multimodal strategies were identified for this ROP:

- Systematic expansion of bike lanes
- Implementation of additional dedicated bus lanes

- Identification and expansion of park and ride locations
- Continued construction of The Circuit Trails as well as sidewalks, crosswalks and ramps
- Actively management connections routes ie. signalized corridors that lead to SEPTA stations

## Operational Teamwork/Institutional Coordination

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Teamwork and coordination amongst the various transportation agencies and other entities in the region are vital to ensure a well-functioning transportation system. TIM Task Forces, as mentioned above, are a great example of the type of interdisciplinary collaboration that can develop from these partnerships. Currently, there are plans to integrate with SEPTA to provide traveler information on travel times to Center City comparing vehicle to rail. In addition, there are opportunities to coordinate efforts between PennDOT and the PA Turnpike Authority on TSMO strategies, data collection efforts and special events.

Another example of this type of teamwork and coordination can be found in the ITS Architecture update processes. This involved a highly cooperative effort between transportation agencies representing all the region's transportation modes. The overarching framework developed through this process provides a glimpse at the various ITS-related relationships that span the region and all of the stakeholder agencies. The latest ITS Architecture for the Southeastern Region can be found online here:

[Regional ITS Architecture for the Delaware Valley](#)

These collaborative relationships and documents should continue to be maintained as they provide a multitude of positive impacts on transportation operations and safety in the region. An updated ITS Architecture for the Southeastern Region should be considered to reflect the different stakeholders and technology which have emerged since this last update.







As the implementation of ICM strategies continues to progress, it is especially important to coordinate with other regional agencies such as the City of Philadelphia Department of Streets, PA Turnpike, SEPTA, NJ Transit, DelDOT, NJDOT, DCRPC, DRPA, DRJTBC, 911 Centers and County Office of Emergency Management (OEM). The need for network interconnectivity to share information and access data will only increase as we promote multimodal connectivity.

## Chapter 5. Strategies and Projects

### ROP Projects

Based on the Transportation Issues and Operational Needs identified in the previous chapter, a set of projects that are currently unfunded were developed for inclusion in this Regional Operations Plan. Once the types of congestion were identified and classified for each area, the most appropriate TSMO tools and strategies were determined, thereby developing projects. The TSMO Guidebook includes the following table, which provides a matrix for matching tools and strategies with the varying types of congestion.

TABLE 8: TSMO SOLUTION APPLICABILITY

TSMO Solution	Causes of Congestion					
	Recurring Congestion		Unplanned Events		Planned Events	
	Bottlenecks 	Poor Signal Timing 	Traffic Incidents 	Inclement Weather 	Work Zones 	Special Events 
Bridge De-icing				X		
Closed Circuit TV Cameras (CCTV)	X		X	X	X	X
Dynamic Curve Warning			X	X		
Dynamic Message Signs (DMS)	X		X	X	X	X
Dynamic Rerouting	X		X		X	X
Flex Lanes	X		X		X	X
Freeway Service Patrols			X		X	X
Integrated Corridor Management	X	X	X	X	X	X
Junction Control	X		X		X	X
Managed Lanes	X					
Queue Warning	X		X		X	X
Ramp Metering	X		X			X
Road Weather Info. Systems (RWIS)				X		
Smart Corridor Initiatives	X	X	X	X	X	X
TIM Teams			X			X
Traffic Incident Detection			X			
Traffic Management Center	X	X	X	X	X	X
Traffic Signal Enhancements		X				
Transit Signal Priority		X				
Traveler Information	X		X	X	X	X
Variable Speed Displays	X		X	X	X	

A number of the strategies in the above table were included as part of the projects in this ROP, including:

- Closed Circuit TV Cameras (CCTV)
- Dynamic Message Signs (DMS)
- Dynamic Curve Warning

- Flex Lanes
- Freeway Service Patrols
- Integrated Corridor Management
- Junction Control
- Managed Lanes
- Queue Warning
- TIM Teams
- Traffic Management Center
- Traffic Signal Enhancements
- Transit Signal Priority
- Traveler Information
- Variable Speed Displays

In addition to the strategies outlined above, other multimodal tools and strategies were also identified and included in ROP projects, including the following:

- Emergency Access Points
- Median Gates
- Ramp Management Gates
- Digital Alerting System
- Truck Parking

In total, 36 projects that are currently unfunded were identified for inclusion in this document, spanning the entire Southeastern RTMC Region. With such a diverse set of needs areas and project types, prioritization by a simple metric would be difficult. Therefore, in addition to the operational and safety data utilized to develop and evaluate projects, stakeholder input was utilized to help differentiate between high priority projects and medium priority projects.

Table 9 summarizes the high priority projects while Table 10 summarizes the medium priority projects. Maps of the projects are provided in Appendix B. For further detail on each project, please refer to the summary sheets in Appendix C.

TABLE 9: HIGH PRIORITY PROJECTS

Project #	Project	Priority Area	Stakeholders	Planned Improvements
CN.01	Battery Backup System for Communications Hub	Communications Network	PennDOT District 6-0, DVRPC	Install battery backup system for communications hub to provide resiliency during major storms and other power outages
FA.01	I-676 (Vine Street Expressway) Active Traffic Management	Freeway and Arterial Operations	City of Philadelphia, PennDOT District 6-0, DVRPC	Implementation of appropriate active traffic management and other operational strategies
FA.02	I-76 Philadelphia Active Traffic Management	Freeway and Arterial Operations	City of Philadelphia, PennDOT District 6-0, DVRPC	Part time shoulder use and other operational strategies
FA.03	I-95 Delaware County Active Traffic Management	Freeway and Arterial Operations	Delaware County, PennDOT District 6-0, DVRPC	Part time shoulder use and other operational strategies
FA.04	US 202 (Section 200) Active Traffic Management	Freeway and Arterial Operations	Chester County, PennDOT District 6-0, DVRPC	Implementation of appropriate active traffic management and other operational strategies
FA.05	US 422 Active Traffic Management	Freeway and Arterial Operations	Chester County, Montgomery County, PennDOT District 6-0, DVRPC	Part-time shoulder use, emergency access points and other operational strategies
FA.06	US 1 (Roosevelt Boulevard) from Broad Street to Bensalem Township	Freeway and Arterial Operations	City of Philadelphia, PennDOT District 6-0, DVRPC	Operational improvements and TSMO enhancements
FA.07	I-76 ITS Enhancements on Adjacent Arterials	Freeway and Arterial Operations	Montgomery County, City of Philadelphia, PennDOT District 6-0, DVRPC	Install arterial CCTV, DMS, Fiber Communications and traffic signal enhancements at strategic locations on parallel corridors to support to I-76 ICM
FA.08	District 6-0 RTMC Staffing	Freeway and Arterial Operations	PennDOT District 6-0, DVRPC	Additional RTMC staffing to support increased ITS deployments and traffic signal operation and maintenance responsibilities
FA.09	Queue Warning and Variable Speed Limits	Freeway and Arterial Operations	PennDOT District 6-0, DVRPC	Deployment of queue warning and variable speed limits at spot locations on freeways and expressways, including works zones
FA.10	Ramp Metering	Freeway and Arterial Operations	PennDOT District 6-0, DVRPC	Deployment of ramp metering system at on ramps to congested interstates, freeways, or expressways to control the merge conflicts
FA.11	Dynamic Curve Warning	Freeway and Arterial Operations	PennDOT District 6-0, DVRPC	Deployment of dynamic curve warning system at spot locations on interstates, freeways, expressways or principal arterials
FA.12	ITS Gaps Along Freeways or Expressways	Freeway and Arterial Operations	PennDOT District 6-0, DVRPC	Expand coverage of CCTV, DMS, TT Detectors, Fiber Communications along regional freeways and expressways

Project #	Project	Priority Area	Stakeholders	Planned Improvements
FA.13	Antiquated ITS Infrastructure Replacements	Freeway and Arterial Operations	PennDOT District 6-0, DVRPC	Replace antiquated ITS infrastructure at locations TBD
MC.01	Multimodal Connections	Multimodal Connectivity	PennDOT District 6-0, DVRPC, SEPTA	Bike lanes, bus lanes, park and rides, transit signal priority, actively managed connection routes (eg. signal corridors that lead to SEPTA stations)
TI.01	Transit Traveler Information	Traveler Information	PennDOT District 6-0, DVRPC	Provide transit traveler information such as next train arrival, travel time, parking availability or bus schedules to encourage multimodal use
TIM.01	Freeway Service Patrol	Traffic Incident Management	PennDOT District 6-0, DVRPC	Expand coverage areas and/or hours of operation of existing freeway service patrols
TIM.02	Incident Management Task Forces	Traffic Incident Management	PennDOT District 6-0, DVRPC	Additional support for 5 county Traffic Incident Management (TIM) Teams
TIM.03	Digital Alert System for Emergency Response	Traffic Incident Management	PennDOT District 6-0, DVRPC	Deploy R2V technology to allow emergency responders and roadside workers to automatically alert nearby motorists of their position.
TIM.04	Ramp Management Gates	Traffic Incident Management	PennDOT District 6-0, DVRPC	Install ramp management gates at strategic locations on freeways and expressways to remotely control the flow of traffic during events
TIM.05	Freeway Emergency Access Points	Traffic Incident Management	PennDOT District 6-0, DVRPC	Construct emergency access points along regional freeways and expressways to improve incident response times
TIM.06	Median Gates	Traffic Incident Management	PennDOT District 6-0, DVRPC	Install median gates along freeways and expressways for incident management

TABLE 10: MEDIUM PRIORITY PROJECTS

Project #	Project	Priority Area	Stakeholders	Planned Improvements
FA.14	US 202 (Section 100) TSMO Enhancements	Freeway and Arterial Operations	Chester County, Delaware County, PennDOT District 6-0, DVRPC	Improve operational efficiency, deployment of TSMO strategies, including traffic signal improvements
FA.15	US 1 TSMO Enhancements	Freeway and Arterial Operations	Delaware County, City of Philadelphia, PennDOT District 6-0, DVRPC	Deployment of TSMO strategies, ICM, Multimodal Connections, Transit Traveler Information, transit signal priority, traffic signal enhancements
FA.16	PA 3 (Chestnut Street) TSMO Enhancements	Freeway and Arterial Operations	City of Philadelphia, PennDOT District 6-0, DVRPC	Deployment of TSMO strategies, ICM, Multimodal Connections, Transit Traveler Information, transit signal priority, traffic signal enhancements

Project #	Project	Priority Area	Stakeholders	Planned Improvements
FA.17	PA 3 (Walnut Street) TSMO Enhancements	Freeway and Arterial Operations	City of Philadelphia, PennDOT District 6-0, DVRPC	Deployment of TSMO strategies, ICM, Multimodal Connections, Transit Traveler Information, transit signal priority, traffic signal enhancements
FA.18	PA 3 (West Chester Pike) TSMO Enhancements	Freeway and Arterial Operations	Delaware County, PennDOT District 6-0, DVRPC	Deployment of TSMO strategies, including traffic signal enhancements add fiber and connect to RTMC for remote monitoring
FA.19	US 30 (Lancaster Avenue) TSMO Enhancements	Freeway and Arterial Operations	Chester County, PennDOT District 6-0, DVRPC	Deployment of TSMO strategies, including traffic signal enhancements add fiber and connect to RTMC for remote monitoring
FA.20	US 30 (Girard Avenue) TSMO Enhancements	Freeway and Arterial Operations	City of Philadelphia, PennDOT District 6-0, DVRPC	Deployment of TSMO strategies, including traffic signal enhancements
FA.21	PA 41 (Gap Newport Pike) TSMO Enhancements	Freeway and Arterial Operations	Chester County, PennDOT District 6-0, DVRPC	Deployment of TSMO strategies, including truck traffic improvements
FA.22	PA 73 (Skippack Pike) TSMO Enhancements	Freeway and Arterial Operations	Montgomery County, PennDOT District 6-0, DVRPC	Deployment of TSMO strategies, including traffic signal enhancements add fiber and connect to RTMC for remote monitoring
FA.23	PA 132 (Street Road) TSMO Enhancements	Freeway and Arterial Operations	Bucks County, PennDOT District 6-0, DVRPC	Deployment of TSMO strategies, including traffic signal enhancements
FA.24	Baltimore Pike TSMO Enhancements	Freeway and Arterial Operations	Delaware County, PennDOT District 6-0, DVRPC	Deployment of TSMO strategies, including traffic signal enhancements, add fiber and connect to RTMC for remote monitoring
FA.25	Market Street TSMO Enhancements	Freeway and Arterial Operations	City of Philadelphia, PennDOT District 6-0, DVRPC	Deployment of TSMO strategies, ICM, Multimodal Connections, Transit Traveler Information, transit signal priority, traffic signal enhancements
FA.26	ITS Gaps/Enhancements on Adjacent Arterials and Parallel Corridors	Freeway and Arterial Operations	PennDOT District 6-0, DVRPC	Expand arterial ITS and fiber communications networks
TI.02	Truck Parking	Traveler Information	PennDOT District 6-0, DVRPC	Study of truck parking needs and/or development of additional truck parking facilities, traveler information of parking availability

## Studies/Initiatives

No specific studies and initiatives were identified during this round of ROP discussions.



