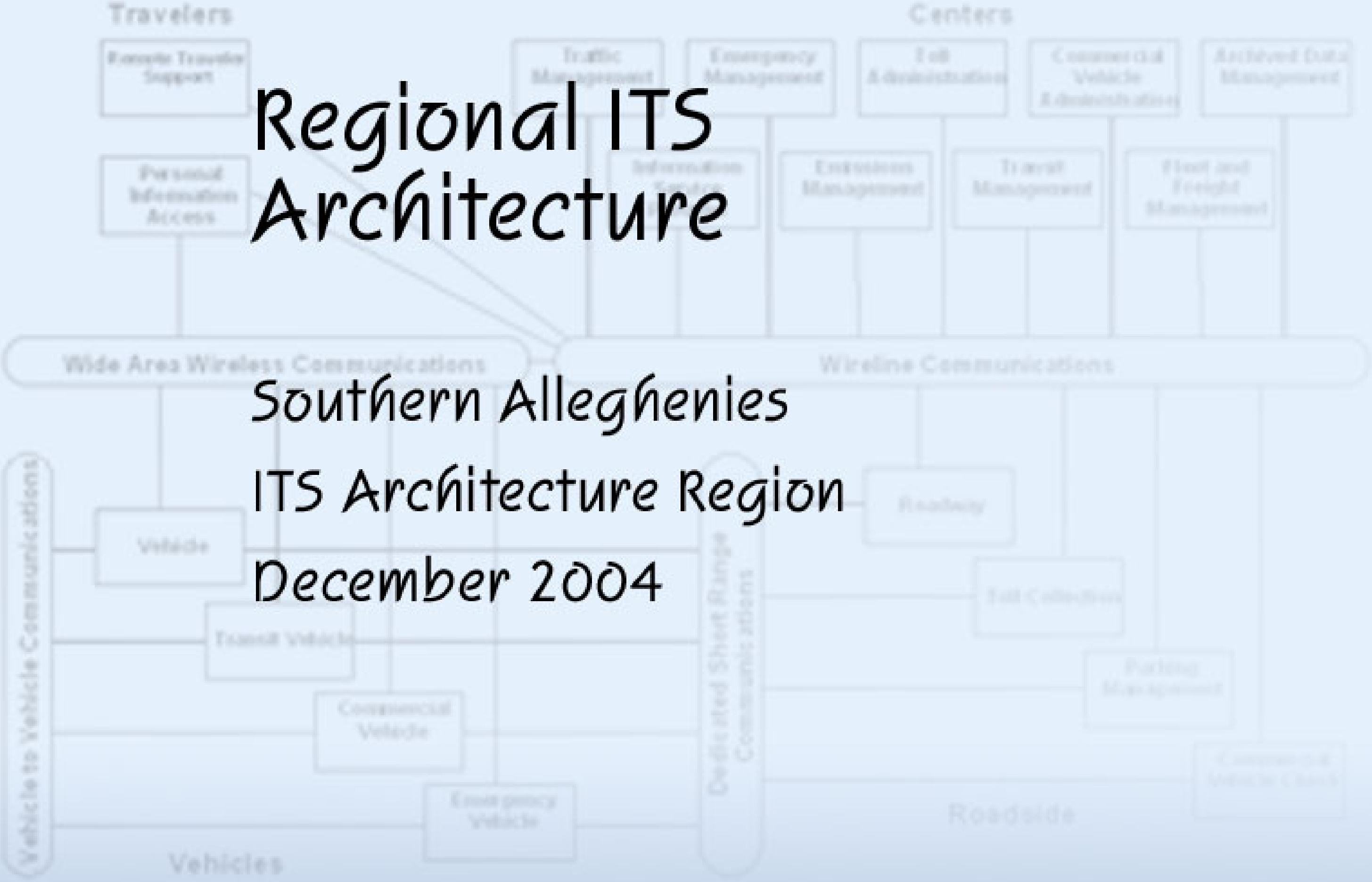
Regional ITS Architecture

Southern Alleghenies
ITS Architecture Region
December 2004


Travelers
Centers
Remote Traveler Support
Personal Information Access
Traffic Management
Emergency Management
Toll Administration
Commercial Vehicle Administration
Archived Data Management
Information Service Provider
Emissions Management
Transit Management
Fleet and Freight Management
Wide Area Wireless Communications
Wireline Communications
Vehicle to Vehicle Communications
Vehicle
Transit Vehicle
Commercial Vehicle
Emergency Vehicle
Vehicles
Dedicated Short Range Communications
Roadway
Toll Collection
Parking Management
Commercial Vehicle Check
Roadside

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Altoona – Metropolitan Planning Organization
Adopted on February 8, 2005

Johnstown – Metropolitan Planning Organization
Adopted on February 9, 2005

Southern Alleghenies – Rural Planning Organization
Pending adoption on April 13, 2005

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Statewide Working Group

The Statewide Working Group guided the Commonwealth through the development of the Architectures. Their principal role was to ensure that the Regional Architectures were reasonably uniform and consistent.

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Karen Russell – PennDOT Central Office, *Program Development Division*

Dominic Munizza – PennDOT District 11-0

Denny Prestash – PennDOT District 2-0

John Ward – Delaware Valley Regional Planning Commission (DVRPC)

Lt. Thomas McDaniel – Pennsylvania State Police (PSP)

Jessie Yung – Federal Highway Administration (FHWA)

Mike Herron – Federal Highway Administration (FHWA)

Regional Champion

The Regional Champion supported the RAP by facilitating the RAP meetings and played a critical role in coordinating with the Statewide Working Group for merging statewide visions with Regional characteristics. The Champion for this Region was:

Mike Pastore – PennDOT District 9-0

Regional Advisory Panel

The Regional Advisory Panel lead and guided the Regional ITS Architecture development in the Southwest ITS Architecture Region. The Architecture was developed with input from regional stakeholders, channeled and focused by the RAP.

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Dan Bretzman – Pennsylvania Turnpike Commission (PTC)

Dave Belz – Cambria County Planning Commission

Lt. John Bey – Pennsylvania State Police

Rodney Bohner – Blair County Emergency Management Agency

Wes Burket – Blair County Planning Commission

Roger Dodson – PennDOT District 9-0

John Dubnansky – Southern Alleghenies Planning and Development Commission

Kevin Snyder – PennDOT District 9-0

Greg Stolz – PennDOT 9-2 County Maintenance

Tony Tanzi – PennDOT District 9-0

Craig Yohn – PennDOT District 9-0

Parsons Brinckerhoff

The principal role of Parsons Brinkerhoff was to oversee and produce the Regional ITS Architectures. The PB Team consisted of:

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Joel Ticatch – PB Farradyne – Assistant Project Manager

JD Schneeberger – PB Farradyne – Turbo

Noah Goodall – PB Farradyne – Web

Mike Waisley – PB Farradyne – Southern Alleghenies Lead

Vijay Varadarajan – PB Farradyne – Southern Alleghenies Support

Conformity Statement

The Southern Alleghenies Region of the Commonwealth of Pennsylvania is in compliance with the requirements of the "Intelligent Transportation Systems Architecture and Standards," as mandated by the Federal Highway Administration (23 CFR 940) and supported by the policy of the Federal Transit Administration.

The following policy objectives are enumerated in 23 CFR 940.5: "ITS projects shall conform to the National ITS Architecture and standards in accordance with the requirements contained in this [Federal rule]. Conformance with the National ITS Architecture is interpreted to mean the use of the National ITS Architecture to develop a [R]egional ITS Architecture, and the subsequent adherence of all ITS projects to that [R]egional ITS Architecture. Development of the [R]egional ITS Architecture should be consistent with the transportation planning process for Statewide and Metropolitan Transportation Planning."

The Southern Alleghenies Region's ITS Architecture was developed to address these specific policy objectives. The resultant Regional ITS Architecture is consistent with Pennsylvania's statewide and metropolitan transportation planning processes.

1 Introduction

This document, developed under the *Pennsylvania Intelligent Transportation Systems (ITS) Architecture* initiative, presents the ITS Architecture for Pennsylvania's Southern Alleghenies Region, which is comprised of six counties in the Southern Alleghenies part of the state. The Southern Alleghenies Region encompasses PennDOT Engineering District 9-0. The document is the result of intensive data-gathering, research, and planning activities conducted between March 2003 and December 2004. The current version of the ITS Architecture was generated in December 2004.

The Southern Alleghenies Regional ITS Architecture was prepared under the auspices of a Regional Advisory Panel (RAP), a panel of experts drawn from transportation stakeholder organizations across the Region and State. Additional stakeholder organizations participated in the process of "validating" the Architecture. PB Farradyne, a division of Parsons Brinckerhoff, Inc., executed development of the Architecture under contract to the Pennsylvania Department of Transportation (PennDOT). PennDOT appointed an ITS Statewide Working Group to establish statewide ITS Architecture standards, advise and guide the statewide process, and ensure consistency across the Regions.

The Southern Alleghenies Regional ITS Architecture is one of nine Regional Architectures being developed across the Commonwealth of Pennsylvania, as shown in Figure 1-1, below:

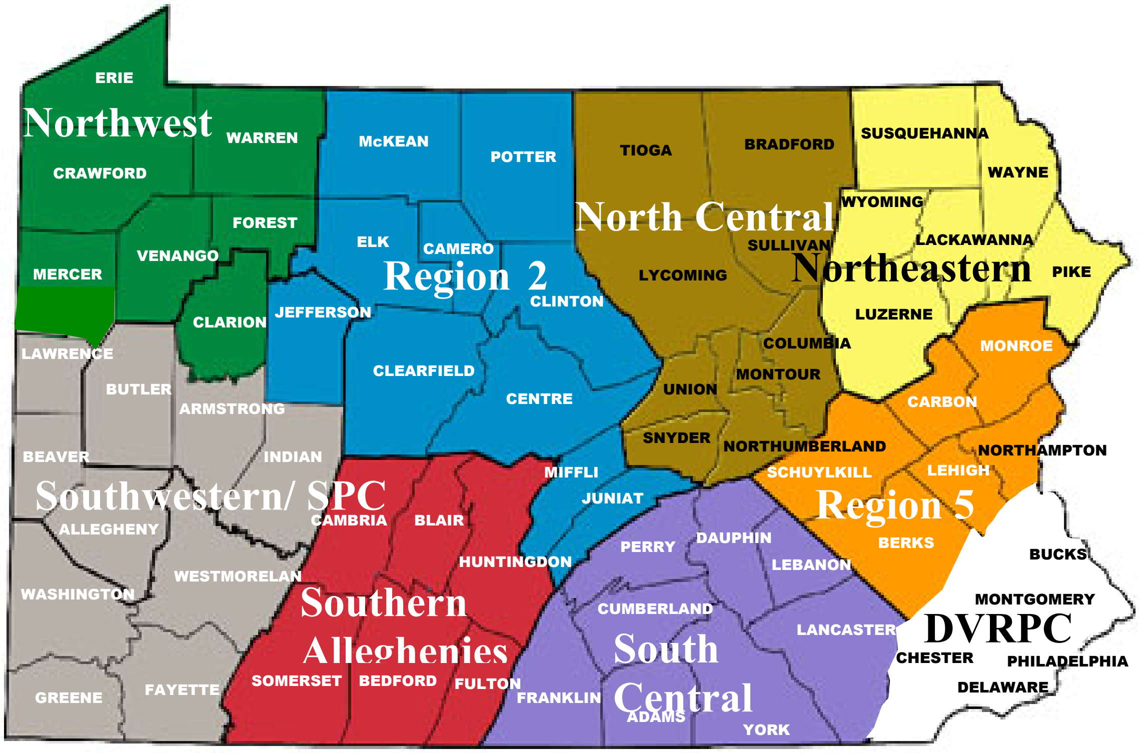

ERIE
Northwest
WARREN
CRAWFORD
FOREST
MERCER
VENANGO
CLARION
McKEAN
POTTER
ELK
CAMERO
Region 2
JEFFERSON
CLINTON
CLEARFIELD
CENTRE
TIOGA
BRADFORD
North Central
SULLIVAN
LYCOMING
COLUMBIA
MONTOUR
UNION
SNYDER
NORTHUMBERLAND
SUSQUEHANNA
WAYNE
WYOMING
LACKAWANNA
Northeastern
PIKE
LUZERNE
MONROE
CARBON
NORTHAMPTON
LEHIGH
SCHUYLKILL
Region 5
BERKS
LAWRENCE
BUTLER
ARMSTRONG
BEAVER
INDIAN
Southwestern/ SPC
ALLEGHENY
WASHINGTON
WESTMORELAN
GREENE
FAYETTE
CAMBRIA
BLAIR
MIFFLI
JUNIAT
HUNTINGDON
Southern
Alleghenies
SOMERSET
BEDFORD
FULTON
PERRY
DAUPHIN
LEBANON
CUMBERLAND
South
Central
FRANKLIN
ADAMS
YORK
LANCASTER
BUCKS
MONTGOMERY
DVRPC
CHESTER
PHILADELPHIA
DELAWARE

Figure 1-1: PennDOT ITS Architecture Regions

1.1 Architecture Process

PennDOT took a structured approach to developing Regional ITS Architectures throughout the State. The Regional ITS Architecture development process was defined and documented in the "Pennsylvania ITS Architecture Phase I Report," dated February 2003. PennDOT, the Federal Highway Administration (FHWA), the Pennsylvania State Police (PSP), and the Planning Partners championed the former effort.

The Phase I Report describes PennDOT's approach towards developing Regional ITS Architectures in Pennsylvania while utilizing the national guidance. The approach ensures that the resultant Architectures depict the ITS infrastructure in the Region and conform to the National ITS Architecture. The process developed is inherently flexible and adaptable so that special conditions and circumstances in each Region can be effectively addressed or otherwise accommodated, while maintaining a statewide consistency.

The development process was specifically designed to support the preparation and refinement of Regional ITS Architectures across Pennsylvania. The process benefits the Pennsylvania environment, optimizes the national guidance, and creates an efficient and effective response to regional needs and circumstances.

The complete process for developing Regional ITS Architectures in Pennsylvania, as described in the Phase I Report, is:

- Task 1.0 — Define Architecture Scope
- Task 2.0 — Inventory Systems and Define Needs, Services, and Operations Concept
- Task 3.0 — Generate Strawman Regional ITS Architecture
- Task 4.0 — Conduct Outreach to Validate Regional ITS Architecture
- Task 5.0 — Finalize the Regional ITS Architecture

The process is depicted in further detail in the following schematic:

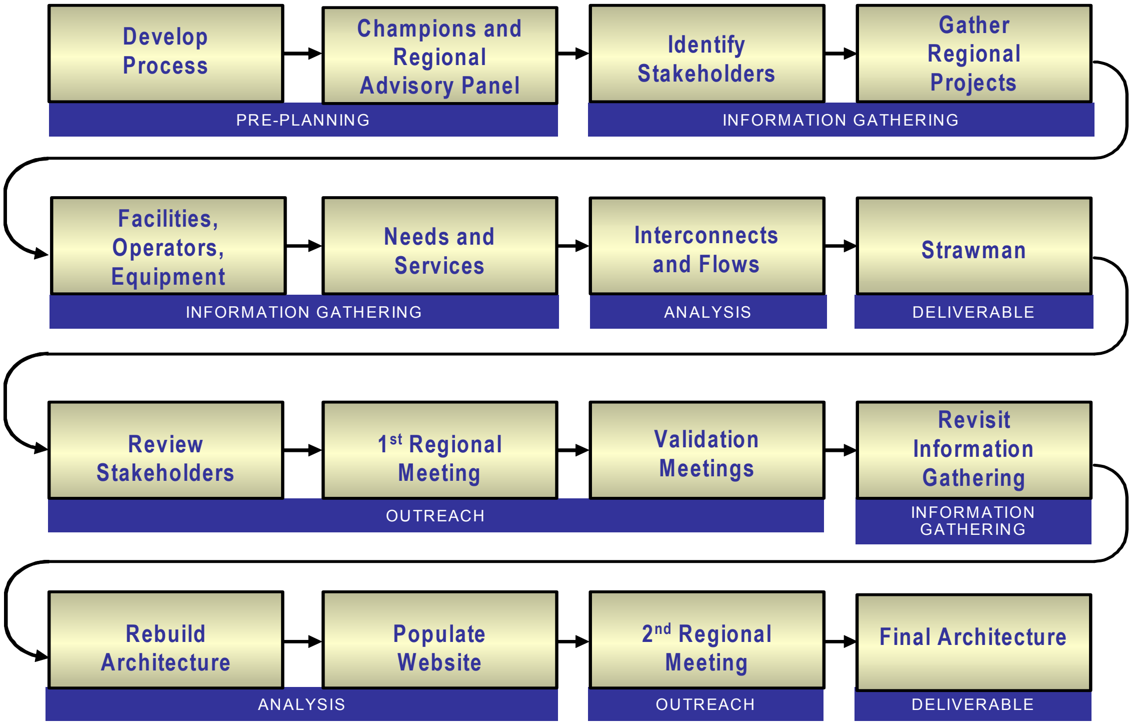

Develop Process
Champions and Regional Advisory Panel
Identify Stakeholders
Gather Regional Projects
PRE-PLANNING
INFORMATION GATHERING
Facilities, Operators, Equipment
Needs and Services
Interconnects and Flows
Strawman
INFORMATION GATHERING
ANALYSIS
DELIVERABLE
Review Stakeholders
1st Regional Meeting
Validation Meetings
Revisit Information Gathering
OUTREACH
INFORMATION GATHERING
Rebuild Architecture
Populate Website
2nd Regional Meeting
Final Architecture
ANALYSIS
OUTREACH
DELIVERABLE

Figure 1-2: Pennsylvania ITS Architecture Process Schematic

1.2 Using this Document

This document is, principally, a resource instrument, designed to assist engineers, planners, designers, developers, managers, and decision-makers in defining a regionally-integrated surface transportation infrastructure that promotes safety, maximizes operational efficiencies, and utilizes appropriate technologies. Materials in the document are targeted at traditional surface transportation organizations, transit agencies, and the host of entities that interface with the transportation infrastructure. The latter include incident and emergency management personnel, commercial vehicle operators, shippers, operators of tourist destinations, event managers, traveler information providers, etc.

The document is a resource instrument to be consulted during the planning process. It is not intended as a textbook to be read from cover-to-cover.

The term "ITS" implies the use of technologies or other innovations to achieve new operational efficiencies in transportation. Yet, an ITS Architecture is, itself, technology-independent; that is, it identifies *who and what* need to connect, but not *how* those connections ought to best to be accomplished.

An ITS Architecture describes the interrelationships that exist—or ought to exist—among transportation "elements" across the Region. It distinguishes between those

relationships that exist now and those planned for the future. However, the Architecture does not judge the efficacy, or utility, of those relationships or assess whether the technologies or procedures supporting those linkages are optimized.
These sorts of judgments will need to be made after the Regional ITS Architecture is finalized.

Document Organization and Access Strategies

The ITS Architecture is presented in five primary sections:

- Section 1 — *Introduction*
- Section 2 — *Architecture Scope*
- Section 3 — *Regional Systems Inventory, Needs, and Services*
- Section 4 — *Regional Architecture*
- *Appendices*

Section 1, *Introduction*, contains important background information and establishes the "context" for the Architecture effort. This section defines key concepts and terms, examines the utility of a Regional ITS Architecture, the importance of maintaining the Architecture, ITS standards, and strategies for mainstreaming, or institutionalizing, ITS. This section should be read in its entirety.

Section 2, *Architecture Scope*, summarizes the general scope and magnitude of the Regional ITS Architecture effort. It describes the Southern Alleghenies Region, emphasizing those characteristics that potentially impact transportation activities and performance. It further identifies major ITS stakeholders and existing and planned ITS projects across the Region. This section of the document should also be read in its totality.

Section 3, *Regional Systems Inventory, Needs, and Services*, contains the essential "building blocks" of the ITS Architecture. It identifies and defines each pertinent ITS "element" in the Region. "Elements" are the organizational entities (e.g., the PennDOT District Offices, 911 Communications Centers, and Regional Transit Agency Offices) that operate in the transportation environment. Additionally, the section presents the ITS Systems Inventory, organized by element and linked back to the Projects List in Section 2. The Needs and Services tables establish the interrelationships among the Region's ITS elements. Each element in the Needs Table is defined in terms of the "inputs" it requires from the other elements with which it interacts; similarly, each element in the Services Table is defined in terms of the "outputs" it furnishes to other elements.

Users of the ITS Architecture should familiarize themselves with the general content of Section 3. Thereafter, when they are engaged in ITS deployment planning or related activities, they can generally proceed directly to Section 4. Users can return to Section 3, as needed, for descriptions of the elements being investigated, identification of the pertinent roadway corridors, and more comprehensive understanding of the interrelationships across elements.

Section 4, *Regional Architecture,* graphically displays the details of the ITS Architecture. Notably, Figure 4-2, *Regional Subsystem Interconnect Diagram Showing Elements*, identifies the systems and subsystems with which each regional ITS element is associated; elements are color-coded—here and throughout the remainder of the document—according to which of the four primary systems they fall under (i.e., Centers, Roadside, Vehicles, or Travelers). Similarly, Table 4-2, *Regional Interconnect Matrix*, specifies which elements gather inputs from—or furnish outputs to—other elements. The remainder of Section 4 is a compendium of the ITS elements. Each element is depicted in terms of the other elements with which it interfaces, and then each "element pair" is examined in detail. The detailed pairings show the types of information that pass between the elements, the direction of the information flow, and whether the flow currently exists or is planned.

Practitioners consulting the Regional ITS Architecture can use Table 4-2 to determine those elements pertinent to their investigations and proceed directly to the corresponding interconnect diagrams. From the diagrams, practitioners can gather the essential information.

The *Appendices* contain a wealth of supplemental materials to assist practitioners in comprehending the Architecture. These include: (1) ITS acronyms; (2) definitions of ITS terminology; (3) definitions of subsystems/terminators and architecture flows identified and defined in the National ITS Architecture; (4) "operations coverage" across the Region; and (5) summaries of Outreach and Validation meetings.

Sample Access Scenario

The Regional ITS Architecture is a valuable planning tool. The following sample scenario defines how a stakeholder in the Region might utilize the material presented in this document:

A transit agency planner in Pennsylvania's Southern Alleghenies Region preparing to deploy an automatic vehicle location (AVL) system on its buses can learn a great deal from consulting the Regional ITS Architecture. By turning to the Regional Transit Agency Offices' Interconnect Diagram, the transit planner can immediately grasp the range of stakeholders potentially interested in receiving pertinent vehicle location and more detailed transit data (e.g., 911 Communication Centers, PennDOT Traffic Management Centers, Personal Traveler Information Devices, etc.). The planner would discover that connections between 911 Communication Centers are generally in place; that the remaining interfaces do not currently exist, but are planned for the future.

By consulting the interconnect and information flow diagrams, the transit planner would further learn that AVL inputs might effectively be used to improve the detail, precision, and timeliness of transit emergency data that already pass to other agencies in the Region. The diagrams further show that future “hooks” are planned for communicating bus status data to other agencies. For example, PennDOT would like to use the transit vehicles as probe data to identify congested corridors in the Region. Other stakeholders might be interested in broadcasting vehicle status or delay data to their users.

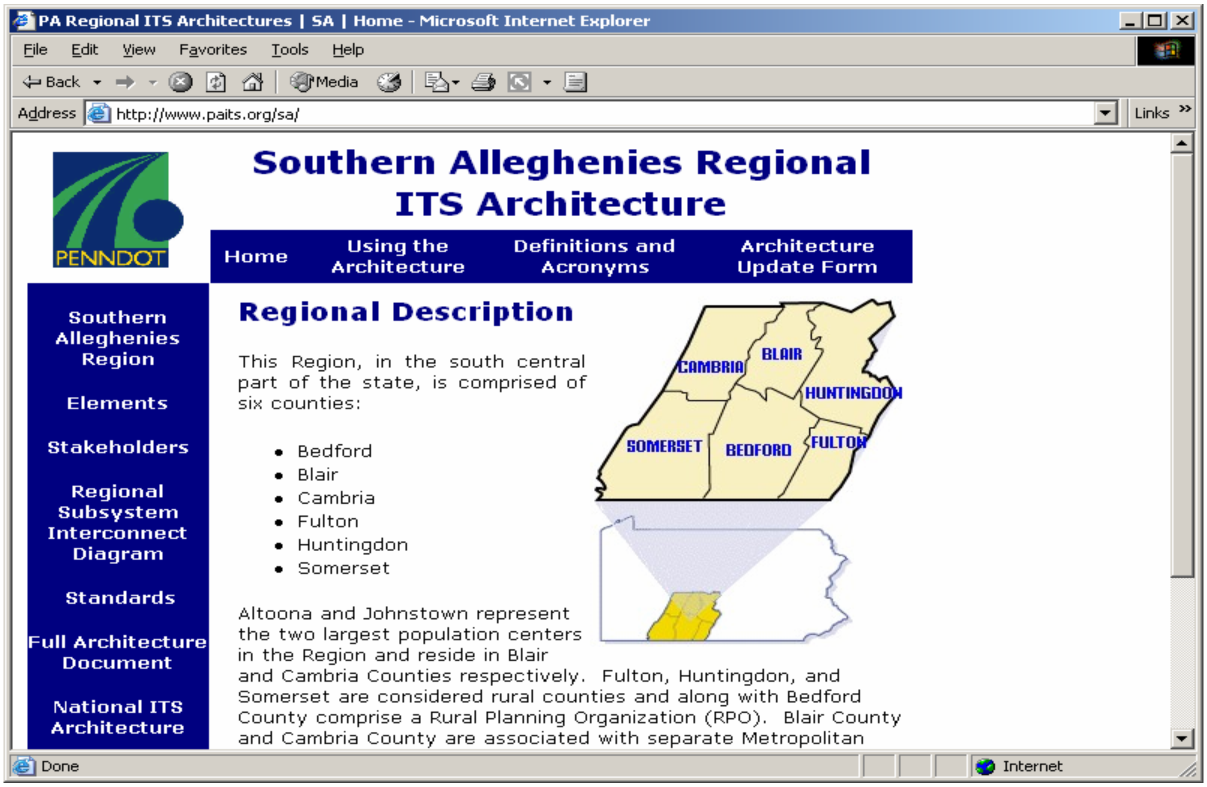
Access to the ITS Architecture enables users to view the pertinent infrastructure before new ITS projects are undertaken. Existing and planned interrelationships can be quickly viewed and grasped, and the realm of agencies and other entities with a potential stake in the subject matter can be easily identified. Details about the information passing between stakeholders offer insight into optimizing future deployments and concretizing the range of possibilities for important new projects.

Accessing the Architecture On-Line

Key sections of the Regional ITS Architecture—notably Section 4 of the hardcopy document—are accessible on-line. To access the Southern Alleghenies Regional Architecture, go to:

www.paits.org/sa

When you access this location, the web screen shown in Figure 1-3 will be displayed:


PA Regional ITS Architectures | SA | Home - Microsoft Internet Explorer
File
Edit
View
Favorites
Tools
Help
Back
Media
Address
http://www.paits.org/sa/
Links
PENNDOT
Home
Using the Architecture
Definitions and Acronyms
Architecture Update Form
Southern Alleghenies Region
Elements
Stakeholders
Regional Subsystem Interconnect Diagram
Standards
Full Architecture Document
National ITS Architecture
CAMBRIA
BLAIR
HUNTINGDON
SOMERSET
BEDFORD
FULTON
Done
Internet

Southern Alleghenies Regional ITS Architecture

Regional Description

This Region, in the south central part of the state, is comprised of six counties:

- Bedford
- Blair
- Cambria
- Fulton
- Huntingdon
- Somerset

Altoona and Johnstown represent the two largest population centers in the Region and reside in Blair and Cambria Counties respectively. Fulton, Huntingdon, and Somerset are considered rural counties and along with Bedford County comprise a Rural Planning Organization (RPO). Blair County and Cambria County are associated with separate Metropolitan

Figure 1-3: Pennsylvania ITS Architecture Web Site

From the Southern Alleghenies Regional ITS Architecture Homepage (www.paits.org/sa), there are three ways to access information about a specific element:

1. Click on “Elements” and select any element from the list.

2. Click on “Stakeholders” and select the correct stakeholder, and then select an element.

3. Click on the “System Interconnect Diagram” for a sausage diagram of the Region that lists the elements grouped by type. Clicking on the element in the diagram will take you to page associated with the selected element.

After locating the page for a given element, users can download a PDF file that includes the interconnect diagram and architectural flow diagrams.

Definitions of Architecture terms, acronyms, information flows, and subsystem terminators are also included on the website.

1.3 Utility of the Architecture

Developing, maintaining, and utilizing the ITS Architecture offers a range of significant benefits to the adopting Region. These benefits include the following:

- A Regional ITS Architecture enables planning and deployment to occur in an organized and coordinated manner. It offers a framework for systematically identifying and evaluating prospective solutions to the transportation problems in the Region. It establishes an environment for inter-agency cooperation and coordination. Stakeholders across the Region may use the Architecture to plan their ITS projects to support regional goals and priorities. Utilization of the Architecture also helps to ensure consistency among the state, regional, and local planning processes.

- A Regional ITS Architecture establishes institutional mechanisms that promote the development and deployment of ITS projects. The Architecture compels the Region to set up forums for the discussion of regional transportation requirements. These forums, in turn, encourage the building of relationships among transportation professionals and stakeholders across the Region—these professionals are thereby given opportunities to understand the needs, issues, constraints, etc. of other transportation sectors. As the regional dialogue expands, institutional barriers tend to crumble and the integration of disparate goals, concepts, approaches, and solutions is increasingly possible. With this institutional integration comes the sharing of technologies and information, so that innovative, region-wide thinking becomes a guiding principle in transportation planning and new, synergistic relationships take hold. Additionally, the Architecture provides the basis for updating the Transportation Plan, the Transportation Improvement Program (TIP), the Statewide TIP, and the State Implementation Plan (SIP).

- A Regional ITS Architecture promotes interoperability. The Architecture reveals to stakeholders the key interrelationships presently established in the Region and those planned for the future. These interrelationship requirements identify those areas where operational or technology bridges to multiple agencies are needed. In this way, the Architecture helps to anticipate and plan for the integration requirements between state, regional, and local systems. Significantly, the Architecture promotes adherence to consistent and uniform standards across the Region. By its very nature, it also ensures consistency in documentation of ITS elements across the Region.

- A Regional ITS Architecture encourages efficient investment. As prospective new ITS projects are identified in the Region, they can be "plotted" on the Regional Architecture and their interrelationships with existing and planned components assessed. This lessens the probability that a particular project will result in a "dead-end" investment. It also helps planners to identify and invest in projects capable of addressing multiple needs, such as automated vehicle location (AVL) systems that can both improve on-road performance and inform customers of status conditions. In general, the Architecture offers regional stakeholders a basis for prioritizing ITS projects and making sound investment choices.

- A Regional ITS Architecture satisfies the Federal mandate. The mandate of the U.S. Federal Highway Administration (FHWA) requires that Regional ITS Architectures be completed by April 2005, in order for stakeholders in the Region to continue using Federal funds for the development and deployment of ITS projects. Consequently, promulgation of Regional ITS Architectures is necessary for continued access to Federal funds for ITS deployment.

1.4 ITS Standards

ITS standards are industry-consensus standards that define how system components operate within a consistent framework. By specifying how systems and components interconnect, ITS standards promote interoperability.

A seamless transportation system relies on clear communication between agencies, systems, and individuals. To ensure that different entities can communicate, the systems must be designed according to standards. For PennDOT, this might mean systems that can exchange data between regional and statewide centers. At the local level, this can mean data exchanges between jurisdictions concerning incidents, congestion, and signal timing plans.

An interoperable and seamless transportation system provides several benefits. Transportation agencies are now increasingly communicating with law enforcement, as police are usually the first to learn of incidents. Many transportation agencies are linking their transportation management centers with police dispatch. When systems are interoperable, police and emergency units can respond faster to crashes; this often relieves congestion and improves safety. In an emergency, quick and reliable communication is even more crucial.

To accrue the benefits noted above, systems and the underlying equipment must be designed according to standards that enable interoperability. Future systems and equipment should be designed to meet these standards. Existing systems and equipment, additionally, should be updated to meet the standards.

The USDOT's ITS Standards Program is working with existing standards development organizations (SDO's) to establish a national collection of ITS standards. The following organizations participate in ITS standards activities:

- AASHTO (American Association of State Highway and Transportation Officials)
- ASTM (American Society for Testing and Materials)
- IEEE (Institute of Electrical and Electronics Engineers)
- ITE (Institute of Transportation Engineers)
- NEMA (National Electrical Manufacturers Association)
- SAE (Society of Automotive Engineers)

The following organization oversees the development of ITS standards:

- ANSI (American National Standards Institute)

For more information on ITS standards, visit www.standards.its.dot.gov or www.ntcip.org.

To identify ITS standards applicable to the Southern Alleghenies Regional ITS Architecture, visit the National ITS Architecture website. This site provides a listing of all National ITS Architecture information flows and their associated standards. A Southern Alleghenies ITS Architecture user can access applicable ITS standards by:

1. Viewing the information flow diagrams in the Southern Alleghenies Regional ITS Architecture document.

2. Visiting the National ITS Architecture website:
   http://itsarch.iteris.com/itsarch/html/af/padde.htm

3. Identifying a specific Architecture Flow, by name, in the Regional ITS Architecture document, clicking on that Architecture Flow name on the National ITS Architecture website, and the reviewing the details under "Standard Activities."

The current ITS standards—or pertinent standards activities—will be displayed for the information flow that the user specifies.

1.5 Maintaining the Architecture

As ITS projects are planned and implemented, the Regional ITS Architecture will need to be updated to reflect the new ITS priorities and strategies emerging through the transportation planning process. The Regional ITS Architecture is not a static document, but rather is a "living" document. The ITS Architecture must grow and adapt as plans change, ITS projects are implemented, and ITS needs and services evolve in the Region.

In order to serve as a regional framework, the Regional Architecture must be maintained so that it continues to reflect the current and planned ITS systems, interconnections, etc. The following circumstances or conditions may all trigger the need to make changes to the Architecture:

- Changes in Regional needs. Regional ITS Architectures are created to support transportation planning in addressing regional needs. Over time, these needs can change and the corresponding aspects of the Regional ITS Architecture that address these needs may have to be updated. These changes in needs will also typically be expressed in updates to planning documents, such as regional transportation plans.

- New stakeholders. As new stakeholders become active in ITS, the Regional ITS Architecture should be updated to reflect their place in the regional view of ITS elements, interfaces, and information flows. Why might new stakeholders emerge? The stakeholders might represent new organizations that were not in place during the original Architecture development. Maybe the geographic scope of the Architecture is being expanded, bringing in new stakeholders. Perhaps additional transportation modes or transportation services are being considered that touch the systems of additional stakeholders.

- Changes in scope of services considered. The range of services considered by the Regional ITS Architecture expands. This might happen because the National ITS Architecture has been expanded and updated to include new user services or to better define how existing elements satisfy the user services. A Regional ITS Architecture based on an earlier version of the National ITS Architecture should take into consideration these changes as the Regional ITS Architecture is updated. The National ITS Architecture may have expanded to include a user service that has been discussed in the Region, but not included in the Architecture, or was included in a cursory manner. Changes in the National ITS Architecture are not, of themselves, a reason to update a Regional ITS Architecture, but the Region may want to consider new services in the context of their regional needs.

- Changes in stakeholder or element names. An agency's name, or the name used to describe their element(s), undergoes change. Transportation agencies occasionally merge, split, or just rename themselves. In addition, element names may evolve as projects are defined. The Regional ITS Architecture should be updated to use the current names for both stakeholders and elements.

- Changes in other Architectures. A Regional ITS Architecture covers not only elements and interfaces within the Region, but also interfaces to elements in adjoining Regions. Changes in the Regional ITS Architecture in one Region may necessitate changes in the Architecture in an adjoining Region to maintain consistency between the two.

There are also several changes relating to project definition that will cause the need for updates.

- Change due to project definition or implementation. When actually defined or implemented, a project may add, subtract, or modify elements, interfaces, or information flows from the Regional ITS Architecture. Because the Regional Architecture is meant to describe the current (as well as future) regional implementation of ITS, it must be updated to accurately reflect how the developed projects integrate into the Region.

- Change due to project addition/deletion. Occasionally a project will be added or deleted through the planning process, or even during project delivery. Some aspects of the Regional ITS Architecture that are associated with the project may be expanded, changed, or removed.

- Change in project priority. Due to funding constraints or other considerations, the planned project sequencing may change. Delaying a project may have a ripple effect on other projects that depend on it; conversely, raising the priority for a project's implementation may impact other projects that are related to it.

The purpose of maintaining the Architecture is to keep it current and relevant, so that stakeholders will use it as a technical and institutional reference when developing specific ITS project plans. In order to maintain the Architecture, three decisions must be discussed:

- Who — Who will lead and implement the maintenance effort?

- When — When will the Regional ITS Architecture change be updated?

- What — What parts of the Regional ITS Architecture will be maintained?

- How — How will the Architecture be maintained?

Who Will Maintain the Architecture?

In cooperation with the Pennsylvania ITS Architecture Regions, PennDOT Central Office expects to utilize a statewide approach to maintaining the Commonwealth's nine Regional ITS Architectures. Although PennDOT Central Office will lead the maintenance effort in the Southern Alleghenies Region, *all* stakeholders will still need to participate in the process. Maintenance of the Architecture is a recurring, long-term effort that requires inputs from all stakeholders in the Region.

When Will the Architecture be Updated?

The Regional ITS Architecture is expected to be updated every four years to coincide with updates to long-range plans throughout the Commonwealth. There will be a process planning effort prior to the update in order to ensure statewide consistency of the updates. This timeframe will be used throughout the state. The next update to the Southern Alleghenies Regional ITS Architecture is projected to be completed by Autumn 2008.

What Will be Maintained?

The constituent parts of the Regional ITS Architecture that will be maintained is referred to as the "baseline." The baseline of the Regional ITS Architecture for the Southern Alleghenies Region includes:

- Description of the Region. This description includes the geographic scope, functional scope, and architecture horizon. Geographic scope defines the ITS elements within the Region. Functional scope defines which services are included. Architecture horizon is the distance (in years) into the future that the Architecture will consider.

- Regional ITS Projects Matrix. The matrix includes a list of existing and planned ITS projects for the Region.

- List of stakeholders. The listing and description of ITS Stakeholders in the Region should be revised as stakeholders evolve, consolidate, or separate.

- List of elements. The inventory of ITS elements is a key aspect to the Architecture. Changes in stakeholders, as well as operational concepts, may impact the inventory of elements. Furthermore, implementation and planning status may change (i.e., change from planned to existing).

- Systems Inventory. Links the ITS Projects Matrix to Regional elements. Additionally, the Systems Inventory defines the functionalities of the elements.

- Needs and Services Tables. The Needs and Services Tables define the existing and future flow of information being shared between elements. The Needs and Services tables serve as the building blocks for the programming/building of the Architecture.
- Interconnect diagrams. Interfaces between elements define the interactions between one another. They provide information on "who" is talking to "whom."

- Information flow diagrams. Information flows between elements define the details of the Architecture. They are the detailed description of how elements interact or will interact in the future. This is the key aspect of the baseline and will likely see the greatest amount of change.

- Applicable ITS Standards. The selection of standards depends on the information exchange requirements. The maintenance process should consider how ITS standards may have evolved and matured since the last update.

How Will the Architecture be Maintained?

PennDOT Central Office will be responsible for updating the aforementioned parts of the Regional ITS Architecture. In order to document the necessary changes to the Regional ITS Architecture, the Pennsylvania ITS Architecture website (www.paits.org) will be utilized as a tool for tracking changes to the Architecture.

All stakeholders in the Region involved in ITS project activity will be responsible for documenting additions, changes, and updates to the ITS Architecture.

To document an update, go to the Southern Alleghenies Regional ITS Architecture Homepage (www.paits.org/sa) and follow these steps:

1. Select the "Architecture Update Form" at the top of the screen. This link takes you to the requisite form.

2. Complete the "Architecture Update Form." The form, shown on the following page allows a stakeholder to suggest an update to the Architecture. The form is broken into five sections: (1) Contact Information, (2) New ITS Project, (3) New Stakeholder, (4) New Element, and (5) Other Changes. Each section is described below:

    - Contact Information — Contains contact information (name, organization, email, and phone number) so that the stakeholder submitting the form can be contacted in the future.

    - New ITS Project — Future ITS projects considered for State and/or Federal funding should be documented in this section. Project name, stakeholder, type of funding requested, location, deployment date, and a brief description of the project should be inputted here.

    - New Stakeholder — Requests for new stakeholders and changes to stakeholder names/descriptions should be identified in this section of the form. The status, existing or planned, should also be identified.

    - New Element — Requests for a new element and changes to element names/descriptions should be identified in this section of the form. The status, existing or planned, should also be identified.

- Other Changes — Other changes to the Regional ITS Architecture can be documented in this section.

3. Submit the “Architecture Update Form.” The form can be submitted by clicking on the “Submit” button on the bottom of the webpage. Once submitted, the form will be sent to the webmaster who will compile the information. The information will be utilized for the next update to the Regional ITS Architecture.

4. Once the “Architecture Update Form” has been submitted, the information will be sent to the webmaster. The webmaster will compile the information and post it on the Architecture website. Once posted, the information can be accessed by (1) clicking on the “update list” link at the top of the “Architecture Maintenance Form” webpage or (2) going to http://paits.org/sa/update.htm.

Southern Alleghenies ITS Architecture Maintenance Form

Contact Information

Name of Submitter:	Submission Date:
Organization:	Phone Number:
Email Address:	

New ITS Project

Project Name:	
Stakeholders:	Funding: ☐ Local Funding ☐ State Funding ☐ Federal Funding Details:
Location:	Deployment Date:
Project Description:	

New Stakeholder

Stakeholder Name:
Status: ☐ Exisitng ☐ Planned
Stakeholder Description:

New Element

Element Name:	Stakeholder:
Status: ☐ Exisitng ☐ Planned	
Element Description:	

Other Changes

Other Changes:

Contact the PAITS Webmaster with questions and comments.

1.6 Moving Forward/Institutionalizing ITS

Across the State, PennDOT has enjoyed strong commitment to ITS deployment initiatives, some through traditional funding mechanisms and most through federal funds earmarked for ITS. In virtually all Regions, there is an increasing emphasis on regional deployments and coordination among public agencies, illuminated by the cooperative effort displayed by the creation of Regional ITS Architectures. An integral part of the ITS planning, agency coordination, and program development activities is the cooperation and coordination with PennDOT Districts, MPO's and/or RPO's throughout the State that overlap, and regional stakeholders.

The application of advanced technologies to solve some of the transportation-related problems was first initiated by staff from DVRPC in the Philadelphia Region a few decades ago. Since then, there is a fully integrated system in place in Pittsburgh and operation centers are being explored in many other areas of the State. However, only since 2002, has there been a concerted effort to consolidate all of the individual ITS efforts by each agency and jurisdiction into a comprehensive and consolidated plan, starting with the creation of Regional ITS Architectures for each Region of the State that are coordinated and have statewide consistency.

Each regional agency represented in these Regional ITS Architectures has unique responsibilities for planning, operating, maintaining, or monitoring the transportation system.

Responsibility for, and involvement with, ITS by key agencies in the Southern Alleghenies Region has become a joint effort between PennDOT Districts, MPO's, and regional stakeholders. These groups, together, have assumed responsibility for coordinating regional ITS planning and deployment.

Figure 1-4 shows a map of the current PennDOT district boundaries by county. Figure 1-5 shows a map of the current MPO and RPO boundaries by county. The purpose of these figures is to give the reader context into the PennDOT district and MPO boundaries.

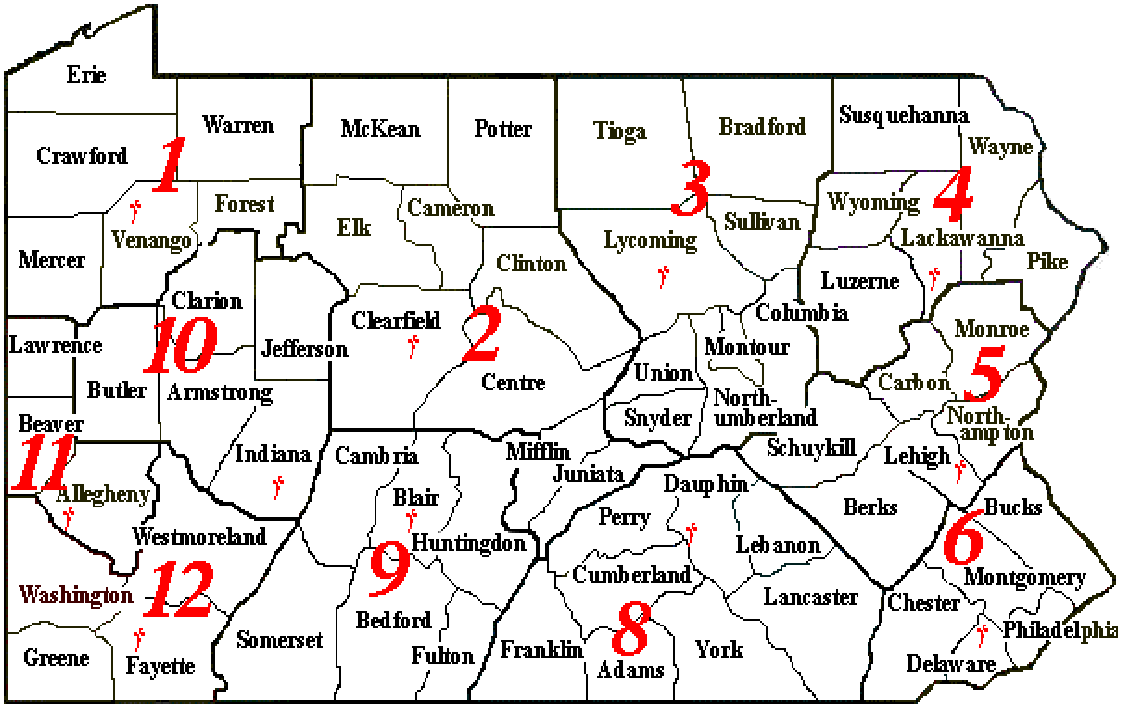

Erie
Crawford
1
Warren
McKean
Potter
Tioga
Bradford
Susquehanna
Wayne
3
4
Forest
Venango
Mercer
Elk
Cameron
Clinton
Lycoming
Sullivan
Wyoming
Lackawanna
Pike
Luzerne
Clarion
Lawrence
10
Jefferson
Clearfield
2
Centre
Columbia
Montour
Monroe
Union
Carbon
5
Butler
Armstrong
North-
umberland
Snyder
North-
amp ton
Beaver
11
Indiana
Cambria
Mifflin
Schuylkill
Lehigh
Allegheny
Juniata
Blair
Dauphin
Berks
Bucks
Perry
6
Westmoreland
Huntingdon
Lebanon
9
Montgomery
Washington
12
Cumberland
Lancaster
Chester
Bedford
8
Philadelphia
Greene
Fayette
Somerset
Fulton
Franklin
Adams
York
Delaware

Figure 1-4:. PennDOT District Map

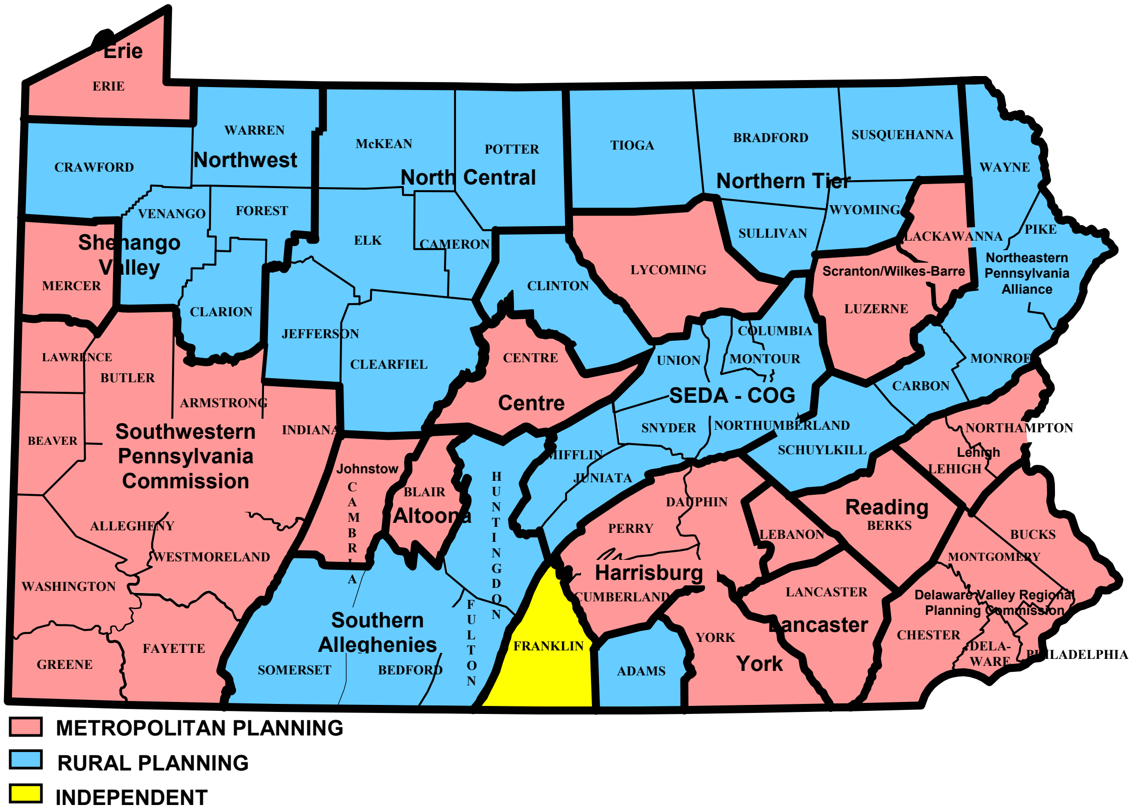

Erie
ERIE
CRAWFORD
WARREN
Northwest
McKEAN
POTTER
North Central
TIOGA
BRADFORD
SUSQUEHANNA
Northern Tier
WAYNE
VENANGO
FOREST
Shenango Valley
MERCER
ELK
CAMERON
CLINTON
LYCOMING
SULLIVAN
WYOMING
LACKAWANNA
PIKE
Northeastern Pennsylvania Alliance
Scranton/Wilkes-Barre
LUZERNE
CLARION
JEFFERSON
CLEARFIEL
CENTRE
Centre
COLUMBIA
UNION
MONTOUR
MONROE
LAWRENCE
BUTLER
ARMSTRONG
SEDA - COG
CARBON
BEAVER
Southwestern Pennsylvania Commission
INDIANA
SNYDER
NORTHUMBERLAND
NORTHAMPTON
Johnstow
CAMBRIA
BLAIR
Altoona
HUNTINGDON
MIFFLIN
JUNIATA
SCHUYLKILL
Lehigh
LEHIGH
ALLEGHENY
DAUPHIN
Reading
BERKS
PERRY
LEBANON
BUCKS
WESTMORELAND
MONTGOMERY
WASHINGTON
Harrisburg
CUMBERLAND
LANCASTER
Delaware Valley Regional Planning Commission
FULTON
Southern Alleghenies
FRANKLIN
Lancaster
CHESTER
GREENE
FAYETTE
SOMERSET
BEDFORD
ADAMS
YORK
DELA-
WARE
PHILADELPHIA
York
METROPOLITAN PLANNING
RURAL PLANNING
INDEPENDENT

Figure 1-5: Pennsylvania MPO/RPO Map

Mainstreaming

To date, there have been ITS plans in place to cover a few metropolitan areas across the Commonwealth of Pennsylvania. These early plans have led to isolated, non-integrated ITS equipment being scattered throughout the State, except for in the Pittsburgh and Philadelphia Regions. The current deployments have primarily been PennDOT led. The ITS projects deployed to date have already produced important benefits for PennDOT and the traveling public. Unfortunately they have also led to questions about integration across boundaries and the costs, in labor and resources, associated with operating and maintaining these technology deployments.

The Regional ITS Architecture effort has helped to begin addressing these issues by, first, bringing regional agencies to the table to discuss regional technology deployment. Secondly, the Architectures have built a regional foundation for understanding the needs, applications, and linkages to the technologies that are currently deployed or scheduled to be deployed. Lastly, the ITS Architectures will set the stage for “mainstreaming” to occur.

“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.

Throughout the State, MPO’s and RPO’s will work with PennDOT and other regional stakeholders to include ITS as part of long-range plans that eventually spill into regional and statewide Transportation Improvement Programs (TIP’s). MPO’s and RPO’s should strive to go beyond the basic federal requirement of including transportation projects receiving certain types of federal funds in a Region’s TIP and use the TIP to highlight ITS projects. Project evaluation criteria used to select projects might now be modified in order for ITS projects to be fairly evaluated. Most traditional selection processes to date have excluded valuable ITS projects by not considering the regional needs and benefits associated with technology projects.

There are key factors that can contribute to increased coordination and mainstreaming of ITS within the transportation planning process throughout the Commonwealth of Pennsylvania:

- Creating and utilizing committees or task forces that foster ITS discussions and open communications.
- Cultivating support for ITS deployments, coordination, and integration from the administrators of influential state and regional transportation agencies.
- Creating committees to target coordination, integration, technical, and policy issues.

- Learning from previous ITS deployments.
- Instilling trust in representatives of area agencies in the responsibilities and performance of the MPO, RPO, PennDOT, and regional stakeholder staff that enable them to mainstream ITS and coordinate the area's ITS/Operations efforts.
- Encouraging advocacy for ITS initiatives among top managers.
- Incorporating ITS projects in the Region's long-range transportation plans.
- Developing ITS programs and plans.
- Utilizing the Regional ITS Architecture.
- Including ITS projects within the TIP.
- Utilizing enhanced criteria for selecting ITS projects for inclusion in the TIP.
- Educating elected officials and agency administrators in ITS terminology and strategies.
- Educating other prime stakeholders (beyond traditional transportation agencies) about ITS.
- Educating MPO and RPO staff about ITS.
- Conducting scanning reviews to ITS deployments in external regions and states.

MPO, RPO, and PennDOT Role

Throughout the State, transportation officials can look to the MPO/RPO to function in the role of ITS facilitator, ITS educator, and ITS project funding prioritizer. The MPO/RPO is often best able to provide a regional context for projects in geographic areas with many political boundaries and to better understand the experiences of a traveling public that tends to have minimal interest in the jurisdictions they pass through. The MPO/RPO has historically been able to recognize the different philosophies of sub-regions and fuse these philosophies into common goals and priorities when working on regional projects. In addition, the MPO/RPO offers a direct conduit to the politicians and is, therefore, seen as the only entity fully capable of educating elected officials about ITS regional applications.

MPO/RPO staff members must recognize, however, that their involvement with specific ITS projects relies on invitations to participate from the sponsoring agencies, such as PennDOT. Inclusion in non-planning activities is generally possible because the MPO/RPO staff have an established record of being knowledgeable, cooperative, and trustworthy. The MPO/RPO staff has earned the respect of the Region not only from their collective knowledge and responsiveness, but also because they have not overreached their authority. Indeed, when the MPO/RPO staff is knowledgeable about ITS applications, good listeners, and not prone to pressing a narrow agenda, the process to mainstreaming ITS products and services is much simpler since the agency most attuned to the transportation planning process is also the agency most trusted. These conditions may prove to be the most critical toward mainstreaming ITS in the transportation planning process.

Regional ITS Coordination Committees

Regional agencies should consider coordinating all regional ITS efforts into a single regional operations plan. To do this, a committee composed of transportation agencies and operators should be formed. There should be a policy body and a technical body to the committee. This plan should then be used as input into the regional long-range plan.

Elected officials and transportation managers sometimes use or form committees through which they act as regional advocates for ITS. These can be non-profit government organizations composed of elected officials, as well as business interests. The primary goal of these committees is generally to use technology to improve mobility through political and project advocacy. On an annual basis, the committee members adopt a set of projects with regional significance; these include ITS products and services promoted to municipal managers and local transportation officials.

In some metropolitan areas around the country, elected officials and transportation managers have personally taken on the responsibility to act as advocates for ITS products and services. Strong leadership from top management of transportation providers can elevate ITS throughout the Region.

ITS technologies tend to be most useful when planned and deployed from a regional perspective that cuts across geographic boundaries, agencies, and transportation modes. A wide range of stakeholders should have input into ITS planning and deployment activities since many of these agencies will be required to operate these systems or provide coordination and information to enable these systems to function efficiently. This requires elected officials and staff within—and across agencies—to communicate and coordinate with one another. It can, however, be difficult to plan for and deploy ITS within a Region, especially in areas comprised of many local autonomous communities.

One role of a regional committee is to aid in coordinating ITS activities across jurisdictions and agencies. In keeping with the coordinating role, the committee can form a workgroup to improve procedures for incident clearance and make the procedures more uniform within the Region. The workgroup can consist of law enforcement personnel, MPO staff, DOT staff, and officials from select municipalities.

Endorsement of ITS

Public endorsement of ITS products and services demonstrates to all regional stakeholders that ITS is accepted as a tool to solve transportation problems and will be seriously considered as a funding option in the Region's transportation planning process. Elected officials are the most important people from whom to garner support for ITS since they make funding decisions and can influence support by other stakeholders. It is also important for mid- and upper-level transportation managers to support ITS since they inform elected officials and guide funding decisions within their respective transportation organizations. To gain their support, elected officials and transportation managers need to be provided with data and information that define ITS products and services, explain how the technologies are used, and detail the benefits of ITS that can potentially accrue.

In the Southern Alleghenies Region, regular updates from the MPO's to elected officials should be considered during ITS program planning, and implementation. For example, to secure support, the MPO's can brief officials on the logical arguments supporting freeway management in order to receive congestion information and show relationships among incidents, congestion, and air pollution. Local problems can be highlighted and then examined in terms of how ITS products and services can help solve these problems. The message is that transportation professionals in the Region should aggressively manage traffic and focus on reliability and mobility.

Education

Education can improve coordination across jurisdictions and modes in several ways, including increasing awareness of ITS products and services, reducing tensions between agencies representing different transportation modes, and getting planners and operations staff to understand each other's responsibilities and terminology. A lack of awareness of ITS products and services, and their associated benefits, hinders the routine consideration of ITS technologies in a Region's planning and deployment processes. Until a few years ago, ITS education was primarily the responsibility of each agency considering ITS. However, MPO staff should consider taking the lead in creating and providing programs to educate regional stakeholders.

There are many forums available for educating and training transportation professionals in ITS, and not all require a formal classroom setting. For instance, "scanning tours" take place outside a classroom. These tours enable participants to learn how to use the technologies and then interject some first-hand knowledge about the equipment being analyzed into the ITS discussion. Invitees to these scanning tours can consist of:

- County commissioners,
- Executive boards,
- Policy boards,
- Transit operations staff,
- MPO staff,
- Politicians, and

- Public safety officials.

A mixture of upper management, operations, and policy people should be considered. Scanning tours should be taken at the beginning of regional planning efforts or when exposure is needed in advance of a specific project to help decision-makers conceptualize what they need. Elected officials and transportation managers can also become educated about ITS technologies, products, and services by participating on regional, statewide, or national committees, especially those established to consider ITS solutions.

Training courses are available for stakeholders in the Region to learn more about ITS. Such courses are available through the National Highway Institute (NHI) at the following website:

http://www.nhi.fhwa.dot.gov/default.asp

National ITS Architecture and Turbo Architecture training are available through the U.S. Department of Transportation. Information on training can be found at the following website:

http://itsarch.iteris.com/itsarch/html/training/training.htm

2 Architecture Scope

This section summarizes the study's scope of services and identifies the matrix used to assess "conformity." The Conformity Matrix, developed by the Statewide Working Group, is specific to Pennsylvania and has been used in every Region across the Commonwealth to ensure statewide consistency. Descriptions of the Region, regional stakeholders, and existing regional ITS projects are also included in this section.

2.1 Scope of Services

At the outset of the study, the Southern Alleghenies Architecture Region's Regional Advisory Panel (RAP) determined that the Region would need to work through all five of the study tasks required to develop the Regional ITS Architecture. The five tasks are:

- Define an Architecture Scope,
- Inventory Systems and Define Needs, Services, and an Operations Coverage,
- Generate a Strawman Regional ITS Architecture,
- Conduct Outreach to Validate the Regional ITS Architecture, and
- Finalize the Regional ITS Architecture.

Consistent with its mandate, the RAP oversaw execution of the Architecture development methodology.

2.2 Conformity Matrix

The Pennsylvania Architecture Checklist, specified in the Phase I Report, that preceded the Architecture study, was used to verify compliance of the Southern Alleghenies Regional ITS Architecture with the prescribed methodology. By checking off the bulleted list of outputs and considerations in the checklist tables, below, a Region and State ensures conformity with the Federal Mandate and consistency among the Architectures.

Compliance of the Southern Alleghenies Regional ITS Architecture with the Pennsylvania Architecture Checklist is validated in the following tables:

Checklist Table #1

Key Task To Complete	**Key Outputs from Task to Include in Regional ITS Architecture** *(Do we have?)*	**Considerations and Conformity & Validation Checks** *(Did we consider and address?)*
Define the Regional Architecture Scope	☑ Description-of-region map and text, that includes: ✓ Geographic area (Districts, Counties, Cities, Corridors) ✓ Service boundaries, major roadway systems ✓ Relationship among jurisdictions within Region ✓ Relationship to adjacent Regions and jurisdictions ☑ Existing projects matrix (key projects only), that includes: ✓ Project description ✓ Impacts on Region ✓ ITS components ✓ Timetables ☑ Scope of services summary (If Not Previously Developed), that includes: ✓ Regional stakeholders list ✓ Owners and operators of ITS systems in Region ✓ Entities with stake or interest in Regional transportation issues ✓ Conformity requirements matrix	☑ Has a Regional Champion been identified? ☑ Have traditional, existing, transportation planning documentation been reviewed? ☑ Is there consistency between regional scope and transportation plans? ☑ Is there consistency between Regional scope and National ITS Architecture

Checklist Table #2

Key Task to Complete	**Key Outputs from Task to Include in Regional ITS Architecture** *(Do we have?)*	**Considerations and Conformity & Validation Checks** *(Did we consider and address?)*
Develop an Inventory of Regional Systems & Define Regional Needs, Services, and Operational Concept	☑ System inventory, that includes: ✓ System name(s) ✓ Descriptions ✓ Status (existing or planned) ✓ Associated subsystems/terminators in National ITS Architecture ✓ System owner/operator (stakeholders and system elements) ☑ Needs and services summary, that includes: ✓ Regional needs ✓ ITS services (planned or implemented) ☑ Operations coverage that includes: ✓ Operational roadways. ✓ Assignment of operational coverage	☑ Is there completeness and consistency of the inventory among stakeholders? ☑ Is the conformity to and compatibility with the Architecture? ☑ Has the Region considered the following: ✓ System operations that extend beyond Regional boundaries ✓ Impacts on contiguous Regions or jurisdictions ✓ Operational characteristics along corridors and at local levels ✓ Locations and operational characteristics of planned traffic operations centers (TMC) ✓ Working relationship among stakeholder organizations

Checklist Table #3

Key Task to Complete	**Key Outputs from Task to Include in Regional ITS Architecture** *(Do we have?)*	**Considerations and Conformity & Validation Checks** *(Did we consider and address?)*
Generate Strawman (Rough Draft) Architecture	☑ Develop a Regional systems interconnect summary, that includes: ✓ Diagram of actual and potential connections between subsystems ✓ Connection status (existing or planned) for each connection ☑ Develop Regional information flow diagrams, that include: ✓ Descriptive name for the information ✓ Information flow status (existing or planned) ✓ Direction of information flow ☑ Develop a Regional Strawman Architecture, that includes: ✓ Architecture approach ✓ Needs & services ✓ Systems inventory ✓ Interconnects ✓ Information flows	☑ Have the interconnections and information exchanges across Regional boundaries been identified? ☑ Has the ability of the communications infrastructure to support the proposed interconnections been addressed at a high-level? ☑ Is there completeness and consistency in the interconnects summary? ☑ Is there completeness and consistency among the information flow diagrams? ☑ Is there consistency and compatibility with the completed or evolving Architectures in other Regions in the state? ☑ Is there conformity and compatibility with the National ITS Architecture?

Checklist Table #4

Key Task to Complete	**Key Outputs from Task to Include in Regional ITS Architecture** *(Do we have?)*	**Considerations and Conformity & Validation Checks** *(Did we consider and address?)*
Conduct Outreach to Validate Architecture	☑ Develop Stakeholders' guide to Regional Architecture, that could include: ✓ Background on Regional Architecture project ✓ Stakeholder review and validation process ✓ Glossary of technical terms ☑ Documentation of stakeholder inputs ☑ Refined and validated Architecture	☑ Have real-world and program issues been considered? ☑ Have any unusual institutional Issues been identified? ☑ Have any specialized data-sharing requirements been identified? ☑ Have political considerations been identified? ☑ Have any other unique conditions, circumstances, or issues in the Region been identified? ☑ Have Stakeholders from areas contiguous to the Region been involved? ☑ Is there conformity with FHWA Regional ITS Architecture Assessment Criteria?

Checklist Table #5

Key Task to Complete	Key Outputs from Task to Include in Regional ITS Architecture (Do we have?)	Considerations and Conformity & Validation Checks (Did we consider and address?)
Finalize the Regional Architecture	☑ Final Regional ITS Architecture Document ☑ Statewide Operations Framework Input ✓ Regional Architecture overview ✓ High-level Regional operations summary ✓ Relationship between Region and State	☑ Is there consistency and compatibility among the Regional ITS Architectures?

2.3 Description of the Region

This Region, in the south central part of the state, is comprised of six counties: Bedford, Blair, Cambria, Fulton, Huntingdon, and Somerset. The Southern Alleghenies Region encompasses PennDOT Engineering District 9-0.The Region is depicted in Figure 2-1.

Altoona and Johnstown represent the two largest population centers in the Region and reside in Blair and Cambria Counties respectively. Fulton, Huntingdon, and Somerset are considered rural counties and along with Bedford County comprise a Rural Planning Organization (RPO). Blair County and Cambria County are associated with separate Metropolitan Planning Organizations (MPO).

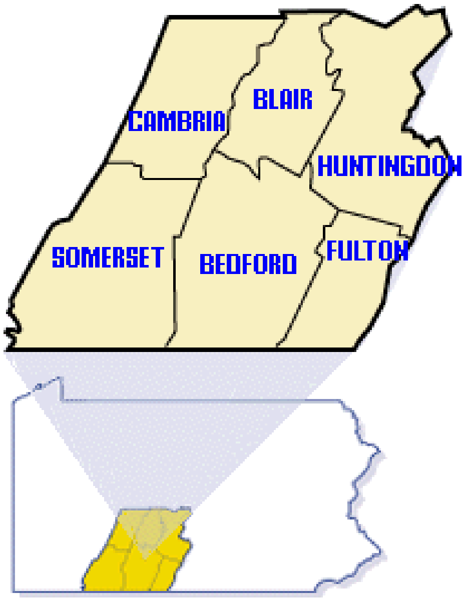


Figure 2-1: Southern Alleghenies ITS Architecture Region
(Source: PennDOT District 9-0 Web site)

Table 2-1 reveals that over four hundred and seventy thousand people — or approximately four percent of statewide residents of the Commonwealth of Pennsylvania — live in the Southern Alleghenies ITS Architecture Region. Approximately three-fifths of the Region's population resides in Blair and Cambria Counties, with the remainder scattered among the other four counties of the Region.

Table 2-1: Southern Alleghenies ITS Architecture Region Population by County

County	% Population
Bedford	11%
Blair	27%
Cambria	32%
Fulton	3%
Huntingdon	10%
Somerset	17%
Total Population in the Southern Alleghenies Region	471,596

(Source: U.S. Census Bureau, 2000)

Table 2-2 compares specific population traits in the Southern Alleghenies to those across Pennsylvania and the U.S. generally. For instance, the Region is decidedly more homogeneous than either the statewide or national populations — only 3.3 percent of the Southern Alleghenies residents are classified as minorities. Similarly, the Region's population skews older than the state or national averages — the median age of residents is 40, as compared to 38 years statewide and 35 years nationally. Also, mean family size is smaller, and per capita income is lower, in the Southern Alleghenies than across Pennsylvania or the U.S.

Table 2-2: Comparison of Key Population Demographics Southern Alleghenies ITS Architecture Region, Pennsylvania, and the United States

Demographic Factor	SA Region	Pennsylvania	United States
Total Population	471,596	12,281,054	281,421,906
% Minority Population	3.3%	14.6%	24.9%
Median Age (In Years)	39.4	38.0	35.3
Mean Family Size	2.95	3.04	3.14
Per Capita Income	$16,014	$20,880	$21,587

(Source: U.S. Census Bureau, 2000)

Table 2-3 examines commuting patterns in the Region to the state and national commuting conditions. Nearly four-out-of-five Southern Alleghenies workers drive to work alone, just a bit higher than the state and national "drive-alone" rates. Twelve percent of workers in the Region carpool to work, which is comparable to the statewide average. Less than one percent of workers use public transportation; considerably less than state and national transit usage trends. The average one-way commute time for the Southern Alleghenies ITS Architecture Region workers is 23 minutes, which compares favorably to the 25-26 minutes for Pennsylvania and U.S. workers generally.

Table 2-3: Comparison of Commuting Patterns Among Workers 16 & Over Southern Alleghenies ITS Architecture Region, Pennsylvania, and the United States

Commuting Pattern	SA Region	Pennsylvania	United States
Total Workers 16 & Over	198,392	5,556,311	128,279,228
% Commuters Driving Alone	80.2	76.5%	75.7%
% Commuters Carpooling	11.6%	10.4%	12.2%
% Commuters Using Public Transportation	0.6%	5.2%	4.7%
Mean Travel Time to Work (Minutes)	22.5	25.2	25.5

(Source: U.S. Census Bureau, 2000)

As shown in Table 2-4, the Southern Alleghenies Region encompasses a substantial network of roadways. As reported in PennDOT's *2002 Highway Statistics,* the Region contains 9198 linear miles of roadway, signifying 7.6 percent of the Commonwealth's total linear mileage. This includes 3,749 linear miles of roadway maintained by PennDOT, with the remaining road miles maintained by the municipalities, etc.

Table 2-4: Southern Alleghenies ITS Architecture Region Linear Miles

County	PennDOT Linear Miles	Total Linear Miles
Bedford	795.2	1,812.2
Blair	457.4	1,199.4
Cambria	673.0	1,721.5
Fulton	341.5	737.6
Huntingdon	598.6	1,452.3
Somerset	883.4	2,275.4
Regional Total	3,749.1	9,198.4
Statewide Total	39,905.5	120,297.7

Table 2.5 depicts the daily vehicle miles of travel (DVMT) across the Region, which is substantial. Total DVMT on all roadways in the Region, as reported in the *2002 Highway Statistics* was approximately 14.7 million miles. The DVMT on PennDOT roadways was approximately 9.7 million miles.

