PENNSYLVANIA

ROP

REGIONAL OPERATIONS PLAN

2007

Northwest Region

EXECUTIVE SUMMARY

INTRODUCTION

The Northwest PA Regional Operations Plan (ROP) was developed for PennDOT to address the Transportation Operation needs of the communities in NW Pennsylvania. PennDOT is responsible for transportation operations planning at the statewide level. The statewide plan is spelled out in the Transportation Systems Operation Plan (TSOP, adopted September 2005), which defines PennDOT's operational direction. This document is a centrally-led and coordinated statewide approach to transportation operations. The document builds on national definitions of "operations", such as that promulgated by the American Association of State Highway and Transportation Officials (AASHTO).

The direction established through the Northwest PA Regional ITS Architecture and the TSOP defined PennDOT's approach to Operations. The Regional ITS Architecture is one of nine regional documents that was designed to support the preparation and refinement of ITS across Pennsylvania. These preceding documents are resource tools for the ROP to help assist engineers, planners, designers, developers, managers, and decision-makers in defining a regionally-integrated surface transportation infrastructure.

The TSOP was driven by statewide direction and regional needs. The TSOP is used to enhance the operational efficiencies, improve public safety and security, and reduce traveler delay. **The ROP is being developed for PennDOT and its planning partners in each region to adapt or "rightsize" the statewide directions established in the TSOP and Regional ITS Architecture to their own specialized needs.**

After completion of the ROP, the programs delineated in it are to be implemented and mainstreamed in transportation planning documents and day-to-day activities. Outputs of the ROP will be used in future updates of the statewide TSOP and Regional ITS Architectures. The ROP is to be updated every two years to be kept current with the most recent needs and projects slated for deployment in the district.

NORTHWEST PA REGION

The Northwest (NW) PA Region includes PennDOT District 1-0 and Clarion County in PennDOT District 10-0. The following seven (7) counties represent the NW PA Region:

- Clarion,
- Crawford,
- Erie,
- Forest,
- Mercer,
- Venango, and
- Warren.

The NW PA Region is a rural region bordered by Ohio and New York. Erie is the main urban area in the region and attracts a large tourist population in the summer months from the Erie Bayfront. The Erie Bayfront is complemented by Presque Isle State Park,

Presque Isle Downs & Casino, and construction of a new convention center underway. The winter months see a lot of snow and inclement weather in the entire NW PA Region.

Recognizing that the NW PA Region is mostly rural, the ITS strategies and projects that were recommended out of the Regional Operations Plan (ROP) adhere to ITS/Operations direction already established in the region. The ITS strategies and projects recommended were designed to address the NW PA Region's transportation related problems, needs and challenges, significant effort was put forth to identify these challenges through relevant documents and Stakeholder participation throughout the ROP process.

PROJECT DEVELOPMENT

The development of the NW PA ROP followed a process that was outlined in the Regional Guidance Document (May 2006). The process established a Regional Operations Forum Committee that developed the general vision for the NW PA Region. The committee was made up of knowledgeable planning and transportation agencies in the region that helped to identify the ITS/Operations. The members were an extension of the Regional Advisory Panel (RAP) that was responsible for governing the development of the NW PA Regional ITS Architecture document.

The TSOP and Regional ITS Architecture documents laid the ground work for the integration of planning and operations in the ROP. The projects defined in these documents were used as a foundation for recommended project deployments in the ROP. In order to bring focus to the ITS planning process for the NW PA Region, it was important to address the needs of the region.

NW PA REGION NEEDS AREAS

The NW PA Region is somewhat familiar with ITS/Operations. The operations for the region are not as advanced as other Districts in the state. DMS, RWIS, HAR, Closed-Loop Signal Systems and Anti-Icing Bridge Systems are some of the ITS elements in the Region. The ROP process included Stakeholder input for the Needs Areas in the Region.

The four (4) Needs Areas were agreed to as the following:

1. Traveler Information
2. Incident and Emergency Management
3. Congestion Management
4. Communications

PROJECT DEPLOYMENTS

A list of potential projects were formulated and presented to Stakeholders at the second Workshop Meeting. This meeting brought together all the Stakeholders of the NW PA Region for their input on prioritizing the recommended project deployments. The recommended project deployments were categorized as short- and long-term projects.

Short-Term projects were identified by a time frame of 1 to 2 years and Long-Term projects by a 3 to 4 year time frame for programming.

Once a list of recommended projects was assembled, stakeholders were asked to rank the importance of each project in relation to the needs of the NW PA Region. This ranking process was used to determine the regional priorities. When ranking the project it was important to factor in the importance of the project, the complexity of the project and whether the project would require significant regional coordination. Projects were ranked based on a numbering system of ***1 (low priority) to 5 (high priority)*** with the level of complexity considered in the vote.

The Recommended Short-Term Projects were ranked as follows:

1. District 1-0 TMC (Oil City)
2. I-80 & I-79 Interchange DMS Replacement Project
3. I-80 & I-79 Interchange HAR Deployment
4. I-80 & PA 60 DMS Project
5. I-90 Traffic Surveillance Project
6. I-80 & PA 60 Interchange HAR Deployment
7. District 1-0 Communications Plan/Infrastructure
8. Statewide 5-1-1 Implementation
9. I-80 & Route 8 Interchange HAR Deployment
10. City of Erie Traffic Signal Project: Bayfront Connector (I-90 to Bayfront Parkway)
11. City of Erie DMS Project
12. City of Erie Traffic Signal Project: Route 5 (Millcreek/Erie)
13. I-79 & PA 358 HAR Deployment
14. City of Erie Traffic Signal Project: Peach Street (Erie)
15. City of Erie Traffic Signal Project: 38th Street
16. Venango County Traffic Signal Project: Downtown Oil City (CCIP)
17. Venango County Traffic Signal Project: City of Franklin
18. Phase 1: AITS Deployment for EMTA Transit Information
19. Phase 1: AVL Deployment on EMTA Buses

The Recommended Long-Term Projects were ranked as follows:

1. Coordination of Traffic Signals on Alternate Detour Routes for I-90: 12th Street & Bayfront Connector (PA 290)
2. NW PA Region Detour Routes GIS Mapping
3. Coordination of Traffic Signals on Detour Routes for I-90: 26th Street
4. Co-Located Regional PennDOT TMC (City of Erie, 9-1-1 Center, EMTA)
5. I-80 Traffic Surveillance Project (CCTV)
6. Coordination of Traffic Signals on Detour Routes for I-80: Route 62 (Sharon/Hermitage)
7. Coordination of Traffic Signals on Detour Routes for I-80: Route 18 (Hermitage)
8. Coordination of Traffic Signals on Detour Routes for I-80: Route 62/322 (City of Franklin)
9. Coordination of Traffic Signals on Detour Routes for I-80: Downtown Clarion Corridor
10. Traveler Information at NW PA Welcome Centers
11. Erie County Traffic Signal Pre-emption Project

12. Mercer County Traffic Signal Project: Mercer Borough
13. Downtown Meadville Traffic Signal Project
14. Hermitage & Sharon Traffic Signal Project: State Street (Sharon/Hermitage)
15. Hermitage & Sharon Traffic Signal Project: Route 62 (Hermitage)
16. Mercer County Traffic Signal Project: Route 58 (Grove City)
17. Hermitage & Sharon Traffic Signal Project: Route 19 (Hermitage)
18. Phase 2: AVL Deployment on EMTA Buses
19. Phase 2: AITS Deployment for EMTA Transit Information
20. EMTA Voice Annunciator & Passenger Counter Deployment Project

The projects prioritized as part of the ROP are intended to help determine where ITS/Operations funding should be focused in the coming years. The recommended project deployments programmed in the ROP are intended to be included in the 2009-2012 TIP Projects.

PROGRAM MANAGEMENT

The projects recommended in the ROP are to be adopted by the planning partners of the NW PA Region and considered for the 2009-2012 transportation improvement program (TIP). The ROP is scheduled to be updated every two (2) years so that projects that are a lower priority can move up in priority and be deployed as the ROP document is revised. The ROP is to be implemented and mainstreamed in transportation planning documents and day-to-day activities. The ROP program is to be included in the updates of the TSOP and Regional ITS Architecture.

It is recommended that individual agencies need to step forward to lead or "champion" individual ITS projects based on their level of interest and need. Each project programmed in the ROP is defined by a lead agency, and these lead agencies will need to take the initiative to move ITS Projects forward by identifying funding, developing a design, and taking it through procurement.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ACKNOWLEDGMENTS

Major contributions from the following PennDOT groups; Districts 1-0, 10-0, and 11-0, and the Bureau of Highway Safety and Traffic Engineering, made the Regional Operations Plan for the Northwest PA Region possible. The ROP was developed with input from multiple regional stakeholders.

PennDOT District Traffic Engineers
The Northwest PA ROP included Traffic Engineers from two (2) PennDOT Districts who contributed toward the development of the ROP:

- Tom McClelland PennDOT District 1-0
- Randall Brink PennDOT District 1-0
- Dave Tomaswick PennDOT District 10-0

Regional Steering Committee
The ROP was guided by the Regional Steering Committee consisting of the following individuals:

- Tom McClelland PennDOT District 1-0
- Randall Brink PennDOT District 1-0
- Mike Kapp PennDOT District 1-0 IT Department
- Cheryl Pastor PennDOT District 1-0 IT Department
- Mariah Hanson PennDOT District 1-0 Programming Services
- Brenda Murphy PennDOT BHSTE
- Dave Tomaswick PennDOT District 10-0
- Jake Welsh Erie County Metropolitan Planning Organization
- Bob Skarada Northwest Commission: Regional Planning & Development Commission
- Dan Gracenin Mercer County Metropolitan Planning Commission
- LeAnn Parmenter City of Erie
- Mike Will Erie Metropolitan Transit Authority (EMTA)
- Lorene McGuire Erie Metropolitan Transit Authority (EMTA)
- Joe Weindorf Erie County Emergency Management Agency (911)
- Abdul Osman Erie County Emergency Management Agency (911)
- Lt. Douglas McGee Pennsylvania State Police (PSP)
- Lt. Bradley Allen Pennsylvania State Police (PSP)

Consultant Team
Jacobs Edwards and Kelcey (JEK) facilitated the ROP process, documented the outcomes, and prepared the plan document.

ACRONYMS and ABBREVIATIONS

AFLADS	Automatic Fixed Location Anti/De-Icing System
ATR	Automatic Traffic Recorder
ATRWS	Automatic Truck Rollover Warning System
AVL	Automatic Vehicle Location
BHSTE	Bureau of Highway Safety and Traffic Engineering
CCTV	Closed-Circuit Television
CMP	Congestion Management Process
CVO	Commercial Vehicle Operation
DMS	Dynamic Message Sign
DVMT	Daily Vehicle Miles of Travel
EDP	Early Deployment Program
EMA	Emergency Management Agency
EMS	Emergency Medical Services
FHWA	Federal Highway Administration
FSP	Freeway Service Patrol
GPS	Global Positioning System
HAR	Highway Advisory Radio
HOV	High Occupancy Vehicle
IEM	Incident and Emergency Management
IEN	Information Exchange Network
IM	Interstate Maintenance
ISP	Information Service Providers
ITS	Intelligent Transportation System
LRP	Long Range Plan (or Long Range Transportation Plan)
MPO	Metropolitan Planning Organization
NWS	National Weather Service
O&M	Operations and Maintenance
OA	Office of Administration
OIP	Other in-Pavement Loop Site
PEMA	Pennsylvania Emergency Management Agency
PennDOT	Pennsylvania Department of Transportation
PSP	Pennsylvania State Police
PTC	Pennsylvania Turnpike Commission
RCRS	Road Closure Reporting System
RIMIS	Regional Integrated Multimodal Information Sharing
ROP	Regional Operations Plan
RPO	Rural Planning Organization
RTMC	Regional Transportation Management Center
RTMS	Remote Traffic Microwave Sensor
RWIS	Road Weather Information System
SAMS	Signals Asset Management System
STMC	Statewide Transportation Management Center
TIP	Transportation Improvement Program
TMA	Transportation Management Approach
TMC	Transportation Management Center
TSAMS	Traffic Signal Asset Management System
TSOP	Transportation Systems Operations Plan
UPWP	Unified Planning Work Program

1. BACKGROUND

Transportation agencies today do not always have the luxury of undertaking massive new capacity expansion projects. Instead, more innovative approaches are often required to optimize the use of transportation infrastructure and achieve heightened operational efficiencies. Those activities, approaches, and procedures that help to maximize efficiencies are part of the transportation operations program. Operations' planning is the process used to define and prepare for operations programming.

The Pennsylvania Department of Transportation (PennDOT) is responsible for operations planning at the statewide level. The statewide plan is spelled out in the Transportation Systems Operations Plan (TSOP), which defines PennDOT's operational directions over the next several years.

To complement the statewide operations planning effort, each of the nine (9) transportation operations regions across the Commonwealth has undertaken preparation of a Regional Operations Plan (ROP), which documents each region's approach to operational activities. The plans were prepared through joint consultations between PennDOT District offices, transportation planning partners, and other key regional stakeholders. The plans all use TSOP as a starting point, but adapt the statewide directions to each region's transportation conditions, values, and priorities.

1.1 Statewide TSOP Initiative

The Transportation Systems Operations Plan, adopted in September 2005, defines PennDOT's general framework for managing capacity along the Commonwealth's roadways. Its development was a response to PennDOT Executive Goal No. 6, to "effectively and efficiently operate the transportation system." Toward this end, TSOP has four overarching goals:

1. build and maintain a transportation operations foundation,
2. improve highway operational performance,
3. improve safety, and
4. Improve security.

Associated with these goals are a series of tangible objectives. Key objectives include:

- support transportation operations uniformly in all PennDOT engineering districts,
- furnish consistent incident response on all segments of the interstate system, regardless of location,
- share timely, reliable information about incidents among federal, state, and regional/local emergency management agencies,
- improve mobility on arterials through consolidated, inter-municipal management of traffic signals,
- Provide practical, reliable traveler information to transportation consumers using no-cost or low-cost media, and

- Define and implement performance metrics for effectively managing operations and guiding planning and funding.

An electronic version of the TSOP document is available at http://paits.org.

TSOP, first and foremost, is an action plan of statewide projects. There are 19 projects that encompass four priority areas:

- incident and emergency management,
- traffic signals,
- traveler information, and
- Standardization.

Standardization encompasses the uniformity of hardware, software, communications procedures and protocols, etc.

TSOP is being updated during calendar year 2007.

1.2 ROP Scope and Objectives

The Regional Operations Plan for the NW PA Region specifies the intended approach to transportation operations. It identifies, defines, and prioritizes operationally-focused projects for the region, consistent with regional and statewide operations objectives. The ROP sets the stage for regional implementation of pertinent elements of TSOP. It may also identify other initiatives reflective of the specialized needs of the region.

Development of the ROP is intended to:

- define a strategic transportation operations plan for the region,
- extend TSOP to the regional level,
- tailor statewide directions to regional needs,
- specify and prioritize regional operations projects,
- achieve uniformity and compatibility across operations regions, and
- expand cooperative relationships between regional transportation operators and planning partners.

Regarding the last item, the ROP process is intended to link planning and operations. It emphasizes (1) collaboration and coordination among regional planners and operators, and (2) structured assessment of the planning and operational implications of expanded management procedures, technology systems, and investments. The ROP will feed into the Long-Range Plans (LRPs) in each region and the corresponding Transportation Improvement Programs (TIPs). Each ROP will also supply important inputs to future updates of TSOP, Regional Intelligent Transportation System (ITS) Architectures, and PennDOT's Long-Range Statewide Transportation Plan (Mobility Plan).

ROP stakeholders in every region are presenting the ROP document to their respective metropolitan planning organizations (MPOs) and regional planning organizations (RPOs), encouraging these planning partners to adopt or endorse the plans.

It is expected that all ROPs will be updated at two-year intervals in advance of biannual TIP update cycles.

1.3 ROP Development Process

The Regional Operations Plan (ROP) is being completed statewide for all the PennDOT Districts. The recommended procedures for defining and developing a ROP are listed in the Regional Guidance Document. This document outlines the procedures for developing the ROP in order to keep all ROPs consistent with one another. There are seven (7) steps consistent with the systems engineering process are summarized below:

1. Establish a Regional Operations Forum (ROF). The ROF was a group of knowledgeable planning and transportation partners who are involved in operations and transportation for the region. The ROF committee for NW PA Region was a new committee with representation from the following:

- NW PA Planning Partners
- PennDOT District 1-0
- PennDOT District 10-0
- Transit Authority
- Emergency Management Agency/ 9-1-1
- Pennsylvania State Police (PSP)
- PennDOT Central Office

2. Review/Update Plans and Document Projects. A memo of the existing and planned projects was compiled as the information for the NW PA Region. The documents reviewed in preparing the project inventory include the following:

i. Regional Guidance Document

The Regional Guidance Document was prepared by PB, May 2006, to outline an approach for developing the Regional Operations Plan (ROP). This document is being used by each PennDOT District completing a ROP.

ii. 2005 Transportation Systems Operations Plan (TSOP)

The Transportation Systems Operations Plan (TSOP) was prepared by PB in September 2005 and defines the statewide plan for operations. The TSOP will be updated on a bi-annual basis and its purpose is to set statewide direction for projects in Intelligent Transportation Systems (ITS) and to formalize and extend PennDOT's business focus to include operations. TSOP is predicated on four goals, which include building and maintaining a transportation operations foundation, improving highway operational performance, improving safety, and improving security.

In order to achieve these goals, the TSOP outlines 19 distinct statewide projects that include both planning efforts as well as deployments. These projects cover areas of priority such as operations mainstreaming, ITS maintenance, standards and procedures, resource management, information technology, and intermodal support. Coordination of these

priorities will be carried out both through statewide initiatives and regional deployments dependant on localized needs. Like the ROP, the TSOP is positioned to be linked to the two-year Transportation Improvement Program (TIP) updates.