## Other ROP Considerations

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During the development of this ROP, other issues and needs were discussed during the stakeholder process that were not included in this latest update. These other potential projects are included in list of congested corridors in the [2019 CMP](#) or other planned projects on the [FY2023 TIP](#) or the [Connections 2050 LRTP](#). See Appendix D for a list of projects currently on the TIP that include TSMO components in development or programmed with identified funding sources. If priorities, scopes or funding availability changes, it is recommended to review those lists (or their updated versions) as this document gets updated.

## Chapter 6. ROP Coordination and Maintenance

### Coordination and Maintenance

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The first Regional Operations Plans in Pennsylvania were published in 2007. These led to the implementation of a number of successful ITS projects and other operational improvements. Since then, a lot of progress has been made, but the plans have not been updated to keep up with changing needs and priorities.

It is intended that this process of updates should be continued every four years for the Southeastern RTMC Region. Each update should include the status of any previous ROP projects, in addition to the discussion of current issues and needs, and the resulting additional projects to mitigate those issues and needs. An interim update should also be considered for two years after each full ROP is completed. Therefore, the ROP would be refreshed every other year, aligning with the TIP update schedule. The ROP schedule should be aligned so that it is published in the year prior to TIP updates, so that the ROP can be incorporated into the development of the TIP. Aligning the ROP with the region's L RTPs would be ideal.

A Congestion Management Process (CMP) is a document that DVRPC develops for this region and updates on a regular basis. The 2019 CMP was used heavily to identify congested corridors and develop objectives-driven, performance-based recommendations for improvements. Identified CMP locations should be added as a layer to One Map for easier collaboration.

More robust mapping, either through One Map, an online GIS based system, or another alternative, was identified by the stakeholders as a need moving forward. The ability to pull in different data sources from PennDOT and DVRPC and toggle on and off safety data, congestion locations, existing infrastructure and planned projects would be extremely helpful when identifying needs, recommending improvements and programming and prioritizing future projects.

Additionally, in order to maximize the success of the ROP, further funding sources for TSMO projects should be pursued. Ideally, dedicated line items for TSMO funding and ITS maintenance would be added to the L RTP and TIP processes. Funding replacement of antiquated ITS devices via the Interstate TIP should be strongly considered as these devices provide important and cost-effective improvements to the interstate system.

TSMO should also be included within the project scoping checklist. This way, ROP projects can be incorporated into larger construction projects occurring in the areas recommended within this plan. To help ensure continuity of the recommendations included in this report, it is hoped that each of the region's partners will formally adopt this ROP and the recommendations included herein. Finally, the ITS projects recommended in this document should be considered for PennDOT's statewide Device Deployment Plan compiled each year.

### Emerging Transportation Trends

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Connected and autonomous vehicles were generally not accounted for within this report. Despite its ongoing presence in the news and the very real advancements occurring, too much remains unknown with the future of these technologies. As this plan is revisited for future updates, the issue of regional planning

for connected and autonomous vehicles should be examined again. Any guidance provided by PennDOT and other stakeholders should be incorporated into future updates of this document.

Another transportation trend not discussed in detail elsewhere in this plan is the rise of micromobility. This includes traditional bike share systems, but also emerging technology such as e-assist bicycles, electric scooters, and electric skateboards. Electric scooters in particular have seen a rapid rise in usage in other American cities though they are currently not allowed by law in Pennsylvania. In future ROP updates, these types of mobility options will likely need to be considered as the transportation environment and the laws guiding it evolve.

## Appendix A. Meeting Minutes

<b>Agreement # / Name</b>	<b>E04989, Work Order 4 / DTMC ITS Support 2021-2025</b>
<b>Project</b>	<b>Southeastern RTMC Region ROP</b>
<b>Meeting Name</b>	<b>Kick Off Meeting</b>
<b>Date / Time / Location</b>	<b>09-06-2022 / 11:00 AM-12:00 PM / PennDOT District 6-0</b>
<b>Attendees</b>	<b>See Sign-in Sheet</b>

**Meeting Purpose:** Initial meeting of the PennDOT District 6-0 stakeholder group.

Meeting Minutes:	Action Items:
<ul style="list-style-type: none"> <li>➤ Welcome and Introductions               <ul style="list-style-type: none"> <li>• A sign in sheet was passed around.</li> <li>• The attendees gave verbal introductions.</li> <li>• Frank Cavataio welcomed everyone and gave an overview of the project.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>➤ Rachel will send Pierce and Frank pictures of past ROP meetings</li> </ul>
<ul style="list-style-type: none"> <li>➤ Southeastern ROP Scope               <ul style="list-style-type: none"> <li>• The ROP document will be updated every 4 years with a mid-cycle update every 2 years. New projects can be (and should be) added to the ROP in order to receive funding.</li> <li>• After the ROP is complete, the projects will be added to OneMap.</li> <li>• Central Office would like to incorporate analytics with before and after studies on how the TSMO strategies improved operations of the top priority projects.</li> </ul> <p>What gets included in the ROP?</p> <ul style="list-style-type: none"> <li>• The ROP is a needs identification document.</li> <li>• The ROP does not provide funding.</li> <li>• The ROP should only include projects that will realistically happen in the next 4 years.</li> <li>• Projects should be TSMO related, focused on operations and staffing (as opposed to safety specific).</li> <li>• Any/all projects that need funding must be included, but inclusion in the document does not guarantee funding.</li> <li>• Existing projects or projects that are already funded and on the TIP will be included in the appendix.</li> <li>• Map of communications network?</li> <li>• A map of needs and projects is best way to communicate info (as opposed to reading 100 page document).</li> <li>• The projects are then prioritized into high, medium and low priority. This was previously done via stakeholder consensus.</li> <li>• Commonwealth gets \$4M in federal funds for</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>➤ Contact Pierce Sube if access to TSMO layers in OneMap is needed</li> </ul>

<p>Interstate ITS. In order to use those funds, the projects must be included in the ROP. There is no match required.</p> <ul style="list-style-type: none"> <li>• TFI is \$10M over 2 years that requires a 50% match from the District.</li> <li>• Pierce Sube can add access to the TSMO layers in OneMap for any of the project team that is interested in getting access to that data</li> </ul>	
<ul style="list-style-type: none"> <li>➤ DVRPC Connections 2050 (and other plans) <ul style="list-style-type: none"> <li>• DVRPC's 2019 Congestion Management Process (CMP) <ul style="list-style-type: none"> <li>○ Best place to start, it defines the 'problem areas', but does not list specific projects.</li> <li>○ Could use the top 10 or 20 congested corridors or segments to define projects, determine scopes and estimates.</li> <li>○ Kickoff meeting to update the plan scheduled for Sept 20<sup>th</sup> at 10am</li> </ul> </li> <li>• DVRPC's Long Range Plan (LRP) Connections 2050 <ul style="list-style-type: none"> <li>○ Also include info from LRP, but may need to add more detail</li> </ul> </li> <li>• Transportation Improvement Program (TIP) <ul style="list-style-type: none"> <li>○ The projects that are fully funded will be included in the appendix</li> <li>○ The draft 2023 TIP is out for comment now</li> </ul> </li> <li>• PennDOT's ITS Master Plan <ul style="list-style-type: none"> <li>○ Lists existing, programmed, and future projects</li> </ul> </li> <li>• Existing ROP (2007) <ul style="list-style-type: none"> <li>○ Any projects that haven't been implemented yet that are still a priority?</li> </ul> </li> <li>• Future need to update Pennsylvania's ITS Architecture <ul style="list-style-type: none"> <li>○ Existing plan hasn't been updated in years</li> <li>○ Each project has a system architecture</li> <li>○ Flows have changed, new projects, infrastructure, and connections have been added</li> <li>○ Update could include signals and CV</li> </ul> </li> <li>• Outreach to City needed?</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>➤ Jacobs will work with DVRPC to review existing documents and available resources to start identifying needs and projects <ul style="list-style-type: none"> <li>○ Meeting with Jacobs and DVRPC scheduled for 9/20/22 @1pm</li> </ul> </li> <li>➤ PennDOT will send DVRPC a link to the fiber network mapping</li> <li>➤ Participants will contact Peirce for OneMap or SharePoint access</li> <li>➤ DVRPC will invite these attendees to the CMP kickoff meeting 9/20/22 @10am</li> </ul>
<ul style="list-style-type: none"> <li>➤ Draft Schedule <ul style="list-style-type: none"> <li>• The schedule for completing the Southeastern ROP will be finalized after the project scope is updated.</li> <li>• It will likely be completed in Spring 2023 (8 or 9 months).</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>➤ Jacobs will work with Central Office to update the project scope and schedule</li> </ul>
<ul style="list-style-type: none"> <li>➤ Wrap Up / Next Steps</li> </ul>	<ul style="list-style-type: none"> <li>➤ Jacobs will prepare and distribute meeting minutes</li> <li>➤ Jacobs will send doodle poll for next meeting, mid-Oct</li> </ul>

<b>Agreement # / Name</b>	<b>E04989, Work Order 4 / DTMC ITS Support 2021-2025</b>
<b>Project</b>	<b>Southeastern RTMC Region ROP</b>
<b>Meeting Name</b>	<b>Follow Up Meeting</b>
<b>Date / Time / Location</b>	<b>10-17-2022 / 10:30 AM-12:30 PM / PennDOT District 6-0</b>
<b>Attendees</b>	<b>Rachel DePan, Steve Cunningham, Elizabeth Coffey, Jay Ruit, Frank Cavataio, Pierce Sube, Tom Edinger, Justin Neff, Chris King, Dave Adams, Manny Anastasiadis</b>

**Meeting Purpose:** Initial meeting of the PennDOT District 6-0 stakeholder group.

Meeting Minutes:	Action Items:
<ul style="list-style-type: none"> <li>➤ Welcome and Introductions           <ul style="list-style-type: none"> <li>• Rachel reminded the group that the purpose and need of the ROP is to identify important TSMO related projects in the region that are currently unfunded and gave an overview of what types of projects should be included:               <ul style="list-style-type: none"> <li>○ Projects that require funding</li> <li>○ TSMO-related</li> <li>○ Can be implemented in 4 years</li> <li>○ 20-25 Short Term / High Priority</li> <li>○ 20-25 Long Term / Recommended Projects</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>➤</li> </ul>
<ul style="list-style-type: none"> <li>➤ Draft List of Potential Projects           <ul style="list-style-type: none"> <li>• Jacobs started a draft list of projects, ideas congested corridors, and bottleneck intersections with input from DVRPC, based on a review of multiple sources:               <ul style="list-style-type: none"> <li>○ <a href="#">Existing D6 ROP (2007)</a></li> <li>○ <a href="#">Connections 2050 LRP</a></li> <li>○ <a href="#">2019 CMP</a></li> <li>○ <a href="#">OneMap</a></li> <li>○ <a href="#">DVRPC Transportation Operations Master Plan</a></li> <li>○ <a href="#">Draft FY2023 TIP</a></li> <li>○ Stakeholder Input</li> <li>○ I-76 ITS Enhancements on Adjacent Arterials SER</li> </ul> </li> <li>• The next step is to turn the ideas and corridors into projects, add any additional projects, and then prioritize list.</li> <li>• The group would like to have input from the Counties, but the compressed schedule is not conducive to scheduling individual meetings. DVRPC's LRP and CMP should cover many of the high priority areas within each county. Jacobs will also review each County's LRP to see if any vital projects are missing.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>➤ PennDOT just wants this to move forward and has a tight deadline, move forward without involving counties</li> <li>➤ See if there are corridors with multiple noted intersections, which would then make that corridor more of a priority</li> </ul>

<ul style="list-style-type: none"> <li>• The group reviewed the list of projects, ideas, congested corridors and bottleneck intersections line by line and evaluated if they should be considered high priority, medium priority or not included on this iteration of the ROP. It was decided to not include any of the isolated intersections.</li> <li>• In general, Manny thinks the focus should be on equipping parallel arterial corridors and detour routes with fiber and ITS devices.</li> </ul>	
<ul style="list-style-type: none"> <li>➤ Draft Schedule             <ul style="list-style-type: none"> <li>• The schedule for completing the Southeastern ROP will be finalized after the project scope is updated.</li> <li>• It will likely be completed in Spring 2023</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>➤ Jacobs will work with Central Office to update the project scope and schedule</li> </ul>
<ul style="list-style-type: none"> <li>➤ Wrap Up / Next Steps             <ul style="list-style-type: none"> <li>• Jacobs will clean up and organize the project list, cross reference with major parallel corridors to identify any missing links, and provide more defined project scopes. The list will be distributed to the Stakeholders for additional feedback.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>➤ Jacobs will prepare and distribute meeting minutes</li> <li>➤ Jacobs will send doodle poll for next meeting in Nov/Dec.</li> </ul>