Table 2-5: Southern Alleghenies Daily Vehicle Miles of Travel

County	PennDOT DVMT	Total DVMT
Bedford	**1,384,825**	**2,980,787**
Blair	**2,445,250**	**2,876,584**
Cambria	**2,651,913**	**3,108,596**
Fulton	**660,861**	**1,287,783**
Huntingdon	**1,004,535**	**1,445,979**
Somerset	**1,626,043**	**3,009,275**
Regional Total	**9,773,433**	**14,709,004**
Statewide	**217,331,036**	**287,203,348**

The Southern Alleghenies ITS Architect Region contains significant highway corridors as defined by the RAP, including:

Table 2-6: Significant Highway Corridors

Interstates	United States (U.S.) Routes	Pennsylvania (PA) Routes
Interstate 70 (I-70)	US Route 22 (US-22)	PA Route 26 (PA-26)
Interstate 76 (I-76)	US Route 30 (US-30)	PA Route 31 (PA-31)
Interstate 99 (I-99)	US Route 40 (US-40)	PA Route 45 (PA-45)
	US Route 219 (US-219)	PA Route 53 (PA-53)
	US Route 220 (US-220)	PA Route 56 (PA-56)
	US Route 422 (US-422)	PA Route 96 (PA-96)
	US Route 522 (US-522)	PA Route 160 (PA-160)
		PA Route 271 (PA-271)
		PA Route 281 (PA-281)
		PA Route 305 (PA-305)
		PA Route 550 (PA-550)
		PA Route 653 (PA-653)
		PA Route 913 (PA-913)
		PA Route 994 (PA-994)

The Southern Alleghenies Region contains intermodal facilities and service providers that support passenger and freight, including:

- AP Green Industries, Inc.
- B&E Railroad, Inc.
- Bellefonte Historical Railroad
- Conemaugh & Black Lick Railroad Company

- CSX Transportation, Inc.
- East Broad Top Railroad
- Everett Railroad Company
- Hollidaysburg and Roaring Spring Railroad Company
- Johnstown America Corporation
- Morrison Cove Railroad, Inc.
- National Railroad Passenger Corporation (Amtrak)
- Nittany and Bald Eagle Railroad
- Norfolk Southern Railway Company
- PBS Coal, Inc.
- R.J. Corman Railroad Group
- SEDA-COG Joint Railway Authority
- Wheeling & Lake Erie Railway Company

The District 9-0 Region contains tourist attractions and travel destinations, including:

- Amusement Parks
  - DelGrosso's Amusement Park
  - Lakemont Park

- Caves and Mines
  - Indian Caverns
  - Lincoln Caverns Inc. & Whisper Rocks

- Entertainment and Special Events
  - Blair County Ballpark—Altoona Curve Baseball Club
  - Altoona Mirror Keystone Country Fair
  - Mansion Park Stadium (Altoona Area School District)
  - Point Stadium, Johnstown

- Parks and Recreation
  - Blue Knob All Seasons Resort
  - Canoe Creek State Park
  - Hidden Valley Resort
  - Morrison Cove Memorial Park
  - Prince Gallitzin Park
  - Raystown Lake
  - Seven Springs Mountain Resort

- Others
  - Blair County Convention Center
  - Johnstown War Memorial
  - Johnstown Convention and Visitors Bureau
  - Logan Valley Mall

The Region is also home to multiple transit providers, including:

- Amtrak
- Altoona Metro Transit (AMTRAN)
- Cambria County Transit Authority (CamTRAN)
- Fullington Trailways
- Greyhound

2.4 Regional Stakeholders

This section documents the Regional stakeholders defined by the RAP for inclusion and participation in the Regional ITS Architecture effort. Stakeholders are generally identified in terms of agencies and specific individuals in those agencies responsible for policy and operations. Agencies were selected by assessing the mission of operation of services related to the transportation system. Therefore Emergency Management Services (EMS), Incident Management (IM), ITS, Transit, and enforcement activities were all included. Planning agencies were included as well because capital and some Operations & Maintenance (O&M) funds are programmed through these agencies.

Attractions and Event Promoters: Regional attractions and events generating large traffic that have a significant impact on the local and regional transportation system.

Commercial Vehicle Companies: Privately owned trucking companies responsible for the safe and efficient movement of goods using the transportation system in the Region. Services provided by various commercial vehicle agencies include the delivery of intermodal shipments (containers and trailers), bulk materials (including chemical and HAZMAT products), and specialized cargo (legal, over-dimensional, and heavy haul shipments).

Counties: Bedford, Blair, Cambria, Fulton, Huntingdon, and Somerset county government operations are included within the Region. Departments typically participating in emergency management operations include county police, fire, EMS, 911, and emergency management agencies.

General Public: The community or the people as a whole using the transportation system. The general public may be an automobile driver, transit passenger, computer, or cell-phone user obtaining travel information, or any other person interacting with the transportation system in the Region.

Maryland Emergency Management Agency (MEMA): The Maryland Emergency Management Agency (MEMA) coordinates state agency emergency response to support county and local governments in the areas of civil defense, disaster mitigation and preparedness, planning, and response to and recovery from man-made and natural disasters. For more information, visit MEMA's website (http://www.mema.state.md.us).

Maryland Department of State Police (MDSP): The Maryland Department of State Police is a full service statewide law enforcement agency that fulfills the law enforcement needs of the general public across Maryland. For more information, visit the Maryland Department of State Police website (http://www.mdsp.maryland.gov/mdsp/default.asp).

Maryland State Highway Administration (MDSHA): The Maryland State Highway Administration is Maryland's statewide transportation agency responsible for building, maintaining, and operating the state's roads, bridges and tunnels. For more information, visit the MDSHA website (http://www.sha.state.md.us).

Municipalities: Pennsylvania cities, boroughs, or townships incorporated for local governments throughout the Region. Municipalities are responsible for local roads, which account for 70 percent of the Pennsylvania road system. Municipalities are also responsible for various local operations within its limits, including public safety (police, fire, and EMS) and traffic signal systems.

Pennsylvania Department of Transportation (PennDOT): The Pennsylvania Department of Transportation is the Commonwealth's statewide transportation agency responsible for building, maintaining, and operating the state's roads, bridges and tunnels. PennDOT consists of a single Central Office and 11 District Offices throughout the state.

PennDOT's Central Office consists of several internal organizations, including the Bureau of Maintenance and Operations (BOMO), Motor Carrier Division, Bureau of Planning and Research (BPR), Bureau of Highway Safety and Traffic Engineering (BHSTE), Bureau of Licensing, Bureau of Motor Vehicles, Bureau of Freights and Rails, Bureau of Information Systems, Communication Office of Information Technology, and Press Office. PennDOT's Central Office oversees statewide operations and is responsible for coordination of transportation services between the 11 Districts.

PennDOT's District Offices are responsible for the design, operation, maintenance, and construction of state highways and bridges in their respective districts.

For more information, visit PennDOT's website (http://www.dot.state.pa.us).

Pennsylvania Emergency Management Agency (PEMA): The Pennsylvania Emergency Management Agency (PEMA) coordinates state agency emergency response, including the Office of the State Fire Commissioner and Office of Homeland Security, to support county and local governments in the areas of civil defense, disaster mitigation and preparedness, planning, and response to and recovery from man-made and natural disasters. For more information, visit PEMA's website (http://www.pema.state.pa.us).

Pennsylvania Office of Homeland Security: Pennsylvania Homeland Security addresses the security needs of the state. Developed in response to 9/11 the Homeland Security Office is focusing on a range of important security needs and services, including transportation-related issues. Potential high-threat topics — e.g., nuclear power plants, DOE shipments, chemical industry, major distribution of gas and electric utilities, and other target infrastructure — are all covered through the Office's Homeland Security mission. Initially, the ITS Architecture focuses on security issues as part of incident management. In the future, as the Office's mandate is refined, additional security services and needs are likely to be reflected in the Architecture.

Pennsylvania State Police (PSP): The Pennsylvania State Police is a full service statewide law enforcement agency that fulfills the law enforcement needs of the general public across the Commonwealth of Pennsylvania. Transportation services provided by the Pennsylvania State Police include: (1) incident response, (2) commercial vehicle inspections, and (3) law enforcement on state highways. For more information, visit the Pennsylvania State Police website (http://www.psp.state.pa.us).

Pennsylvania Turnpike Commission (PTC): The Pennsylvania Turnpike Commission maintains and operates the 531-mile Pennsylvania Turnpike. The Pennsylvania Turnpike is a key transportation route within the state and a vital link in the transportation network of the eastern United States. The Turnpike contains 57 fare-collection facilities, 21 service plazas and two traveler information centers, 21 maintenance facilities, 8 State Police barracks, and 5 tunnels. For more information, visit the PTC's website (http://www.paturnpike.com).

Regional Media: The regional media consist of all regional/local television and radio stations that provide weather, traffic, and other information to the general public via means of mass communication.

Regional Transit Agencies: Agencies operating public transportation services within the Region. Regional Transit Agencies include Altoona Metro Transit (AMTRAN), Cambria County Transit Authority (CamTRAN) and various on-demand paratransit and senior transit service providers.

Spill Centers: These agencies are responsible for environmental clean up after incidents, particularly when hazardous materials are involved. Spill Centers include the Department of Environmental Protection, Department of Agriculture, and others who respond to incidents on the roadway.

Towing Industry: The towing industry consists of privately owned towing agencies in the Region responsible for incident cleanup and removal of vehicles at incident sites.

TRANSCOM: TRANSCOM is a coalition of 16 transportation and public safety agencies in the New York-New Jersey-Connecticut metropolitan region. It was created in 1986 to provide a cooperative, coordinated approach to regional transportation management. For more information, visit TRANSCOM's website (http://www.xcm.org/index.html).

Various Stakeholders: This stakeholder represents several stakeholders within the Region working in conjunction to initiate, own, operate, and/or maintain transportation infrastructure within the Region.

Weather Information Providers: Public agencies and private companies that provide weather forecast information to transportation agencies, emergency response entities, media outlets, and the general public. The category includes the National Weather Service/NOAA, Accuweather, The Weather Channel, and others.

2.5 Regional ITS Projects

The Regional ITS Projects Matrix identifies ITS projects in the Region and provides a high-level description of the projects. The matrix denotes the status of each project, as follows:

- Existing — An ITS project that is deployed and operational.
- Planned 1 — A future ITS project that is programmed or formally documented by the MPO, DOT, transit agency, police, or other transportation stakeholder.
- Planned 2 — A future ITS project that is not programmed or documented.

The information on projects shown in the matrix (see Table 2-7) was collected from Regional or Municipal planning documents, or otherwise enunciated by members of the RAP. Regional stakeholders went through a process of defining projects as existing, planned 1, or planned 2. A planning horizon of 20 years was used as a criterion in determining those projects to include in the matrix.

Table 2-7: Regional ITS Projects

Stakeholder	Project	Status	Project Description
Attractions and Event Promoters	Events	Existing	Event promoters provide event related information to PennDOT and other agencies to better manage traffic during a planned event.

Stakeholder	Project	Status	Project Description
Commercial Vehicle Companies	Private Carrier Commercial Vehicle Tracking System	Existing	Commercial Vehicle Tracking System provides tracking information of all the trucks using the system. Commercial vehicles also have communication devices to communicate with the trucking agency on-route.
Commercial Vehicle Companies	Private Carrier Fleet Maintenance Management	Existing	This program provides capabilities to administer preventive maintenance schedules.
Commercial Vehicle Companies	FHWA Carrier Compliance Review	Existing	The FHWA Compliance Review process involves examining carrier records to ensure that the carrier meets all safety-related regulations and does not have unsafe operating practices.
Counties	County 911 Communications Centers	Existing	The County Communication Centers dispatch and manage resources for incidents.
Counties (Cambria County & City of Johnstown)	Integrated Emergency Operations Center, Cambria County	Existing	This project includes an Integrated Emergency Operations Center to provide voice, video and data interoperability between emergency operations center and on-scene incident command in an effort to promote greater coordination and management of the incident.
Counties	County Emergency Management Agency Centers	Existing	The county EMA centers maintain an emergency operations center that can be activated to coordinate incident actions.

Stakeholder	Project	Status	Project Description
Counties	County 911 Communication Centers – Geographic Information System (GIS)	Existing and Planned 1	County EMA Centers use a GIS to map 911 calls. The GIS helps to provide automatic location of the street address of wire line calls, and in the future it will handle cellular call location (E911).
Counties	County/Regional Planning Department	Existing	This program provides planning services to various transportation related activities.
Counties	Congestion Management System Studies	Existing	The MPO/RPO conducts the congestion management system study to monitor the levels of service of traffic flow on congested highways and at intersections.
Counties	Events Monitoring	Existing	The MPO/RPO monitors increased traffic volumes on highways and at parking facilities and levels of service and congestion during peak events for planning purposes. .
Counties	EMS, Fire, and Police Vehicles	Existing	These vehicles respond to the incident emergencies.
General Public	EZ Pass	Existing	This program allows the passenger vehicles to pay toll at the toll both without stopping.
General Public	Personal Traveler Information System	Existing	These systems allow users to access transportation related information through their personal information devices including personal computers, PDA etc.,
Municipalities	Traffic Signal Systems	Existing and Planned 1	Municipalities maintain the closed-loop and traffic responsive traffic signal systems in the region.

Stakeholder	Project	Status	Project Description
Municipalities	Traffic Signal System Preemption	Planned 2	This project would allow the deployment of traffic signal preemption for transit and emergency vehicles to reduce the travel time of the emergency and transit vehicles.
Municipalities	Public Safety Services	Existing	These services include fire fighters, police officers, and others who are dispatched to the incident site.
PennDOT (Central Office)	Winter Road Condition Hotline for Interstate Highways	Existing	A hotline phone service that disseminates seasonal statewide road conditions including road closures, detours, alternative routes, work zone/ construction events, and road surface conditions.
PennDOT (Central Office)	Roadway Weather Information System (RWIS)	Existing	Road Weather Information Systems collect weather information/images throughout the state. RWIS information is made available to the public and transportation agencies via a webpage.
PennDOT (Central Office)	PennDOT Performance and Registration Information Systems Management (PRISM)	Existing	This project began as an effort to explore the potential of linking the Commercial Vehicle registration process to motor carrier safety.
PennDOT (Central Office)	PennDOT Safety and Fitness Electronic Record (SAFER)	Planned 1	SAFER is a software program that enables the enforcement community to transmit and receive data on CVO safety, credential, and inspection to and from the roadside.

Stakeholder	Project	Status	Project Description
PennDOT (Central Office)	PennDOT Transportation Management Centers (TMC's)	Planned 2	PennDOT intends to enhance existing Transportation Management Centers (TMC's), and establish new TMC's, to monitor and control the transportation system in partnership with other transportation operations providers.
PennDOT (Central Office)	PennDOT "Wizard" Work Zone Alert Radio	Planned 1	The alert radio alerts truck drivers to work zone conditions.
PennDOT (Central Office)	Statewide Telecommunication	Planned 2	This project would develop a statewide telecommunication system
PennDOT (Central Office)	Construction Projects (current and future)	Existing	This projects allows for road closure, work zone and construction information dissemination through PennDOT website.
PennDOT (Central Office)	Central Repository	Planned 2	This project would involve developing a central repository for information. The central repository information would include work zone information, real time traffic information, and accident information among others. The central repository will facilitate better coordination among various PennDOT offices and the customers.

Stakeholder	Project	Status	Project Description
PennDOT (Central Office)	Real -time Traffic Information Website	Planned 2	This project would include deployment of a real time traffic information website which would disseminate the following real time information: traffic information, incident information, work zone information and weather advisory information.
PennDOT (Central Office)	Statewide GIS based Incident Detour Map	Planned 2	This project would develop a statewide GIS based incident detour map for various major interstate routes. The statewide GIS based data would be consistent with the Counties' GIS data.
PennDOT (Central Office)	Video Sharing	Planned 2	This project would involve sharing of video images among various PennDOT Districts, PSP, PEMA, and other coordinating agencies.
PennDOT (Central Office)	Web site Portal for Assisting Commercial Vehicle Operators	Planned 2	In addition to the real time traffic information, this website would assist the commercial vehicle operators by providing video images, incident alerts, customized incident information/alerts, site restrictions. This website would also assist the commercial vehicle operators by reducing paper work necessary for their operations.
PennDOT (District 9-0)	PennDOT D9 Traffic Management Center (TMC)	Existing	PennDOT D9 TMC operates certain ITS devices, operates state roadways, and coordinates incident response.

Stakeholder	Project	Status	Project Description
PennDOT (District 9-0)	PennDOT D9 Central System Software	Planned 1	The Central system software will allow the D9 TMC to control and manage all the D9 field devices from single central system software.
PennDOT (District 9-0)	PennDOT D9/D2 Regional TMC Expansion (RTMC)	Planned 1	This project involves the integration of hardware and software systems at the TMC to serve as an advanced traveler information and traffic management center for the D9 and D2 region.
PennDOT (District 9-0)	HAR Systems	Existing	HAR systems include radio transmitters that are used to provide travel advisories to travelers.
PennDOT (District 9-0)	Permanent DMS Systems	Existing	Permanent DMS systems include signs where messages can be changed in order to provide real-time travel information to travelers.
PennDOT (District 9-0)	Portable DMS Systems	Existing	Portable DMS systems include signs where messages can be changed from a number of limited messages in order to provide real-time travel information to travelers. All the counties possess portable DMS for posting messages from a mobile laptop.
PennDOT (District 9-0)	CCTV Systems	Existing	CCTV systems include either permanent or portable cameras in the field used for incident detection, verification, and response.
PennDOT (District 9-0)	Additional CCTV Systems	Planned 2	This program would allow the deployment of additional CCTV system on the roadway to increase the coverage of the detection, verification, and response of the incident.

Stakeholder	Project	Status	Project Description
PennDOT (District 9-0)	Communication Network	Existing and Planned 1	PennDOT D9 currently has 15 miles of Fiber Optics along its roadway network.
PennDOT (District 9-0)	Fiber Optics Communication along US 22	Planned 2	This program would allow the deployment of additional fiber optics communication along US 22 to improve the quality and reliability of the communication network.
PennDOT (District 9-0)	Roadway Weather Information System (RWIS)	Existing	The RWIS collects roadway weather information using environmental sensors.
PennDOT (District 9-0)	Improved Maintenance of RWIS Devices	Planned 2	This program would allow for improved maintenance of the RWIS field devices to provide more accurate and reliable data.
PennDOT (District 9-0)	Automated De-Icing for Bridges	Planned 2	This project would allow the District to deploy automate de-icing on the bridges to improve the roadway safety during winter weather conditions.
PennDOT (District 9-0)	I-99 Bedford or Cessna Interchange, Bedford County	Planned 1	This project involves deployment of DMS to warn travelers of inclement weather conditions as they travel North into Blair County. They may be concurrently used with a road temperature monitor currently in use near the county line on I-99.
PennDOT (District 9-0)	PA 56 Pleasantville Area Project, Bedford County	Planned 1	This project involves deployment of DMS to warn travelers of potential weather and traffic threats on Pleasantville Mountain. This may be concurrently used with the existing weather station and roadside camera that is currently in use on the mountain.

Stakeholder	Project	Status	Project Description
PennDOT (District 9-0)	US 30, East of Breezewood Project, Bedford County	Planned 1	This project involves deployment of DMS and roadside cameras. These would be placed at a location that travelers could see upon entering and leaving Breezewood to warn travelers of traffic conditions in Breezewood, as well as along route I-70 and PA 30.
PennDOT (District 9-0)	US 220 South Project, Bedford County	Planned 1	This project involves deployment of DMS near the Bedford fairground Exit and US 30 east and west.
PennDOT (District 9-0)	PA 31 Project, Bedford County	Planned 1	This project involves deployment of CCTV, RWIS and DMS along PA 31 from Juniata Township to Somerset County (possible location includes east of Kegg or the Rt. 96/31 intersection).
PennDOT (District 9-0)	US 30 West Providence Township Project, Bedford County	Planned 1	This project involves deployment of DMS along US 30 in West Providence Township, east of PA 26 intersection.
PennDOT (District 9-0)	I-70 near the Warfordsburg exit, Fulton County	Planned 1	This project involves deployment of DMS along I-70 near the Warfordsburg exit.
PennDOT (District 9-0)	I-70 near the Town Hill exit, Fulton County	Planned 1	This project involves deployment of DMS along I-70 near the Town Hill exit.
PennDOT (District 9-0)	I-76 near the Fort Littleton exit, Fulton County	Planned 1	This project involves deployment of DMS along I-76 near the Fort Littleton exit.
PennDOT (District 9-0)	I-76 near the Sideling Hill Plaza exit, Fulton County	Planned 1	This project involves deployment of DMS along I-76 near the sideling hill plaza exit.
PennDOT (District 9-0)	US 30 near the US 522 exit at McConnellsburg, Fulton County	Planned 1	This project involves deployment of DMS along US 30 near US 522 interchange.

Stakeholder	Project	Status	Project Description
PennDOT (District 9-0)	SR 655 Project, Fulton County	Planned 1	This project involves deployment of DMS along SR 655 in Taylor Township by the Forbes Road school intersection with SR 4007.
PennDOT (District 9-0)	SR 1001 City Road Project, Fulton County	Planned 1	This project involves deployment of DMS along SR 1001 Cito Road near Fulton County Business Park.
PennDOT (District 9-0)	SR 1005 Aughwick Road Project, Fulton County	Planned 1	This project involves deployment of DMS along SR 1005 Aughwick Road near Cowans Gap State Park.
PennDOT (District 9-0)	US 522 Project, Huntingdon County	Planned 1	This project involves deployment of DMS to warn travelers of the congestion caused by Agape Farm or Lake Raystown traffic.
PennDOT (District 9-0)	US 22 Water Street Area Project, Huntingdon County	Planned 1	This project involves deployment of DMS along US 22 at one mile west of PA 453 and half mile east of PA 453 intersection.
PennDOT (District 9-0)	US 522 Mount Union Area Project, Huntingdon County	Planned 1	This project involves deployment of DMS along US 522 at one mile south of US 22 intersection.
PennDOT (District 9-0)	US 522 Fulton County line Project, Huntingdon County	Planned 1	This project involves deployment of DMS along US 522 at half mile north of Burnt Cabins.
PennDOT (District 9-0)	PA 26 Project, Huntingdon County	Planned 1	This project involves deployment of DMS along PA 26 near Charter Oak Road and half mile north of Bedford County line.
PennDOT (District 9-0)	US 219 Project, Somerset County	Planned 1	This project involves deployment of DMS along US 219 near 601 and along US 219 just off the Turnpike exit ramp to direct the Turnpike traffic.

Stakeholder	Project	Status	Project Description
PennDOT (District 9-0)	I-99 Project, Blair County	Existing	This project involves deployment of CCTV along I-99 from US Route 22 to 17th street and deployment of DMS from Duncansville overpass to 17th street and at Pinecroft.
PennDOT (District 9-0)	Plank Road Project, Blair County	Existing	This involved deployment of CCTV to monitor the movement of traffic along Plank Road from Meadows Intersection to I-99. This project also involves installation of 2 miles of fiber optics 24 S.M communication and 4 miles of fiber optics 6 M.M communication.
PennDOT (District 9-0)	17th Street Project, Blair County	Existing	This project involves deployment of cameras along 17th street bridge over 10th Avenue to I-99.
PennDOT (District 9-0)	Chestnut Avenue Project, Blair County	Existing	This project involves deployment of cameras along Chest Avenue between Juniata Gap Road and 8th Street Bridge. This project also involves installation of 2 miles of fiber optics 6 M.M communication.
PennDOT (District 9-0)	US Route 22 Project, Blair County	Existing	This project involves deployment of DMS along US Route 22 from Cambria County to Duncansville intersection.
PennDOT (District 9-0)	PA Route 764 Project, Blair County	Existing	This project involves deployment of DMS along PA Route 764 from US Route 22 to Veeder-Root Company.
PennDOT (District 9-0)	Old US Route 220 Project, Blair County	Existing	This project involves deployment of DMS along old US Route 220 from Inlows to Duncansville Intersection.

Stakeholder	**Project**	**Status**	**Project Description**
PennDOT (District 9-0) & Blair County 911 Emergency Communication Center	Bedford and Blair County's DMS Operation	Existing	This project involves the joint operation of DMS on I-99 from the PTC north to I-80. These DMS's can be accessed and activated by Blair County 911 Emergency Communication Center.
PennDOT (District 9-0)	Deploy Additional Field Devices (HAR, DMS) along I-80	Planned 2	This project would allow the deployment of additional field devices along Interstate I-80.
PennDOT (District 9-0)	Deploy Additional DMS Devices Throughout the Region	Planned 2	This project would allow the deployment of additional DMS devices throughout the region to provide real time traveler information.
PennDOT (District 9-0)	CCTV Images sharing	Planned 2	This project would allow the District to share the CCTV images with the cities, where the CCTV's are deployed, for better incident management and with regional media for information dissemination to the public.
PennDOT (District 9-0)	Logan Township Agreement for Maintenance of the Traffic Signal Systems	Planned 2	This project would develop an agreement between the City of Altoona and the Logan Township for the maintenance of the traffic signal systems.
PennDOT (District 9-0)	Improved Incident Management Coordination	Planned 2	This program would allow for improving the incident management coordination between the Blair County Maintenance Office and the Blair County 911 Communication Centers.
PennDOT (District 9-0)	Incident Information Website	Planned 2	This project would allow the District to develop an incident information website to disseminate the incident information within the Region to the general public.

Stakeholder	Project	Status	Project Description
PennDOT (District 9-0)	Information Exchange Website	Planned 2	This project would allow various public agencies including PEMA, PSP, PennDOT, PTC, 911 Communication Centers, and other public agencies to share the transportation related information.
PennDOT (District 9-0)	Park-and-Ride Lots	Existing	The park-and-ride lot facilities facilitate traffic management by providing opportunities to ride share. They also provide a critical link in auto-to-bus transfer.
PennDOT (District 9-0)	Welcome Centers and Rest Areas	Existing	These places act as a travel guide to provide information on the surrounding area including attractions, boarding and lodging, and events occurring in the area. It also provides directional maps. These facilities also provide restrooms and refreshments facilities.
PennDOT (District 9-0)	Animal-Vehicle Crash Mitigation	Planned 2	Animal-Vehicle crash mitigation systems are intended to prevent animal-vehicle collisions in areas prone to animal incidents.
Pennsylvania Emergency Management Agency (PEMA)	PEMA Emergency Operation Center	Existing	Emergency Operation Center provides agency coordination for significant incidents, events, and emergencies throughout Pennsylvania. Also collects/distributes information from various agencies for a Daily Incident Report webpage.

Stakeholder	Project	Status	Project Description
Pennsylvania Emergency Management Agency (PEMA)	PEMA Truck	Existing	PEMA truck acts as a backup to the operations of the PEMA's Emergency Operations Center. The mobility of the truck allows establishing an Emergency Operations Center at the incidence location in case of major incident.
Pennsylvania Emergency Management Agency (PEMA)	Pennsylvania Emergency Information Reporting System (PEIRS)	Existing	A statewide electronic database, the Pennsylvania Emergency Information Reporting System (PEIRS) collects information from all state agencies responding to incidents/emergencies in the Commonwealth of Pennsylvania.
Pennsylvania Emergency Management Agency (PEMA)	Regional Agile Port Intermodal Distribution System (RAPID)	Existing	This system uses global positioning satellites to keep track of any military cargo or hazardous materials moving by ship, truck or rail.
Pennsylvania Office of Administration	Statewide Communication System	Planned 1	This project involves the deployment of a statewide 800 MHz wireless communication system for state agencies.
Pennsylvania Office of Homeland Security	Regional Counter Terrorism Task Force	Existing	This program is a major effort to properly organize the most effective scheme for Regional Counter Terrorism Task Forces to respond to the growing threat of the use of Weapons of Mass Destruction (WMD). PennDOT would like to be involved in the Regional Counter Terrorism task force.

Stakeholder	Project	Status	Project Description
Pennsylvania State Police (PSP)	Incident Information Management System (IIMS)	Existing	The Incident Information Management System is a database used to provide PSP vehicles incident reporting and dispatching capabilities.
Pennsylvania State Police (PSP)	PSP Dispatch Centers	Existing	PSP Dispatch Centers are responsible for PSP operations. Dispatch Centers dispatch PSP Vehicles to incidents and emergencies on state highways.
Pennsylvania State Police (PSP)	PSP Consolidated Dispatch Center	Planned 1	PSP Consolidated Dispatch Centers will provide consolidated dispatch and management of PSP resources for incident/emergency operations throughout the coverage area.
Pennsylvania State Police (PSP)	Mobile Data Terminals (MDT's)	Existing and Planned 1	In-vehicle systems used by the vehicles to communicate and receive dispatch information from PSP and other agencies' systems. MDT's are currently being integrated with other state agencies now (i.e. PEMA) and municipal agencies in the future.
Pennsylvania Turnpike Commission (PTC)	Pennsylvania Turnpike Field Devices	Existing and Planned 1	Pennsylvania Turnpike Commission existing and planned field devices including: DMS, RWIS, HAR, CCTV, CADS, and TRWS.
Pennsylvania Turnpike Commission (PTC)	PTC ATIS Integration Project	Planned 1	The PTC will integrate DMS, RWIS, HAR, CCTV, and CADS sub-systems into an integrated traffic management system.

Stakeholder	Project	Status	Project Description
Pennsylvania Turnpike Commission (PTC)	PTC *11 Phone Service	Existing	The PTC *11 Phone Service allows motorists to notify the PTC of incidents and emergencies on the Pennsylvania Turnpike.
Pennsylvania Turnpike Commission (PTC)	PTC E-Z Pass Toll Collection System	Existing	E-Z Pass is an electronic toll collection system used on the Pennsylvania Turnpike and other toll roads in the Commonwealth. E-Z Pass allows passenger vehicles to pay tolls at toll both without stopping.
Pennsylvania Turnpike Commission (PTC)	PTC Service Plazas	Existing	PTC Service Plazas serve as a center for traveler information. Service plazas utilize scrolling message boards to broadcast weather and lodging information.
Pennsylvania Turnpike Commission (PTC)	PTC Traffic Operation Center (TOC)	Existing	The PTC Traffic Operation Center, located near Harrisburg, is responsible for detecting, monitoring, managing, operating, dispatching resources in response to incidents, events, construction and maintenance work for the entire length of the Pennsylvania Turnpike.
Regional Media	Information Dissemination	Existing	This program allows the regional media outlets to disseminate the weather, traffic, and other information to the general public.

Stakeholder	Project	Status	Project Description
Regional Transit Agencies	Transit Dispatch Center	Existing	Transit dispatch center provides fixed route transit service. The center provides operations, maintenance, customer information, planning, and management functions for the transit property. They also provide paratransit services.
Regional Transit Agencies	Maintenance Garages	Existing	These locations are used to maintain, overhaul and rebuild existing fleet of buses where practical.
Regional Transit Agencies	Automatic Vehicle Location (AVL)	Planned 1	AVL is the use of technology to track vehicles, in this case-transit vehicles, for trip planning, routing, and providing real-time information to customers.
Regional Transit Agencies (CamTRAN)	Vehicle Schedule Adherence	Planned 1	This project would allow the deployment of technology (similar to NextBus) in the CAMTRAN vehicles to improve the vehicle schedule adherence.
Regional Transit Agencies	Security Monitoring	Planned 2	This project would allow the deployment of technologies (example CCTV's) to monitor the bus terminals, which would improve the security of the transit users.
Towing Industry	Incident Response Program	Existing	This program allows for clearance of the wrecks after an incident/event.
Towing Industry	Communication Medium for Wreckers	Planned 2	This program would allow towing industry responders to establish communication with other emergency response agencies

Stakeholder	Project	Status	Project Description
Towing Industry	Incident Information for Towing Industry Responders	Planned 2	This program would allow towing industry responders to respond efficiently to the incidents. The incident information that needs to be relayed to the towing industry responders would include the exact location of the incidents, nature of the incident, and the established code for the abandoned vehicle(s).
TRANSCOM	Regional Transportation Management	Existing	This program allows various agencies to share incident and emergency information within the Region through TRANSCOM.
Various Stakeholders	800 MHz Statewide Communication System	Existing	This project involves the deployment of a statewide 800 MHz wireless communication system for state agencies.
Various Stakeholders	511 Traveler Information Phone System	Planned 2	Project that may be initiated by PennDOT and the PTC to collect and distribute traveler information via a dedicated 511 phone number throughout the state.
Various Stakeholders	AMBER Alert Coordination	Existing	AMBER alert coordination between PennDOT Central Office, PEMA, PennDOT District Offices, and PSP.

3 Regional Systems Inventory, Needs, and Services

The National ITS Architecture provides guidance on collecting and creating ITS Architectures using regional data. Given this guidance, this section provides a common sense approach to gathering information, providing a logical flow down to this information in order to create the Regional ITS Architecture. This section documents elements (groups that operate), systems inventory (what these groups are doing), needs (information or data that these groups need or use from others) and services (information or data that these groups provide to others). This section also includes a section on operations coverage.

3.1 Element Descriptions

Element descriptions are furnished below to document the groups that operate in the transportation environment as related to ITS. These elements are described in terms of their mission and relationship to the Regional ITS Architecture. Elements refer to organizational entities that operate in the transportation environment and are stakeholders in the effort. Elements also include planning agencies that are involved in the "business" of programming ITS into the mainstream project planning process.

911 Communication Centers: County-operated locations serving as Public Safety Answering Points (PSAP's) for answering and managing 911 calls. Include systems and personnel that coordinate incident dispatch with various emergency response agencies, as well as dispatch requests from responders in the field. Municipal public safety vehicles and other specialty response vehicles, such as wreckers, ambulances, and local fire, police and EMS, and HAZMAT teams are dispatched by the 911 centers.

Adjacent PennDOT Districts and County Offices: This element includes existing and future PennDOT TMC's, county maintenance offices, and stockpiles located in PennDOT Districts 2-0, 8-0, 10-0, and 12-0, which are located around the Region. The element includes personnel and systems that coordinate with PennDOT entities in District 9-0 to perform traffic management, maintenance and construction, and incident/emergency management operations at or near District borders.

Attractions and Event Promoters: Regional attractions and event locations generating large traffic that have a significant impact on the local and/or regional transportation system. Attractions and Event Promoters communicate with local/regional transportation agencies for traffic management during events. Examples of Southern Alleghenies Region Attractions and Event Promoters include: Delgrosso's Amusement Park, Lakemont Park, Blair County Ballpark, and Mansion Park Stadium.

Blair County 911 Communication Center: Blair County-operated locations serving as Public Safety Answering Points (PSAP's) for answering and managing 911 calls. This element includes systems and personnel that coordinate incident dispatch with various emergency response agencies, as well as dispatch request from responders in the field. Municipal public safety vehicles and other specialty response vehicles, such as wreckers, ambulances, and local fire, police and EMS, and hazmat teams are dispatched by the 911 centers. The Blair County 911 Communication Center also plays role in operating PennDOT District 9-0 DMS and CCTV field devices.

Commercial Vehicle Company Offices: Commercial Vehicle Company Offices owned by private freight hauling agencies operating in the Region. This element also includes the Pennsylvania Motor Trucking Association. Includes the existing and future Commercial Vehicle Company systems which provide the capability for freight managers to furnish drivers with routing information, support safety and hazardous materials credentialing, conduct safety checks, support vehicle diagnostic checks and on-board monitoring, automate recordkeeping, etc.

Commercial Vehicles: Privately-owned freight hauling vehicles operating in the Region. This element includes existing and future in-vehicle devices enabling vehicles to communicate with (1) Commercial Vehicle Company Offices, (2) Commercial Vehicle Company systems, and (3) and other agency systems throughout Pennsylvania.

County EMA Centers: County-operated facilities within the Region responsible for centralized emergency coordination during emergency and hazmat response situations. Includes systems and personnel at the center that provide a single point of contact by collocating representatives from various emergency response agencies/departments.

County/Regional Planning Organizations: This element includes the planning bodies within Southern Alleghenies Region. Planning agencies include:

- Metropolitan Planning Organizations (MPO): Altoona MPO and Johnstown MPO;
- Rural Planning Organizations (RPO): Southern Alleghenies Planning and Development Commission (Huntingdon County, Fulton County, Somerset County, and Cambria County); and
- The Federal Highway Administration (FHWA).

The planning bodies are responsible for long-range planning for the future of transportation system and the short-range programming of funds for upcoming projects.

High Threat Facilities: Operations and management headquarters for major security assets located within or adjacent to the Region, which require special treatment in terms of emergency response and security. Existing/future systems include facility surveillance and secure communications with local, state, and national police and emergency management agencies.

Incident Response Agency Offices: Incident response agency offices include all the agencies that are involved in the incident clearance stage of incident management. Example: Spill centers, Department of Agriculture, Department of Environmental Protection, etc.

MDSHA Offices: Maryland State Highway Administration and all the Maryland Department of Transportation Offices that coordinate with PennDOT during incident response, and construction and maintenance activities. This element also includes Maryland's CHART system.

MDSP Offices: Includes all Maryland Department of State Police offices. MDSP Offices represent public safety systems that support incident management, disaster response and evacuation, security monitoring, dissemination of incident information and other security and public safety-oriented ITS applications.

MEMA Emergency Operation Center: Maryland Emergency Management Agency Emergency Operation Center stores, coordinates, and utilizes emergency response and evacuation information/plans to facilitate coordinated emergency response for all responding agencies throughout Maryland. MEMA coordinates with PEMA during emergency operations affecting both Maryland and Pennsylvania.

Municipal Field Devices: Municipality-operated traffic management field devices. Include traffic signal system components.

Municipal/Regional Public Safety Offices: This element consists of municipality-operated public safety offices and includes systems and personnel from police, fire, and EMS agencies that provide local incident response and traffic control services.

Municipal/Regional Public Safety Vehicles: Includes systems, resources, and personnel operating police, fire, EMS, and other emergency response vehicles including helicopter resources and bomb squads. Also includes existing/planned in-vehicle systems including voice/data communications.

Municipal Traffic Management Offices: This element consists of municipality-operated traffic engineering and operations offices throughout the Region. It includes systems and personnel that provide existing/future monitoring, controlling, and maintaining of traffic management field devices – typically signal systems. The element also provides traffic signal timing change coordination, as well as emergency, maintenance, and construction coordination with other agencies. Operations coordinated between municipal traffic offices are also present within the Region, including existing "Traffic Information Coordination" and planned "Traffic Control Coordination" information flows.

Passenger Vehicles: This element consists of systems within all passenger vehicles, excluding commercial vehicles, owned by the general public. The element also encompasses in-vehicle systems used to communicate with other systems such as E-Z Pass toll tags and devices used to communicate with parking facilities.

PEMA Emergency Operation Center: Systems housed at the PEMA Statewide Emergency Operation Center (Harrisburg), Western Area Office (Indiana), and Eastern Area Office (Hamburg). PEMA Western and Eastern Regional Offices serve as regional operational arms of the Statewide Emergency Operation Center in Harrisburg.

PEMA stores, coordinates, and utilizes emergency response and evacuation information/plans to facilitate coordinated emergency response for all responding agencies throughout Pennsylvania. PEMA supports county and local governments in the areas of civil defense, disaster mitigation and preparedness, planning, and response to and recovery from manmade or natural disasters. It interfaces with other emergency management agencies to support coordinated emergency response involving multiple agencies. As the response progresses, situation information, including damage assessments, response status, and evacuation and resource data are shared to keep all allied agencies appraised of the response.

PennDOT Central Office Field Devices: Field devices owned and operated by PennDOT Central Office. Field devices include existing/future RWIS stations, commercial vehicle check systems, automatic traffic recorders, and other field devices distributed on and along the roadway that monitor, control, and manage traffic.

PennDOT Central Office Organizations: Systems located at the PennDOT Central Office Organizations in Harrisburg. The element consists of those Central Office Organizations operating transportations systems, including the Bureau of Maintenance and Operations (BOMO), Motor Carrier Division, Bureau of Planning and Research (BPR), Bureau of Highway Safety and Traffic Engineering (BHSTE), Bureau of Licensing, Bureau of Motor Vehicles, Bureau of Freights and Rails, Bureau of Information Systems, Communication Office of Information Technology, and Press Office.

PennDOT D2 TMC: Pennsylvania Department of Transportation Engineering District 2-0 existing Transportation Management Center (TMC) including personnel and existing/planned systems that provide traffic management, incident/emergency response, and maintenance and construction coordination services along PennDOT roadways. The District 2-0 TMC may act as a Regional Transportation Management Center (RTMC) in the future.

PennDOT D8 TMC: Pennsylvania Department of Transportation Engineering District 8-0 existing Transportation Management Center (TMC) including personnel and existing/planned systems that provide traffic management, incident/emergency response, and maintenance and construction coordination services along PennDOT roadways. The District 8-0 TMC may act as a Regional Transportation Management Center (RTMC) in the future.

PennDOT D9 County Maintenance Offices: Pennsylvania Department of Transportation Engineering District 9-0 County Maintenance Offices in the entire District 9-0 Counties. Include personnel and existing/planned systems that provide overall coordination and support for construction and maintenance on PennDOT roadways, management of construction and maintenance equipment, and traffic permits.

PennDOT D9 Field Devices: Pennsylvania Department of Transportation Engineering District 9-operated field devices. Include existing/planned HAR, DMS, traffic flow detection systems, truck rollover warning systems, and queue detection systems.

PennDOT D9 TMC: Pennsylvania Department of Transportation Engineering District 9-0 existing Traffic Management Center in Hollidaysburg, PA responsible for Bedford, Blair, Cambria, Fulton, Huntingdon, and Somerset Counties. Includes personnel and existing/planned systems that provide traffic management, incident/emergency response, and maintenance and construction coordination services along PennDOT roadways. PennDOT District 9-0 also operates traffic signals within the region. This element also represents the design and construction services, community relation coordination services, and the PennDOT District Maintenance (role of an emergency coordination) provided by PennDOT District 9-0.

PennDOT D9 Maintenance and Construction Vehicles: PennDOT-operated vehicles that perform maintenance and construction operations along PennDOT roads. Includes existing/planned in-vehicle systems on snowplows and other systems for communication with dispatch centers and tracking maintenance activity.

PennDOT STMC: A potential future PennDOT transportation management center for providing statewide coordination and operations. The STMC is based on the latest PennDOT Statewide Transportation Management Approach and will be located in Harrisburg and provide (1) traffic, incident, and emergency management operations and (2) will be a collection/distribution point for traveler information data throughout the entire state of Pennsylvania. Additionally, the PennDOT STMC will be responsible for

(1) coordinating PennDOT statewide operations, (2) coordinating among Districts and adjacent states, (3) coordinating with other state agencies (PSP, PTC, and PEMA), (4) performing political and public relations, (5) coordinating weather events, and (6) commercial vehicle operations.

PennDOT Welcome Centers and Rest Areas: This element includes the welcome centers and rest areas with the Region that consists of existing/future systems that provide traveler information.

Pennsylvania Office of Homeland Security: State-level department responsible for coordination of activities between other state agencies involved in security and threat management. Appropriate communications and management systems are still under development.

Personal Traveler Information Devices: This element consists of Personal Traveler Information Devices owned by the general public used to access and provide transportation information. Personal Traveler Information devices include personal computers, phones (including cell phones for reporting incidents and retrieving travel conditions en-route), and personal digital assistants (PDA's).

PSP Offices: Includes the (1) Pennsylvania State Police Headquarters located in Harrisburg Pennsylvania, (2) existing barracks, and (3) existing/future Consolidated Dispatch Centers. PSP Offices represent public safety systems that support incident management, disaster response and evacuation, security monitoring, disseminating incident information and other security and public safety-oriented ITS applications.

PSP Offices utilize several existing and future systems including mobile data terminals (MDT's) and Incident Information Management System (IIMS). MDT's are used to communicate and dispatch PSP vehicles. MDT's are currently being integrated with other state agencies now (i.e. PEMA) and municipal agencies in the future. Additionally, PSP Offices interface with other Emergency Management agencies to support coordinated emergency response. The IIMS is an all exclusive system performing dispatch and reporting functions throughout the Region and state.

PSP Troop T Highspire: Existing Pennsylvania State Police Troop T barracks currently dispatch PSP units on the Pennsylvania Turnpike. PSP Troop T Dispatch Centers represent public safety systems that support incident management, disaster response and evacuation, security monitoring, and other security and public safety-oriented ITS applications for the Pennsylvania Turnpike.

PSP Troop T Vehicles: All existing/future systems within Pennsylvania State Police vehicles Troop T vehicles. In-vehicle systems include voice communications and mobile data terminals (MDT's) used by the vehicles to communicate and receive dispatch information from PSP and other agencies' systems. MDT's are currently being integrated with other state agencies (i.e., PEMA) and will be integrated with municipal agencies in the future.

PSP Vehicles: All existing/future systems within Pennsylvania State Police vehicles. In-vehicle systems include voice communications and mobile data terminals (MDT's) used by the vehicles to communicate and receive dispatch information from PSP and other agency systems. MDT's are currently being integrated with other state agencies (i.e., PEMA) and will be integrated with municipal agencies in the future.

PTC Field Devices: Existing and future Pennsylvania Turnpike Commission Field Devices located within the Region. This element encompasses existing/future traffic detectors, HAR, RWIS, DMS, CCTV cameras, over-height vehicle detection systems, call boxes, truck rollover warning systems (TRWS), and other field devices distributed on and along the roadway that monitor, control, and manage traffic.

PTC Maintenance and Construction Vehicles: Pennsylvania Turnpike Commission-operated in-vehicle systems that perform maintenance and construction operations along the Turnpike. Includes existing/planned in-vehicle systems on snowplows and other vehicles for communicating with dispatch centers and tracking maintenance activity.

PTC Offices: The Pennsylvania Turnpike Commission offices consist of systems housed at the Operations Control Center, located in Harrisburg, as well as at all other offices/towers along the Turnpike. The PTC Offices' element serves as the focal point for Turnpike emergency management, traffic management, maintenance and construction management, toll administration, traveler information, and other activities associated with the Pennsylvania Turnpike.

- The PTC Offices support incident management, disaster response and evacuation, security monitoring, and other security and public safety-oriented ITS applications along the Turnpike. It interfaces with other emergency management agencies to support coordinated emergency response.

- Traffic management operations performed by the PTC Offices include monitoring and controlling traffic and the road network. The PTC Offices also coordinate traffic information and control strategies with neighboring agencies, including PennDOT and adjacent states.

- PTC Offices are responsible for monitoring and managing Turnpike roadway infrastructure construction and maintenance activities. The offices also manage equipment at the roadside, including environmental sensors (RWIS), and the repair and maintenance of both non-ITS and ITS equipment.

- PTC Offices also provide toll administration capabilities. Functions include general payment administration and the electronic transfer of authenticated funds from the customer to the Pennsylvania Turnpike Commission.

PTC Service Plazas: Existing/future systems housed in Pennsylvania Turnpike Commission-operated plazas along the Turnpike. The service plazas provide traveler information using scrolling message boards.

PTC Toll Plazas: Existing/future Pennsylvania Turnpike Commission-operated systems/equipment located at tolling plazas. PTC Toll plazas encompass E-Z Pass electronic toll capabilities, ticketed systems, archived toll data, and E-Z Pass video enforcement systems. CVO credentialing at PTC Toll Plazas is planned for the future.

NO TICKETS
TICKETS

Regional Media Outlets: Systems housed at regional television and radio stations that collect, process, store, and/or disseminate transportation information to the traveling public. This element also includes the local public access channel. Regional Media provides basic advisories, traffic and road conditions, transit schedule information, yellow pages information, and parking information to the general public.

Regional Transit Agency Offices: Regional Transit Agency Offices include all the transit operation centers (including the multimodal centers and airports) in the Southern Alleghenies Region providing fixed and “shared ride program” operations. Include systems and personnel that provide centralized transit and emergency management, vehicle maintenance, and security operations for the transit agencies.

Regional Transit Remote Traveler Support: This system includes future security monitoring systems which will be deployed at various transit facilities.

Regional Transit Vehicles: Various regional transit agency’s vehicles and in-vehicle systems. Include drivers and in-vehicle systems that provide existing/planned driver-to-dispatch communications, automated payment, automated passenger count, AVL, and vehicle maintenance and diagnostics tracking.

Towing Industry Responders: Privately-owned towing companies operating in the Region responsible for the towing and cleanup of traffic incidents.

TRANSCOM Center: An Information Exchange Network (IEN) to report incidents affecting the I-95 corridor to member agencies. The PennDOT District 9-0 Office is a member agency of TRANSCOM.

Weather Information Providers: Systems operated by private companies and public agencies that collect, analyze, and disseminate information on current and future weather conditions. Existing/future systems include surveillance devices (i.e., satellites, weather station, and Doppler radar), central database and analysis tools, and public and private information distribution networks.

3.2 Systems Inventory

Using existing documentation, ITS systems in the Region — both existing and planned — were identified. The inventory is presented in tabular format by agency. The information presented here provides traceability from the systems projects initially entered into the Architecture. Because the Architecture is a "living" document, this section will need to be updated as time passes. Projects are grouped into three categories: *Existing*, *Planned 1*, and *Planned 2*. As noted previously, *Planned 1* projects refer to efforts that are currently programmed or funded, whereas *Planned 2* projects are neither funded nor programmed.

Table 3-1: Regional Systems Inventory

Element	Stakeholder	Functionality	Status	Associated Project (s)
911 Communication Centers	Counties	Supports emergency call-taker functions by collecting appropriate information about the caller and the incident location and type	Existing	• County 911 Communication Centers • Integrated Emergency Operations Center, Cambria County • Incident Response Program • Amber Alert Coordination • County 911 -- GIS
		Receives information from OnStar system	Existing	
		Maintains resource lists for an array of equipment including police, fire, EMS and utility notifications	Existing	
		Dispatches all public safety vehicles (EMS, fire, police) through radio	Existing	
		Coordinates amber alert information and response	Existing	
		Notifies towing and wrecking services per request of incident commander for clearing of incidents	Existing	
		Provides tracking of emergency unit	Existing	
		Coordinates with PennDOT D9 County Maintenance Offices during incidents/emergencies	Existing	

Element	Stakeholder	Functionality	Status	Associated Project (s)
		Reports incidents to PennDOT and PEMA (through PIERS)	Existing	
		Provides voice and data interoperability between emergency operations center and on-scene incident commander in an effort to promote greater coordination and management of incident	Existing	
		Uses a GIS to map calls. The GIS provides automatic location of cellular and wire line calls	Existing/Planned 1	
		Provides road closure/reduction information to the media	Existing	
		Provides emergency information to the media for public information dissemination	Existing	
		Controls the CCTV and DMS devices	Planned 2	
		Archives call data for 3 years and archives audio files for 30 days. Archived data can be retrieved and sent to other agencies	Existing	
Adjacent PennDOT Districts and County Offices	Pennsylvania Department of Transportation (PennDOT)	Coordinates with D9 TMC during incidents, construction and maintenance activities, work plan and work zone coordination	Existing	• External Stakeholders

Element	Stakeholder	Functionality	Status	Associated Project (s)
Attractions and Event Promoters	Event promoters	Coordinates with PennDOT and PSP to manage traffic in case of major events	Existing	• Events Monitoring
Blair County 911 Communication Center	Counties	Includes all the functionalities of the 911 communication centers	Existing	
		Supports control of DMS devices. If any message is changed, Blair County 911 center faxes the information to PennDOT D9 TMC to keep track of the purpose of the usage of the signs	Existing	
		Supports back-up control of PennDOT's CCTV	Existing	
Commercial Vehicle Company Offices	Commercial Vehicle Companies	Provides the PennDOT Motor Carrier Division with appropriate credentials, registration, and title fees	Existing	• Private Carrier Commercial Vehicle Tracking System • Private Carrier Fleet Maintenance Management • FHWA Carrier Compliance Review
		Provides vehicle tracking of Commercial Vehicles	Existing	
		Provides capabilities to track cargo and freight	Existing	
		Provides capabilities to generate preventative maintenance schedule based on the vehicle miles traveled determined using vehicle tracking	Existing	

Element	Stakeholder	Functionality	Status	Associated Project (s)
		Provides appropriate transportation and emergency agencies with hazmat and emergency information	Existing	• Commercial Vehicle Tracking System
Commercial Vehicles	Commercial Vehicle Companies	Monitors adherence to the PennDOT Motor Carrier Division weight enforcement activities	Existing	• Private Carrier Commercial Vehicle Tracking System • Private Carrier Fleet Maintenance Management • FHWA Carrier Compliance Review
		Supports communication devices to communicate with Commercial Vehicle Company Offices. May include the addition of a cell-based radio and equipment	Existing	
		Offers the capability for Commercial Vehicle Offices to track vehicles with automatic vehicle location (AVL) systems and to monitor the movement of cargo and freight	Existing	
County EMA Centers	Counties	Provides response in case of hazmat clearance, evacuation activity, threat to large population, and large weather event	Existing	• County EMA Centers • Amber Alert Coordination
		Maintains an emergency operations center that can be activated to coordinate incident actions	Existing	
		Maintains resource lists for various disciplines	Existing	

Element	Stakeholder	Functionality	Status	Associated Project (s)
		Coordinates with PEMA and other emergency agencies	Existing	
		Coordinates and sponsor training to all public service agencies in HAZMAT operations and incident command	Existing	
County/Regional Planning Organizations	Counties	Obtains computerized Automated Traffic Recorder (ATR) data from municipalities and PennDOT Central Office	Existing	• County Planning Departments • Congestion Management System Studies • County 911—GIS • Events Monitoring • Cambria County Planning Commission • Congestion Management System Study • Hazard Mitigation Study
		Obtains GIS layers from PennDOT Central Office	Existing	
		Utilizes the PennDOT crash database for long range planning	Existing	
		Utilizes the PennDOT video log for land development studies	Existing	
		Requests transit route and traffic signal maps for planning studies	Existing	
		Requests toll collection data from the PTC for planning purposes	Existing	
		Requests emissions data from the Department of Environmental Protection (DEP)	Existing	

Element	Stakeholder	Functionality	Status	Associated Project (s)
		Shares GIS data with County EMA and County 911 Communication Centers	Existing	
		Conducts hazard mitigation and congestion management system studies	Existing	
High Threat Facilities	High Threat Facilities	Includes major facilities that require special security and/or emergency response coordination	Existing	
		Reports high threat facility information to 911 Communication and EMA Centers	Existing	
Incident Response Agency Offices	Spill Centers	Notifies PEMA in case of major spills	Existing	• Incident Response Program
		Coordinates (DEP) with PEMA in case of HAZMAT event	Existing	
		Coordinates (Department of Agriculture) with PEMA in case of incidents involving food products	Existing	
MDSHA Offices	Maryland State Highway Administration (MDSHA)	Coordinates with PTC and PennDOT in case of incidents	Existing	

Element	**Stakeholder**	**Functionality**	**Status**	**Associated Project (s)**
MDSP Offices	Maryland Department of State Police (MDSP)	Coordinates incident and emergency information with PSP	Existing	
MEMA Emergency Operation Center	Maryland Emergency Management Agency (MEMA)	Coordinates with PEMA in case of major disasters	Existing	
Municipality Field Devices	Municipalities	Includes traffic signal systems	Existing	• Traffic Signal Systems
Municipal Traffic Management Offices	Municipalities	Monitors municipality-owned traffic signal systems contact PennDOT for traffic coordination, and detours	Existing	• Traffic Signal Systems
Municipal/Regional Public Safety Offices	Municipalities	Coordinates with PennDOT District offices during events	Existing	
Municipal Public/Regional Safety Vehicles	Municipalities	Provides direct interface between public safety vehicles and incident management personnel	Existing	• Public Safety Services
Passenger Vehicles	General Public	Provides the capability for vehicle operators to pay toll without stopping	Existing	• Pennsylvania Turnpike E-Z Pass Toll System
PEMA Emergency Operation Center	Pennsylvania Emergency	Notifies appropriate transportation and emergency agencies of any major disasters	Existing	• PEMA Emergency Operation

Element	Stakeholder	Functionality	Status	Associated Project (s)
	Management Agency (PEMA)	Coordinates with cooperating agencies in case of major disasters	Existing	Center • PEMA Truck • Pennsylvania Emergency Information Reporting System (PEIRS)
		Runs a statewide electronic database, Pennsylvania Emergency Information Reporting System (PEIRS) that collects information from all state agencies responding to incidents/emergencies statewide	Existing	
		Gathers/provides specific incident information from/to County Emus, Pennsylvania State Police, PennDOT, and PTC	Existing	
		Gathers current and forecast road conditions and surface weather information from a variety of sources to monitor major natural disasters	Existing	
		Disseminates disaster information to the public	Existing	
		Monitors alerting and advisory systems reported by other emergency agencies	Existing	
		Develops and stores emergency evacuation plans	Existing	
		Serves as one-point contact for all the coordinating agencies during emergencies	Existing	

Element	Stakeholder	Functionality	Status	Associated Project (s)
		Provides incident command in case of a major event	Existing	
		Contacts on-site field officers through the County EMA agencies.	Existing	
		Plans to control PTC DMS during emergencies	Planned 2	
PennDOT Central Office Field Devices	Pennsylvania Department of Transportation (PennDOT)	Monitors roadway weather conditions and provides RWIS data to PennDOT Central Office and County Maintenance Offices	Existing	• Roadway Weather Information System (RWIS) • PennDOT Commercial Vehicle Information Systems and Networks (CVISN) Project
		Collects Commercial Vehicle safety inspection and violations data	Existing	
PennDOT Central Office Organizations	Pennsylvania Department of Transportation (PennDOT)	PennDOT BHSTE coordinates with PEMA and other agencies (PennDOT Districts, PSP, County EMA's, Transit agencies, etc.) in case of major incidents	Existing	• PennDOT Transportation Management Centers (TMC's) • Winter Road Condition Hotline for Interstate Highways • Roadway Weather Information System (RWIS) • PennDOT Commercial Vehicle Information Systems and Networks (CVISN) Project • PennDOT Performance and
		The PennDOT Central Office Press Office communicates traffic-related information to Regional Media Outlets	Existing	
		PennDOT (Motor Carrier Division) maintains commercial vehicle registrations	Existing	

Element	Stakeholder	Functionality	Status	Associated Project (s)
		CVO Supports the exchange of safety credential information across the jurisdictions	Existing	Registration Information Systems Management (PRISM) • PennDOT Safety and Fitness Electronic Record (SAFER) • PennDOT ITS Transportation Management Approach • Construction Projects (current and future) • Central Repository • Real -time Traffic Information Website • Statewide GIS based Incident Detour Map • Video Sharing • Web site Portal for Assisting Commercial Vehicle Operators • Statewide Telecommunication
		CVO Supports the collection and review of carrier safety data and determines the carrier safety rating	Planned 1	
		PennDOT Motor Carrier Division conducts roadside commercial vehicle inspections	Existing	
		PennDOT Motor Carrier Division provides appropriate credentials to motor carriers and collects necessary registration and title fees	Existing	
		PennDOT Motor Carrier Division conducts weight enforcement activities	Existing	
		PennDOT Bureau of Planning and Research owns and maintains Automatic Traffic Recorders throughout the state	Existing	
		RWIS data flows from the RWIS site to Central Office (BOMO) to a public website	Existing	
		RWIS monitor roadway weather conditions and transfer information to PennDOT BOMO	Existing	

Element	Stakeholder	Functionality	Status	Associated Project (s)
		Receives environmental conditions information from various weather sources to aid in scheduling routine maintenance activities	Existing	
PennDOT D2 TMC	Pennsylvania Department of Transportation (PennDOT)	Provides proactive incident/congestion management	Planned 2	• PennDOT Transportation Management Centers (TMC's)
		Assumes control of cross-District TMC's during off-peak periods	Planned 2	
		Provides traveler information/advisories using field devices such as HAR and DMS	Planned 2	
		Monitors the roadway conditions and status using detectors	Planned 2	
		Supports Advanced Traveler Information System (ATIS)	Planned 2	
PennDOT D8 TMC	Pennsylvania Department of Transportation (PennDOT)	Provides proactive incident/congestion management	Planned 2	• PennDOT Transportation Management Centers (TMC's)
		Assumes control of cross-District TMC's during off-peak periods	Planned 2	
		Provides traveler information/advisories using field devices such as HAR and DMS	Planned 2	

Element	Stakeholder	Functionality	Status	Associated Project (s)
		Monitors the roadway conditions and status using detectors	Planned 2	
		Supports Advanced Traveler Information System (ATIS)	Planned 2	
PennDOT D9 County Maintenance Offices	Pennsylvania Department of Transportation (PennDOT)	Collects and stores maintenance information	Existing	• PennDOT D9 Maintenance Program
		Collects current road and weather conditions using data collected from environmental sensors deployed on and about the roadway	Existing	
		Receives environmental conditions information from various weather sources to aid scheduling routine maintenance activities	Existing	
		Recommends winter maintenance courses of action based on current and forecast environmental and road conditions	Existing	
		Provides overall management and support for routine maintenance on a roadway system or right-of-way	Existing	
		Supports coordinated response to highway incidents	Existing	

Element	Stakeholder	Functionality	Status	Associated Project (s)
		Supports control of DMS during off-peak hours during winter months	Existing	
		Monitors vehicle and equipment condition, track maintenance history, and schedule routine and corrective maintenance	Existing	
		Manages winter maintenance including snow plow operations	Existing	
		Provides construction activity information to other agencies	Existing	
		Provides coordination with other agencies and controls traffic in the work zone	Existing	
		Disseminates construction information through PennDOT website	Existing	
PennDOT D9 Field Devices	PennDOT	Collects traffic and roadway information for transportation planning purposes	Existing	• PennDOT D9 TMC
		Disseminates real-time traveler information through HAR and DMS	Existing	• HAR Systems • Portable DMS Systems • Permanent DMS Systems

Element	Stakeholder	Functionality	Status	Associated Project (s)
		Provides incident detection and verification capabilities	Existing	• PennDOT D9 TMC • CCTV Systems
		Monitors vehicle speeds	Existing and Planned 1	• Freeway Work Zone Management
		Monitors roadway traffic conditions	Existing and Planned 1	• Various DMS and CCTV deployment projects
		Detects vehicle intrusions in the work zone	Planned 2	• Freeway Work Zone Management
		Enforces speed limit using variable speed limit signs	Planned 2	• Freeway Work Zone Management
PennDOT D9 Maintenance and Construction Vehicles	PennDOT	Provides on-board systems that support routine non-winter maintenance on a roadway system	Existing	• PennDOT D9 Maintenance Program
		Provides on-board systems that support routine winter maintenance on a roadway system	Existing	
		Coordinates with PennDOT County Maintenance Offices during an incident	Existing	
PennDOT D9 TMC	PennDOT	Collects traffic surveillance data	Existing	

Element	Stakeholder	Functionality	Status	Associated Project (s)
		Operates ITS subsystems including CCTV, DMS (both permanent and portable), HAR, and RWIS	Existing	• PennDOT D9 TMC • Permanent and Portable DMS Systems • HAR Systems • CCTV Systems • RWIS Systems • Freeway Work Zone Management • Amber Alert Coordination
		Provides freeway management	Existing	
		Provides traffic control strategies to minimize traffic impacts in the work zone	Existing Planned 1	
		Operates coordinated traffic signal systems	Existing	
		Provides capabilities to detect and verify incidents	Existing	
		Collects special event information	Existing	
		Provides detour planning	Existing	
		Provides the capability to disseminate traffic and road conditions information to travelers using HAR and DMS	Existing	
		Provides interface for information dissemination to public	Existing	

Element	Stakeholder	Functionality	Status	Associated Project (s)
		Provides monitoring and remote diagnostics of field equipment to detect field equipment failures, issues problem reports, and tracks the repair or replacement of the failed equipment	Planned 2	
PennDOT STMC	Pennsylvania Department of Transportation (PennDOT)	Could potentially serve as back-up operations management to PennDOT RTMC's	Planned 2	• PennDOT Transportation Management Centers (TMC's) • Winter Road Condition Hotline for Interstate Highways • Roadway Weather Information System (RWIS) • PennDOT Commercial Vehicle Information Systems and Networks (CVISN) Project • PennDOT Performance and Registration Information Systems Management (PRISM) • PennDOT Safety and Fitness Electronic Record (SAFER) • PennDOT ITS Transportation Management Approach • Construction Projects (current and future) • Central Repository • Real -time Traffic Information
		May support ATIS systems	Planned 2	
		May coordinate statewide operations (among districts and other states) and other state agencies (PSP, PTC, PEMA)	Planned 2	
		May perform political and public relations on behalf of PennDOT	Planned 2	
		May coordinate weather events throughout PennDOT	Planned 2	
		May coordinate incident, emergency, and inter/intra-state events	Planned 2	
		May act as central data repository	Planned 2	
		May coordinate amber alert for PennDOT	Planned 2	

Element	Stakeholder	Functionality	Status	Associated Project (s)
		May be responsible for maintaining commercial vehicle registrations and credentials	Planned 2	Website • Statewide GIS based Incident Detour Map • Video Sharing • Web site Portal for Assisting Commercial Vehicle Operators • Statewide Telecommunication
		May be responsible for maintaining the state's Motor Carrier Safety Assistance Program (MCSAP) files	Planned 2	
		May be responsible for conducting roadside inspections	Planned 2	
		May be responsible for conducting weight enforcement activities	Planned 2	
PennDOT Welcome Centers and Rest Areas	PennDOT	Act as a travel guide to provide information on the surrounding area including the attractions, boarding and lodging, and events happening in the area	Existing	• Welcome Centers and Rest Areas
Pennsylvania Office of Homeland Security	Pennsylvania Office of Homeland Security	Coordinates homeland security activities within the Commonwealth, both with municipal and county officials and with the federal Department of Homeland Security	Existing	
Personal Traveler Information Devices	General Public	Provide capability to access traffic information from personal devices, including pager, cell phone, and computer	Planned 1	• PTC TOC • PennDOT D9 TMC

Element	**Stakeholder**	**Functionality**	**Status**	**Associated Project (s)**
PSP Offices	Pennsylvania State Police (PSP)	Provides capability to access traffic information from personal devices including pager, cell phone, computer etc.	Existing	• Pennsylvania State Police Dispatch Centers • Incident Information Management System (IIMS) • Pennsylvania State Police Consolidated Dispatch Center • 800 MHz Statewide Communication System • AMBER Alert Coordination
		Receives roadway incident notification from the County 911 Centers, PennDOT Offices, and PTC Office	Existing	
		Plans to receive CCTV images from PTC. PTC intends to share CCTV images with PennDOT, PEMA, and other incident management agencies	Planned 1	
		Receives work zone coverage plans and requests for troopers to cover work zones from PennDOT District Offices	Existing	
		Receives forwarded 911 calls from County 911 Communication Centers	Existing	
		Coordinates with other agencies through PennDOT provided radio communication	Existing	
		Coordinates with in case of major incidents	Existing	
		Provides incident information to other agencies including PEMA, PennDOT, and radio stations	Existing	

Element	**Stakeholder**	**Functionality**	**Status**	**Associated Project (s)**
		The 800 MHz radio is planned for the entire Region. This will create interoperability for all public service vehicles and centers	Planned 1	
		Coordinates with PennDOT County Maintenance Offices or District Offices for requesting salt and performing other maintenance operations	Existing	
PSP Troop T Highspire	Pennsylvania State Police (PSP)	Dispatches PSP Troop T Vehicles for incidents on the Pennsylvania Turnpike	Existing	• Pennsylvania State Police Dispatch Centers • Incident Information Management System (IIMS) • Pennsylvania State Police Consolidated Dispatch Center • 800 MHz Statewide Communication System • AMBER Alert Coordination
		Acts as first-responder at an incident site	Existing	
		Tracks and maintains PSP Troop T vehicles	Existing	
		Provides roadway incident notification to the County and Municipal 911 centers if local jurisdiction services are needed on the scene	Existing	
		Gathers/provides specific incident information from/to other PSP troopers	Existing	
PSP Troop T Vehicles	Pennsylvania State Police (PSP)	PSP Troop T Vehicles are dispatched from PTC Offices and PSP Troop T Dispatch Centers	Existing	• 800 MHz Statewide Communication System • Emergency Vehicle Traffic Signal Preemption • Mobile Data Terminals (MDT's)
		Responds to incident of the Pennsylvania Turnpike	Existing	

Element	**Stakeholder**	**Functionality**	**Status**	**Associated Project (s)**
PSP Vehicles	Pennsylvania State Police (PSP)	Receives incident and dispatch information from PSP Offices	Existing	• 800 MHz Statewide Communication System • Emergency Vehicle Traffic Signal Preemption • Mobile Data Terminals (MDT's)
		Coordinates with PSP Dispatch Center and other emergency management agencies during incidents	Existing	
PTC Field Devices	Pennsylvania Turnpike Commission (PTC)	Collects traffic and roadway information (vehicle counts, etc.) for transportation planning purposes	Existing	• Pennsylvania Turnpike Field Devices • PTC ATIS Integration Project
		Disseminates traffic and roadway conditions to the public using DMS, HAR and other sources	Existing	
		Provides incident detection capabilities. The PTC provides call boxes for incident detection/ verification	Existing	
		Monitors roadway weather conditions using RWIS that measures temp, humidity, wind speed and direction, and rain and snow precipitation.	Existing	
PTC Maintenance and Construction Vehicles	Pennsylvania Turnpike Commission (PTC)	Provides on-board systems that support routine winter maintenance on a roadway system	Existing	
PTC Offices	Pennsylvania Turnpike Commission (PTC)	Provides freeway management including integration of surveillance information for the purpose of information sharing	Existing	• PTC *11 Phone Service • PTC ATIS Integration Project

Element	Stakeholder	Functionality	Status	Associated Project (s)
		Coordinates traffic and emergency operations with agencies throughout the state	Existing	• PTC Traffic Operation Center (TOC) • PTC E-Z Pass Toll Collection System
		Provides support for special event traffic management	Planned 1	
		Monitors alerts and advisory systems reported by other agencies	Existing	
		Plans to share CCTV camera images with PennDOT Districts, PSP, various emergency management agencies, and others	Planned 1	
		Provides 24x7 capabilities to coordinate traffic and incident management with PennDOT staff	Planned 2	
		Provides incident management services including the dispatch of emergency and service vehicles and coordinates with appropriate agencies	Existing	
		Detects and verifies incidents. PTC uses a free cell phone service for incident detection.	Existing	
		Provides dispatch of emergency and service vehicles	Existing	
		Tracks PTC emergency service vehicles	Existing	

Element	Stakeholder	Functionality	Status	Associated Project (s)
		Provides detour routes in case of an incident and shares this information with PennDOT and other transportation agencies	Existing	
		Provides capabilities to be contacted by PennDOT Districts in case of major incidents that may affect traffic on Pennsylvania Turnpike	Existing	
		Shares real-time incident information with other transportation agencies, local and state law enforcement and fire and rescue agencies	Existing	
		Provides traffic and incident information to freeway and arterial management agencies, public transit, and safety agencies	Existing	
		Distributes real-time traffic information to the public through dedicated, automated phone service, web sites, email and cell phone/ automated voice methods	Existing	
		Distributes information regarding freeway travel times and speeds, incident information, special events, work zones, weather and road conditions	Existing and Planned 1	

Element	Stakeholder	Functionality	Status	Associated Project (s)
		Stores processed data using an Archived Database Management system. PTC uses archived data for studying the impact due to work zones, capital planning/ analysis, operation planning/ analysis, safety analysis and traffic control.	Existing	
		PTC collects traffic volume, vehicle classification, road conditions, weather conditions and video surveillance information	Existing	
		PTC collects route designations, current work zones, emergency/ evacuation routes and procedures and incident information from other agencies	Existing	
		Collects toll collection fees and supports electronic toll collection using E-Z Pass	Existing	
		Collects and stores toll information for operational analysis and determining pricing structure	Existing	
		Monitors current and forecasted weather conditions for issuing general travel advisories	Existing	
		Coordinates with PennDOT County Maintenance Offices to reduce the impact of traffic during work zone activities	Existing	

Element	Stakeholder	Functionality	Status	Associated Project (s)
		Provides monitoring and remote diagnostics of field equipment failures, issues problem reports, and tracks the repairs or replacement of the failed equipment	Existing	
PTC Service Plazas	Pennsylvania Turnpike Commission (PTC)	Provides traveler information on the Pennsylvania Turnpike	Planned 1	• PTC Service Plazas
		Provides traveler information, weather information centers, and lodging call centers, using scrolling message boards	Existing and Planned 1	
PTC Toll Plazas	Pennsylvania Turnpike Commission (PTC)	Provides capability to automatically identify the vehicle type using tag reader and automatically perform toll collection	Existing	• PTC E-Z Pass Toll Collection System
		Serves as electronic screening and safety inspection stations for the Pennsylvania Turnpike	Planned 2	
Regional Media Outlets	Regional Media	Gathers incident information from State Police and other incident management agencies	Existing	
Regional Transit Agency Offices	Various Transit Agencies	Collects and stores accurate ridership data for operational analysis and to determine fare structure	Existing	• Transit Dispatch Centers • Maintenance Garages • Automated Vehicle Location (AVL) • Passenger Intermodal Centers
		Collects and stores transit information for operational analysis	Existing	

Element	Stakeholder	Functionality	Status	Associated Project (s)
		Collects and maintains vehicles operational and maintenance data	Existing	• Goods Intermodal Centers
		Collects and archives passenger counts and incident (stalled vehicles) information in real-time	Planned 1	
		Collects route designation information electronically	Existing	
		Archives evacuation routes and procedures	Existing	
		Provides communication between transit operators and the dispatch center	Existing	
		Supports shared ride program operations	Existing	
		Supports the assignment of transit vehicles and operators to enhance the daily operation of transit service considering the transit operators convenience	Existing	
		Supports scheduled coordination with other modes of transportation	Existing	
		Monitors schedule adherence in real-time	Planned 1	

Element	Stakeholder	Functionality	Status	Associated Project (s)
		Coordinates with County EMA centers during evacuation	Existing	
		Provides manual maintenance functions for the transit property	Existing	
		Provides the capability to collect payment through electronic medium	Planned 1	
		Provides transit links with other Regional Transit agencies	Existing	
		Supports on-board security devices (silent alarms)	Existing	
		Provides public transit information dissemination (non real-time through telephone, kiosks, email/PC etc)	Existing/Planned 1	
		Develops, prints, and disseminates transit schedules (non-real-time)	Existing	
		Provides transit status information to public through regional website	Planned 1	
		Supports tracking of transit vehicles in real-time (using AVL)	Existing	

Element	Stakeholder	Functionality	Status	Associated Project (s)
		Shares transit transfer clusters where transfer to other modes of transportation can be made conveniently	Existing	
Regional Transit Remote Traveler Support	Regional Transit Agencies	Provides information dissemination through phone, kiosks, email/PC, in-vehicles navigation system, facsimile, cell phone, audible enunciators	Existing	• Regional Transit Agencies • Trip Planning Websites
Regional Transit Vehicles	Regional Transit Agencies	Provides capabilities to communicate with the Regional Transit Agency Offices	Existing	• Transit Dispatch Center • Automated Vehicle Location (AVL)
		Provides real-time schedule adherence information to the dispatch for schedule management	Planned 1	
		Collects and transmits accurate ridership data for operational analysis and to determine fare structure	Existing	
		Provides communication between transit operators and the dispatch centers	Existing	
Towing Industry Responders	Towing Industry	Assists with cleanup of accident sites	Existing	
		Responds to requests from the PSP and 911 Centers	Existing	

Element	Stakeholder	Functionality	Status	Associated Project (s)
TRANSCOM Center	TRANSCOM	Collects incident information and makes it available for member agencies	Existing	• Regional Transportation Management
Weather Information Providers	Weather Information Providers	Provides web-based (free) and weather service provider (subscription) information	Existing	

3.3 Needs

Sections 3.3 and 3.4 examine each element defined in Section 3.2 in terms of *needs* (what each element — i.e., agency stakeholder — needs from others) and *services* (what each element can provide to others). This information is used to program *Turbo Architecture*, the National ITS Architecture software. "Needs" refer to the information inputs from one agency operation to another; they are presented in tabular format and trace back to the systems inventory.