In development of the ROP, the TSOP is to be used as the primary guideline to follow, with the ROP covering the more specific regional needs of NW PA Region.

iii. District 1-0 ITS Strategic Plan

The District 1-0 ITS Strategic Plan identifies the ITS/Operations direction for the region. The existing and planned projects listed in the Strategic Plan were the basis for identifying the projects to be programmed for the ROP.

iv. Northwest Regional ITS Architecture

The Northwest Regional ITS Architecture helped The Pennsylvania Department of Transportation (PennDOT) and Regional Stakeholders from around the state address the application of current and future technology applications to transportation systems. The integration and operation of these technology applications and systems is an important issue regionally and statewide. This information is the basis for the ROP that initiates the implementation of the operations identified in the Regional ITS Architecture.

v. Erie Bayfront Traffic & Planning Study

The Erie Bayfront Traffic & Planning Study was the most recent plan completed for the Northwest Region. The study produced three (3) separate reports, an Origin-Destination Study, an EMTA Traveler Information Feasibility Study and an Intelligent Transportation Systems (ITS)/TMC Needs Analysis. The information that came out of these reports included ITS deployments for the City of Erie, and an Automatic Vehicle Locator (AVL) deployment on EMTA buses. These projects can be programmed as projects in the ROP so that they will be included as TIP Projects as well as improve ITS/Operation projects for the entire Northwest PA Region.

3. Define Regional Needs and Priorities. A workshop was held with transportation and planning stakeholders of the region to define and discuss operational needs for the region. The starting point for identifying critical needs was TSOP, followed by region-specific operational requirements addressed at the first forum workshop. Following this discussion, four operational areas were identified that captured these needs into defined groups (i.e., incident and emergency management, traveler information, traffic signals, and institutional issues).

4. Identify Regional Operations Concepts. Each of the operations areas was then assigned a task force that reviewed the list of needs associated with its respective operations area, and identified solutions to those needs in the form of potential “projects” (i.e., policies, planning studies or physical deployments). These projects reflected the specialized conditions and circumstances of the region consistent with statewide guidance.

5. Define Operations Projects. Project concepts were developed based on the TSOP projects and in support of the needs that were discussed at the Task Force Meetings. Projects were defined based on the operations concept(s) that Stakeholders wanted to see implemented.

The recommended projects may be regional in scope or they may demonstrate proof-of-concept in one part of the region. Projects identified were realistic, manageable, and achievable within the short-term and long-term timeframe. Projects that did not meet this timeframe were recommended to be considered as a future implementation.

6. Develop a Regional Program. The recommended projects were prioritized based on a short-term and long-term timeframe. Stakeholders ranked the recommended projects based on funding, complexity and need. The recommended projects are to be programmed in Long-Range Plans (LRPs), the 2009 TIP, and other pertinent venues. The stakeholders participated in the project prioritization at the final workshop to help identify a regional program to best fit their regions' needs.

7. Prepare and Adopt a Regional Operations Plan. The results of the entire ROP planning effort were documented as the ROP Plan. At a minimum, the plan encompasses: (1) background, (2) short- and long-term projects, and (3) program implementation. The ROP is to be reviewed and adopted by the planning partners in the region.

1.4 ROP Oversight and Management

The development of the ROP required several meetings to be conducted. The meetings helped to identify the needs of the region and the assemble project deployments to be programmed. The schedule of meetings held for the Northwest PA ROP was as follows:

Meeting	Date
Northwest PA ROP Kick-off Meeting	November 7th, 2007
ROF Committee Meeting #1	December 12th, 2007
Workshop Meeting #1	January 24th, 2007
Task Force Meeting #1	March 6th, 2007
Task Force Meeting #2	April 3rd, 2007
Workshop Meeting #2	May 16th, 2007

1.4.1 Regional Operations Forum

As part of the effort to develop the ROP a Regional Operations Forum (ROF) was established. The ROF committee represents a decision-making body of knowledgeable planning partners and practitioners across the region to plan and oversee transportation operations. Their effort in developing the ROP follows the principles behind the TSOP and all projects that are ongoing and/or planned already for deployment in District 1-0. The ROF committee is made up of an extended group of stakeholders from the Regional Advisory Panel (RAP) that developed the Regional ITS Architecture. These stakeholders include:

Stakeholder	Member Contact
District 1-0	Tom McClelland- *Project Manager*
	Randy Brink- *District Traffic Engineer*
	Mike Kapp- *IT Department*
	Cheryl Pastor- *IT Department*
	Mariah Hanson- *Programming Services*
PennDOT BHSTE	Brenda Murphy
PennDOT District 10-0	Dave Tomaswick
Erie Metropolitan Planning Organization (MPO)	Jake Welsh- *Director*
Northwest Commission: Regional Planning & Development Commission	Bob Skarada
Mercer County Metropolitan Planning Commission	Dan Gracenin
City of Erie	LeAnn Parmenter
Erie Metropolitan Transit Authority (EMTA)	Mike Will
	Lorene McGuire
Erie County Emergency Management Agency (911)	Joe Weindorf – *Director*
	Abdul Osman – *IT Director*
Pennsylvania State Police (PSP)	Lt. Douglas McGee
	Lt. Bradley Allen

The organizations involved in the development of the ROP are the knowledgeable authorities on their own conditions and have a reasonable degree of autonomy to adapt statewide directions to their particular circumstances.

1.4.2 Stakeholders

The Workshops and Task Force meetings were held with stakeholders from the NW PA Region that included a large representation of operations personnel from across the region. The stakeholders represent a similar interest in the regional operations that exist and are planned for District 1-0. They bring a diverse range of input to the operational direction for the region. The purpose of the Workshop and Task Force meetings was to identify and prioritize the needs of the region with help from the interested stakeholders in the area. The ROF Committee and Stakeholders worked collaboratively to develop the needs of the NW PA Region.

The stakeholders involved in the Workshop and Task Force meetings and development of the ROP included:

- Pennsylvania State Police (PSP)
- PennDOT Central Office
- Erie Metropolitan Transit Authority (EMTA)
- Crawford Area Transportation Authority (CATA)
- Northwest Commission: Regional Planning and Development Commission
- Mercer County Regional Planning Commission
- PennDOT Offices:
  - District 1-0
  - District 10-0

- District 11-0
- Clarion County Planning Commission
- Warren County Planning & Zoning Commissions
- Venango County Emergency Management Agency
- Erie County Emergency Management Agency (911)
- Crawford County Office of Emergency Services
- Federal Highway Administration (FHWA)

2. REGIONAL ACTIVITIES AND INITIATIVES

2.1 Description of the Region

The Northwest PA Region includes PennDOT District 1-0 and Clarion County in PennDOT District 10-0. The following seven (7) counties represent the Northwest PA Region:

- Clarion,
- Crawford,
- Erie,
- Forest,
- Mercer,
- Venango, and
- Warren.

The NW PA Region is bordered by New York and Ohio states. Erie is the main urban concentration in the Northwest Region. A large portion of the Region's population lives in or near this metropolitan area. The City of Erie sees a lot of travelers in the summer months with visitors to the Presque Isle State Park and the Bayfront. The winter months bring a lot of snow to the region. The counties outside of the City of Erie and Erie County are rural areas. Traveling south on I-79 links the Northwest Region to the City of Pittsburgh.

The planning partners that are part of the Northwest PA Region include:

- Erie County Metropolitan Planning Organization (MPO),
- Mercer County Metropolitan Planning Organization (MPO), and
- Northwest Commission: Regional Planning & Development Commission

The planning partner's role in the ROP process is crucial to securing the possibility of plans being implemented. The ROP gives PennDOT engineering districts, metropolitan planning organizations (MPO's), and rural planning organizations (RPO's) discretion to custom-tailor statewide priorities for their region. Following the same purpose, the ROP will prepare the way for operational activity and interaction by the PennDOT district office(s) and planning partners in the region.

2.1.1 Population

According to the US Census Bureau for Pennsylvania an estimate of population stats is available for the counties in the NW PA Region as of 2005. Approximately three quarters of the Region's population resides in Crawford, Erie and Mercer Counties with the remainder scattered among the other counties of the Region. **TABLE 1** includes all the counties representing the NW PA Region including their Population and Land Area in square miles.

TABLE 1: NORTHWEST PA POPULATION BY COUNTY

County	Population	Land Area (sq. miles)
Clarion	40,589	602
Crawford	89,442	1,012
Erie	280,446	801
Forest	5,739	428
Mercer	119,598	671
Venango	55,928	675
Warren	42,033	883

2.1.2 Roadway System

The NW PA Region contains a range of important highway corridors. The most significant corridors are listed in **TABLE 2**.

Interstate 79, the Pittsburgh to Erie Regional Thruway traverses the entire region north to south. There is a desire for ITS traveler warning systems in the corridor to alert travelers of traffic accidents, weather conditions and other emergencies. The I-79 corridor requires additional intelligent transportation system (ITS) facilities similar to other Pennsylvania interstates.

Interstate 80 is a significant carrier for commerce and tourism. The corridor is heavily used by truckers and travelers between the Midwest and the Northeast United States. I-80 provides a non-toll alternative to I-76, the Pennsylvania Turnpike. It is Pennsylvania's longest (311 miles) east-west interstate. Improvements along the interstate have been identified as necessary by the Mercer County MPO. I-80 running through Clarion County is being enhanced by a major ITS project that is listed on the 2005/2008 TIP.

Pennsylvania Route 6 encompasses eleven counties, stretches over 400 miles across northern PA and encounters many of the Keystone State's historic treasures and scenic places. In the NW PA Region, Route 6 runs through Warren, Crawford and Erie Counties. The recent recognition of Route 6 as a Tourism corridor has brought more tourism and travel to the NW PA Region.

PA 60 (future I-376) is a limited access facility connecting the Shenango Valley with Toll PA 60 - the James E. Ross highway - in New Castle. This highway provides travelers access to the Pennsylvania Turnpike and the Beaver Valley Expressway north of

Pittsburgh. The MPO has classified PA 60 as a Rural Principal Arterial while PA 18 is a rural minor arterial (west of PA 60) and a Rural Major Collector (east of PA 60).

The PA 18 Corridor extends from PA 518 in Hermitage north approximately eleven miles to downtown Greenville Borough. The corridor serves as the main travel and commercial highway between the greater Greenville area and the Shenango Valley. The Mercer County Regional Planning Commission has functionally classified the roadway through the City of Hermitage as an Urban Principal Arterial.

Interstate 90 cuts through Erie County connecting Erie with the states of Ohio and New York and is 46 miles long. It was one of the first interstates to be completed border to border in Pennsylvania.

Originally New York 17, the Eastern Interstate 86 corridor was given high priority status in 1998, which led to the Interstate 86 designation. Designated in 1999, Interstate 86 currently extends from just east of Erie, Pennsylvania, to New York 14/Exit 52 in Horseheads. Interstate 86 does not follow any specific U.S. route with the exception of a small portion of U.S. 6 near the future eastern terminus.

TABLE 2: SIGNIFICANT HIGHWAY CORRIDORS

Interstates	United States (U.S) Routes	Pennsylvania (PA) Routes
I-79	US- 6	PA 8
I-90	US- 19	PA 5
I-86	US- 20	PA 18
I-80	US- 62	PA 58
	US- 322	PA 60
		PA 97
		PA 257

The Northwest Region encompasses a substantial network of roadways, depicted in **TABLE 3**. As reported in PennDOT's 2002 Highway Statistics, the Region contains 11,684.7 linear miles of roadway, signifying 7.6 percent of the Commonwealth's total linear mileage.

TABLE 3: NORTHWEST PA LINEAR MILES

County	PennDOT Linear Miles	Total Linear Miles
Clarion	469.6	1,427.4
Crawford	909.9	2,432.8
Erie	778.8	2,569.6
Forest	206.5	541.4
Mercer	743.5	2,016.4
Venango	529.0	1,364.9
Warren	531.4	1,331.9
Regional Total	4168.7	11,684.7

2.1.3 Regional Congestion

Congestion is seen primarily on the major highways, but is limited since the region is primarily rural in nature. The Erie Metropolitan Area has the most congestion in the region due to both the population and attractions.

Erie County has a greater proportion of resident workers than many Pennsylvania counties, with approximately 93% of its workers living in the county. Commuters in the Erie area primarily travel by private automobile, with about 80% of commuters traveling alone. Access control/mobility on arterial routes in the Erie urban area; and the major arterial routes connecting the outlying urbanized communities to the Interstate System and Erie urban area is inadequate during peak periods.

The region is home to multiple transit providers, including:

- Crawford Area Transportation Authority (CATA)
- Erie Metropolitan Transit Authority (EMTA)
- Transit Authority of Warren County (TAWC)
- Mercer County Community Transit (MCCT)
- Shenango Valley Shuttle Service
- Venango County Go Bus

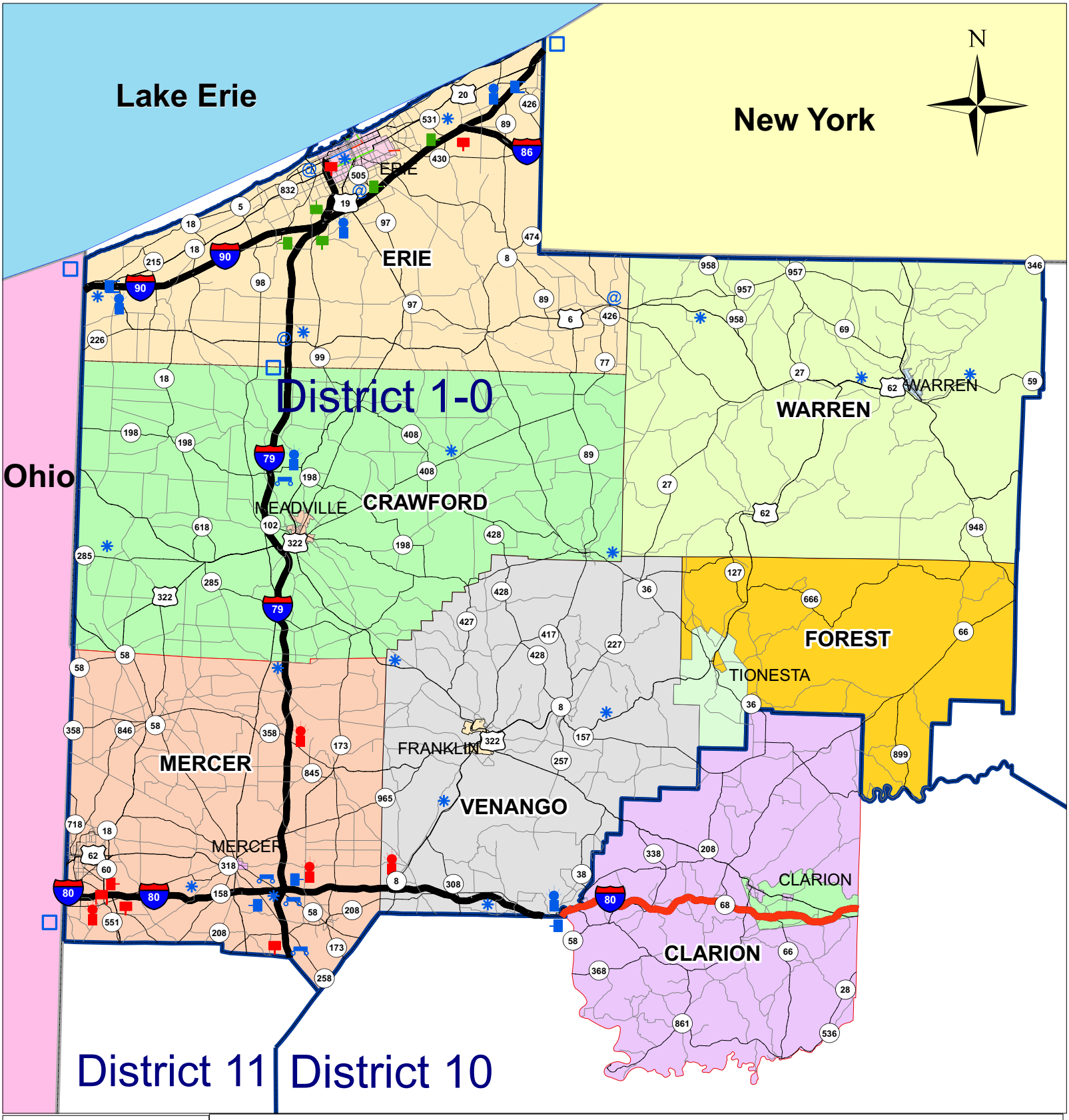
2.2 ITS and Operations

ITS devices are not completely new to the NW PA Region. There are limited ITS systems that have been implemented and are functioning throughout the region, and there are several more projects in the planning and design stage. An inventory and understanding of these existing systems is critical to the needs analysis development of the ROP. The existing conditions were used as the basis for ID of the transportation issues and problems in the region that might be addressed with ITS solutions.

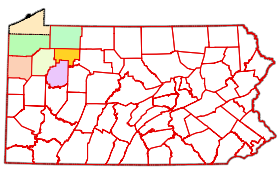
The ITS devices that are deployed in the District are listed below:

- Dynamic Message Signs (DMS) – Overhead, Pedestal and Portable units
- Highway Advisory Radio (HAR)
- Roadway Weather Information System (RWIS)
- Closed-Loop Traffic Signal Systems
- Anti-icing Bridge Sprayers

The District 1-0 TMC in Oil City, PA controls the operations of DMS and HAR in the NW PA Region. The Existing and Planned ITS/Operations in the Region are shown below in FIGURE 1.



Northwest PA Region ITS Device Locations



Legend

- RWIS
- Pedestal VMS
- Anti-Icing Bridge
- Overhead VMS
- HAR
- Portable VMS
- Welcome Center
- Existing
- In Construction
- Future
- Future_ITS_deployment
- Twisted Pair
- Fiber
- Spread Spectrum
- Interstate
- U.S. Route
- PA State Route
- Local Roads

PENNDOT

0 2.5 5 10 15 Miles

2.2.1 Traffic Management Center (TMC)

A TMC is the central location for the collection, processing, and dissemination of information used for traffic management activities. Currently, traffic management and operations for PennDOT Engineering District 1-0 (including the Erie Metropolitan Area) are directed from the Traffic Unit at the District office in Oil City, PA. The current operations consist of a laptop computer for DMS control. The Traffic Unit also has the ability to post and edit HAR messages. Due to the limited functionality of the current setup, the investigation of a new TMC facility for PennDOT District 1-0 is necessary.

2.2.2 Traffic Signals

Most traffic signals in the Erie area are currently operating on stand-alone timing plans, while some are in a Closed-Loop coordinated system. PennDOT District 1-0 has every traffic signal in the District in a database. The limits of the existing coordinated traffic signal systems in the NW PA Region are listed in **TABLE 4** by county.