<b>Agreement # / Name</b>	<b>E04989, Work Order 4 / DTMC ITS Support 2021-2025</b>
<b>Project</b>	<b>Southeastern RTMC Region ROP</b>
<b>Meeting Name</b>	<b>Southeastern ROP Stakeholder Meeting</b>
<b>Date / Time / Location</b>	<b>01-12-2022 / 10:30 AM-12:00 PM / PennDOT District 6-0</b>
<b>Attendees</b>	<b>Rachel DePan, Steve Cunningham, Elizabeth Coffey, Jay Ruit, Frank Cavataio, Pierce Sube, Tom Edinger, Justin Neff, Chris King, Dave Adams, David Goffrey, Jeff Engle, Steve Gault, Jared S., Ashwin Patel</b>

**Meeting Purpose:** PennDOT District 6-0 Stakeholder meeting to finalize the list of projects included in the ROP.

Meeting Minutes:	Action Items:
<ul style="list-style-type: none"> <li>➤ Welcome and Introductions               <ul style="list-style-type: none"> <li>• A sign in sheet was passed around.</li> <li>• Rachel and Frank recapped the previous meetings.</li> <li>• Rachel informed everyone that the goal was to solicit feedback on the maps and finalize the project list.</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>➤ Southeastern ROP Group Discussion               <ul style="list-style-type: none"> <li>• Map Comments:                   <ul style="list-style-type: none"> <li>○ On the Bucks County map, Street Road already has an existing project from the US 1 to I-95. Please modify the limits to exclude this section.</li> <li>○ City of Philadelphia devices and fiber are not shown on the City map. Please add or note that.</li> <li>○ Most of the existing detectors are obsolete or will not be maintained in the future. Please delete detectors from the maps.</li> <li>○ US 202 limits appear to be incorrect, please verify.</li> </ul> </li> <li>• General ROP Comments:                   <ul style="list-style-type: none"> <li>○ Current and/or funded projects can be added to an appendix. The ROP will focus on unfunded projects.</li> <li>○ This will be a living document that will be updated every two years or can be amended with new projects as needed. District 6-0 will be responsible for maintaining the document in the future.</li> <li>○ Pub 646 ITS Design Guide is being replaced with Pub 852 TSMO Guidebook Part II: Design.</li> <li>○ District 6-0 noted it would be helpful to have all of the OneMap info, TSAMS info, CMP info and LRTP/ROP project info mapped in one, GIS based location to easily toggle on and off elements and program projects.</li> <li>○ In general, DVRPC noted that it is important that the ROP include active transportation also. Removing single occupancy vehicles from the roadways is an important TSMO strategy.</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Jacobs will revise the maps to address Stakeholder comments.</li> <li>• Current and/or unfunded projects will be included in the Appendix.</li> <li>• The ROP will include a discussion of ICM and multimodal strategies in the ROP Report.</li> </ul>

<ul style="list-style-type: none"> <li>• ROP Project Comments: <ul style="list-style-type: none"> <li>◦ Many project descriptions are intentionally vague so that project scopes can be adjusted to what is needed, providing more flexibility during project programming.</li> <li>◦ However, in an effort to apply some more specific TSMO Strategies to specific locations, PennDOT Central Office will provide Congestion Pie Chart data that documents the sources of congestion. Once the problem is identified, a TSMO solution can be applied to make the roadway more reliable.</li> <li>◦ PennDOT noted that some of the descriptions include many different strategies along one roadway – for example VSLs and flex lanes on I-676. The group agreed that it was likely some of these strategies involve much more complex projects than others, so they should be split out into different Phases.</li> <li>◦ The group asked if the projects were ranked? The projects are rated High Priority and Medium Priority, but not ranked. It was suggested to add some reference to where the project came from or justification for why it was included (ie. the CMP or LRTP, etc).</li> <li>◦ DVRPC suggested adding a project for Multimodal Connections such as bike lanes, park and rides or actively managed connection routes to transit.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• PennDOT will send Jacobs the Congestion Pie Chart data.</li> <li>• Jacobs will review the Congestion Pie Chart data to try and identify sources of congestion and apply appropriate TSMO strategies.</li> <li>• Jacobs will separate some project scopes into Phases.</li> <li>• Jacobs will add information and justification as to why the projects were selected under the Issues and Considerations.</li> <li>• Jacobs will add a project for Multimodal Connections.</li> </ul>
<ul style="list-style-type: none"> <li>➤ Draft Schedule / Next Steps <ul style="list-style-type: none"> <li>• Jacobs will revise the ROP Project List to incorporate comments from this meeting.</li> <li>• Jacobs will draft the 100% ROP Report by the end of February.</li> <li>• Stakeholders will review and comment in the beginning of March.</li> <li>• Final ROP Report by end of March.</li> </ul> </li> </ul>	

## Appendix B. Project Maps

# DISTRICT 6 - BUCKS COUNTY

## ROP PROJECTS

### Other Bucks County Projects

**CN.01: Battery Backup System for Communications Hub**  
Install battery backup system for communications hub to provide resiliency during major storms and other power outages

**FA.08: District 6-0 RTMC Staffing**  
Additional RTMC staffing to support increased ITS deployments and traffic signal operation and maintenance responsibilities

**FA.09: Queue Warning and Variable Speed Limits**  
Deployment of queue warning and variable speed limits at spot locations on freeways and expressways, including works zones

**FA.10: Ramp Metering**  
Deployment of ramp metering system on ramps to congested interstates, freeways, or expressways to control merge conflicts

**FA.11: Dynamic Curve Warning**  
Deployment of dynamic curve warning system at spot locations on interstates, freeways, expressways or principal arterials

**FA.12: ITS Gaps Along Freeways or Expressways**  
Expand coverage of CCTV, DMS, TT Detectors, Fiber Communications along regional freeways and expressways

**FA.13: Antiquated ITS Infrastructure Replacements**  
Replace antiquated ITS infrastructure at locations TBD

**FA.26: ITS Gaps/Enhancements on Adjacent Arterials & Parallel Corridors**  
Expand arterial CCTV, DMS, TT Detectors, Fiber, OTN Communications HUB

**MC.01: Multimodal Connections**  
Bike lanes, bus lanes, park and rides, transit signal priority, actively managed connection routes (eg. signal corridors that lead to SEPTA stations)

**TIM.01: Freeway Service Patrol**  
Expand coverage areas and/or hours of operation of existing freeway service patrols

**TIM.02: Incident Management Task Forces**  
Additional support for 5 county Traffic Incident Management (TIM) Teams

**TIM.03: Digital Alerting System for Emergency Response**  
Deploy a standard digital alerting system for emergency response in the region

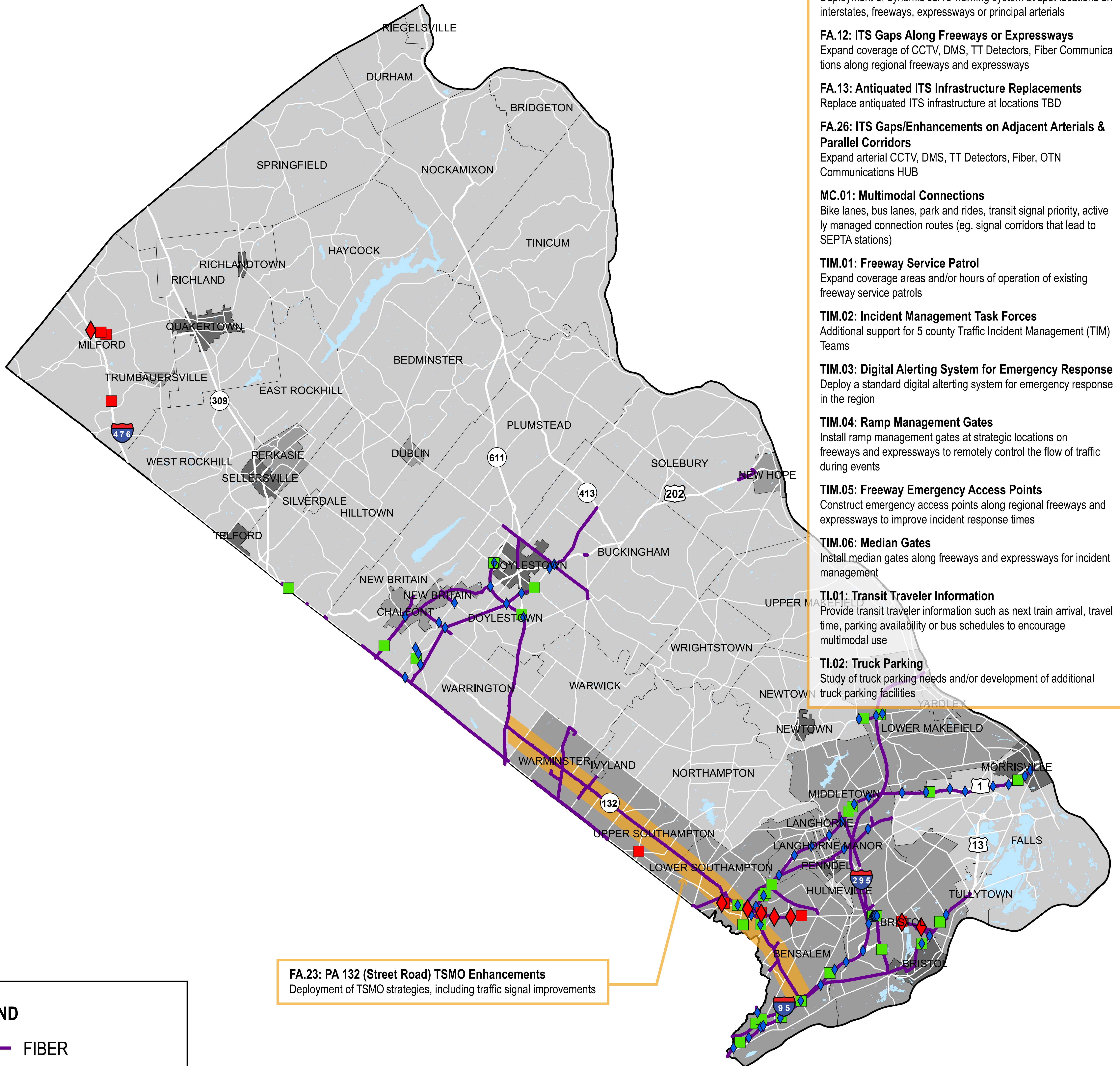
**TIM.04: Ramp Management Gates**  
Install ramp management gates at strategic locations on freeways and expressways to remotely control the flow of traffic during events

**TIM.05: Freeway Emergency Access Points**  
Construct emergency access points along regional freeways and expressways to improve incident response times

**TIM.06: Median Gates**  
Install median gates along freeways and expressways for incident management

**TI.01: Transit Traveler Information**  
Provide transit traveler information such as next train arrival, travel time, parking availability or bus schedules to encourage multimodal use

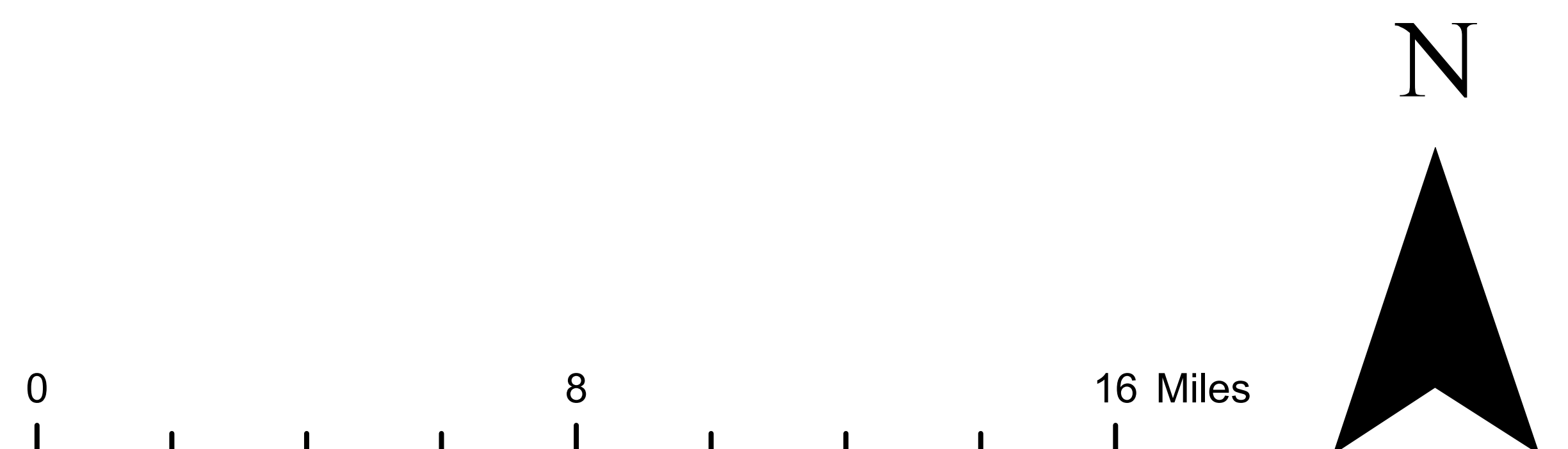
**TI.02: Truck Parking**  
Study of truck parking needs and/or development of additional truck parking facilities