Table 3-2: Regional Needs Table

Element	Need (operation/data inputs from others)	Status	Origin Element
911 Communication Centers	Incident information	Existing	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices, PTC Offices, County EMA Centers, PSP Offices, Municipal/Regional Public Safety Offices
		Planned 2	TRANSCOM Center
	Incident response coordination	Existing	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices, PTC Offices, PEMA Emergency Operation Center, County EMA Centers, PSP Offices, Incident Response Agency Offices, Municipal/Regional Public Safety Offices
	Traffic control coordination	Existing	PennDOT D9 TMC
	Road network conditions	Existing	PennDOT D9 TMC, PTC Offices
	Control CCTV and DMS devices control	Planned 2	PennDOT D9 TMC
	Maintenance and construction resource coordination	Existing	PennDOT D9 County Maintenance Offices, PTC Offices
	Work zone information	Existing	PennDOT D9 County Maintenance Offices, PTC Offices,
	Roadway maintenance status	Existing	PennDOT D9 County Maintenance Offices
	Roadway weather information	Existing	PennDOT D9 County Maintenance Offices
	Current asset restrictions	Existing	PennDOT D9 County Maintenance Offices
	PIERS incident data	Existing	PEMA Emergency Operation Center

Element	**Need (operation/data inputs from others)**	**Status**	**Origin Element**
	Transit incident information	Existing	Regional Transit Agency Offices
	Transit emergency response coordination	Existing	Regional Transit Agency Offices
	Emergency dispatch coordination	Existing	Towing Industry Responders
	Weather Information	Existing	Weather Information Providers
	Threat information coordination	Existing	High Threat Facilities
Adjacent PennDOT District and County Offices	Work zone information	Existing	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices
	Work plan coordination	Existing	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices
	Maintenance and construction resource coordination	Existing	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices
	Incident response coordination	Existing	PennDOT D9 TMC
	Traffic information coordination	Existing	PennDOT D9 TMC
	DMS control coordination	Planned 2	PennDOT D9 TMC
	Roadway maintenance status	Existing	PennDOT D9 County Maintenance Office
Attractions and Event Promoters	Coordination during events	Planned 2	PennDOT D9 TMC, PTC Offices, PSP Offices, Regional Transit Agency Offices, Municipal Traffic Management Offices
	Maintenance and construction work plans	Planned 2	PennDOT D9 TMC, PTC Offices
	Additional toll plazas	Planned 2	PTC Offices

Element	**Need (operation/data inputs from others)**	**Status**	**Origin Element**
	DMS control	Existing	PennDOT D9 Field Devices
Blair County 911 Communication Center	Incident information	Existing	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices, PTC Offices, County EMA Centers, PSP Offices, Municipal/Regional Public Safety Offices
		Planned 2	TRANSCOM Center
	Incident response coordination	Existing	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices, PTC Offices, PEMA Emergency Operation Center, County EMA Centers, PSP Offices, Incident Response Agency Offices, Municipal/Regional Public Safety Offices
	Traffic control coordination	Existing	PennDOT D9 TMC
	Control CCTV and DMS devices	Existing	PennDOT D9 TMC
	Road network conditions	Existing	PennDOT D9 TMC, PTC Offices
	Maintenance and construction resource coordination	Existing	PennDOT D9 County Maintenance Offices, PTC Offices
	Work zone information	Existing	PennDOT D9 County Maintenance Offices, PTC Offices,
	Roadway maintenance status	Existing	PennDOT D9 County Maintenance Offices
	Roadway weather information	Existing	PennDOT D9 County Maintenance Offices
	Current asset restrictions	Existing	PennDOT D9 County Maintenance Offices
	PIERS incident data	Existing	PEMA Emergency Operation Center

Element	Need (operation/data inputs from others)	Status	Origin Element
	Transit incident information	Existing	Regional Transit Agency Offices
	Transit emergency response coordination	Existing	Regional Transit Agency Offices
	Emergency dispatch coordination	Existing	Towing Industry Responders
	Weather Information	Existing	Weather Information Providers
	Threat information coordination	Existing	High Threat Facilities
Commercial Vehicle Company Offices	Road network conditions	Existing	PTC Offices
	Credential status verification	Existing	PTC Offices, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
	Trip log	Existing	Commercial Vehicles
	On-board vehicle and safety data	Existing	Commercial Vehicles
	Driver update	Existing	Commercial Vehicles
	Compliance review report	Planned 2	PennDOT STMC
	Safety inspection report	Planned 2	PennDOT STMC
	Tax filing and citation	Planned 2	PennDOT STMC
Commercial Vehicles	Communication with the company offices	Existing	Commercial Vehicle Company Offices
	Safety inspection (electronic)	Planned 2	PTC Toll Plazas, PennDOT Central Office Field Devices
	Electronic toll collection	Existing	PTC Toll Plazas

Element	Need (operation/data inputs from others)	Status	Origin Element
	Toll collection using single transponder throughout the region	Planned 2	PTC Toll Plazas
County EMA Centers	Incident information	Existing	911 Communication Centers, Blair Count 911 Communication Center, Blair Count 911 Communication Center, PennDOT D9 TMC, PennDOT D9 County Maintenance Offices, PTC Offices, PSP Offices, Municipal/Regional Public Safety Offices
		Planned 2	TRANSCOM Center
	Incident response coordination	Existing	911 Communication Centers, Blair Count 911 Communication Center, Blair Count 911 Communication Center, PennDOT D9 TMC, PTC Offices, PEMA Emergency Operation Center, PSP Offices, Incident Response Agency Offices, Municipal/Regional Public Safety Offices
	Maintenance and construction response coordination	Existing	PennDOT D9 County Maintenance Offices, PTC Offices
	Work zone information	Existing	PennDOT D9 County Maintenance Offices
	Road network conditions	Existing	PTC Offices
	Transit incident information	Existing	Regional Transit Agency Offices
	Transit emergency response coordination	Existing	Regional Transit Agency Offices
	Weather information	Existing	Weather information providers
	Threat information coordination	Existing	High Threat Facilities
County/Regional	Archived road/lane/bridge closure information	Existing	PennDOT D9 TMC, PTC Offices

Element	Need (operation/data inputs from others)	Status	Origin Element
Planning Organizations	Construction project's schedule	Existing	PennDOT D9 TMC, PTC Offices
	Archived data coordination	Existing	PennDOT D9 TMC, PTC Offices, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
	Transit archived data	Existing	Regional Transit Agency Offices
High Threat Facilities	Threat information coordination	Existing	911 Communication Centers, Blair Count 911 Communication Center, County EMA Centers
Incident Response Agency Offices	Incident response coordination	Existing	911 Communication Centers, Blair Count 911 Communication Center, County EMA Centers, PTC Offices, PEMA Emergency Operation Center
MDSHA Offices	Incident response coordination	Planned 2	PennDOT D9 TMC, PennDOT STMC
	Traffic Information Coordination	Planned 2	PennDOT D9 TMC, PennDOT STMC
	Work zone information	Existing	PennDOT D9 County Maintenance Offices
		Planned 2	PennDOT STMC
	Work plan coordination	Existing	PennDOT D9 County Maintenance Offices
	Maintenance and construction resource coordination	Existing	PennDOT D9 County Maintenance Offices
		Planned 2	PennDOT STMC
MDSP Offices	Incident response coordination	Existing	PSP Offices
	Threat information coordination	Existing	PSP Offices

Element	Need (operation/data inputs from others)	Status	Origin Element
MEMA Emergency Operation Center	Incident response coordination	Existing	PEMA Emergency Management Center
Municipal Field Devices	Traffic signal control	Existing	Municipal Traffic Management Offices
		Planned 2	PennDOT D9 TMC
	DMS control	Planned 1	Municipal Traffic Management Offices
	Video surveillance control	Planned 2	Municipal Traffic Management Offices
Municipal/Regional Public Safety Offices	Incident information	Existing	911 Communication Centers, Blair Count 911 Communication Center, County EMA Centers
	Incident response coordination	Existing	911 Communication Centers, Blair Count 911 Communication Center, County EMA Centers
	Emergency dispatch coordination	Existing	Municipal/Regional Public Safety Vehicles
	Incident command coordination	Existing	Municipal/Regional Public Safety Vehicles
Municipal/Regional Public Safety Vehicles	Emergency dispatch coordination	Existing	Municipal/Regional Public Safety Offices
	Incident command coordination	Existing	Municipal/Regional Public Safety Offices
Municipal Traffic Management Offices	Traffic archived data	Existing	County/Regional Planning Organizations
	Coordination during events	Existing	Attractions and Event Promoters
	Traffic information coordination	Existing	PennDOT D9 TMC, PTC Offices
	Incident information	Existing	PennDOT D9 TMC, PTC Offices

Element	**Need (operation/data inputs from others)**	**Status**	**Origin Element**
	CCTV images	Planned 2	PennDOT D9 TMC
	Weather information	Existing	Weather Information Providers
	Current asset restrictions	Existing	PennDOT D9 TMC, PTC Offices
Passenger Vehicles	Electronic toll collection	Existing	PTC Toll Plazas
PEMA Emergency Operation Center	Incident response coordination	Existing	911 Communication Centers, Blair Count 911 Communication Center, County EMA Centers, Incident Response Agency Offices, MEMA Emergency Operation Center, PTC Offices, PEMA Emergency Operation Center
		Planned 2	PennDOT STMC
	PIERS incident data	Existing	911 Communication Centers, Blair Count 911 Communication Center
	HAZMAT information	Planned 2	Commercial Vehicle Company Offices
	Incident information	Existing	PTC Offices, TRANSCOM Center
	Road network conditions	Existing	PTC Offices
		Planned 2	PennDOT STMC
	Remote CCTV control	Existing	PennDOT D9 TMC
		Planned 2	PTC Offices
	Traffic images	Planned 2	PennDOT D9 Field Devices
	DMS Control	Existing	PennDOT D9 Field Devices

Element	Need (operation/data inputs from others)	Status	Origin Element
	Threat information coordination	Existing	Pennsylvania Office of Homeland Security
PennDOT Central Office Field Devices	RWIS device control	Existing	PennDOT Central Office
		Planned 2	PennDOT STMC
	Safety inspection and electronic screening information	Planned 2	Commercial Vehicles, PennDOT STMC
PennDOT Central Office Organizations	PennDOT Bureau of Planning and Research collects archived data	Existing	Regional Transit Agencies, PennDOT D9 TMC, PTC Offices
		Planned 2	PennDOT STMC
	Incident/emergency response coordination and information	Existing	PEMA Emergency Operation Center, PennDOT D9 TMC, PSP Offices, PTC Offices, MDSHA Offices, TRANSCOM Center
		Planned 2	PennDOT STMC
	Work plan coordination	Existing	PennDOT D9 TMC
		Planned 2	PennDOT STMC
	Maintenance and construction coordination	Existing	PennDOT D9 TMC, MDSHA Offices
	Traffic information and roadway conditions	Existing	PennDOT D9 TMC, MDSHA Offices
		Planned 2	PennDOT STMC
	Weather information	Planned 2	PennDOT STMC
	Request for traffic and emergency information for the media	Existing	Regional Media Outlets
	PennDOT Motor Carrier Division conducts weight enforcement	Existing	PSP Offices

Element	Need (operation/data inputs from others)	Status	Origin Element
	activities	Planned 2	PennDOT STMC
	PennDOT (Motor Carrier Division) maintains commercial vehicle registrations	Existing	Commercial Vehicle Company Offices
		Planned 2	PennDOT STMC
	Tax credentials, audits information, and ax-related enforcement activities (Motor Carrier Division)	Existing	Commercial Vehicle Company Offices
		Planned 2	PennDOT STMC
	RWIS information (BOMO)	Existing	PennDOT Central Office Field Devices
	Request for traffic and emergency information for the media	Existing	Regional Media Outlets
	PennDOT Motor Carrier Division conducts weight enforcement activities	Existing	PSP Offices
		Planned 2	PennDOT STMC
	PennDOT (Motor Carrier Division) maintains commercial vehicle registrations	Existing	Commercial Vehicle Company Offices
		Planned 2	PennDOT STMC
	Tax credentials, audits information, and ax-related enforcement activities (Motor Carrier Division)	Existing	Commercial Vehicle Company Offices
	Incident response coordination	Planned 2	PennDOT STMC
	RWIS information (BOMO)	Existing	PennDOT Central Office Field Devices
PennDOT D2 TMC	Traffic information	Planned 2	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices, PennDOT STMC
	Incident information	Planned 2	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices, PennDOT STMC

Element	Need (operation/data inputs from others)	Status	Origin Element
	Road closures	Planned 2	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices, PennDOT STMC
	Road weather information	Planned 2	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices, PennDOT STMC
	Road conditions	Planned 2	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices, PennDOT STMC
	Maintenance and construction information	Planned 2	PennDOT D9 County Maintenance Offices, PennDOT STMC
	Work zone information	Planned 2	PennDOT D9 County Maintenance Offices, PennDOT STMC
	CCTV images	Planned 2	PennDOT D9 Field Devices
	DMS status	Planned 2	PennDOT D9 Field Devices
PennDOT D8 TMC	Traffic information	Planned 2	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices, PennDOT STMC
	Incident information	Planned 2	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices, PennDOT STMC
	Road closures	Planned 2	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices, PennDOT STMC
	Road weather information	Planned 2	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices, PennDOT STMC
	Road conditions	Planned 2	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices, PennDOT STMC
	Maintenance and construction information	Planned 2	PennDOT D9 County Maintenance Offices, PennDOT STMC

Element	Need (operation/data inputs from others)	Status	Origin Element
	Work zone information	Planned 2	PennDOT D9 County Maintenance Offices, PennDOT STMC
	CCTV images	Planned 2	PennDOT D9 Field Devices
	DMS status	Planned 2	PennDOT D9 Field Devices
PennDOT D9 County Maintenance Offices	Incident Information	Existing	911 Communication Centers, Blair Count 911 Communication Center, County EMA Centers, Municipal Traffic Management Offices, PennDOT D9 TMC, PSP Offices
		Planned 1	PennDOT D9 RTMC, PennDOT STMC
	Maintenance and construction resource coordination	Existing	911 Communication Centers, Blair Count 911 Communication Center, PSP Dispatch Centers
	Weather information	Existing	Weather Information Providers
	Road weather information	Existing	PennDOT Central Office, Adjacent PennDOT Districts, PTC Offices
PennDOT D9 Field Devices	DMS control	Planned 1	Municipal Traffic Management Offices
		Existing	Attractions and Event Promoters
	Field device maintenance	Existing	PennDOT D9 County Maintenance Offices
	Field device control	Existing	PennDOT D9 TMC, PEMA Emergency Operation Center
PennDOT D9 Maintenance and Construction Vehicles	Dispatch coordination	Existing	PennDOT D9 County Maintenance Offices

Element	Need (operation/data inputs from others)	Status	Origin Element
PennDOT D9 TMC	Incident information	Existing	911 Communication Centers, Blair Count 911 Communication Center, County EMA Centers, PennDOT D9 County Maintenance Offices, PTC Offices, PSP Offices, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC, TRANSCOM Center
	Incident response coordination	Existing	911 Communication Centers, Blair Count 911 Communication Center, County EMA Centers, Adjacent PennDOT District and County Offices, MDSHA Offices, PTC Offices, PSP Offices, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
	Work zone information	Existing	Adjacent PennDOT District and County Offices, PennDOT D9 County Maintenance Offices, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
	Work plan coordination	Existing	Adjacent PennDOT District and County Offices, PennDOT D9 County Maintenance Offices, PTC Offices, PennDOT Central Office Organizations
		Planned 2	Attractions and Event Promoters

Element	Need (operation/data inputs from others)	Status	Origin Element
	Maintenance and construction resource coordination	Existing	Adjacent PennDOT District and County Offices, PennDOT D9 County Maintenance Offices, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
	Traffic information coordination	Existing	Adjacent PennDOT District and County Offices, Attractions and Event Promoters, MDSHA Offices, Municipal Traffic Management Offices, PTC Offices, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
	DMS control coordination	Existing	Blair County 911 Communication Center
		Planned 2	911 communication Centers, Adjacent PennDOT District and County Offices, Event Promoters
	CCTV control	Existing	Blair County 911 Communication Center
		Planned 2	911 Communications Centers, Municipal Traffic Management Offices
	Archived data coordination	Existing	County/Regional Planning Organizations, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
	Events information	Existing	Attractions and Event Promoters
	Current asset restrictions	Existing	PennDOT D9 County Maintenance Offices

Element	Need (operation/data inputs from others)	Status	Origin Element
	Road weather information	Existing	PennDOT Central Office Organizations
		Planned 2	PennDOT D9 County Maintenance Offices, PennDOT STMC
	Roadway maintenance status	Planned 2	PennDOT D9 County Maintenance Offices
	Field device (DMS, HAR, CCTV) control	Existing	PennDOT D9 Field Devices
	Road network conditions	Existing	PTC Offices, PSP Offices, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
	Road network probe information	Planned 2	Regional Transit Agency Offices
Pennsylvania Office of Homeland Security	Threat information coordination	Existing	PEMA Emergency Operation Center
PennDOT STMC	Incident/emergency information and coordination	Planned 2	PEMA Emergency Operation Center, PennDOT Central Office Organizations, PennDOT D9 TMC, PTC Offices, MDSHA Offices, TRANSCOM Center
	Traffic control coordination	Planned 2	PennDOT D9 TMC, MDSHA Offices
	Traffic conditions and information	Planned 2	PEMA Emergency Operation Center, PennDOT Central Office Organizations, PennDOT D9 TMC, MDSHA Offices, PTC Offices
	Archived data	Planned 2	PennDOT Central Office Organizations, PennDOT D9 TMC

Element	Need (operation/data inputs from others)	Status	Origin Element
	Weather information	Planned 2	PennDOT Central Office Organizations PennDOT D9 TMC, PennDOT Central Office Field Devices
	Work zone information	Planned 2	PennDOT D9 TMC, MDSHA Offices
	Special event information	Planned 2	Attractions and Event Promoters
	Maintenance and Construction information including snow removal	Planned 2	PennDOT Central Office Organizations
	Vehicle registrations	Planned 2	PennDOT Central Office Organizations, Commercial Vehicle Company Offices
	Credentialing information	Planned 2	PennDOT Central Office Organizations, PennDOT Central Office Field Devices, Commercial Vehicle Company Offices
	Hazmat information	Planned 2	Commercial Vehicle Company Offices
PennDOT Welcome Centers and Rest Areas	Traveler information	Existing	PennDOT D9 TMC
Personal Traveler Information Devices	Traveler information	Existing	Regional Transit Agency Offices
	Trip plan	Planned 2	Regional Transit Agency Offices
	Customized personal transit information	Planned 2	Regional Transit Agency Offices

Element	Need (operation/data inputs from others)	Status	Origin Element
PSP Offices	Incident and emergency information and coordination	Existing	911 Communication Centers, Blair Count 911 Communication Center, County EMA Centers,, Municipal Public Safety Offices, PennDOT Central Office Organizations, PennDOT D9 TMC, MDSHA Offices, PSP Vehicles, PTC Offices, PSP Troop T Highspire, Towing Industry Responders
		Planned 2	PennDOT STMC
	Credentialing and safety inspection information	Existing	PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
	Maintenance and Construction information	Existing	PennDOT D9 County Maintenance Offices
		Planned 2	PennDOT STMC
	Traffic conditions	Existing	PennDOT D9 TMC
		Planned 2	PennDOT STMC
	Weather information	Existing	PennDOT D9 TMC, Weather Information Providers
		Planned 2	PennDOT STMC
PSP Troop T Highspire	Incident and emergency information and coordination	Existing	PSP Offices, PTC Offices
	Weather information	Existing	PTC Offices
	Traffic information/conditions	Existing	PTC Offices
PSP Troop T Vehicles	Incident and emergency information on the Pennsylvania Turnpike	Existing	PTC Offices, PSP Troop T Highspire

Element	Need (operation/data inputs from others)	Status	Origin Element
	Dispatch to incidents on the Pennsylvania Turnpike	Existing	PTC Offices, PSP Troop T Highspire
PSP Vehicles	Incident and emergency information on state highways	Existing	PSP Offices
	Dispatch to incidents on state highways	Existing	PSP Offices
PTC Field Devices	DMS and HAR messages	Existing	PTC Offices
	CCTV control	Existing	PTC Offices
	Roadway treatment control	Planned 1	PTC Offices
	RWIS control	Planned 1	PTC Offices
PTC Maintenance and Construction Vehicles	Maintenance dispatch information	Existing	PTC Offices
PTC Offices	Incident and emergency information and coordination	Existing	911 Communication Centers, Blair Count 911 Communication Center, County EMA Centers, PEMA Emergency Operation Center, PennDOT Central Office Organizations, PennDOT D9 TMC, PSP Troop T Highspire, TRANSCOM Center, Towing Industry Responders
		Planned 2	PennDOT STMC
	Request for maintenance and construction services	Existing	911 Communication Centers, Blair Count 911 Communication Center, County EMA Centers
	Maintenance and Construction coordination	Existing	PennDOT D9 County Maintenance Offices

Element	Need (operation/data inputs from others)	Status	Origin Element
	Traffic control coordination (control of DMS along the Turnpike)	Planned 2	PEMA Emergency Operation Center, PennDOT D9 TMC, PennDOT STMC
	Traffic information and conditions	Existing	PennDOT D9 TMC, PTC Field Devices, PSP Troop T Highspire
		Planned 2	PennDOT STMC
	Weather conditions	Existing	PennDOT Central Office Organizations, PSP Troop T Highspire, Weather Information Providers
	Work zone and plan information	Existing	PennDOT D9 County Maintenance Offices, PennDOT D9 TMC
		Planned 2	PennDOT STMC
	CVO violation information (overweight vehicles)	Existing	PTC Field Devices
	CCTV images	Existing	PTC Field Devices
	RWIS and roadway treatment data	Planned 1	PTC Field Devices
	CCTV security monitoring information	Planned 2	PTC Field Devices
	Toll information	Existing	PTC Toll Plazas
	Information for the media	Existing	Regional Media Outlets
	Hazmat information	Existing	Commercial Vehicle Company Offices
	Credentialing information	Existing	Commercial Vehicle Company Offices
PTC Service Plazas	Traveler information	Existing	PTC Offices

Element	**Need (operation/data inputs from others)**	**Status**	**Origin Element**
PTC Toll Plazas	E-Z Pass tag reader information	Existing	Passenger Vehicles, Commercial Vehicles
Regional Media Outlets	Incident information	Existing	911 Communication Centers, Blair Count 911 Communication Center, County EMA Centers, PennDOT D9 TMC, PTC Offices, PSP Offices, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
	Traveler information	Existing	PennDOT D9 TMC, PTC Offices
		Planned 2	PennDOT STMC
	Road weather information	Existing	PennDOT D9 County Maintenance Offices
		Planned 2	PennDOT STMC
	Work zone information	Existing	PennDOT D9 County Maintenance Offices, PTC Offices
		Planned 2	PennDOT STMC
	Road network conditions	Existing	PennDOT D9 TMC, PTC Offices
		Planned 2	PennDOT STMC
	Weather information	Existing	Weather Information Providers
	Transit information	Existing	Regional Transit Agency Offices
	Transit incident information	Existing	Regional Transit Agency Offices

Element	Need (operation/data inputs from others)	Status	Origin Element
Regional Transit Agency Offices	Transit emergency response coordination	Existing	911 Communication Centers, Blair Count 911 Communication Center, County EMA Centers
	Coordination during events	Existing	Attractions and Event Promoters
	Incident information	Existing	PennDOT D9 TMC
	Work zone information	Existing	PennDOT D9 County Maintenance Offices
	Current asset restrictions	Existing	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices
	Road network conditions	Planned 2	PennDOT D9 TMC
	Roadway maintenance status	Existing	PennDOT D9 County Maintenance Offices
	Weather information	Existing	Weather Information Providers, PennDOT D9 County Maintenance Offices
	Archived data coordination	Existing	County/Regional Planning Organizations, PennDOT Central Office Organizations
	Security area monitoring data (through camera)	Existing	Regional Transit Remote Traveler Support
	Fare and payment information	Existing	Regional Transit Vehicles
	Emergency notification	Existing	Regional Transit Vehicles
	Transit vehicle location	Existing	Regional Transit Vehicles
	Transit vehicle passenger and use data	Existing	Regional Transit Vehicles
	Transit vehicle schedule performance	Existing	Regional Transit Vehicles

Element	Need (operation/data inputs from others)	Status	Origin Element
Regional Transit Remote Traveler Support	Secured area monitoring support (through camera)	Existing	Regional Transit Agency Offices
Regional Transit Vehicles	Communication with the offices	Existing	Regional Transit Agency Offices
	Fare management information	Existing	Regional Transit Agency Offices
	Schedule information	Existing	Regional Transit Agency Offices
Towing Industry Responders	Incident information	Planned 2	911 Communication Centers, Blair Count 911 Communication Center, PTC Offices, PSP Offices, Blair County 911 Communication Center
	Emergency dispatch coordination	Existing	911 Communication Centers, Blair Count 911 Communication Center, PTC Offices, PSP Offices, Blair County 911 Communication Center
TRANSCOM Center	Incident information	Existing	PTC Offices, PEMA Emergency Operation Center, PennDOT Central Office Organizations
		Planned 2	911 Communication Centers, Blair Count 911 Communication Center, Blair County 911 Communication Center, County EMA Centers, PennDOT D9 TMC, PennDOT STMC
Weather Information Providers	N/A	N/A	N/A

3.4 Services

Sections 3.3 and 3.4 examine each element defined in Section 3.2 in terms of *needs* (what each element — i.e., agency stakeholder — needs from others) and *services* (what each element can provide to others). This information is used to program *Turbo Architecture*, the National ITS Architecture software. “Services” refer to the information outputs from one agency operation to another; they are presented in tabular format and trace back to the systems inventory.

Table 3-3: Regional Services Table

Element	Service (operation/data outputs to others)	Status	Destination Element
911 Communication Centers	Incident information	Existing	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices, PTC Offices, County EMA Centers, PSP Offices, Regional Media Outlets, Municipal/Regional Public Safety O
		Planned 2	TRANSCOM Center, Towing Industry Responders
	Incident response coordination	Existing	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices, PTC Offices, PEMA Emergency Operation Center, County EMA Centers, PSP Offices, Incident Response Agency Offices, Municipal/Regional Public Safety Offices
	Traffic control coordination	Existing	PennDOT D9 TMC
	Road network conditions	Existing	PennDOT D9 TMC
	Maintenance and construction response coordination	Existing	PennDOT D9 County Maintenance Offices, PTC Offices
	PIERS incident data	Existing	PEMA Emergency Operation Center
	Transit emergency response coordination	Existing	Regional Transit Agency Offices
	Emergency dispatch coordination	Existing	Towing Industry Responders
	Threat information coordination	Existing	High Threat Facilities
Adjacent PennDOT District and County	Work zone information	Existing	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices

Element	Service (operation/data outputs to others)	Status	Destination Element
Offices	Work plan coordination	Existing	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices
	Maintenance and construction resource coordination	Existing	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices
	Incident response coordination	Existing	PennDOT D9 TMC
	Traffic information coordination	Existing	PennDOT D9 TMC
	DMS control coordination	Planned 2	PennDOT D9 TMC
	Roadway maintenance status	Existing	PennDOT D9 County Maintenance Offices
	Road weather information	Existing	PennDOT D9 County Maintenance Offices
Attractions and Event Promoters	Event information	Existing	PennDOT D9 TMC, PTC Offices, PSP Offices
	Coordination during events	Existing	PennDOT D9 TMC, PTC Offices, PSP Offices, Regional Transit Agency Offices, Municipal Traffic Management Offices
	DMS control	Planned 2	PennDOT D9 Field Devices
Blair County 911 Communication Centers	Incident information	Existing	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices, PTC Offices, County EMA Centers, PSP Offices, Regional Media Outlets, Municipal/Regional Public Safety O
		Planned 2	TRANSCOM Center, Towing Industry Responders

Element	Service (operation/data outputs to others)	Status	Destination Element
	Incident response coordination	Existing	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices, PTC Offices, PEMA Emergency Operation Center, County EMA Centers, PSP Offices, Incident Response Agency Offices, Municipal/Regional Public Safety Offices
	Traffic control coordination	Existing	PennDOT D9 TMC
	Road network conditions	Existing	PennDOT D9 TMC
	Maintenance and construction response coordination	Existing	PennDOT D9 County Maintenance Offices, PTC Offices
	PIERS incident data	Existing	PEMA Emergency Operation Center
	Transit emergency response coordination	Existing	Regional Transit Agency Offices
	Emergency dispatch coordination	Existing	Towing Industry Responders
	Threat information coordination	Existing	High Threat Facilities
Commercial Vehicle Company Offices	Credential information	Existing	PTC Offices
	Hazmat information	Planned 2	PTC Offices, PEMA Emergency Operation Center, PennDOT STMC
	Fleet to driver update	Existing	Commercial Vehicles
Commercial Vehicles	On-board vehicle and safety data	Existing	Commercial Vehicle Company Offices
	Trip log	Existing	Commercial Vehicle Company Offices
	Driver to fleet update	Existing	Commercial Vehicle Company Offices

Element	Service (operation/data outputs to others)	Status	Destination Element
	Highway watch program	Planned 2	PTC Offices, PSP Offices, 911 Communication Centers, PennDOT D9 TMC
	Electronic toll tag readers	Existing	PTC Toll Plazas
	Safety inspection records	Planned 2	PTC Toll Plazas, PennDOT Central Office Field Devices
County EMA Centers	Incident information	Existing	911 Communication Centers, Blair County 911 Communication Center, PennDOT D9 TMC, PTC Offices, PSP Offices, Regional Media Outlet, Municipal/Regional Public Safety Offices, PennDOT D9 County Maintenance Offices
		Planned 2	TRANSCOM Center
	Incident response coordination	Existing	911 Communication Centers, Blair County 911 Communication Center, PennDOT D9 TMC, PTC Offices, PEMA Emergency Operation Center, PSP Offices, Incident Response Agency Offices, Municipal/Regional Public Safety Offices
	Maintenance and construction response coordination	Existing	PennDOT D9 County Maintenance Offices, PTC Offices
	Transit emergency response coordination	Existing	Regional Transit Agency Offices
	Threat information coordination	Existing	High Threat Facilities
County/Regional Planning Organizations	Archived data coordination	Existing	PennDOT D9 TMC, PTC Offices, Municipal Traffic Management Offices, PennDOT Central Office Organizations

Element	Service (operation/data outputs to others)	Status	Destination Element
		Planned 2	PennDOT STMC
High Threat Facilities	Threat information coordination	Existing	911 Communication Centers, Blair County 911 Communication Center, County EMA Centers
Incident Response Agency Offices	Incident response coordination	Existing	911 Communication Centers, Blair County 911 Communication Center, County EMA Centers, PTC Offices, PEMA Emergency Operation Center
MDSHA Offices	Incident response coordination	Planned 2	PennDOT D9 TMC, PennDOT STMC
	Traffic information coordination	Planned 2	PennDOT D9 TMC, PennDOT STMC
	Work plan coordination	Existing	PennDOT D9 County Maintenance Offices
	Work zone information	Existing	PennDOT D9 County Maintenance Offices
		Planned 2	PennDOT STMC
	Maintenance and construction resource coordination	Existing	PennDOT D9 County Maintenance Offices
		Planned 2	PennDOT STMC
MDSP Offices	Incident response coordination	Existing	PSP Offices
	Threat information coordination	Existing	PSP Offices
MEMA Emergency Operation Center	Incident response coordination	Existing	PEMA Emergency Operation Center
Municipal Field Devices	N/A	N/A	N/A

Element	Service (operation/data outputs to others)	Status	Destination Element
Municipal/Regional Public Safety Offices	Incident information	Existing	911 Communication Centers, Blair County 911 Communication Center, County EMA Centers
	Incident response coordination	Existing	911 Communication Centers, Blair County 911 Communication Center, County EMA Centers
	Emergency dispatch coordination	Existing	Municipal/Regional Public Safety Vehicles
	Incident command coordination	Existing	Municipal/Regional Public Safety Vehicles
Municipal/Regional Public Safety Vehicles	Emergency dispatch coordination	Existing	911 Communication Centers, Blair County 911 Communication Center, Municipal/Regional Public Safety Offices
	Incident command coordination	Existing	Municipal/Regional Public Safety Offices
Municipal Traffic Management Offices	Coordination during events	Existing	Attractions and Event Promoters
	Traffic signal control	Existing	Municipal Field Devices
	DMS signal control	Planned 1	Municipal Field Devices
	Video surveillance control	Planned 2	Municipal Field Devices
	Traffic information coordination	Existing	PennDOT D9 TMC, Municipal Traffic Management Offices
	Incident information	Existing	911 Communication Centers, Blair County 911 Communication Center, PTC Offices

Element	Service (operation/data outputs to others)	Status	Destination Element
Passenger Vehicles	Electronic toll tag readers	Existing	PTC Toll Plazas
PEMA Emergency Operation Center	Incident response coordination	Existing	911 Communication Centers, Blair County 911 Communication Center, County EMA Centers, Incident Response Agency Offices, MEMA Emergency Operation Center, PTC Offices, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
	PIERS Incident data	Existing	911 Communication Centers, Blair County 911 Communication Center,
	Incident information	Existing	PTC Offices, TRANSCOM Center
	Traffic control coordination	Planned 2	PTC Offices
	CCTV control	Planned 2	PTC Offices
	Threat information coordination	Existing	Pennsylvania Office of Homeland Security
	DMS control	Existing	PennDOT D9 Field Devices
PennDOT Central Office Field Devices	RWIS information	Existing	PennDOT Central Office Organizations, PennDOT D9 County Maintenance Offices
		Planned 2	PennDOT STMC
	Safety inspection reports and violation notification	Existing	PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
PennDOT Central	Request for archived data (BPR)	Existing	Regional Transit Offices, PennDOT D9 TMC

Element	Service (operation/data outputs to others)	Status	Destination Element
Office Organizations		Planned 2	PennDOT STMC
	Incident and emergency information and coordination (BHSTE)	Existing	PEMA Emergency Operation Center, PennDOT D9 TMC, PSP Offices, TRANSCOM Center
		Planned 2	PennDOT STMC
	Traffic information and conditions (BHSTE)	Existing	PennDOT D9 TMC
		Planned 2	PennDOT STMC
	Work zone information (BOMO)	Existing	PennDOT D9 TMC
		Planned 2	PennDOT STMC
	Maintenance and Construction coordination		PennDOT D9 TMC
		Planned 2	PennDOT STMC
	Commercial vehicle enforcement information (Motor Carrier Division)	Existing	PSP Offices
		Planned 2	PennDOT STMC
	Media information	Existing	Regional Media Outlets
PennDOT D2 TMC	Traffic information	Planned 2	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices, PennDOT STMC
	Incident information	Planned 2	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices, PennDOT STMC
	Road closures	Planned 2	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices, PennDOT STMC

Element	Service (operation/data outputs to others)	Status	Destination Element
	Road weather information	Planned 2	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices, PennDOT STMC
	Road conditions	Planned 2	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices, PennDOT STMC
	Maintenance and construction information	Planned 2	PennDOT D9 County Maintenance Offices, PennDOT STMC
	Work zone information	Planned 2	PennDOT D9 County Maintenance Offices, PennDOT STMC
	CCTV control	Planned 2	PennDOT D9 Field Devices
	DMS control	Planned 2	PennDOT D9 Field Devices
PennDOT D8 TMC	Traffic information	Planned 2	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices, PennDOT STMC
	Incident information	Planned 2	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices, PennDOT STMC
	Road closures	Planned 2	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices, PennDOT STMC
	Road weather information	Planned 2	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices, PennDOT STMC
	Road conditions	Planned 2	PennDOT D9 TMC, PennDOT D9 County Maintenance Offices, PennDOT STMC
	Maintenance and construction information	Planned 2	PennDOT D9 County Maintenance Offices, PennDOT STMC
	Work zone information	Planned 2	PennDOT D9 County Maintenance Offices, PennDOT STMC

Element	Service (operation/data outputs to others)	Status	Destination Element
	CCTV control	Planned 2	PennDOT D9 Field Devices
	DMS control	Planned 2	PennDOT D9 Field Devices
PennDOT D9 County Maintenance Offices	Incident information	Existing	911 Communication Centers, Blair County 911 Communication Center, County EMA Centers, PennDOT D9 TMC, PTC Offices, PSP Offices
	Incident response coordination	Existing	911 Communication Centers, Blair County 911 Communication Center, PennDOT D9 TMC
	Maintenance and construction response coordination	Existing	911 Communication Centers, Blair County 911 Communication Center, County EMA Centers, Adjacent PennDOT District and County Offices, MDSHA Offices, PennDOT D9 TMC, PTC Offices
	Work zone information	Existing	County EMA Centers, Adjacent PennDOT District and County Offices, MDSHA Offices, PennDOT D9 TMC, PTC Offices, PSP Offices, Regional Media Outlets, Regional Transit Agency Offices
	Work plan coordination	Existing	Adjacent PennDOT District and County Offices, MDSHA Offices, PennDOT D9 TMC, PTC Offices
	Roadway maintenance status	Existing	911 Communication Centers, PennDOT D9 TMC , Adjacent PennDOT District and County Offices, Regional Transit Agency Offices

Element	Service (operation/data outputs to others)	Status	Destination Element
	Current asset restriction	Existing	911 Communication Centers, PennDOT D9 TMC, PSP Offices, Regional Transit Agency Offices
	Road weather information	Existing	911 Communication Centers, PennDOT D9 TMC, PSP Offices, Adjacent PennDOT District and County Offices, Regional Media Outlet, Regional Transit Agency Offices
	Maintenance and construction vehicle dispatch coordination	Existing	PennDOT D9 Maintenance and Construction Vehicles
PennDOT D9 Field Devices	DMS control	Existing	Attractions and Event Promoters, PEMA Emergency Operation Center, Event Promoters
	Traffic images	Planned 2	PEMA Emergency Operation Center
	Field device status	Existing	PennDOT D9 County Maintenance Offices, PennDOT D9 TMC
PennDOT D9 Maintenance and Construction Vehicles	Dispatch coordination	Existing	PennDOT D9 County Maintenance Offices
	Location data	Existing	PennDOT D9 County Maintenance Offices
	Work zone status	Existing	PennDOT D9 County Maintenance Offices
	Work zone warning	Existing	PennDOT D9 County Maintenance Offices

Element	Service (operation/data outputs to others)	Status	Destination Element
PennDOT D9 TMC	Incident information	Existing	911 Communications Centers, Blair County 911 Communication Center, County EMA Centers, PennDOT D9 County Maintenance Offices, PTC Offices, PSP Offices, Regional Transit Agency Offices, TRANSCOM Center, Regional Media Outlets, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
	Incident response coordination	Existing	911 Communications Centers, Blair County 911 Communication Center, County EMA Centers, Adjacent PennDOT District and County Offices, MDSHA Offices, Municipal Traffic Management Offices, PennDOT D9 County Maintenance Offices, PTC Offices, PSP Offices, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
	Road network conditions	Existing	911 Communication Centers, Blair County 911 Communication Center, PTC Offices, PSP Offices, Regional Media Outlets, PennDOT Central Office Organizations
		Planned 2	PennDOT D9 County Maintenance Offices, Regional Transit Agency Offices, PennDOT STMC
	Work zone information	Existing	911 Communication Centers, Blair County 911 Communication Center, Adjacent PennDOT District and County Offices, PennDOT Central Office Organizations

Element	Service (operation/data outputs to others)	Status	Destination Element
		Planned 2	PennDOT STMC
	Work plan coordination	Existing	911 Communication Centers, Blair County 911 Communication Center, Adjacent PennDOT District and County Offices, PennDOT D9 County Maintenance Offices, PTC Offices, PennDOT Central Office Organizations
	Maintenance and construction resource coordination	Existing	911 Communication Centers, Blair County 911 Communication Center, Adjacent PennDOT District and County Offices, PennDOT D9 County Maintenance Offices, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
	Traffic information coordination	Existing	911 Communication Centers, Blair County 911 Communication Center, Adjacent PennDOT District and County Offices, Attractions and Event Promoters, MDSHA Offices, Municipal Traffic Management Offices, PTC Offices, PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
	DMS control coordination	Planned 2	911 Communication Centers, Adjacent PennDOT District and County Offices, Attractions and Event Promoters
		Existing	Blair County 911 Communication Center
	CCTV images	Existing	Blair County 911 Communication Center

Element	Service (operation/data outputs to others)	Status	Destination Element
		Planned 2	911 Communications Centers, Municipal Traffic Management Offices
	Archived road/lane/bridge closure information	Existing	County/Regional Planning Organizations
	Coordination during events	Existing	Attractions and Event Promoters
	Traffic signal control	Planned 2	Municipal Field Devices
	Current asset restrictions	Existing	Municipal Traffic Management Offices, Regional Transit Agency Offices
		Planned 2	PennDOT STMC
	Field device control	Existing	PennDOT D9 Field Devices
	Remote CCTV control	Planned 2	PSP Offices
	Traveler information	Existing	PennDOT Welcome Centers and Rest Areas, Regional Media Outlets
PennDOT STMC	Incident and emergency information and coordination	Planned 2	PEMA Emergency Operation Center, PennDOT Central Office Organizations, PennDOT D9 TMC, MDSHA Offices, PSP Offices, PTC Offices, TRANSCOM Center
	Request for archived data	Planned 2	PennDOT Central Office Organizations, PennDOT D9 TMC, MDSHA Offices
	Traffic information, restrictions, and conditions	Planned 2	PennDOT Central Office Organizations, PennDOT D9 TMC, MDSHA Offices, PTC Offices

Element	Service (operation/data outputs to others)	Status	Destination Element
	Work zone information	Planned 2	PennDOT Central Office Organizations, PennDOT D9 TMC, MDSHA Offices, PTC Offices
	Maintenance and Construction coordination	Planned 2	PennDOT Central Office Organizations, PennDOT D9 TMC, MDSHA Offices, PTC Offices
	Commercial vehicle enforcement information	Planned 2	PennDOT Central Office Organizations, Commercial Vehicle Company Offices
	Road weather information	Planned 2	PennDOT Central Office Organizations, PennDOT D9 TMC, PTC Offices, Regional Media Outlets
	Media information	Planned 2	Regional Media Outlets
PennDOT Welcome Centers and Rest Areas	N/A	N/A	N/A
Pennsylvania Office of Homeland Security	Threat information coordination	Existing	PEMA Emergency Operation Center
Personal Traveler Information Devices	Incident notification and information	Existing	911 Communication Centers, Blair County 911 Communication Center

Element	Service (operation/data outputs to others)	Status	Destination Element
PSP Offices	Incident and emergency information and coordination	Existing	911 Communication Centers, Blair County 911 Communication Center, County EMA Centers, Municipal Public Safety Offices, PennDOT Central Office Organizations, PennDOT D9 County Maintenance Offices, PennDOT D9 TMC, MDSHA Offices, PTC Offices, PSP Troop T Highspire, Towing Industry Responders
		Planned 2	PennDOT STMC
	Commercial vehicle credentialing and safety information (overweight vehicles)	Existing	PennDOT Central Office Organizations
	Maintenance and Construction information	Existing	PennDOT D9 County Maintenance Offices
	Request for towing	Existing	Towing Industry Responders
	Incident and emergency dispatch of PSP Vehicles	Existing	PSP Vehicles
	Information for the media	Existing	Regional Media Outlets
PSP Troop T Highspire	Incident and emergency information and coordination	Existing	PSP Offices, PTC Offices
	Information for the media	Existing	Regional Media Outlets
	Incident and emergency dispatch of PSP Vehicles	Existing	PSP Troop T Vehicles
PSP Troop T Vehicles	Emergency dispatch information	Existing	PSP Troop T Highspire, PTC Offices
	Vehicle tracking	Existing	PSP Troop T Highspire, PTC Offices
PSP Vehicles	Emergency dispatch information	Existing	PSP Offices
	Vehicle tracking	Existing	PSP Offices

Element	Service (operation/data outputs to others)	Status	Destination Element
PTC Field Devices	CCTV images used for surveillance	Existing	PTC Offices
	Traffic flow information	Existing	PTC Offices
	RWIS data	Planned 2	PTC Offices
	CCTV images used infrastructure monitoring	Planned 2	PTC Offices
PTC Maintenance and Construction Vehicles	Maintenance and Construction information	Existing	PTC Offices
PTC Offices	Incident information	Existing	911 Communication Centers, Blair County 911 Communication Center, County EMA Centers, Municipal Traffic Management offices, PEMA Emergency Operation Center, PennDOT D9 County Maintenance Offices, PennDOT D9 TMC, Regional Medial Outlets, TRANSCOM Center
	Incident response coordination	Existing	911 Communication Centers, Blair County 911 Communication Center, County EMA Centers, Incident Response Agency Offices, PEMA Emergency Operation Center, PennDOT D9 TMC
	Maintenance and construction resource coordination	Existing	911 Communication Centers, Blair County 911 Communication Center, County EMA Centers, PennDOT D9 County Maintenance Offices

Element	Service (operation/data outputs to others)	Status	Destination Element
	Road network condition	Existing	911 Communication Centers, Blair County 911 Communication Center, County EMA Centers, Commercial Vehicle Company Offices, PEMA Emergency Operation Center, PennDOT D9 TMC, Regional Media Outlets
	Credential verification	Existing	Commercial Vehicle Company Offices
	Archived road/lane/bridge closures information	Existing	County/Regional Planning Organizations
	Constructions project's schedule	Existing	County/Regional Planning Organizations
	Archived data coordination	Existing	County/Regional Planning Organizations
	Traffic information coordination	Existing	Attractions and Event Promoters, Municipal Traffic Management Offices, PennDOT D9 TMC
	Current asset restrictions	Existing	Municipal Traffic Management Offices
	Remote CCTV control	Planned 2	PEMA Emergency Operation Center
	Traffic control coordination	Planned 2	PEMA Emergency Operation Center
	Work zone information	Existing	PennDOT D9 County Maintenance Offices
	Work plan coordination	Existing	PennDOT D9 County Maintenance Offices, PennDOT D9 TMC
	Emergency dispatch coordination	Existing	Towing Industry Responders
	Traveler information	Existing	Regional Media Outlet, Personal Traveler Information Devices

Element	Service (operation/data outputs to others)	Status	Destination Element
PTC Service Plazas	N/A	N/A	N/A
PTC Toll Plazas	Electronic toll collection	Existing	Commercial Vehicles, Passenger Vehicles
	Safety inspection (electronic)	Existing	Commercial Vehicles
Regional Media Outlets	N/A	N/A	N/A
Regional Transit Agency Offices	Transit incident information	Existing	911 Communication Centers, Blair County 911 Communication Center, County EMA Centers, Regional Media Outlets
	Transit emergency response coordination	Existing	911 Communication Centers, Blair County 911 Communication Center, County EMA Centers
	Transit Archived data	Existing	County/Regional Planning Organizations, PennDOT Central Office Organizations
	Coordination during events	Existing	Attractions and Event Promoters
	Road network probe information	Planned 2	PennDOT D9 TMC
	Traveler information	Existing	Personal Traveler Information Devices, Regional Media Outlets
	Trip Plan	Planned 2	Personal Traveler Information Devices
	Customized personal transit information	Planned 2	Personal Traveler Information Devices
	Secured area monitoring control	Existing	Regional Transit Remote Traveler Support
	Communication with the vehicles	Existing	Regional Transit Vehicles

Element	Service (operation/data outputs to others)	Status	Destination Element
	Fare management information	Existing	Regional Transit Vehicles
	Schedule information	Existing	Regional Transit Vehicles
Regional Transit Remote Traveler Support	Secured area monitoring data	Existing	Regional Transit Agency Offices
Regional Transit Vehicles	Fare and payment information	Existing	Regional Transit Agency Offices
	Emergency notification	Existing	Regional Transit Agency Offices
	Transit vehicle location	Existing	Regional Transit Agency Offices
	Transit vehicle passenger and use data	Existing	Regional Transit Agency Offices
	Transit vehicle schedule performance	Existing	Regional Transit Agency Offices
Towing Industry Responders	Emergency dispatch coordination	Existing	911 Communication Centers, Blair County 911 Communication Center, PTC Offices, PSP Offices
TRANSCOM Center	Incident information	Existing	PTC Offices, PEMA Emergency Operation Center, PennDOT Central Office Organizations
		Planned 2	911 Communication Centers, Blair County 911 Communication Center, County EMA Centers, PennDOT D9 TMC, PennDOT STMC

Element	**Service (operation/data outputs to others)**	**Status**	**Destination Element**
Weather Information Providers	Weather information	Existing	PennDOT D9 County Maintenance Offices, 911 Communication Centers, Blair County 911 Communication Center, County EMA Centers, PSP Offices, Regional Transit Agency Offices, Municipal Traffic Management Offices, Regional Media Outlets

4 Regional ITS Architecture

The Regional ITS Architecture was created using the process discussed in Section 1.1 'Architecture Process' on this document. The development of the Regional ITS Architecture consisted of: (1) developing a Strawman document using the RAP as a source of information gathering, (2) outreaching to ITS stakeholders in the Region and validating the Strawman, and (3) revising the Architecture to reflect stakeholder inputs from the outreach process. This process is further discussed below.

Strawman

Using existing documentation and information gathered from the RAP (Section 3 tables) a Strawman, or draft, Regional ITS Architecture was developed. The RAP consisted of key stakeholders in the Region and was used to gather preliminary information for Architecture development. This information was then used to assign actual and potential "interconnects" and "information flows" between among the ITS elements. The result was this effort was a draft version of this Final Report, known as the Strawman Architecture. The Strawman Architecture document was created and submitted to PennDOT on July 19, 2004.

Outreach

Outreach is the sharing of information to stakeholders. The ITS Architecture effort was led with outreach being a central activity of the project. Stakeholders were gathered through an extensive effort working with the RAP. RAP members identified key regional persons and agencies involved in surface transportation activities that may benefit from the ITS Architecture effort. Three outreach segments were scheduled into the process to gather input and reach out to these important stakeholders:

Outreach Activity 1: Regional Meeting (called the 1st Bookend meeting)-this meeting provided an introduction to ITS, provided context for the effort and set the stage for smaller working meetings.

Outreach Activity 2: Small Working Meetings (called Validation meetings)-these were a series of meetings that were smaller in size and broken into functional areas such as; traffic, emergency management, incident management, enforcement, transit and planning. Stakeholders attending these meetings reviewed and edited a piece of the draft of the ITS Architecture that pertained directly to their agency and job function. In this way the ITS Architecture became validated by each stakeholder represented in the ITS Architecture.

Outreach Activity 3: Regional Meeting (called the 2nd Bookend meeting)-this meeting concluded the ITS Architecture effort and launched the next steps of preparing a regional operations plan, that has input into the regional long-range plan and regional transportation improvement program.

All of these activities were led by PennDOT and regional champions. In many cases RAP members championed the effort as well. The success of this regions ITS Architecture effort can be directly tied to the efforts of regional champions and the willingness of the regional stakeholders to participate to complete this effort.

Bookend Meeting #1

On September 16, 2004, a Stakeholders Bookend Meeting convened in Altoona Pennsylvania. The meeting began the outreach process by introducing Regional stakeholders to ITS operation, ITS planning, and the Architecture project.

Agencies represented at the Bookend Meeting included PennDOT, PTC, airports, transit agencies, counties, cities, emergency management agencies, planning offices, townships, partnership organizations, the enforcement community, and policy organizations. Detailed meeting minutes, including the stakeholders in attendance, are included in Appendix F.

Validation Meetings

Validation meetings were conducted in October 2004 with small intimate groups of stakeholders to validate the Strawman Architecture. These meetings were used to expand, tailor, and refine the documentation of existing and planned interconnects and information flows. Detailed meeting minutes from the Validation Meetings are contained in Appendix G.

Bookend Meeting #2

Bookend Meeting #2 was held on December 16, 2004 in Altoona, Pennsylvania. The meeting included many of the stakeholders that participated at the first Bookend Meeting and validation meetings. Detailed meeting minutes are included in Appendix H.

Final Architecture

This report, Final Regional ITS Architecture, was developed based on comments received from stakeholders during the outreach process. Stakeholder comments from the outreach process were reconciled and incorporated into the Strawman document, resulting in the Final Architecture. The following sections depict the final ITS Architecture diagrams. These diagrams include:

- Subsystem Interconnect Diagrams,
- Interconnect Diagrams, and
- Information Flow Diagrams.

4.1 Subsystem Interconnect Diagram

This diagram presents the Regional ITS Architecture relationships between subsystems and the communication between them. As shown this diagram provides a visual representation of data used in the development of the Regional ITS Architecture. Subsystems that do not pertain this particular Regional ITS Architecture are denoted in a light grey text. The Subsystem Interconnect Diagram is divided into four system classes; Travelers, Centers, Vehicles, and Roadside. A color scheme (green, yellow, blue, and red) links subsystems and elements back to the System Interconnect Diagram.

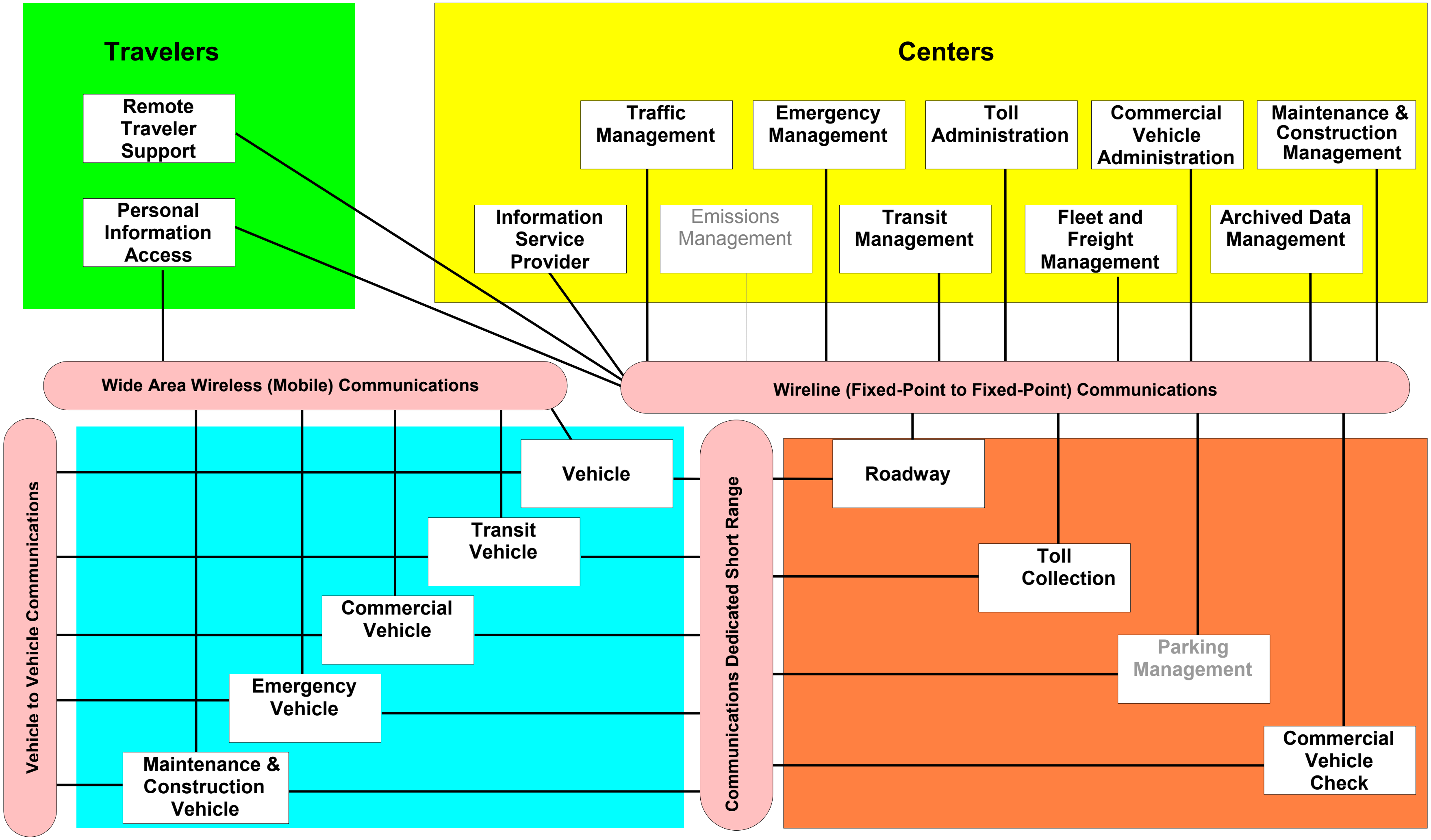

Travelers
Remote Traveler Support
Personal Information Access
Centers
Traffic Management
Emergency Management
Toll Administration
Commercial Vehicle Administration
Maintenance & Construction Management
Information Service Provider
Emissions Management
Transit Management
Fleet and Freight Management
Archived Data Management
Wide Area Wireless (Mobile) Communications
Wireline (Fixed-Point to Fixed-Point) Communications
Vehicle to Vehicle Communications
Vehicle
Transit Vehicle
Commercial Vehicle
Emergency Vehicle
Maintenance & Construction Vehicle
Communications Dedicated Short Range
Roadway
Toll Collection
Parking Management
Commercial Vehicle Check

Figure 4-1: Subsystem Interconnect Diagram

4.2 Regional Subsystem Interconnect Diagram showing Elements

This diagram presents the regional ITS Architecture relationships between subsystems, the communication between them, and the elements within each subsystem. As shown this diagram provides a visual representation of data used in the development of the Regional ITS Architecture. In this diagram elements have been added to make this diagram useful for regional specificity. This information is also provided in a tabular format listed by element.

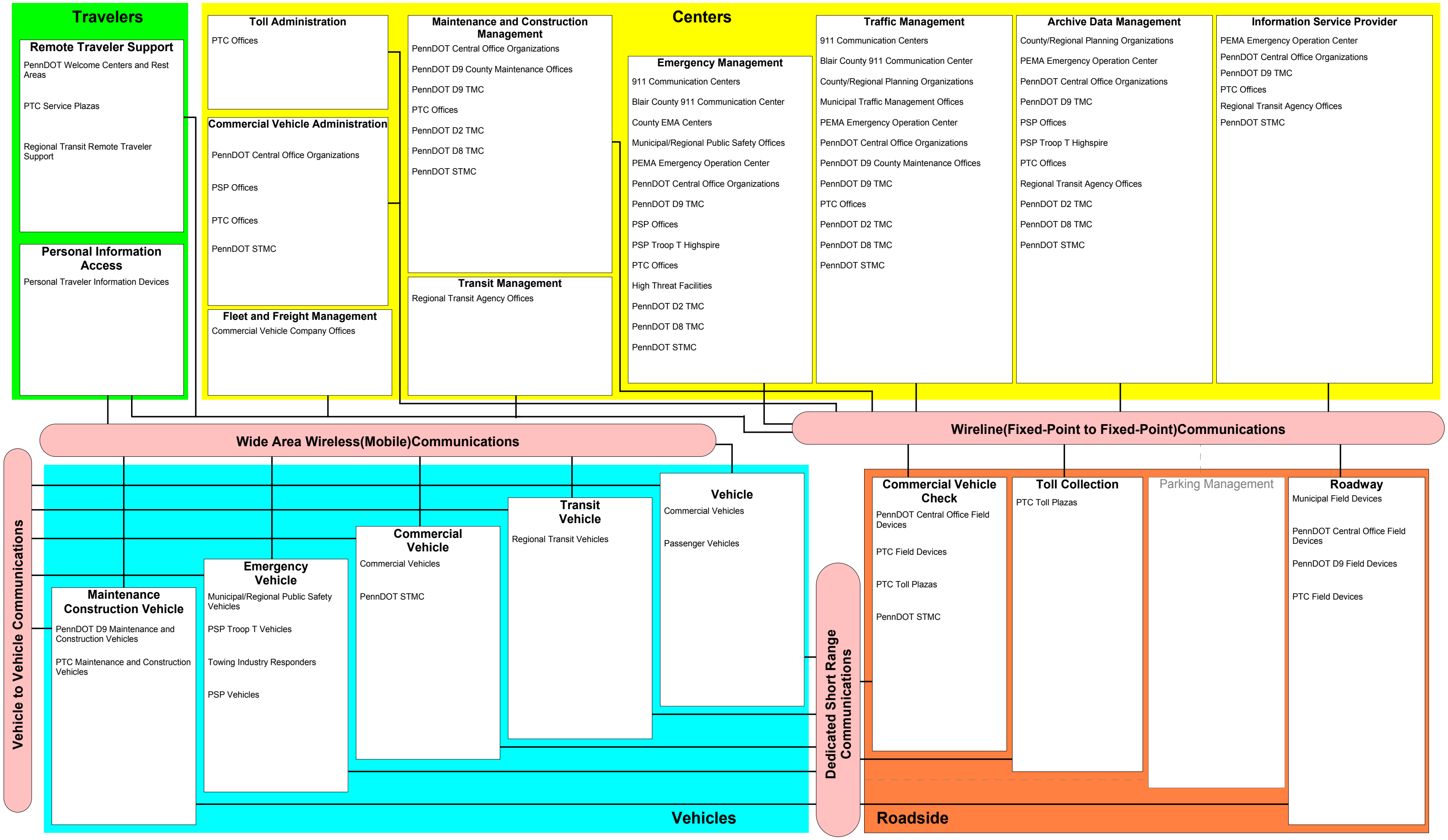

Travelers
Remote Traveler Support
PennDOT Welcome Centers and Rest Areas
PTC Service Plazas
Regional Transit Remote Traveler Support
Personal Information Access
Personal Traveler Information Devices
Centers
Toll Administration
PTC Offices
Commercial Vehicle Administration
PennDOT Central Office Organizations
PSP Offices
PTC Offices
PennDOT STMC
Fleet and Freight Management
Commercial Vehicle Company Offices
Maintenance and Construction Management
PennDOT Central Office Organizations
PennDOT D9 County Maintenance Offices
PennDOT D9 TMC
PTC Offices
PennDOT D2 TMC
PennDOT D8 TMC
PennDOT STMC
Transit Management
Regional Transit Agency Offices
Emergency Management
911 Communication Centers
Blair County 911 Communication Center
County EMA Centers
Municipal/Regional Public Safety Offices
PEMA Emergency Operation Center
PennDOT Central Office Organizations
PennDOT D9 TMC
PSP Offices
PSP Troop T Highspire
PTC Offices
High Threat Facilities
PennDOT D2 TMC
PennDOT D8 TMC
PennDOT STMC
Traffic Management
911 Communication Centers
Blair County 911 Communication Center
County/Regional Planning Organizations
Municipal Traffic Management Offices
PEMA Emergency Operation Center
PennDOT Central Office Organizations
PennDOT D9 County Maintenance Offices
PennDOT D9 TMC
PTC Offices
PennDOT D2 TMC
PennDOT D8 TMC
PennDOT STMC
Archive Data Management
County/Regional Planning Organizations
PEMA Emergency Operation Center
PennDOT Central Office Organizations
PennDOT D9 TMC
PSP Offices
PSP Troop T Highspire
PTC Offices
Regional Transit Agency Offices
PennDOT D2 TMC
PennDOT D8 TMC
PennDOT STMC
Information Service Provider
PEMA Emergency Operation Center
PennDOT Central Office Organizations
PennDOT D9 TMC
PTC Offices
Regional Transit Agency Offices
PennDOT STMC
Wide Area Wireless(Mobile)Communications
Wireline(Fixed-Point to Fixed-Point)Communications
Vehicle to Vehicle Communications
Maintenance and Construction Vehicle
PennDOT D9 Maintenance and Construction Vehicles
PTC Maintenance and Construction Vehicles
Emergency Vehicle
Municipal/Regional Public Safety Vehicles
PSP Troop T Vehicles
Towing Industry Responders
PSP Vehicles
Commercial Vehicle
Commercial Vehicles
PennDOT STMC
Transit Vehicle
Regional Transit Vehicles
Vehicle
Commercial Vehicles
Passenger Vehicles
Vehicles
Dedicated Short Range Communications
Commercial Vehicle Check
PennDOT Central Office Field Devices
PTC Field Devices
PTC Toll Plazas
PennDOT STMC
Toll Collection
PTC Toll Plazas
Parking Management
Roadway
Municipal Field Devices
PennDOT Central Office Field Devices
PennDOT D9 Field Devices
PTC Field Devices
Roadside

Figure 4-2: Regional Subsystem Interconnect Diagram showing Elements

Table 4-1: Regional Subsystems/Terminators

Element	Subsystem/Terminator mapped to:
911 Communication Centers	Emergency Management Traffic Management
Adjacent PennDOT District and County Offices	Emergency Management Maintenance and Construction Management Traffic Management
Attractions and Event Promoters	Event Promoters
Blair County 911 Communication Center	Emergency Management Traffic Management
Commercial Vehicle Company Offices	Fleet and Freight Management
Commercial Vehicles	Commercial Vehicle Vehicle
County EMA Centers	Emergency Management
County/Regional Planning Organizations	Archived Data Management Traffic Management
High Threat Facilities	Emergency Management
Incident Response Agency Offices	Emergency Management
MDSHA Offices	Emergency Management Maintenance and Construction Management Traffic Management
MDSP Offices	Emergency Management
MEMA Emergency Operation Center	Emergency Management
Municipal Field Devices	Roadway
Municipal Traffic Management Offices	Traffic Management
Municipal/Regional Public Safety Offices	Emergency Management
Municipal/Regional Public Safety Vehicles	Emergency Vehicle
Passenger Vehicles	Vehicle
PEMA Emergency Operation Center	Archived Data Management Emergency Management Information Service Provider Maintenance and Construction Management Traffic Management

Element	**Subsystem/Terminator mapped to:**
PennDOT Central Office Field Devices	Commercial Vehicle Check Roadway
PennDOT Central Office Organizations	Archived Data Management Commercial Vehicle Administration Emergency Management Information Service Provider Maintenance and Construction Management Traffic Management
PennDOT D2 TMC	Archived Data Management Emergency Management Maintenance and Construction Management Traffic Management
PennDOT D8 TMC	Archived Data Management Emergency Management Maintenance and Construction Management Traffic Management
PennDOT D9 County Maintenance Offices	Maintenance and Construction Management Traffic Management
PennDOT D9 Field Devices	Roadway
PennDOT D9 Maintenance and Construction Vehicles	Maintenance and Construction Vehicle
PennDOT D9 TMC	Archived Data Management Emergency Management Information Service Provider Maintenance and Construction Management Traffic Management
PennDOT STMC	Archived Data Management Commercial Vehicle Administration Emergency Management Information Service Provider Maintenance and Construction Management Traffic Management
PennDOT Welcome Centers and Rest Areas	Remote Traveler Support
Pennsylvania Office of Homeland Security	Emergency Management
Personal Traveler Information Devices	Personal Information Access

Element	**Subsystem/Terminator mapped to:**
PSP Offices	Archived Data Management Commercial Vehicle Administration Emergency Management
PSP Troop T Highspire	Archived Data Management Emergency Management
PSP Troop T Vehicles	Emergency Vehicle
PSP Vehicles	Emergency Vehicle
PTC Field Devices	Commercial Vehicle Check Emergency Telecommunications System Roadway
PTC Maintenance and Construction Vehicles	Maintenance and Construction Vehicle
PTC Offices	Archived Data Management Commercial Vehicle Administration Emergency Management Information Service Provider Maintenance and Construction Management Toll Administration Traffic Management
PTC Service Plazas	Remote Traveler Support
PTC Toll Plazas	Commercial Vehicle Check Toll Collection
Regional Media Outlets	Media
Regional Transit Agency Offices	Archived Data Management Information Service Provider Transit Management
Regional Transit Remote Traveler Support	Remote Traveler Support
Regional Transit Vehicles	Transit Vehicle
Towing Industry Responders	Emergency Vehicle
TRANSCOM Center	Information Service Provider
Weather Information Providers	Weather Service

4.3 Interconnect Matrix

This section documents the actual and potential “interconnects” (i.e., interfaces) among the ITS elements. Interconnects show where one operation will connect data or information with another operation. The section is primarily documented as Turbo software output.