TABLE 4: TRAFFIC SIGNAL SYSTEMS

SIGNALIZED CORRIDORS	
Crawford County	***City of Meadville:*** • SR 27 (Washington Street): Hickory Street to & Park Ave. • North Street & Market Street • North Street & Water Street • SR 1001 (Park Avenue): Chestnut Street to Main Street • SR 322 (Linden Street) & S. Main Street • SR 6 (French Creek Parkway) & Linden Street ***City of Titusville:*** • SR 8 (Spring Street): Central Avenue to Franklin Street • Main Street: Washington Street to Franklin Street • SR 8 (Spring Street): Perry Street to Spring Street ***Vernon Township:*** • SR 6 (Conneaut Lake Road): Pennsylvania Avenue to Meadville Mall Drive ***Conneaut Lake Borough:*** • SR 6 (Water Street): Fourth Street to First Street
Erie County	***City of Erie*** • West 26th Street: Hudson/Geist to State Street • East 26th Street: French Street to Elm Street • Bayfront Parkway: State Street to Holland Street • Bayfront Parkway: Port Access to 6th to 6th Street/East • Peach Street: Liberty Street to Chestnut Street • Bayfront Connector: E. 8th Street to E. 12th Street • Bayfront Connector: McClelland Avenue to Shannon Road

	• West 38th Street: Glenwood Park to Cherry Street • East 12th Street: French Street to Reed Street • West 12th Street: Weschler Avenue to State Street
Clarion County	***Clarion Borough*** • Main Street: 5th Avenue to 9th Avenue *(twisted pair)* • 8th Avenue/Wood Street *(Connected to Main Street via GPS Time Synchronization Module)*
Mercer County	***Grove City Borough:*** • SR 58 (Main Street): Liberty Street to S. Center Street • Center & Pine Street • S. Broad Street: Pine Street to North Street ***Greenville Borough:*** • Main Street : Clarksville Street to Columbia Avenue • Mercer Street : Stewart Avenue to Shenango Street • College Avenue & Shenango Street ***Springfield Township:*** • SR 208 (Grove City Road): SR 258 (Butler Pike) to Grove City Outlets Drive ***Wheatland Borough*** • Broadway Avenue & Mercer Street • Council Avenue & Broadway Avenue ***Hempfield Township:*** • SR 358 (Hadley Road) & SR 4006 (Williamson Road) • SR 4006 (Williamson Road) & Wal-Mart Drive ***Pine Township:*** • SR 58(Mercer Road) & George Jr. Road • SR 58 (Mercer Road) & Wal-Mart Drive ***City of Hermitage:*** • SR 3014 (Highland Road) & N. Buhl Farm Drive • SR 3014 (Highland Road) & Clarksville Road • SR 3025 (N. Buhl Farm Drive) & E. State Street • SR 3008 (E. State Street): Ellis Avenue to Maple Drive • SR 62 (Shenango Valley Freeway): Maple Drive to Hermitage Road • SR 418 (Mercer Avenue) & Morefield Road • SR 18 (N. Hermitage Road): Lamor Road to Glimcher Boulevard ***Mercer Borough:*** • SR 19 (Erie Street): SR 2008 (N. Butler Street) to SR 58 ***City of Sharon*** • SR 718 (State Street): Water Avenue to Chestnut Street
Venango County	***City of Franklin*** • SR 322 (13th Street): Atlantic Avenue to Elk Street • SR 62 (Liberty Street) & SR 322 (13th Street)

	• Buffalo Street & 13th Street • SR 62 (Liberty Street): Elk Street to 11th Street • SR 322 (Liberty Street): 9th Street to Elk Street ***Oil City:*** • SR 8 (Center Street): SR 1002 (Main Street) to Seneca Street • SR 1001 (Center Street) & Elm Street • Elm Street & Sycamore Street • SR 62 (Front Street): SR 62 (Petroleum Street) to State Street ***Sugarcreek Borough:*** • SR 62 (Allegheny Avenue): Sugarcreek Center to Quality Farm and Fleet ***Cranberry Township:*** • SR 257 (Salina Road) & Cranberry Mall Drive to 28th Division Highway • SR 322: Home Depot Drive to Ross Drive
Warren County	***City of Warren:*** • SR 62 (Market Street): Fifth Avenue to Second Avenue • Liberty Street: Second Avenue to Fourth Avenue • Hickory Street: Fourth Avenue to Third Avenue • SR 6006 (Pennsylvania Ave): Hickory Street to South Street

The communications infrastructure for the closed-loop signal systems includes:

- Twisted Pair Cable
- Fiber Optic Cable
- Spread Spectrum Radio

Traveler Information

Currently, traveler information is relayed to motorists via Dynamic Message Signs (DMS) and Highway Advisory Radio (HAR). There are four (4) Welcome Centers in the Region that provide visitors information on the area. **TABLE 5** below includes the existing locations of DMS by county.

TABLE 5: NORTHWEST PA DMS LOCATIONS

	DMS
Erie County*	• I-90 WB near the NY State Line (SR 20) -*existing* • I-90 EB near the Ohio State Line (US 6N)- *existing* • I-90 WB approaching SR 0430/Bayfront Connector • I-90 WB approaching I-79 • I-79 SB approaching I-90 • I-90 EB approaching I-79 • I-79 NB approaching I-90
Clarion County*	• I-80 WB approaching Exit 42 • I-80 WB approaching Exit 45 • I-80 EB approaching Exit 53 • I-80 WB approaching Exit 53 • I-80 EB approaching Exit 60 • I-80 WB approaching Exit 60 • I-80 EB approaching Exit 62 • I-80 WB approaching Exit 62 • I-80 EB approaching Exit 64 • I-80 WB approaching Exit 64 • I-80 EB approaching Exit 70 • I-80 WB approaching Exit 70 • I-80 EB approaching Exit 73
Crawford County	• I-79 at SR 198 at Mile Post 153.5
Mercer County	• I-79 at Mile Post 110 • I-79 SB approaching SR 208/258 • I-80 EB approaching I-79 Interchange • I-80 WB approaching I-79 Interchange • I-79 NB approaching I-80 Interchange • I-79 SB approaching I-80 Interchange
Venango County	• I-80 EB approaching SR 268

In-Construction

The District has currently started construction on five (5) DMS in the Erie Metropolitan Area. The permanent DMS are to be used to provide information about incidents, special events, hazardous weather, and road closures. The DMS locations are along Interstates 79 and 90 at major interchanges, as listed in **TABLE 5**.

The use of DMS helps communicate vital traffic information to drivers. The deployment of more DMS would enhance traveler information. The current operations for posting DMS messages are done by PennDOT's District 1-0 Control Center. The PSP can call PennDOT with a message to be posted on the DMS on an as needed basis.

HAR provides traveler information to motorists via AM radio. These systems consist of transmission sites positioned along the roadway network at strategic locations. Typically, HAR systems involve the use of dedicated AM radio frequencies/channels and have a broadcast range of ½ to 2 miles. A HAR system, if updated in a timely fashion, can be used to disseminate a significant amount of traveler information, using a live message or pre-selected recorded messages. HAR messages are controlled by the

District 1-0 Control Center. The locations for HAR in the region are included in **TABLE 6**.

TABLE 6: NORTHWEST PA HAR LOCATIONS

	HAR
Erie County	• I-79 NB approaching I-90 • I-90 WB approaching SR 20 by the New York border • I-90 EB approaching US 6N by the Ohio Border
Clarion County	• I-80 at Exit 45 • I-80 at Exit 53 • I-80 at Exit 60 • I-80 at Exit 64 • I-80 at Exit 70
Crawford County	• I-79 at SR 198 at Mile Post 153.5
Venango County	• I-80 at Exit 42

RWIS

The district faces harsh winter weather and it is important to emphasize winter-time activities. The deployment of RWIS stations is important to the region, especially in areas where winter "white outs" are common. RWIS stationed in these areas can help communicate weather and traveler information to motorists easier. The locations for RWIS in the region are included in **TABLE 7**.

PennDOT currently operates 17 Road Weather Information Systems (RWIS) in the NW PA Region and each RWIS has a fixed CCTV camera at the site. The main purpose of the RWIS is to facilitate the scheduling and dispatch of roadway maintenance and snow clearing crews. The RWIS stations measure and provide the following information:

- Pavement surface condition,
- Surface temperature,
- Subsurface temperature,
- Air temperature,
- Relative humidity and dew point,
- Wind speed and direction,
- Precipitation type and intensity,
- Visibility, and
- Video of current conditions (some locations).

TABLE 7: NORTHWEST PA RWIS LOCATIONS

RWIS	
Crawford County	• SR 77 (0220/0000) • SR 285 Pymatuning Causeway
Erie County	• I-79 at Exit 166 (State Route 6) • I-79 at Exit 183 (Conrail Bridge) • SR 4034 Wintergreen Gorge Bridge • I-90 Milepost 1 camera • I-90 at I-86
Mercer County	• I-79 at MP 136 • I-80 Exit 015 at MP 11 • I-80 EB approaching I-79 Interchange
Venango County	• I-80 Exit 35 at MP 37.5 • SR 8 at SR 308 • SR 27 (0020/0000) • SR 62 (0700/0300) • SR 322 near Venango/Crawford Co. Line
Warren County	• SR 6 a ½ mile east of Sears Rd. • SR 59 near Kinzua Dam

There are four (4) Anti-Icing Bridge Systems in the NW PA Region. These systems address a number of safety issues and provide solutions for improving road conditions by preventing the formation of ice in spot locations. Fixed anti-icing detects ice in likely locations, such as bridge decks or shady areas, and treats the roadway before it becomes hazardous to drivers. These systems require environmental or in-road sensors, a processor to determine when conditions require de-icing, and a device for removing ice. The following table lists the locations in the region:

TABLE 8: NORTHWEST PA ANTI-ICING BRIDGE SYSTEMS

ANTI-ICING BRIDGE SYSTEMS	
Erie County	• I-79 at Exit 166 (State Route 6) • I-79 at Exit 183 (Conrail Bridge) • SR 4034 Wintergreen Gorge Bridge
Warren County	• SR 6 (West of Warren)

Communication Systems

Voice-grade telephone service is currently utilized in the region for connections to DMS and HAR. Both of these devices do not require high bandwidth data transmissions. For this reason continuous communication is not required. Communication is only required when changing messages or polling the sign to confirm the current message, therefore the existing voice-grade telephone service works well for DMS and HAR. Closed loop traffic signal systems utilize a variety of communications infrastructure including twisted pair, fiber optic cable, and spread spectrum radio.

Currently, only state agencies have 800 MHz system in place for interoperable voice communications, text messaging, and vehicle tracking. It is planned for the 800 MHz system to be deployed as a statewide communication system. The deployment at the local level would allow for the radio system to be in municipal public safety vehicles, and integrated into County vehicles. It will create interoperability for all public service vehicles and centers.

2.3 Other Regional ITS/Operations Initiatives

Erie Metropolitan Transit Authority (EMTA) is currently deploying Advanced Public Transportation Systems (APTS). EMTA has deployed an Automatic Vehicle Locator (AVL) system with the capability to broadcast real-time bus arrival information to Bus Stop DMS, Kiosks and the EMTA website. This is a "Pilot Phase" or "Phase 1" that includes ten (10) of the EMTA buses and eleven (11) AITS (Automated Information Traveler System) sign locations, five indoor and six outdoor.

The AITS that are being implemented are located at the following indoor locations:

- University of Edinboro Student Union
- Erie Conference Center
- Erie Civic Center
- Erie Intermodal Facility
- Erie Insurance Building

The AITS that are being implemented are located at the following outdoor locations:

- Edinboro Wal-Mart
- Ontario St. E. Normal Street
- Lawrence Towers Complex
- Liberty Park – Ride Lot Bayfront Hwy
- Perry Square
- 10th & State Street

EMTA has plans to deploy "Phase 2" or a "Full Fleet Phase" for AVL deployments on the rest of the fleet and deploy additional AITS in the downtown Erie area. The AVL will involve more funding that has not been secured, but will be investigated after the "Pilot Phase". EMTA plans to eventually have GPS locators for the entire bus fleet so that the buses can be located.

The deployment of AVL on EMTA buses in the City of Erie can encourage the deployment of AVL on transit units throughout the NW PA Region so that all buses are user-friendly to the riders of the community. Mercer County plans for AVL on fixed-bus routes for tracking and transit management operations.

2.4 National Initiatives

SAFETEA-LU requires consideration of transportation systems operations and management from two primary levels in the planning process. First, long range transportation plans shall contain operational and management strategies to improve the performance of existing transportation facilities. Second, within transportation management areas, the transportation planning process shall address congestion management through a process that provides for safe and effective integrated management and operation of the transportation system.

FHWA is focusing on a number of high-priority efforts to help reduce congestion on the nation's highways in support of the US DOT Secretary's Congestion Relief Initiative. Together, these efforts will provide information that allows more informed decisions, better coordination, and quicker action to avoid and reduce traffic congestion.

Furthermore, the SAFETEA-LU Real-Time System Management Information Program (Section 1201) is to provide all states with the capability to monitor, in real time, the traffic and travel conditions of the major highways of the United States and to share that information to improve the security of the surface transportation system, to address congestion problems, to support improved response to weather events and surface transportation incidents, and to facilitate national and regional highway traveler information.

Finally, the Work Zone Safety and Mobility Final Rule take effect in October 2007. The Final Rule places increased emphasis on maintaining travel mobility in construction work areas through enhanced operations, traffic management, and public information strategies.

The ROP clearly provides a strong link to the operations and management elements of the long range plan and the plan's constituent projects and strategies support many of the elements related to the Congestion Initiative, Section 1201, and the Work Zone Safety and Mobility Final Rule.

2.5 Regional Planning Process

The planning partners and PennDOT District 1-0 and 10-0 in the NW PA Region are responsible for the implementation of planned projects. The planning partners promote sound planning practices and coordinate planning activities with their Long Range Plans (LRPs). The MPO/RPO has the primary role and responsibility of ensuring that the transportation planning process is being carried out in accordance with current Federal and State regulations. The primary planning responsibilities of the MPO/RPO include creating a Long Range Transportation Plan (LRTP), a shorter range Transportation Improvement Program (TIP) and a Unified Planning Work Program (UPWP).

The TIP is an intermediate-range planning document that reflects the transportation expenditures programmed over the next four (4) years. The TIP contains information on a wide array of transportation projects including aviation, bicycle facilities, planning studies, road improvements and transit, among others. Projects identified in the TIP must be derived from the LRTP to be eligible for Federal funds. ITS projects can be listed on the TIP as stand alone projects or often can be identified in the scope of larger transportation projects.

Each MPO/RPO must develop and administer a TIP, the region's short range (4 year) investment plan, which prioritizes all transportation related projects within the constraints of federal funding to be received over that period. The TIP is updated every two (2) years and included as a component of the State Transportation Improvement Program (STIP).

The STIP in 2001 and 2003 were developed for all areas of the state. They were developed in cooperation with all planning partners; allowed for a broad range of public comment, including all modal and intermodal surface transportation projects, were consistent with MPO, RPO, independent county long range plans. The program provides a forum where decision-makers identify issues/opportunities and make informed decisions regarding the programming and implementation of transportation projects and services that address these issues and opportunities.

Erie County MPO

The Erie MPO is comprised of appointed representatives from municipalities and organizations throughout the Erie urban area and Erie County, as well as state and Federal representation. The role of the Erie MPO Committee members is to provide representation for their municipality / organization in order to facilitate an integrated and informed decision-making process which incorporates all concerns and issues into the formal development of policies and actions.

It is the duty and responsibility of the Coordinating Committee to direct and control the policies and objectives of the Erie Area Transportation Study. It is the duty of the Technical Committee to study and report on the technical aspects as directed by the Coordinating Committee, and to initiate studies and recommendations on technical aspects in pursuance of the objectives of the study.

Mercer County MPO

The Mercer County MPO has a Coordinating committee that is responsible for insuring the maintenance of planning eligibility for state and federal grants and the maintenance of both the LRP and TIP. The Coordinating Committee is made up of twenty-one voting members.

Northwest Commission

The Northwest RPO has a Transportation Advisory Committee which prioritizes projects when the TIP is revised and approves TIP amendments and administrative actions. The Technical committee has the duty to study and report on technical aspects as directed

by the Coordinating Committee and to initiate studies and recommendations on technical aspects.

The projects that are developed out of the ROP process are to be programmed on the 2009 TIP. The Planning Partner's Long Range Plans are going to have to be amended to include the projects programmed in the ROP and then onto the TIP. The development of the 2009 - 2012 TIP is on-going. A meeting will be held sometime during the 3rd quarter of 2007 to review a candidate list.

3. REGIONAL OPERATIONS FRAMEWORK

3.1 Overview of the Region's Approach to Operations

The NW PA Region is familiar with ITS/Operations. The operations for the region are not as advanced as other districts in the state, but this allows the region to learn from previous projects in other districts. DMS, RWIS and HAR are the ITS devices that are utilized in the Region. The ROP investigated the deployment of these devices in previous projects in order to update operations and fill the gap where needed in the region.

Needs Areas

A major step in any study or planning process is to identify, discuss, and prioritize a list of needs and strategies. The examination of existing conditions and the ITS inventory helped to identify potential shortcomings and needs in the region. The Workshop Meetings held with stakeholders in the region led to the selection of the Needs Areas.

The recommended ITS projects set forth in this plan are designed specifically to address the documented transportation needs of the region. The objective is not to simply implement ITS projects because the technologies are available, rather to match existing ITS technologies that meet the transportation needs of the NW PA Region and follow the operations for the entire state. For example, the current ITS/Operations of the region may benefit from deployment of CCTV in congested areas.