**FA.23: PA 132 (Street Road) TSMO Enhancements**  
Deployment of TSMO strategies, including traffic signal improvements

**LEGEND**

- FIBER
- ◆ PENNDOT CCTV
- PENNDOT DMS
- ◆ PA TURNPIKE CCTV
- PA TURNPIKE DMS



# DISTRICT 6 - CHESTER COUNTY

## ROP PROJECTS

### Other Chester County Projects

**CN.01: Battery Backup System for Communications Hub**  
Install battery backup system for communications hub to provide resiliency during major storms and other power outages

**FA.08: District 6-0 RTMC Staffing**  
Additional RTMC staffing to support increased ITS deployments and traffic signal operation and maintenance responsibilities

**FA.09: Queue Warning and Variable Speed Limits**  
Deployment of queue warning and variable speed limits at spot locations on freeways and expressways, including works zones

**FA.10: Ramp Metering**  
Deployment of ramp metering system on ramps to congested interstates, freeways, or expressways to control merge conflicts

**FA.11: Dynamic Curve Warning**  
Deployment of dynamic curve warning system at spot locations on interstates, freeways, expressways or principal arterials

**FA.12: ITS Gaps Along Freeways or Expressways**  
Expand coverage of CCTV, DMS, TT Detectors, Fiber Communications along regional freeways and expressways

**FA.13: Antiquated ITS Infrastructure Replacements**  
Replace antiquated ITS infrastructure at locations TBD

**FA.26: ITS Gaps/Enhancements on Adjacent Arterials & Parallel Corridors**  
Expand arterial CCTV, DMS, TT Detectors, Fiber, OTN Communications HUB

**MC.01: Multimodal Connections**  
Bike lanes, bus lanes, park and rides, transit signal priority, actively managed connection routes (eg. signal corridors that lead to SEPTA stations)

**TIM.01: Freeway Service Patrol**  
Expand coverage areas and/or hours of operation of existing freeway service patrols

**TIM.02: Incident Management Task Forces**  
Additional support for 5 county Traffic Incident Management (TIM) Teams

**TIM.03: Digital Alerting System for Emergency Response**  
Deploy a standard digital alerting system for emergency response in the region

**TIM.04: Ramp Management Gates**  
Install ramp management gates at strategic locations on freeways and expressways to remotely control the flow of traffic during events

**TIM.05: Freeway Emergency Access Points**  
Construct emergency access points along regional freeways and expressways to improve incident response times

**TIM.06: Median Gates**  
Install median gates along freeways and expressways for incident management

**TI.01: Transit Traveler Information**  
Provide transit traveler information such as next train arrival, travel time, parking availability or bus schedules to encourage multimodal use

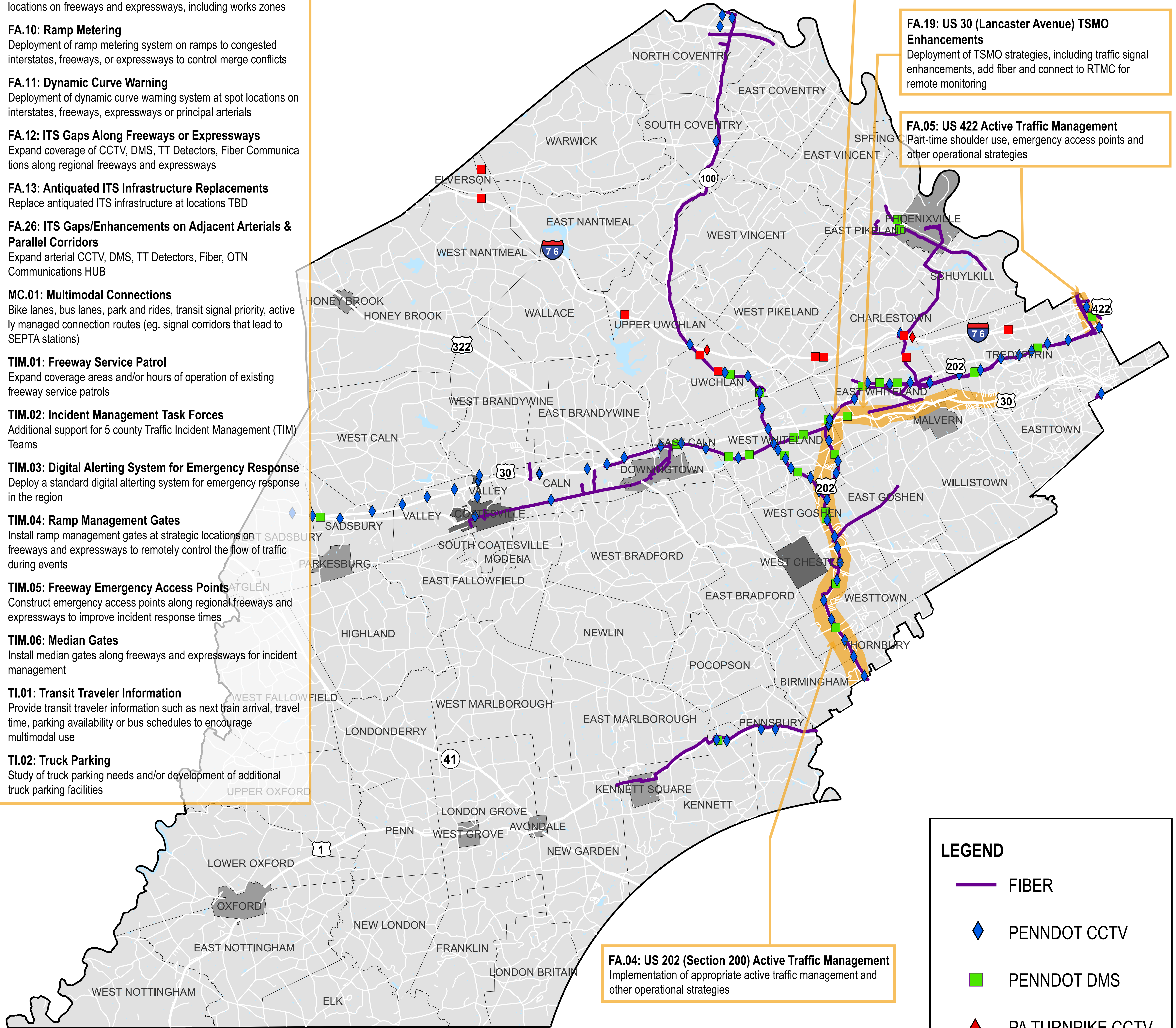
**TI.02: Truck Parking**  
Study of truck parking needs and/or development of additional truck parking facilities

**FA.14: US 202 (Section 100) TSMO Enhancements**  
Improve operational efficiency, deployment of TSMO strategies, including traffic signal improvements

**FA.19: US 30 (Lancaster Avenue) TSMO Enhancements**  
Deployment of TSMO strategies, including traffic signal enhancements, add fiber and connect to RTMC for remote monitoring

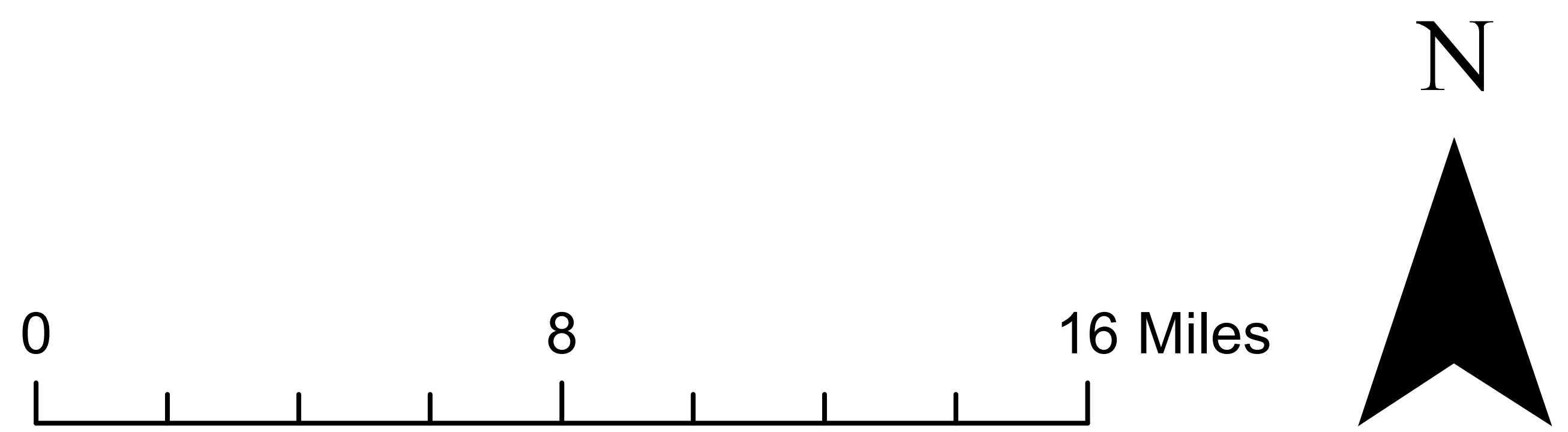
**FA.05: US 422 Active Traffic Management**  
Part-time shoulder use, emergency access points and other operational strategies

**FA.04: US 202 (Section 200) Active Traffic Management**  
Implementation of appropriate active traffic management and other operational strategies



**LEGEND**

- FIBER
- ◆ PENNDOT CCTV
- PENNDOT DMS
- ◆ PA TURNPIKE CCTV
- PA TURNPIKE DMS



# DISTRICT 6 - DELAWARE COUNTY

## ROP PROJECTS

### Other Delaware County Projects

**CN.01: Battery Backup System for Communications Hub**  
Install battery backup system for communications hub to provide resiliency during major storms and other power outages

**FA.08: District 6-0 RTMC Staffing**  
Additional RTMC staffing to support increased ITS deployments and traffic signal operation and maintenance responsibilities

**FA.09: Queue Warning and Variable Speed Limits**  
Deployment of queue warning and variable speed limits at spot locations on freeways and expressways, including works zones

**FA.10: Ramp Metering**  
Deployment of ramp metering system on ramps to congested interstates, freeways, or expressways to control merge conflicts

**FA.11: Dynamic Curve Warning**  
Deployment of dynamic curve warning system at spot locations on interstates, freeways, expressways or principal arterials

**FA.12: ITS Gaps Along Freeways or Expressways**  
Expand coverage of CCTV, DMS, TT Detectors, Fiber Communications along regional freeways and expressways

**FA.13: Antiquated ITS Infrastructure Replacements**  
Replace antiquated ITS infrastructure at locations TBD

**FA.26: ITS Gaps/Enhancements on Adjacent Arterials & Parallel Corridors**  
Expand arterial CCTV, DMS, TT Detectors, Fiber, OTN Communications HUB

**MC.01: Multimodal Connections**  
Bike lanes, bus lanes, park and rides, transit signal priority, actively managed connection routes (eg. signal corridors that lead to SEPTA stations)

**TIM.01: Freeway Service Patrol**  
Expand coverage areas and/or hours of operation of existing freeway service patrols

**TIM.02: Incident Management Task Forces**  
Additional support for 5 county Traffic Incident Management (TIM) Teams

**TIM.03: Digital Alerting System for Emergency Response**  
Deploy a standard digital alerting system for emergency response in the region

**TIM.04: Ramp Management Gates**  
Install ramp management gates at strategic locations on freeways and expressways to remotely control the flow of traffic during events

**TIM.05: Freeway Emergency Access Points**  
Construct emergency access points along regional freeways and expressways to improve incident response times

**TIM.06: Median Gates**  
Install median gates along freeways and expressways for incident management

**TI.01: Transit Traveler Information**  
Provide transit traveler information such as next train arrival, travel time, parking availability or bus schedules to encourage multimodal use

**TI.02: Truck Parking**  
Study of truck parking needs and/or development of additional truck parking facilities

**FA.18: PA 3 (West Chester Pike) TSMO Enhancements**  
Deployment of TSMO strategies, including traffic signal enhancements add fiber and connect to RTMC for remote monitoring

**FA.15: US 1 TSMO Enhancements**  
Deployment of TSMO strategies, ICM, Multimodal Connections, Transit Traveler Information, transit signal priority, traffic signal enhancements