Table 4-2: Regional Interconnect Matrix

	911 Communication Centers	Adjacent PennDOT District and County Offices	Attractions and Event Promoters	Blair County 911 Communication Center	Commercial Vehicle Company Offices	Commercial Vehicles	County EMA Centers	County/Regional Planning Organizations	High Threat Facilities	Incident Response Agency Offices	MDSHA Offices	MDSP Offices	MEMA Emergency Operation Center	Municipal Field Devices	Municipal Traffic Management Offices	Municipal/Regional Public Safety Offices	Municipal/Regional Public Safety Vehicles	Passenger Vehicles	PEMA Emergency Operation Center	PennDOT Central Office Field Devices	PennDOT Central Office Organizations	PennDOT D2 TMC	PennDOT D8 TMC	PennDOT D9 County Maintenance Offices	PennDOT D9 Field Devices	PennDOT D9 Maintenance and Construction Vehicles	PennDOT D9 TMC	PennDOT STMC	PennDOT Welcome Centers and Rest Areas	Pennsylvania Office of Homeland Security	Personal Traveler Information Devices	PSP Offices	PSP Troop T Highspire	PSP Troop T Vehicles	PSP Vehicles	PTC Field Devices	PTC Maintenance and Construction Vehicles	PTC Offices	PTC Service Plazas	PTC Toll Plazas	Regional Media Outlets	Regional Transit Agency Offices	Regional Transit Remote Traveler Support	Regional Transit Vehicles	Towing Industry Responders	TRANSCOM Center	Weather Information Providers
911 Communication Centers							X		X	X					X	X	X		X					X	X		X					X	X					X			X	X			X	X	X
Adjacent PennDOT District and County Offices																								X			X																				
Attractions and Event Promoters															X	X											X					X						X				X					
Blair County 911 Communication Center							X		X	X					X	X	X		X					X	X		X					X						X			X	X			X		X
Commercial Vehicle Company Offices						X													X		X							X				X						X									
Commercial Vehicles					X															X																				X							
County EMA Centers	X			X					X	X					X	X			X					X			X					X						X				X				X	X
County/Regional Planning Organizations															X						X						X	X										X				X					
High Threat Facilities	X			X			X																																								
Incident Response Agency Offices	X			X			X												X																			X									
MDSHA Offices																								X			X	X																			
MDSP Offices																																X															
MEMA Emergency Operation Center																			X																												
Municipal Field Devices															X												X																				
Municipal Traffic Management Offices	X		X	X			X	X						X										X			X					X						X			X						X
Municipal/Regional Public Safety Offices	X		X	X			X										X																														
Municipal/Regional Public Safety Vehicles	X			X												X																X															
Passenger Vehicles																																								X							
PEMA Emergency Operation Center	X			X	X		X			X			X								X							X		X								X								X	
PennDOT Central Office Field Devices						X															X			X				X																			
PennDOT Central Office Organizations					X			X											X	X							X	X			X	X						X			X	X				X	

	911 Communication Centers	Adjacent PennDOT District and County Offices	Attractions and Event Promoters	Blair County 911 Communication Center	Commercial Vehicle Company Offices	Commercial Vehicles	County EMA Centers	County/Regional Planning Organizations	High Threat Facilities	Incident Response Agency Offices	MDSHA Offices	MDSP Offices	MEMA Emergency Operation Center	Municipal Field Devices	Municipal Traffic Management Offices	Municipal/Regional Public Safety Offices	Municipal/Regional Public Safety Vehicles	Passenger Vehicles	PEMA Emergency Operation Center	PennDOT Central Office Field Devices	PennDOT Central Office Organizations	PennDOT D2 TMC	PennDOT D8 TMC	PennDOT D9 County Maintenance Offices	PennDOT D9 Field Devices	PennDOT D9 Maintenance and Construction Vehicles	PennDOT D9 TMC	PennDOT STMC	PennDOT Welcome Centers and Rest Areas	Pennsylvania Office of Homeland Security	Personal Traveler Information Devices	PSP Offices	PSP Troop T Highspire	PSP Troop T Vehicles	PSP Vehicles	PTC Field Devices	PTC Maintenance and Construction Vehicles	PTC Offices	PTC Service Plazas	PTC Toll Plazas	Regional Media Outlets	Regional Transit Agency Offices	Regional Transit Remote Traveler Support	Regional Transit Vehicles	Towing Industry Responders	TRANSCOM Center	Weather Information Providers
PennDOT D2 TMC																								X	X		X	X																			
PennDOT D8 TMC																								X	X		X	X																			
PennDOT D9 County Maintenance Offices	X	X		X			X				X				X					X		X	X		X	X	X					X				X		X				X					X
PennDOT D9 Field Devices	X			X																		X	X	X			X											X									
PennDOT D9 Maintenance and Construction Vehicles																								X																							
PennDOT D9 TMC	X	X	X	X			X	X			X			X	X						X	X	X	X	X			X	X			X						X			X					X	
PennDOT STMC					X			X			X								X	X	X	X	X				X					X						X			X					X	
PennDOT Welcome Centers and Rest Areas																											X																				
Pennsylvania Office of Homeland Security																			X																												
Personal Traveler Information Devices																					X																	X				X					
PSP Offices	X		X	X	X		X					X			X		X				X			X			X	X					X		X			X			X	X			X		X
PSP Troop T Highspire	X																															X		X				X			X						
PSP Troop T Vehicles																																	X					X									
PSP Vehicles																																X															
PTC Field Devices																								X														X									
PTC Maintenance and Construction Vehicles																																						X									
PTC Offices	X		X	X	X		X	X		X					X				X		X			X	X		X	X			X	X	X	X		X	X		X	X	X				X	X	
PTC Service Plazas																																						X									
PTC Toll Plazas						X												X																				X									
Regional Media Outlets	X			X											X						X						X	X				X	X					X				X					
Regional Transit Agency Offices	X		X	X			X	X													X			X							X	X									X		X	X			X
Regional Transit Remote Traveler Support																																										X					

	911 Communication Centers	Adjacent PennDOT District and County Offices	Attractions and Event Promoters	Blair County 911 Communication Center	Commercial Vehicle Company Offices	Commercial Vehicles	County EMA Centers	County/Regional Planning Organizations	High Threat Facilities	Incident Response Agency Offices	MDSHA Offices	MDSP Offices	MEMA Emergency Operation Center	Municipal Field Devices	Municipal Traffic Management Offices	Municipal/Regional Public Safety Offices	Municipal/Regional Public Safety Vehicles	Passenger Vehicles	PEMA Emergency Operation Center	PennDOT Central Office Field Devices	PennDOT Central Office Organizations	PennDOT D2 TMC	PennDOT D8 TMC	PennDOT D9 County Maintenance Offices	PennDOT D9 Field Devices	PennDOT D9 Maintenance and Construction Vehicles	PennDOT D9 TMC	PennDOT STMC	PennDOT Welcome Centers and Rest Areas	Pennsylvania Office of Homeland Security	Personal Traveler Information Devices	PSP Offices	PSP Troop T Highspire	PSP Troop T Vehicles	PSP Vehicles	PTC Field Devices	PTC Maintenance and Construction Vehicles	PTC Offices	PTC Service Plazas	PTC Toll Plazas	Regional Media Outlets	Regional Transit Agency Offices	Regional Transit Remote Traveler Support	Regional Transit Vehicles	Towing Industry Responders	TRANSCOM Center	Weather Information Providers
Regional Transit Vehicles																																										X					
Towing Industry Responders	X			X																												X						X									
TRANSCOM Center	X						X												X		X						X	X										X									
Weather Information Providers	X			X			X								X				X					X								X						X				X					

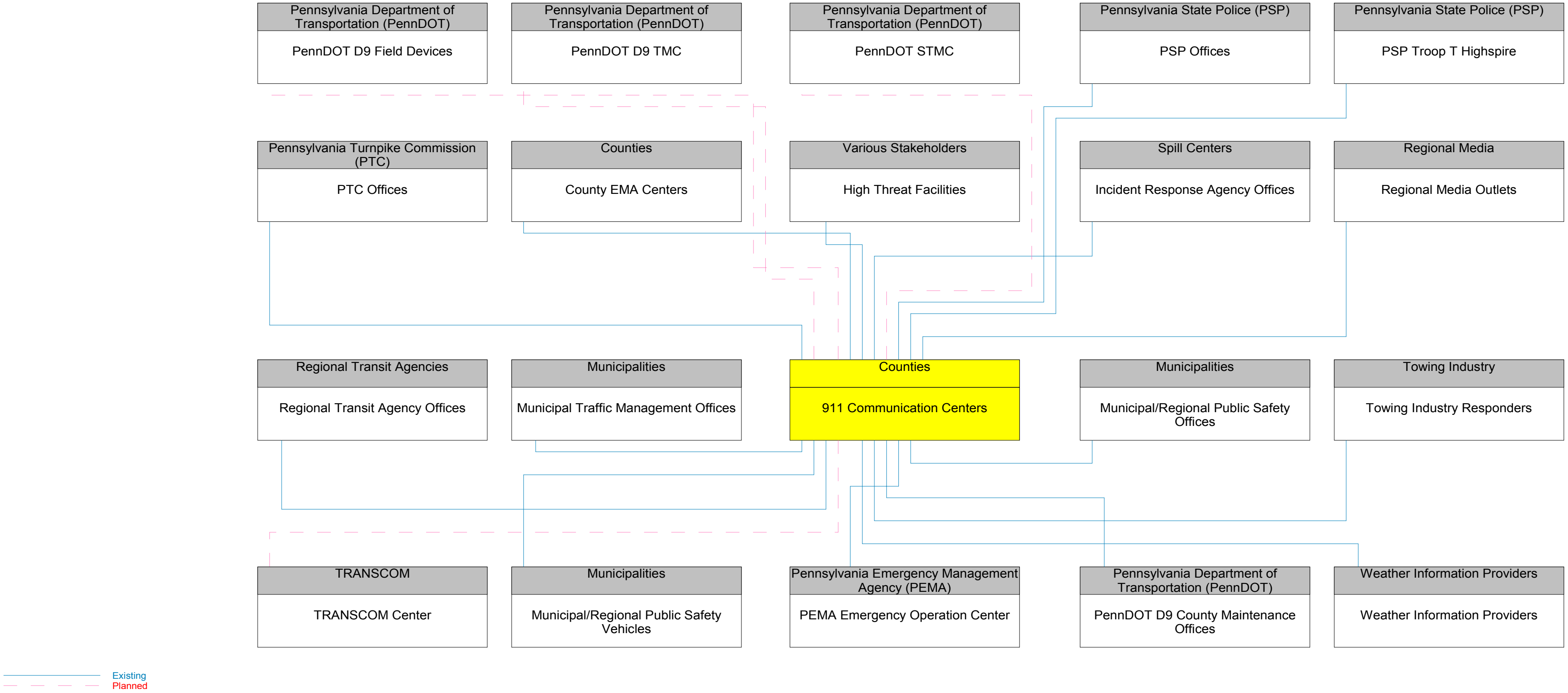
4.4 ITS Architecture

This section documents the “information flow” between the elements. The information flows describe what data or information is passing between one operation and another operation. The section is primarily documented as Turbo software outputs.

Travelers
Centers
Remote Traveler Support
Traffic Management
Emergency Management
Toll Administration
Commercial Vehicle Administration
Archived Data Management
Personal Information Access
Information Service Provider
Emissions Management
Transit Management
Fleet and Freight Management
Wide Area Wireless Communications
Wireline Communications
Vehicle
Transit Vehicle
Commercial Vehicle
Emergency Vehicle
Vehicles
Roadway
Toll Collection
Parking Management
Roadside
Dedicated Short Range Communications

911 Communication Centers

911 Communication Centers Interconnect Diagram



Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 Field Devices

Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC

Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC

Pennsylvania State Police (PSP)
PSP Offices

Pennsylvania State Police (PSP)
PSP Troop T Highspire

Pennsylvania Turnpike Commission (PTC)
PTC Offices

Counties
County EMA Centers

Various Stakeholders
High Threat Facilities

Spill Centers
Incident Response Agency Offices

Regional Media
Regional Media Outlets

Regional Transit Agencies
Regional Transit Agency Offices

Municipalities
Municipal Traffic Management Offices

Counties
911 Communication Centers

Municipalities
Municipal/Regional Public Safety Offices

Towing Industry
Towing Industry Responders

TRANSCOM
TRANSCOM Center

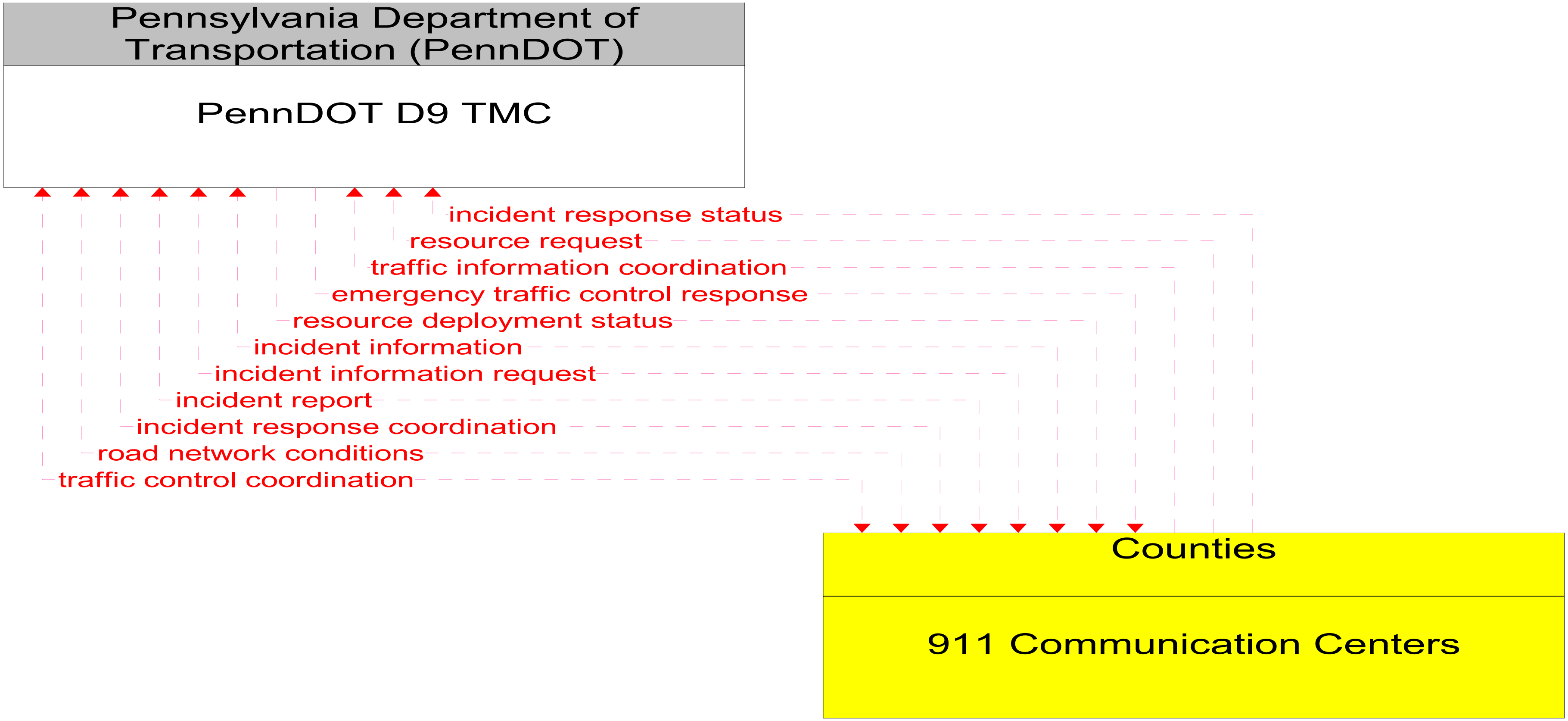
Municipalities
Municipal/Regional Public Safety Vehicles

Pennsylvania Emergency Management Agency (PEMA)
PEMA Emergency Operation Center

Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 County Maintenance Offices

Weather Information Providers
Weather Information Providers

Existing
Planned


Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 TMC

incident response status

resource request

traffic information coordination

emergency traffic control response

resource deployment status

incident information

incident information request

incident report

incident response coordination

road network conditions

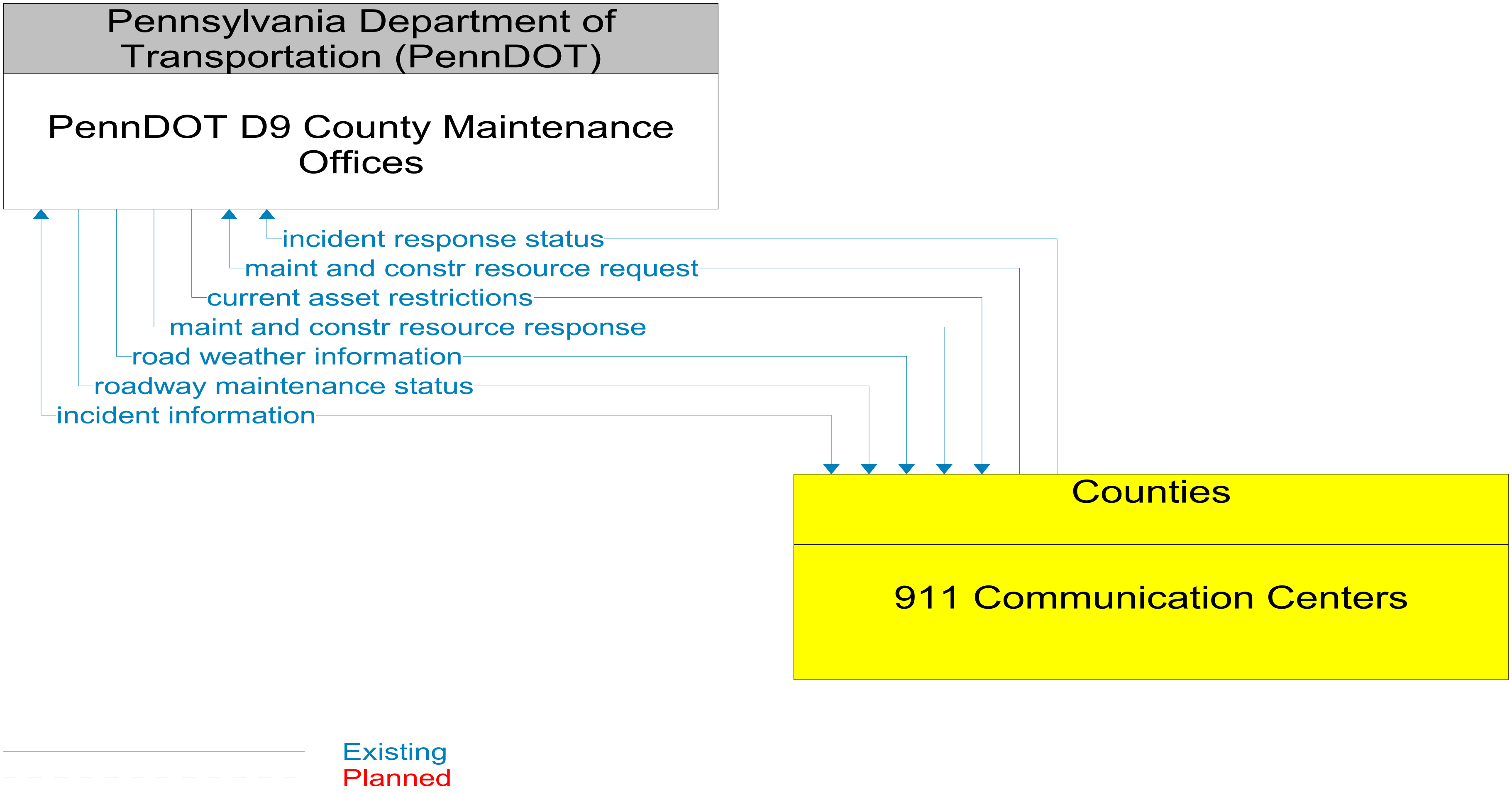
traffic control coordination

Counties

911 Communication Centers

Existing

Planned



Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 County Maintenance Offices

incident response status

maint and constr resource request

current asset restrictions

maint and constr resource response

road weather information

roadway maintenance status

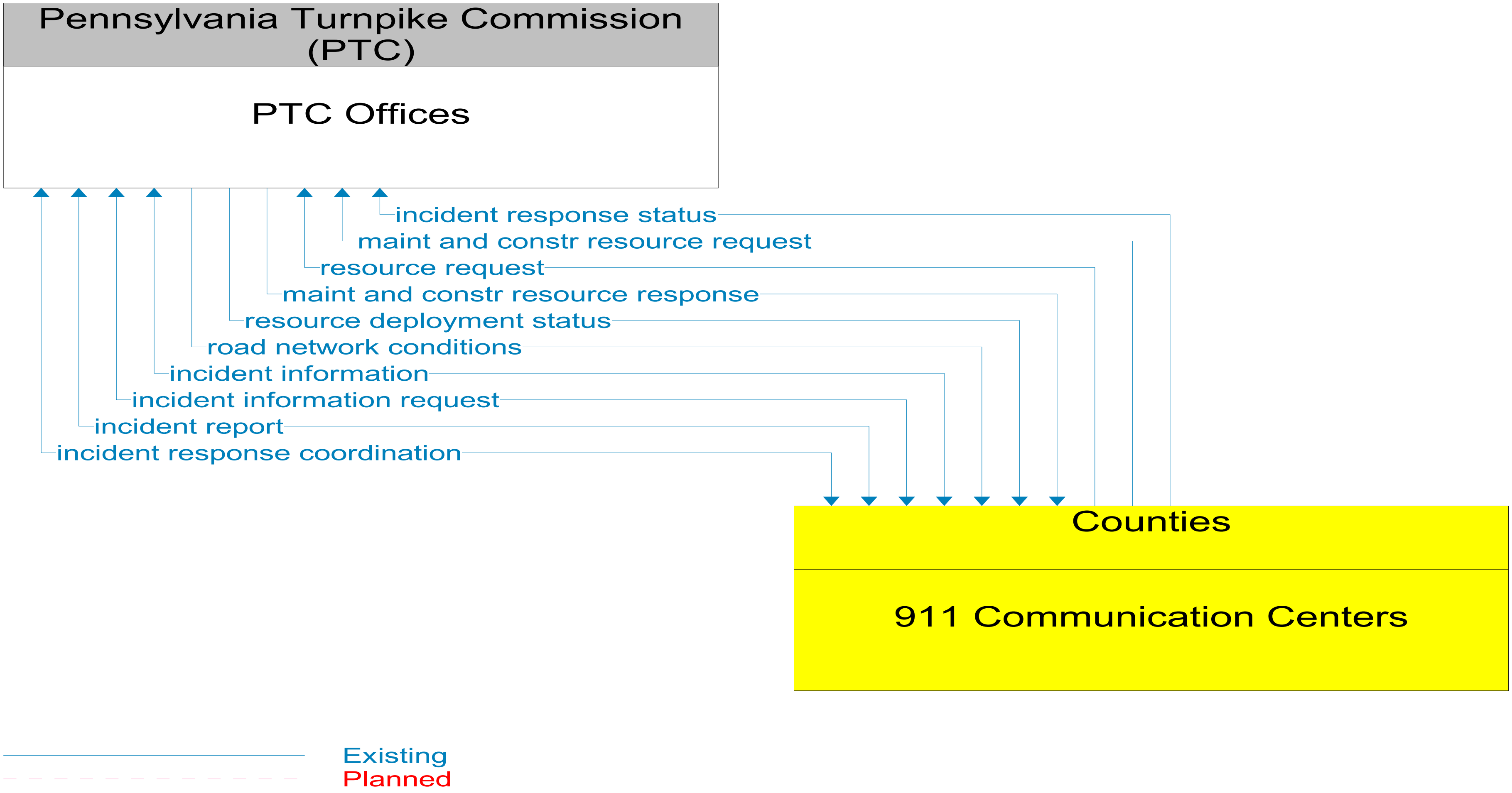
incident information

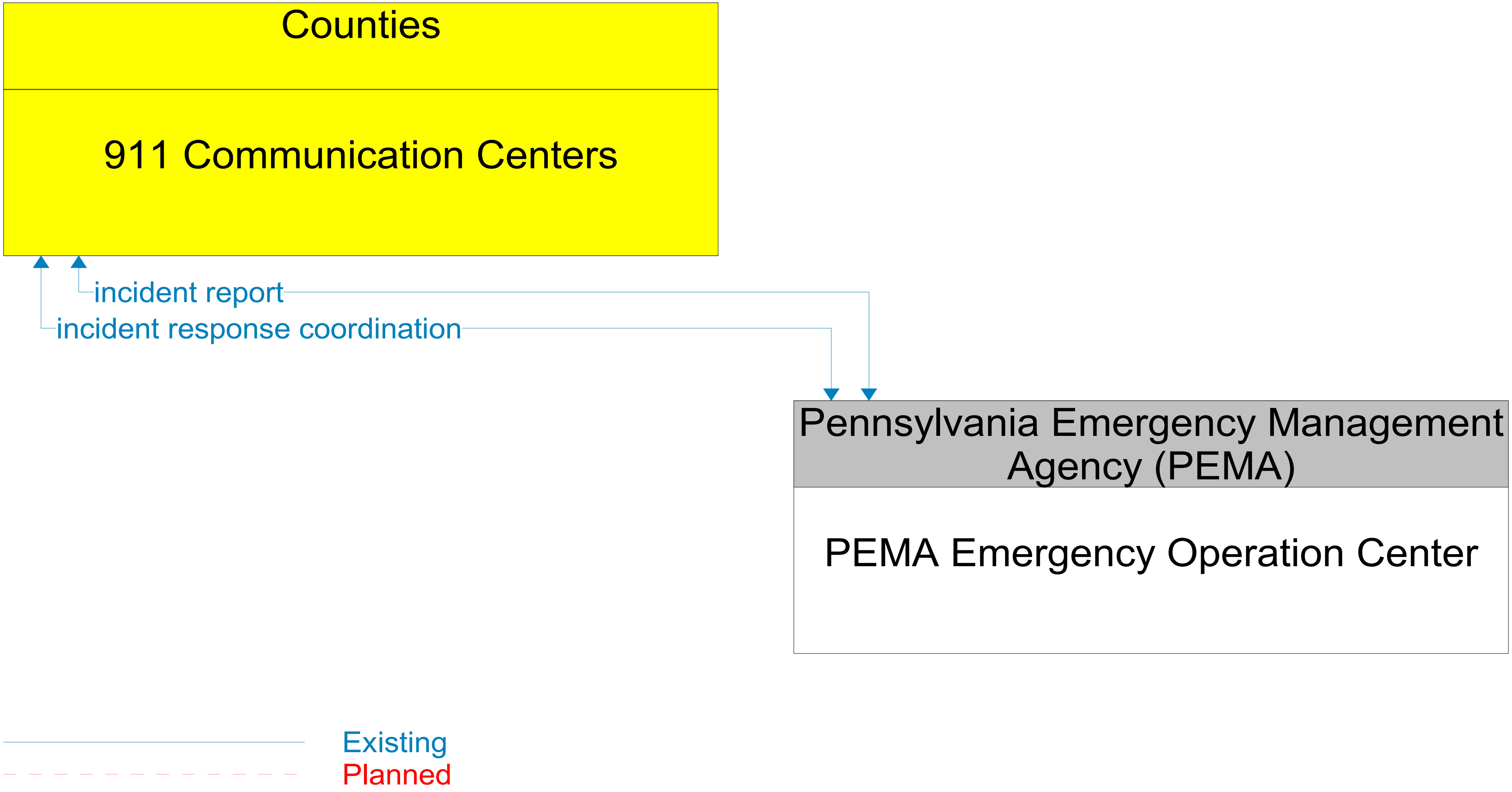
Counties

911 Communication Centers

Existing

Planned


Pennsylvania Turnpike Commission (PTC)
PTC Offices
incident response status
maint and constr resource request
resource request
maint and constr resource response
resource deployment status
road network conditions
incident information
incident information request
incident report
incident response coordination
Counties
911 Communication Centers
Existing
Planned



Counties

911 Communication Centers

incident report

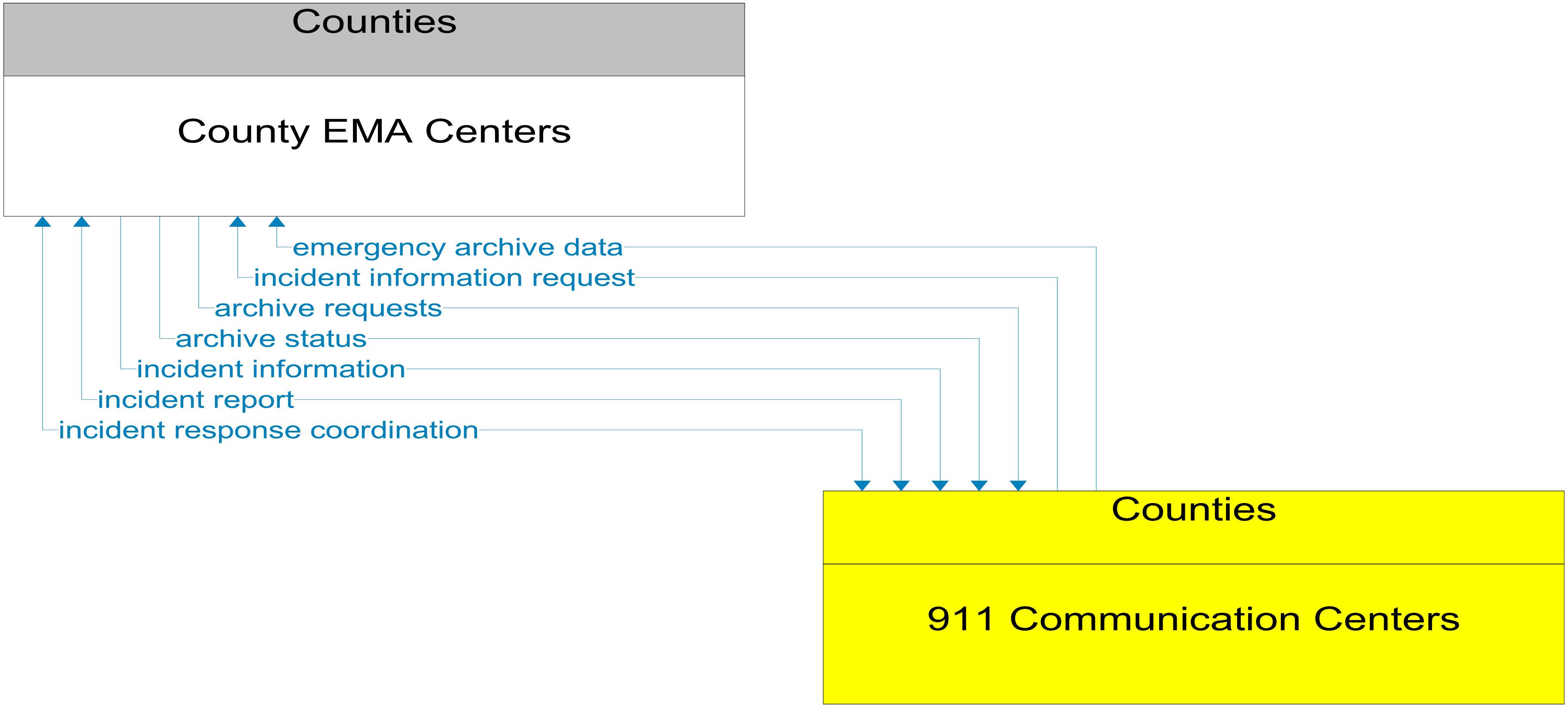
incident response coordination

Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

Existing

Planned



Counties

County EMA Centers

emergency archive data

incident information request

archive requests

archive status

incident information

incident report

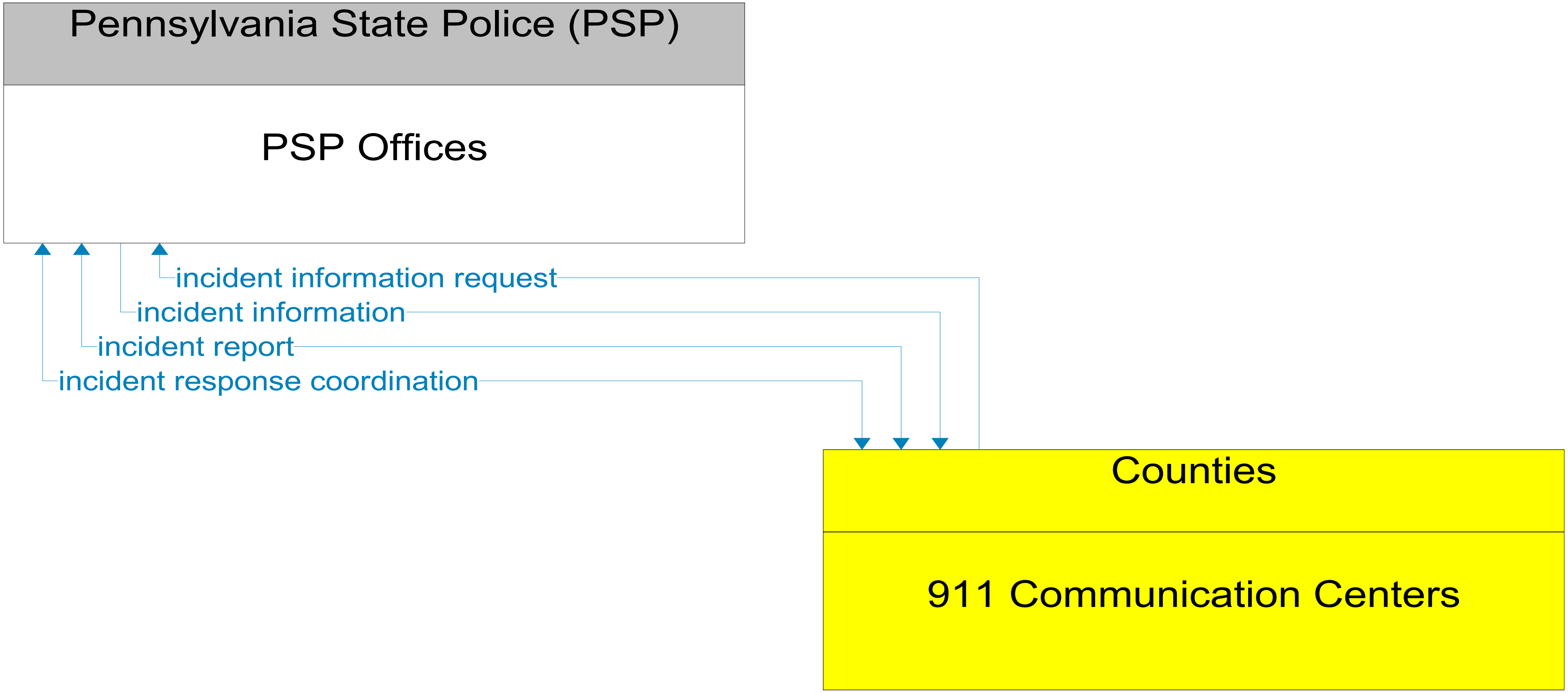
incident response coordination

Counties

911 Communication Centers

— Existing

-- Planned



Pennsylvania State Police (PSP)

PSP Offices

incident information request

incident information

incident report

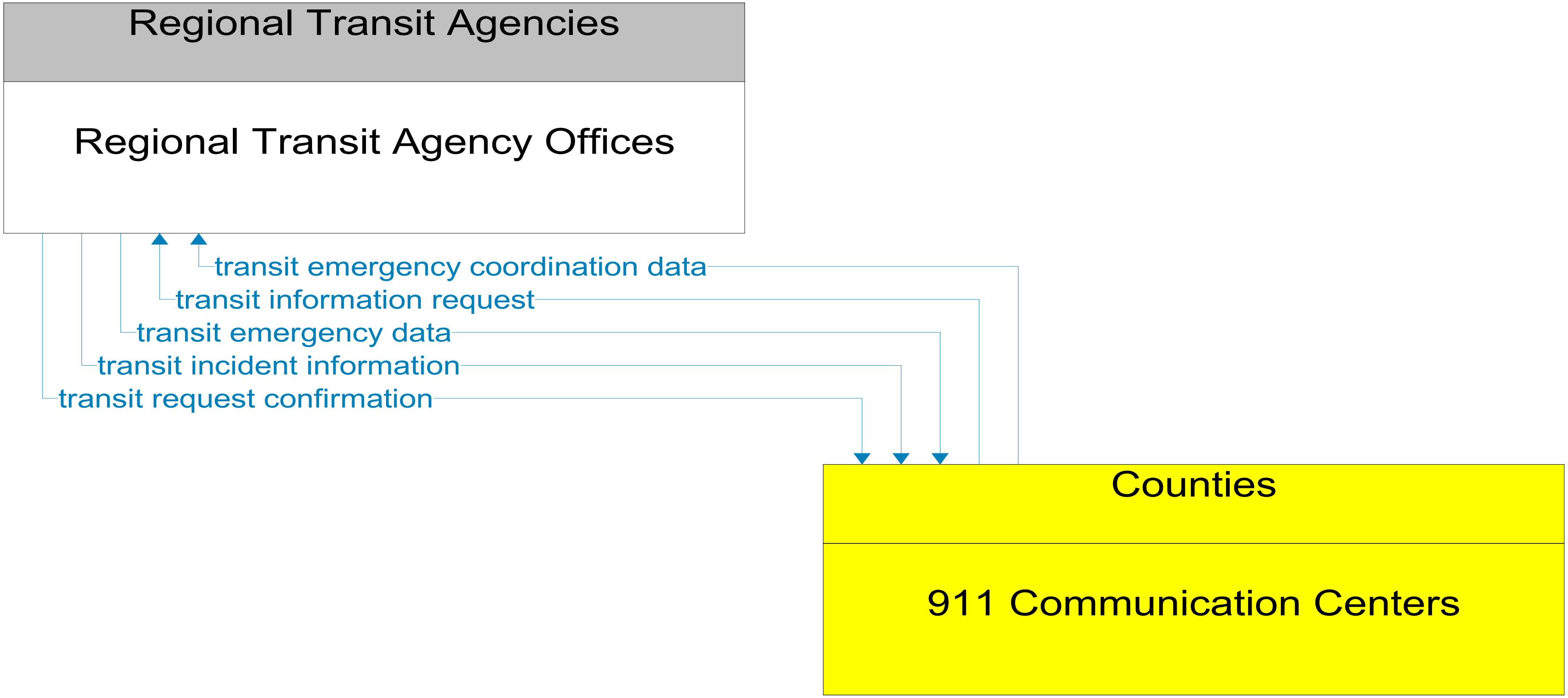
incident response coordination

Counties

911 Communication Centers

Existing

Planned



Regional Transit Agencies

Regional Transit Agency Offices

transit emergency coordination data

transit information request

transit emergency data

transit incident information

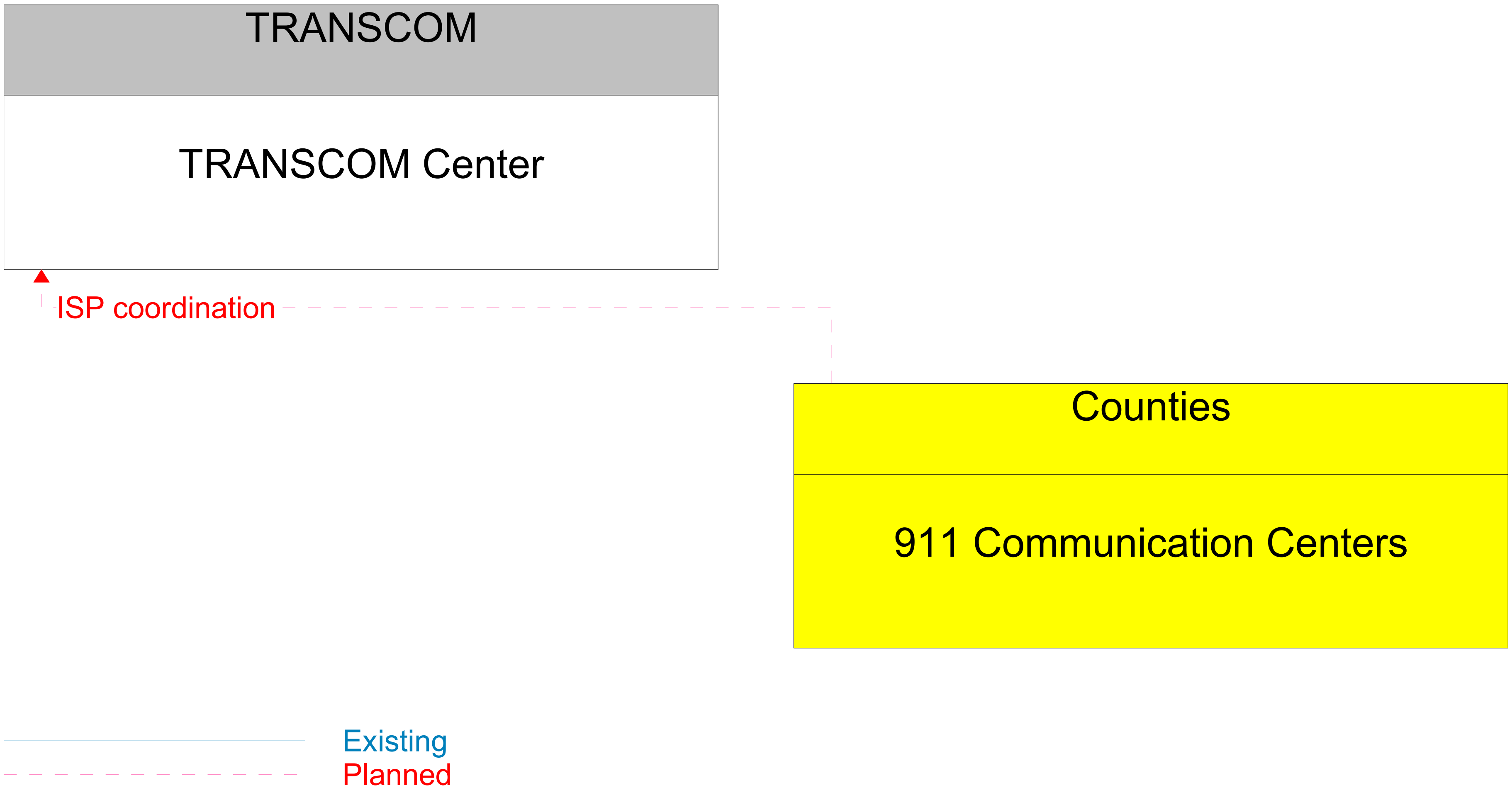
transit request confirmation

Counties

911 Communication Centers

Existing

Planned



TRANSCOM

TRANSCOM Center

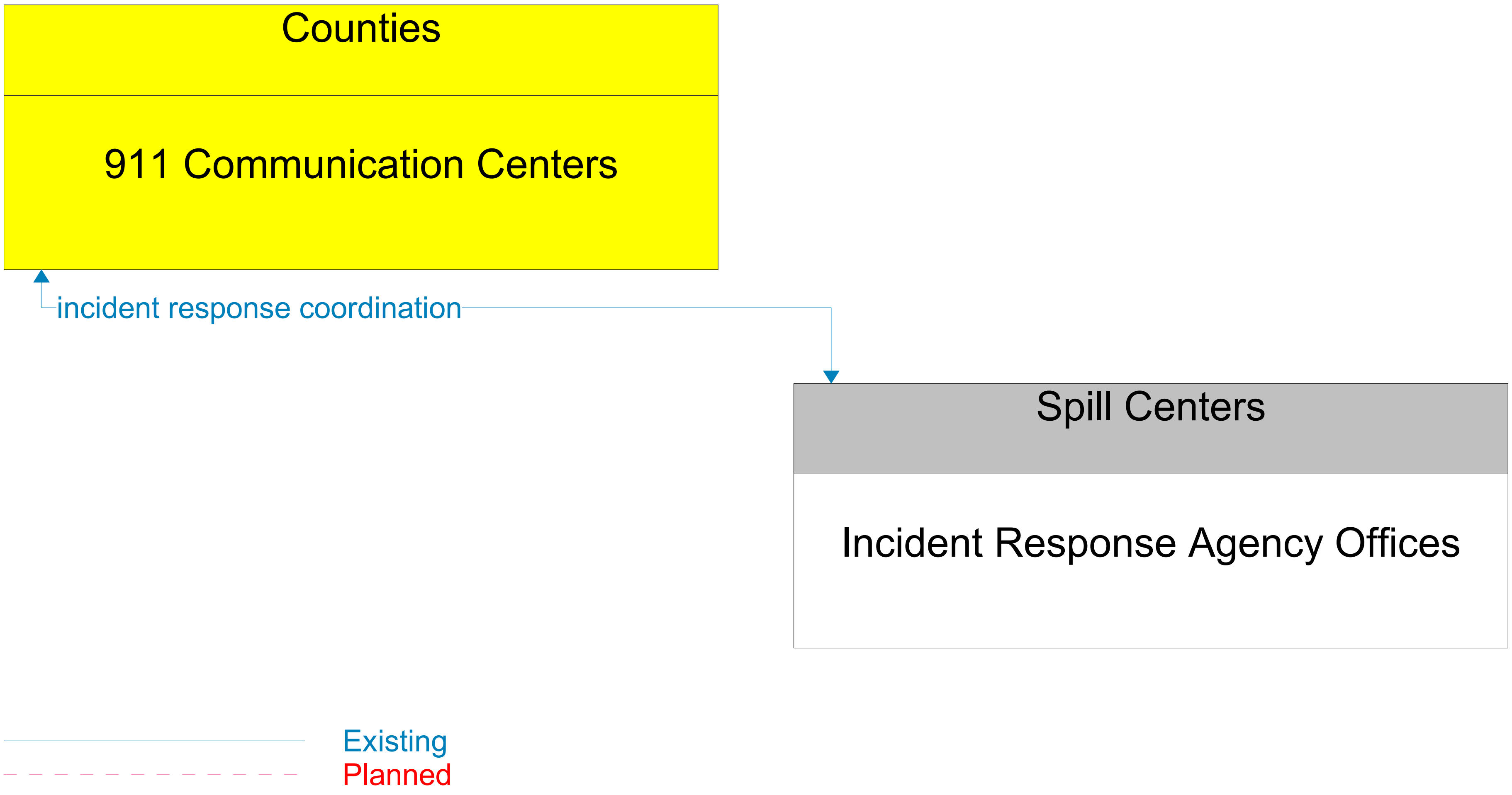
ISP coordination

Counties

911 Communication Centers

Existing

Planned



Counties

911 Communication Centers

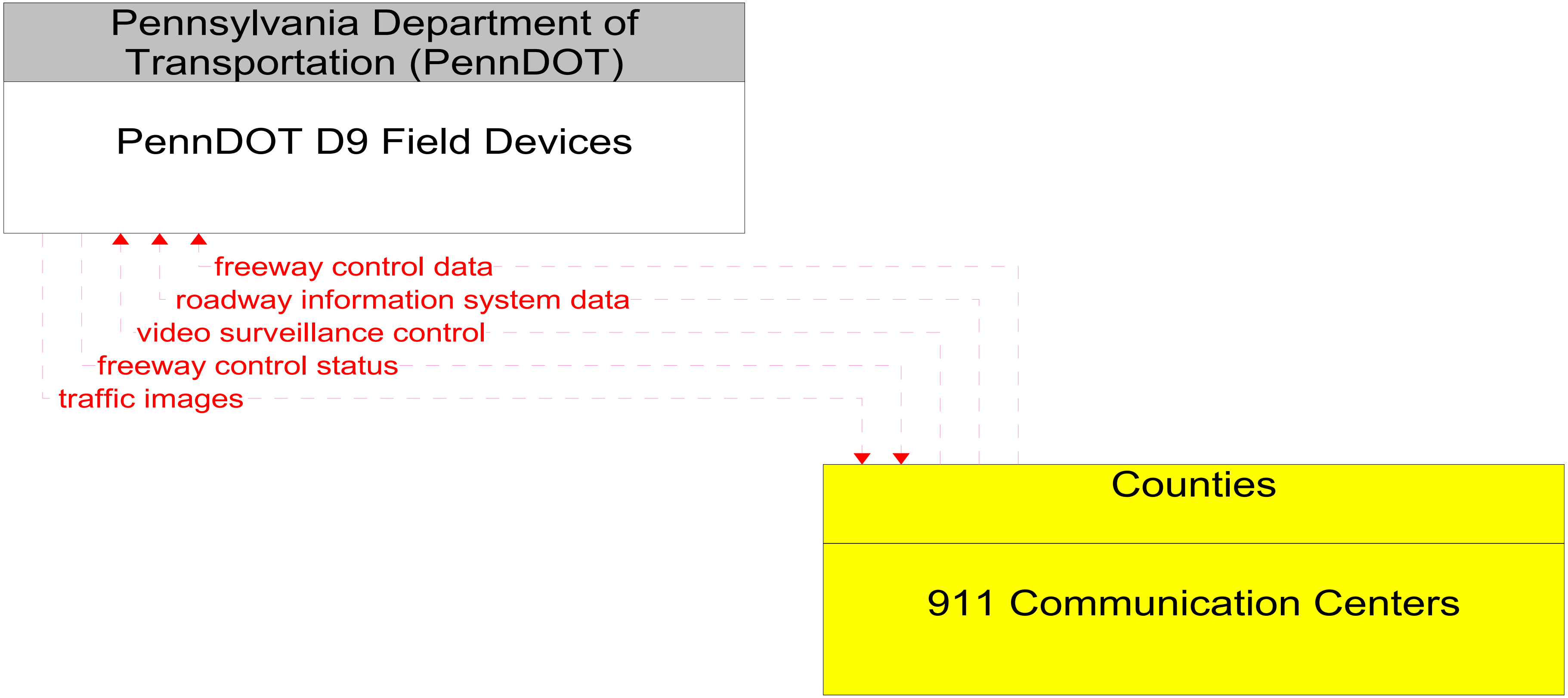
incident response coordination

Spill Centers

Incident Response Agency Offices

Existing

Planned



Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 Field Devices

freeway control data

roadway information system data

video surveillance control

freeway control status

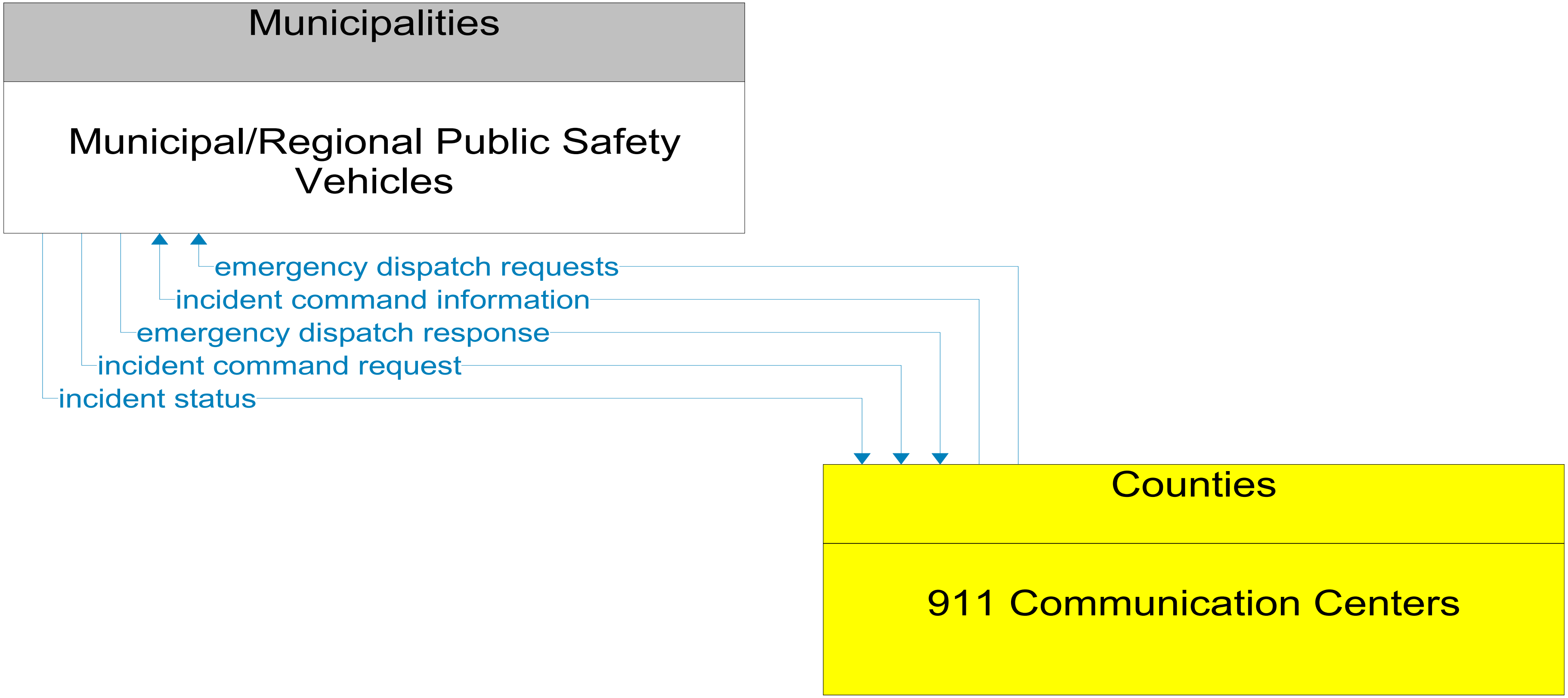
traffic images

Counties

911 Communication Centers

Existing

Planned



Municipalities

Municipal/Regional Public Safety Vehicles

emergency dispatch requests

incident command information

emergency dispatch response

incident command request

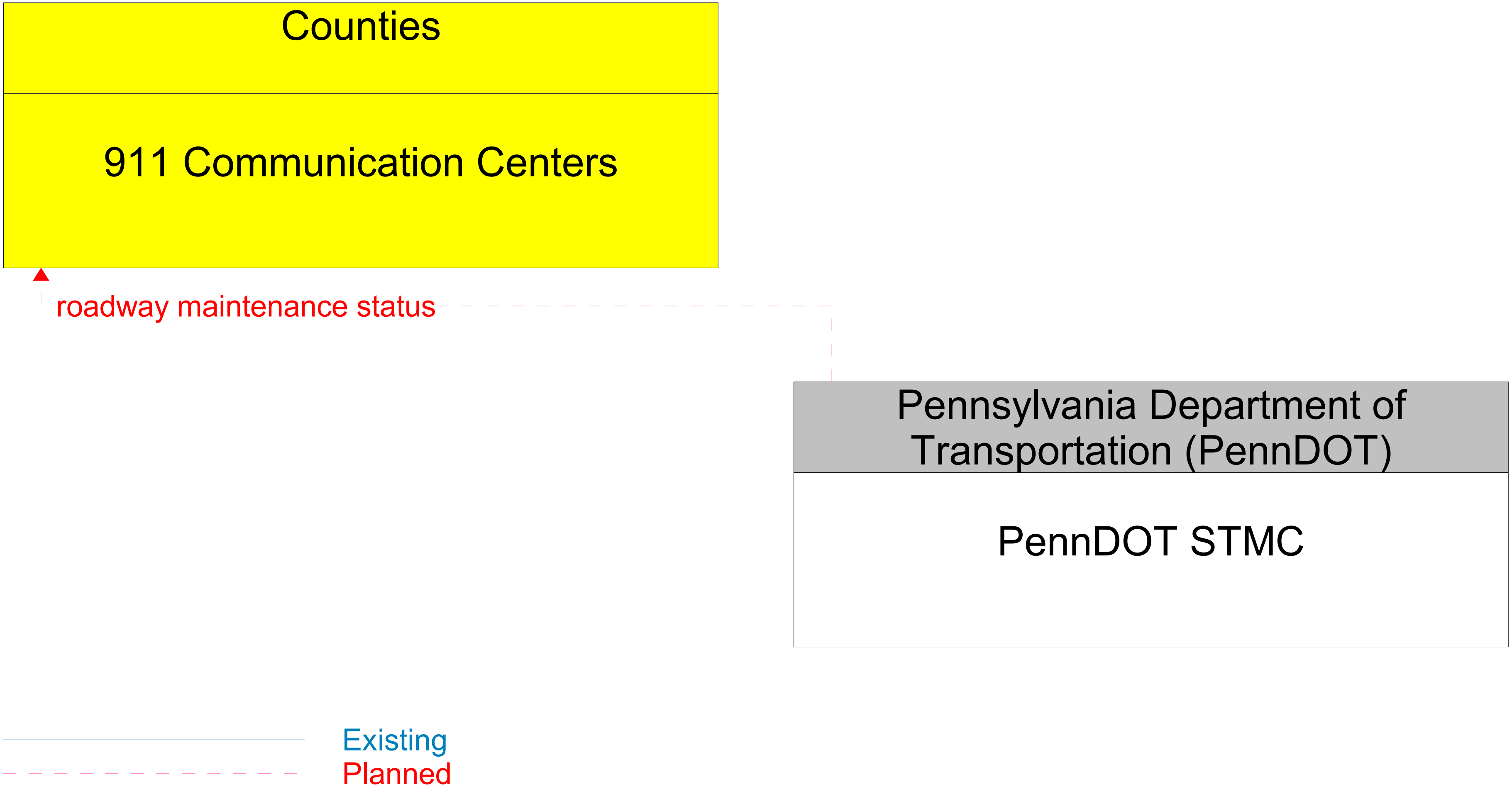
incident status

Counties

911 Communication Centers

Existing

Planned



Counties

911 Communication Centers

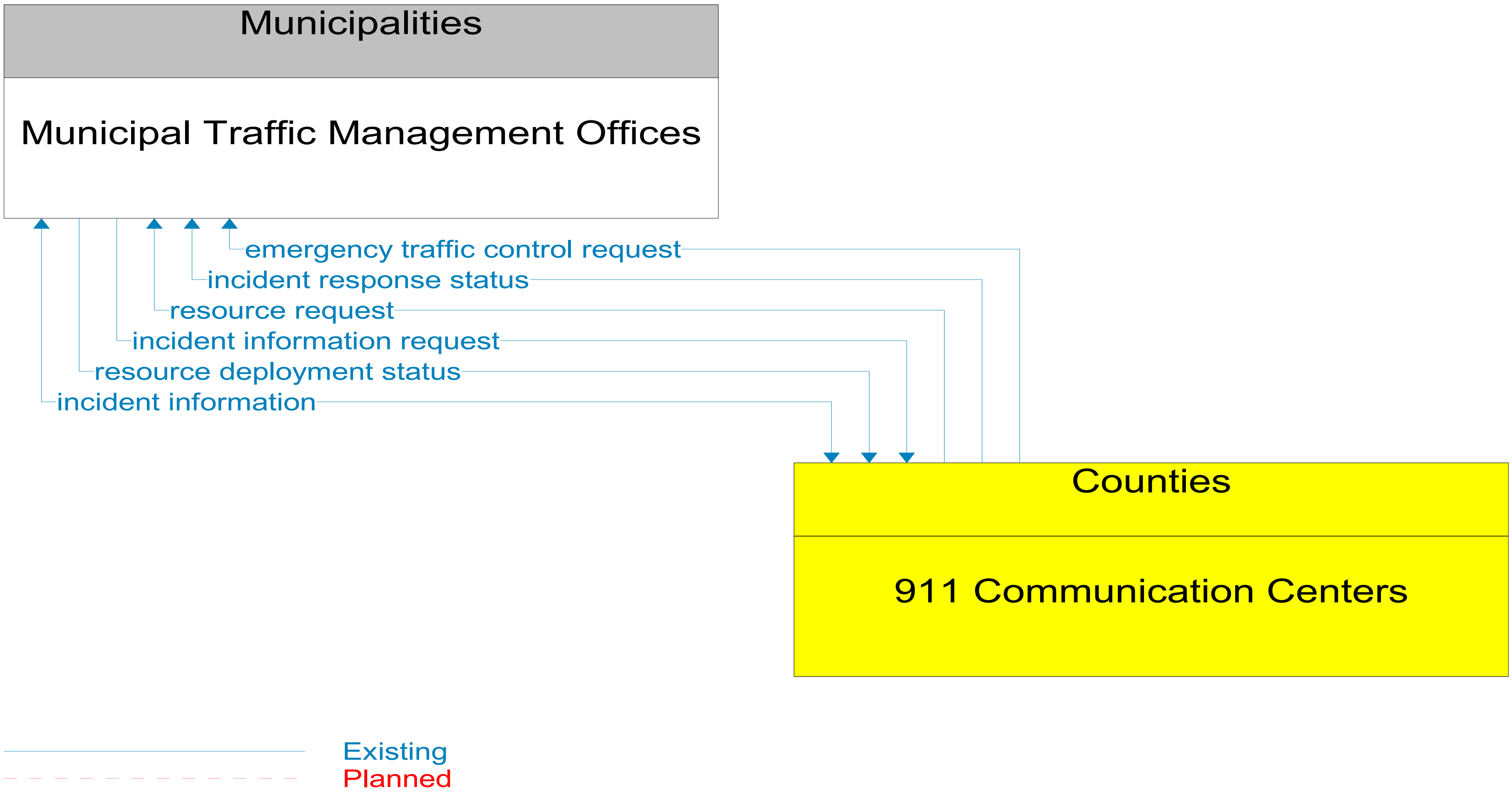
roadway maintenance status

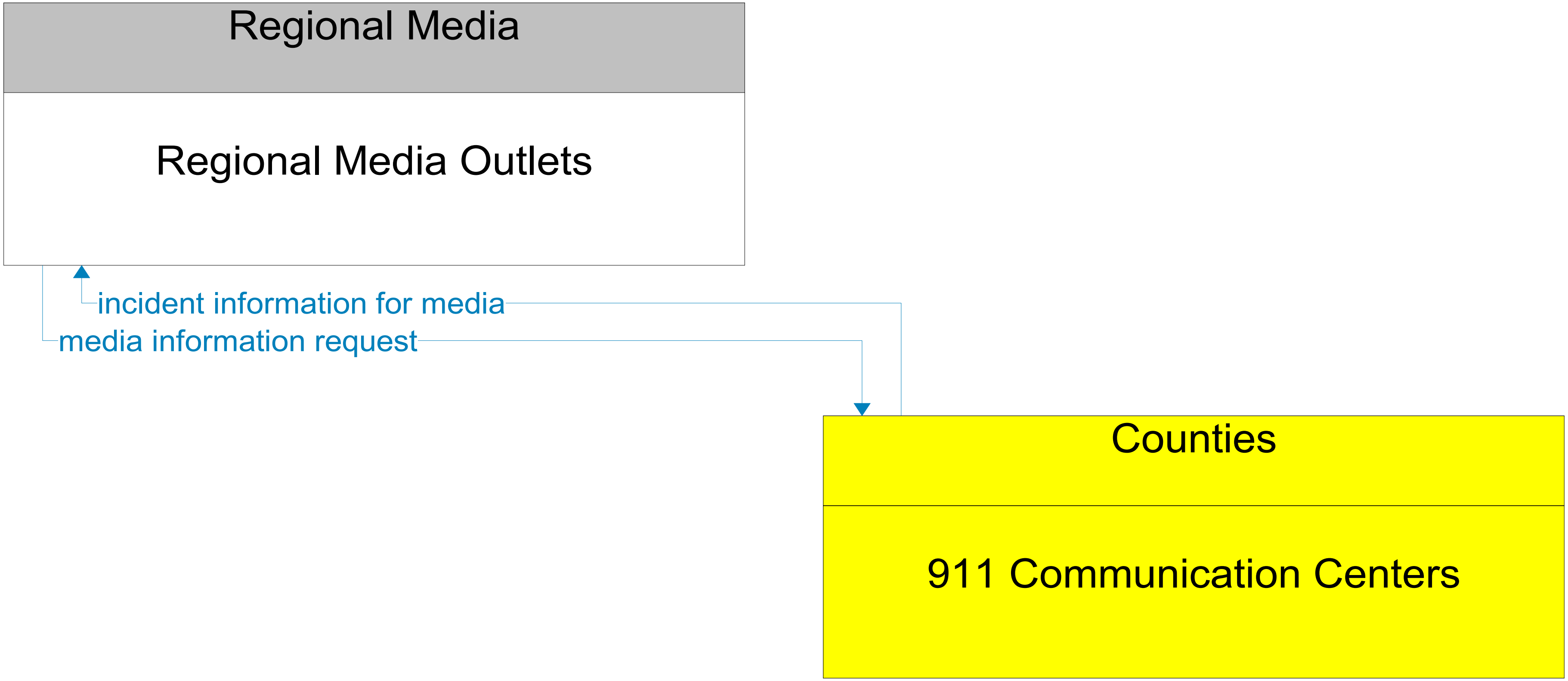
Pennsylvania Department of Transportation (PennDOT)

PennDOT STMC

Existing

Planned


Municipalities
Municipal Traffic Management Offices
emergency traffic control request
incident response status
resource request
incident information request
resource deployment status
incident information
Counties
911 Communication Centers
Existing
Planned



Regional Media

Regional Media Outlets

incident information for media

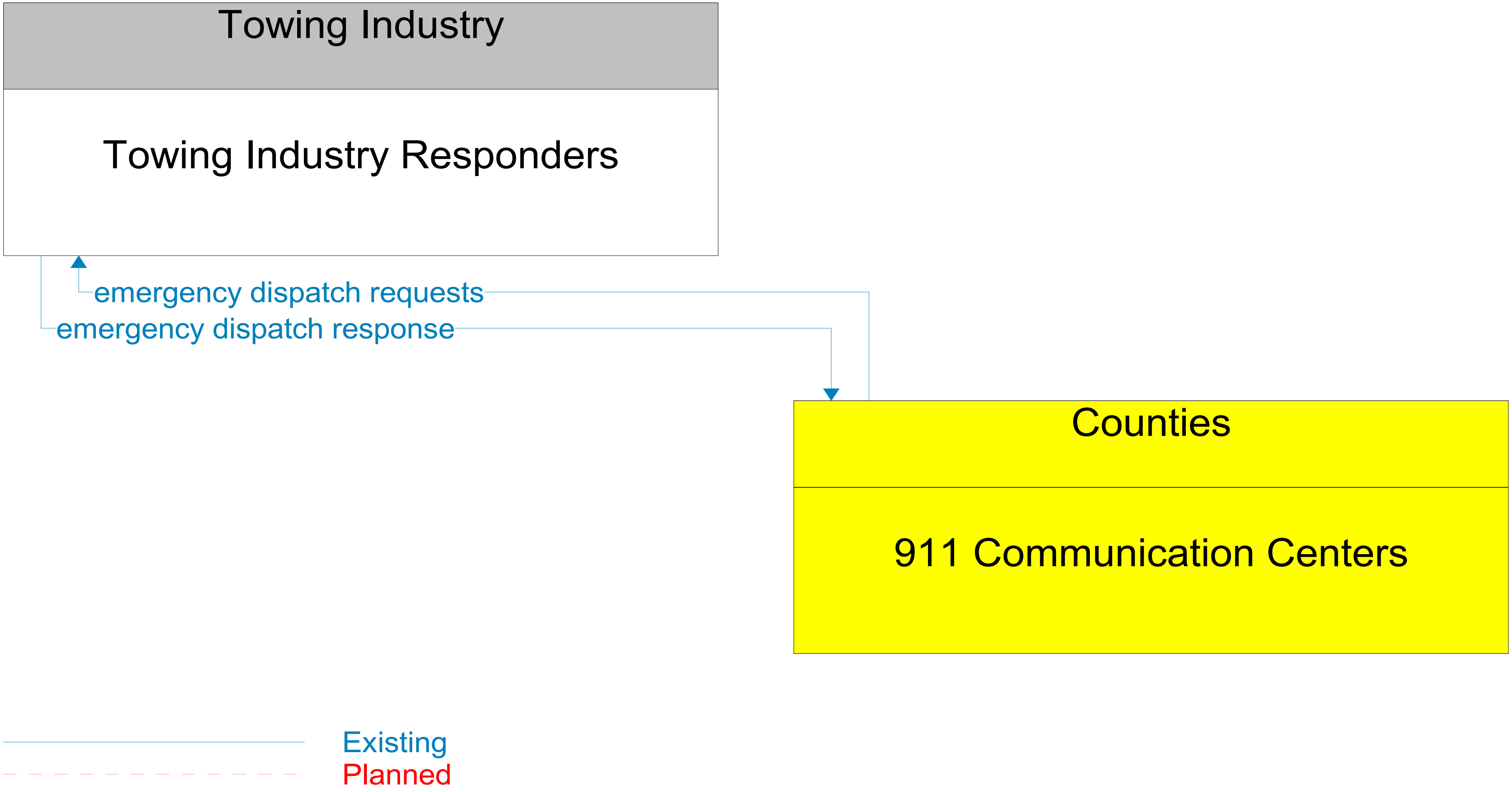
media information request

Counties

911 Communication Centers

Existing

Planned



Towing Industry

Towing Industry Responders

emergency dispatch requests

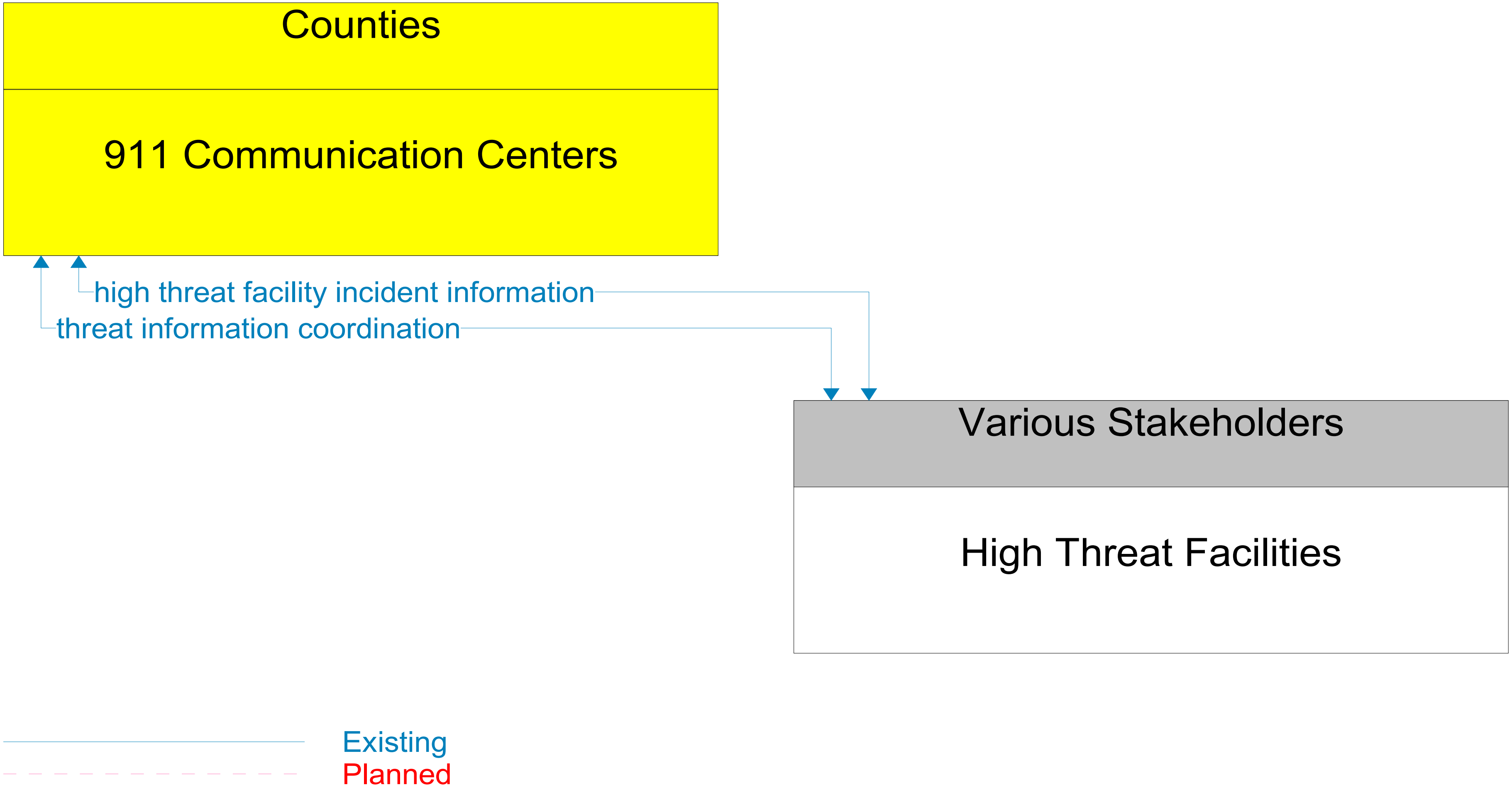
emergency dispatch response

Counties

911 Communication Centers

Existing

Planned



Counties

911 Communication Centers

high threat facility incident information

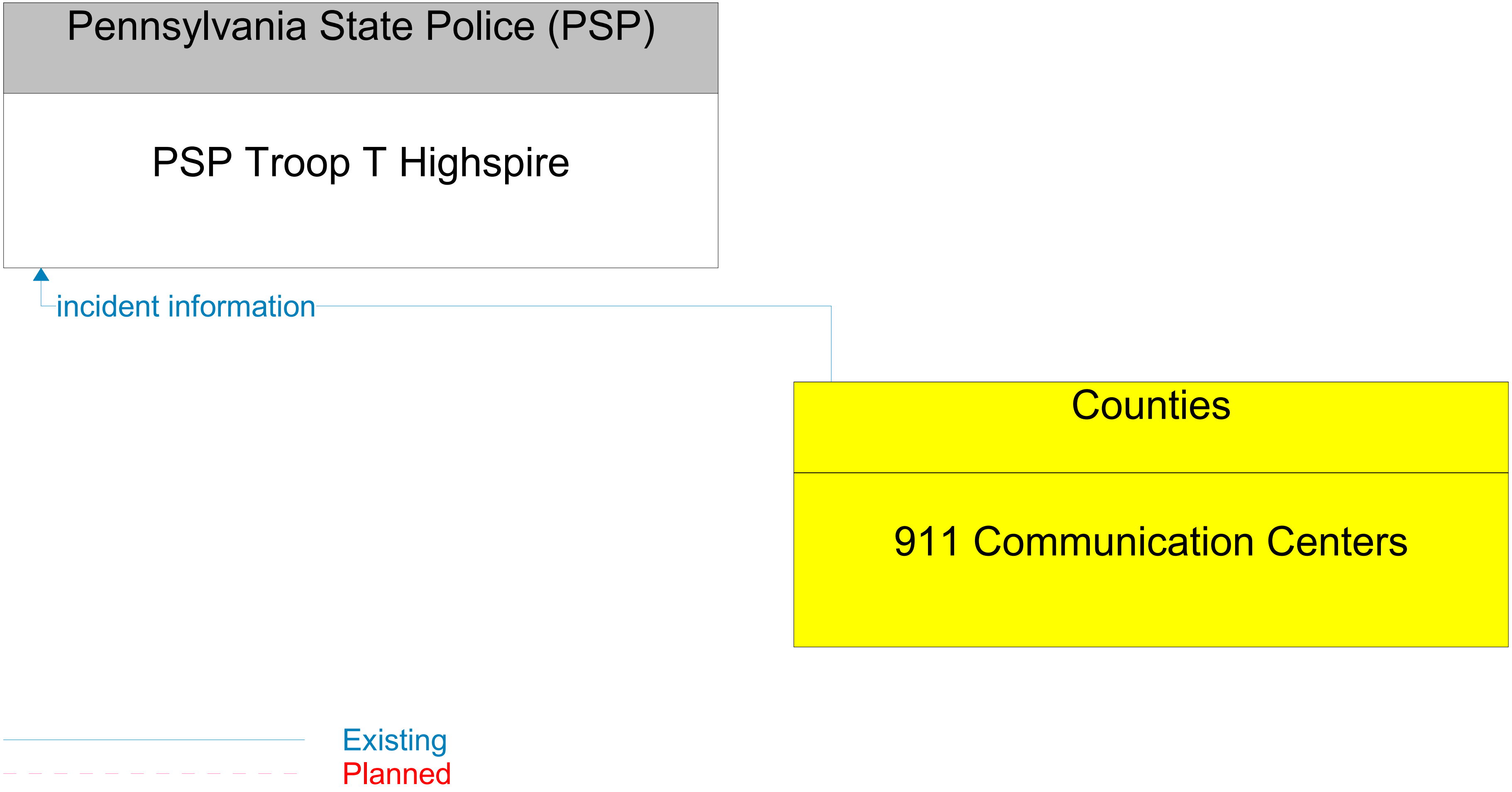
threat information coordination

Various Stakeholders

High Threat Facilities

Existing

Planned



Pennsylvania State Police (PSP)