During the Operations Workshop, held on January 24th, 2007 the Stakeholders defined the critical ITS/Operation Needs Areas for the District. The discussion focused on areas of management, deployment, information and coordination. The list below summarizes the identified needs:

- Detour Routing - Provide motorists with alternate routes around incidents
- Safety/Secondary Accidents
- Special Event Management - Provide alternate routes on DMS signs for improved traveler information
- Incident Management/Communication
- 5-1-1 Opportunity
- Video images at TMC - CCTV deployment
- Weather Management
- Evacuation Plan for the Interstates
- Real-time Traveler Information
- Route Planning (pre-trip)

The general needs were categorized under the following four (4) primary needs areas:

1. **Congestion Management**
2. **Incident and Emergency Management**
3. **Traveler Information**
4. **Communications**

3.2 Operations Area: Congestion Management

The Traffic Signals Operations pave the way for a more centralized traffic signal program that holistically plans and coordinates activities, as well as operates and maintains signals at the corridor and regional levels. Traffic Signals are an asset and are a shared responsibility that needs to be investigated. One of the goals of *TSOP-08* is to develop the Statewide Traffic Signal Asset Management System (TSAMS). TSAMS will be used as a tool to improve traffic signal planning, design, installation and operation. Improved transit operations can also help to decrease congestion by promoting transit ridership.

The needs related to Congestion Management and addressed by the recommended projects in **TABLE 9** include:

- Coordination of traffic signals can improve the operability of the roadway
- Implementation of more closed-loop signal systems, controller upgrades and retiming
- AVL deployment on the Transit systems can help to mitigate the traffic congestion in the NW PA Region

Traffic Signal Projects identified for specific corridors in the District are to be programmed in the ROP for closed-loop signal systems, controller upgrades, and re-timing improvements. The corridors included in these projects that do not operate as detour routes will be implemented as their own project. Traffic Signals on detour routes that are to be coordinated and also programmed as part of a Traffic Signal Project will try to be completed together. This will eliminate the duplication of efforts.

TABLE 9: RECOMMENDED CONGESTION MANAGEMENT PROJECT CONCEPTS

Description	Lead Agency	Pertinent TSOP Projects
City of Erie Traffic Signal Projects – The corridors identified as needing deployment of Closed-Loop Signal Systems, controller upgrades, or re-timing include: ▪ Bayfront Connector ▪ 38th Street ▪ Route 5 (Millcreek/Erie) ▪ Peach Street	PennDOT 1-0	TSOP 08 – TAC Signal Study Implementation
Venango County Traffic Signal Projects – The corridors identified as needing deployment of Closed-Loop Signal Systems, controller upgrades, or re-timing include: ▪ Downtown Oil City (CCIP) ▪ City of Franklin	PennDOT 1-0	TSOP 08 – TAC Signal Study Implementation

TABLE 9 (CONTINUED): RECOMMENDED CONGESTION MANAGEMENT PROJECT CONCEPTS

Description	Lead Agency	Pertinent TSOP Projects
Hermitage and Sharon Traffic Signal Projects - The corridors identified as needing deployment of Closed-Loop Signal Systems, controller upgrades, or re-timing include: ▪ State Street (Sharon/Hermitage) ▪ Route 62 (Sharon/Hermitage) ▪ Route 18 (Hermitage)	PennDOT 1-0	TSOP 08 – TAC Signal Study Implementation
Mercer County Traffic Signal Projects - The corridors identified as needing deployment of Closed-Loop Signal Systems, controller upgrades, or re-timing include: ▪ Mercer Borough ▪ Route 58 (Grove City)	PennDOT 1-0	TSOP 08 – TAC Signal Study Implementation
Downtown Meadville Traffic Signal Project- The corridors identified as needing deployment of Closed-Loop Signal Systems, controller upgrades, or re-timing.	PennDOT 1-0	TSOP 08 – TAC Signal Study Implementation
Coordination of Traffic Signals on Alternate Detour Routes for Interstate 90 – In the event of an incident on the Interstate the adjacent roadway's traffic signals can be coordinated to handle the larger traffic volumes. The potential corridors include: ▪ 12th Street & Bayfront Connector (PA 290) ▪ 26th Street	PennDOT 1-0	TSOP 03 – Interstate Incident Management Program TSOP 08 – TAC Signal Study Implementation
Coordination of Traffic Signals on Detour Routes for Interstate 80 - In the event of an incident on the Interstate the adjacent roadway's traffic signals can be coordinated to handle the larger traffic volumes. The potential corridors include: ▪ Route 62 (Sharon/Hermitage) ▪ Route 18 (Hermitage) ▪ Route 62/322 (City of Franklin) ▪ Downtown Clarion Corridor	PennDOT 1-0 PennDOT 10-0	TSOP 03 – Interstate Incident Management Program TSOP 08 – TAC Signal Study Implementation
Traffic Signal Pre-emption in the Erie County – Upgrade the Traffic Signal pre-emption in Erie County.	PennDOT 1-0 Erie County Municipalities	TSOP 08 – TAC Signal Study Implementation

TABLE 9 (CONTINUED): RECOMMENDED CONGESTION MANAGEMENT PROJECT CONCEPTS

Description	Lead Agency	Pertinent TSOP Projects
Phase 1 EMTA Automated Vehicle Location (AVL) System – Implement AVL system to effectively plan routes and fleet service functions. It is the building block of advanced transit technologies. In Phase 1, ten (10) EMTA buses will be equipped with the AVL system.	EMTA	TSOP 17 – Statewide Transit Operations
Phase 1 EMTA Automated Information Traveler System – Implement technologies to disseminate pre-trip travel planning information such as route and schedule information via high resolution displays (both indoors and outdoors).	EMTA	TSOP 17 – Statewide Transit Operations
Phase 2 EMTA Automated Vehicle Location (AVL) System – Implement AVL system to effectively plan routes and fleet service functions. It is the building block of advanced transit technologies. In Phase 2, the remainder of the EMTA fleet is planned to be equipped with the AVL system.	EMTA	TSOP 17 – Statewide Transit Operations
Phase 2 EMTA Automated Information Traveler System – Implement technologies to disseminate pre-trip travel planning information such as route and schedule information via high resolution displays (both indoors and outdoors).	EMTA	TSOP 17 – Statewide Transit Operations

3.3 Operations Area: Incident and Emergency Management

The Incident and Emergency Management need refers to the ability to detect, verify and respond to incidents within the regional transportation system. There are several issues that contribute to the challenge of emergency response and incident management in the region.

The needs related to Incident and Emergency Management and addressed by the recommended projects in **TABLE 10** include:

- Deployment of more ITS to close Interstate gaps
- Improve coordination and communication of on-scene emergency response
- Improve the detection of incidents
- Detour Routing
- Road/Weather Management
- Co-Located Operations Center

Each county has its own Emergency 9-1-1 Center that is available 24 hours a day. As part of the Department of Public Safety they provide, maintain, improve and upgrade 911 emergency call taking and dispatch services in the county by utilizing the most modern equipment and technology available. A new TMC that is connected or co-located with the 9-1-1 Center in Erie County would provide a substantial improvement to the existing emergency response operations for traffic incidents in the Erie Metropolitan Area and surrounding NW PA Region.

The information from the RWIS and CCTV can be disseminated to the traveling public via DMS, HAR and the Internet to provide advanced warning in the event of approaching adverse weather. The deployment of the above ITS devices can help to promote safer roadways in the NW PA Region.

TABLE 10: RECOMMENDED INCIDENT AND EMERGENCY MANAGEMENT PROJECT CONCEPTS

Description	Lead Agency	Pertinent TSOP Projects
I-90 & I-79 Traffic Surveillance Project (CCTV) – Deploy Closed-Circuit TV Cameras at key locations. The locations include: ▪ I-90 & I-79 Interchange ▪ I-79 & 12th Street Interchange ▪ I-90 & SR 19 Interchange ▪ I-90 & I-86 Interchange ▪ I-79 & Route 6 (Erie)	PennDOT 1-0	TSOP 03 – Interstate Incident Management Program TSOP 04 – Incident Management Traveler Information
I-80 Traffic Surveillance Project (CCTV) - Deploy Closed-Circuit TV Cameras at key locations. The locations include: ▪ I-79 & I-80 (Mercer) ▪ I-80 at the Ohio Border	PennDOT 1-0	TSOP 03 – Interstate Incident Management Program TSOP 04 – Incident Management Traveler Information
City of Erie DMS Project – Deploy Traveler information devices at key locations and junctions. Potential locations include: ▪ I-90 EB approaching the I-86 Interchange ▪ I-79 NB approaching 12th Street *(Decision point for Bayfront)*	PennDOT 1-0	TSOP 03 – Interstate Incident Management Program TSOP 04 – Incident Management Traveler Information

TABLE 10 (CONTINUED): RECOMMENDED INCIDENT AND EMERGENCY MANAGEMENT PROJECT CONCEPTS

Description	Lead Agency	Pertinent TSOP Projects
I-80 & PA 60 DMS Project - Deploy Traveler information devices at key locations and junctions. Potential locations include: ▪ I-80 EB at the Ohio Border ▪ PA 60 NB approaching I-80 Interchange ▪ PA 60 SB approaching I-80 Interchange ▪ I-79 SB approaching PA 258	PennDOT 1-0	TSOP 03 – Interstate Incident Management Program TSOP 04 – Incident Management Traveler Information
I-80 & I-79 Interchange DMS Replacement Project – Replace DMS at key locations with full size DMS for improved visibility of traveler information. The locations include: ▪ I-80 EB approaching I-79 Interchange ▪ I-80 WB approaching I-79 Interchange ▪ I-79 NB approaching I-80 Interchange ▪ I-79 SB approaching I-80 Interchange ▪ I-79 NB approaching PA 258/PA 208	PennDOT 1-0	TSOP 03 – Interstate Incident Management Program TSOP 04 – Incident Management Traveler Information
I-90 & I-79 DMS Project – The Deployment of Traveler Information devices at key locations and junctions in the City of Erie is currently under-construction. The locations include: ▪ I-79 NB approaching I-90 Interchange ▪ I-79 SB approaching I-90 Interchange ▪ I-90 EB approaching I-79 Interchange ▪ I-90 WB approaching Bayfront Connector/SR 430 ▪ I-90 WB approaching I-79 Interchange	PennDOT 1-0	TSOP 03 – Interstate Incident Management Program TSOP 04 – Incident Management Traveler Information

TABLE 10 (CONTINUED): RECOMMENDED INCIDENT AND EMERGENCY MANAGEMENT PROJECT CONCEPTS

Description	Lead Agency	Pertinent TSOP Projects
NW PA Region Detour Route GIS Mapping – Develop GIS Detour Routes maps for the NW PA Region to be able to post on the internet. The Detour Routes would be easily accessible via the internet for Pre-trip travel plans.	PennDOT 1-0	TSOP 02 – Road Closure Reporting System TSOP 05 – Incident Management Processes and Procedures TSOP 12 – Mobility in Work Zone
District 1-0 Traffic Management Center (TMC) – Complete a new permanent TMC in the District 1-0 Office building as a central control for ITS field devices and assist in incident management**.**	PennDOT 1-0	TSOP 09- STMC and TMC's TSOP 20- Organization
Co-located Regional PennDOT Traffic Management Center (TMC) - Deploy a co-located TMC in the Erie Metropolitan Area for control of ITS field devices and assist in incident management in Erie. Co-location can be with the City of Erie, 9-1-1 Center, and EMTA.	PennDOT 1-0	TSOP 09- STMC and TMC's TSOP 20- Organization

3.4 Operations Area: Traveler Information/Communications

Improving the efficiency of the transportation system requires that travelers are informed about the various travel options as well as the real-time operating conditions of the transportation system.

One of the major needs for traveler information in the region is the completion of a TMC that could control the information disseminated to motorists. Traveler information disseminated to the motorists from the TMC includes roadway conditions, incidents and crashes, construction and maintenance activities, and weather conditions.

The needs related to Traveler Information and addressed by the recommended projects in **TABLE 11** include:

- Pre-Trip Traveler Information
- En-Route Traveler Information

The following ITS applications present opportunities to provide enhanced traveler information activities in the region:

- Dynamic Message Signs (DMS),
- Highway Advisory Radio (HAR),
- Internet-based Applications, and
- 5-1-1 System

Additional ITS deployments in the NW PA Region and coordinated with the construction of a new TMC will greatly enhance traveler information in the region

Communications

Interagency communications and cooperation are critical to the efficient operation of the transportation system. The needs related to Communications and addressed by the recommended projects in **TABLE 11** include:

- Device-to-Center Communication
- Center-to-Center Communication

Effective Center-to-Center Communication Systems allow all transportation-related agencies to share data and information in a timely, efficient manner. Personnel are able to conduct operations safely and efficiently with seamless communication.

The deployment of fiber and/or high bandwidth in the NW PA Region is suggested for the primary interstate and secondary arterial. The Erie County's EMA wireless deployment can be utilized by the ITS/Operations in the City of Erie. The deployment of high-speed communications between devices and centers will improve the communication between PennDOT and other agencies. This will result in efficient traveler information dissemination and incident response.

TABLE 11: RECOMMENDED TRAVELER INFORMATION/COMMUNICATIONS PROJECT CONCEPTS

Description	Lead Agency	Pertinent TSOP Projects
Communication Plan / Infrastructure – Develop a Communications Plan that builds upon BHSTE efforts on TSOP 13-ITS and IT. Components of the plan to consider for the NW PA Region include: ▪ Integration of ITS/Operations needs and IT requirements in all jobs. ▪ Establish communication links between operation centers	PennDOT 1-0	TSOP 01 – Inter-Agency Incident Reporting System TSOP 05 – Incident Management Processes and Procedures TSOP 13 – ITS and IT

TABLE 11 (CONTINUED): RECOMMENDED TRAVELER INFORMATION/COMMUNICATIONS PROJECT CONCEPTS

Description	Lead Agency	Pertinent TSOP Projects
Statewide 5-1-1 Implementation - Coordinate with the statewide efforts of implementing the 511 system to provide motorists the ability to use the web and their cell phones to get pre-trip traveler information.	PennDOT 1-0	TSOP 01 – Inter-Agency Incident Reporting System TSOP 04 – Incident Management Traveler Information
Traveler Information at NW PA Welcome Centers– Deploy the CASTNET program at the Welcome Centers in the NW PA Region to provide weather information via kiosks to visitors and travelers to the region.	PennDOT 1-0	TSOP 06 – Roadway Weather Management
I-79 HAR Project - Deploy HAR for Traveler information at key locations and junctions. A Potential location in the NW PA Region includes: ▪ I-79 at PA 358 (Mercer)	PennDOT 1-0	TSOP 04 – Incident Management Traveler Information
I-80 HAR Project - Deploy HAR for Traveler information at key locations and junctions. Potential locations in the NW PA Region include: ▪ I-80 & I-79 Interchange ▪ I-80 & PA 60 (future I-376) Interchange ▪ I-80 & SR 8 (Lower Priority)	PennDOT 1-0	TSOP 04 – Incident Management Traveler Information
I-79 & I-90 Road Weather Information Project – Deploy RWIS to improve the management of inclement weather to the NW PA Region.	PennDOT 1-0	TSOP 04 – Incident Management Traveler Information TSOP 06 – Roadway Weather Management
I-80 Road Weather Information Project - Deploy RWIS to improve the management of inclement weather to the NW PA Region.	PennDOT 1-0	TSOP 04 – Incident Management Traveler Information TSOP 06 – Roadway Weather Management

3.5 Framework Summary

The list of the Needs Areas that were identified at Workshop Meeting #1 is listed in **TABLE 12**. The Needs Areas were developed from the needs addressed by the planning partners and transportation agencies in the region. Each Need Area formed a Task Force Group that met to develop Project Concepts that would help to address the needs. The Project Concepts were developed out of the TSOP projects listed by PennDOT.

TABLE 12: NW PA REGION ROP PROJECT MATRIX

Needs Areas	High Level Needs	Project Concepts
Incident and Emergency Management	Gap in ITS Equipment	Deploy ITS to address Interstate "gaps"
		Deploy more ITS devices in areas of congestion
		DMS at strategic locations
	Unified Command-Incident Command System (ICS) /National Incident Management System (NIMS)	Communication training for emergency responders
		Direct Media Contact
	Detour Routing	Develop pre-assigned detours for display on DMS
		Detour Routes posted on DMS
		Traffic Signals tied into corridors used for detour routing
	Operations Center communication: PSP, EMA, Transit, 911, PennDOT	Co-location- use of New EMA facility in City of Erie
		High Speed Data Connections between centers
	Road/Weather Management	Weather Information via kiosks at Welcome Centers
Congestion Management	CCTV images/video for monitoring traffic	Deploy CCTV to monitor traffic conditions at key locations
		Construct a new PennDOT District 1-0 TMC
	Improve traffic signal operations and coordination	Identification of key corridors needing deployment of Closed-Loop Signal Systems, controller upgrades, or re-timing
		Coordinate Traffic Signals on adjacent corridors to I-90 and I-80 for Detour Routing
		Plan signal projects through construction projects
		Update Pre-emption on signals in City of Erie
	Transit Operations	Deploy AITS at popular downtown spots for EMTA Transit
		AVL deployment on the EMTA fleet (Phase 1)
		Signal pre-emption to keep buses on schedule better
	Personnel	Co-Located PennDOT TMC in the City of Erie
		A new PennDOT District 1-0 TMC
		Utilize District 11-0 TMC personnel to operate ITS/Operations in off hours
Communications	Inter-Agency Communication	Following the construction of a new TMC establish communication links between centers: -EMTA Transit Operations -PSP -911/EMA -PennDOT
		Interoperable Radio Systems
	Field Device to Center Communication	Include communications conduit in all highway construction jobs
		Utilize high speed data connections (Fiber or T1) for CCTV surveillance
Traveler Information	En-Route Traveler Information	DMS deployed at key locations
		Deploy HAR to be used more effectively
	Pre-Trip Traveler Information	Media
		511 System: -Cell Phone -Web
		Tourist/Visitor number enhanced statewide

4. REGIONAL PROGRAM

4.1 Overview

Projects that fall under the ROP are projects that are developed based on PennDOT's vision and address one or more of PennDOT's operational needs. The needs of NW PA Region fall under some or all of the projects set forth in the TSOP and are to be addressed by the ROP. The projects referenced in this plan are selected because of their ability, collectively, to establish an operations framework for PennDOT and contribute markedly towards achieving PennDOT's operational goals.

Many of the projects lay a foundation for important work in such areas as incident management and traveler information. This mainstreaming of the ROP also ensures projects are incorporated into the existing planning and programming functions that the MPOs and RPOs in the NW PA Region, including the 2009 TIP and Long-Range Plan update. Overall coordination and cooperation between agencies is critical for the successful implementation of the ROP.