**FA.24: Baltimore Avenue TSMO Enhancements**  
Deployment of TSMO strategies, including traffic signal enhancements, add fiber and connect to RTMC for remote monitoring

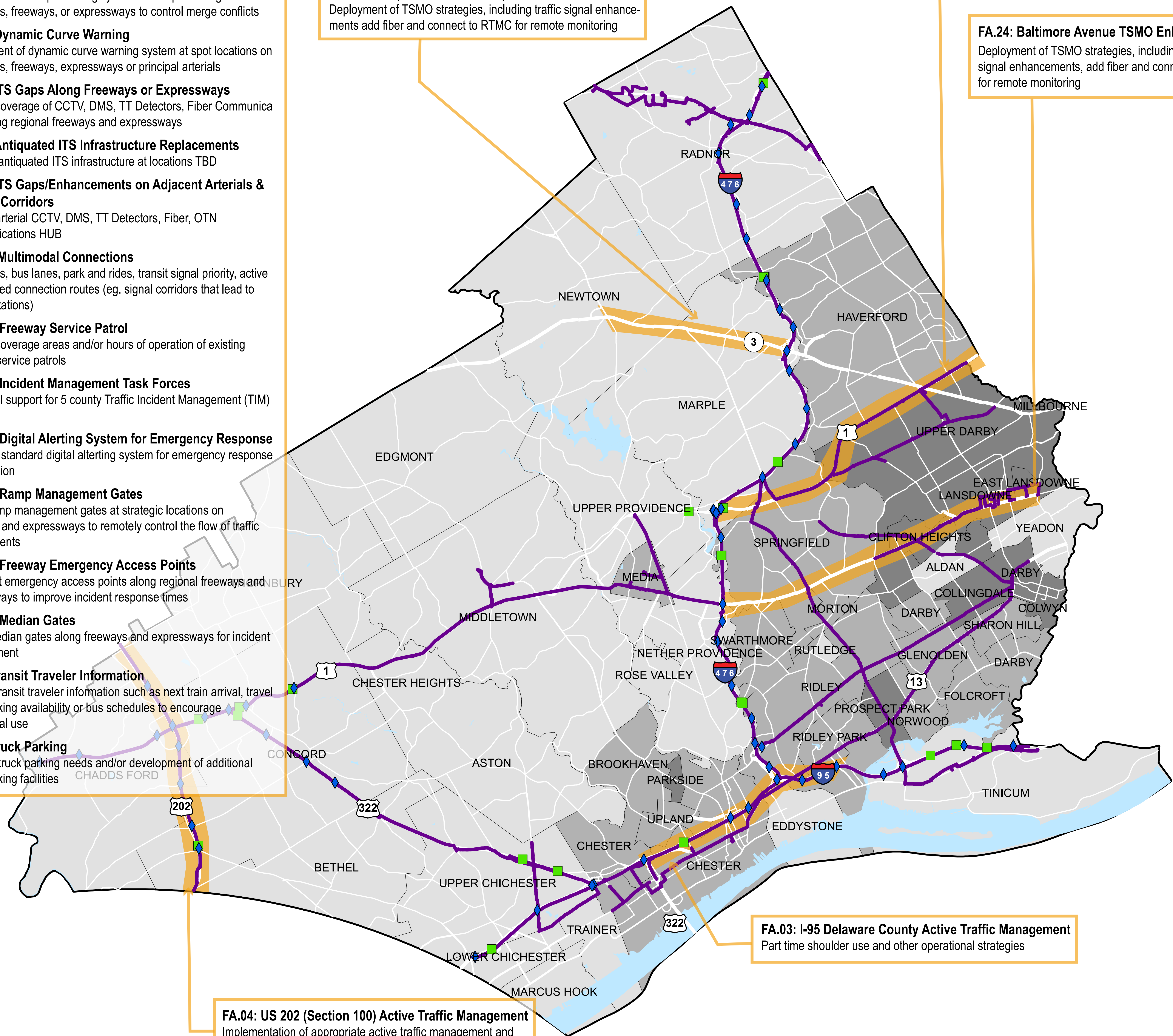
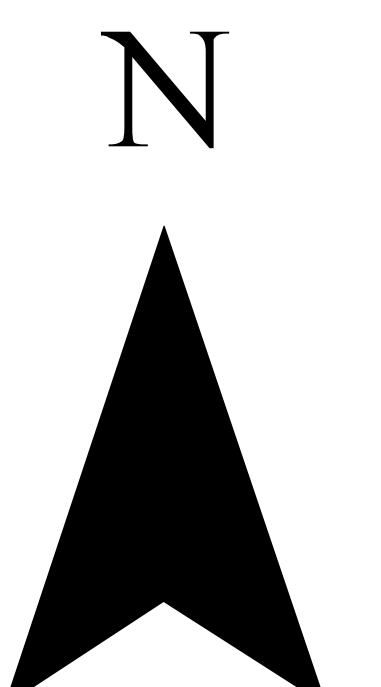
**FA.03: I-95 Delaware County Active Traffic Management**  
Part time shoulder use and other operational strategies

**FA.04: US 202 (Section 100) Active Traffic Management**  
Implementation of appropriate active traffic management and other operational strategies

### LEGEND

- FIBER
- ◆ PENNDOT CCTV
- PENNDOT DMS

0 4 8 Miles



# DISTRICT 6 - MONTGOMERY COUNTY

## ROP PROJECTS

### Other Montgomery County Projects

**CN.01: Battery Backup System for Communications Hub**  
Install battery backup system for communications hub to provide resiliency during major storms and other power outages

**FA.07: I-76 ITS Enhancements on Adjacent Arterials**  
Install arterial CCTV, DMS, TT Detectors, Fiber, and OTN Communications HUB at strategic locations on parallel corridors to support to I-76 ICM

**FA.08: District 6-0 RTMC Staffing**  
Additional RTMC staffing to support increased ITS deployments and traffic signal operation and maintenance responsibilities

**FA.09: Queue Warning and Variable Speed Limits**  
Deployment of queue warning and variable speed limits at spot locations on freeways and expressways, including works zones

**FA.10: Ramp Metering**  
Deployment of ramp metering system on ramps to congested interstates, freeways, or expressways to control merge conflicts

**FA.11: Dynamic Curve Warning**  
Deployment of dynamic curve warning system at spot locations on interstates, freeways, expressways or principal arterials

**FA.12: ITS Gaps Along Freeways or Expressways**  
Expand coverage of CCTV, DMS, TT Detectors, Fiber Communications along regional freeways and expressways

**FA.13: Antiquated ITS Infrastructure Replacements**  
Replace antiquated ITS infrastructure at locations TBD

**FA.26: ITS Gaps/Enhancements on Adjacent Arterials & Parallel Corridors**  
Expand arterial CCTV, DMS, TT Detectors, Fiber, OTN Communications HUB

**MC.01: Multimodal Connections**  
Bike lanes, bus lanes, park and rides, transit signal priority, actively managed connection routes (eg. signal corridors that lead to SEPTA stations)

**TIM.01: Freeway Service Patrol**  
Expand coverage areas and/or hours of operation of existing freeway service patrols

**TIM.02: Incident Management Task Forces**  
Additional support for 5 county Traffic Incident Management (TIM) Teams

**TIM.03: Digital Alerting System for Emergency Response**  
Deploy a standard digital alerting system for emergency response in the region

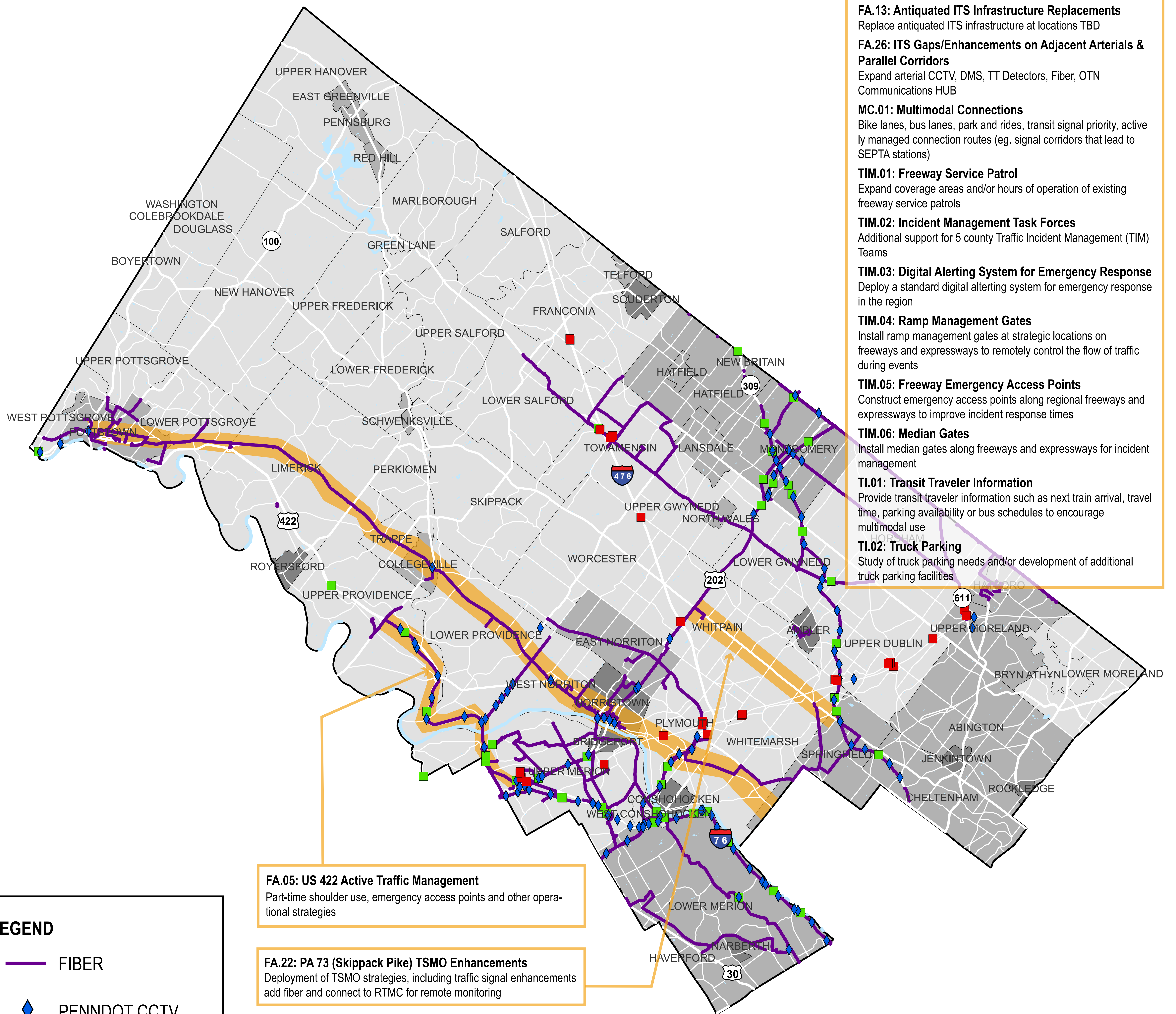
**TIM.04: Ramp Management Gates**  
Install ramp management gates at strategic locations on freeways and expressways to remotely control the flow of traffic during events

**TIM.05: Freeway Emergency Access Points**  
Construct emergency access points along regional freeways and expressways to improve incident response times

**TIM.06: Median Gates**  
Install median gates along freeways and expressways for incident management

**TI.01: Transit Traveler Information**  
Provide transit traveler information such as next train arrival, travel time, parking availability or bus schedules to encourage multimodal use

**TI.02: Truck Parking**  
Study of truck parking needs and/or development of additional truck parking facilities

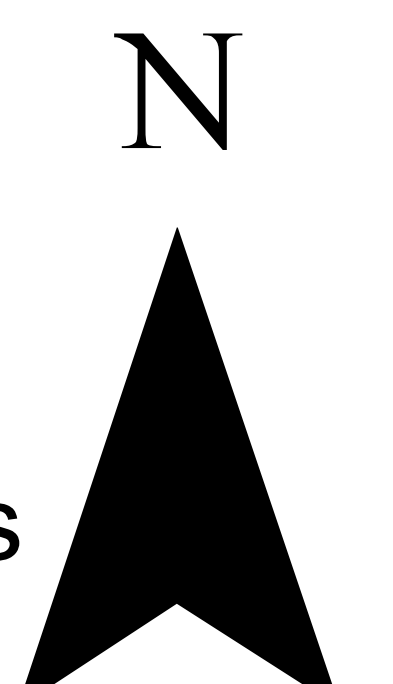


**LEGEND**

- FIBER
- ◆ PENNDOT CCTV
- PENNDOT DMS
- ◆ PA TURNPIKE CCTV
- PA TURNPIKE DMS

**FA.05: US 422 Active Traffic Management**  
Part-time shoulder use, emergency access points and other operational strategies