PSP Troop T Highspire

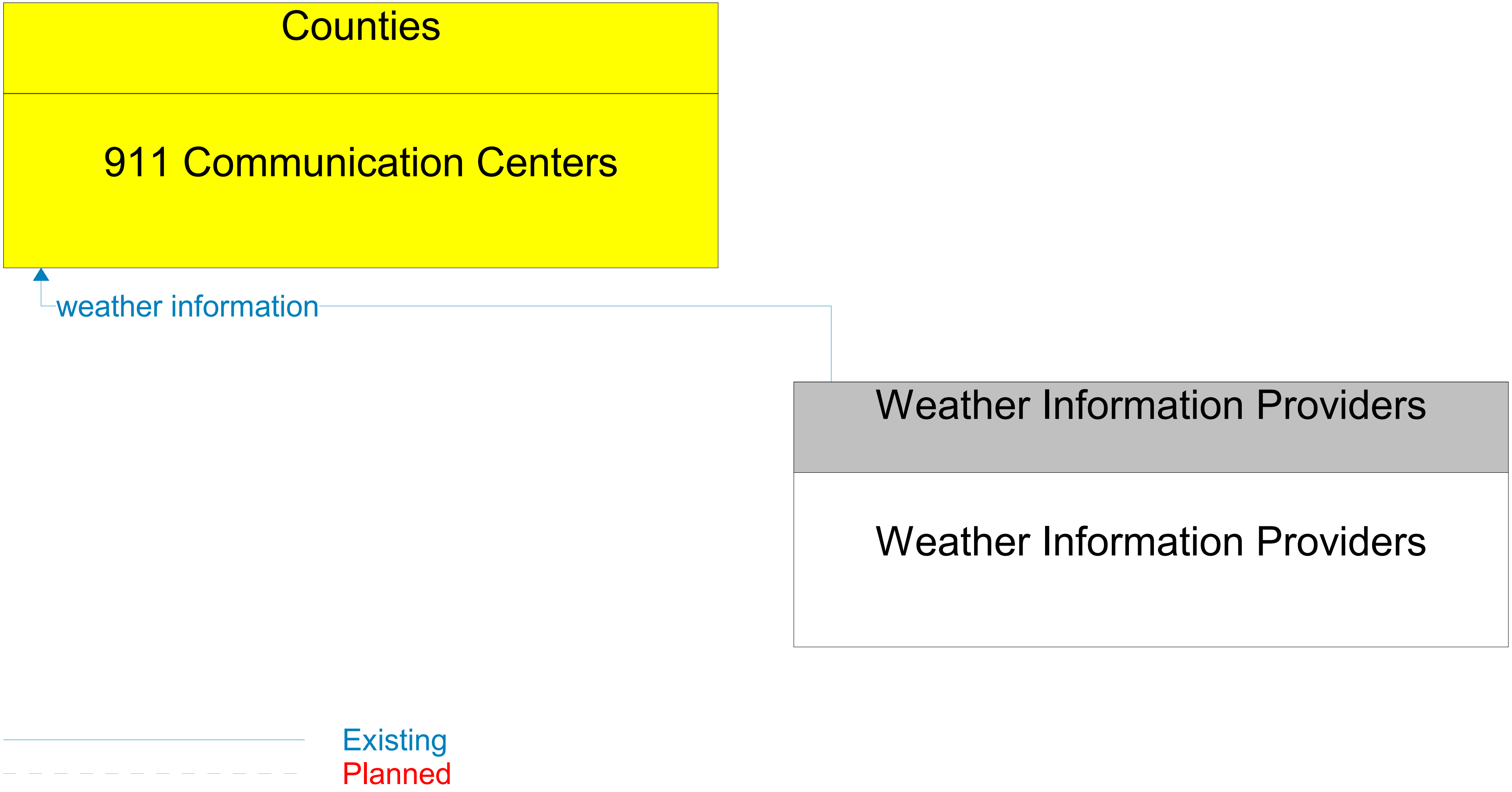
incident information

Counties

911 Communication Centers

Existing

Planned



Counties

911 Communication Centers

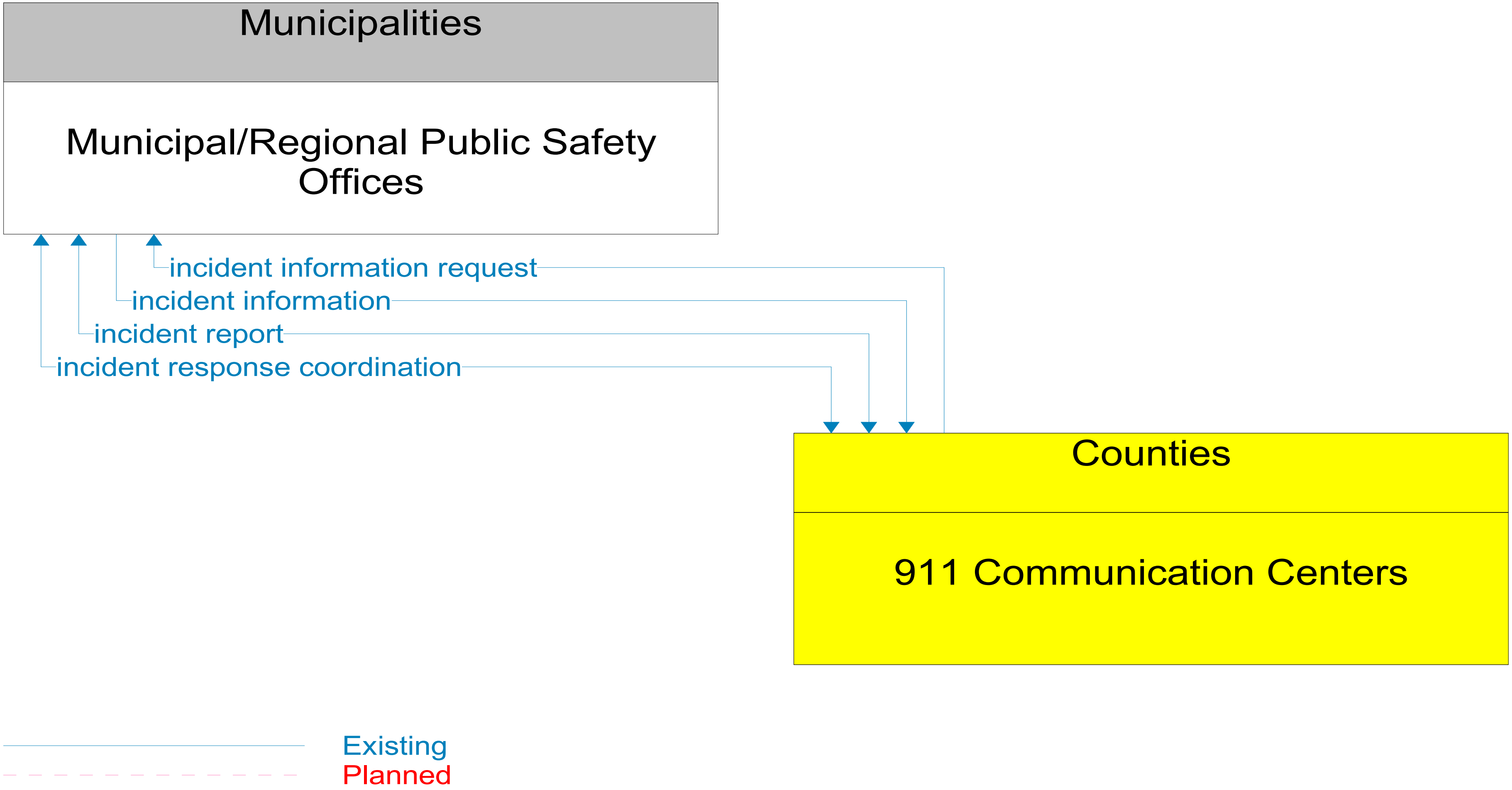
weather information

Weather Information Providers

Weather Information Providers

Existing

Planned



Municipalities

Municipal/Regional Public Safety Offices

incident information request

incident information

incident report

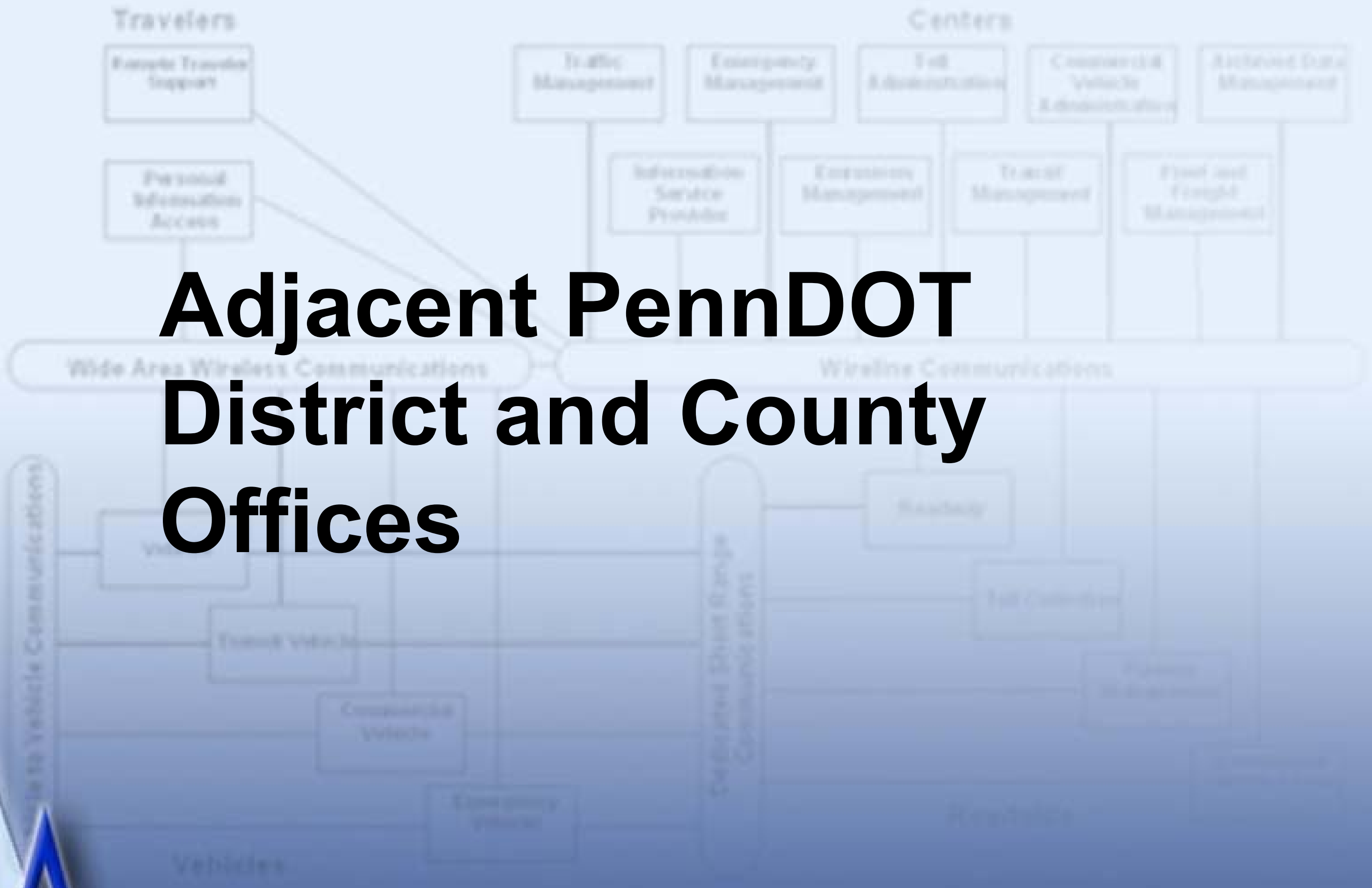
incident response coordination

Counties

911 Communication Centers

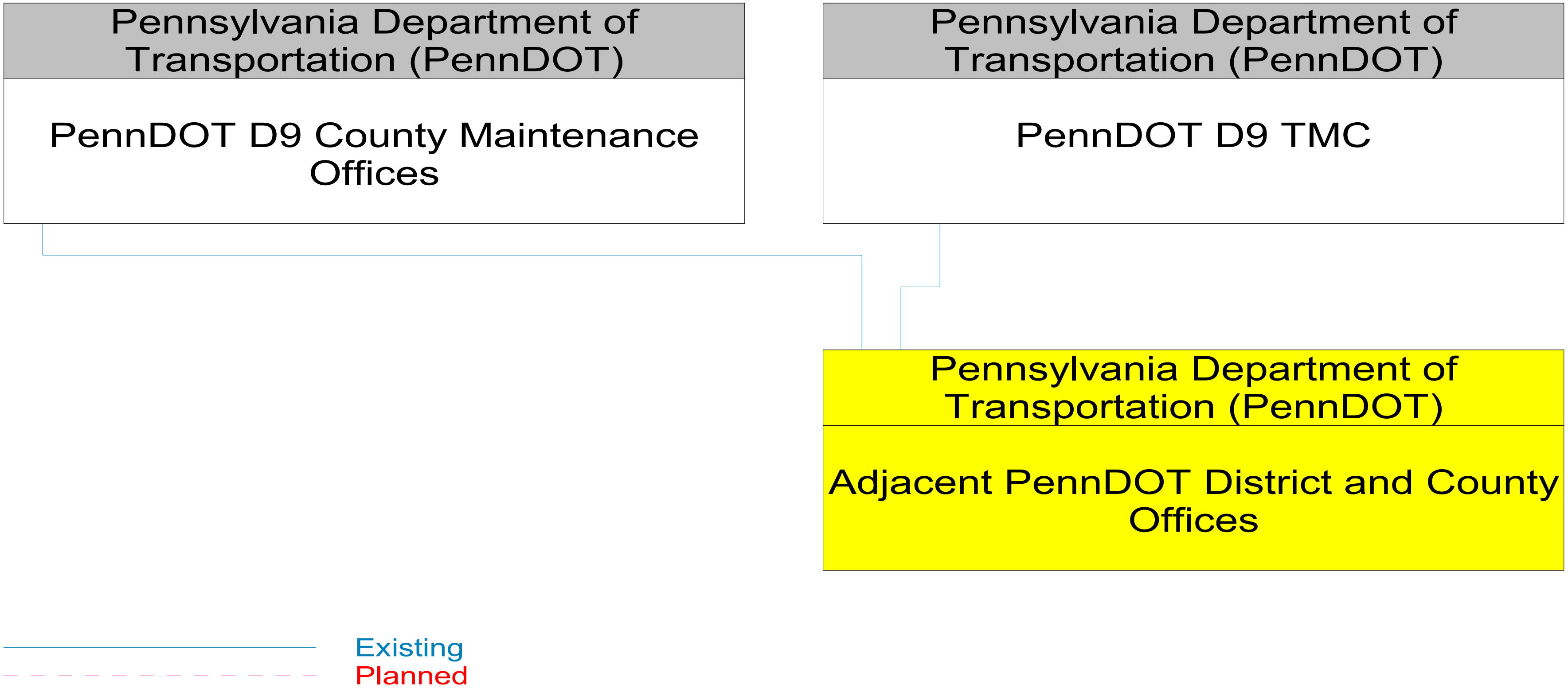
Existing

Planned



Adjacent PennDOT District and County Offices

Adjacent PennDOT District and County Offices Interconnect Diagram



Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 County Maintenance Offices

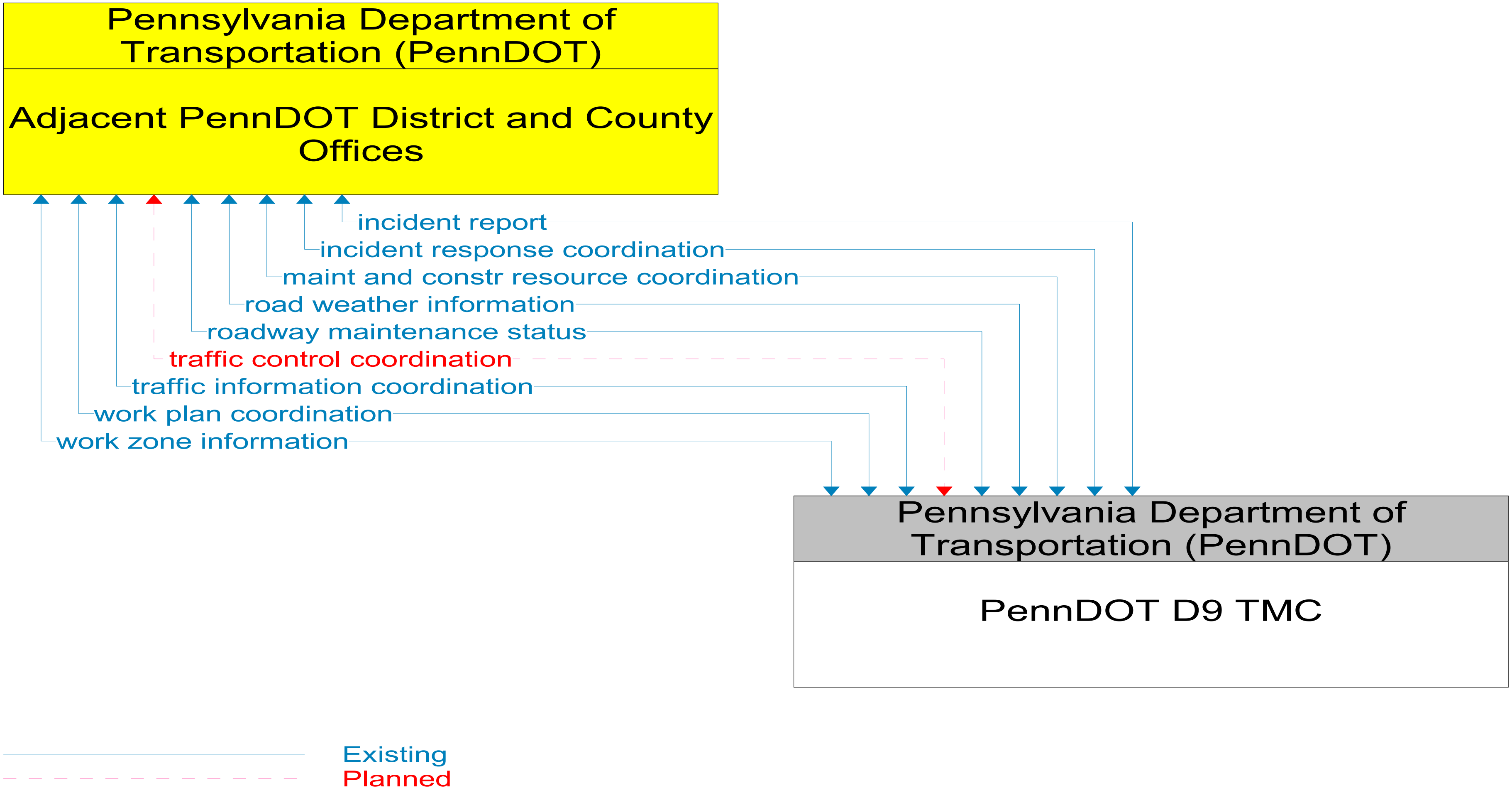
Pennsylvania Department of Transportation (PennDOT)

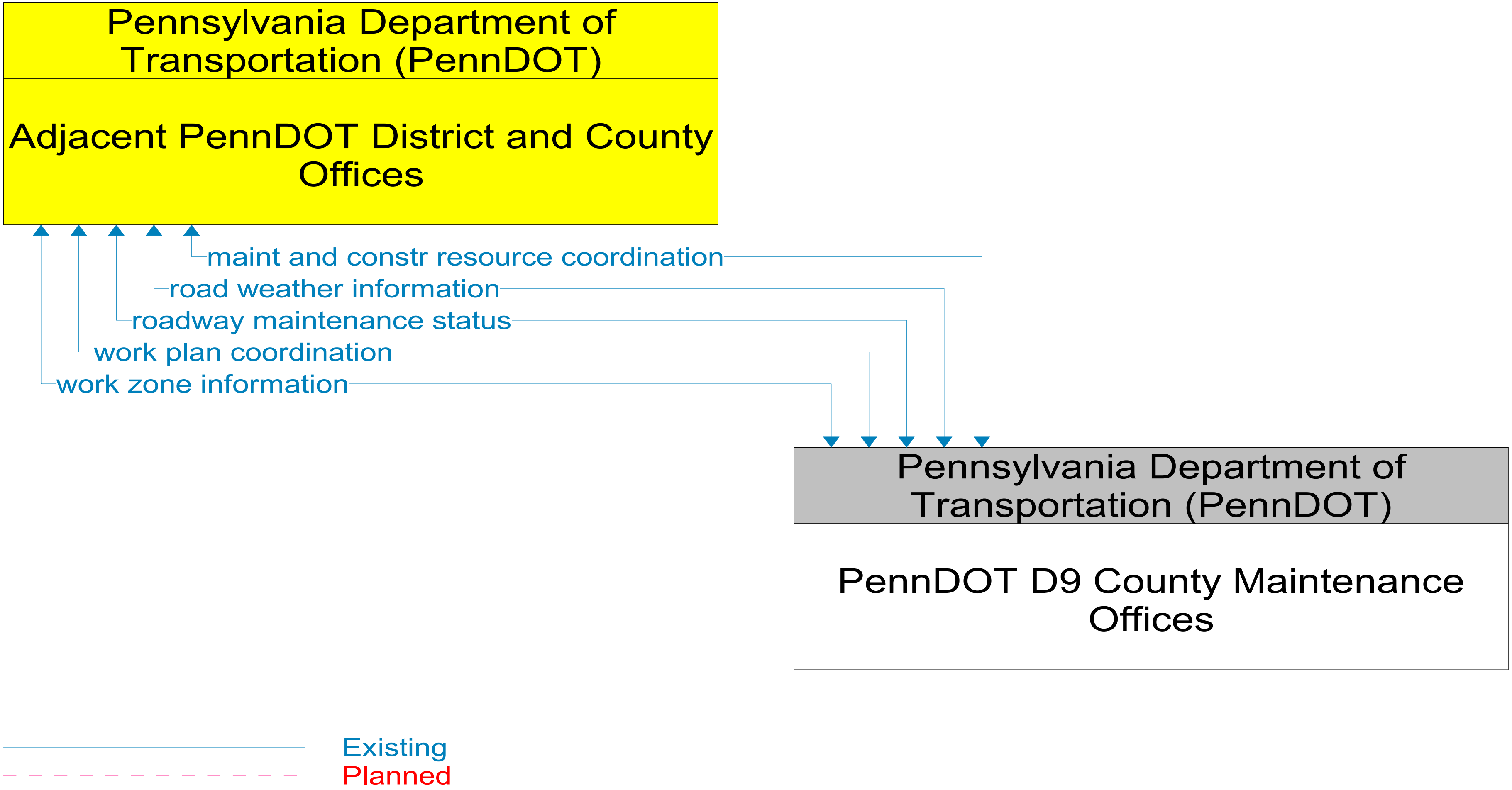
PennDOT D9 TMC

Pennsylvania Department of Transportation (PennDOT)

Adjacent PennDOT District and County Offices

Existing
Planned


Pennsylvania Department of Transportation (PennDOT)
Adjacent PennDOT District and County Offices
incident report
incident response coordination
maint and constr resource coordination
road weather information
roadway maintenance status
traffic control coordination
traffic information coordination
work plan coordination
work zone information
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
Existing
Planned



Pennsylvania Department of Transportation (PennDOT)

Adjacent PennDOT District and County Offices

maint and constr resource coordination

road weather information

roadway maintenance status

work plan coordination

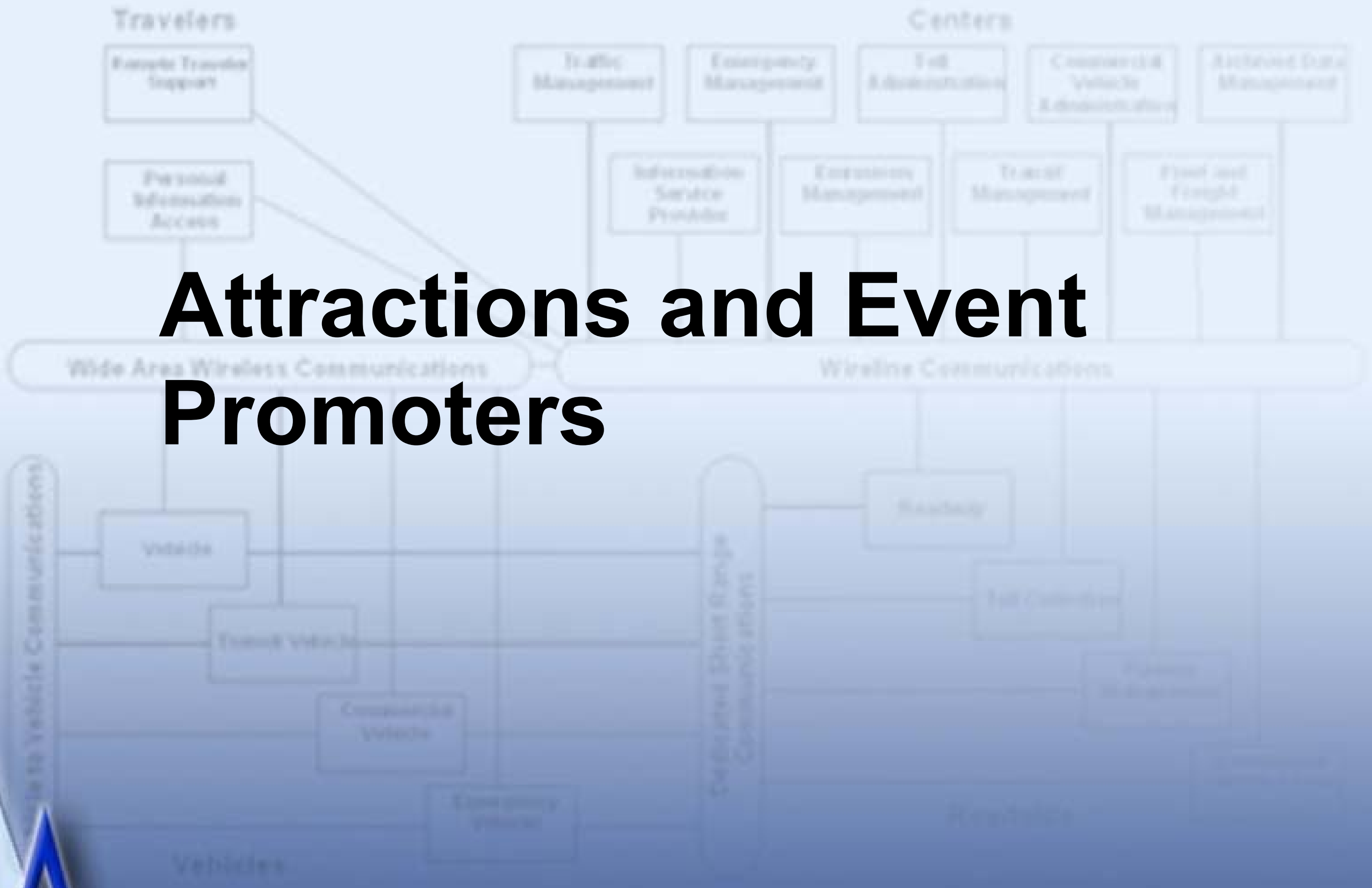
work zone information

Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 County Maintenance Offices

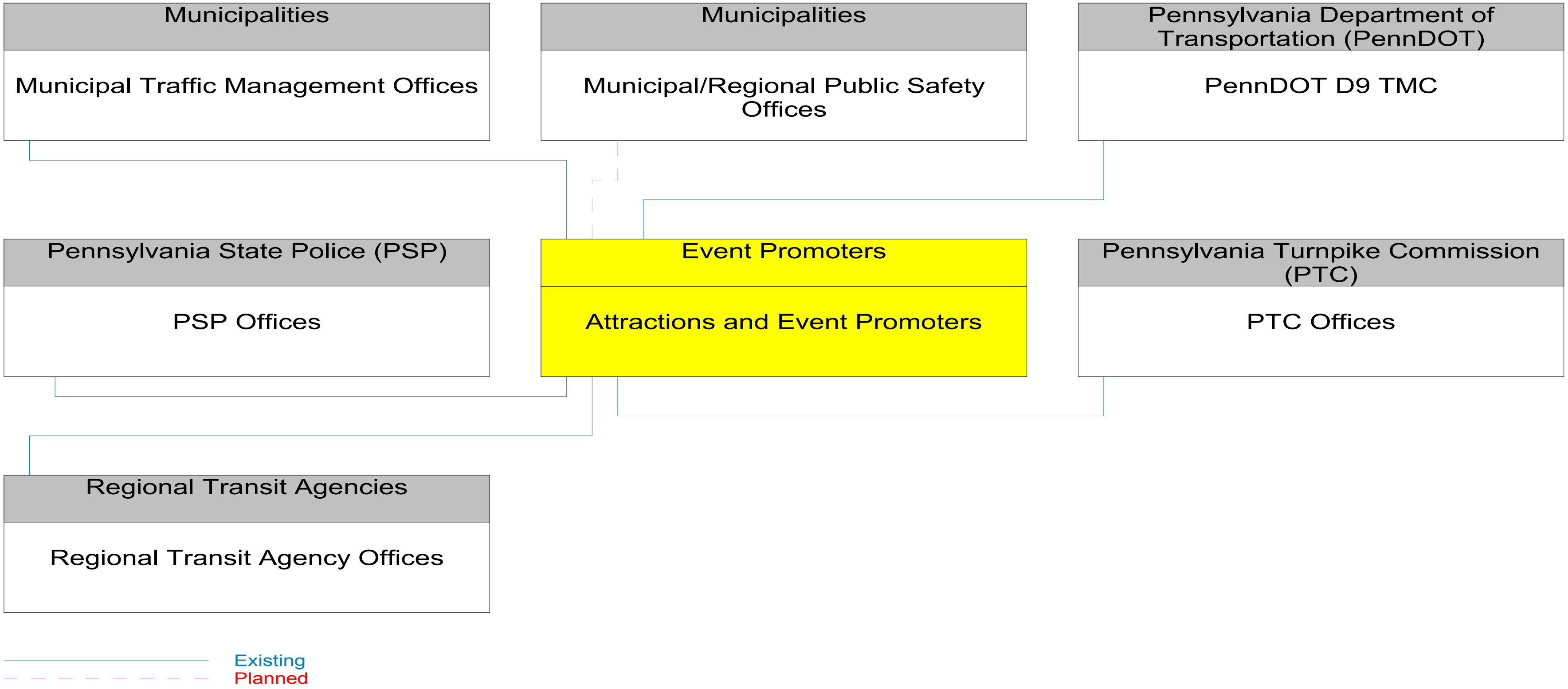
Existing

Planned



Attractions and Event Promoters

Attractions and Event Promoters Interconnect Diagram



Municipalities

Municipal Traffic Management Offices

Municipalities

Municipal/Regional Public Safety Offices

Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 TMC

Pennsylvania State Police (PSP)

PSP Offices

Event Promoters

Attractions and Event Promoters

Pennsylvania Turnpike Commission (PTC)

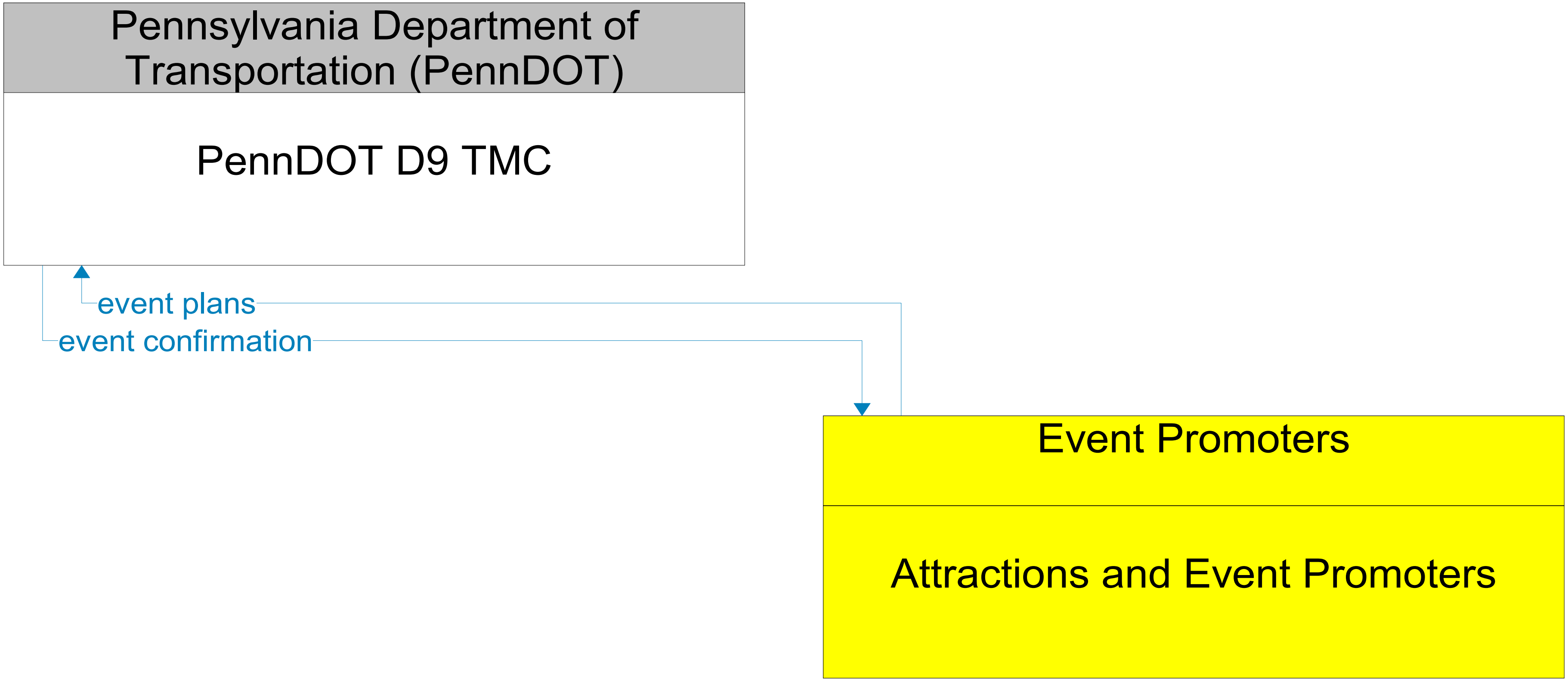
PTC Offices

Regional Transit Agencies

Regional Transit Agency Offices

Existing

Planned



Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 TMC

event plans

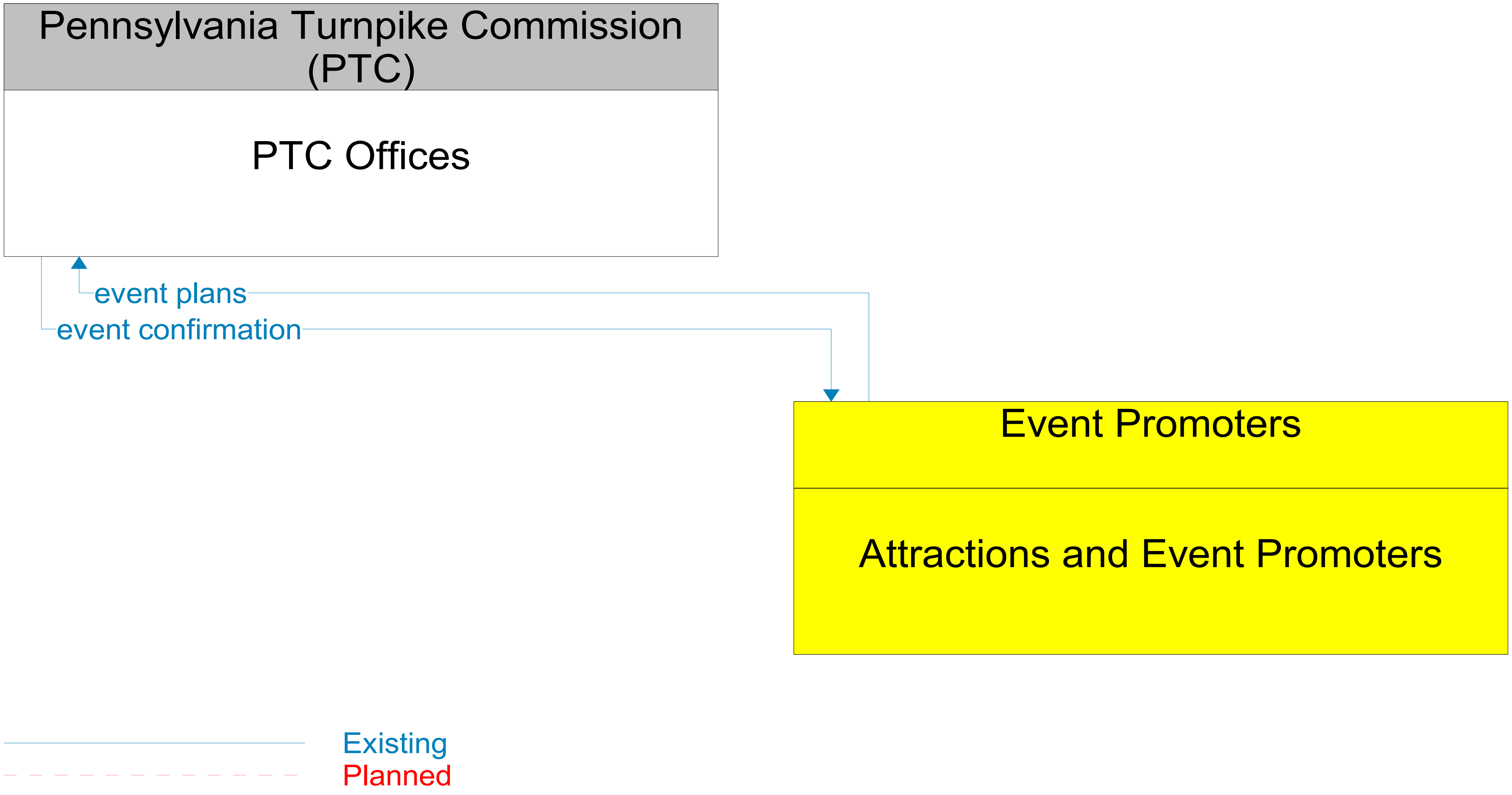
event confirmation

Event Promoters

Attractions and Event Promoters

Existing

Planned



Pennsylvania Turnpike Commission (PTC)

PTC Offices

event plans

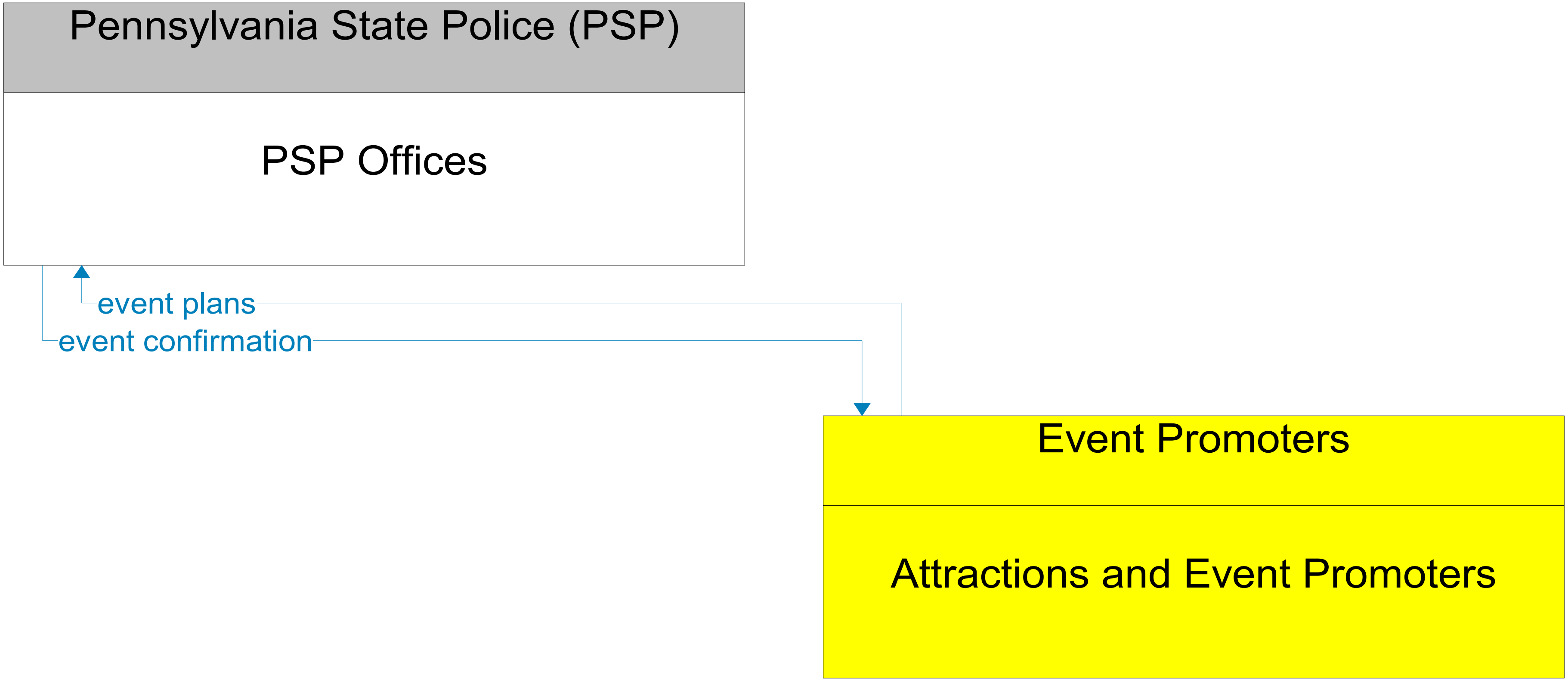
event confirmation

Event Promoters

Attractions and Event Promoters

Existing

Planned



Pennsylvania State Police (PSP)

PSP Offices

event plans

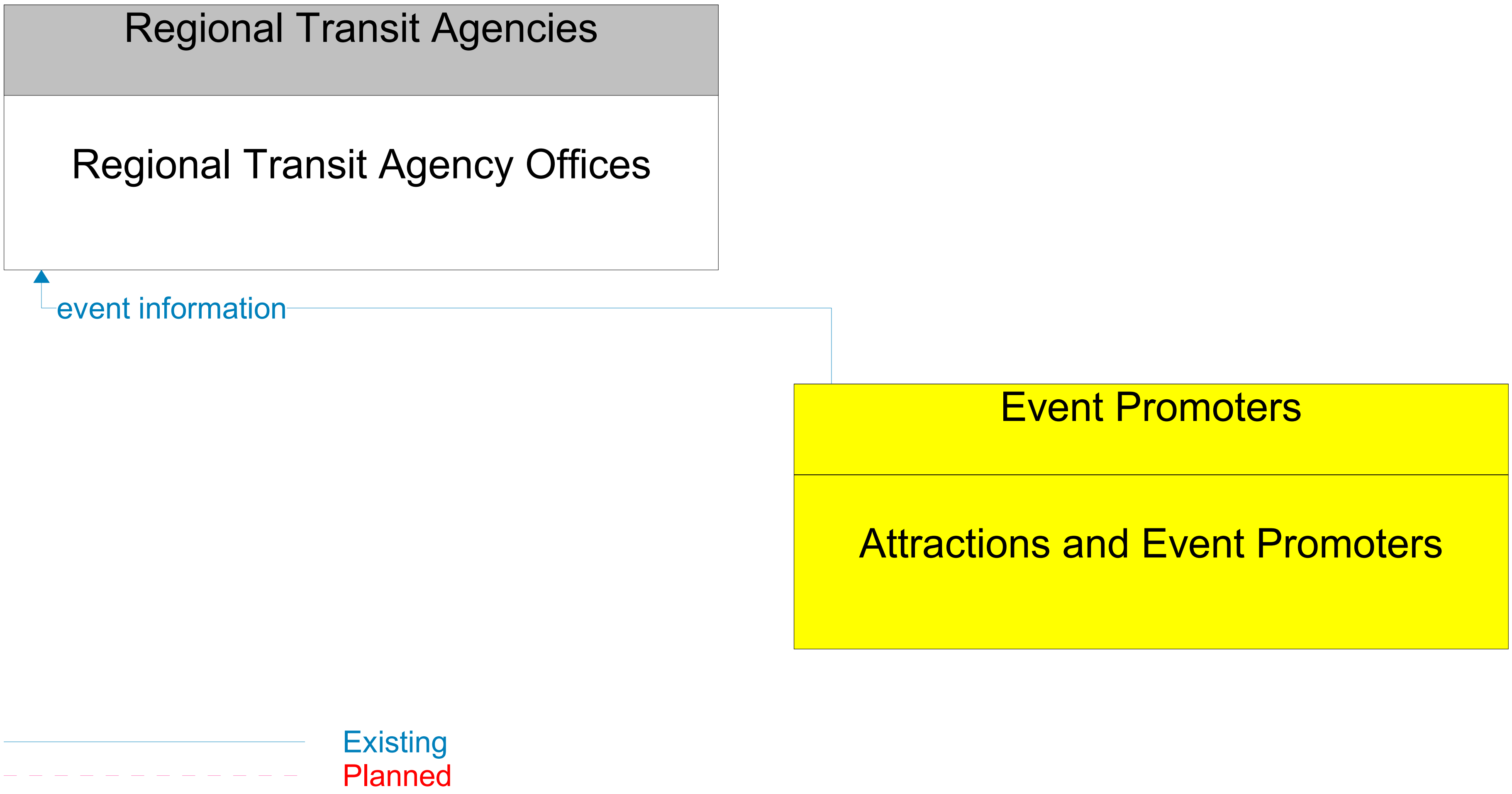
event confirmation

Event Promoters

Attractions and Event Promoters

Existing

Planned



Regional Transit Agencies

Regional Transit Agency Offices

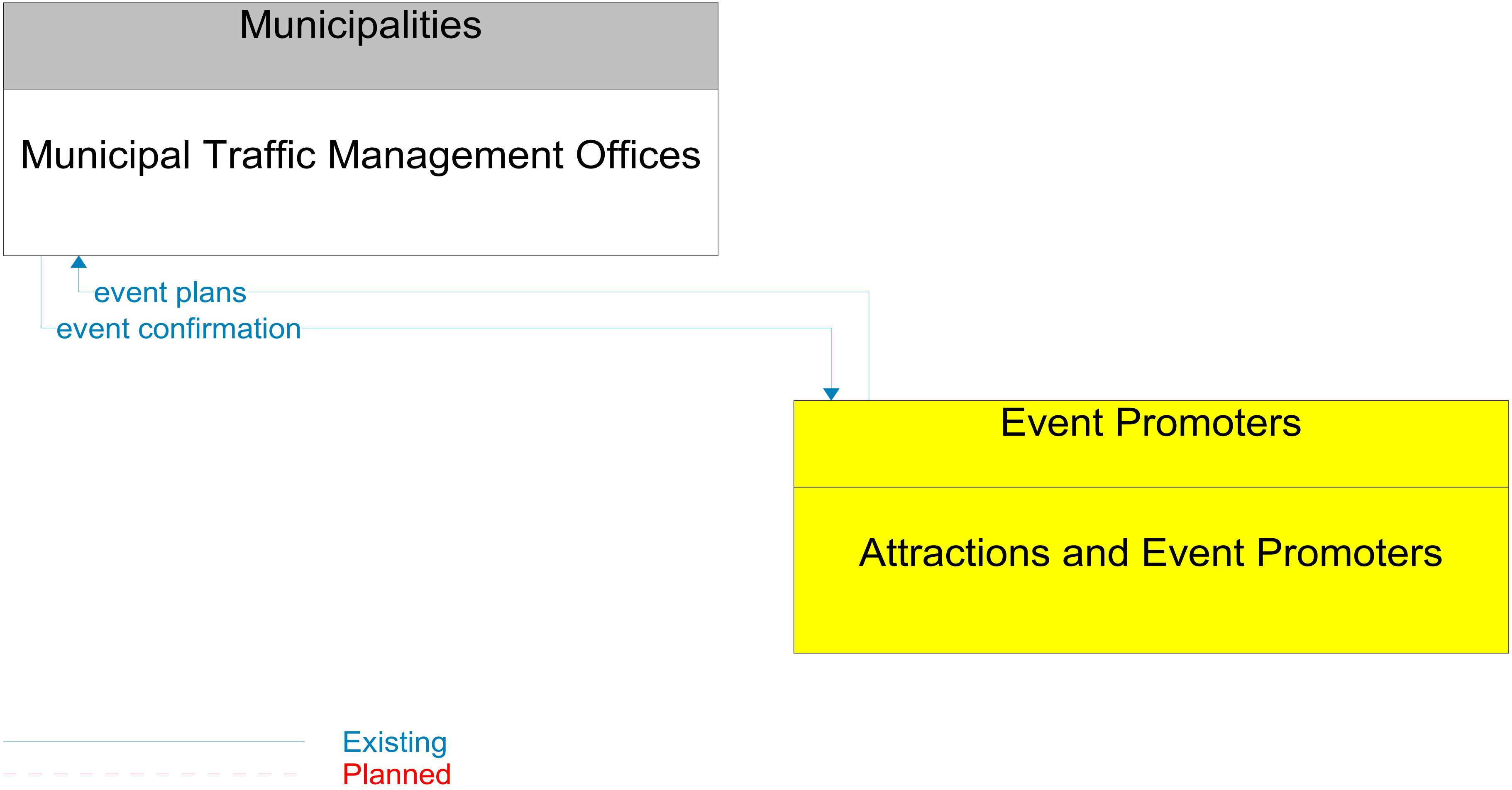
event information

Event Promoters

Attractions and Event Promoters

Existing

Planned



Municipalities

Municipal Traffic Management Offices

event plans

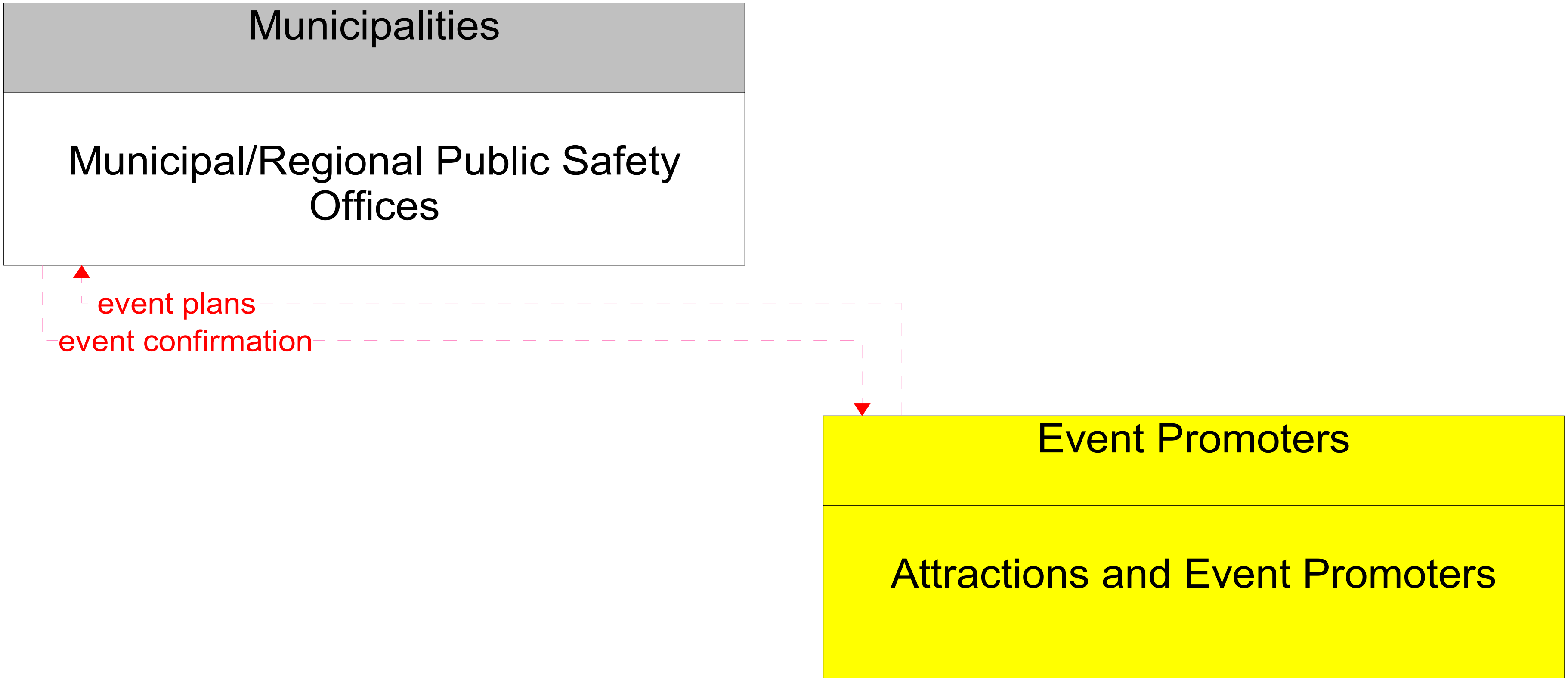
event confirmation

Event Promoters

Attractions and Event Promoters

Existing

Planned



Municipalities

Municipal/Regional Public Safety Offices

event plans

event confirmation

Event Promoters

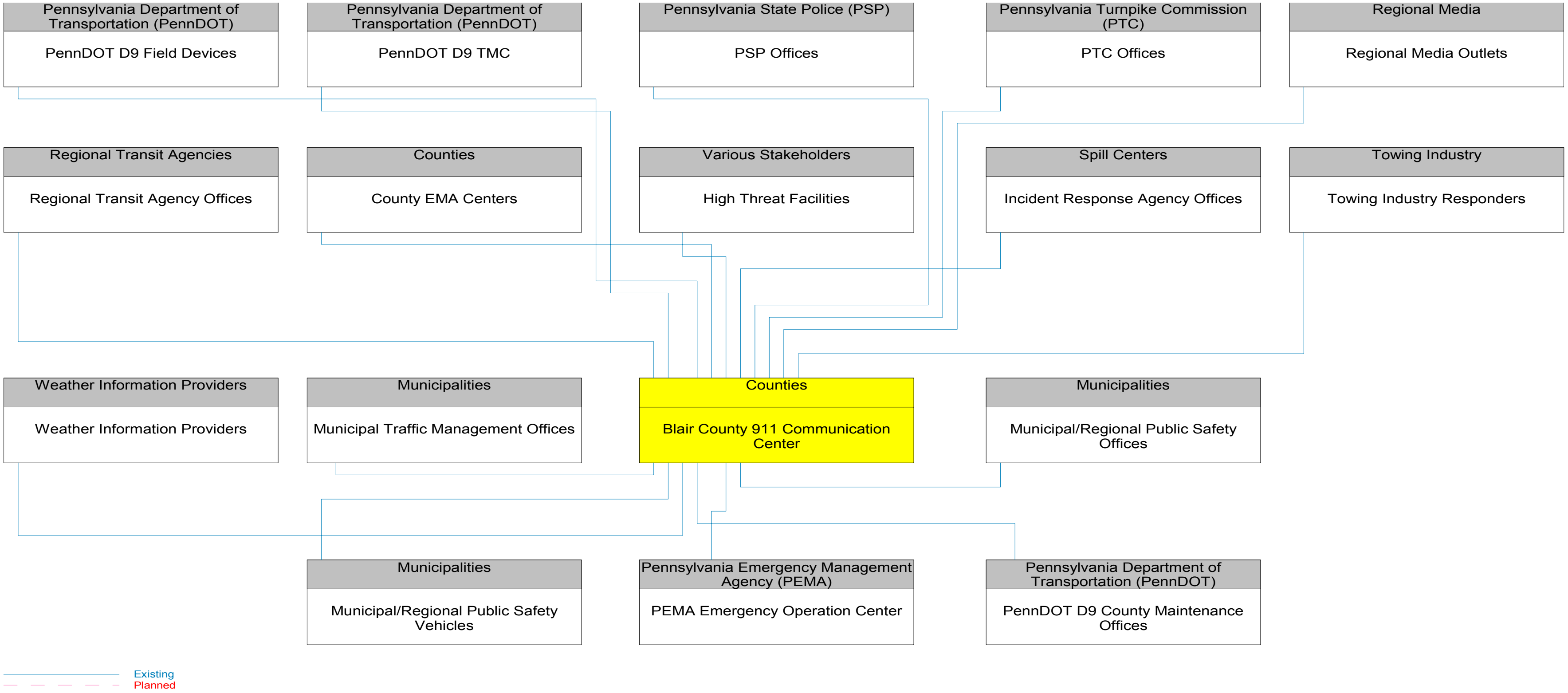
Attractions and Event Promoters

Existing

Planned

Blair County 911 Communication Center

Blair County 911 Communication Center Interconnect Diagram



Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 Field Devices

Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC

Pennsylvania State Police (PSP)
PSP Offices

Pennsylvania Turnpike Commission (PTC)
PTC Offices

Regional Media
Regional Media Outlets

Regional Transit Agencies
Regional Transit Agency Offices

Counties
County EMA Centers

Various Stakeholders
High Threat Facilities

Spill Centers
Incident Response Agency Offices

Towing Industry
Towing Industry Responders

Weather Information Providers
Weather Information Providers

Municipalities
Municipal Traffic Management Offices

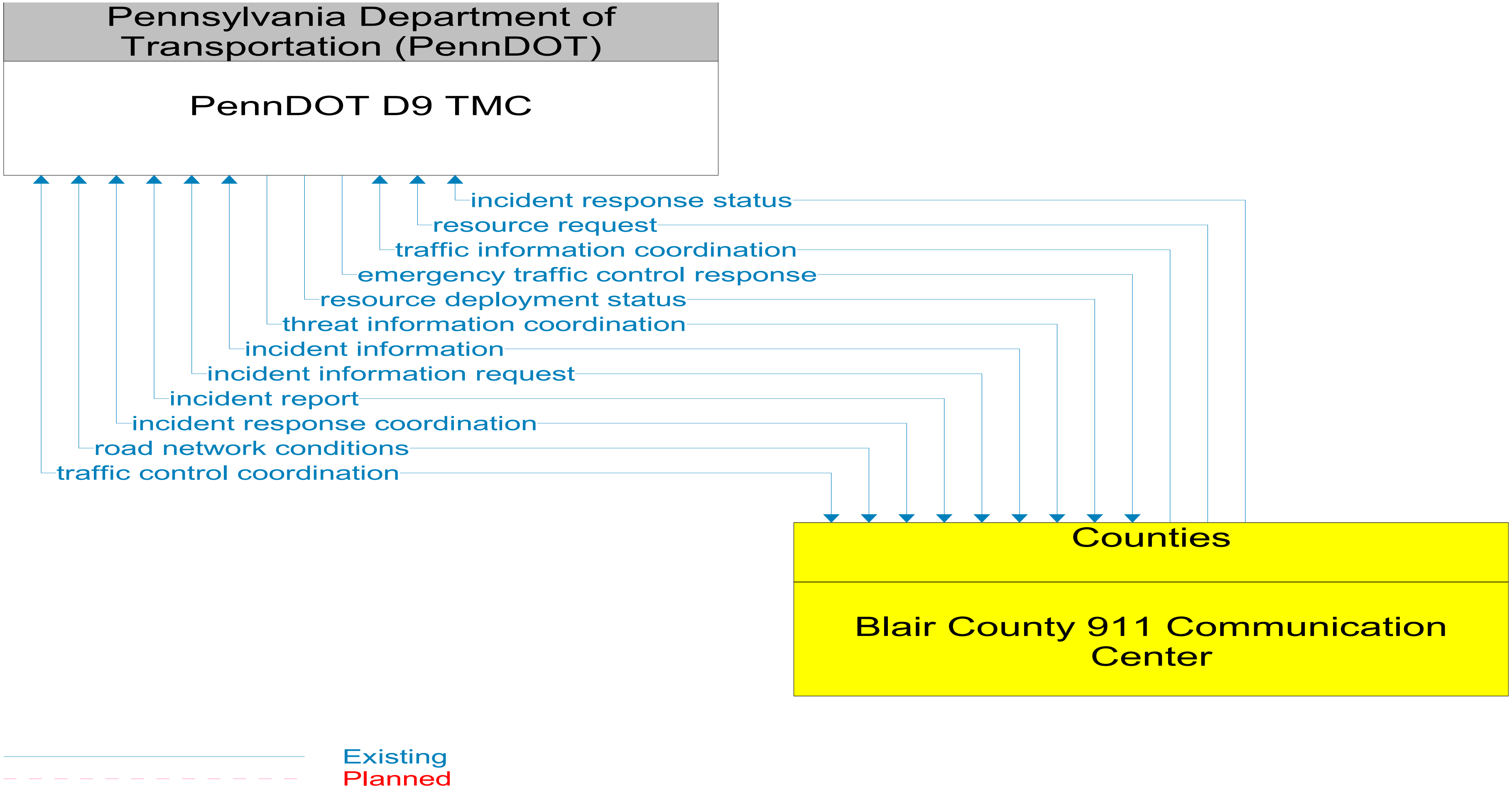
Counties
Blair County 911 Communication Center

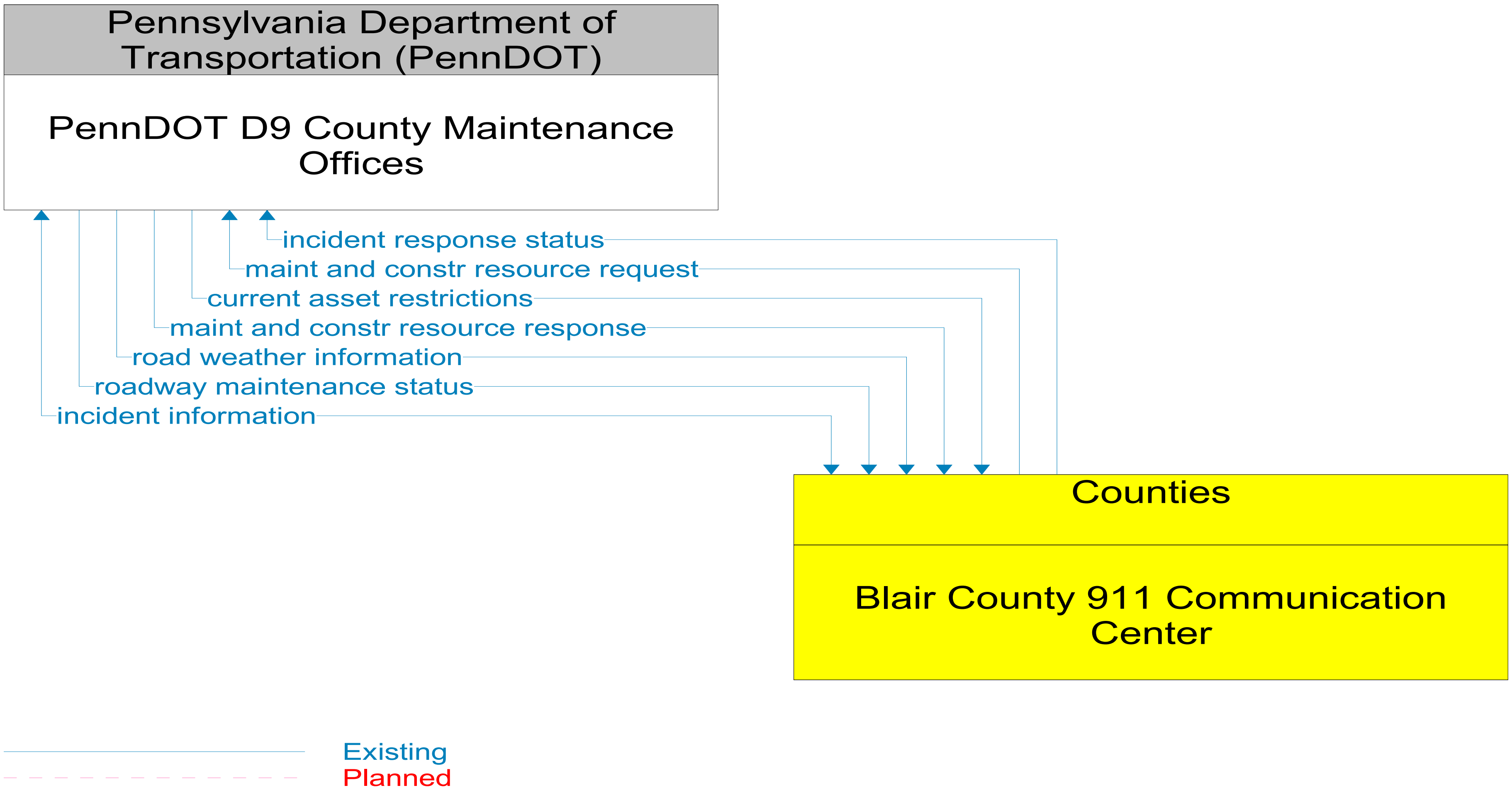
Municipalities
Municipal/Regional Public Safety Offices

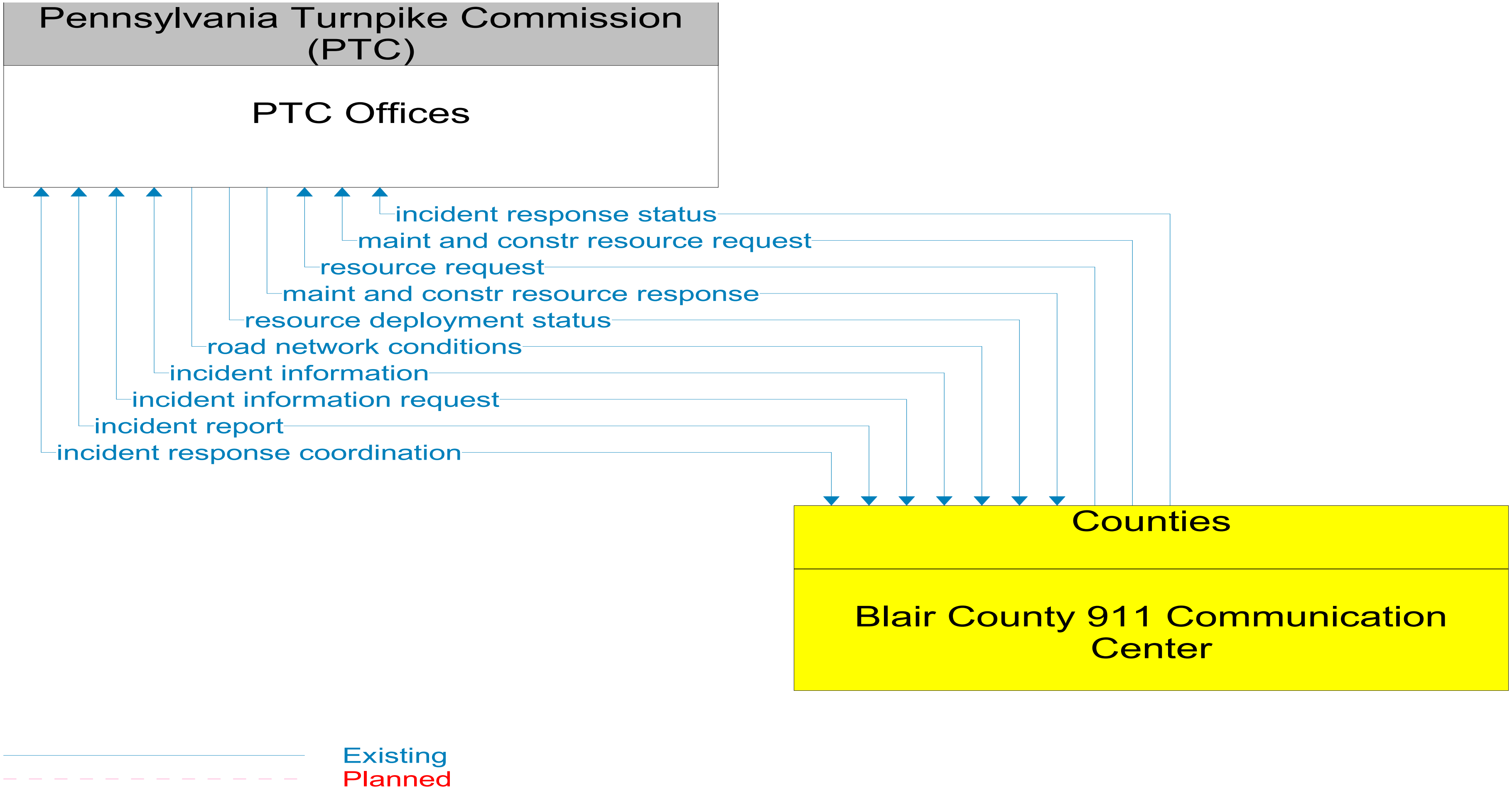
Municipalities
Municipal/Regional Public Safety Vehicles