The following is a list of the TSOP projects that are relevant to the ROP projects recommended for the NW PA Region:

- TSOP 01- Inter-Agency Incident Reporting System
- TSOP 02- Road Closure Reporting System (RCRS)
- TSOP 03- Interstate Incident Management Program
- TSOP 04- Incident Management Traveler Information
- TSOP 05- Incident Management Processes and Procedures
- TSOP 06- Roadway Weather Management
- TSOP 08- TAC Signal Study Implementation
- TSOP 09- STMC and TMC's
- TSOP 12- Mobility in Work Zones
- TSOP 13- ITS and IT
- TSOP 17- Statewide Transit Operations

These projects are the "building blocks" of the ROP. They are significant statewide priorities that are included in the ROP projects to bring potential benefits to the NW PA Region.

Some project initiatives prepared in District 1-0 previously were an I-79 Early Deployment Program Study in conjunction with Districts 10-0, 11-0, and 12-0. Also included in the district's developments were the establishment of an ITS Task Force, development of a Strategic Plan in 2004, and an RWIS/DMS Pilot Project. The District also has maintenance contracts in place for DMS and HAR in the Region.

The Erie Bayfront Traffic & Planning Study was done for PennDOT District 1-0. The plan involved the deployment of Dynamic Message Signs (DMS), Closed-Circuit Televisions

(CCTV), a new Transportation Management Center (TMC) and as part of the EMTA Feasibility Study, Automatic Vehicle Location (AVL). The Erie DMS Deployment on I-79 and I-90 is part of another project with plans to deploy five (5) DMS signs along the interstates.

4.2 Mainstreaming Operations

Pennsylvania's Regional ITS Architecture set the plan for "mainstreaming" ITS throughout Pennsylvania. "Mainstreaming" is, simply, getting technology issues in the transportation environment in front of the representative regional bodies for discussion, analysis, and decision making, in the same way that traditional transportation improvements are processed. ITS and Operations can no longer be considered just a PennDOT initiative, but must now be viewed as requiring regional input.

The ROP lays out the region's short-term and long-term approach to transportation operations. It identifies, defines, and prioritizes operational-focused projects for the region that are consistent with regional and statewide operations objectives. The extent of devices to be deployed and the funding available for deployment are the factors used to determine implementation.

4.3 Project Priorities and Sequences

The Recommended Project Deployments were developed based on the discussions during each Task Force Meeting. The project deployments were categorized as Short-Term and Long-Term Projects based on the project's necessity, funding needs, and complexity. The Project Descriptions are included in **APPENDIX A for Short-Term Projects and APPENDIX B for Long-Term Projects.**

Once the list of recommended projects was formulated, Stakeholders were asked to rank the importance of each project in relation to the needs of the NW PA Region. Voting Sheets were provided at Workshop Meeting #2 for the Recommended Short-Term Projects and a separate voting sheet for Long-Term Projects. Stakeholders were asked to vote on a scale of 1 (low priority) to 5 (high priority). This ranking process was used to determine regional priorities as each Stakeholder sees fit for the NW PA Region. A number of factors were considered when establishing these rankings:

- Need
- Complexity of the Project
- Funding Availability
- Prior Projects that would be required
- Regional Coordination

TABLE 13 identifies the Short-Term project priorities for the NW PA Region and **TABLE 14** identifies the Long-Term prioritized projects. They are prioritized separately as part of short-term and long-term projects. The priorities established in this plan are intended to help determine where ITS funding should be focused for the 2009-2012 TIP. It also provides a

roadmap for the planning partners to plan, fund, and implement ITS initiatives in a way that supports the regional vision and objectives.

4.3.1 Short-Term Program

The ITS to be deployed under "short-term" according to the ROP includes projects that should be built within 1 to 2 years. These deployments include CCTV, DMS, Closed Loop Signal Systems, a new District 1-0 TMC, and the Communications infrastructure to support the ITS deployment. There is no funding currently allocated for the deployment of these ITS elements. All elements classified as part of the short-term plan are considered a high-priority and are included below in **TABLE 13**.

TABLE 13: REGIONAL SHORT-TERM ITS PROJECT PRIORITIES

Priority	Project ID	Description	Need Area	Proposed Lead	Cost
1	ST-01	District 1-0 TMC (Oil City)	Incident and Emergency Management	PennDOT D1	Deployment: $500,000 Annual O&M: $5,000
2	ST-02	I-80 & I-79 Interchange DMS Replacement Project	Incident and Emergency Management	PennDOT D1	Deployment: $1,015,000 Annual O&M: $54,000
3	ST-03	I-80 & I-79 Interchange HAR Deployment	Traveler Information	PennDOT D1	Deployment: $32,000 Annual O&M: $2,500
4	ST-04	I-80 & PA 60 DMS Project	Incident and Emergency Management	PennDOT D1	Deployment: $880,000 Annual O&M: $48,000
4	ST-05	I-90 Traffic Surveillance (CCTV) Project	Incident and Emergency Management	PennDOT D1	Deployment: $425,000 Annual O&M: $18,000
4	ST-06	I-80 & PA 60 Interchange HAR Deployment	Traveler Information	PennDOT D1	Deployment: $32,000 Annual O&M: $2,500
5	ST-07	District 1-0 Communication Plan/Infrastructure	Communications	PennDOT D1	$75,000
6	ST-08	Statewide 5-1-1 Implementation	Traveler Information	PennDOT BHSTE	TBD
7	ST-09	I-80 & Route 8 Interchange HAR Deployment	Traveler Information	PennDOT D1	Deployment: $32,000 Annual O&M: $2,500
7	ST-10	City of Erie Traffic Signal Project: Bayfront Connector (I-90 to Bayfront Parkway)	Congestion Management	PennDOT D1	Deployment: $50,000
8	ST-11	City of Erie DMS Project	Incident and Emergency Management	PennDOT D1	Deployment: $430,000 Annual O&M: $22,000
8	ST-12	City of Erie Traffic Signal Project: Route 5 (Millcreek/Erie)	Congestion Management	PennDOT D1	Deployment: $50,000

TABLE 13 (CONTINUED): REGIONAL SHORT-TERM ITS PROJECT PRIORITIES

Priority	Project ID	Description	Need Area	Proposed Lead	Cost
9	ST-13	I-79 & PA 358 HAR Deployment	Traveler Information	PennDOT D1	Deployment: $32,000 Annual O&M: $2,500
10	ST-14	City of Erie Traffic Signal Project: Peach Street (Erie)	Congestion Management	PennDOT D1	Deployment: $50,000
11	ST-15	City of Erie Traffic Signal Project: 38th Street	Congestion Management	PennDOT D1	Deployment: $50,000
11	ST-16	Venango County Traffic Signal Project: Downtown Oil City (CCIP)	Congestion Management	PennDOT D1	Deployment: $50,000
12	ST-17	Venango County Traffic Signal Project: City of Franklin	Congestion Management	PennDOT D1	Deployment: $50,000
13	ST-18	Phase 1: AITS Deployment for EMTA Transit Information	Congestion Management	EMTA	Deployment: $570,000 Annual O&M: $45,000
14	ST-19	Phase 1: AVL Deployment on EMTA Buses			

4.3.2 Long-Term Program

The ITS recommendations proposed for deployment under "long-term" according to the ROP should be completed beyond 2 years. These deployments include CCTV, DMS, Closed Loop Signal Systems, AVL and AITS for Transit Operations and a co-located PennDOT TMC in the Erie Metropolitan Area. The projects listed as "Long-Term" are those that require large amounts of funding, are highly complicated or are not as high of a priority.

The ROP will be updated every two (2) years. This will allow the projects to be updated as they progress to their deployment stage. All elements classified as part of the Long-Term plan are considered on a 3-4 year timeframe and included below in **TABLE 14**.

TABLE 14: REGIONAL LONG-TERM ITS PROJECT PRIORITIES

Priority	Project ID	Description	Need Area	Proposed Lead	Cost
1	LT-01	Coordination of Traffic Signals on Alternate Detour Routes for I-90: 12th Street & Bayfront Connector (PA 290)	Congestion Management	PennDOT D1	$15,000/signal
2	LT-02	NW PA Region Detour Route GIS Mapping	Incident and Emergency Management	PennDOT D1	TBD
3	LT-03	Coordination of Traffic Signals on Detour Routes for I-90: 26th Street	Congestion Management	PennDOT D1	$15,000/signal
4	LT-04	Co-Located Regional PennDOT TMC (City of Erie, 9-1-1 Center, EMTA)	Incident and Emergency Management	PennDOT D1	TBD. This will be determined once a location is finalized.
5	LT-05	I-80 Traffic Surveillance Project (CCTV)	Incident and Emergency Management	PennDOT D1	Deployment: $270,000 Annual O&M: $4,000
6	LT-06	Coordination of Traffic Signals on Detour Routes for I-80: Route 62 (Sharon/Hermitage)	Congestion Management	PennDOT D1	$15,000/signal
7	LT-07	Coordination of Traffic Signals on Detour Routes for I-80: Route 18 (Hermitage)	Congestion Management	PennDOT D1	$15,000/signal
7	LT-08	Coordination of Traffic Signals on Detour Routes for I-80: Route 62/322 (City of Franklin)	Congestion Management	PennDOT D1/D10	$15,000/signal
7	LT-09	Coordination of Traffic Signals on Detour Routes for I-80: Downtown Clarion	Congestion Management	PennDOT D1/D10	$15,000/signal
8	LT-10	Traveler Information at NW PA Welcome Centers	Traveler Information	PennDOT D1	Deployment: $20,000/site Annual O&M: $2,000
9	LT-11	Traffic Signal Pre-emption in Erie County Project	Congestion Management	City of Erie / PennDOT D1	$3,000/signal
10	LT-12	Mercer County Traffic Signal Project: Mercer Borough	Congestion Management	PennDOT D1	Deployment: $50,000
10	LT-13	Downtown Meadville Traffic Signal Project	Congestion Management	PennDOT D1	Deployment: $50,000

TABLE 14 (CONTINUED): REGIONAL LONG-TERM ITS PROJECT PRIORITIES

Priority	Project ID	Description	Need Area	Proposed Lead	Cost
10	LT-14	Hermitage & Sharon Traffic Signal Project: State Street (Sharon/Hermitage)	Congestion Management	PennDOT D1	Deployment: $50,000
10	LT-15	Hermitage & Sharon Traffic Signal Project: Route 62 (Hermitage)	Congestion Management	PennDOT D1	Deployment: $50,000
11	LT-16	Mercer County Traffic Signal Project: Route 58 (Grove City)	Congestion Management	PennDOT D1	Deployment: $50,000
12	LT-17	Hermitage & Sharon Traffic Signal Project: Route 18 (Hermitage)	Congestion Management	PennDOT D1	Deployment: $50,000
13	LT-18	Phase 2: AVL Deployment on EMTA Buses	Congestion Management	EMTA	Deployment: $865,000 Annual O&M: $70,000
13	LT-19	Phase 2: AITS Deployment for EMTA Transit Information	Congestion Management	EMTA	
14	LT-20	EMTA Voice Annunciator & Passenger Counter Deployment Project	Congestion Management	EMTA	Deployment: $450,000 Annual O&M: $36,000

4.4 Regional Oversight

Ultimately, to be successful, ROP implementation will require the collaboration of many stakeholders. However, to help move the implementation process forward, it is expected that PennDOT District 1-0 and the Planning Partners will provide oversight and eventually be responsible for championing this Plan. This Committee will further track progress on implementation, oversee any "regional" projects, track performance measures and lead the update of any future ROPs.

4.5 Institutional Considerations

The recommended project deployments were developed from the discussions held at the Task Force Meetings. The Workshop and Task Force Meetings assembled representatives of the NW PA Region together who are familiar with the transportation operations in the NW PA Region. The Stakeholder participation was an important part of the ROP that helped identify planning and transportation needs to be programmed as part of the ROP. All the needs addressed at the ROP meetings were important ITS/Operation needs that stakeholders wanted to see addressed in the NW PA Region. Some of the Need Areas can be addressed by recommended projects for future deployment, beyond four (4) years because they require extensive planning and/or funding. These projects were not included in

the short-term and long-term tables, but are listed below as recommended future deployments and best practices for the NW PA Region.

4.5.1 Personnel

An important need for the NW PA Region is a new Traffic Management Center (TMC) in the District 1-0 Office. The deployment of additional ITS field devices in the region necessitates an improved TMC that can control the ITS/Operations. The TMC in the District 1-0 Office will require improved communications to ITS field devices deployed in the region. As part of this deployment the recommendation that was significant to the NW PA Region based on the deployment of a new TMC and more ITS devices was the need for more Personnel. Additional Personnel would be available to control the ITS/Operations deployed in the NW PA Region. This was a concern addressed by other ROPs in the state and PennDOT Central Office is developing TSOP 20 – Personnel/Organization to address the statewide need. It is recommended that the NW PA Region coordinate with Central Office's TSOP 20 project.

4.5.2 Incident Management Training

The Pennsylvania Emergency Management Agency (PEMA) Quarterly Incident Management Trainings are held to bring together the County EMA's and PennDOT. These meetings review the difference between the summer and winter responsibilities that each agency has. The meetings are a good communication tool for coordinating incident management operations in the Region. It is recommended that the NW PA Region participate in these meetings to help improve the operations coordination between agencies involved with incident management.

The Federal Highway Administration (FHWA) Roadway Operations Self Assessment Workshop has developed an easy-to-use self-assessment tool that state and local transportation agencies can use to assess their own roadway operations performance, and to find ideas of how to achieve better operations. The self-assessment covers a broad range of traffic operations areas, including traffic signal timing, incident management, work zones, and freeway service patrols. The improvement of roadway operations offers excellent low-cost opportunities for improving the transportation system performance through enhanced management of existing facilities. This Self-Assessment Workshop can be done with the help of FHWA at a low costs. It has not been listed as a project deployment because it can be done without difficulty.

4.5.3 Roadway Weather Information System (RWIS)

There are 17 RWIS sites in the NW PA Region. RWIS sites help to manage weather information so that it can be displayed via the internet and accessed by motorists for pre-trip travel plans. The RWIS in the NW PA Region are not all operating correctly. RWIS sites are not maintained properly and the weather information is not displayed on the internet for motorists to access. Therefore when weather information is needed motorists utilize a more reliable source such as *The National Weather Service*.

It is recommended that the maintenance of the existing RWIS sites be implemented as part of the ROP. The two (2) sites recommended for Long-Term Deployment can be programmed for the 2009 TIP if there is a need for new sites. Existing RWIS sites can be evaluated for proper working conditions and if they are needed. If a site is not needed and/or not working properly than it can eliminated and a new site could be added where appropriate. This evaluation can be completed by the District Maintenance Managers to provide a full report on the working condition of each RWIS location.

4.5.4 CASTNET Program Deployment

The CASTNET program provides motorists with Traveler Information on flat screen displays. The National Weather Service information can be coordinated with this program to disseminate up-to-date weather forecasts. The CASTNET program is to be deployed at the Welcome Centers in the NW PA Region as a Long-Term Project and can also be identified for deployment at the rest stops in the region. There are six (6) rest stops in the NW PA Region that would be candidates for CASTNET deployment including:

- I-79 North at mile marker 134 (before Crawford County line)
- I-79 South at mile marker 136 (after Mercer County line)
- I-79 North at mile marker 162 (before Edinboro exit)
- I-79 South at mile marker 163 (after Edinboro exit)
- I-80 Eastbound at mile marker 29 (after Barkeyville exit)
- I-80 Westbound at mile marker 29 (before Barkeyville exit)

These locations would be valuable rest stops in the NW PA Region for CASTNET Deployment in addition to the Welcome Centers. The deployment at both facilities can be coordinated with Central Office's efforts to deploy the program statewide.

5. FUNDING SOURCES

Linking planning and operations is important to improve transportation decision-making and the overall effectiveness of the system. Coordination between planners and operators helps ensure that regional transportation investment decisions reflect full consideration of all available strategies and approaches to meet regional goals and objectives.

Funding is a powerful tool for promoting participation. Agencies may be unaccustomed to coordinating with other agencies for operations, or perceive that coordination provides more hardship than benefit. When this is the case, providing additional resources in exchange for participation may overcome this issue. Planning partners can champion operations through training and other forums to promote regional operations strategies. Linking participation to funding access is the key. For example, an agency may become eligible for matching funds only by participating in a regional operations training program or an established regional operations group.

Almost every transportation agency identifies inadequate funding as a major concern. At the same time, virtually every agency acknowledges that funding constraints are a major impetus for advancing operations strategies. In many cases planners often become champions for relatively low-cost operations strategies after recognizing that the discrepancy between available funds and the cost of new capital investments to maintain regional mobility is too high.

Funding Sources

There are a number of funding sources that can support operations activities and equipment. Funding for system operations traditionally has relied on the discretionary budgets of individual agencies. However, due to the mainstreaming of operations through TSOP and ROP activities, statewide policies now allow several funding sources to be used for regional operations programs. Federal programs are also in place to encourage and promote the safe and efficient management and operation of integrated, intermodal surface transportation systems to serve the mobility needs of people and freight and foster economic growth and development.

Regional Funding

Depending on the project type, various funding approaches may be available for consideration. In the ROP, for priority projects, a project description and high-level scope of the project should have been developed. Projects should have been defined in terms of planning type projects or deployment-type projects. Planning-type projects are programmatic and policy in nature. If the project is a planning-type project, it may be considered in the MPO/RPOs Work Program. The process for planning partners to consider including operations planning-type projects in the next Work Program will begin in October 2007 and end with the delivery of a program to the PennDOT Program Center by February 2008.

Projects that are defining and leading to specific ITS deployment can proceed into the TIP process for funding. These types of projects can either become stand-alone capital deployment or can be packaged as part of a wide-area deployment or construction project. These deployment projects will be required to follow the PennDOT ITS Project Delivery Guidance, which incorporates FHWA adopted systems engineering process. Using this process will ensure consistency with project definition, integration, and consideration of ongoing operations and maintenance requirements. The 2009 TIP update process for each MPO/RPO has already begun and will be completed by each planning partner by June 2008.

At the discretion of each planning partner and PennDOT District, projects may arrange pooled funding to achieve multi-jurisdictional benefit. PennDOT's Central Office may also decide to fund multiple cross-jurisdictional efforts using A-140 (A-576) or other mechanisms to ensure coordinated statewide benefit. These types of pooled funding arrangements are project-specific and can be achieved when coordination and cooperation exists and the benefits of pooled or Central Office funding outweigh the administrative cost.