**FA.22: PA 73 (Skippack Pike) TSMO Enhancements**  
Deployment of TSMO strategies, including traffic signal enhancements add fiber and connect to RTMC for remote monitoring



# DISTRICT 6 - PHILADELPHIA COUNTY

## ROP PROJECTS

**FA.06: US 1 (Roosevelt Boulevard) from Broad Street to Bensalem Township**  
Operational improvements and TSMO enhancements

**FA.02: I-76 Philadelphia Active Traffic Management**  
Part time shoulder use and other operational strategies

**FA.15: US 1 TSMO Enhancements**  
Deployment of TSMO strategies, ICM, Multimodal Connections, Transit Traveler Information, transit signal priority, traffic signal enhancements

**FA.20: US 30 (Girard Avenue) TSMO Enhancements**  
Deployment of TSMO strategies, including traffic strategies, including traffic signal improvements

**FA.25: Market Street TSMO Enhancements**  
Deployment of TSMO strategies, ICM, Multimodal Connections, Transit Traveler Information, transit signal priority, traffic signal enhancements

**FA.01: I-676 (Vine Street Expressway) Active Traffic Management**  
Implementation of appropriate active traffic management and other operational strategies

**FA.16: PA 3 (Chestnut Street) TSMO Enhancements**  
Deployment of TSMO strategies, ICM, Multimodal Connections, Transit Traveler Information, transit signal priority, traffic signal enhancements

**FA.17: PA 3 (Walnut Street) TSMO Enhancements**  
Deployment of TSMO strategies, ICM, Multimodal Connections, Transit Traveler Information, transit signal priority, traffic signal enhancements

### Other Philadelphia County Projects

**CN.01: Battery Backup System for Communications Hub**  
Install battery backup system for communications hub to provide resiliency during major storms and other power outages

**FA.07: I-76 ITS Enhancements on Adjacent Arterials**  
Install arterial CCTV, DMS, TT Detectors, Fiber, and OTN Communications HUB at strategic locations on parallel corridors to support to I-76 ICM

**FA.08: District 6-0 RTMC Staffing**  
Additional RTMC staffing to support increased ITS deployments and traffic signal operation and maintenance responsibilities

**FA.09: Queue Warning and Variable Speed Limits**  
Deployment of queue warning and variable speed limits at spot locations on freeways and expressways, including works zones

**FA.10: Ramp Metering**  
Deployment of ramp metering system on ramps to congested interstates, freeways, or expressways to control merge conflicts

**FA.11: Dynamic Curve Warning**  
Deployment of dynamic curve warning system at spot locations on interstates, freeways, expressways or principal arterials

**FA.12: ITS Gaps Along Freeways or Expressways**  
Expand coverage of CCTV, DMS, TT Detectors, Fiber Communications along regional freeways and expressways

**FA.13: Antiquated ITS Infrastructure Replacements**  
Replace antiquated ITS infrastructure at locations TBD

**FA.26: ITS Gaps/Enhancements on Adjacent Arterials & Parallel Corridors**  
Expand arterial CCTV, DMS, TT Detectors, Fiber, OTN Communications HUB

**MC.01: Multimodal Connections**  
Bike lanes, bus lanes, park and rides, transit signal priority, actively managed connection routes (eg. signal corridors that lead to SEPTA stations)

**TIM.01: Freeway Service Patrol**  
Expand coverage areas and/or hours of operation of existing freeway service patrols

**TIM.02: Incident Management Task Forces**  
Additional support for 5 county Traffic Incident Management (TIM) Teams

**TIM.03: Digital Alerting System for Emergency Response**  
Deploy a standard digital alerting system for emergency response in the region

**TIM.04: Ramp Management Gates**  
Install ramp management gates at strategic locations on freeways and expressways to remotely control the flow of traffic during events

**TIM.05: Freeway Emergency Access Points**  
Construct emergency access points along regional freeways and expressways to improve incident response times

**TIM.06: Median Gates**  
Install median gates along freeways and expressways for incident management

**T1.01: Transit Traveler Information**  
Provide transit traveler information such as next train arrival, travel time, parking availability or bus schedules to encourage multimodal use

**T1.02: Truck Parking**  
Study of truck parking needs and/or development of additional truck parking facilities

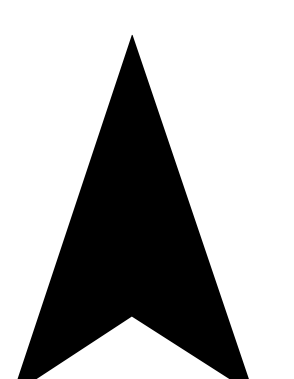
### LEGEND

- FIBER
- ◆ PENNDOT CCTV
- PENNDOT DMS

\* CITY OF PHILADELPHIA DEVICES AND FIBER NOT SHOWN ON MAP

0 3.5 7 Miles

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## Appendix C. Project Descriptions

## CN.01: Battery Backup System for Communications Hub

FOCUS AREA: Communications Network

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Install battery backup and uninterruptable power supply systems for communications hubs. Includes 2-4 locations under consideration as part of Department of Energy (DOE) grant program.

STAKEHOLDERS: PennDOT District 6-0, DVRPC, PECO

ESTIMATED SCHEDULE: 1-3 years

ESTIMATED COSTS:

\$  
(<\$500k)

Life Cycle: 10 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Simple

TECHNOLOGY COMPONENTS: Battery Backup System

PREREQUISITES AND DEPENDENCIES: These initiatives are being coordinated in conjunction with PECO as part of a DOE Grant application.

PERFORMANCE MEASURES: Number of Battery Systems Installed. Improved communications network uptime during severe storms and power outages.

BENEFITS: Improves network resiliency. Allows SERTMC monitoring and management of the roadway network during severe weather events that effect utility power supplies.

OTHER CONSIDERATIONS AND ISSUES: Immediate need to improve redundancy in the communications network. Widespread power outages during Hurricane Ida severely limited PennDOT's ability to monitor the roadway network, provide traveler information, and respond to incidents.

## FA.01: I-676 (Vine Street Expressway) Active Traffic Management

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Implementation of appropriate active traffic management and other operational strategies

STAKEHOLDERS: City of Philadelphia, PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 3+ years

ESTIMATED COSTS:

\$\$\$\$  
(\$10M+)

Life Cycle: 10-15 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Complex

TECHNOLOGY COMPONENTS: Flex Lane System, Junction Control System, Queue Detection System, Ramp Metering System, Variable Speed Limit System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio, Reduced Rear End Crash Rate

BENEFITS: Optimizes available capacity on I-676, improves traffic flow

OTHER CONSIDERATIONS AND ISSUES: 2019 CMP: #1 Congested corridor in the region.  
PA OneMap: Heavy truck related, curve road, rear end and wet road crash clusters.

## FA.02: I-76 Philadelphia Active Traffic Management

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Part time shoulder use and other operational strategies from US 1 to I-676

STAKEHOLDERS: City of Philadelphia, PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 3+ years

ESTIMATED COSTS:

\$\$\$\$  
(\$10M+)

Life Cycle: 10-15 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Complex

TECHNOLOGY COMPONENTS: Flex Lane System, Junction Control System, Queue Detection System, Ramp Metering System, Variable Speed Limit System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio, Reduced Bottleneck Delay, Reduced Rear End Crash Rate

BENEFITS: Optimizes available capacity, improves traffic flow

OTHER CONSIDERATIONS AND ISSUES: Connections 2050 LRTP: Unfunded planned project.  
PA OneMap: 2021 Major Traffic Bottleneck, heavy truck related, curve road and rear end crash clusters

## FA.03: I-95 Delaware County Active Traffic Management

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Part time shoulder use and other operational strategies from Stewart Avenue to US 322

STAKEHOLDERS: Delaware County, PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 3+ years

ESTIMATED COSTS:

\$\$\$\$  
(\$10M+)

Life Cycle: 10-15 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Complex

TECHNOLOGY COMPONENTS: Flex Lane System, Junction Control System, Queue Detection System, Ramp Metering System, Variable Speed Limit System

PREREQUISITES AND DEPENDENCIES: Coordinate with I-95 Reconstruction Sector C and I-95 Concept of Operations

PERFORMANCE MEASURES: Improved Travel Time Ratio, Reduced Bottleneck Delay, Reduced Rear End Crash Rate

BENEFITS: Optimizes available capacity, improves traffic flow

OTHER CONSIDERATIONS AND ISSUES: Connections 2050 LRTP: Unfunded planned project.  
PA OneMap: 2021 Major Traffic Bottleneck. Wet weather and curve crash clusters between PA 320 and Wanamaker Ave.

## FA.04: US 202 (Section 200) Active Traffic Management

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Implementation of appropriate active traffic management and other operational strategies from West Chester to Delaware state line

STAKEHOLDERS: Chester County, PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 3+ years

ESTIMATED COSTS:

\$\$\$\$  
(\$10M+)

Life Cycle: 10-15 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Complex

TECHNOLOGY COMPONENTS: Flex Lane System, Junction Control System, Queue Detection System, Ramp Metering System, Variable Speed Limit System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio, Reduced Bottleneck Delay, Reduced Rear End Crash Rate

BENEFITS: Optimizes available capacity, improves traffic flow

OTHER CONSIDERATIONS AND ISSUES: Connections 2050 LRTP: Unfunded planned project.  
PA OneMap: Existing fiber, CCTV & DMS. Portions on 2021 Major Traffic Bottleneck. Rear end crash cluster.  
PennDOT Congestion Pie Chart: High number of segments with congestions related to weather conditions

## FA.05: US 422 Active Traffic Management

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Part-time shoulder use, emergency access points and other operational strategies from US 202 to PA 29

STAKEHOLDERS: Chester County, Montgomery County, PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 3+ years

ESTIMATED COSTS:

\$\$\$\$  
(\$10M+)

Life Cycle: 10-15 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Complex

TECHNOLOGY COMPONENTS: Flex Lane System, Junction Control System, Queue Detection System, Ramp Metering System, Variable Speed Limit System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio, Reduced Bottleneck Delay, Reduced Rear End Crash Rate, Improved Incident Response Time, Improved Incident Clearance Time

BENEFITS: Optimizes available capacity, improves traffic flow

OTHER CONSIDERATIONS AND ISSUES: Connections 2050 LRTP: Unfunded planned project.  
PA OneMap: Existing fiber, CCTV and DMS to PA 29. 2021 Major Traffic Bottleneck almost whole length. Spot wet weather, curve, and rear end crash clusters.  
PennDOT Congestion Pie Chart: High number of segments with congestion related to crashes.

## FA.06: US 1 (Roosevelt Boulevard) from Broad Street to Bensalem Township

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Operational improvements and TSMO enhancements from PA 611 (Broad Street) to Bensalem Township

STAKEHOLDERS: City of Philadelphia, PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 3+ years

ESTIMATED COSTS:

\$\$\$\$  
(\$10M+)

Life Cycle: 10-15 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Moderate

TECHNOLOGY COMPONENTS: CCTV System, DMS System, Travel Time Detector System, Communications Infrastructure, Traffic Signal System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio, Reduced Crash Rate

BENEFITS: Optimizes available capacity, improves traffic flow

OTHER CONSIDERATIONS AND ISSUES: Connections 2050 LRTP: Unfunded planned project.  
PA OneMap: Rear end and intersection crash clusters along the entire length.  
PennDOT Congestion Pie Chart: High number of segments with congestion related to weather conditions.



## FA.07: I-76 ITS Enhancements on Adjacent Arterials

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Install arterial CCTV, DMS, Fiber Communications and traffic signal enhancements at strategic locations on parallel corridors including S Gulph Road, N Gulph Road, PA 23, Belmont Avenue, City Avenue, DeKalb Pike, Main Street, Ridge Pike, Ridge Avenue and Henry Avenue to support I-76 ICM

STAKEHOLDERS: Montgomery County, City of Philadelphia, PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 1-3 years

ESTIMATED COSTS:

\$\$\$  
(\$2M-\$10M)

Life Cycle: 10-15 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Moderate

TECHNOLOGY COMPONENTS: CCTV System, DMS System, Travel Time Detector System, Communications Infrastructure, Traffic Signal System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time During Incidents

BENEFITS: Optimizes available capacity of arterial parallel corridors, improves traffic flow, improves traveler information, improves incident detection

OTHER CONSIDERATIONS AND ISSUES: I-76 Systems Engineering Report: Parallel corridors Detour route to I-76

## FA.08: District 6-0 RTMC Staffing

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Additional RTMC staffing to support increased ITS deployments and traffic signal operation and maintenance responsibilities

STAKEHOLDERS: PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 1-3 years

ESTIMATED COSTS:

\$  
(<\$500k)

Life Cycle: N/A

PROJECT TYPE: Planning

LEVEL OF EFFORT: Simple

TECHNOLOGY COMPONENTS: N/A

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Increased Number of Full Time TMC Staff

BENEFITS: Improves incident management, improves traveler information, improves inter-agency coordination, improves traffic flow

OTHER CONSIDERATIONS AND ISSUES: District 6-0 RTMC Staffing Evaluation & Projections

## FA.09: Queue Warning and Variable Speed Limits

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Deployment of queue warning and variable speed limits at spot locations on freeways and expressways, including works zones

STAKEHOLDERS: PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 1-3 years

ESTIMATED COSTS:

\$\$  
(\$500k-\$2M)

Life Cycle: 10-15 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Moderate

TECHNOLOGY COMPONENTS: Queue Detection System, Variable Speed Limit System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio, Reduced Bottleneck Delay, Reduced Number of Rear End Crashes

BENEFITS: Improves safety by providing advanced warning of queued traffic, reducing speeds and/or homogenizing speeds and reducing rear-end crashes

OTHER CONSIDERATIONS AND ISSUES: Potential Locations Include: Areas with major congestion and high rear end crashes.