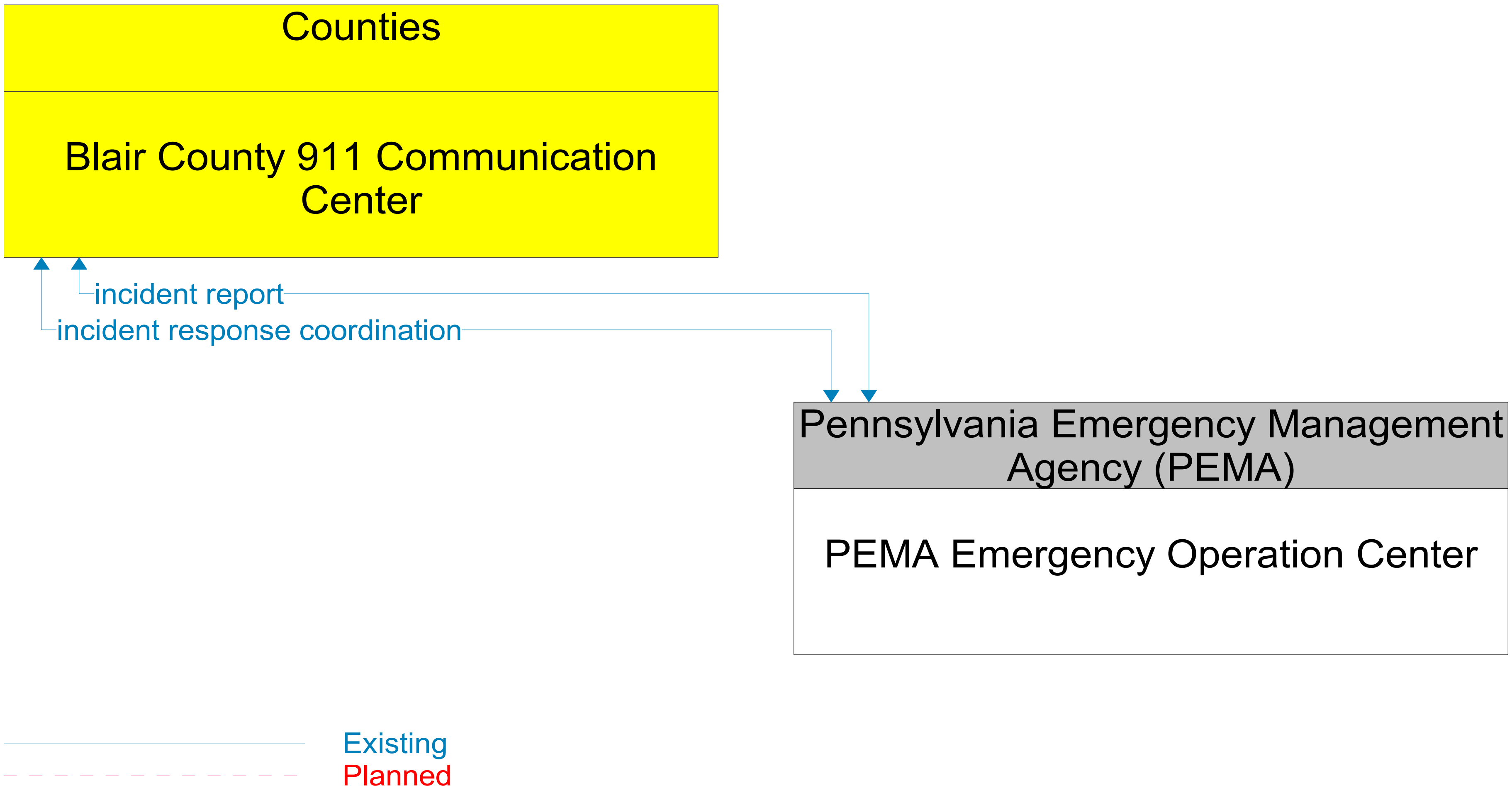
Pennsylvania Emergency Management Agency (PEMA)
PEMA Emergency Operation Center

Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 County Maintenance Offices


Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
incident response status
resource request
traffic information coordination
emergency traffic control response
resource deployment status
threat information coordination
incident information
incident information request
incident report
incident response coordination
road network conditions
traffic control coordination
Counties
Blair County 911 Communication Center
Existing
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 County Maintenance Offices
incident response status
maint and constr resource request
current asset restrictions
maint and constr resource response
road weather information
roadway maintenance status
incident information
Counties
Blair County 911 Communication Center
Existing
Planned


Pennsylvania Turnpike Commission (PTC)
PTC Offices
incident response status
maint and constr resource request
resource request
maint and constr resource response
resource deployment status
road network conditions
incident information
incident information request
incident report
incident response coordination
Counties
Blair County 911 Communication Center
Existing
Planned



Counties

Blair County 911 Communication Center

incident report

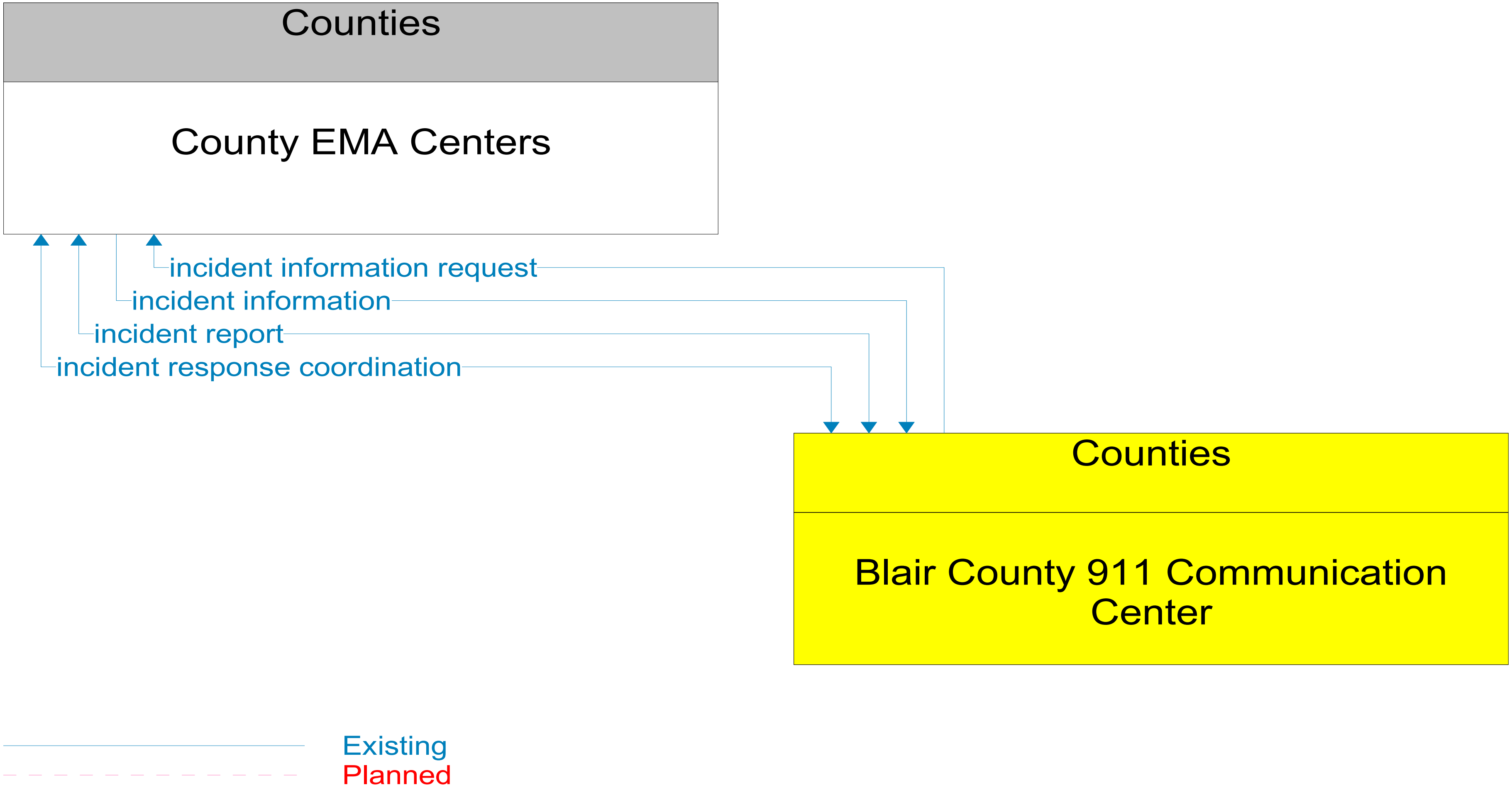
incident response coordination

Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

Existing

Planned



Counties

County EMA Centers

incident information request

incident information

incident report

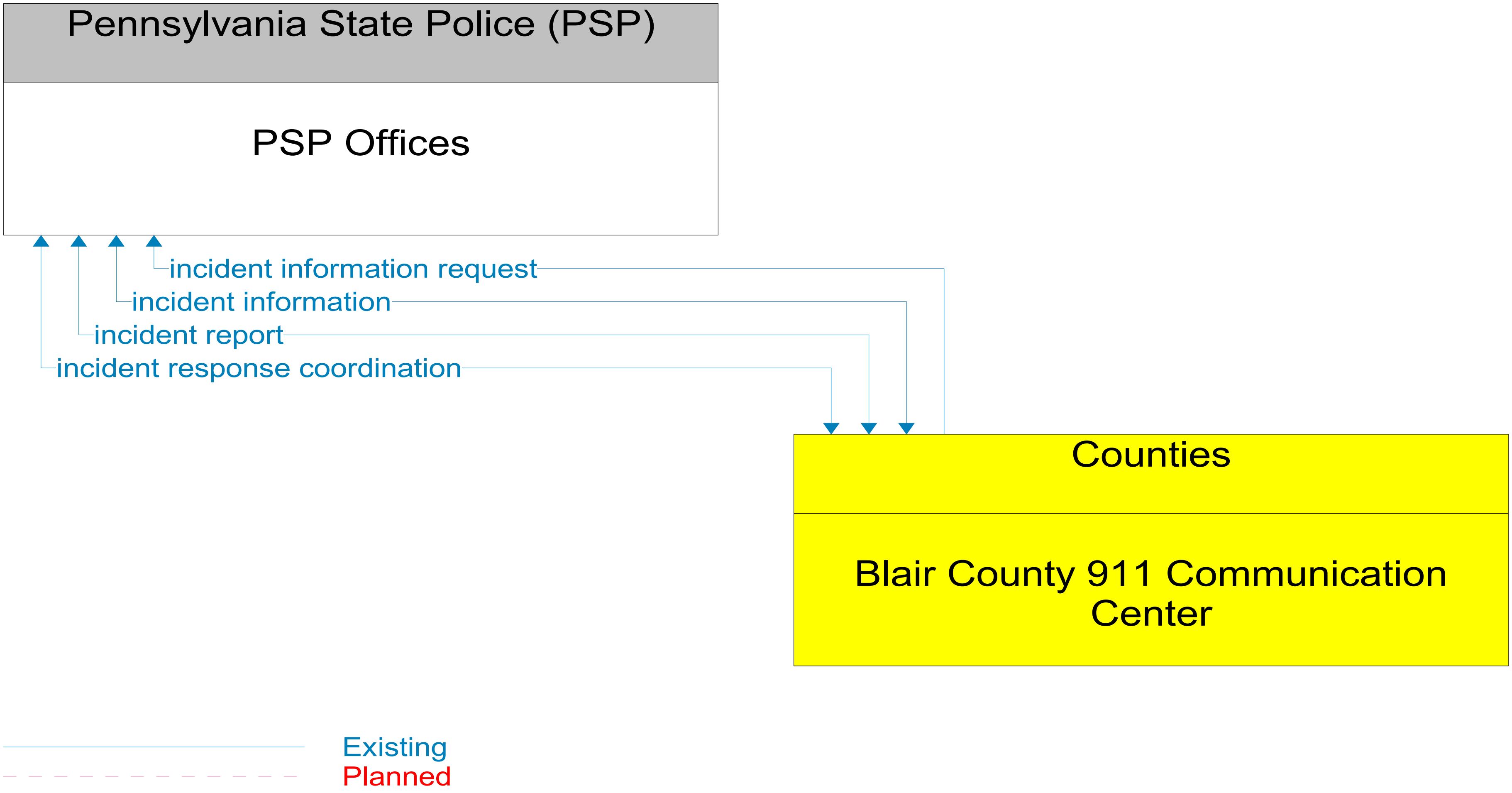
incident response coordination

Counties

Blair County 911 Communication Center

Existing

Planned



Pennsylvania State Police (PSP)

PSP Offices

incident information request

incident information

incident report

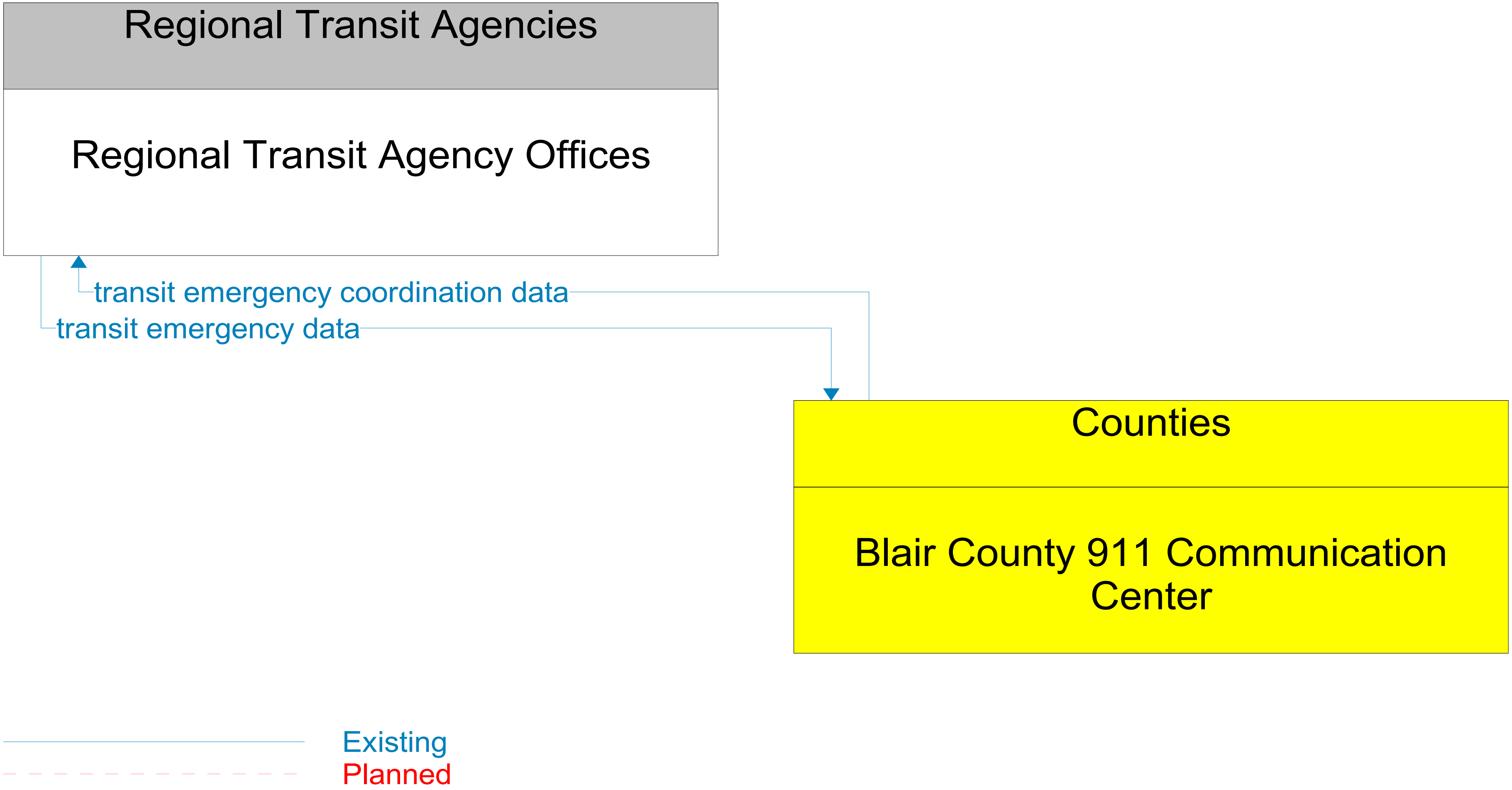
incident response coordination

Counties

Blair County 911 Communication Center

Existing

Planned



Regional Transit Agencies

Regional Transit Agency Offices

transit emergency coordination data

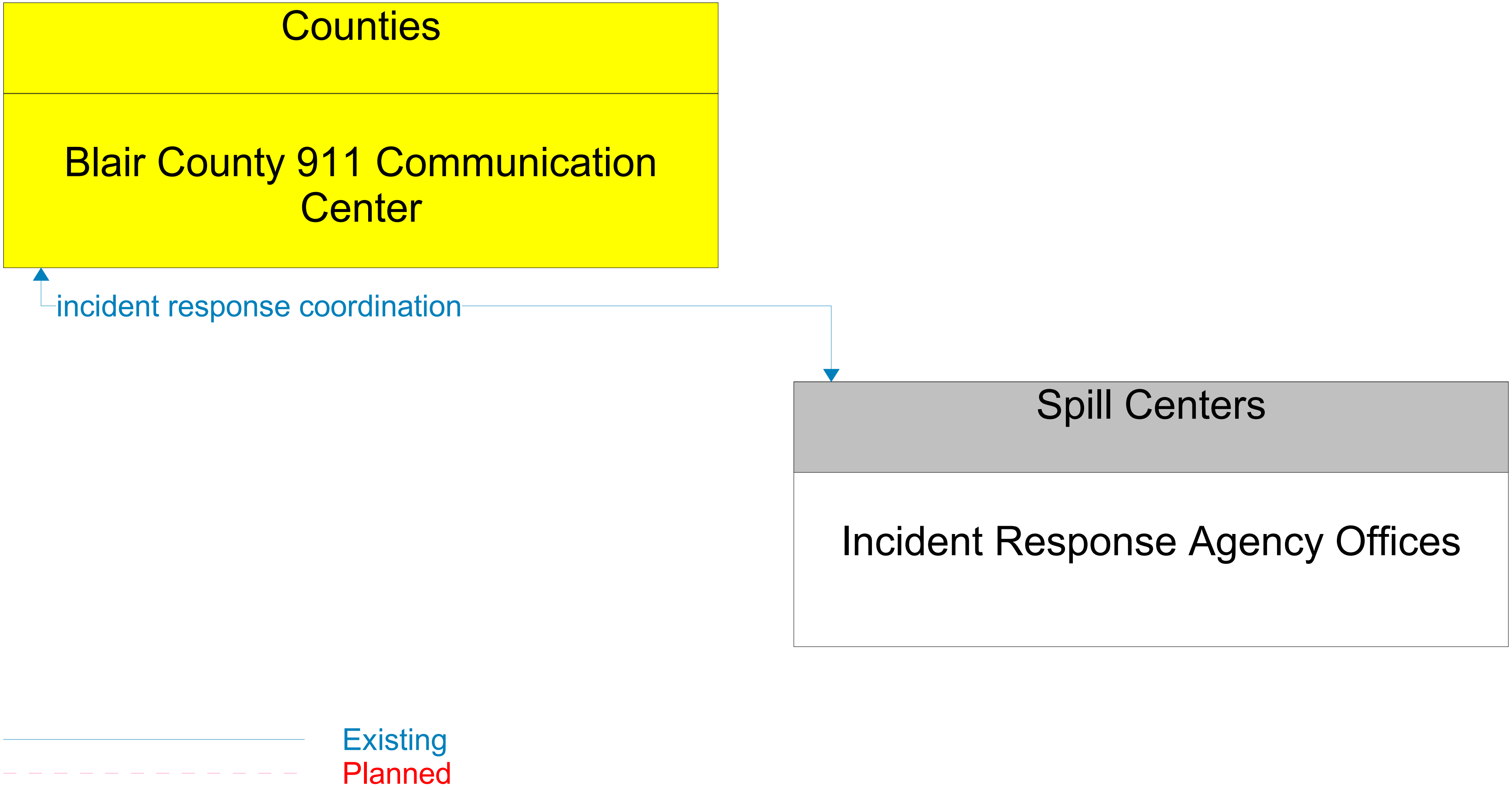
transit emergency data

Counties

Blair County 911 Communication Center

Existing

Planned



Counties

Blair County 911 Communication Center

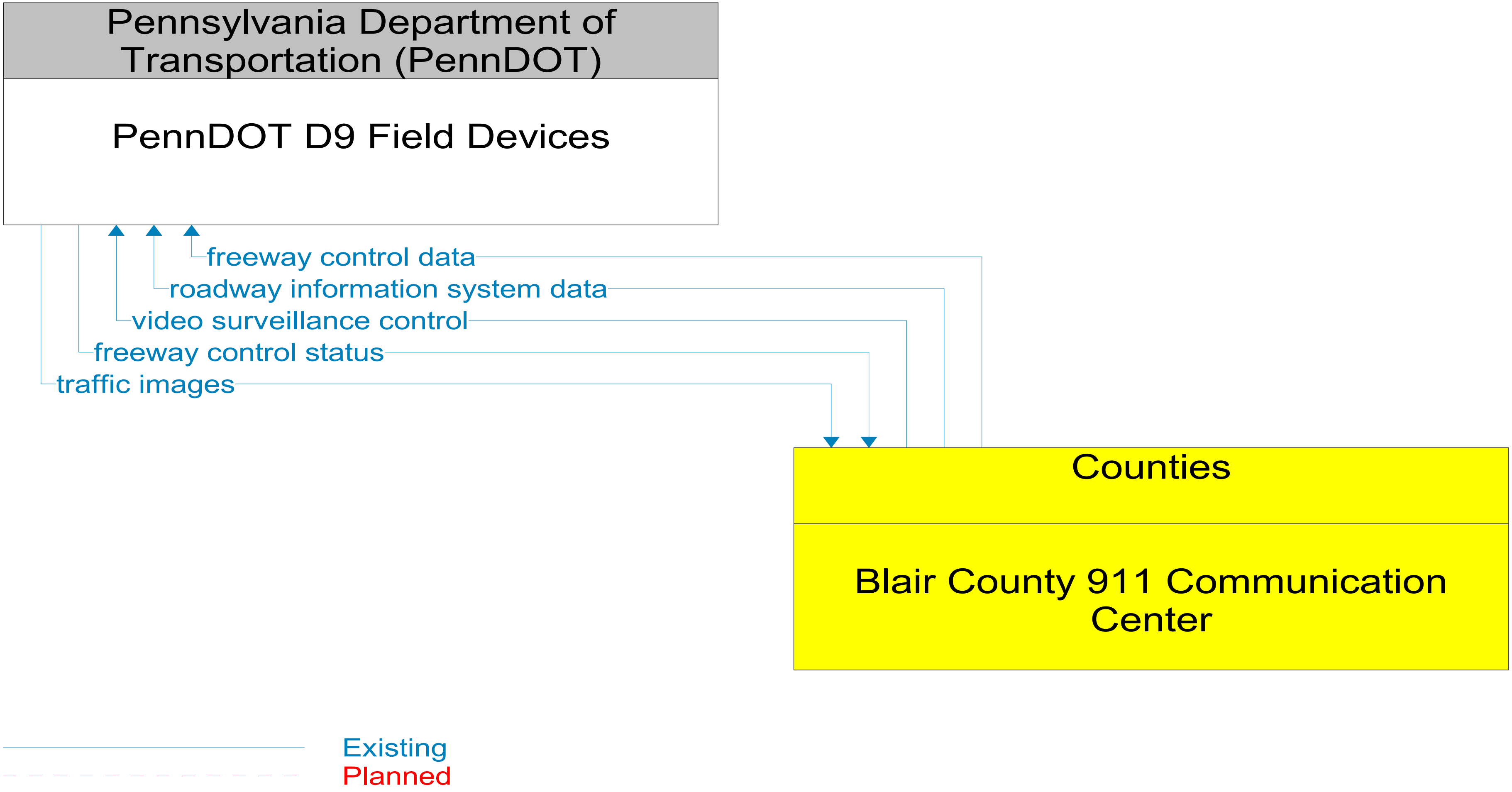
incident response coordination

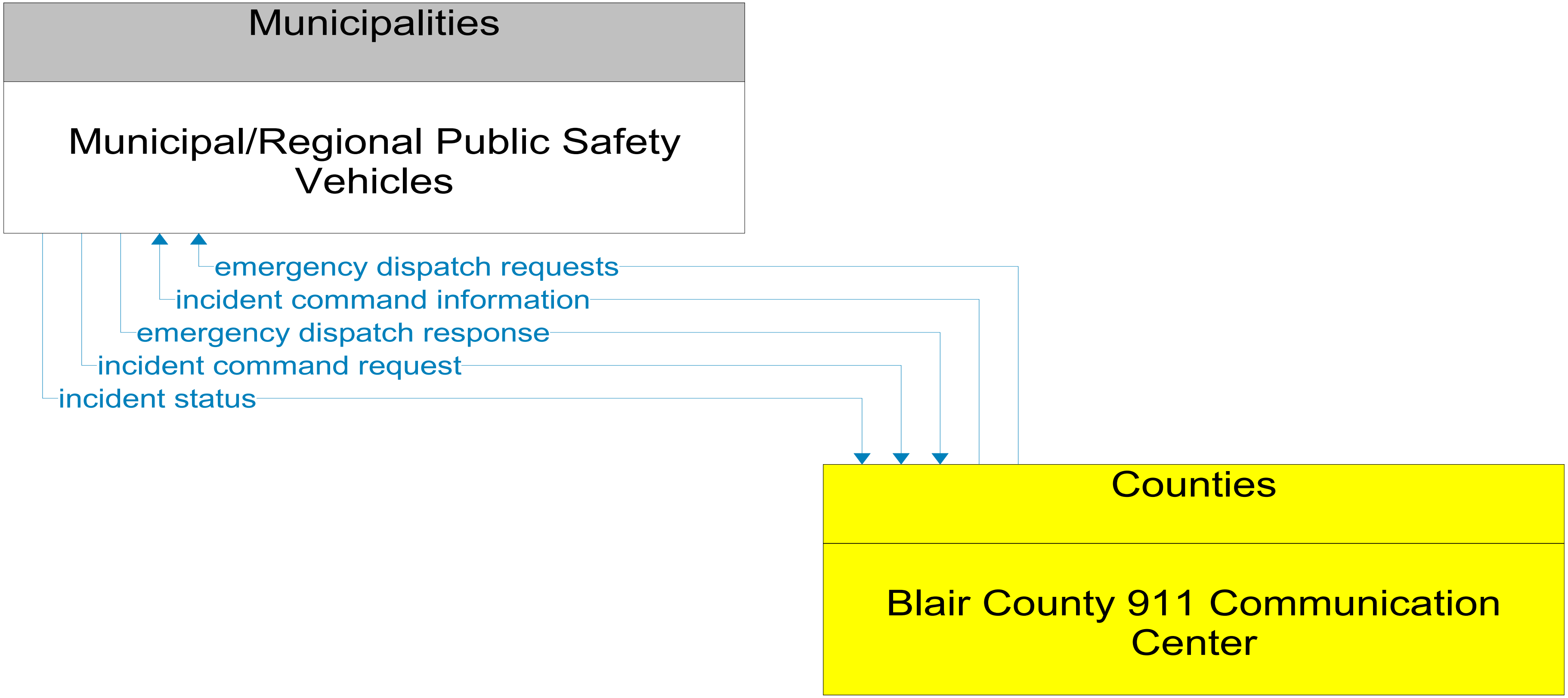
Spill Centers

Incident Response Agency Offices

Existing

Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 Field Devices
freeway control data
roadway information system data
video surveillance control
freeway control status
traffic images
Counties
Blair County 911 Communication Center
Existing
Planned



Municipalities

Municipal/Regional Public Safety Vehicles

emergency dispatch requests

incident command information

emergency dispatch response

incident command request

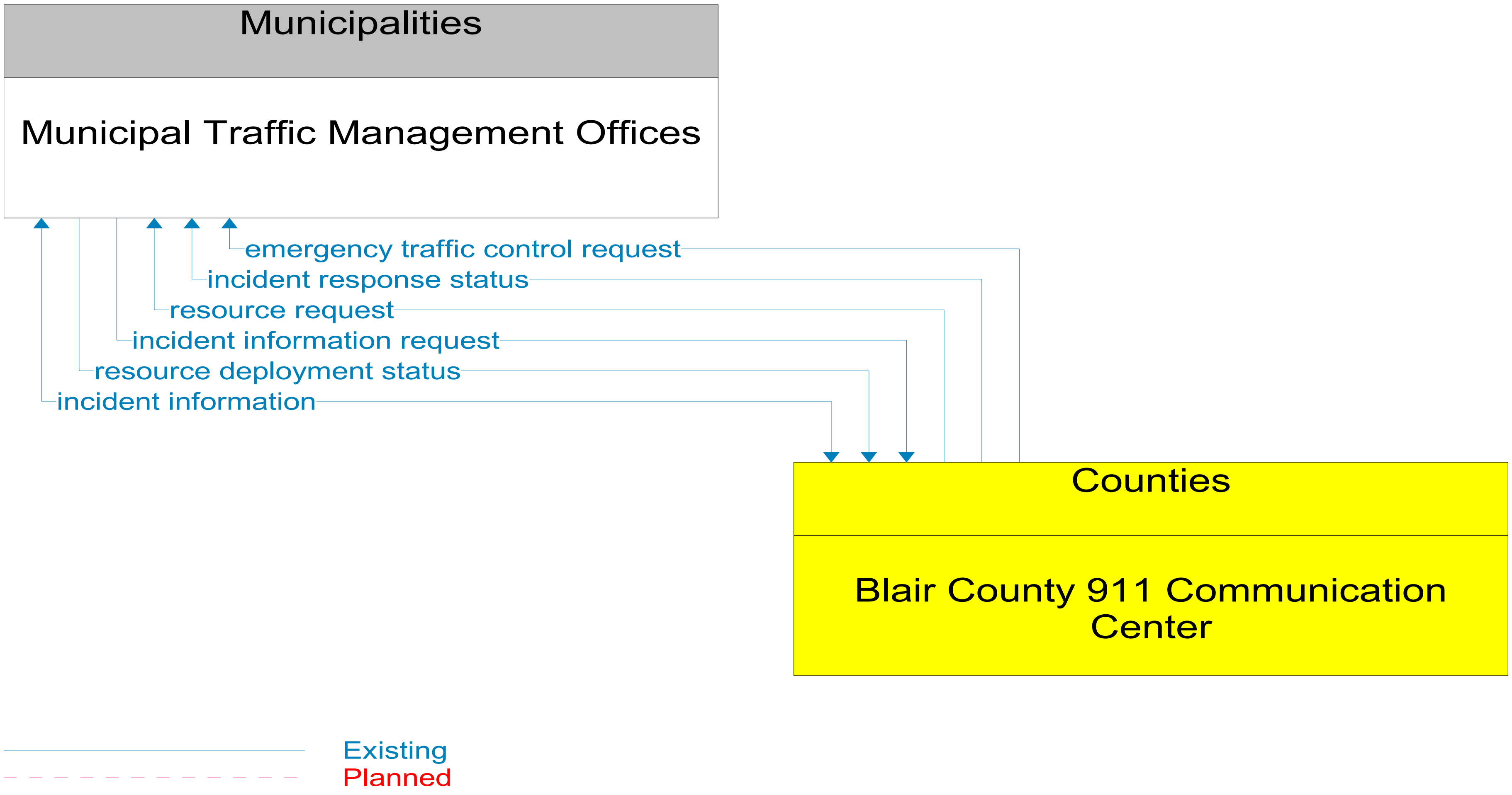
incident status

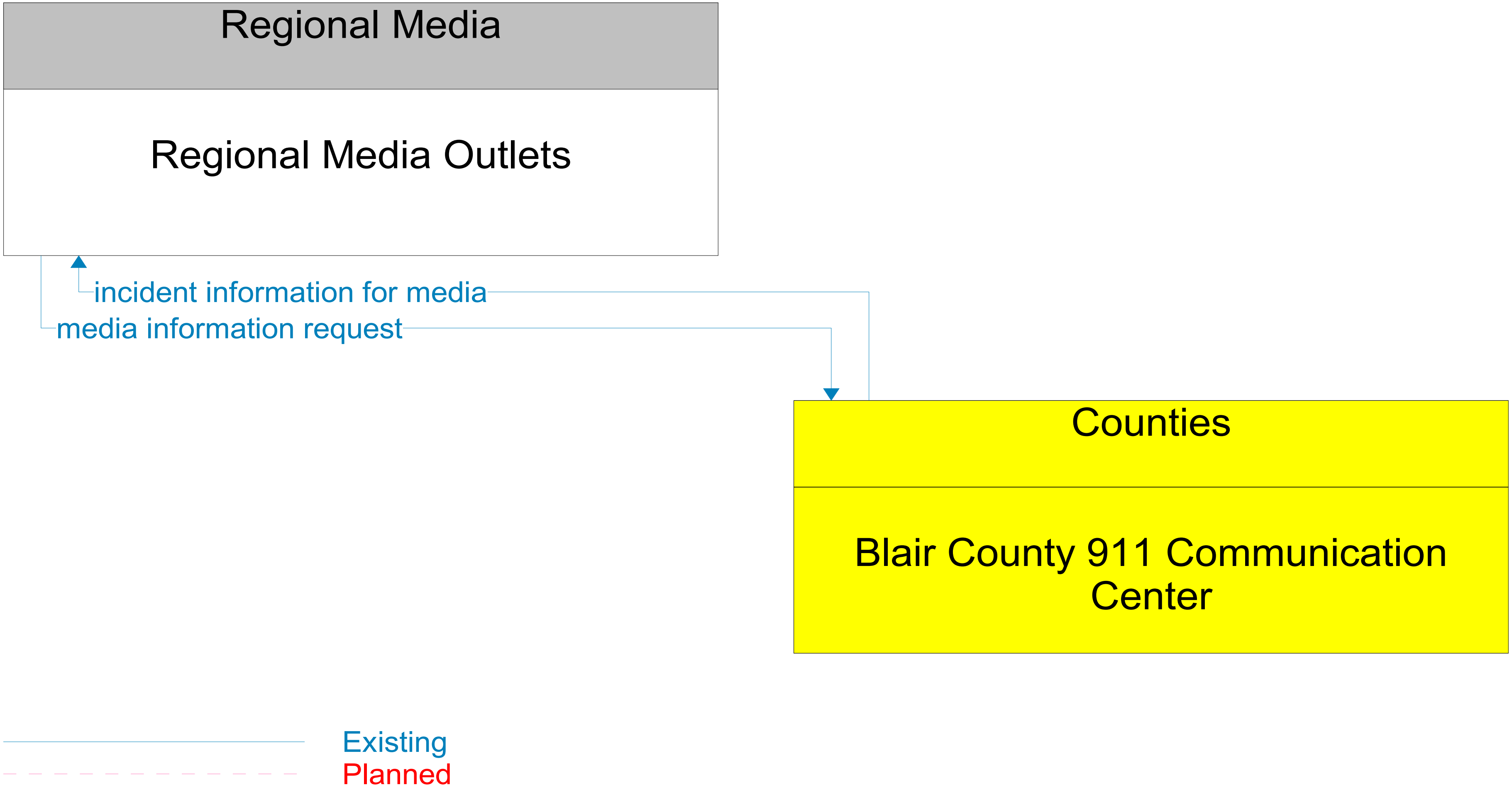
Counties

Blair County 911 Communication Center

Existing

Planned


Municipalities
Municipal Traffic Management Offices
emergency traffic control request
incident response status
resource request
incident information request
resource deployment status
incident information
Counties
Blair County 911 Communication Center
Existing
Planned



Regional Media

Regional Media Outlets

incident information for media

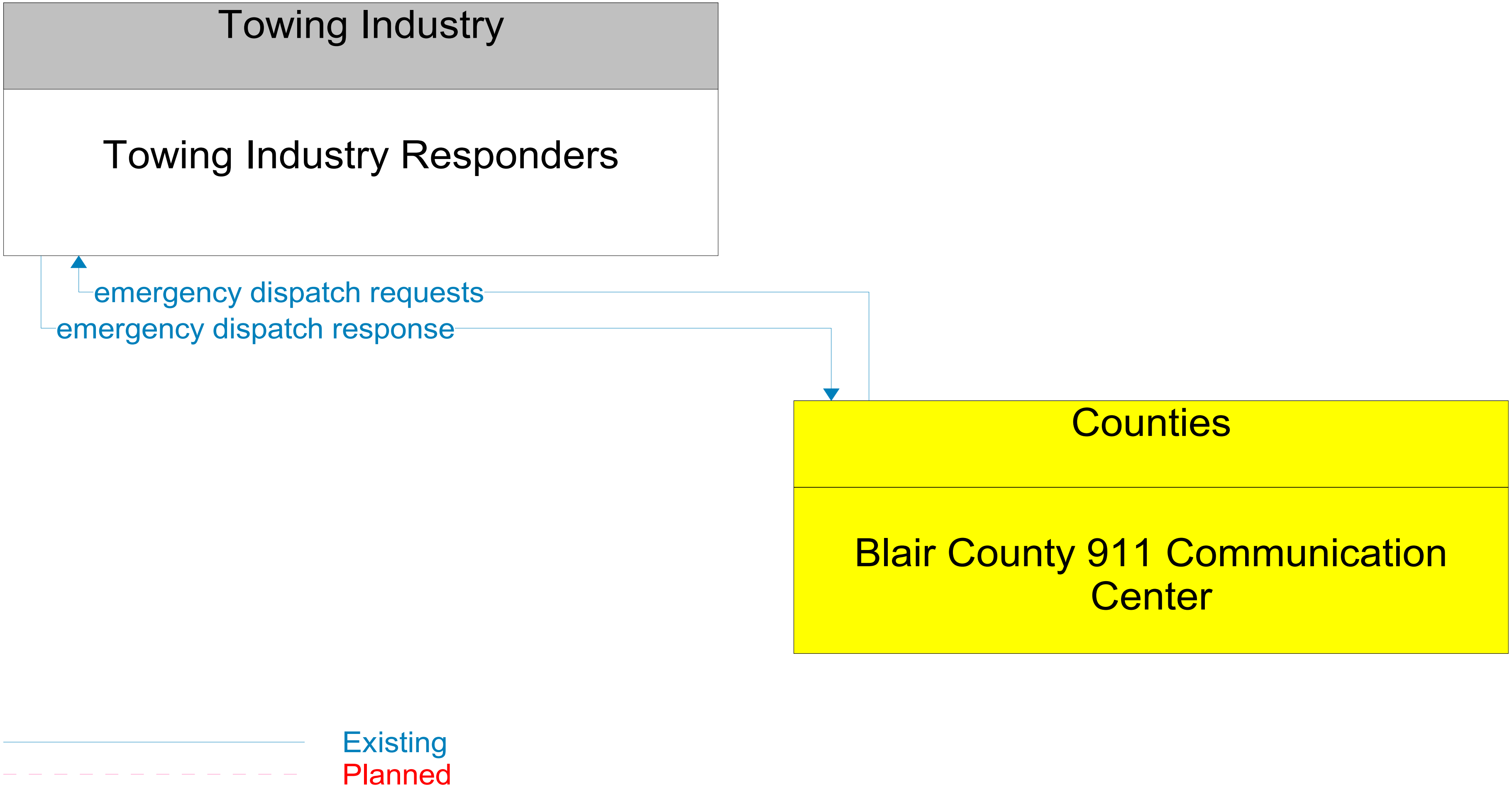
media information request

Counties

Blair County 911 Communication Center

Existing

Planned



Towing Industry

Towing Industry Responders

emergency dispatch requests

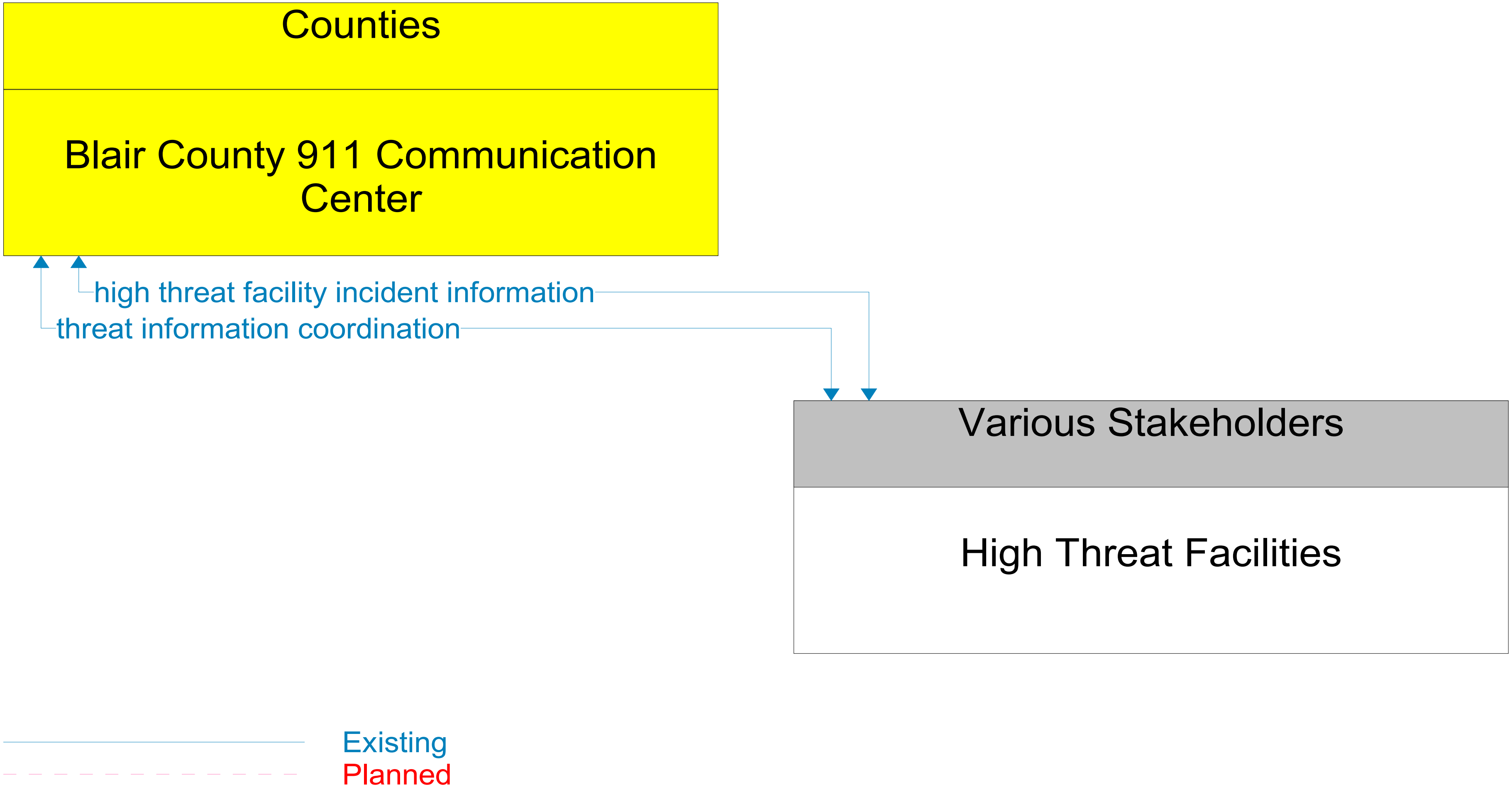
emergency dispatch response

Counties

Blair County 911 Communication Center

Existing

Planned



Counties

Blair County 911 Communication Center

high threat facility incident information

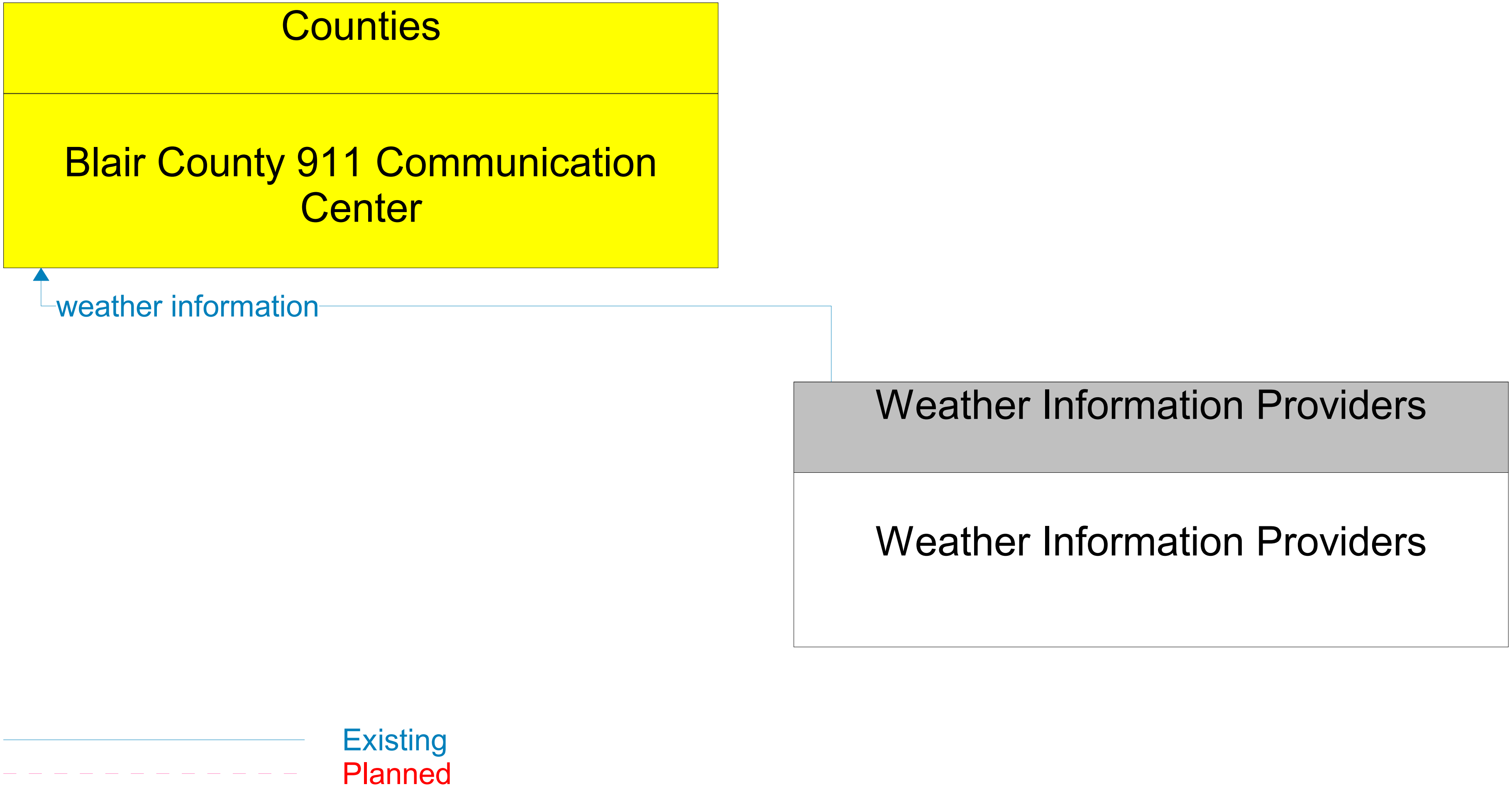
threat information coordination

Various Stakeholders

High Threat Facilities

Existing

Planned



Counties

Blair County 911 Communication Center

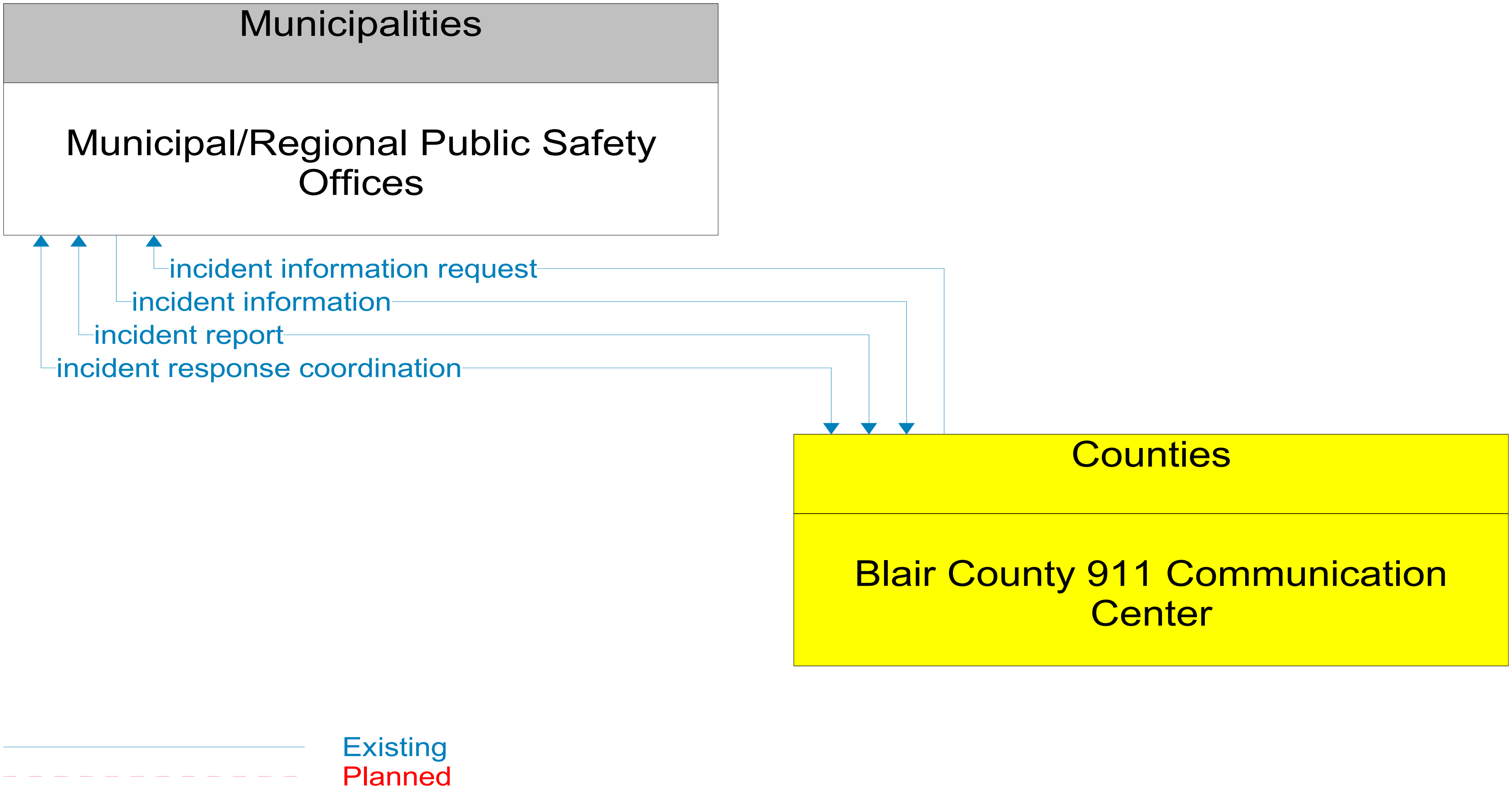
weather information

Weather Information Providers

Weather Information Providers

Existing

Planned



Municipalities

Municipal/Regional Public Safety Offices

incident information request

incident information

incident report

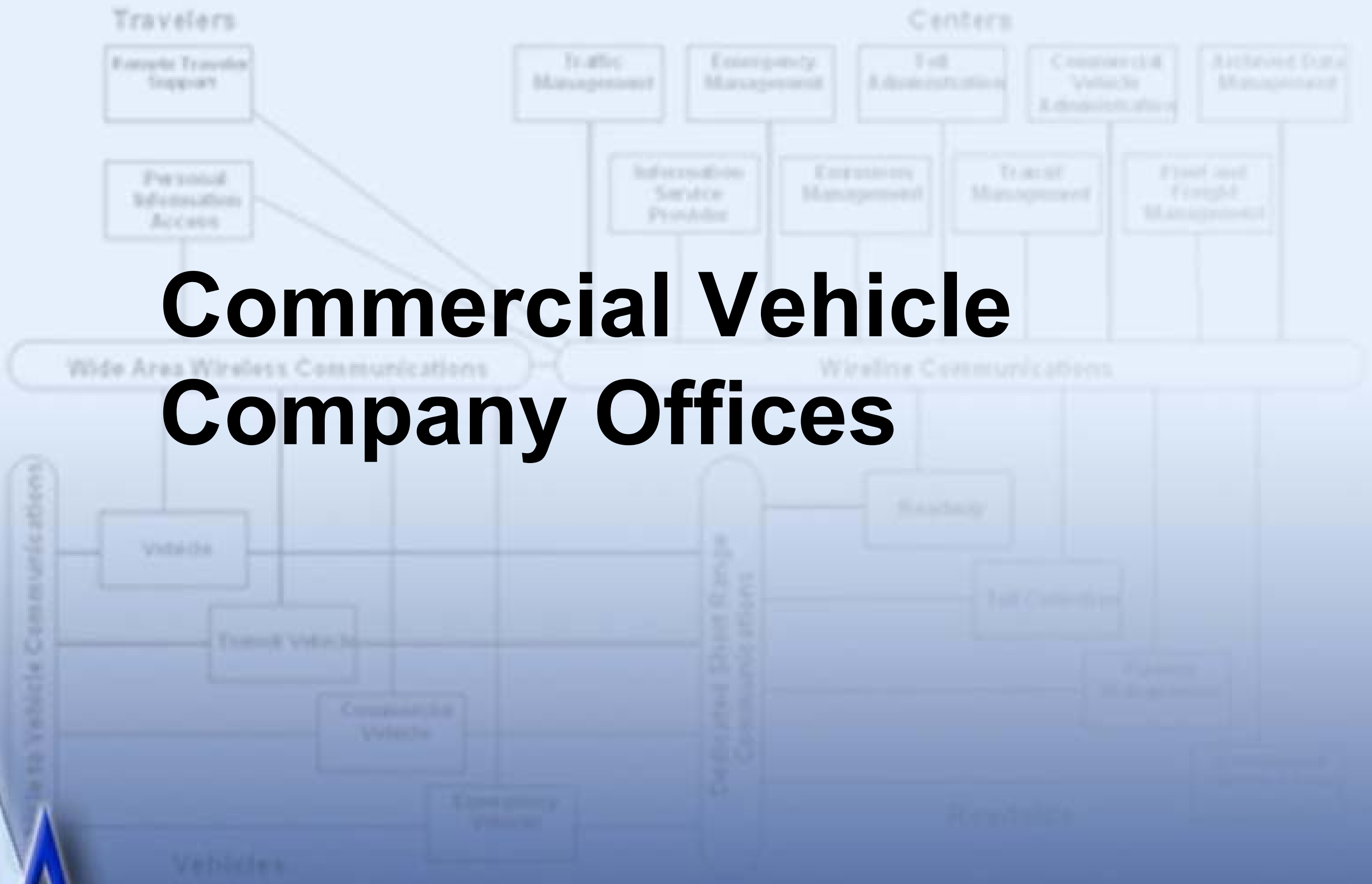
incident response coordination

Counties

Blair County 911 Communication Center

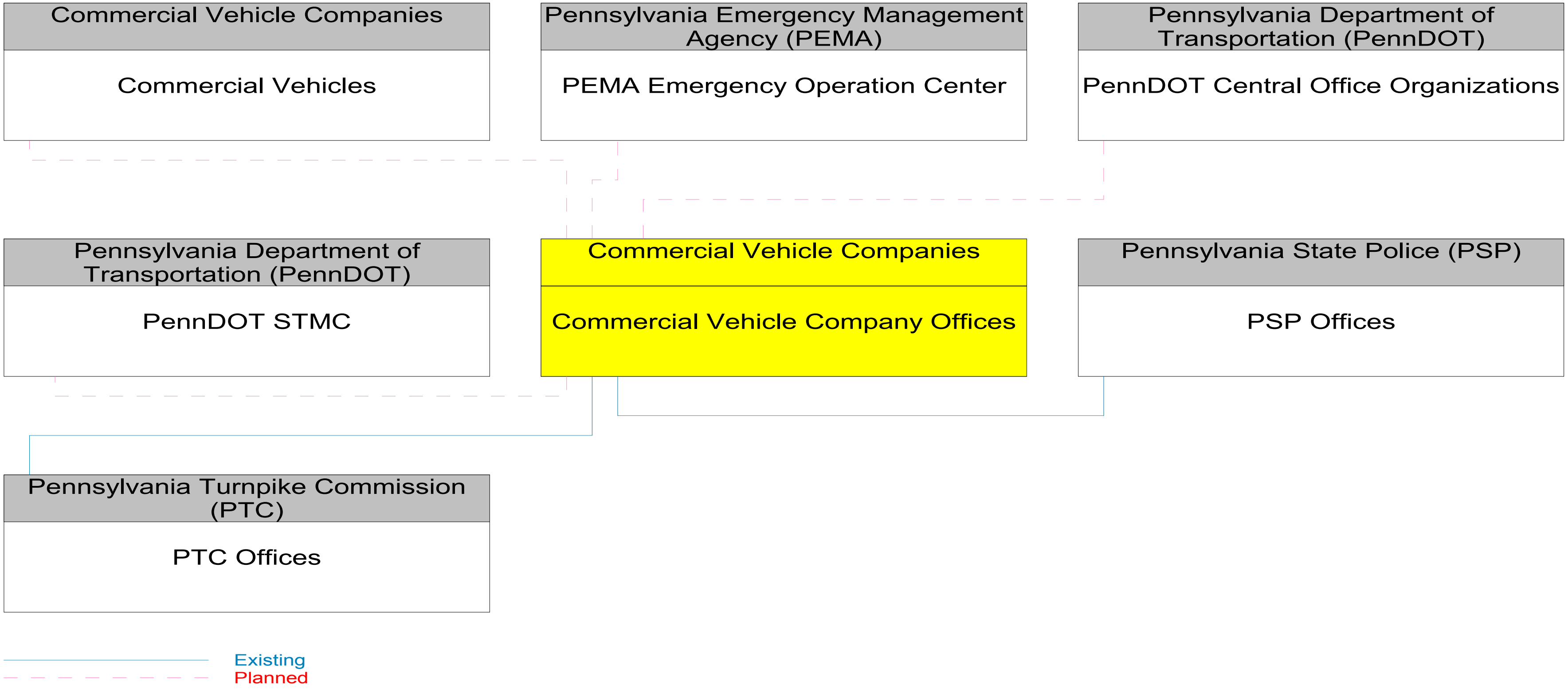
Existing

Planned


Travelers
Centers
Remote Traveler Support
Personal Information Access
Traffic Management
Emergency Management
Toll Administration
Commercial Vehicle Administration
Archived Data Management
Information Service Provider
Emissions Management
Transit Management
Fleet and Freight Management
Wide Area Wireless Communications
Wireline Communications
Vehicle to Vehicle Communications
Dedicated Short Range Communications
Vehicle
Transit Vehicle
Commercial Vehicle
Emergency Vehicle
Vehicles
Roadway
Toll Collection
Roadside

Commercial Vehicle Company Offices

Commercial Vehicle Company Offices Interconnect Diagram



Commercial Vehicle Companies
Commercial Vehicles

Pennsylvania Emergency Management Agency (PEMA)
PEMA Emergency Operation Center

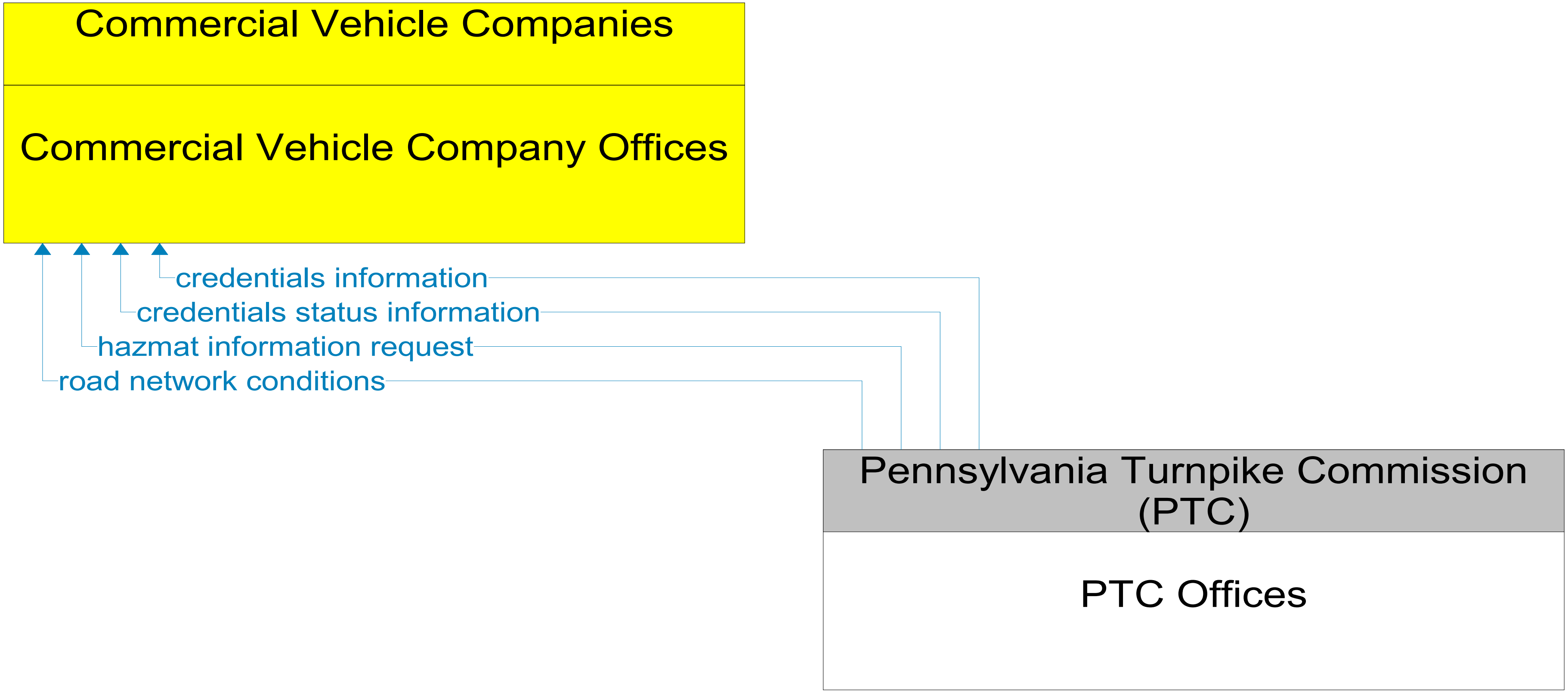
Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Organizations

Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC

Commercial Vehicle Companies
Commercial Vehicle Company Offices

Pennsylvania State Police (PSP)
PSP Offices

Pennsylvania Turnpike Commission (PTC)
PTC Offices



Commercial Vehicle Companies

Commercial Vehicle Company Offices

credentials information

credentials status information

hazmat information request

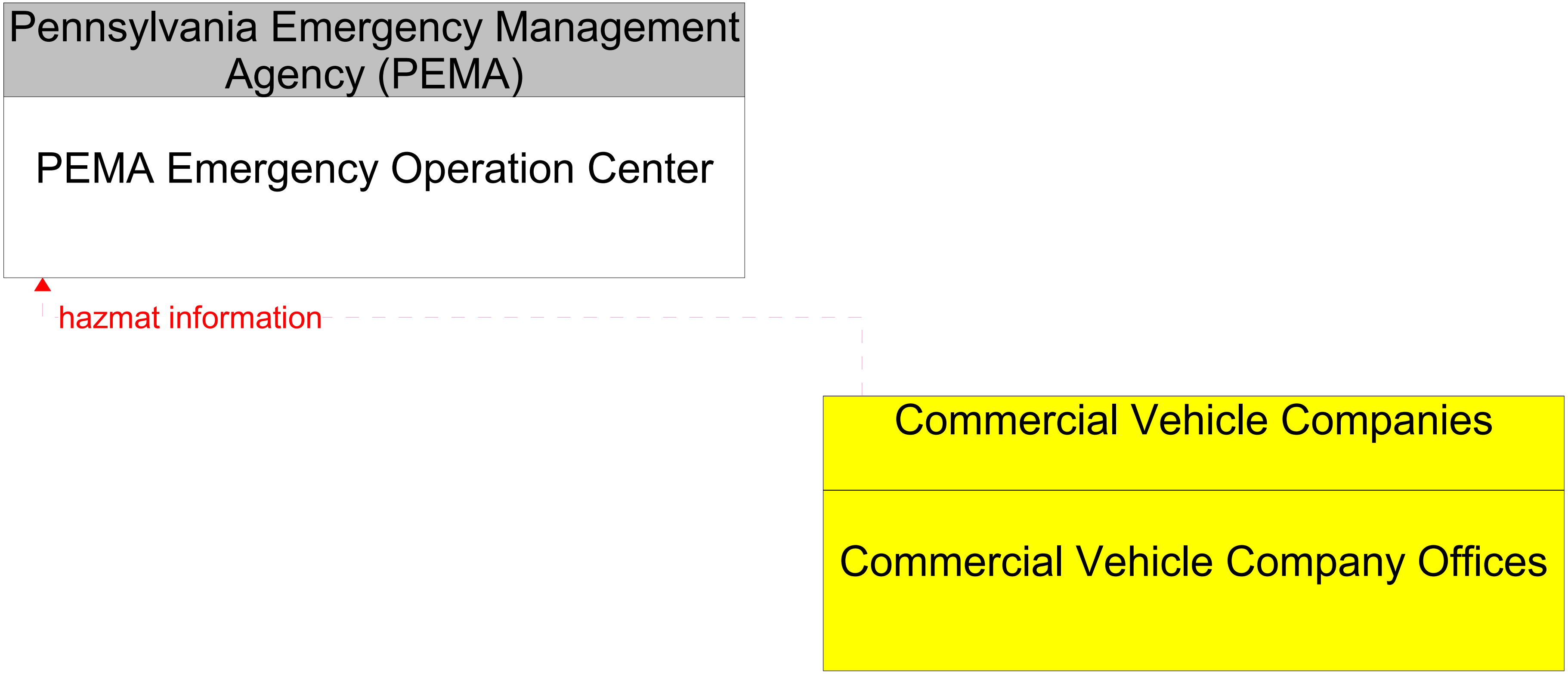
road network conditions

Pennsylvania Turnpike Commission (PTC)

PTC Offices

Existing

Planned



Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

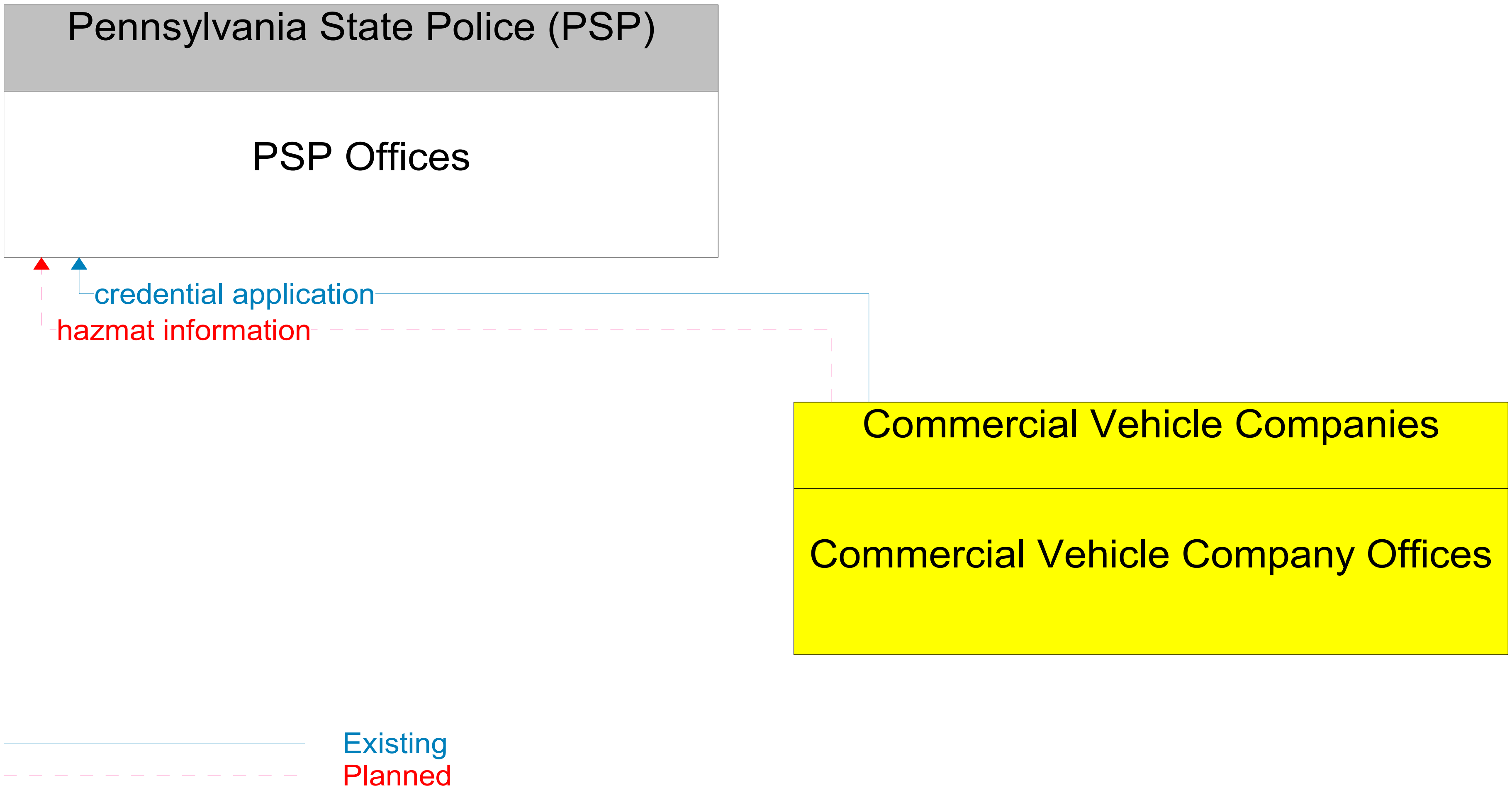
hazmat information

Commercial Vehicle Companies

Commercial Vehicle Company Offices

Existing

Planned



Pennsylvania State Police (PSP)