Federal Funding

There is flexibility in the use of federal funds (i.e., NHS, STP, CMAQ) for operations projects championed by planning partners and PennDOT. Federal funds can be used for traffic monitoring, management, and control for continued operations of the system, freeway surveillance, incident management efforts, travel information systems, and traffic signal control.

Federal funds are eligible for operating costs in labor, administrative, utilities, rent, and system maintenance associated with hardware and software maintenance (preventive and corrective).

For the use of interstate maintenance (IM) funds, eligibility is based on how "maintenance" and the Interstate Maintenance program are defined in Title 23 (USC 119, 116). If the project is a capital improvement to the interstate highway (such as deploying field devices to improve the highway) or involves preventive maintenance on the devices themselves, current FHWA PA Division Office policy is that it would be eligible for IM funds.

Some of the eligible IM costs include:

- infrastructure-based improvements, such as **new** dynamic message signs, CCTV, detectors, and communication systems,
- replacement or rehabilitation of infrastructure, such as replacing components of dynamic message signs or CCTVs,
- preventative maintenance on the roadway traffic management infrastructure, and
- preliminary engineering directly related to infrastructure improvements.

If the project involves operations costs involving communications maintenance (routine or corrective) it would **not** be eligible for Interstate Maintenance funding.

6. CONCLUSION

Transportation agencies today do not have the luxury of undertaking massive new capacity expansion projects, yet are challenged to improve mobility and reduce congestion for travelers, visitors and businesses on its transportation system.

In response to these requirements, new approaches and innovative techniques are being explored to improve the system's operational performance, as well as keep the network safe and secure. Better management of existing facilities is simply the new way of doing business.

Through the guidance of the statewide Transportation Systems Operations Plan and the implementation of region-specific projects documented in this report, these needs are being addressed.

The regional solutions addressed in the ROP tend to be cost effective in supporting (not eliminating) regional congestion issues. So as the region begins to review transportation options a goal should be to have ITS and operations solutions examined, weighed and equally placed in the public forum for regional consideration and funding. This will ensure that innovative and cost effective solutions get a fair hearing alongside more costly capacity expansion projects.

Continued success however relies on integration and coordination between PennDOT, regional planning partners and transportation stakeholders who together will systematically build operations programs based on policies, studies and physical deployments. These improvements will ultimately help improve the mobility, better manage incidents and emergencies and provide for real-time traveler information.

With the long-range scope of these efforts it will take hard work from Stakeholders in the NW PA Region and the surrounding PennDOT Districts to fully realize the goals set out in the ROP. In return the NW PA Region will have a safer and more reliable transportation system for its future.

APPENDIX A: SHORT-TERM ROP PROJECT DEPLOYMENTS

ST-01: PENNDOT DISTRICT 1-0 TRAFFIC MANAGEMENT CENTER

PROJECT DESCRIPTION AND SCOPE: A new TMC for PennDOT District 1-0 will improve ITS/Operations for the NW PA Region. The ITS/Operations that can be controlled from the TMC include:

- DMS
- HAR
- RWIS
- CCTV

The deployment of CCTV will provide real-time traffic images that District personnel can view from the TMC to help report incidents to emergency responders and motorists to the region.

STAKEHOLDERS: **PennDOT District 1-0**

PERTINENT TSOP PROJECTS: TSOP-02, 05, and 12

ESTIMATED SCHEDULE: 1-2 yrs Life Cycle: N/A	**ESTIMATED COSTS:** Capital: $500,000 Annual O&M: $5,000

PROJECT TYPE: Planning & Deployment

LEVEL OF EFFORT: Complex

TECHNOLOGY COMPONENTS *(if applicable)*: Communications Infrastructure; Software Integration

PREREQUISITES AND DEPENDENCIES: A communications plan/infrastructure for the NW PA Region is critical before the deployment of more ITS Field devices for the Region and the construction of a TMC.

PERFORMANCE MEASURES: Improved dissemination of traveler information to motorists in the NW PA Region; Improved Incident Management

BENEFITS: A new TMC will allow complete control of ITS/Operations in the NW PA Region from the District Office.

OTHER CONSIDERATIONS AND ISSUES: PennDOT will need additional personnel to run the operations in the TMC and maintain ITS devices that are planned for deployment in the District.

ST-02: I-80 & I-79 INTERCHANGE DMS REPLACEMENT PROJECT

PROJECT DESCRIPTION AND SCOPE: PennDOT District 1-0 plans to replace the DMS located at the I-79 & I-80 Interchange. The DMS located at the interchange are planned to all be replaced with full size DMS to improve driver visibility. The DMS that are planned to be replaced include:

- I-80 EB approaching I-79 Interchange
- I-80 WB approaching I-79 Interchange
- I-79 NB approaching I-80 Interchange
- I-79 SB approaching I-80 Interchange
- I-79 NB approaching PA 258

The DMS applications are used to warn motorists of upcoming congestion or assist in traffic routing during construction, storms, collisions, or special events. These electronic signs are located along highways, and provide information to drivers at key decision points.

STAKEHOLDERS: **PennDOT District 1-0**

PERTINENT TSOP PROJECTS: TSOP-03, AND 04

ESTIMATED SCHEDULE: 1-2 yrs Life Cycle: 15 years	**ESTIMATED COSTS:** Capital: $1,015,000 Annual O&M: $54,000

PROJECT TYPE: Planning & Deployment **LEVEL OF EFFORT:** Simple

TECHNOLOGY COMPONENTS *(if applicable)*: DMS Boards

PREREQUISITES AND DEPENDENCIES: A new TMC will provide a central location for DMS messages to be controlled from.

PERFORMANCE MEASURES: Improved Traveler Information; Improved Customer Satisfaction

BENEFITS: DMS messages help to warn motorists of travel conditions and help them to make more informed travel decisions.

OTHER CONSIDERATIONS AND ISSUES: N/A

ST-03: I-80 HIGHWAY ADVISORY RADIO (HAR) PROJECT

PROJECT DESCRIPTION AND SCOPE: PennDOT District 1-0 has plans to deploy additional ITS devices in the NW PA Region to close the ITS equipment gaps on the Interstates. The deployment of HAR can improve the dissemination of traveler information to motorists. A potential location for HAR on I-80 is:

▪I-80 & I-79 Interchange

STAKEHOLDERS: **PennDOT District 1-0**

PERTINENT TSOP PROJECTS: TSOP-03, AND 08

ESTIMATED SCHEDULE: 1-2 yrs Life Cycle: 20 years	**ESTIMATED COSTS:** Capital: $35,000 Annual O&M: $2,500

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Medium

TECHNOLOGY COMPONENTS *(if applicable)*: HAR System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved traveler information; Improved Customer Satisfaction.

BENEFITS: Improved traveler information disseminated via the radio to help drivers become aware of driving conditions and can be directed to take alternate routes if necessary.

OTHER CONSIDERATIONS AND ISSUES: Maintenance and Operations are important to help keep HAR working properly.

ST-04: I-80 & PA 60 DMS PROJECT

PROJECT DESCRIPTION AND SCOPE: PennDOT District 1-0 has plans to deploy additional ITS devices in the NW PA Region to close the ITS equipment gaps on the Interstates. The potential location includes:

▪I-80 & PA 60 Interchange

The DMS applications are used to warn motorists of upcoming congestion or assist detour routes for traffic during construction, storms, collisions, or special events. These electronic signs are located along highways, and provide information to drivers at key decision points.

STAKEHOLDERS: **PennDOT District 1-0**

PERTINENT TSOP PROJECTS: TSOP-03, TSOP-08

ESTIMATED SCHEDULE: 1-2 yrs Life Cycle: 10 years	**ESTIMATED COSTS:** Capital: $215,000 Annual O&M: $6,000

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Medium

TECHNOLOGY COMPONENTS *(if applicable)*: DMS Sign System; Telecommunications

PREREQUISITES AND DEPENDENCIES: A new TMC will provide a central location for DMS messages to be controlled from

PERFORMANCE MEASURES: Improved traveler information; Improved Customer Satisfaction.

BENEFITS: DMS messages help to warn motorists of travel conditions and help them to make more informed travel decisions.

OTHER CONSIDERATIONS AND ISSUES: N/A

ST-05: I-90 Traffic Surveillance Project

Project Description and Scope: Closed Circuit Television (CCTV) Cameras are used to provide visual images of highway operations and conditions. These images can then be used to verify incidents, determine what type of emergency response or management strategy should be deployed or dispatched, monitor weather conditions, and to identify field equipment such as traffic signals and signs. The potential locations for deployment include:

- I-90 & I-79 Interchange
- I-79 & 12th Street Interchange
- I-90 & SR 19 Interchange
- I-90 & I-86 Interchange
- I-79 & SR 6 (Erie)

The deployment of a Co-Located TMC in the City of Erie will improve the control of video images from the CCTV deployed.

Stakeholders: **PennDOT District 1-0**

Pertinent TSOP Projects: TSOP-03 and 04

Estimated Schedule: 1-2 yrs Life Cycle: 15 years	**Estimated Costs:** Capital: $425,000 Annual O&M: $18,000

Project Type: Planning & Deployment **Level of Effort:** Medium

Technology Components *(if applicable)*: CCTV System; Telecommunications

Prerequisites and Dependencies: A new TMC will help utilize the deployment of CCTV in the region so that video images can be viewed at a central control center.

Performance Measures: Improved incident response time

Benefits: Incidents on the roadway can be viewed in real-time so that the appropriate emergency response can be taken.

Other Considerations and Issues: N/A

ST-06: I-80 HIGHWAY ADVISORY RADIO (HAR) PROJECT

PROJECT DESCRIPTION AND SCOPE: PennDOT District 1-0 has plans to deploy additional ITS devices in the NW PA Region to close the ITS equipment gaps on the Interstates. The deployment of HAR can improve the dissemination of traveler information to motorists. A potential location for HAR on I-80 is:

- I-80 & PA 60 (future I-376) Interchange

STAKEHOLDERS: **PennDOT District 1-0**

PERTINENT TSOP PROJECTS: TSOP-03, TSOP-08

ESTIMATED SCHEDULE: 1-2 yrs Life Cycle: 20 years	**ESTIMATED COSTS:** Capital: $35,000 Annual O&M: $2,500

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Medium

TECHNOLOGY COMPONENTS *(if applicable)*: HAR System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved traveler information; Improved Customer Satisfaction.

BENEFITS: Improved traveler information disseminated via the radio to help drivers become aware of driving conditions and can be directed to take alternate routes if necessary.

OTHER CONSIDERATIONS AND ISSUES: Maintenance and Operations are important to help keep HAR working properly.

ST-07: DISTRICT 1-0 COMMUNICATIONS PLAN/INFRASTRUCTURE

PROJECT DESCRIPTION AND SCOPE: A new PennDOT District 1-0 TMC will require a Communication Infrastructure for field-to-center communications. The NW PA Region Communications Plan can build upon TSOP 13- ITS and IT. Components of the Statewide ITS and IT Project to consider include:

- Integrate ITS/Operations needs and IT requirements in all projects
- Establish communication links between operation centers
- Communications Infrastructure for a new District 1-0 TMC

STAKEHOLDERS: **PennDOT District 1-0,** PennDOT BHSTE

PERTINENT TSOP PROJECTS: TSOP-03, 05, AND 13

ESTIMATED SCHEDULE: 1-2 yrs Life Cycle: N/A	**ESTIMATED COSTS:** Capital: $75,000 for the plan

PROJECT TYPE: Planning & Deployment **LEVEL OF EFFORT:** Simple

TECHNOLOGY COMPONENTS *(if applicable)*: Telecommunications (Fiber, Leased Infrastructure)

PREREQUISITES AND DEPENDENCIES: ITS field devices in the NW PA Region and a TMC to run the operations on the communications infrastructure

PERFORMANCE MEASURES: N/A

BENEFITS: Improve field-to-center and center-to-center communications.

OTHER CONSIDERATIONS AND ISSUES: N/A

ST-08: STATEWIDE 5-1-1 IMPLEMENTATION

PROJECT DESCRIPTION AND SCOPE: ”511” is the national telephone number designated by the Federal Communications Commission (FCC), in July 2006, for access to traveler information.

Voice interactive telephone service with touchtone backup using data from the website. Service will be available 24/7/365 and will replace the current Interstate Road Condition Hotline (1-888-783-6783). The Department will form a multi-agency, PA 511 Coalition to provide communication, coordination and guidance for the overall program. This group will include representatives from a variety of transportation stakeholders and other organizations that will play a key role in the deployment and operation of 511.

Coordinate with the statewide efforts of implementing the 511 system to provide motorists the ability to use the web and their cell phones to get pre-trip traveler information.

STAKEHOLDERS: **PennDOT BHSTE,** PennDOT District 1-0

PERTINENT TSOP PROJECTS: TSOP-01 AND 04

ESTIMATED SCHEDULE: 1-2 yrs Life Cycle: N/A	**ESTIMATED COSTS:** TBD

PROJECT TYPE: Planning & Deployment **LEVEL OF EFFORT:** Simple

TECHNOLOGY COMPONENTS *(if applicable)*: Software Development

PREREQUISITES AND DEPENDENCIES: Identification of priority regional corridors through Strategic Corridor Investment Plan

PERFORMANCE MEASURES: Improved traveler information messages for motorists via the cell phone and web.

BENEFITS: Allows travelers to get pre-trip and en-route traveler information with the use of their cell phone and the internet.

OTHER CONSIDERATIONS AND ISSUES: District 1-0 will support PennDOT Central Office and their efforts to deploy 5-1-1 Statewide.

ST-09: I-80 HIGHWAY ADVISORY RADIO (HAR) PROJECT

PROJECT DESCRIPTION AND SCOPE: PennDOT District 1-0 has plans to deploy additional ITS devices in the NW PA Region to close the ITS equipment gaps on the Interstates. The deployment of HAR can improve the dissemination of traveler information to motorists. A potential location for HAR on I-80 is:

- I-80 & Route 8 Interchange

STAKEHOLDERS: **PennDOT District 1-0**

PERTINENT TSOP PROJECTS: TSOP-03, TSOP-08

ESTIMATED SCHEDULE: 1-2 yrs Life Cycle: 20 years	**ESTIMATED COSTS:** Capital: $32,000 Annual O&M: $2,500

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Medium

TECHNOLOGY COMPONENTS *(if applicable)*: HAR System

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved traveler information; Improved Customer Satisfaction.

BENEFITS: Improved traveler information disseminated via the radio to help drivers become aware of driving conditions and can be directed to take alternate routes if necessary.

OTHER CONSIDERATIONS AND ISSUES: Maintenance and Operations are important to help keep HAR working properly.

ST-10: CITY OF ERIE TRAFFIC SIGNALS PROJECT

PROJECT DESCRIPTION AND SCOPE: As part of a "Strategic Corridor Investment Plan" there are key regional congestion corridors that need to be analyzed for corridor upgrades The corridor that needs to be evaluated in the City of Erie includes:

▪Bayfront Connector (PA 290)

Controller upgrades, deployment of a Closed-Loop Signal System and re-timing of signals can help improve the conditions of these corridors. This corridor can be evaluated for the potential to be done as Congested Corridor Improvement Programs (CCIP), and Traffic Signal Enhancement Initiative (TSEI).

STAKEHOLDERS: **PennDOT District 1-0,** City of Erie

PERTINENT TSOP PROJECTS: TSOP – 08

ESTIMATED SCHEDULE: 1-2 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** Capital: $15,000 per signal Annual O&M: $1,200/signal

PROJECT TYPE: Planning & Deployment **LEVEL OF EFFORT:** Simple

TECHNOLOGY COMPONENTS *(if applicable)*: TMC; Closed Loop Signal System; Telecommunications

PREREQUISITES AND DEPENDENCIES: The Bayfront Connector can be coordinated and updated as part of the project for coordination of the traffic signals on the I-90 Detour Route.

PERFORMANCE MEASURES: Improved travel time through the Erie Metropolitan Area.

BENEFITS: Improvement of congested corridors in the NW PA Region can help to improve traffic conditions in the region.

OTHER CONSIDERATIONS AND ISSUES: Signal timings should be remotely accessible by the City of Erie and District 1-0. Corridors should be considered for CCTV and DMS deployment.

ST-11: CITY OF ERIE DMS PROJECT

PROJECT DESCRIPTION AND SCOPE: Deploy DMS at strategic locations in the NW PA Region. The potential locations in the City of Erie include:

- I-90 EB approaching the I-86 Interchange
- I-80 NB approaching 12th Street (Decision Point for the Bayfront)

The DMS applications are used to warn motorists of upcoming congestion or assist in traffic routing during construction, storms, collisions, or special events. These electronic signs are located along highways, and provide information to drivers at key decision points.

STAKEHOLDERS: **PennDOT District 1-0**

PERTINENT TSOP PROJECTS: TSOP-03 AND 04

ESTIMATED SCHEDULE: 1-2 yrs Life Cycle: 10-15 years	**ESTIMATED COSTS:** Capital: $430,000 Annual O&M: $22,000

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Simple

TECHNOLOGY COMPONENTS *(if applicable)*: DMS Sign Systems, Telecommunications

PREREQUISITES AND DEPENDENCIES: A new TMC will provide a central location for DMS messages to be controlled from.

PERFORMANCE MEASURES: Improved traveler information; Improved Customer satisfaction

BENEFITS: DMS messages help to warn motorists of travel conditions and help them to make more informed travel decisions.

OTHER CONSIDERATIONS AND ISSUES: N/A

ST-12: CITY OF ERIE TRAFFIC SIGNALS PROJECT

PROJECT DESCRIPTION AND SCOPE: As part of a "Strategic Corridor Investment Plan" there are key regional congestion corridors that need to be analyzed for corridor upgrades The corridor that needs to be evaluated in the City of Erie includes:

▪Route 5 (Millcreek/Erie)

Controller upgrades, deployment of a Closed-Loop Signal System and re-timing of signals can help improve the conditions of these corridors. This corridor can be evaluated for the potential to be done as Congested Corridor Improvement Programs (CCIP), and Traffic Signal Enhancement Initiative (TSEI).