Potential Roadways Include: US 30

## FA.10: Ramp Metering

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Deployment of ramp metering system at on ramps to congested interstates, freeways, or expressways to control the merge conflicts

STAKEHOLDERS: PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 1-3 years

ESTIMATED COSTS:

\$  
(<\$500k)

Life Cycle: 10-15 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Moderate

TECHNOLOGY COMPONENTS: Ramp Metering System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Bottleneck Delay, Improved Travel Time Ratio, Reduced Crash Rate

BENEFITS: Improves traffic flow and safety on mainline by managing on ramp volumes

OTHER CONSIDERATIONS AND ISSUES: Potential Locations Include: Areas with traffic bottlenecks and high merging volumes from on ramps  
Potential Roadways Include: I-676, I-76, I-95, US 202, US 422

## FA.11: Dynamic Curve Warning

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Deployment of dynamic curve warning system at spot locations on interstates, freeways, expressways, or principal arterials

STAKEHOLDERS: PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 1-3 years

ESTIMATED COSTS:

\$  
(<\$500k)

Life Cycle: 10-15 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Moderate

TECHNOLOGY COMPONENTS: Dynamic Curve Warning System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Reduced Crash Rate

BENEFITS: Improves safety at horizontal curves with a history of speeding

OTHER CONSIDERATIONS AND ISSUES: Potential Locations Include: Areas with high curve road crash clusters

Potential Roadways Include: I-95, I-76, US 422, US 202, PA 73, US 1 at Adams Ave

## FA.12: ITS Gaps Along Freeways or Expressways

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Expand coverage of CCTV, DMS, Travel Time Detectors, Fiber Communications along regional freeways and expressways

STAKEHOLDERS: PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 1-3 years

ESTIMATED COSTS:

\$\$  
(\$500k-\$2M)

Life Cycle: 10-15 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Simple

TECHNOLOGY COMPONENTS: CCTV System, DMS System, Travel Time Detector System, Communications Infrastructure

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio, Improved Incident Response

BENEFITS: Improves incident management and improves traveler information

OTHER CONSIDERATIONS AND ISSUES: Potential Locations Include: Interstates, freeways, expressways, or limited access principal arterials without CCTV or DMS.  
Potential Roadways Include: US 1 in Chester, PA 611 in Bucks, US 13 in Bucks

## FA.13: Antiquated ITS Infrastructure Replacements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Replace antiquated ITS infrastructure at locations TBD

STAKEHOLDERS: PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 1-3 years

ESTIMATED COSTS:

\$\$  
(\$500k-\$2M)

Life Cycle: 10-15 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Simple

TECHNOLOGY COMPONENTS: CCTV System, DMS System, Travel Time Detector System, Communications Infrastructure

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio, Improved Incident Response

BENEFITS: Improves incident management and improves traveler information

OTHER CONSIDERATIONS AND ISSUES: Potential Locations Include: Spot locations to be determined as needs arise to replace aging equipment  
Potential Roadways Include: To be determined

## MC.01: Multimodal Connections

FOCUS AREA: Multimodal Connectivity

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Bike lanes, bus lanes, park and rides, transit signal priority, actively managed connection routes (e.g. signal corridors that lead to SEPTA stations)

STAKEHOLDERS: PennDOT District 6-0, DVRPC, SEPTA

ESTIMATED SCHEDULE: 3+ years

ESTIMATED COSTS:

\$  
(<\$500k)

Life Cycle: 10-15 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Moderate

TECHNOLOGY COMPONENTS: N/A

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Increased Transit Usage, Increase Active Transportation Usage, Increased Bus Speed, Increased Park and Ride Usage

BENEFITS: Encourages transit and active transportation usage

OTHER CONSIDERATIONS AND ISSUES: Potential Locations Include: Areas with opportunities to change modes of transportation; bike lanes, bus lanes, park and rides, trail connections, actively managed connection routes to transit locations.

Potential Roadways Include: US 1, PA 611, US 30, PHL, stadiums, 30th Street Station



## TI.01: Transit Traveler Information

FOCUS AREA: Traveler Information

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Provide transit traveler information such as next train arrival, travel time, parking availability or bus schedules to encourage multimodal use

STAKEHOLDERS: PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 3+ years

ESTIMATED COSTS:

\$\$  
(\$500k-\$2M)

Life Cycle: 10-15 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Moderate

TECHNOLOGY COMPONENTS: Communications Infrastructure, Smart Parking System

PREREQUISITES AND DEPENDENCIES: Coordination and integration with SEPTA

PERFORMANCE MEASURES: Improved Travel Time, Increased Transit Usage

BENEFITS: Encourages transit and active transportation usage

OTHER CONSIDERATIONS AND ISSUES: Potential Locations Include: Areas with transit running parallel to a major corridor that could provide an alternate mode of transportation during major congestion

Potential Roadways Include: US 1, PA 611, US 30, PA 309

## TIM.01: Freeway Service Patrol

FOCUS AREA: Traffic Incident Management

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Expand coverage areas and/or hours of operation of existing freeway service patrols

STAKEHOLDERS: PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 1-3 years

ESTIMATED COSTS:

\$  
(<\$500k)

Life Cycle: N/A

PROJECT TYPE: Planning

LEVEL OF EFFORT: Simple

TECHNOLOGY COMPONENTS: N/A

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Incident Response Time, Improved Incident Clearance Time, Reduction in Secondary Crashes

BENEFITS: Reduced incident duration and incident clearance times and minimizes chances of secondary crashes

OTHER CONSIDERATIONS AND ISSUES: Transportation Operations Master Plan

## TIM.02: Incident Management Task Forces

FOCUS AREA: Traffic Incident Management

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Additional support for 5 county Traffic Incident Management (TIM) Teams

STAKEHOLDERS: PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 1-3 years

ESTIMATED COSTS:

\$  
(<\$500k)

Life Cycle: N/A

PROJECT TYPE: Planning

LEVEL OF EFFORT: Simple

TECHNOLOGY COMPONENTS: N/A

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Incident Response Time, Improved Incident Clearance Time, Reduction in Secondary Crashes, Improved Inter-Agency Communication

BENEFITS: Reduced incident duration and incident clearance times and minimizes chances of secondary crashes

OTHER CONSIDERATIONS AND ISSUES: Transportation Operations Master Plan

## TIM.03: Digital Alert System for Emergency Response

FOCUS AREA: Traffic Incident Management

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Deploy responder-to-vehicle (R2V) technology to allow emergency responders and roadside workers to automatically alert nearby motorists of their position.

STAKEHOLDERS: PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 1-3 years

ESTIMATED COSTS:

\$  
(<\$500k)

Life Cycle: 5-10 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Moderate

TECHNOLOGY COMPONENTS: Communications Infrastructure

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Incident Response Time, Improved Incident Clearance Time, Reduction in Secondary Crashes

BENEFITS: Increasing the time and distance a motorist is aware of incident responders can provide them with greater opportunities to move over and slow down.

OTHER CONSIDERATIONS AND ISSUES: Stakeholder Input

## TIM.04: Ramp Management Gates

FOCUS AREA: Traffic Incident Management

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Install ramp management gates at strategic locations on freeways and expressways to remotely control the flow of traffic during events

STAKEHOLDERS: PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 3+ years

ESTIMATED COSTS:

\$  
(<\$500k)

Life Cycle: 10-15 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Moderate

TECHNOLOGY COMPONENTS: Ramp Management System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Incident Response Time, Improved Incident Clearance Time

BENEFITS: Reduces incident duration and incident clearance times and minimizes chances of secondary crashes

OTHER CONSIDERATIONS AND ISSUES: Potential Locations Include: Areas prone to flooding, roadways with long interchange spacing and no medians to turn traffic around if a road is closed due to an incident.

Potential Roadways Include: I-76

## TIM.05: Freeway Emergency Access Points

FOCUS AREA: Traffic Incident Management

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Construct emergency access points along regional freeways and expressways to improve incident response times

STAKEHOLDERS: PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 3+ years

ESTIMATED COSTS:

\$\$  
(\$500k-\$2M)

Life Cycle: 25 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Moderate

TECHNOLOGY COMPONENTS: N/A

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Incident Response Time, Improved Incident Clearance Time

BENEFITS: Reduces incident duration and incident clearance times and minimizes chances of secondary crashes

OTHER CONSIDERATIONS AND ISSUES: Potential Locations Include: Areas with major congestion due to crashes and roadways with narrow shoulders and long interchange spacing.  
Potential Roadways Include: US 422, PA 309

## TIM.06: Median Gates

FOCUS AREA: Traffic Incident Management

PRIORITY: High

PROJECT DESCRIPTION AND SCOPE: Install median gates along freeways and expressways for incident management

STAKEHOLDERS: PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 1-3 years

ESTIMATED COSTS:

\$  
(<\$500k)

Life Cycle: 10-15 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Moderate

TECHNOLOGY COMPONENTS: N/A

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Incident Response Time, Improved Incident Clearance Time

BENEFITS: Reduces incident duration and incident clearance times and minimizes chances of secondary crashes

OTHER CONSIDERATIONS AND ISSUES: Potential Locations Include: Areas with high crash locations and interchange spacing > 3 miles with no crossovers  
Potential Roadways Include: I-476

## FA.14: US 202 (Section 100) TSMO Enhancements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Medium

PROJECT DESCRIPTION AND SCOPE: Improve operational efficiency, deployment of TSMO strategies, including traffic signal improvements from US 30 to Matlack Street

STAKEHOLDERS: Chester County, Delaware County, PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 1-3 years

ESTIMATED COSTS:

\$\$\$\$  
(\$10M+)

Life Cycle: 10-15 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Moderate

TECHNOLOGY COMPONENTS: Traffic Signal System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Optimizes available capacity, improves traffic flow

OTHER CONSIDERATIONS AND ISSUES: Connections 2050 LRTP: Unfunded planned project  
PA OneMap: Existing Fiber, CCTV & DMS, curved road crash cluster at US 30



## FA.15: US 1 (City Line Avenue) TSMO Enhancements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Medium

PROJECT DESCRIPTION AND SCOPE: Deployment of TSMO strategies, ICM, Multimodal Connections, Transit Traveler Information, transit signal priority, traffic signal enhancements from I-476 to I-76

STAKEHOLDERS: Delaware County, City of Philadelphia, PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 1-3 years

ESTIMATED COSTS:

\$\$\$\$  
(\$10M+)

Life Cycle: 10-15 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Moderate

TECHNOLOGY COMPONENTS: Traffic Signal System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio, Increased Transit Usage, Increased Active Transportation Usage, Increase Bus Speed

BENEFITS: Optimizes available capacity, improves traffic flow, encourages transit and active transportation usage

OTHER CONSIDERATIONS AND ISSUES: Added due to Stakeholder Input

PA OneMap: Existing fiber, only CCTV & DMS at I-476, 2021 Major Traffic Bottleneck at PA 320, heavy truck related crash cluster at PA 320, multiple rear end and intersection crash clusters

## FA.16: PA 3 (Chestnut Street) TSMO Enhancements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Medium

PROJECT DESCRIPTION AND SCOPE: Deployment of TSMO strategies, ICM, Multimodal Connections, Transit Traveler Information, transit signal priority, traffic signal enhancements from Front Street to 44<sup>th</sup> Street

STAKEHOLDERS: City of Philadelphia, PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 1-3 years

ESTIMATED COSTS:

\$\$\$  
(\$2M-\$10M)

Life Cycle: 10-15 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Moderate

TECHNOLOGY COMPONENTS: Traffic Signal System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio, Increased Transit Usage, Increased Active Transportation Usage, Increase Bus Speed

BENEFITS: Optimizes available capacity, improves traffic flow, encourages transit and active transportation usage

OTHER CONSIDERATIONS AND ISSUES: 2019 CMP: Top 25 Congested Corridor without current or planned projects