PSP Offices

credential application

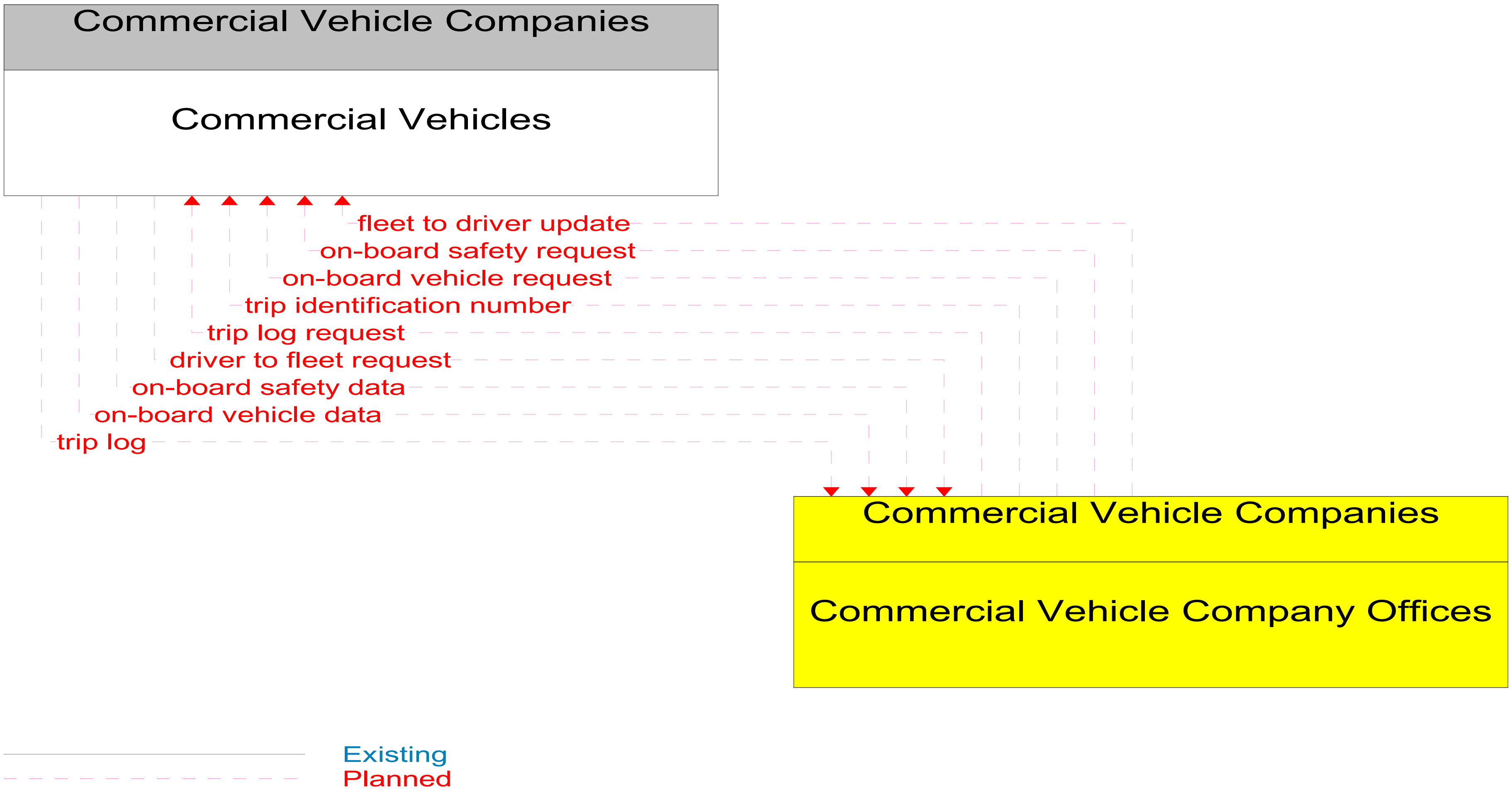
hazmat information

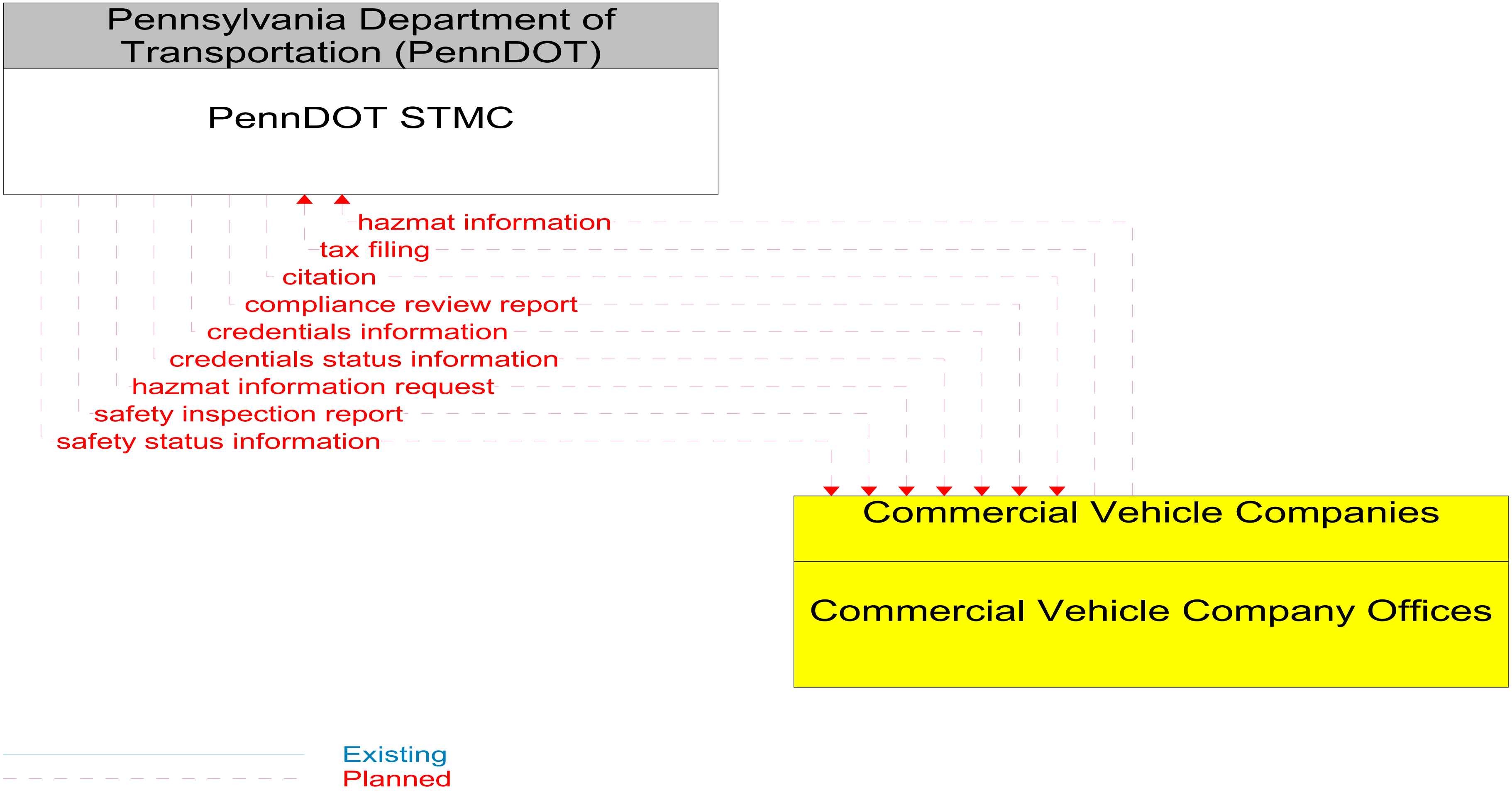
Commercial Vehicle Companies

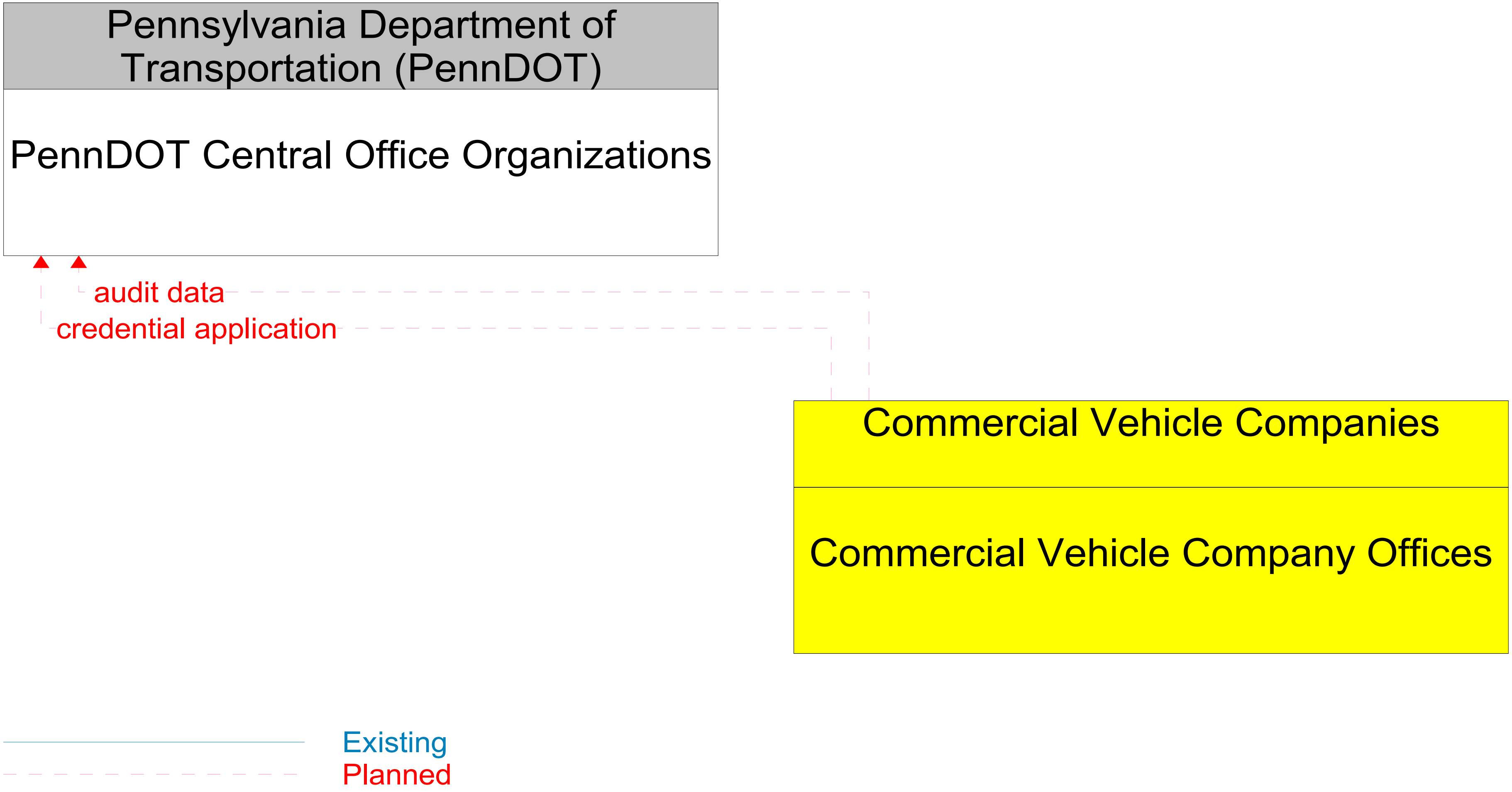
Commercial Vehicle Company Offices

Existing

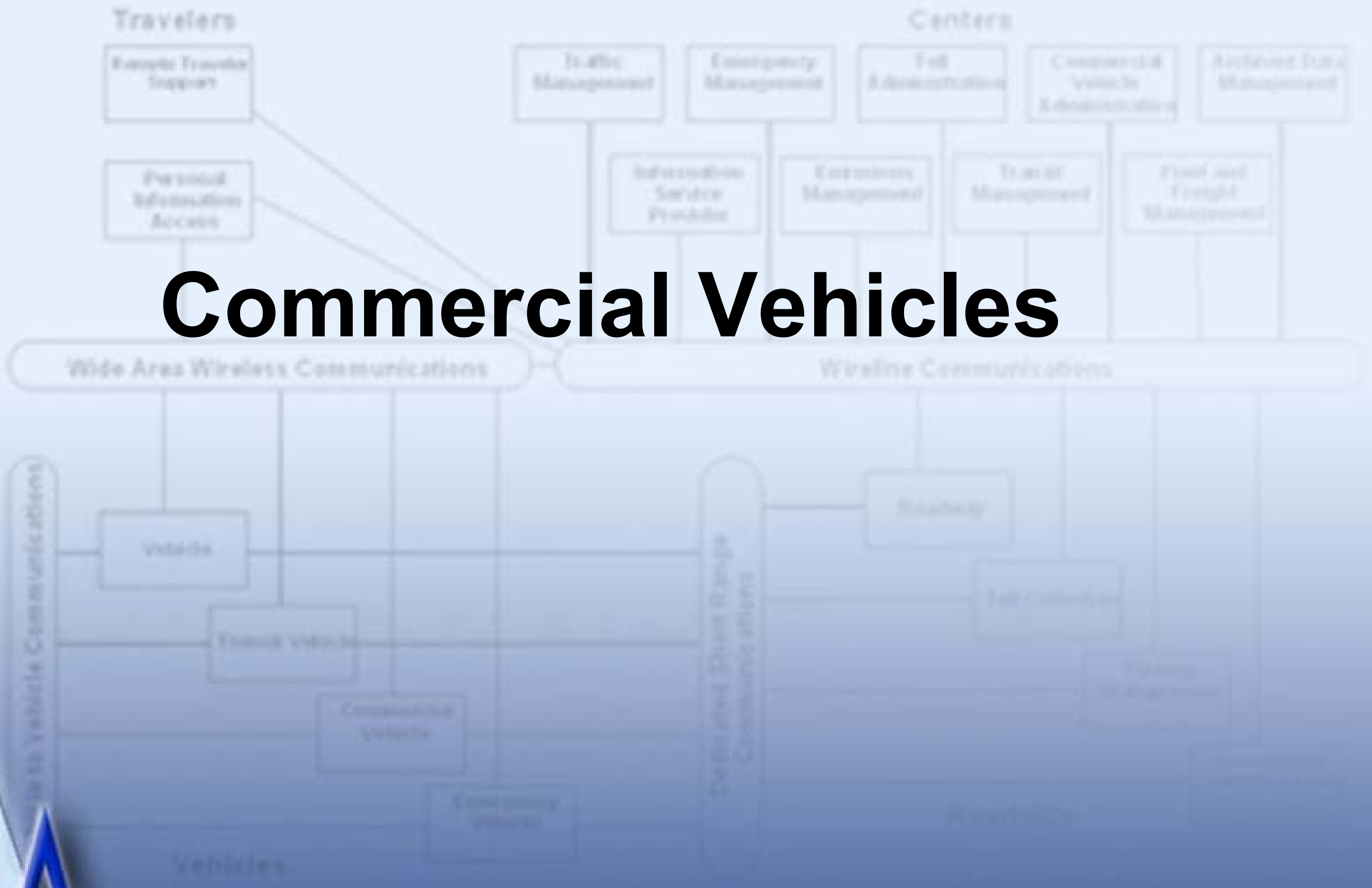
Planned


Commercial Vehicle Companies
Commercial Vehicles
fleet to driver update
on-board safety request
on-board vehicle request
trip identification number
trip log request
driver to fleet request
on-board safety data
on-board vehicle data
trip log
Commercial Vehicle Companies
Commercial Vehicle Company Offices
Existing
Planned

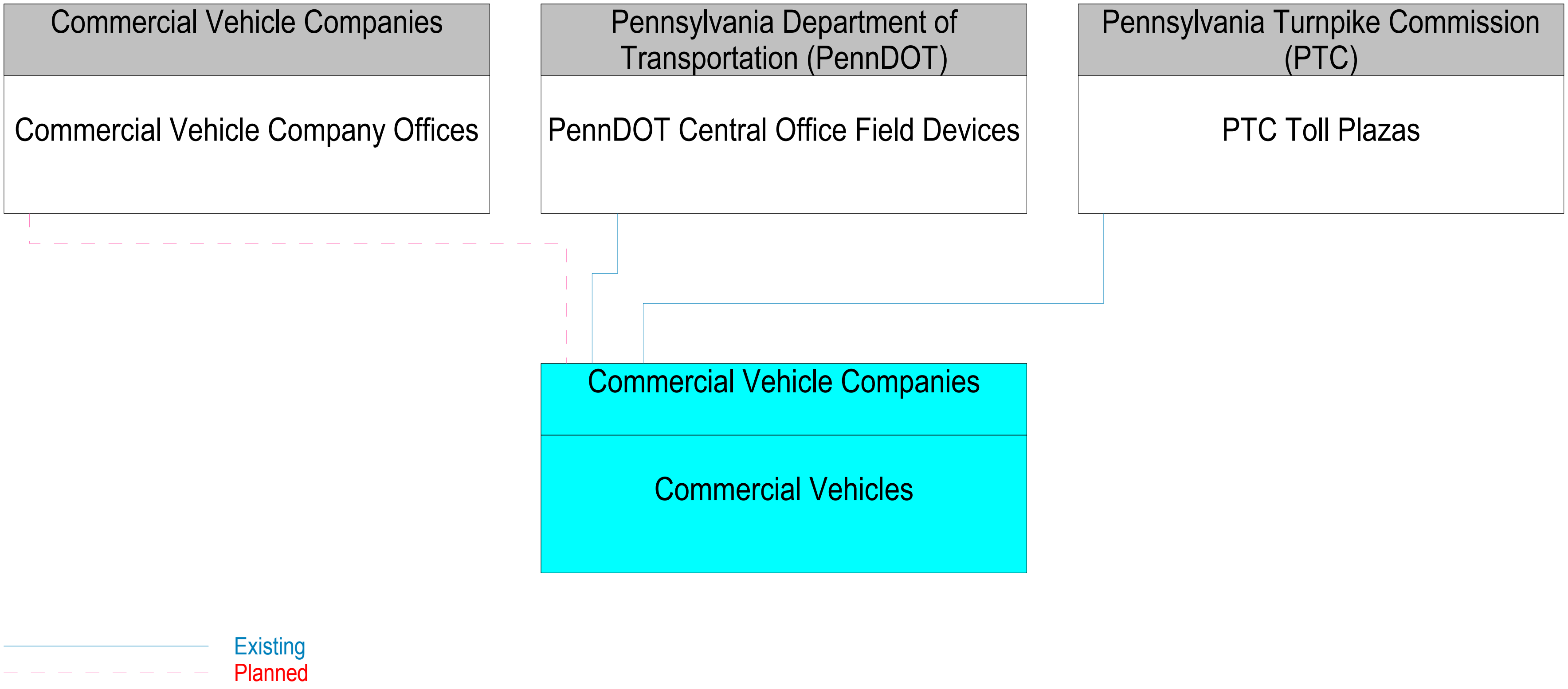

Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC
hazmat information
tax filing
citation
compliance review report
credentials information
credentials status information
hazmat information request
safety inspection report
safety status information
Commercial Vehicle Companies
Commercial Vehicle Company Offices
Existing
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Organizations
audit data
credential application
Commercial Vehicle Companies
Commercial Vehicle Company Offices
Existing
Planned

Commercial Vehicles


Travelers
Centers
Remote Traveler Support
Personal Information Access
Traffic Management
Emergency Management
Toll Administration
Commercial Vehicle Administration
Archived Data Management
Information Service Provider
Emissions Management
Transit Management
Fleet and Freight Management
Wide Area Wireless Communications
Wireline Communications
Vehicle to Vehicle Communications
Vehicle
Transit Vehicle
Commercial Vehicle
Emergency Vehicle
Vehicles
Dedicated Short Range Communications
Roadway
Toll Collection
Parking Management
Roadside

Commercial Vehicles Interconnect Diagram



Commercial Vehicle Companies

Commercial Vehicle Company Offices

Pennsylvania Department of Transportation (PennDOT)

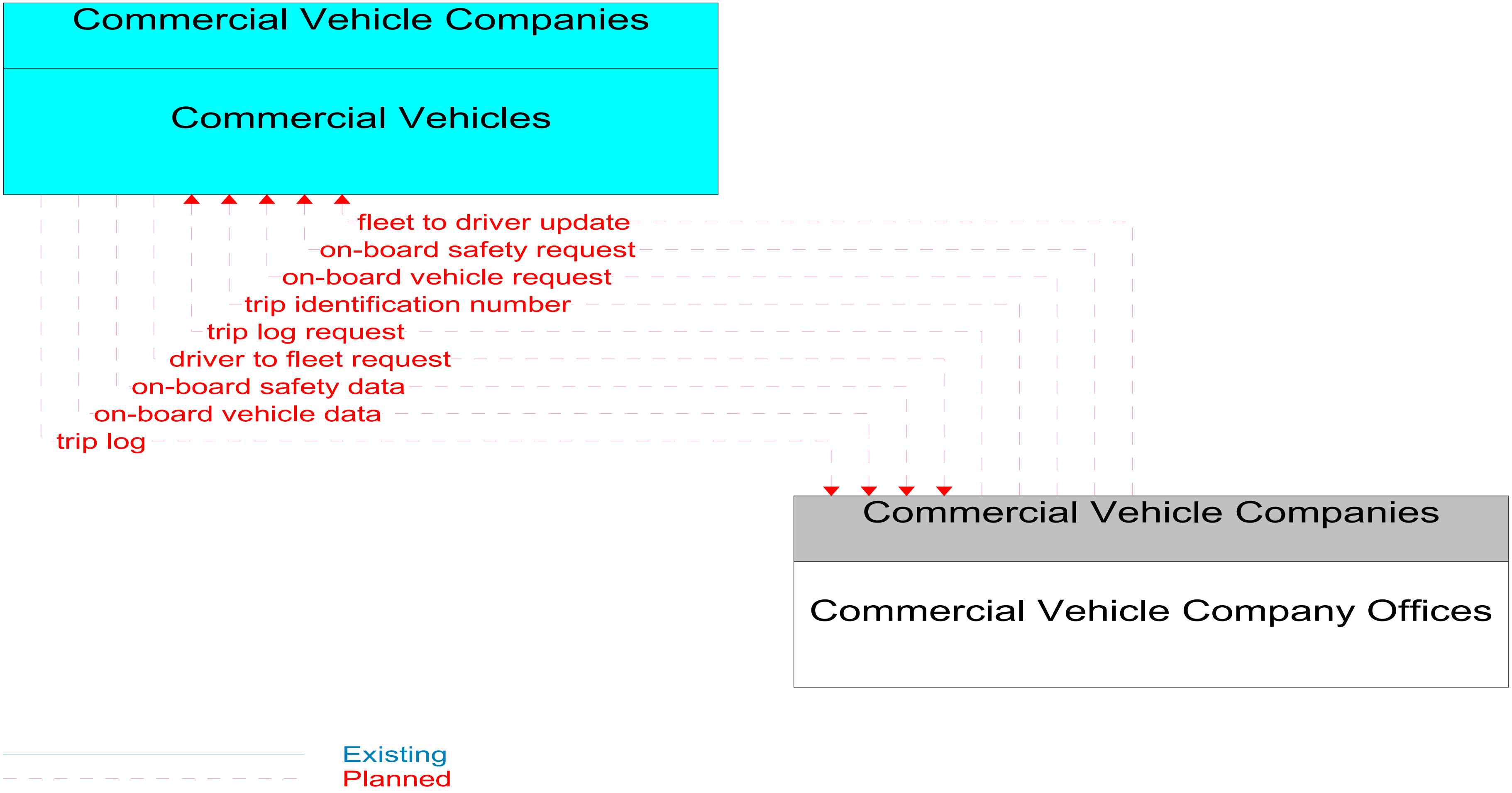
PennDOT Central Office Field Devices

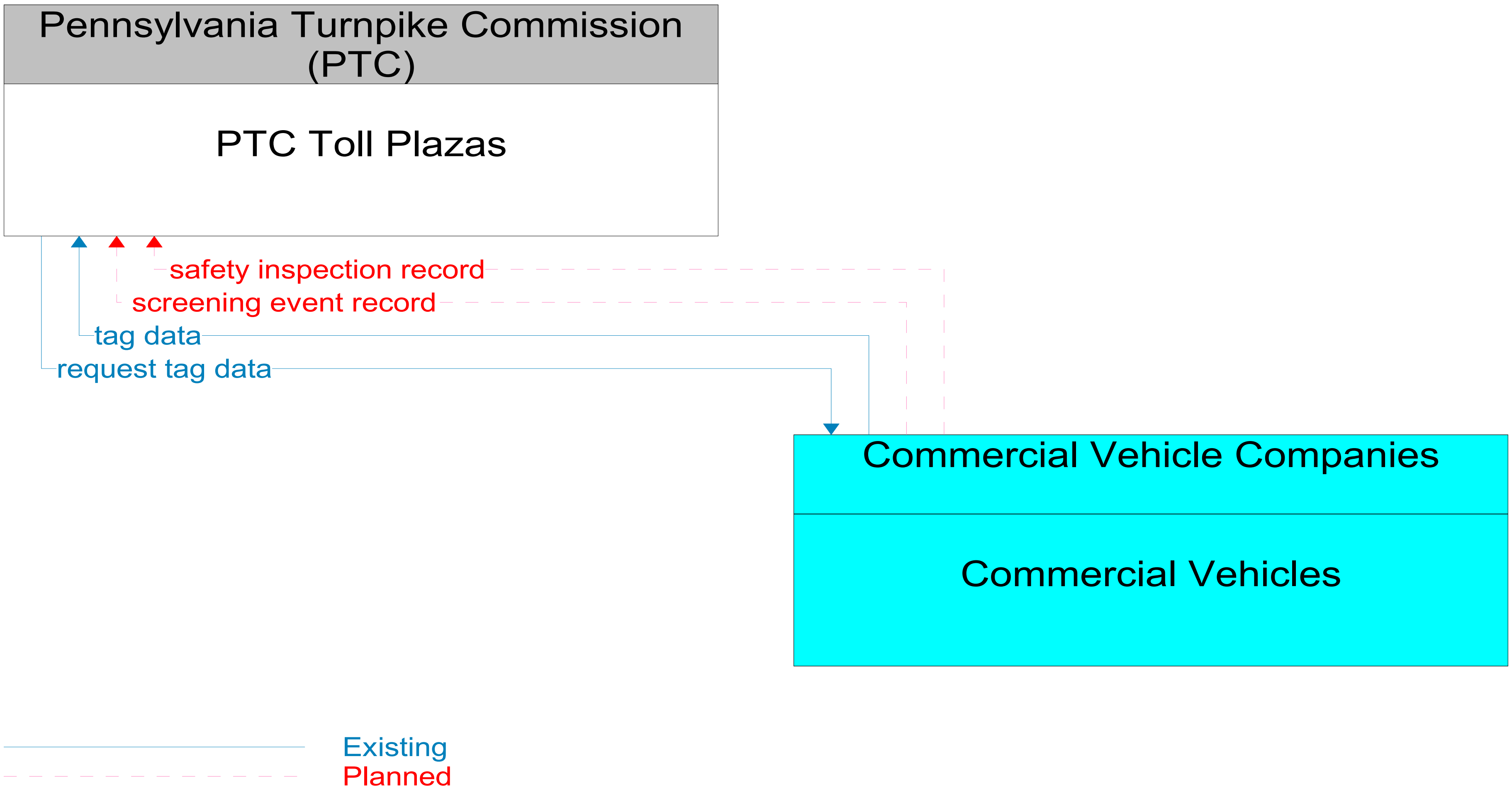
Pennsylvania Turnpike Commission (PTC)

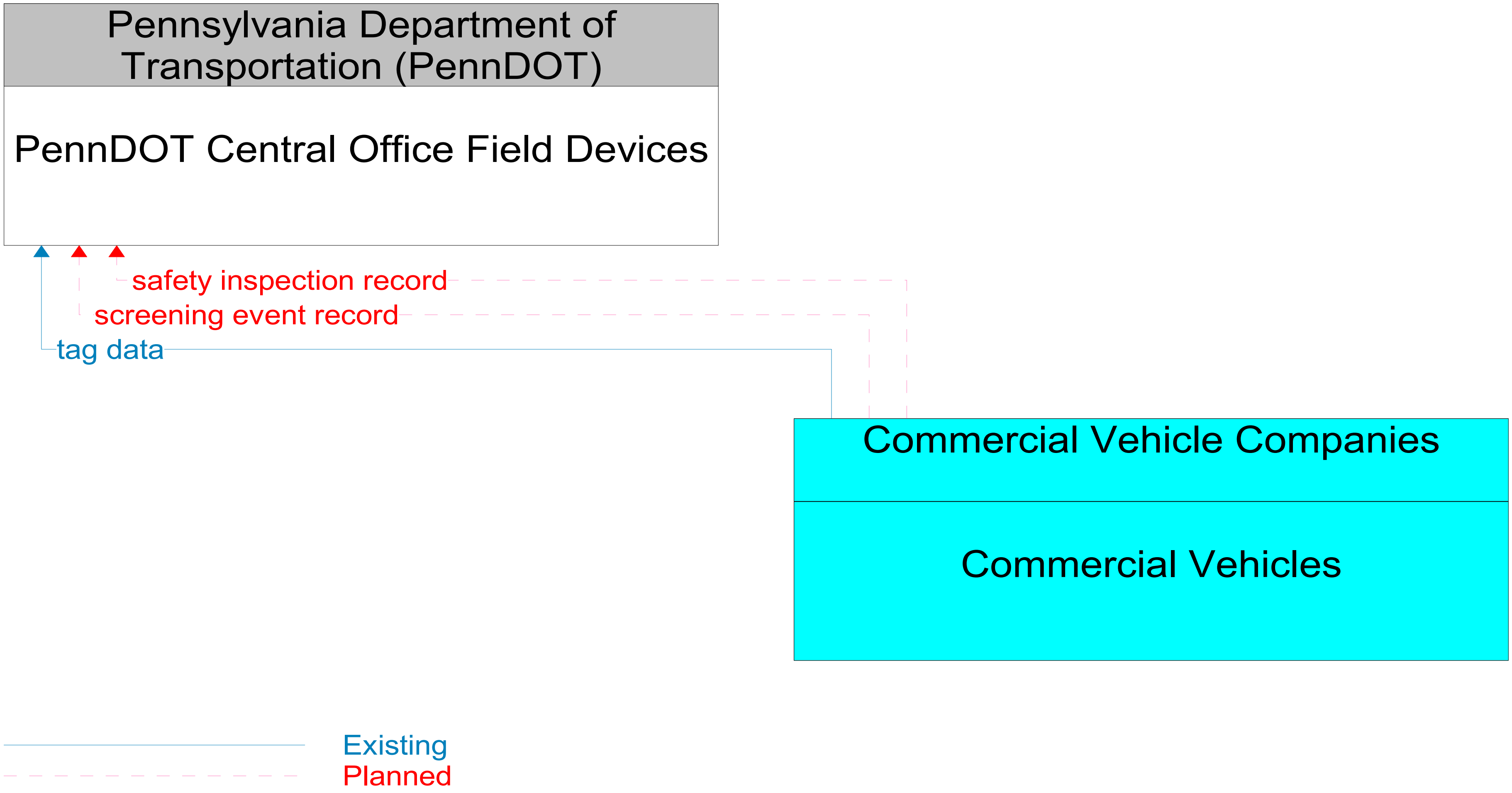
PTC Toll Plazas

Commercial Vehicle Companies

Commercial Vehicles


Commercial Vehicle Companies
Commercial Vehicles
fleet to driver update
on-board safety request
on-board vehicle request
trip identification number
trip log request
driver to fleet request
on-board safety data
on-board vehicle data
trip log
Commercial Vehicle Companies
Commercial Vehicle Company Offices
Existing
Planned


Pennsylvania Turnpike Commission (PTC)
PTC Toll Plazas
safety inspection record
screening event record
tag data
request tag data
Commercial Vehicle Companies
Commercial Vehicles
Existing
Planned



Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Field Devices

safety inspection record

screening event record

tag data

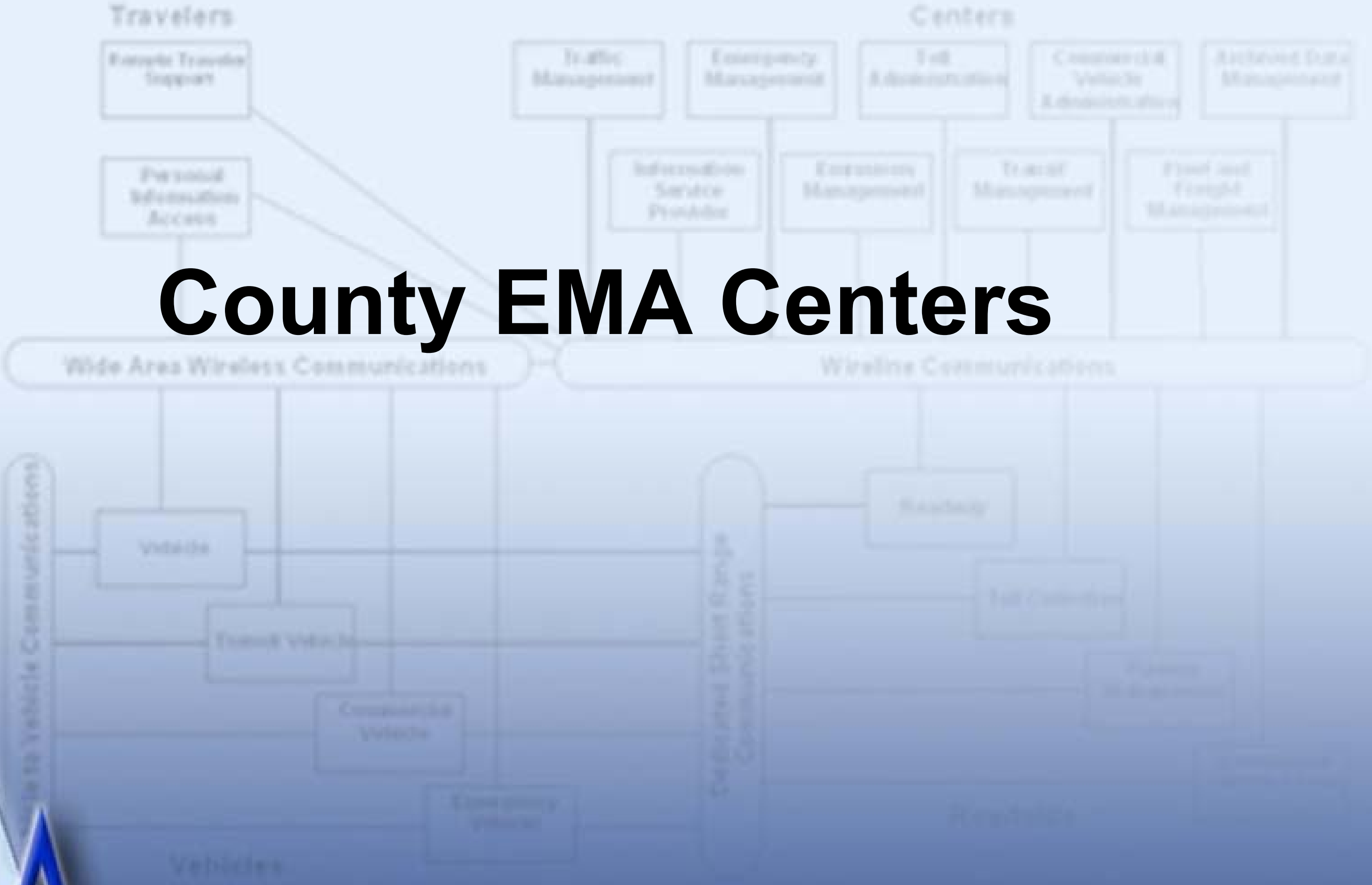
Commercial Vehicle Companies

Commercial Vehicles

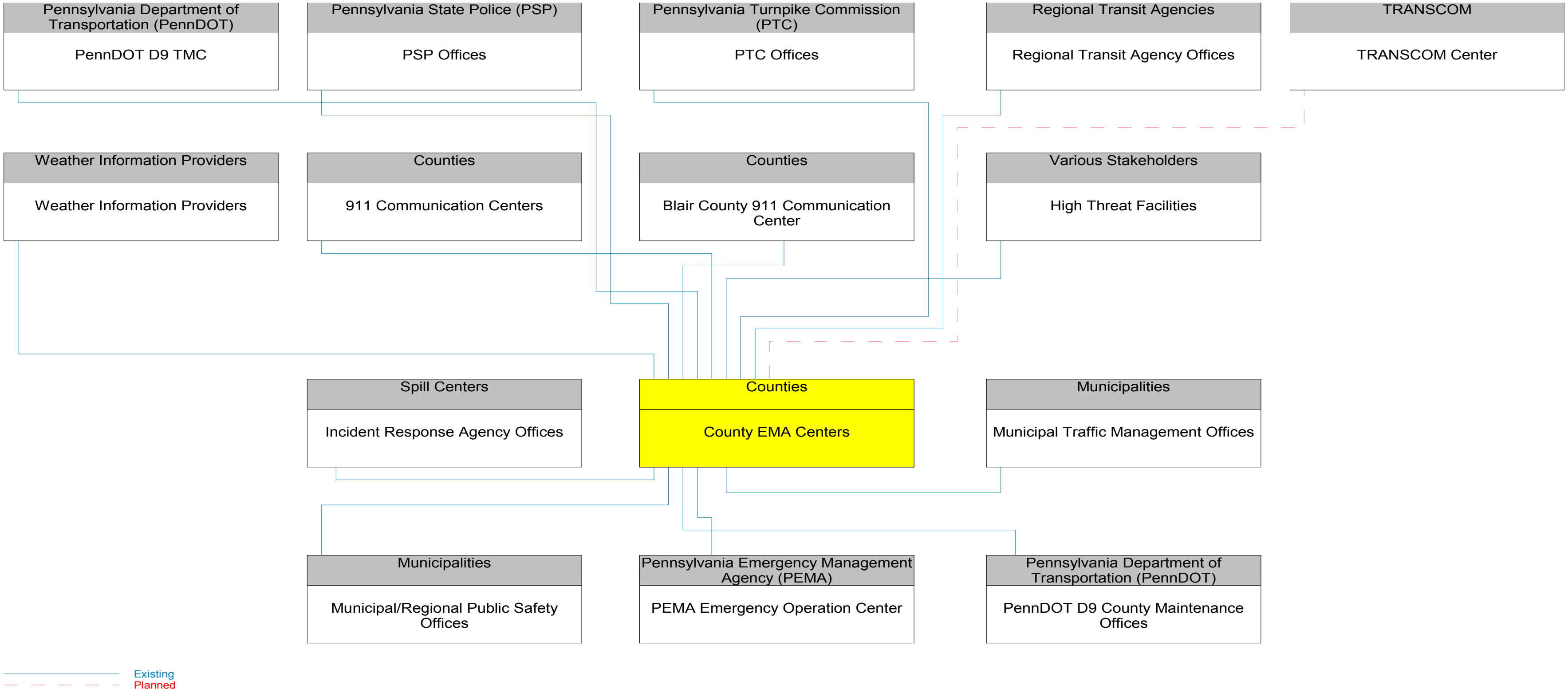
Existing

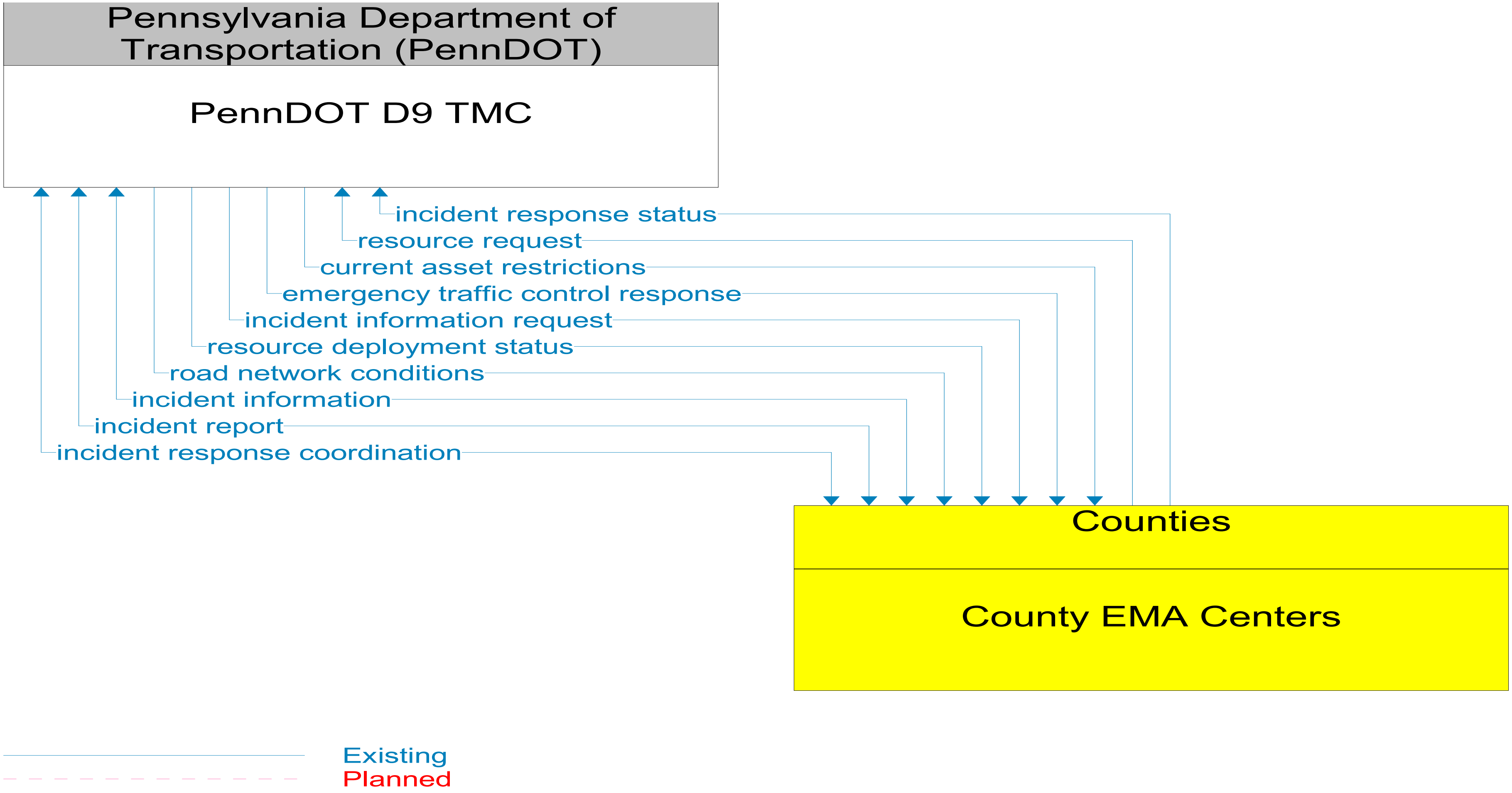
Planned

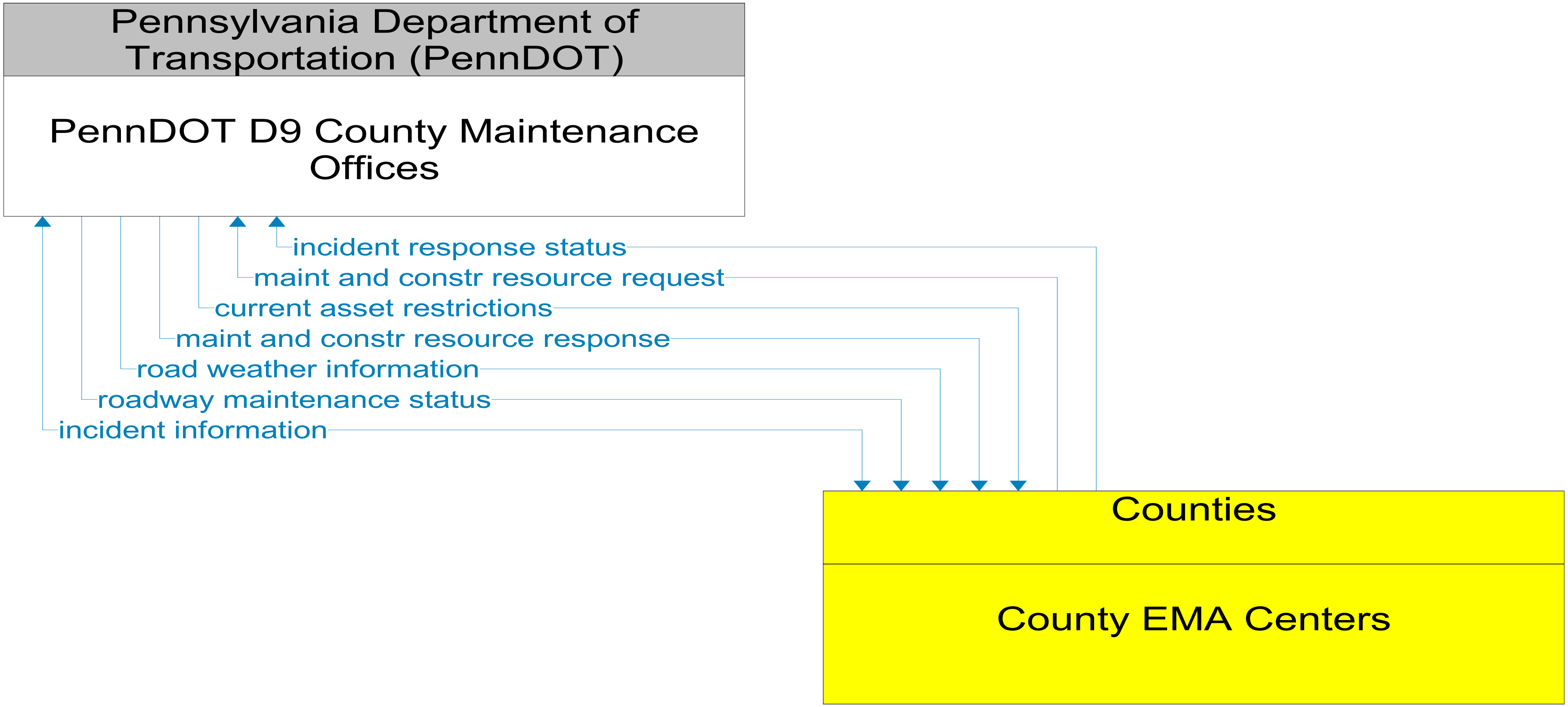
County EMA Centers


Travelers
Centers
Remote Traveler Support
Personal Information Access
Traffic Management
Emergency Management
Toll Administration
Commercial Vehicle Administration
Archived Data Management
Information Service Provider
Emissions Management
Transit Management
Fleet and Freight Management
Wide Area Wireless Communications
Wireline Communications
Vehicle
Transit Vehicle
Commercial Vehicle
Emergency Vehicle
Vehicles
Roadway
Toll Collection
Parking Management
Roadside
Dedicated Short Range Communications

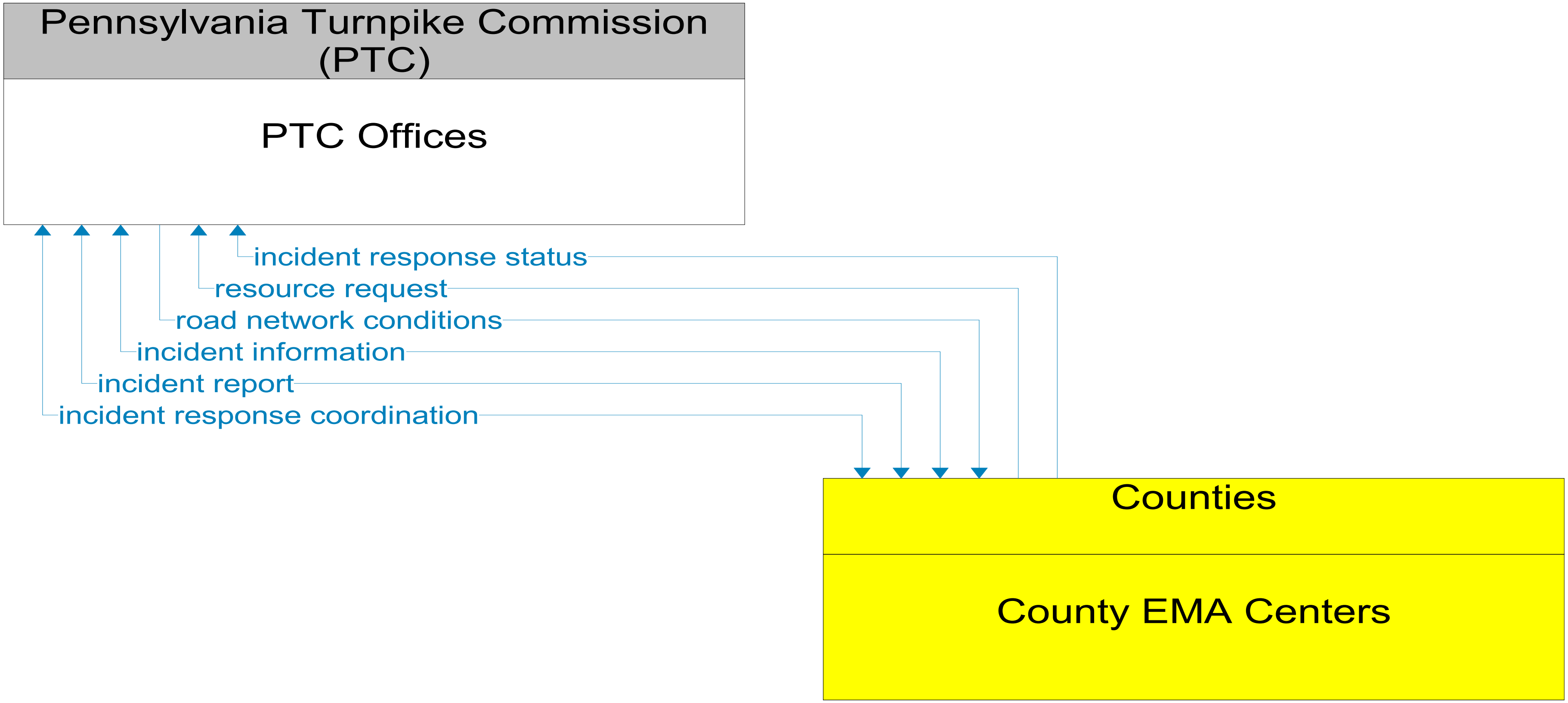
County EMA Centers Interconnect Diagram


Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
Pennsylvania State Police (PSP)
PSP Offices
Pennsylvania Turnpike Commission (PTC)
PTC Offices
Regional Transit Agencies
Regional Transit Agency Offices
TRANSCOM
TRANSCOM Center
Weather Information Providers
Weather Information Providers
Counties
911 Communication Centers
Counties
Blair County 911 Communication Center
Various Stakeholders
High Threat Facilities
Spill Centers
Incident Response Agency Offices
Counties
County EMA Centers
Municipalities
Municipal Traffic Management Offices
Municipalities
Municipal/Regional Public Safety Offices
Pennsylvania Emergency Management Agency (PEMA)
PEMA Emergency Operation Center
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 County Maintenance Offices
Existing
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
incident response status
resource request
current asset restrictions
emergency traffic control response
incident information request
resource deployment status
road network conditions
incident information
incident report
incident response coordination
Counties
County EMA Centers
Existing
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 County Maintenance Offices
incident response status
maint and constr resource request
current asset restrictions
maint and constr resource response
road weather information
roadway maintenance status
incident information
Counties
County EMA Centers

Existing
Planned



Pennsylvania Turnpike Commission (PTC)

PTC Offices

incident response status

resource request

road network conditions

incident information

incident report

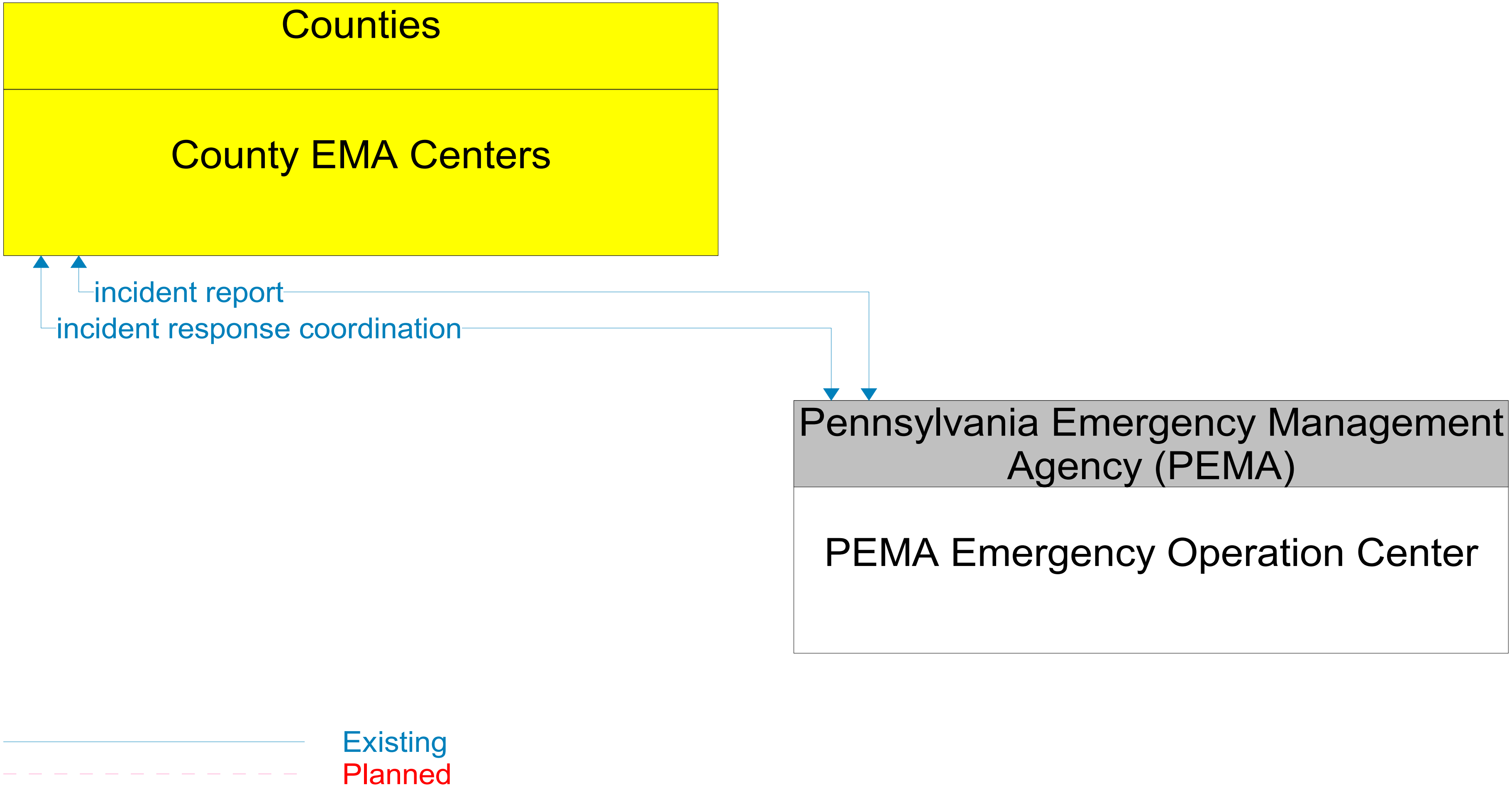
incident response coordination

Counties

County EMA Centers

Existing

Planned


Counties

County EMA Centers

incident report

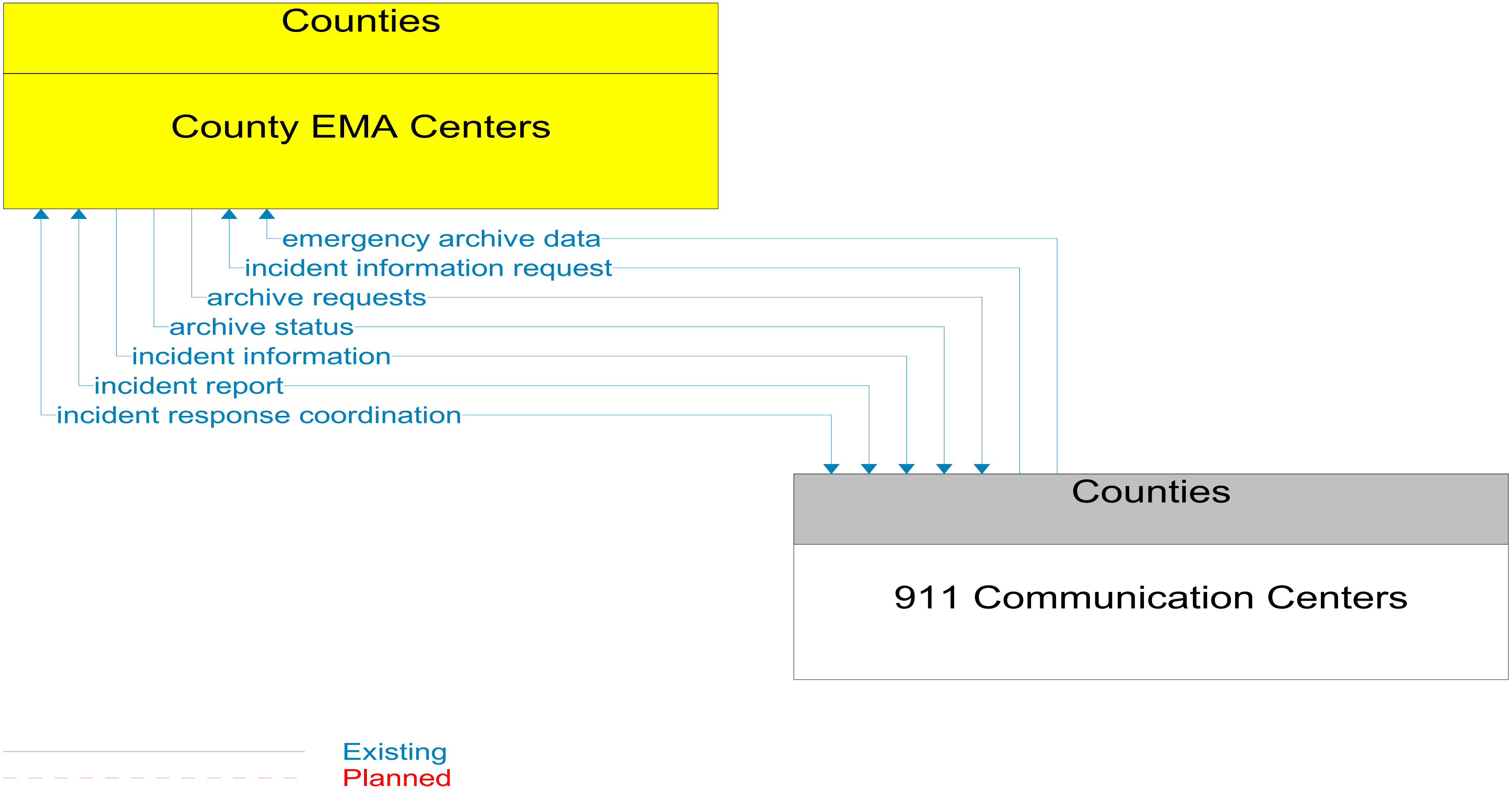
incident response coordination

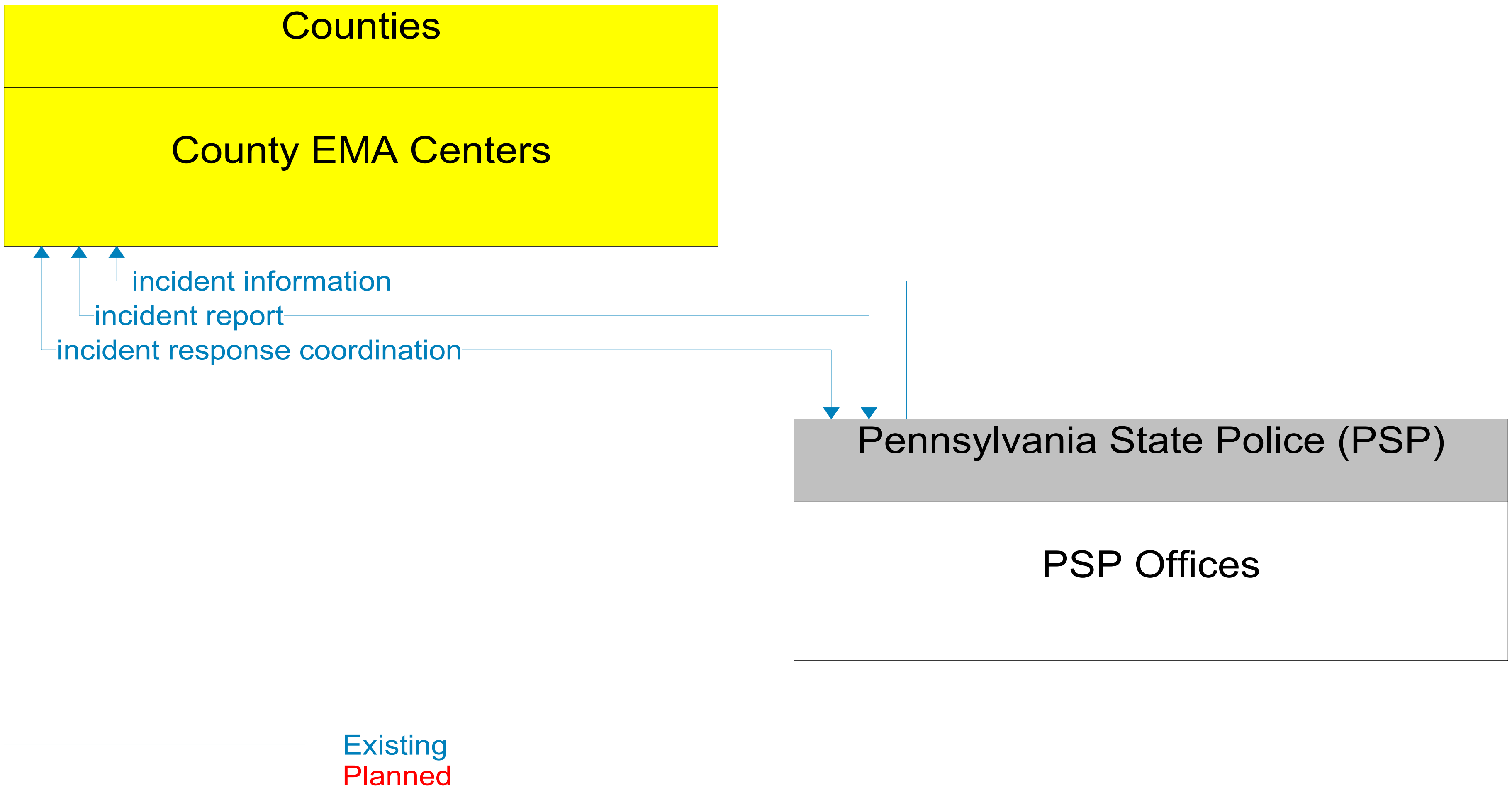
Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

Existing

Planned


Counties
County EMA Centers
emergency archive data
incident information request
archive requests
archive status
incident information
incident report
incident response coordination
Counties
911 Communication Centers
Existing
Planned



Counties

County EMA Centers

incident information

incident report

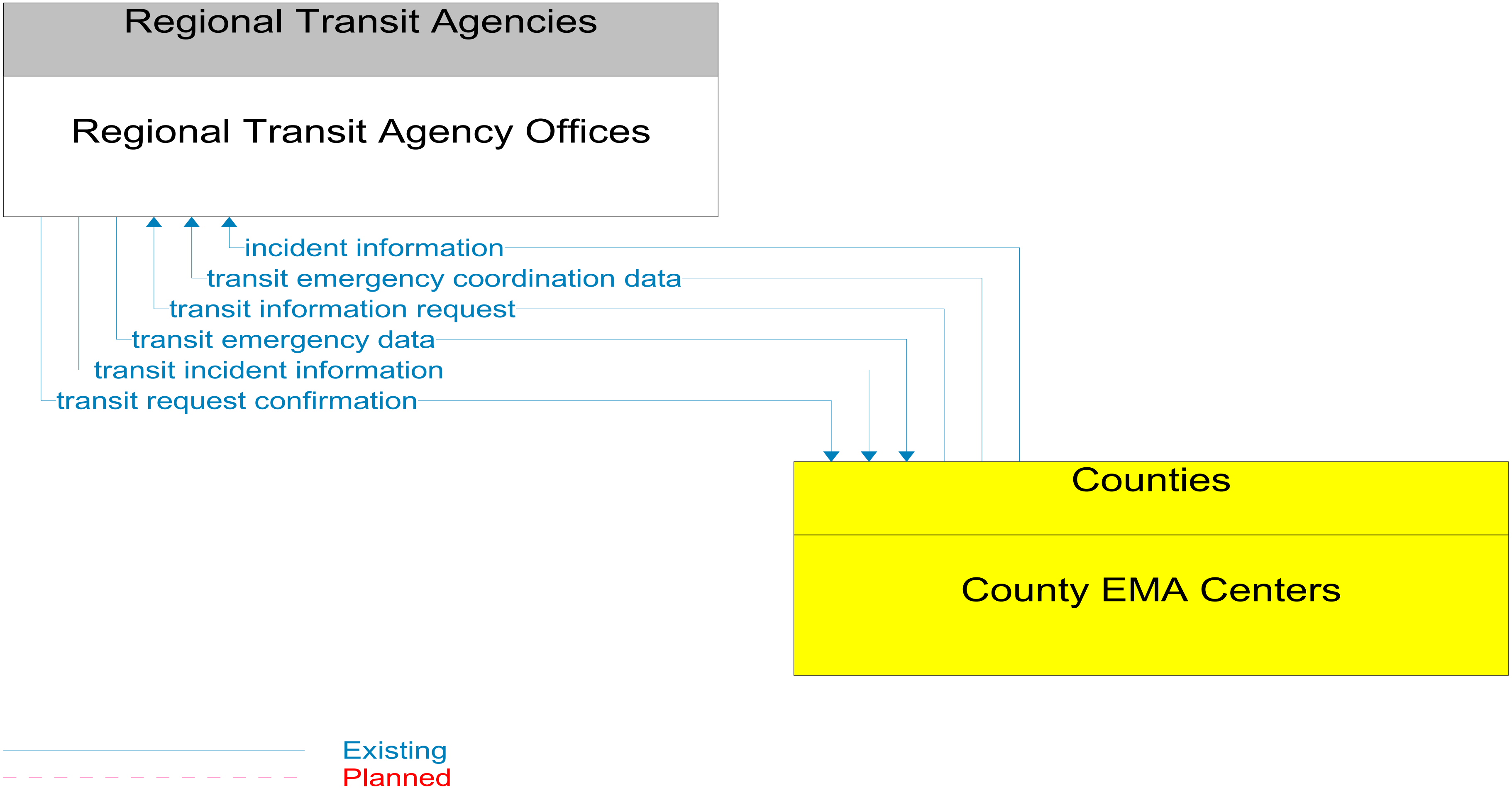
incident response coordination

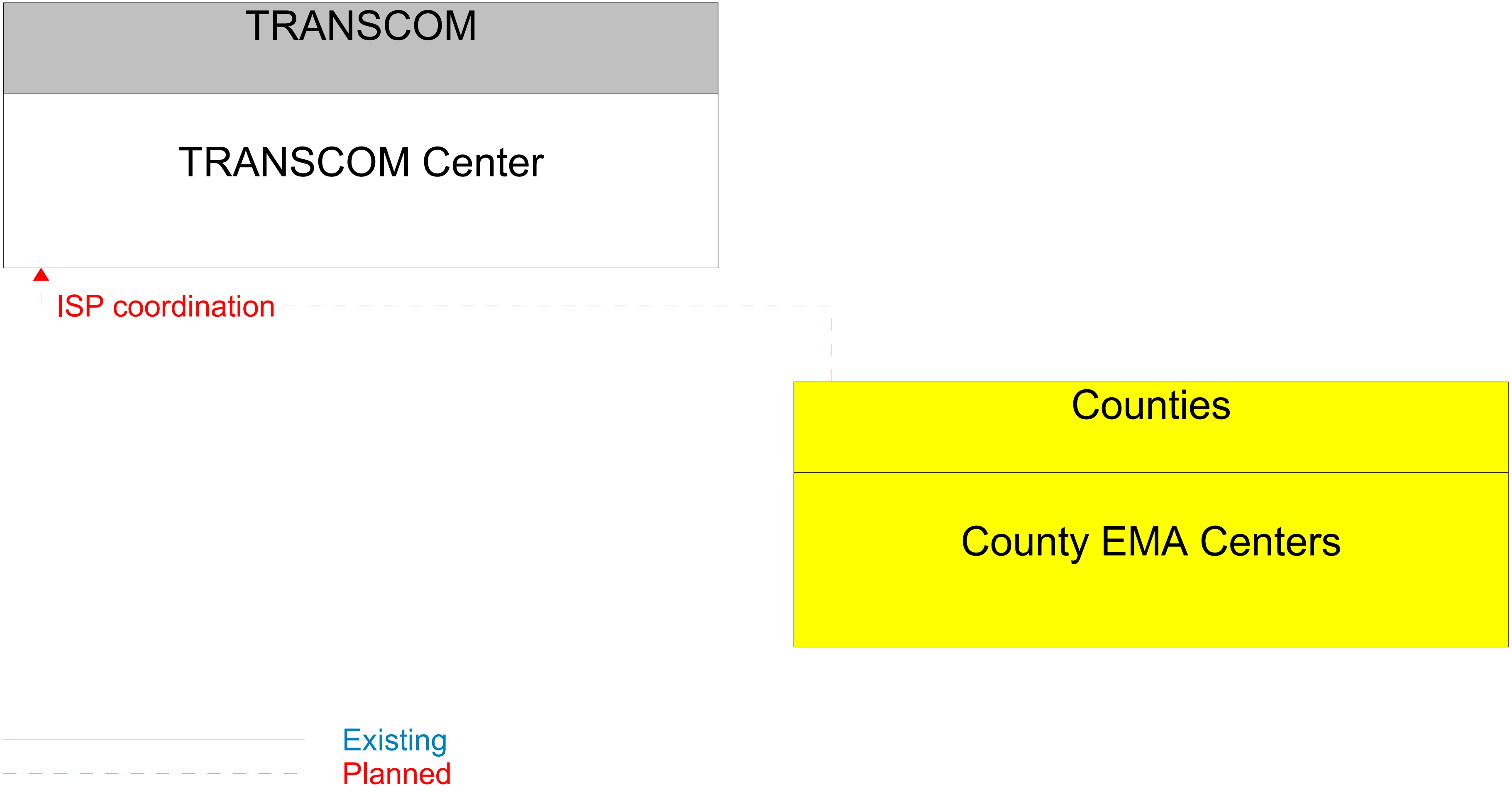
Pennsylvania State Police (PSP)

PSP Offices

Existing

Planned


Regional Transit Agencies
Regional Transit Agency Offices
incident information
transit emergency coordination data
transit information request
transit emergency data
transit incident information
transit request confirmation
Counties
County EMA Centers
Existing
Planned