STAKEHOLDERS: **PennDOT District 1-0,** City of Erie

PERTINENT TSOP PROJECTS: TSOP – 08

ESTIMATED SCHEDULE: 1-2 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** Capital: $15,000 per signal Annual O&M: $1,200/signal

PROJECT TYPE: Planning & Deployment **LEVEL OF EFFORT:** Simple

TECHNOLOGY COMPONENTS *(if applicable)*: TMC; Closed Loop Signal System; Telecommunications

PREREQUISITES AND DEPENDENCIES: Route 5 can be coordinated and updated as part of the project for coordination of the traffic signals on the I-90 Detour Route.

PERFORMANCE MEASURES: Improved travel time through the Erie Metropolitan Area.

BENEFITS: Improvement of congested corridors in the NW PA Region can help to improve traffic conditions in the region.

OTHER CONSIDERATIONS AND ISSUES: Signal timings should be remotely accessible by the City of Erie and District 1-0. Corridors should be considered for CCTV and DMS deployment.

ST-13: I-79 HIGHWAY ADVISORY RADIO (HAR) PROJECT

PROJECT DESCRIPTION AND SCOPE: PennDOT District 1-0 has plans to deploy additional ITS devices in the NW PA Region to close the ITS equipment gaps on the Interstates. The deployment of HAR can help disseminate traveler information on the interstates to motorists better. A potential location for HAR on I-79 is:

- I-79 & PA 358

These systems consist of transmission sites positioned along the roadway network at strategic locations. Typically HAR systems involve the use of dedicated AM radio frequencies/channels and have a broadcast range of 1/2 to 2 miles. An HAR system can disseminate traveler information using a live message or pre-selected recorded messages.

STAKEHOLDERS: **PennDOT District 1-0**

PERTINENT TSOP PROJECTS: TSOP – 04

ESTIMATED SCHEDULE: 1-2 years Life Cycle: 20 years	**ESTIMATED COSTS:** Capital: $32,000 Annual O&M: $2,500

PROJECT TYPE: Deployment

LEVEL OF EFFORT: Medium

TECHNOLOGY COMPONENTS *(if applicable)*: Transmission Site

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved Traveler Information; Improved Customer Satisfaction.

BENEFITS: Improved traveler information disseminated via the radio to help drivers become aware of driving conditions and be directed to take alternate routes if necessary.

OTHER CONSIDERATIONS AND ISSUES: Maintenance and Operations are important to help keep HAR working properly.

ST-14: CITY OF ERIE TRAFFIC SIGNALS PROJECT

PROJECT DESCRIPTION AND SCOPE: As part of a "Strategic Corridor Investment Plan" there are key regional congestion corridors that need to be analyzed for corridor upgrades The corridor that needs to be evaluated in the City of Erie includes:

▪Peach Street

Controller upgrades, deployment of a Closed-Loop Signal System and re-timing of signals can help improve the conditions of these corridors. This corridor can be evaluated for the potential to be done as Congested Corridor Improvement Programs (CCIP), and Traffic Signal Enhancement Initiative (TSEI).

STAKEHOLDERS: **PennDOT District 1-0,** City of Erie

PERTINENT TSOP PROJECTS: TSOP – 08

ESTIMATED SCHEDULE: 1-2 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** Capital: $15,000 per signal Annual O&M: $1,200/signal
PROJECT TYPE: Planning & Deployment	**LEVEL OF EFFORT:** Simple

TECHNOLOGY COMPONENTS *(if applicable)*: TMC; Closed Loop Signal System; Telecommunications

PREREQUISITES AND DEPENDENCIES: Peach Street can be coordinated and updated as part of the project for coordination of the traffic signals on the I-90 Detour Route.

PERFORMANCE MEASURES: Improved travel time through the Erie Metropolitan Area.

BENEFITS: Improvement of congested corridors in the NW PA Region can help to improve traffic conditions in the region.

OTHER CONSIDERATIONS AND ISSUES: Signal timings should be remotely accessible by the City of Erie and District 1-0. Corridors should be considered for CCTV and DMS deployment.

ST-15: CITY OF ERIE TRAFFIC SIGNALS PROJECT

PROJECT DESCRIPTION AND SCOPE: As part of a "Strategic Corridor Investment Plan" there are key regional congestion corridors that need to be analyzed for corridor upgrades The corridors that need to be evaluated in the City of Erie include:

▪38th Street

Controller upgrades, deployment of a Closed-Loop Signal System and re-timing of signals can help improve the conditions of these corridors. This corridor can be evaluated for the potential to be done as Congested Corridor Improvement Programs (CCIP), and Traffic Signal Enhancement Initiative (TSEI).

STAKEHOLDERS: **PennDOT District 1-0,** City of Erie

PERTINENT TSOP PROJECTS: TSOP – 08

ESTIMATED SCHEDULE: 1-2 years Life Cycle: 10-15 years	**ESTIMATED COSTS:** Capital: $15,000 per signal Annual O&M: $1,200/signal

PROJECT TYPE: Planning & Deployment **LEVEL OF EFFORT:** Simple

TECHNOLOGY COMPONENTS *(if applicable)*: TMC; Closed Loop Signal System; Telecommunications

PREREQUISITES AND DEPENDENCIES: 38th Street can be coordinated and updated as part of the coordination of I-90 Detour Route Traffic Signals

PERFORMANCE MEASURES: Improved travel time through the Erie Metropolitan Area.

BENEFITS: Improvement of congested corridors in the NW PA Region can help to improve traffic conditions in the region.

OTHER CONSIDERATIONS AND ISSUES: Signal timings should be remotely accessible by the City of Erie and District 1-0. Corridors should be considered for CCTV and DMS deployment.

ST-16: VENANGO COUNTY TRAFFIC SIGNALS

PROJECT DESCRIPTION AND SCOPE: As part of a "Strategic Corridor Investment Plan" there are key regional congestion corridors that need to be analyzed for corridor upgrades The corridor that needs to be evaluated in Venango County includes:

▪Downtown Oil City (CCIP)

Controller upgrades, deployment of a Closed-Loop Signal System and re-timing of signals can help improve the conditions of these corridors. These corridors can be evaluated for the potential to be done as Congested Corridor Improvement Programs (CCIP), and Traffic Signal Enhancement Initiative (TSEI).

STAKEHOLDERS: **PennDOT District 1-0,** PennDOT BHSTE, Local Municipalities

PERTINENT TSOP PROJECTS: TSOP – 08

ESTIMATED SCHEDULE: 1-2 years Life Cycle: 10 years	**ESTIMATED COSTS:** Capital: $15,000 per signal Annual O&M: $1,200/signal
PROJECT TYPE: Planning	**LEVEL OF EFFORT:** Simple

TECHNOLOGY COMPONENTS *(if applicable)*: TMC; Closed Loop Signal Systems; Telecommunications

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved travel time; Improved Traffic Signal Delay

BENEFITS: Identification of congested corridors in the NW PA Region can help to improve traffic conditions in the region.

OTHER CONSIDERATIONS AND ISSUES: N/A

ST-17: VENANGO COUNTY TRAFFIC SIGNALS

PROJECT DESCRIPTION AND SCOPE: As part of a "Strategic Corridor Investment Plan" there are key regional congestion corridors that need to be analyzed for corridor upgrades The corridor that needs to be evaluated in Venango County includes:

▪City of Franklin

Controller upgrades, deployment of a Closed-Loop Signal System and re-timing of signals can help improve the conditions of these corridors. These corridors can be evaluated for the potential to be done as Congested Corridor Improvement Programs (CCIP), and Traffic Signal Enhancement Initiative (TSEI).

STAKEHOLDERS: **PennDOT District 1-0,** PennDOT BHSTE, Local Municipalities

PERTINENT TSOP PROJECTS: TSOP – 08

ESTIMATED SCHEDULE: 1-2 years Life Cycle: 10 years	**ESTIMATED COSTS:** Capital: $15,000 per signal Annual O&M: $1,200/signal

PROJECT TYPE: Planning **LEVEL OF EFFORT:** Simple

TECHNOLOGY COMPONENTS *(if applicable)*: TMC; Closed Loop Signal Systems; Telecommunications

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved travel time; Improved Traffic Signal Delay

BENEFITS: Identification of congested corridors in the NW PA Region can help to improve traffic conditions in the region.

OTHER CONSIDERATIONS AND ISSUES: N/A

ST-18 & ST-19: Phase 1: Deployment of Automatic Vehicle Locator (AVL) and Automated Information Traveler Systems (AITS) on EMTA Buses

Project Description and Scope: Best fit EMTA buses with an AVL system with limited functionality. The deployment of an AVL system and AITS are part of the "Pilot Phase or Phase 1". The deployment of AITS will provide traveler information for EMTA at both indoor and outdoor locations. These locations include:

Outdoor: Edinboro Walmart, Ontario St. & E. Normal Street, Lawrence Towers Complex, Liberty Park- Ride Lot Bayfront, Perry Square, 10th & State Street

Indoor: University of Edinboro Student Union, Erie Conference Center, Erie Civic Center, Erie Intermodal Facility, Erie Insurance Building

A total of ten (10) AVL equipped buses and eleven (11) AITS sign locations will be used during the Pilot Phase. All of the locations are popular spots in the Erie Metropolitan Area for EMTA service.

Stakeholders: **EMTA,** PennDOT District 1-0

Pertinent TSOP Projects: TSOP – 17

Estimated Schedule: 1-2 years Life Cycle: 10 years	**Estimated Costs:** Capital: $570,000 Annual O&M: $45,000

Project Type: Deployment

Level of Effort: Simple

Technology Components *(if applicable)*: AVL System and AITS Signs

Prerequisites and Dependencies: N/A

Performance Measures: Increased ridership; Improved customer satisfaction

Benefits: The deployment of an AVL system and AITS for the EMTA Transit Operations will provide riders with up-to-date traveler information.

Other Considerations and Issues: The deployment of additional AVL and AITS for the EMTA fleet will be considered after the success of the Pilot Phase.

APPENDIX B: LONG-TERM ROP PROJECT DEPLOYMENTS

LT-01: Coordination of Traffic Signals on Alternate Detour Routes for I-90

Project Description and Scope: In the event of an incident on the Interstate the adjacent roadway's traffic signals can be coordinated to handle larger traffic volumes. The corridor adjacent to I-90 that has the potential to be coordinated includes:

▪12th Street & the Bayfront Connector (PA 290)

Controller upgrades, deployment of a Closed-Loop Signal System and re-timing of signals can help improve large traffic volumes on detour routes. The TMC can control the traffic signals to change timings at the time of an incident to improve traffic conditions.

Stakeholders: **PennDOT District 1-0,** City of Erie

Pertinent TSOP Projects: TSOP-03 and 08

Estimated Schedule: 3-4 yrs Life Cycle: 10 years	**Estimated Costs:** Capital: $15,000 per signal Annual O&M: $12,000/signal

Project Type: Planning & Deployment **Level of Effort:** Simple

Technology Components *(if applicable)*: TMC; Fiber Deployment; Closed-loop Signal System; Telecommunications

Prerequisites and Dependencies: A new TMC is needed to allow traffic signals to be controlled from a central location.

Performance Measures: Improved travel times along corridor; Improved incident management

Benefits: An incident on I-90 can be mitigated by traffic being directed onto the adjacent corridors. The adjacent corridors traffic signals will be re-timed and upgraded to maintain an acceptable Level of Service.

Other Considerations and Issues: Signal timings should be remotely accessible by the local municipality and District 1-0. The corridor should be considered for CCTV and DMS Deployment. The signals system should be connected to the local municipality and PennDOT 1-0.

LT-02: NW PA Region Detour Route GIS Mapping

Project Description and Scope: The detour routes for the NW PA Region are currently in booklets that are handed out as a reference for incidents and emergency detours on the Interstates. When detour routes are updated, coordinating the change in the booklets can be difficult. PennDOT District 1-0 has interest in publishing GIS based detour routes to the Internet. This will allow for easy access and quick updates to be made if a detour route needs to be edited.

Stakeholders: **PennDOT District 1-0,** Pennsylvania State Police

Pertinent TSOP Projects: TSOP-02, 05 and 12

Estimated Schedule: 3-4 yrs Life Cycle: N/A	**Estimated Costs:** TBD

Project Type: Planning

Level of Effort: Medium

Technology Components *(if applicable)*: GIS Database

Prerequisites and Dependencies: GIS data and Detour Routes

Performance Measures: Improved Incident Management and Detour Routing

Benefits: Detour Routing on GIS maps are easy to access by motorists when they are posted to the Internet. They can be easily updated too so that all motorists are aware of changes to the detours pre-trip.

Other Considerations and Issues: N/A

LT-03: Coordination of Traffic Signals on Alternate Detour Routes for I-90

Project Description and Scope: In the event of an incident on the Interstate the adjacent roadway's traffic signals can be coordinated to handle the larger traffic volumes. The corridor adjacent to I-90 that has the potential to be coordinated includes:

- 26th Street

Controller upgrades, deployment of a Closed-Loop Signal System and re-timing of signals can help improve large traffic volumes on detour routes. The TMC can control the traffic signals to change timings at the time of an incident to improve traffic conditions.

Stakeholders: **PennDOT District 1-0,** City of Erie

Pertinent TSOP Projects: TSOP-03 and 08

Estimated Schedule: 3-4 yrs Life Cycle: 10 years	**Estimated Costs:** Capital: $15,000 per signal Annual O&M: $12,000/signal

Project Type: Planning & Deployment **Level of Effort:** Simple

Technology Components *(if applicable)*: TMC; Fiber Deployment; Closed-Loop Signal System; Telecommunications

Prerequisites and Dependencies: A new TMC is needed to allow traffic signals to be controlled from a central location.

Performance Measures: Improved travel times along corridor; Improved incident management

Benefits: An incident on I-90 can be mitigated by traffic being directed onto the adjacent corridors. The adjacent corridors traffic signals will be re-timed and upgraded to maintain an acceptable Level of Service.

Other Considerations and Issues: Signal timings should be remotely accessible by the local municipality and District 1-0. Corridor should be considered for CCTV and DMS Deployment. Signals system should be connected to the local municipality and PennDOT 1-0.

LT-04: Co-Located Regional TMC in the City of Erie

Project Description and Scope: A co-located Regional PennDOT TMC in the City of Erie will help control ITS/Operations in the Erie Metropolitan Area. The ITS/Operations that can be controlled from the TMC include:

- DMS
- HAR
- RWIS
- CCTV
- Traffic Signals

The TMC can potentially be co-located with the City of Erie, Erie 911 Center, or EMTA. Each agency's operations would be performed out of the same facility and would help improve communications between agencies.

Stakeholders: **PennDOT District 1-0,** City of Erie, Erie 9-1-1 Center, EMTA

Pertinent TSOP Projects: TSOP-02, 05 and 12

Estimated Schedule: 3-4 yrs Life Cycle: N/A	**Estimated Costs:** This will be determined once a location is finalized

Project Type: Deployment

Level of Effort: Complex

Technology Components *(if applicable)*: Communications Infrastructure; Software Integration

Prerequisites and Dependencies: A new Erie 9-1-1 Center and EMTA Operations Center are possible locations for a Co-Located TMC.

Performance Measures: Improved Traveler Information and Incident Management; Decrease in Response times and incident clearance

Benefits: A co-located TMC will allow for better control of the Erie Metropolitan Area's ITS/Operations and improve inter-agency communications.

Other Considerations and Issues: N/A

LT-05: I-80 Traffic Surveillance Project

Project Description and Scope: Closed Circuit Television (CCTV) Cameras are used to provide visual images of highway operations and conditions. These images can then be used to verify incidents, determine what type of emergency response or management strategy should be deployed or dispatched, monitor weather conditions, and to identify field equipment such as traffic signals and signs. The potential locations for deployment include:

- I-79 & I-80 Interchange (Mercer)
- I-80 at the Ohio Border

Stakeholders: **PennDOT District 1-0**

Pertinent TSOP Projects: TSOP-03 and 04

Estimated Schedule: 3-4 yrs Life Cycle: 20 years	**Estimated Costs:** Capital: $270,000 Annual O&M: $4,000

Project Type: Deployment

Level of Effort: Medium

Technology Components *(if applicable)*: CCTV System; Telecommunications

Prerequisites and Dependencies: A new TMC will help utilize the deployment of CCTV in the region so that video images can be viewed at a central control center.

Performance Measures: Improved Incident Response Time

Benefits: Incidents on the roadway can be viewed in real-time so that the appropriate emergency response can be taken.

Other Considerations and Issues: N/A

LT-06: Coordination of Traffic Signals on Detour Routes for I-80

Project Description and Scope: In the event of an incident on the Interstate the adjacent roadway's traffic signals can be coordinated to handle the larger traffic volumes. The corridor adjacent to I-80 that has the potential to be coordinated includes:

▪Route 62 (Sharon/Hermitage)

Controller upgrades, deployment of a Closed-Loop Signal System and re-timing of signals can help improve large traffic volumes on detour routes. The TMC can control the traffic signals to change timings at the time of an incident to improve traffic conditions.

Stakeholders: **PennDOT District 1-0,** PennDOT 10-0, Local Municipalities

Pertinent TSOP Projects: TSOP-03 and 08

Estimated Schedule: 3-4 yrs Life Cycle: 10 years	**Estimated Costs:** Capital: $15,000 per signal Annual O&M: $1,200/signal

Project Type: Planning & Deployment **Level of Effort:** Simple

Technology Components *(if applicable)*: Closed-Loop Signal System; Telecommunications

Prerequisites and Dependencies: Traffic Signals in Sharon and Hermitage can be considered for signal upgrades and coordination with the deployment of a new TMC.

Performance Measures: Improved travel times along corridor; Improved Incident Management

Benefits: An incident on I-80 can be mitigated by traffic being directed onto the adjacent corridors. The adjacent corridors traffic signals will be re-timed and upgraded to maintain an acceptable Level of Service.

Other Considerations and Issues: Signal timings should be remotely accessible by District 1-0 and the local municipality. Corridors should be considered for CCTV and DMS Deployment.

LT-07: Coordination of Traffic Signals on Detour Routes for I-80

Project Description and Scope: In the event of an incident on the Interstate the adjacent roadway's traffic signals can be coordinated to handle the larger traffic volumes. The corridor adjacent to I-80 that has the potential to be coordinated include:

▪Route 18 (Hermitage)

Controller upgrades, deployment of a Closed-Loop Signal System and re-timing of signals can help improve large traffic volumes on detour routes. The TMC can control the traffic signals to change timings at the time of an incident to improve traffic conditions.