PA OneMap: intersection crash cluster, some sections with high crash rates

## FA.17: PA 3 (Walnut Street) TSMO Enhancements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Medium

PROJECT DESCRIPTION AND SCOPE: Deployment of TSMO strategies, ICM, Multimodal Connections, Transit Traveler Information, transit signal priority, traffic signal enhancements from Front Street to 44<sup>th</sup> Street

STAKEHOLDERS: City of Philadelphia, PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 1-3 years

ESTIMATED COSTS:

\$\$\$  
(\$2M-\$10M)

Life Cycle: 10-15 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Moderate

TECHNOLOGY COMPONENTS: Traffic Signal System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio, Increased Transit Usage, Increased Active Transportation Usage, Increase Bus Speed

BENEFITS: Optimizes available capacity, improves traffic flow, encourages transit and active transportation usage

OTHER CONSIDERATIONS AND ISSUES: 2019 CMP: Top 25 Congested Corridor without current of planned projects

PA OneMap: 2021 Major Traffic Bottleneck, some sections with high crash rates

## FA.18: PA 3 (West Chester Pike) TSMO Enhancements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Medium

PROJECT DESCRIPTION AND SCOPE: Deployment of TSMO strategies, including traffic signal enhancements add fiber and connect to RTMC for remote monitoring from I-476 to PA 252

STAKEHOLDERS: Delaware County, PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 1-3 years

ESTIMATED COSTS:

\$\$  
(\$500k-\$2M)

Life Cycle: 10-15 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Moderate

TECHNOLOGY COMPONENTS: Traffic Signal System, Communications Infrastructure

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Optimizes available capacity, improves traffic flow

OTHER CONSIDERATIONS AND ISSUES: 2019 CMP: Top 25 Congested Corridor without current of planned projects

PA OneMap: No fiber, CCTV or DMS, 2021 Major Traffic Bottleneck, rear end and intersection crash clusters

## FA.19: US 30 (Lancaster Avenue) TSMO Enhancements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Medium

PROJECT DESCRIPTION AND SCOPE: Deployment of TSMO strategies, including traffic signal enhancements add fiber and connect to RTMC for remote monitoring from PA 252 to US 202

STAKEHOLDERS: Chester County, PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 1-3 years

ESTIMATED COSTS:

\$\$\$  
(\$2M-\$10M)

Life Cycle: 10-15 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Moderate

TECHNOLOGY COMPONENTS: Traffic Signal System, Communications Infrastructure

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Optimizes available capacity, improves traffic flow

OTHER CONSIDERATIONS AND ISSUES: PA OneMap: Some existing fiber, portions on the 2021 Major Traffic Bottlenecks, high crash rate at US 202, existing CCTV and DMS at US 202, rear end crash clusters, intersection crash clusters, potential flooding

## FA.20: US 30 (Girard Avenue) TSMO Enhancements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Medium

PROJECT DESCRIPTION AND SCOPE: Deployment of TSMO strategies, including traffic signal enhancements from US 13 (N 33<sup>rd</sup> Street) to US 1 (City Avenue)

STAKEHOLDERS: City of Philadelphia, PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 1-3 years

ESTIMATED COSTS:

\$\$  
(\$500k-\$2M)

Life Cycle: 10-15 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Moderate

TECHNOLOGY COMPONENTS: Traffic Signal System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Optimizes available capacity, improves traffic flow

OTHER CONSIDERATIONS AND ISSUES: 2019 CMP: Top 25 Congested Corridor without current or planned projects

PA OneMap: Sections with high crash rates, some intersection and rear end crash clusters

## FA.21: PA 41 (Gap Newport Pike) TSMO Enhancements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Medium

PROJECT DESCRIPTION AND SCOPE: Deployment of TSMO strategies, including truck traffic improvements from US 30 to Delaware state line

STAKEHOLDERS: Chester County, PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 1-3 years

ESTIMATED COSTS:

\$\$  
(\$500k-\$2M)

Life Cycle: 10-15 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Moderate

TECHNOLOGY COMPONENTS): Traffic Signal System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Optimizes available capacity, improves traffic flow

OTHER CONSIDERATIONS AND ISSUES: Added due to Stakeholder Input; Heavy truck corridor PA OneMap: Portions on Major Traffic Bottlenecks 2021, heavy truck related crash cluster, wet weather and rear end crash clusters at PA 10, multiple intersection crash clusters, high crash rate at US 1

## FA.22: PA 73 (Skippack Pike) TSMO Enhancements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Medium

PROJECT DESCRIPTION AND SCOPE: Deployment of TSMO strategies, including traffic signal enhancements add fiber and arterial ITS and connect to RTMC for remote monitoring from PA 309 to US 202

STAKEHOLDERS: Montgomery County, PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 1-3 years

ESTIMATED COSTS:

\$\$\$  
(\$2M-\$10M)

Life Cycle: 10-15 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Moderate

TECHNOLOGY COMPONENTS: Traffic Signal System, Communications Infrastructure

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Optimizes available capacity, improves traffic flow

OTHER CONSIDERATIONS AND ISSUES: 2019 CMP: Top 25 Congested Corridor without current or planned projects

PA OneMap: No fiber, CCTV or DMS, high crash rate, wet road, curve and intersection crash cluster at Bethlehem Pk, spot rear end crash clusters



## FA.23: PA 132 (Street Road) TSMO Enhancements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Medium

PROJECT DESCRIPTION AND SCOPE: Deployment of TSMO strategies, including traffic signal enhancements from I-95 to PA 611

STAKEHOLDERS: Bucks County, PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 1-3 years

ESTIMATED COSTS:

\$\$  
(\$500k-\$2M)

Life Cycle: 10-15 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Moderate

TECHNOLOGY COMPONENTS: Traffic Signal System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Optimizes available capacity, improves traffic flow

OTHER CONSIDERATIONS AND ISSUES: 2019 CMP: Contains 2 of the Top 25 Bottleneck Intersections without Current or Planned Projects  
PA OneMap: Existing fiber, spot CCTV at I-95 & US 1, Spot locations have high crash rates, extensive rear end and intersection crash clusters, and Major Bottlenecks of 2021 and Travel Time Ratio over 4

## FA.24: Baltimore Pike TSMO Enhancements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Medium

PROJECT DESCRIPTION AND SCOPE: Deployment of TSMO strategies, including traffic signal enhancements, add fiber and connect to RTMC for remote monitoring from US 13 to I-476

STAKEHOLDERS: Delaware County, PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 1-3 years

ESTIMATED COSTS:

\$\$  
(\$500k-\$2M)

Life Cycle: 10-15 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Moderate

TECHNOLOGY COMPONENTS: Traffic Signal System, Communications Infrastructure

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Optimizes available capacity, improves traffic flow

OTHER CONSIDERATIONS AND ISSUES: 2019 CMP: Top 25 Congested Corridor without current or planned projects.

PA OneMap: Some existing fiber, large sections were on the 2021 Major Traffic Bottlenecks, no CCTV or DMS, but there is fiber, rear end and intersection crash clusters

## FA.25: Market Street TSMO Enhancements

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Medium

PROJECT DESCRIPTION AND SCOPE: Deployment of TSMO strategies, ICM, Multimodal Connections, Transit Traveler Information, transit signal priority, traffic signal enhancements from I-95 Penns Landing to 63<sup>rd</sup> Street (Cobbs Creek Parkway)

STAKEHOLDERS: City of Philadelphia, PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 1-3 years

ESTIMATED COSTS:

\$\$  
(\$500k-\$2M)

Life Cycle: 10-15 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Moderate

TECHNOLOGY COMPONENTS: Traffic Signal System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio, Increased Transit Usage, Increased Active Transportation Usage, Increase Bus Speed

BENEFITS: Optimizes available capacity, improves traffic flow, encourages transit and active transportation usage

OTHER CONSIDERATIONS AND ISSUES: 2019 CMP: Top 25 Congested Corridor without current or planned projects

PA OneMap: Sections with high crash rate, intersection, and rear end crash clusters

## FA.26: ITS Gaps/Enhancements on Adjacent Arterials and Parallel Corridors

FOCUS AREA: Freeway and Arterial Operations

PRIORITY: Medium

PROJECT DESCRIPTION AND SCOPE: Expand arterial ITS and fiber communications networks

STAKEHOLDERS: PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 1-3 years

ESTIMATED COSTS:

\$\$  
(\$500k-\$2M)

Life Cycle: 10-15 years

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Moderate

TECHNOLOGY COMPONENTS: CCTV System, DMS System, Communications Infrastructure, Traffic Signal System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Travel Time Ratio

BENEFITS: Optimizes available capacity of arterial parallel corridors, improves traffic flow, improves traveler information, improves incident detection

OTHER CONSIDERATIONS AND ISSUES: Potential Locations Include: Principal arterials or Other Arterials with high ADTs that are adjacent or parallel to major interstates, freeways or expressways and act as detour routes.

Potential Roadways Include: US 1 (detour route for I-95), US 13 (parallel to I-95 in Bucks and Philadelphia)

## TI.02: Truck Parking

FOCUS AREA: Traveler Information

PRIORITY: Medium

PROJECT DESCRIPTION AND SCOPE: Study of truck parking needs and/or development of additional truck parking facilities, traveler information of parking availability

STAKEHOLDERS: PennDOT District 6-0, DVRPC

ESTIMATED SCHEDULE: 1-3 years

ESTIMATED COSTS:

\$\$  
(\$500k-\$2M)

Life Cycle: 10-15 years

PROJECT TYPE: Planning

LEVEL OF EFFORT: Moderate

TECHNOLOGY COMPONENTS: N/A

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Increased Number of Parking Spaces

BENEFITS: Increases the amount of available truck parking

OTHER CONSIDERATIONS AND ISSUES: PA 2045 Freight Movement Plan: Existing truck peak utilization in PA is at 105%

Potential Roadways: I-95, I-76, I-676, I-476 all in Top 10 Major Truck Bottlenecks in PA. I-95 has a parking shortfall (Truck Parking in PA Final Report, Dec 2007)

## Appendix D. TIP Projects with ITS

## MAJOR TIP PROJECTS WITH TSMO ELEMENTS

MPMS #	Facility	Project Scope	Location	Category	Funded Cost (\$M)
15477	I-95 / US 322 / Highland Ave. Interchange	Realign I-95 and add new movements at interchange to 322, Bethel Rd., and Highland Ave.	Delaware	Roadway Expansion	\$119.80
104821	I-95 and I-476 Interchange	Add lane to on ramp from SB I-476 to SB I-95	Delaware	Roadway Operational Improvement	\$51.60
Multiple	I-95 Sector A (GIR, AFC, BRI, BSR, CPR)	Reconstruct from Race St. to State Rd.; Interchange improvements at Vine, Girard, Allegheny, Betsy Ross Bridge, Bridge, and Cottman interchanges	Philadelphia	Roadway Operational Improvement	\$2,440.90
103555	I-95 Corridor ITS (GR8)	Traffic signal interconnection and implementation of ITS devices along the US-1/Roosevelt Boulevard from 9th Street to Woodhaven Road in Philadelphia.	Philadelphia	Roadway Operational Improvement	\$23.00
106264	I-95 Sector B CAP	Build a cap/bridge structure over I-95 to provide direct pedestrian access from Center City to the waterfront	Philadelphia	Roadway Operational Improvement	\$223.93
106662	I-76 Integrated Corridor Management	Variable speed limits, queue detection, dynamic lane assignments, junction control improvements, adaptive ramp metering, continuous monitoring systems, responsive traffic control, coordination with SEPTA, biking enhancements, and full safety analysis	Montgomery	Roadway Expansion	\$220.70
104821	I-476 Active Traffic Management	Part-time shoulder use and other operational strategies from PA 3 to I-95	Delaware	Roadway Expansion	\$57.10
114112	US 1 at PA 352 and 452	Reconstruction of PA-352 cloverleaf interchange, Media Bypass/Baltimore Pike interchange, and PA-452 intersection, and eliminate lane drops.	Delaware	Roadway Operational Improvement	\$424.40
93445, 93446	US 1, Sec RC3	Reconstruct from I-276 / PA Turnpike to NJ state line; widen from PA Turnpike to PA 413; Interchange improvements	Bucks	Roadway Expansion	\$363.10
14532	US 30 / Coatesville-Downingtown Bypass (Eastern)	Reconstruct from Quarry Rd to PA 10, part-time shoulder use or flex lanes from Quarry Road to Reeceville Road, complete interchanges at PA 82, Airport Road, and make six other interchange improvements	Chester	Roadway Expansion	\$1,623.10
107650	PA 611 / Easton Rd	Corridor, signals, and intersection improvements between Blair Mill Rd. and County Line Rd..	Montgomery	Roadway Operational Improvement	\$89.30
105803	PA 309 Connector	Reconstruct and widen Township Line Road between Souderton Pike and the Sellersville Bypass	Montgomery	Roadway Expansion	\$81.42