Stakeholders: **PennDOT District 1-0,** PennDOT 10-0, Local Municipalities

Pertinent TSOP Projects: TSOP-03 and 08

Estimated Schedule: 3-4 yrs Life Cycle: 10 years	**Estimated Costs:** Capital: $15,000 per signal Annual O&M: $1,200/signal

Project Type: Planning & Deployment **Level of Effort:** Simple

Technology Components *(if applicable)*: Closed-Loop Signal System; Telecommunications

Prerequisites and Dependencies: Traffic Signals in Hermitage can be considered for signal upgrades and coordination with the deployment of a new TMC.

Performance Measures: Improved travel times along corridor; Improved Incident Management

Benefits: An incident on I-80 can be mitigated by traffic being directed onto the adjacent corridors. The adjacent corridors traffic signals will be re-timed and upgraded to maintain an acceptable Level of Service.

Other Considerations and Issues: Signal timings should be remotely accessible by District 1-0 and the local municipality. Corridors should be considered for CCTV and DMS Deployment.

LT-08: Coordination of Traffic Signals on Detour Routes for I-80

Project Description and Scope: In the event of an incident on the Interstate the adjacent roadway's traffic signals can be coordinated to handle the larger traffic volumes. The corridor adjacent to I-80 that has the potential to be coordinated includes:

▪Route 62/322 (City of Franklin)

Controller upgrades, deployment of a Closed-Loop Signal System and re-timing of signals can help improve large traffic volumes on detour routes. The TMC can control the traffic signals to change timings at the time of an incident to improve traffic conditions.

Stakeholders: **PennDOT District 1-0,** PennDOT 10-0, Local Municipalities

Pertinent TSOP Projects: TSOP-03 and 08

Estimated Schedule: 3-4 yrs Life Cycle: 10 years	**Estimated Costs:** Capital: $15,000 per signal Annual O&M: $1,200/signal

Project Type: Planning & Deployment **Level of Effort:** Simple

Technology Components *(if applicable)*: Closed-Loop Signal System; Telecommunications

Prerequisites and Dependencies: Traffic Signals in Franklin can be considered for signal upgrades and coordination with the deployment of a new TMC.

Performance Measures: Improved travel times along corridor; Improved Incident Management

Benefits: An incident on I-80 can be mitigated by traffic being directed onto the adjacent corridors. The adjacent corridors traffic signals will be re-timed and upgraded to maintain an acceptable Level of Service.

Other Considerations and Issues: Signal timings should be remotely accessible by District 1-0 and the local municipality. Corridors should be considered for CCTV and DMS Deployment.

LT-09: COORDINATION OF TRAFFIC SIGNALS ON DETOUR ROUTES FOR I-80

PROJECT DESCRIPTION AND SCOPE: In the event of an incident on the Interstate the adjacent roadway's traffic signals can be coordinated to handle the larger traffic volumes. The corridor adjacent to I-80 that has the potential to be coordinated include:

▪Downtown Clarion Corridor

Controller upgrades, deployment of a Closed-Loop Signal System and re-timing of signals can help improve large traffic volumes on detour routes. The TMC can control the traffic signals to change timings at the time of an incident to improve traffic conditions.

STAKEHOLDERS: **PennDOT District 1-0,** PennDOT 10-0, Local Municipalities

PERTINENT TSOP PROJECTS: TSOP-03 AND 08

ESTIMATED SCHEDULE: 3-4 yrs Life Cycle: 10 years	**ESTIMATED COSTS:** Capital: $15,000 per signal Annual O&M: $1,200/signal

PROJECT TYPE: Planning & Deployment **LEVEL OF EFFORT:** Simple

TECHNOLOGY COMPONENTS *(if applicable)*: Closed-Loop Signal System; Telecommunications

PREREQUISITES AND DEPENDENCIES: Traffic Signals in Clarion County can be considered for signal upgrades and coordination with the deployment of a new TMC.

PERFORMANCE MEASURES: Improved travel times along corridor; Improved Incident Management

BENEFITS: An incident on I-80 can be mitigated by traffic being directed onto the adjacent corridors. The adjacent corridors traffic signals will be re-timed and upgraded to maintain an acceptable Level of Service.

OTHER CONSIDERATIONS AND ISSUES: Signal timings should be remotely accessible by District 1-0 and the local municipality. Corridors should be considered for CCTV and DMS Deployment.

LT-10: Traveler Information for Welcome Centers

Project Description and Scope: PennDOT District 1-0 will coordinate with PennDOT Central Office to provide traveler and weather information via kiosks or electronic displays at Welcome Centers. The Welcome Centers in the NW PA Region that could be deployed with traveler information kiosks include:

- I-80 near the Ohio Border
- I-90 near the New York Border
- I-90 near the Ohio Border
- I-79 SB at the Erie/Crawford County Border

This effort would provide motorists with Traveler Information on flat screen displays or kiosks. The weather information can be coordinated with Central Office to be disseminated to the NW PA Region visitors. It will include a web interface to the PennDOT 5-1-1 system.

Stakeholders: **PennDOT District 1-0,** Pennsylvania Tourism

Pertinent TSOP Projects: TSOP – 06

Estimated Schedule: 3-4 yrs Life Cycle: N/A	**Estimated Costs:** Capital: $25,000/site Annual O&M: $2,000

Project Type: Planning & Deployment **Level of Effort:** Simple

Technology Components *(if applicable)*: LCD Displays or kiosks; Software

Prerequisites and Dependencies: District 1-0's efforts for deployment should be coordinated with PennDOT Central Office's evaluation of the CASTNET deployment statewide.

Performance Measures: Improve traveler's awareness to the conditions in the NW PA Region while visiting.

Benefits: Travelers unfamiliar with the harsh winter weather in the NW PA Region can be made aware at the Welcome Centers when they travel through the region.

Other Considerations and Issues: Deployment of kiosks at the NW PA Region Rest Stops should be considered to help alert travelers to the region of the conditions.

LT-11: Traffic Signal Pre-Emption in Erie County

Project Description and Scope: Traffic Signal Pre-emption in Erie County is a type of system that allows the normal operation of traffic lights to be pre-empted, often to assist emergency vehicles. The most common use of these systems is to allow emergency vehicles priority by changing traffic signals in the path of the vehicle to green.

Stakeholders: **PennDOT District 1-0,** Local Municipalities

Pertinent TSOP Projects: TSOP – 08

Estimated Schedule: 3-4 yrs Life Cycle: 10 years	**Estimated Costs:** Capital: $3,000/signal

Project Type: Deployment

Level of Effort: Simple

Technology Components *(if applicable)*: Pre-emption sensors

Prerequisites and Dependencies: N/A

Performance Measures: Improve incident clearance; Improve emergency response time.

Benefits: Improves response time of emergency vehicles to the scene of an incident.

Other Considerations and Issues: Traffic Signal pre-emption in Erie County can be coordinated with control upgrades and re-timing projects that are planned.

LT-12 : MERCER COUNTY TRAFFIC SIGNAL PROJECT

PROJECT DESCRIPTION AND SCOPE: As part of a "Strategic Corridor Investment Plan" there are key regional congestion corridors that need to be analyzed for corridor upgrades The corridor that needs to be evaluated in Mercer County includes:

▪Mercer Borough

Controller upgrades, deployment of a Closed-Loop Signal System and re-timing of signals can help improve the conditions of these corridors. This corridor can be evaluated for the potential to be done as Congested Corridor Improvement Programs (CCIP), and Traffic Signal Enhancement Initiative (TSEI).

STAKEHOLDERS: **PennDOT District 1-0,** Local Municipalities

PERTINENT TSOP PROJECTS: TSOP – 08

ESTIMATED SCHEDULE: 3-4 yrs Life Cycle: 10 years	**ESTIMATED COSTS:** Capital: $15,000 per signal Annual O&M: $1,200/signal

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Simple

TECHNOLOGY COMPONENTS *(if applicable)*: TMC; Closed-Loop Signal System; Telecommunications

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved travel time; Improve traffic signal delay

BENEFITS: Identification of congested corridors in the NW PA Region can help to improve traffic conditions in the region.

OTHER CONSIDERATIONS AND ISSUES: Signal timings should be remotely accessible by the local municipalities and District 1-0. Corridors should be considered for CCTV and DMS deployment.

LT-13: Downtown Meadville Traffic Signal Project

Project Description and Scope: As part of a "Strategic Corridor Investment Plan" there are key areas that need to be analyzed for signal upgrades. The corridor that needs to be evaluated in Meadville includes:

▪Downtown Meadville Corridor

Controller upgrades, deployment of a Closed-Loop Signal System and re-timing of signals can help improve the conditions of these corridors. This corridor can be evaluated for the potential to be done as Congested Corridor Improvement Programs (CCIP), and Traffic Signal Enhancement Initiative (TSEI).

Stakeholders: **PennDOT District 1-0,** PennDOT BHSTE, City of Meadville

Pertinent TSOP Projects: TSOP – 08

Estimated Schedule: 3-4 yrs Life Cycle: 10 years	**Estimated Costs:** Capital: $15,000 per signal Annual O&M: $1,200/signal

Project Type: Planning **Level of Effort:** Simple

Technology Components *(if applicable)*: TMC; Closed-Loop Signal System; Telecommunications

Prerequisites and Dependencies: N/A

Performance Measures: Improved travel time; Improved Signal Delay

Benefits: Identification of congested areas in the NW PA Region can help to improve traffic conditions in the region.

Other Considerations and Issues: Signal timings should be remotely accessible by the City of Meadville and District 1-0. Corridors should be considered for CCTV and DMS deployment

LT-14 : HERMITAGE AND SHARON TRAFFIC SIGNAL PROJECT

PROJECT DESCRIPTION AND SCOPE: As part of a "Strategic Corridor Investment Plan" there are key regional congestion corridors that need to be analyzed for corridor upgrades The corridor that need to be evaluated in Hermitage and Sharon includes:

▪State Street (Sharon/Hermitage)

Controller upgrades, deployment of a Closed-Loop Signal System and re-timing of signals can help improve the conditions of these corridors. This corridor can be evaluated for the potential to be done as Congested Corridor Improvement Programs (CCIP), and Traffic Signal Enhancement Initiative (TSEI).

STAKEHOLDERS: **PennDOT District 1-0,** Local Municipalities

PERTINENT TSOP PROJECTS: TSOP – 08

ESTIMATED SCHEDULE: 3-4 yrs Life Cycle: 10 years	**ESTIMATED COSTS:** Capital: $15,000 per signal Annual O&M: $1,200/signal

PROJECT TYPE: Planning **LEVEL OF EFFORT:** Simple

TECHNOLOGY COMPONENTS *(if applicable)*: TMC; Closed-Loop Signal System; Telecommunications

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved travel time; Improve traffic signal delay

BENEFITS: Identification of congested corridors in the NW PA Region can help to improve traffic conditions in the region.

OTHER CONSIDERATIONS AND ISSUES: Signal timings should be remotely accessible by the local municipalities and District 1-0. Corridors should be considered for CCTV and DMS deployment.

LT-15 : HERMITAGE AND SHARON TRAFFIC SIGNAL PROJECT

PROJECT DESCRIPTION AND SCOPE: As part of a "Strategic Corridor Investment Plan" there are key regional congestion corridors that need to be analyzed for corridor upgrades The corridors that need to be evaluated in Hermitage and Sharon include:

▪Route 62 (Hermitage)

Controller upgrades, deployment of a Closed-Loop Signal System and re-timing of signals can help improve the conditions of these corridors. This corridor can be evaluated for the potential to be done as Congested Corridor Improvement Programs (CCIP), and Traffic Signal Enhancement Initiative (TSEI).

STAKEHOLDERS: **PennDOT District 1-0,** Local Municipalities

PERTINENT TSOP PROJECTS: TSOP – 08

ESTIMATED SCHEDULE: 3-4 yrs Life Cycle: 10 years	**ESTIMATED COSTS:** Capital: $15,000 per signal Annual O&M: $1,200/signal

PROJECT TYPE: Planning **LEVEL OF EFFORT:** Simple

TECHNOLOGY COMPONENTS *(if applicable)*: TMC; Closed-Loop Signal System; Telecommunications

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved travel time; Improve traffic signal delay

BENEFITS: Identification of congested corridors in the NW PA Region can help to improve traffic conditions in the region.

OTHER CONSIDERATIONS AND ISSUES: Signal timings should be remotely accessible by the local municipalities and District 1-0. Corridors should be considered for CCTV and DMS deployment.

LT-16 : MERCER COUNTY TRAFFIC SIGNAL PROJECT

PROJECT DESCRIPTION AND SCOPE: As part of a "Strategic Corridor Investment Plan" there are key regional congestion corridors that need to be analyzed for corridor upgrades The corridor that needs to be evaluated in Mercer County includes:

▪Route 58 (Grove City)

Controller upgrades, deployment of a Closed-Loop Signal System and re-timing of signals can help improve the conditions of these corridors. This corridor can be evaluated for the potential to be done as Congested Corridor Improvement Programs (CCIP), and Traffic Signal Enhancement Initiative (TSEI).

STAKEHOLDERS: **PennDOT District 1-0,** Local Municipalities

PERTINENT TSOP PROJECTS: TSOP – 08

ESTIMATED SCHEDULE: 3-4 yrs Life Cycle: 10 years	**ESTIMATED COSTS:** Capital: $15,000 per signal Annual O&M: $1,200/signal

PROJECT TYPE: Deployment **LEVEL OF EFFORT:** Simple

TECHNOLOGY COMPONENTS *(if applicable)*: TMC; Closed-Loop Signal System; Telecommunications

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved travel time; Improve traffic signal delay

BENEFITS: Identification of congested corridors in the NW PA Region can help to improve traffic conditions in the region.

OTHER CONSIDERATIONS AND ISSUES: Signal timings should be remotely accessible by the local municipalities and District 1-0. Corridors should be considered for CCTV and DMS deployment.

LT-17 : HERMITAGE AND SHARON TRAFFIC SIGNAL PROJECT

PROJECT DESCRIPTION AND SCOPE: As part of a "Strategic Corridor Investment Plan" there are key regional congestion corridors that need to be analyzed for corridor upgrades The corridors that need to be evaluated in Hermitage and Sharon include:

▪Route 18 (Hermitage)

Controller upgrades, deployment of a Closed-Loop Signal System and re-timing of signals can help improve the conditions of these corridors. These corridors can be evaluated for the potential to be done as Congested Corridor Improvement Programs (CCIP), and Traffic Signal Enhancement Initiative (TSEI).

STAKEHOLDERS: **PennDOT District 1-0,** Local Municipalities

PERTINENT TSOP PROJECTS: TSOP – 08

ESTIMATED SCHEDULE: 3-4 yrs Life Cycle: 10 years	**ESTIMATED COSTS:** Capital: $15,000 per signal Annual O&M: $1,200/signal

PROJECT TYPE: Planning **LEVEL OF EFFORT:** Simple

TECHNOLOGY COMPONENTS *(if applicable)*: TMC; Closed-Loop Signal System; Telecommunications

PREREQUISITES AND DEPENDENCIES: N/A

PERFORMANCE MEASURES: Improved travel time; Improve traffic signal delay

BENEFITS: Identification of congested corridors in the NW PA Region can help to improve traffic conditions in the region.

OTHER CONSIDERATIONS AND ISSUES: Signal timings should be remotely accessible by the local municipalities and District 1-0. Corridors should be considered for CCTV and DMS deployment.

LT-18 & LT- 19: Phase 2 Deployment of Automatic Vehicle Locator (AVL) and Automated Information Traveler Systems (AITS) on EMTA Buses

Project Description and Scope: Best fit the entire EMTA buses with an AVL system. The deployment of an AVL system and AITS are part of the "Phase 2" deployment. The deployment of AITS will provide traveler information for EMTA at both indoor and outdoor locations. The potential locations include:

Outdoor: Millcreek Mall at McDonalds, Buffalo Road at Kmart, Casino, West Erie Plaza
Indoor: Hamot Hospital, County Courthouse, Library, Millcreek Mall

The above locations are popular spots in the Erie Metropolitan Area for EMTA service.

Stakeholders: EMTA, PennDOT District 1-0

Pertinent TSOP Projects: TSOP – 17

Estimated Schedule: 3-4 yrs Life Cycle: 10 years	**Estimated Costs:** Capital: $865,000 Annual O&M: $70,000
Project Type: Deployment	**Level of Effort:** Medium

Technology Components *(if applicable)*: AVL Systems; AITS Signs; Computer Aided Dispatch

Prerequisites and Dependencies: N/A

Performance Measures: Increase ridership; Improved customer satisfaction

Benefits: The deployment of an AVL system and AITS for the entire EMTA Transit Operations will provide riders with up-to-date traveler information.

Other Considerations and Issues: N/A

LT-20: EMTA Voice Annunciator & Passenger Counter Deployment Project

Project Description and Scope: As a follow up to the Phase 2 Deployment of AVL and AITS, EMTA plans to deploy Automatic Passenger Counting System (APC) and Automatic Stop/Voice Annunciator System (AVA).

Automatic Passenger Counting System shall include sensors that accurately detect passenger boarding and alightings under the conditions of simultaneous passenger movements in both directions, multiple doors open (2), and congested situations.

Automatic Stop/Voice Announcement System shall include the ability to deliver internal and external required messages and shall be synchronized with the vehicle's approach, arrival, and departure to and from scheduled stops.

Stakeholders: **EMTA,** PennDOT 1-0

Pertinent TSOP Projects: TSOP – 17

Estimated Schedule: 3-4 yrs Life Cycle: 10 years	**Estimated Costs:** Capital: $450,000 Annual O&M: $36,000

Project Type: Deployment

Level of Effort: Complex

Technology Components *(if applicable)*: Transit ITS Systems

Prerequisites and Dependencies: The availability of funding is necessary for deployment.

Performance Measures: Increased ridership; Improved Customer Satisfaction

Benefits: The Automatic Stop/Voice Announcement System will provide riders will ADA compliant announcements and visual sign messages without requiring the operator to perform them while the bus is in service.

Other Considerations and Issues: Automatic Passenger Counting System will satisfy the FTA's Section 15 reporting requirements. They could be integrated with an AVL system a function of position along a route.