TRANSCOM

TRANSCOM Center

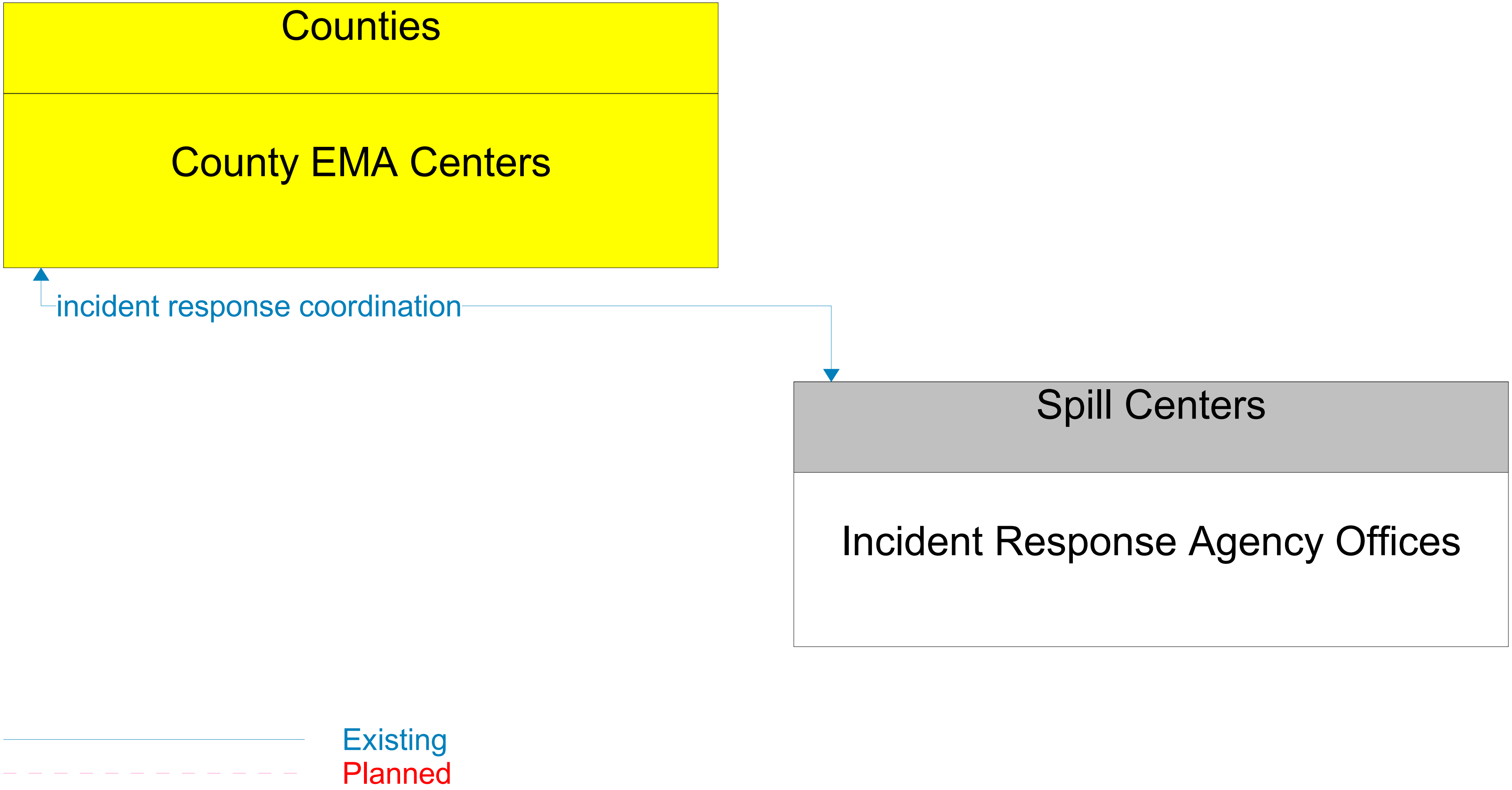
ISP coordination

Counties

County EMA Centers

Existing

Planned



Counties

County EMA Centers

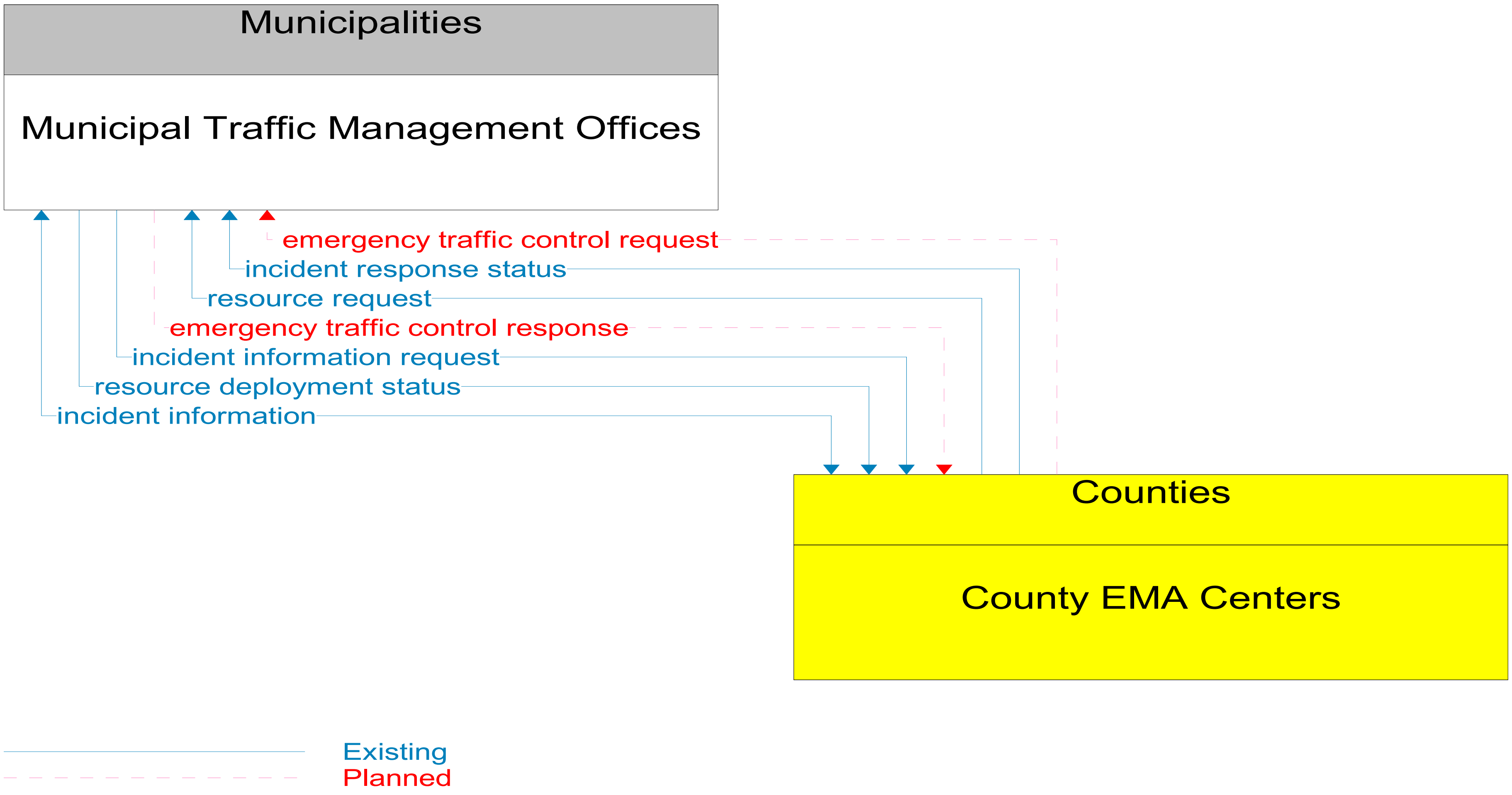
incident response coordination

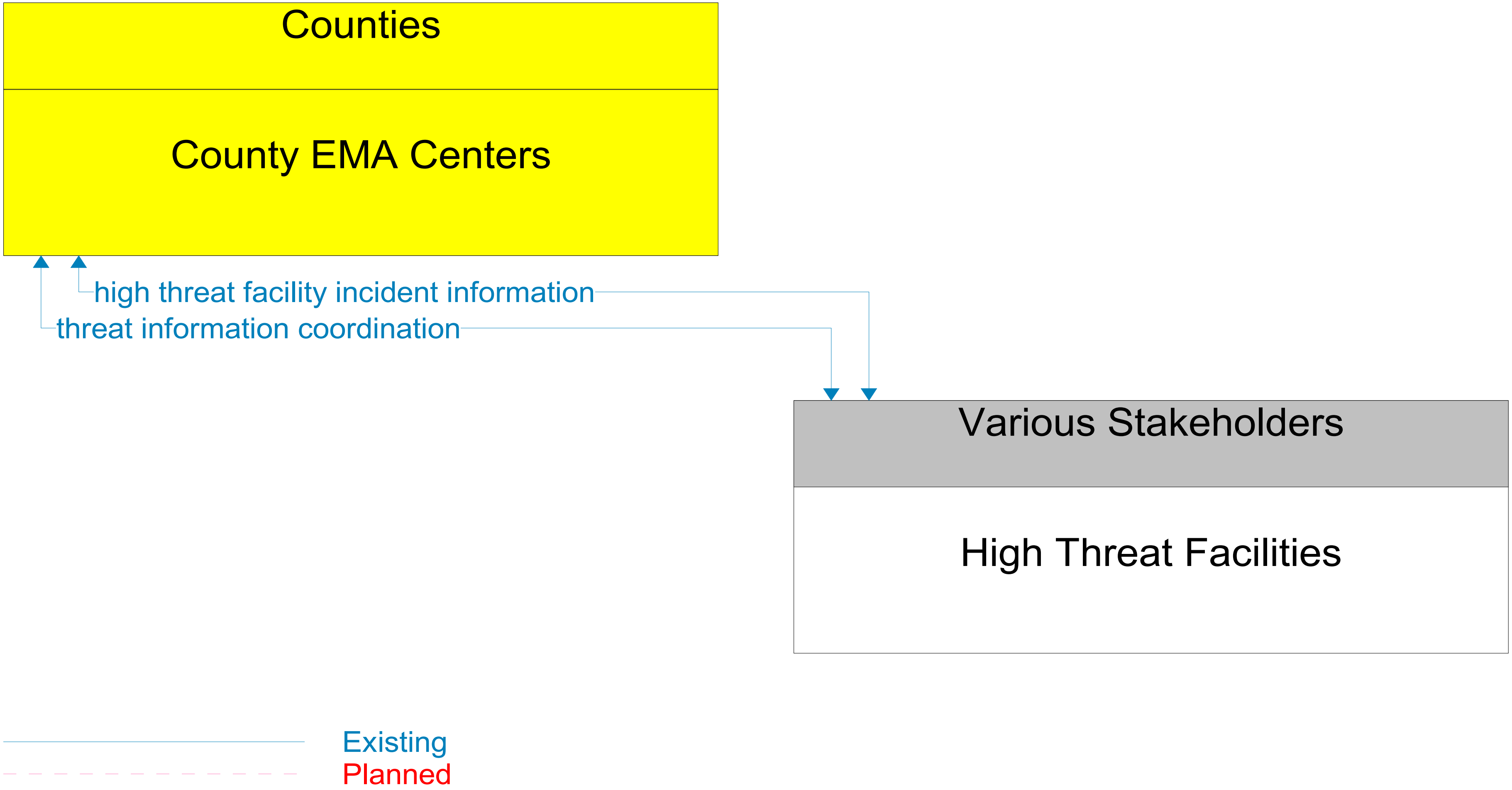
Spill Centers

Incident Response Agency Offices

Existing

Planned


Municipalities
Municipal Traffic Management Offices
emergency traffic control request
incident response status
resource request
emergency traffic control response
incident information request
resource deployment status
incident information
Counties
County EMA Centers
Existing
Planned



Counties

County EMA Centers

high threat facility incident information

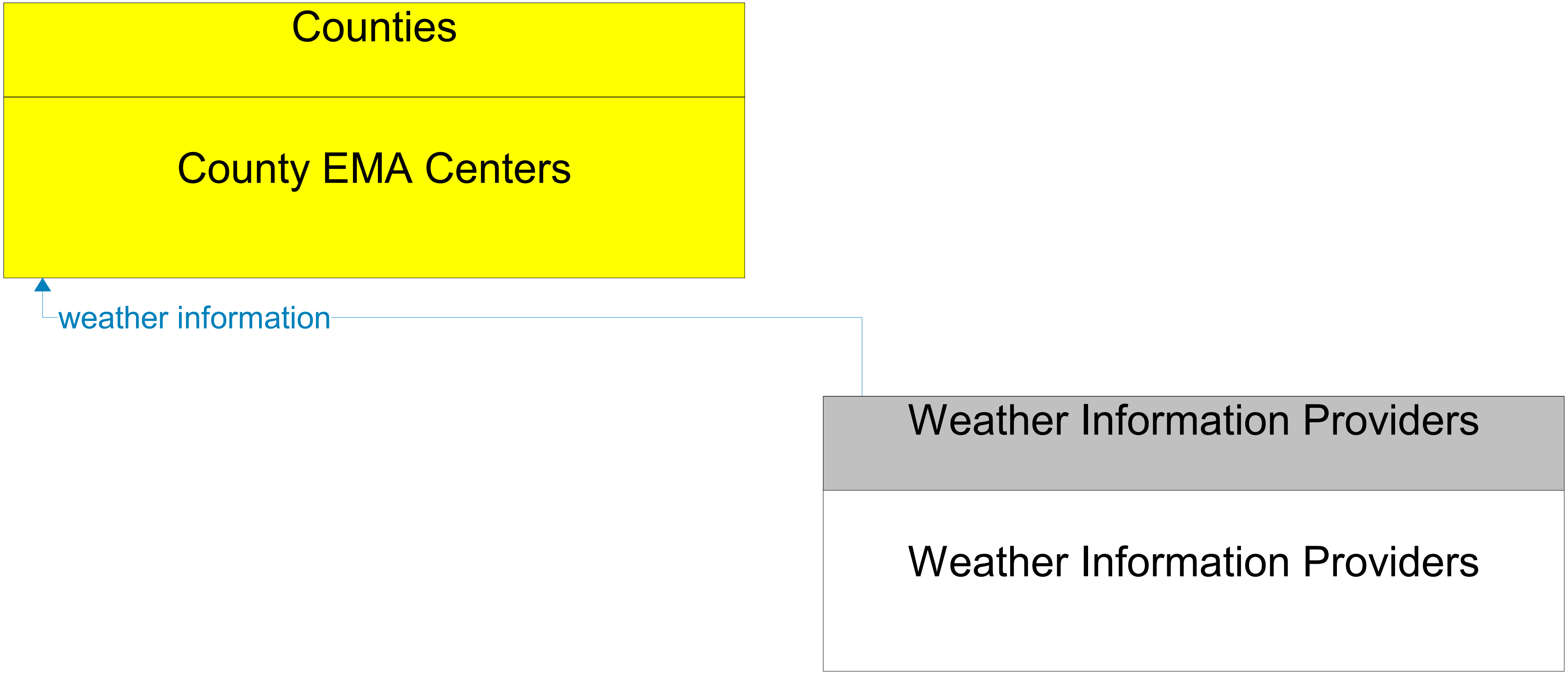
threat information coordination

Various Stakeholders

High Threat Facilities

Existing

Planned



Counties

County EMA Centers

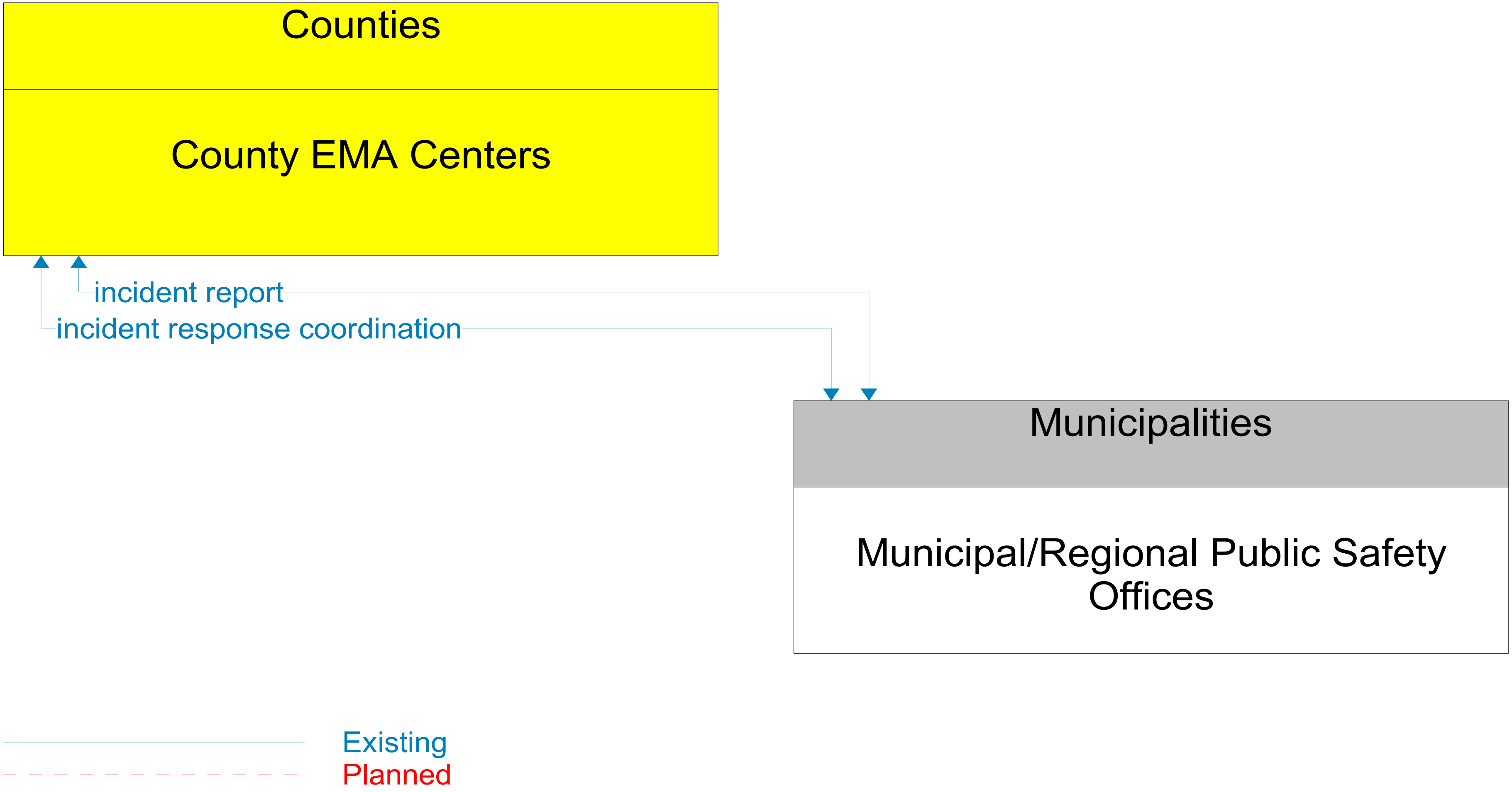
weather information

Weather Information Providers

Weather Information Providers

Existing

Planned



Counties

County EMA Centers

incident report

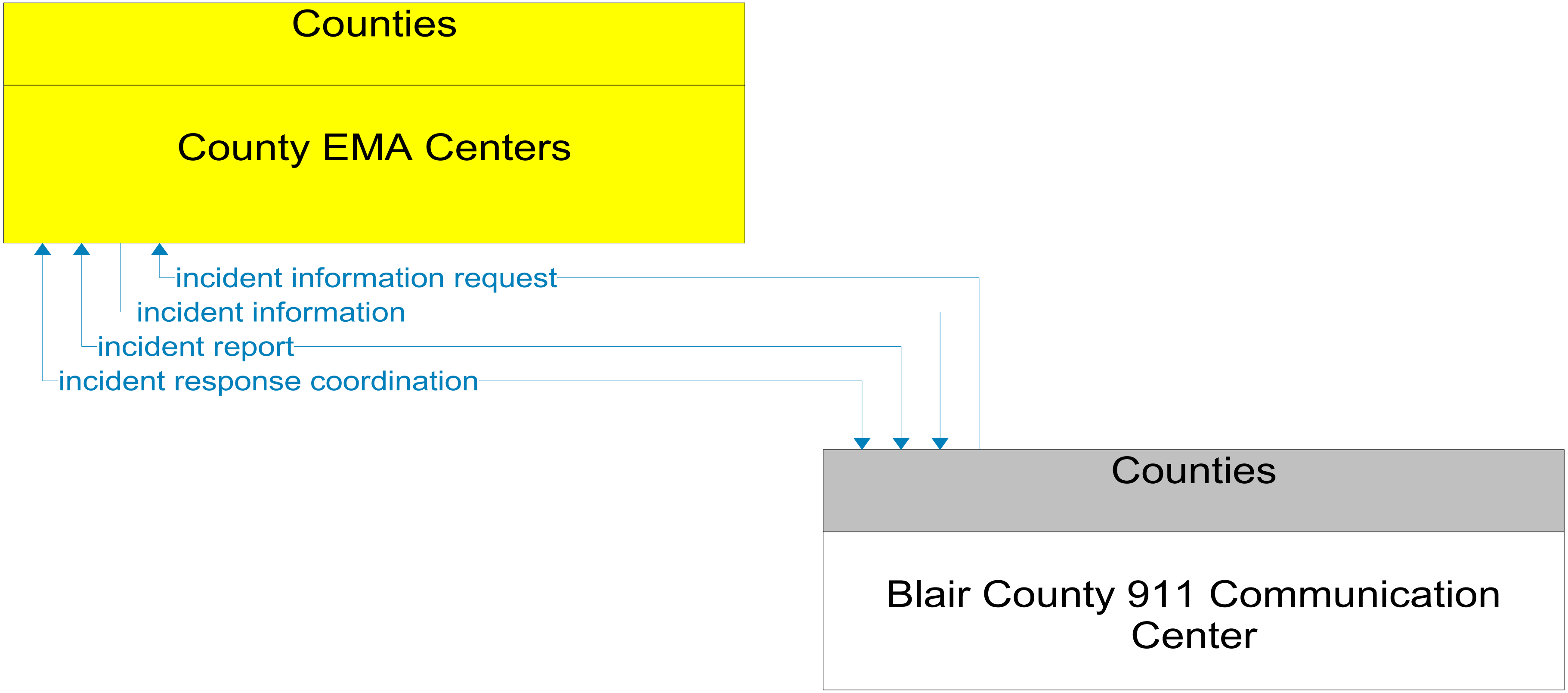
incident response coordination

Municipalities

Municipal/Regional Public Safety Offices

Existing

Planned



Counties

County EMA Centers

incident information request

incident information

incident report

incident response coordination

Counties

Blair County 911 Communication Center

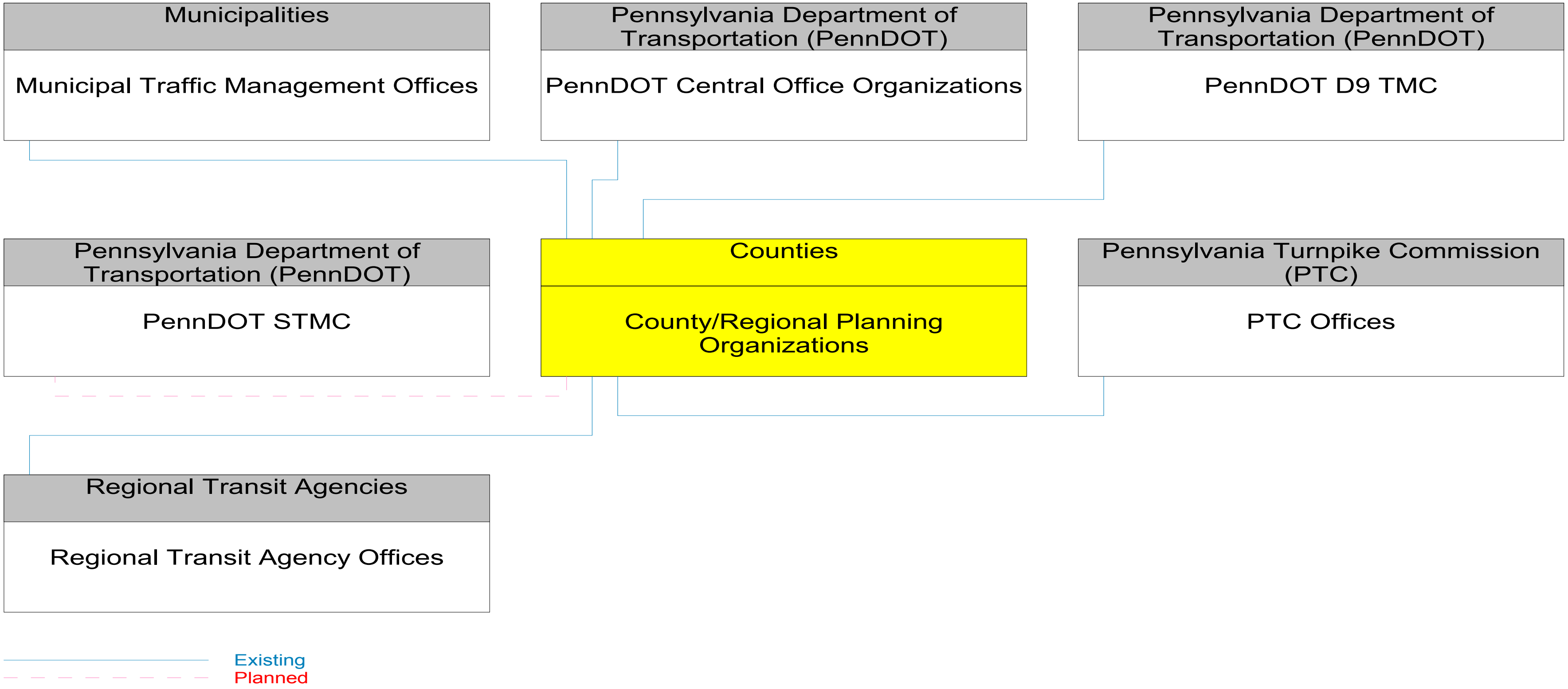
Existing

Planned

Travelers
Centers
Remote Traveler Support
Traffic Management
Emergency Management
Toll Administration
Commercial Vehicle Administration
Archived Data Management
Personal Information Access
Information Service Provider
Emissions Management
Transit Management
Fleet and Freight Management
Wide Area Wireless Communications
Wireline Communications
Vehicle to Vehicle Communications
Dedicated Short Range Communications
Vehicle
Transit Vehicle
Commercial Vehicle
Emergency Vehicle
Vehicles
Roadway
Toll Collection
Parking Management
Roadside

County/Regional Planning Organizations

County/Regional Planning Organizations Interconnect Diagram



Municipalities

Municipal Traffic Management Offices

Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Organizations

Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 TMC

Pennsylvania Department of Transportation (PennDOT)

PennDOT STMC

Counties

County/Regional Planning Organizations

Pennsylvania Turnpike Commission (PTC)

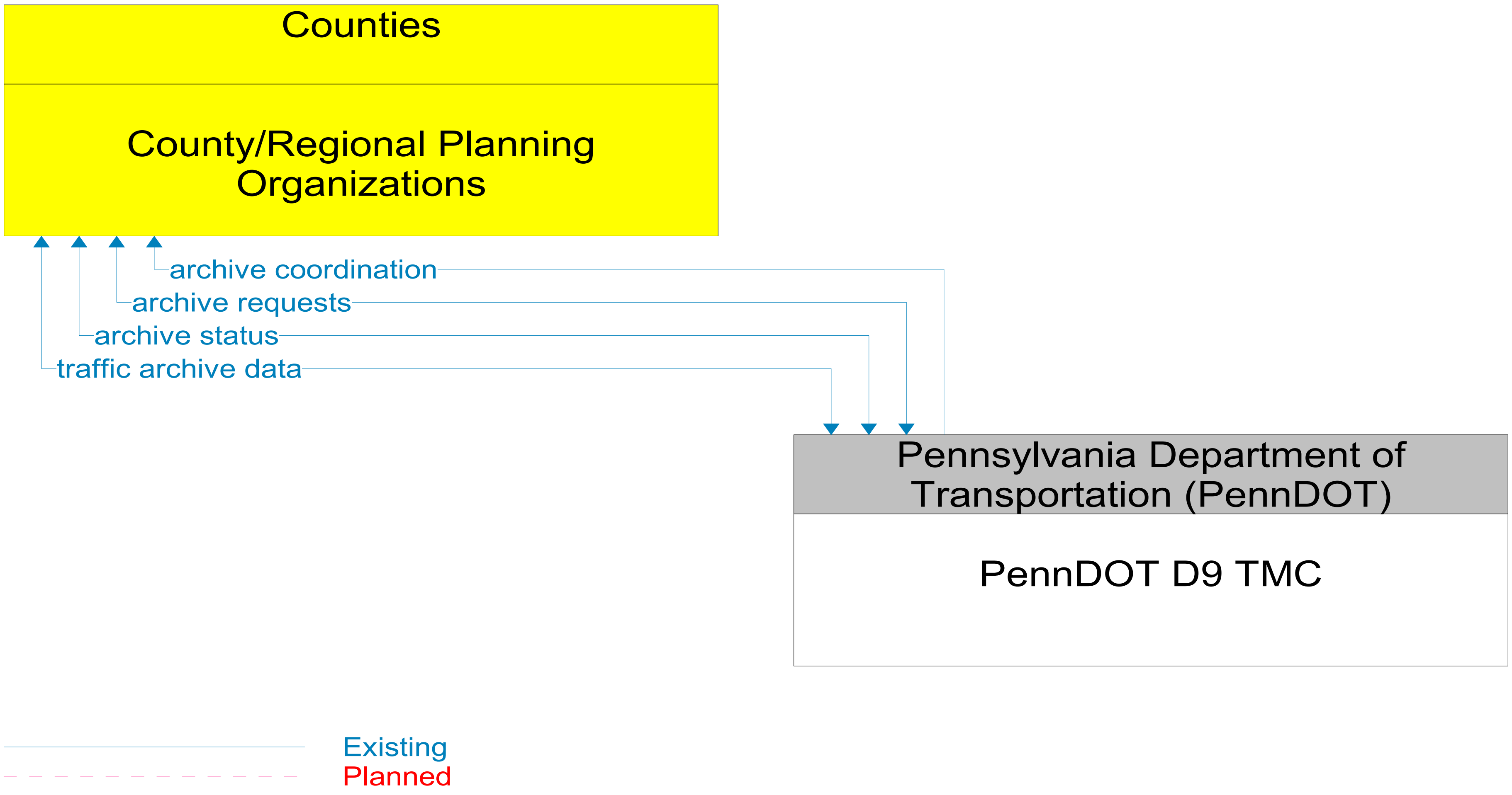
PTC Offices

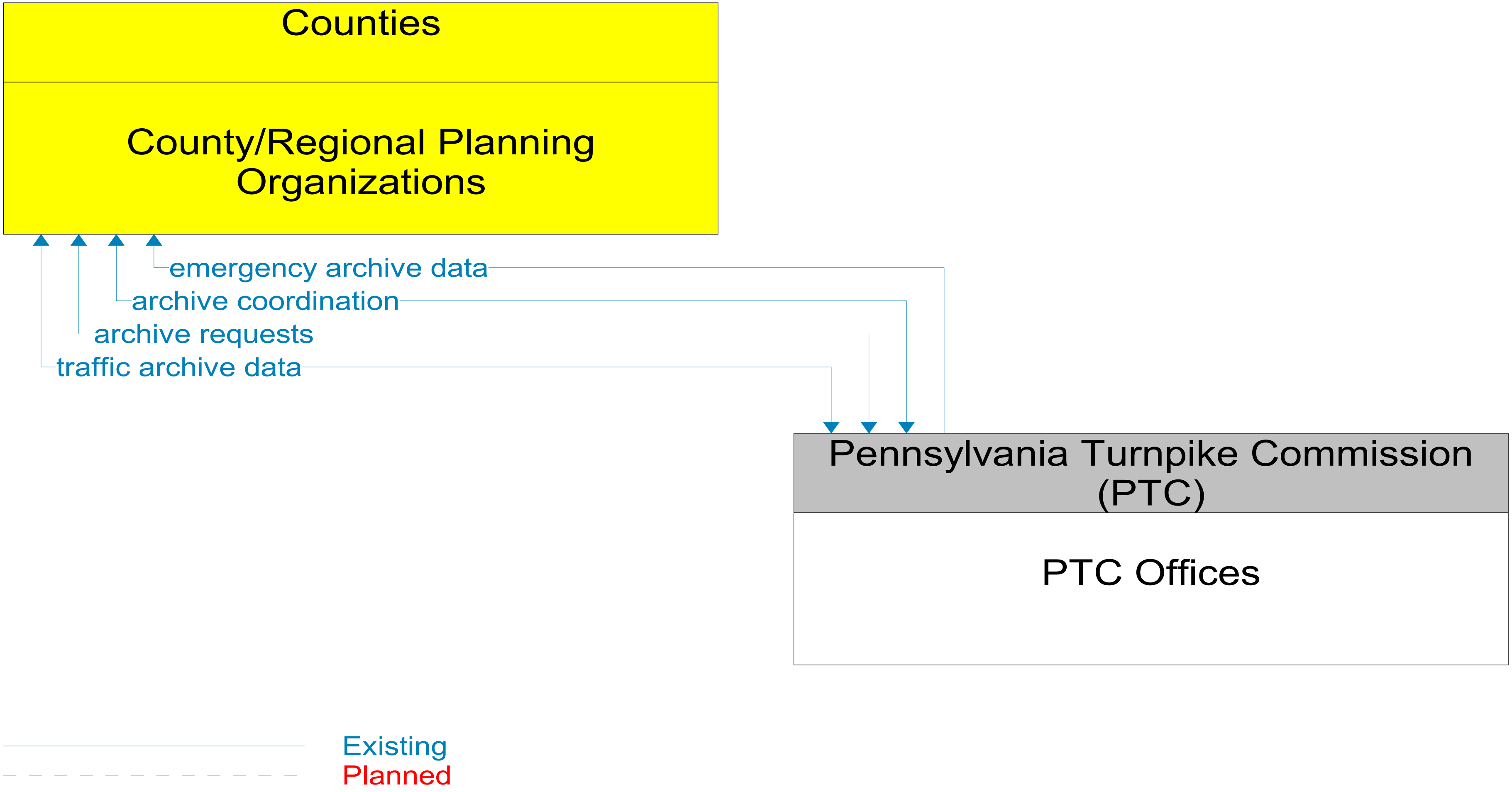
Regional Transit Agencies

Regional Transit Agency Offices

Existing

Planned


Counties
County/Regional Planning Organizations
archive coordination
archive requests
archive status
traffic archive data
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
Existing
Planned



Counties

County/Regional Planning Organizations

emergency archive data

archive coordination

archive requests

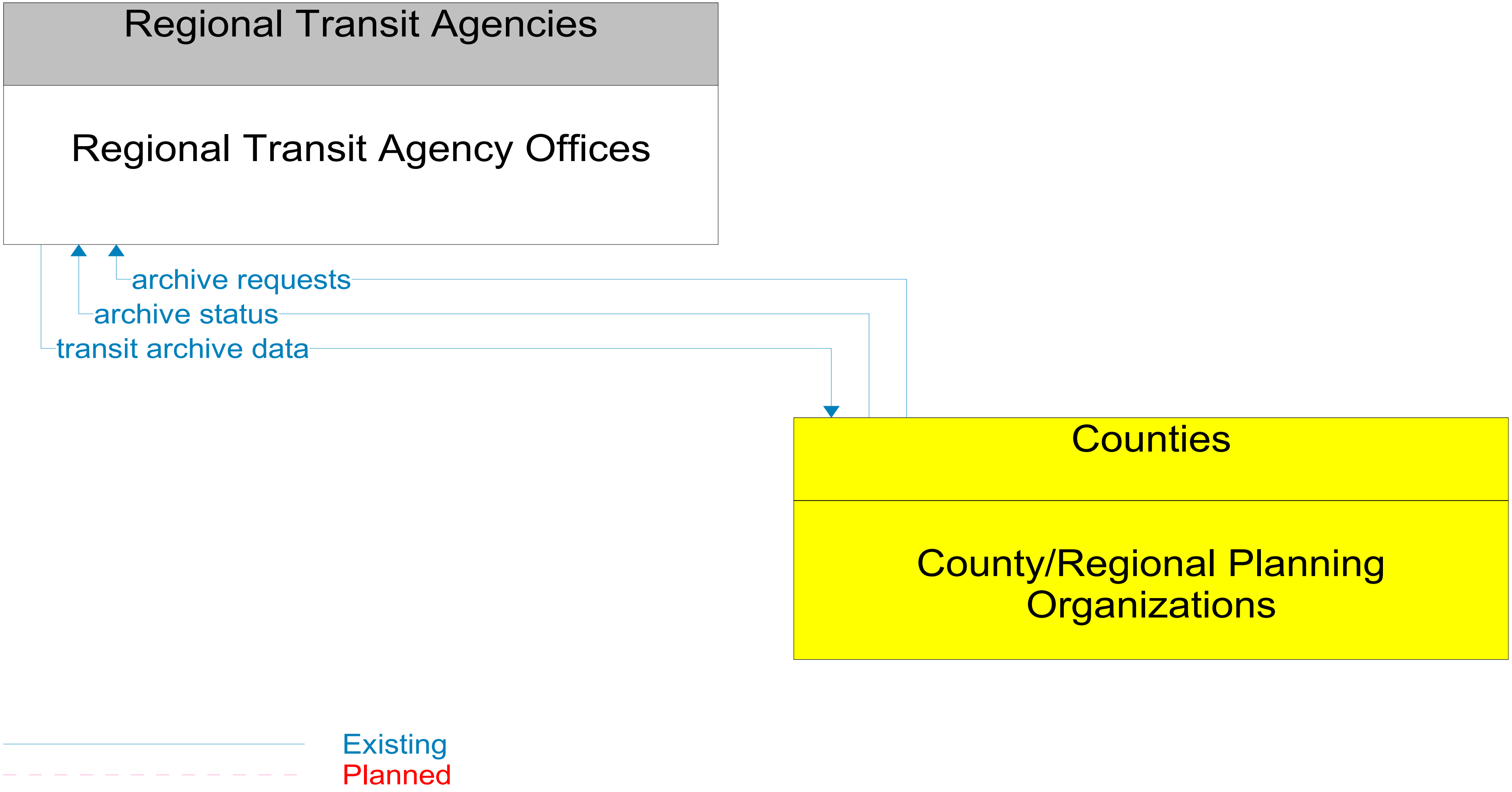
traffic archive data

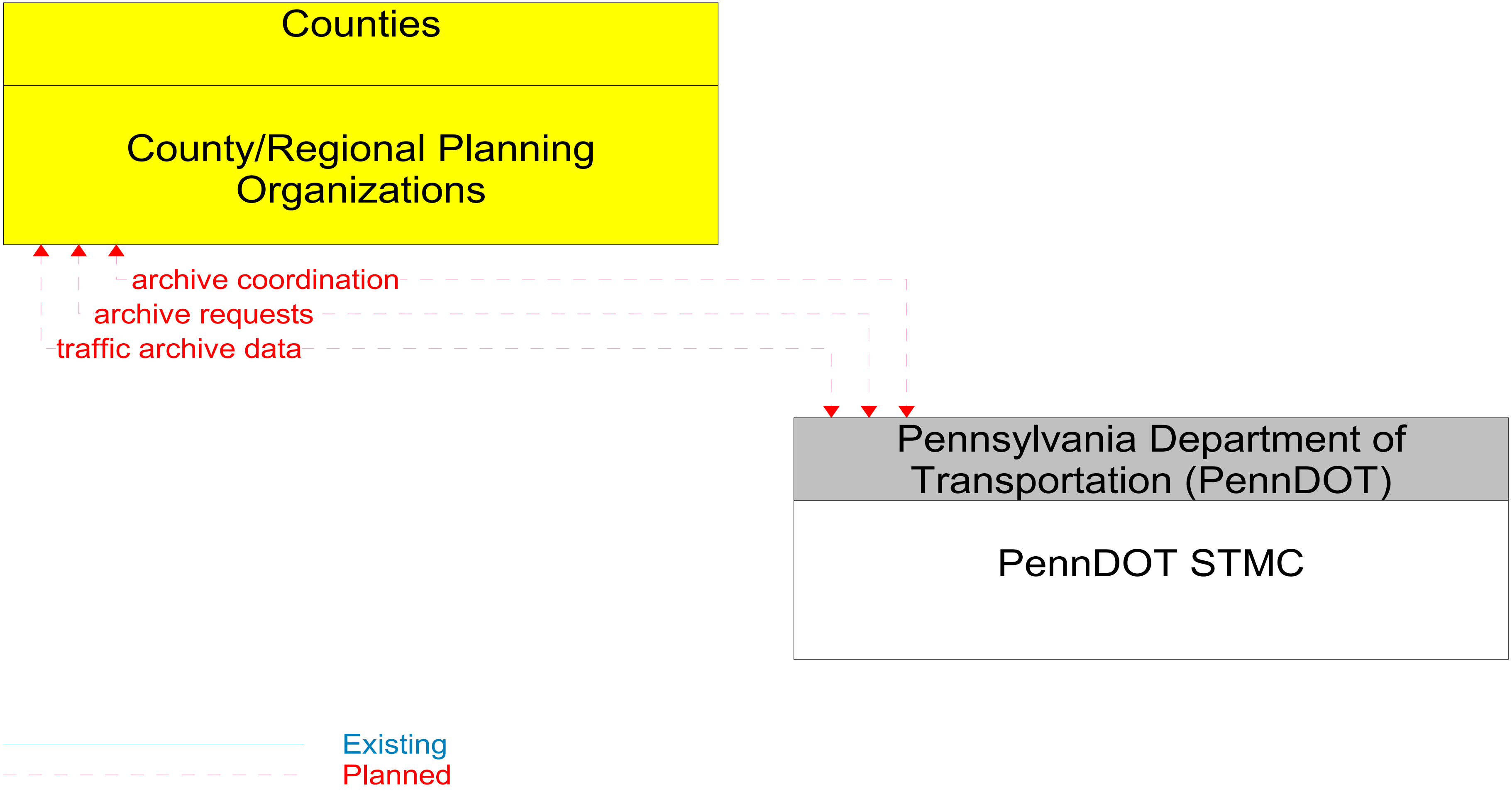
Pennsylvania Turnpike Commission (PTC)

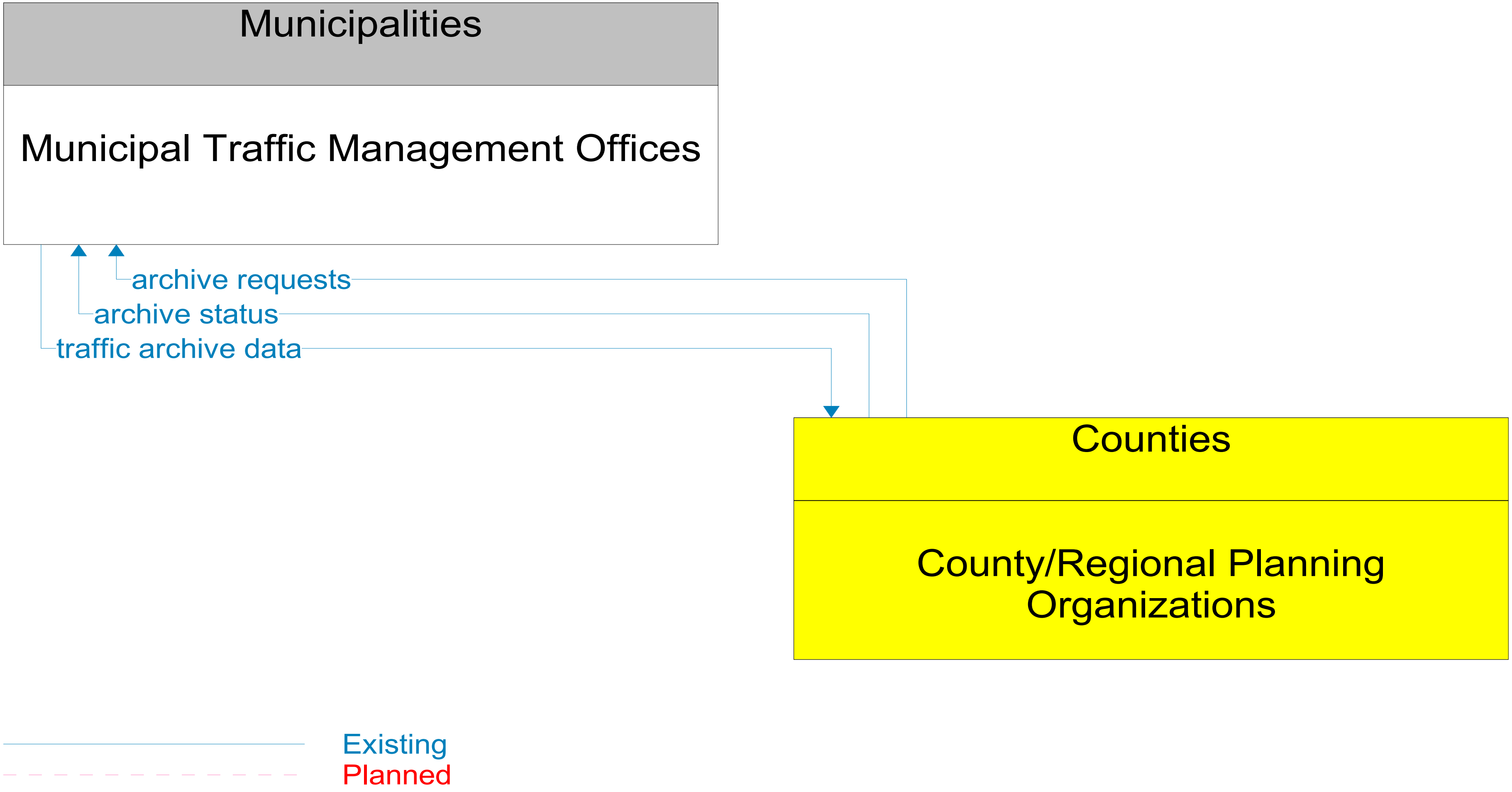
PTC Offices

Existing

Planned


Regional Transit Agencies
Regional Transit Agency Offices
archive requests
archive status
transit archive data
Counties
County/Regional Planning Organizations
Existing
Planned


Counties
County/Regional Planning Organizations
archive coordination
archive requests
traffic archive data
Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC
Existing
Planned



Municipalities

Municipal Traffic Management Offices

archive requests

archive status

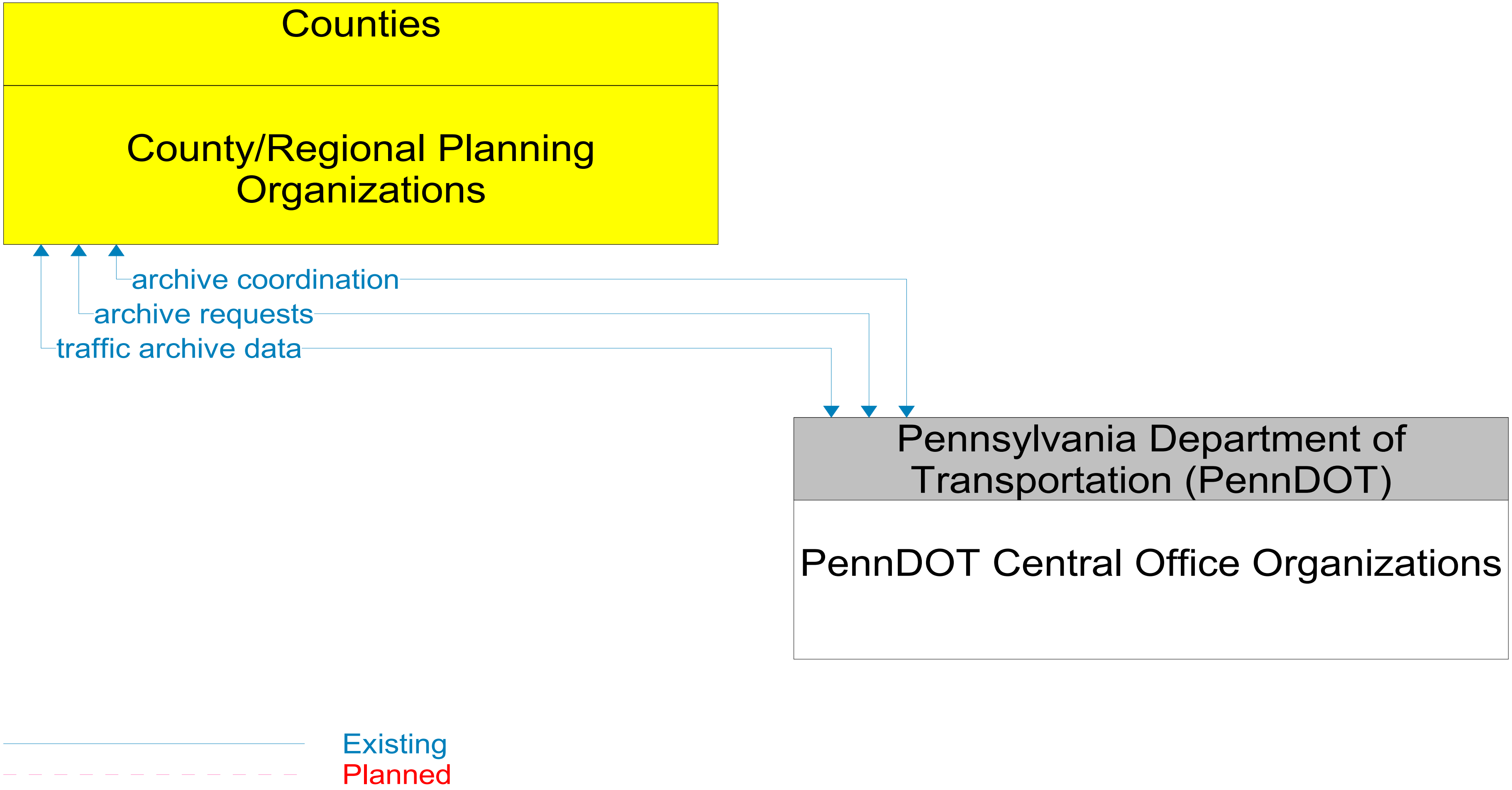
traffic archive data

Counties

County/Regional Planning Organizations

Existing

Planned



Counties

County/Regional Planning Organizations

archive coordination

archive requests

traffic archive data

Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Organizations

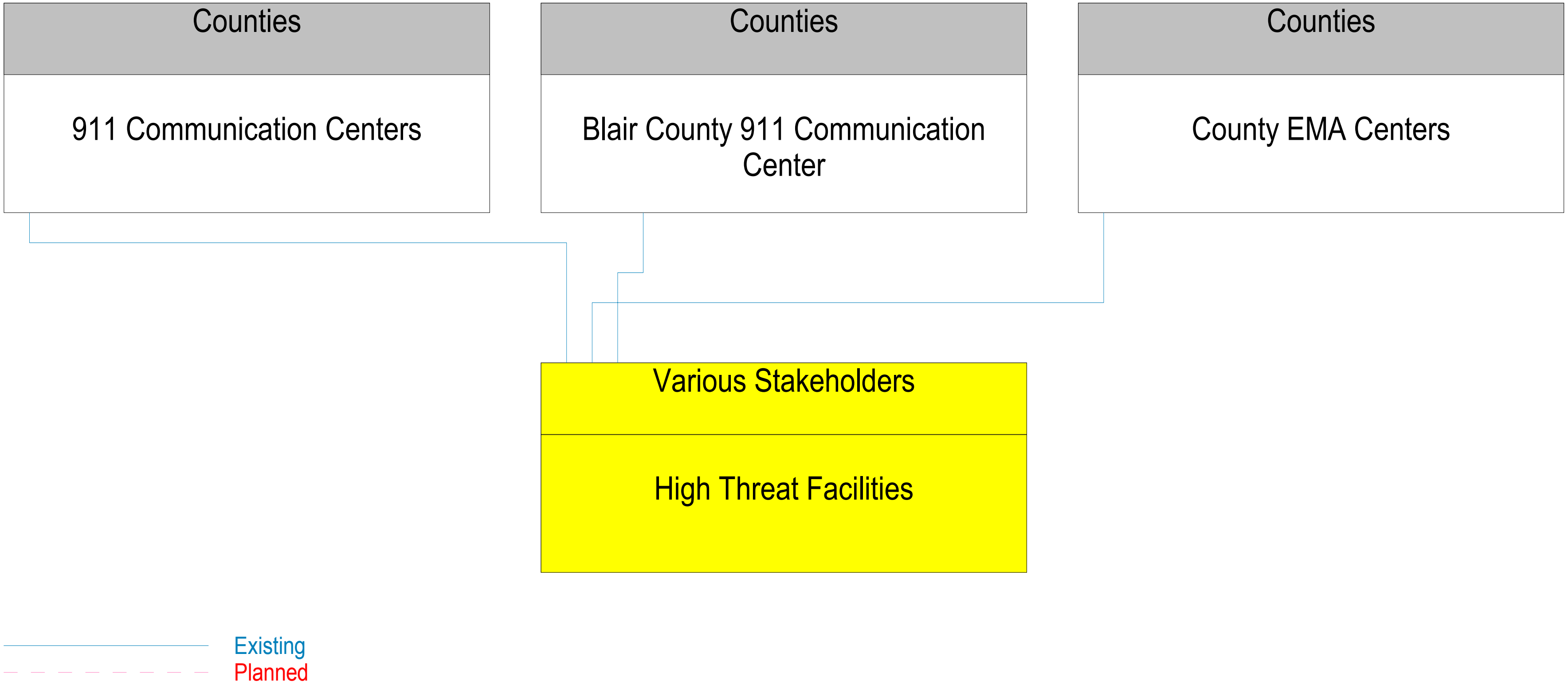
Existing

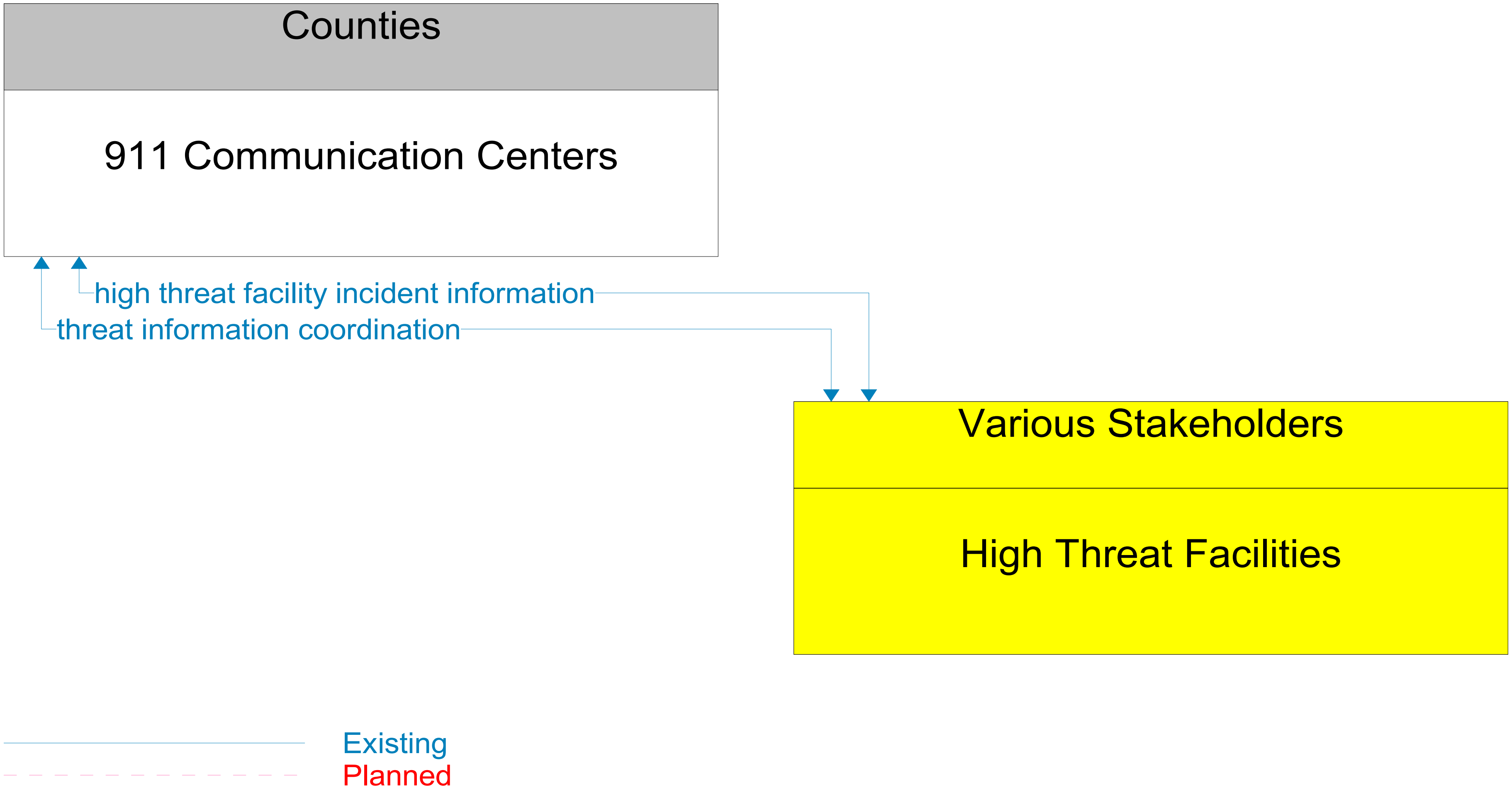
Planned

High Threat Facilities

Travelers
Centers
Wide Area Wireless Communications
Wireline Communications
Vehicles
Roadside

High Threat Facilities Interconnect Diagram


Counties
911 Communication Centers
Counties
Blair County 911 Communication Center
Counties
County EMA Centers
Various Stakeholders
High Threat Facilities
Existing
Planned



Counties

911 Communication Centers

high threat facility incident information

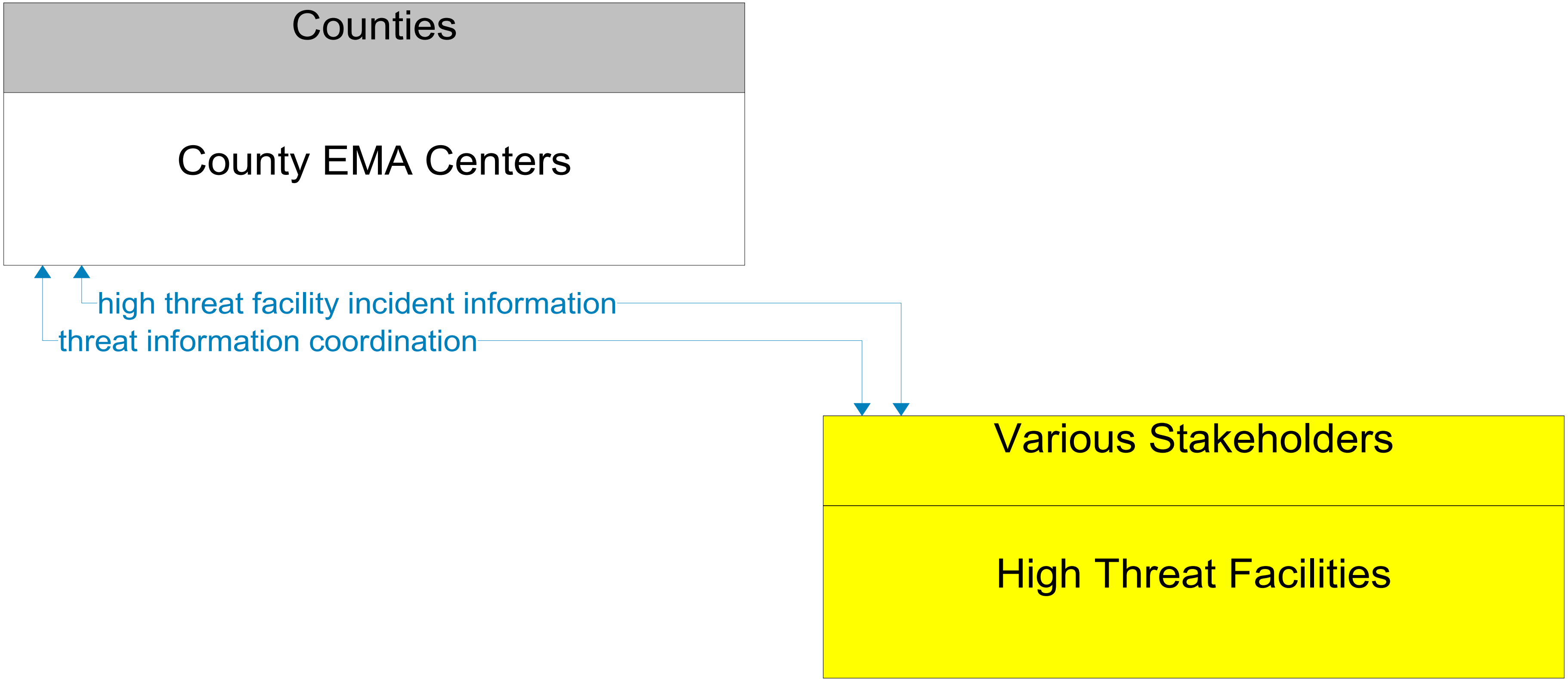
threat information coordination

Various Stakeholders

High Threat Facilities

Existing

Planned



Counties

County EMA Centers

high threat facility incident information

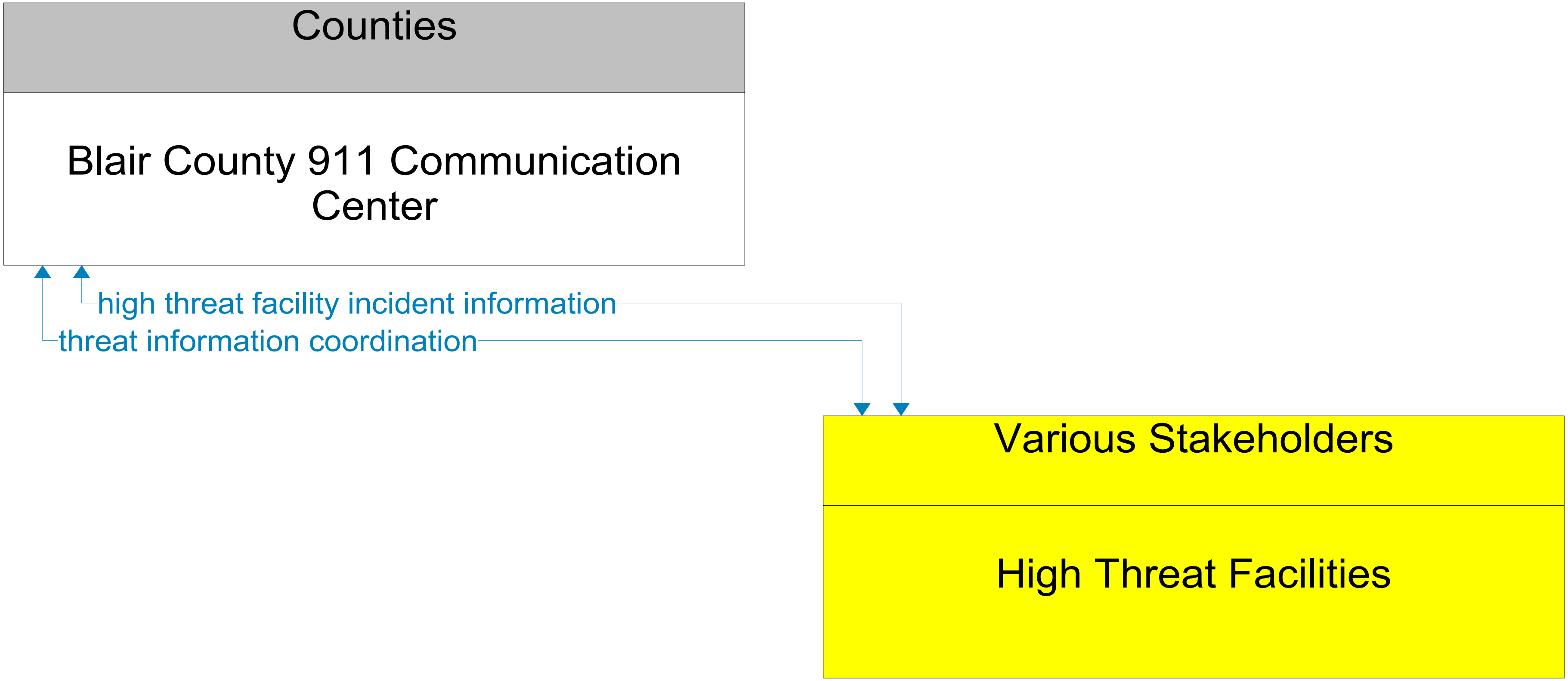
threat information coordination

Various Stakeholders

High Threat Facilities

Existing

Planned



Counties

Blair County 911 Communication Center

high threat facility incident information

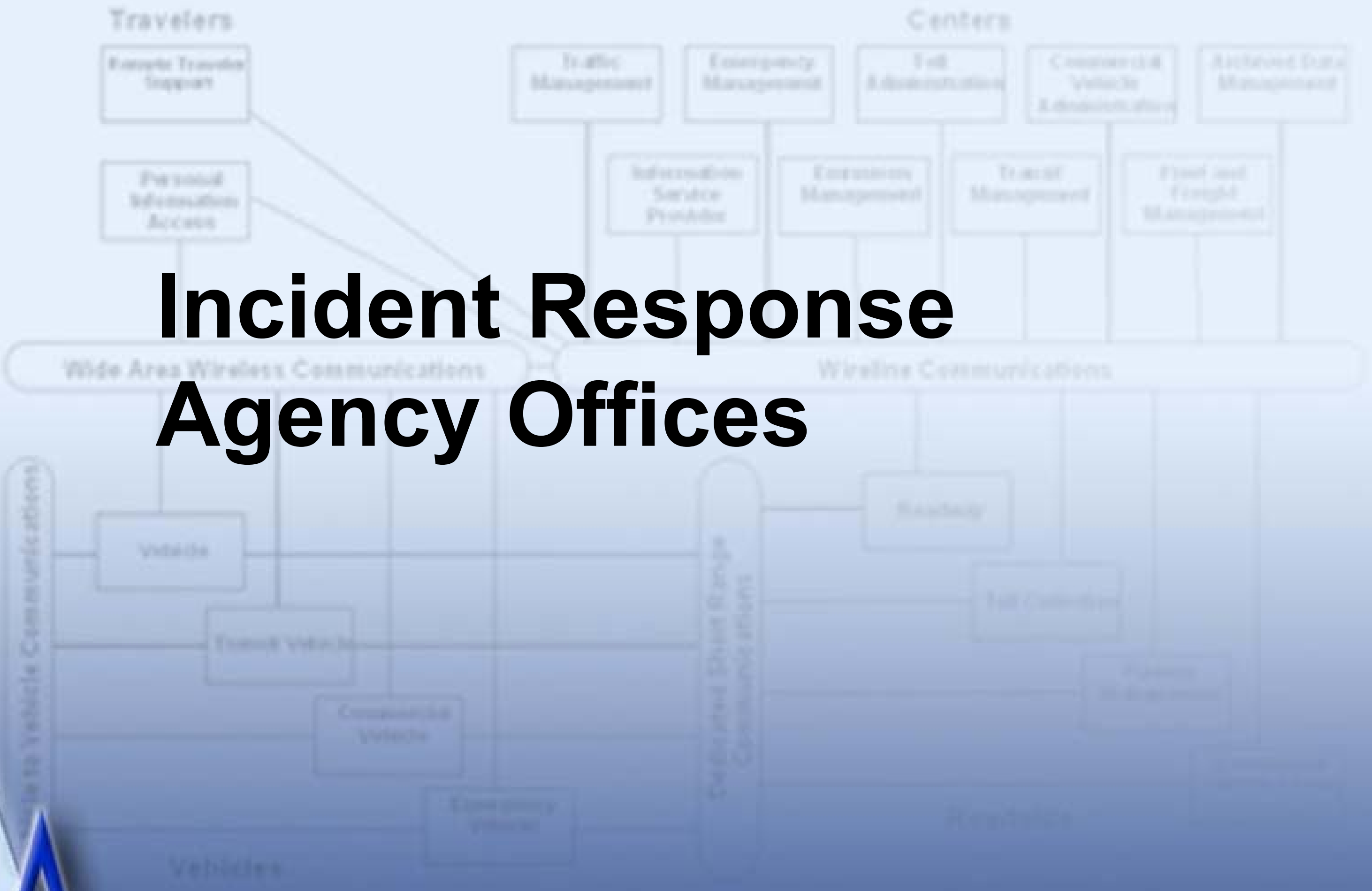
threat information coordination

Various Stakeholders

High Threat Facilities

Existing

Planned


Travelers
Centers
Remote Traveler Support
Traffic Management
Emergency Management
Toll Administration
Commercial Vehicle Administration
Archived Data Management
Personal Information Access
Information Service Provider
Emissions Management
Transit Management
Fleet and Freight Management
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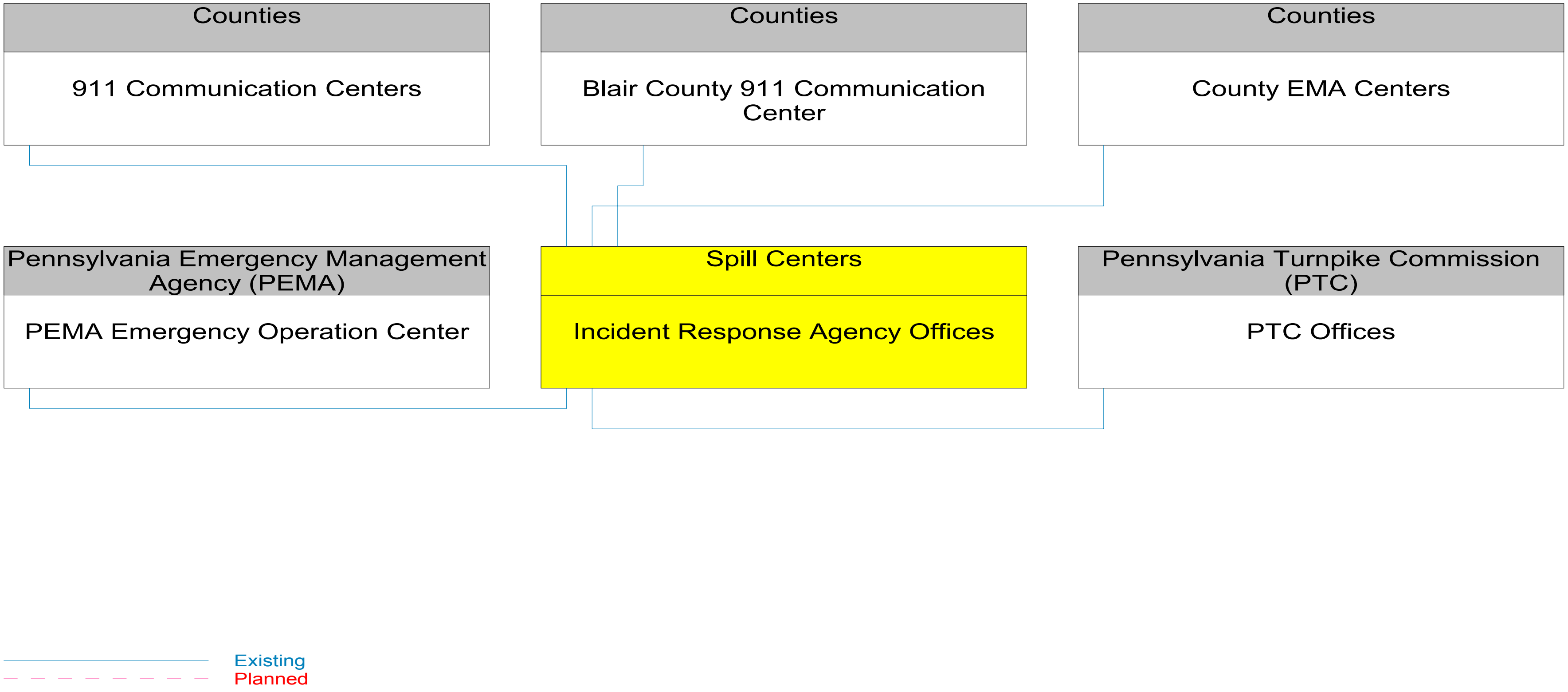
Wireline Communications
Vehicle to Vehicle Communications
Vehicle
Transit Vehicle
Commercial Vehicle
Emergency Vehicle
Vehicles
Dedicated Short Range Communications
Roadway
Toll Collection
Parking Management
Roadside

Incident Response Agency Offices

Incident Response Agency Offices Interconnect Diagram



Counties

911 Communication Centers

Counties

Blair County 911 Communication Center

Counties

County EMA Centers

Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

Spill Centers

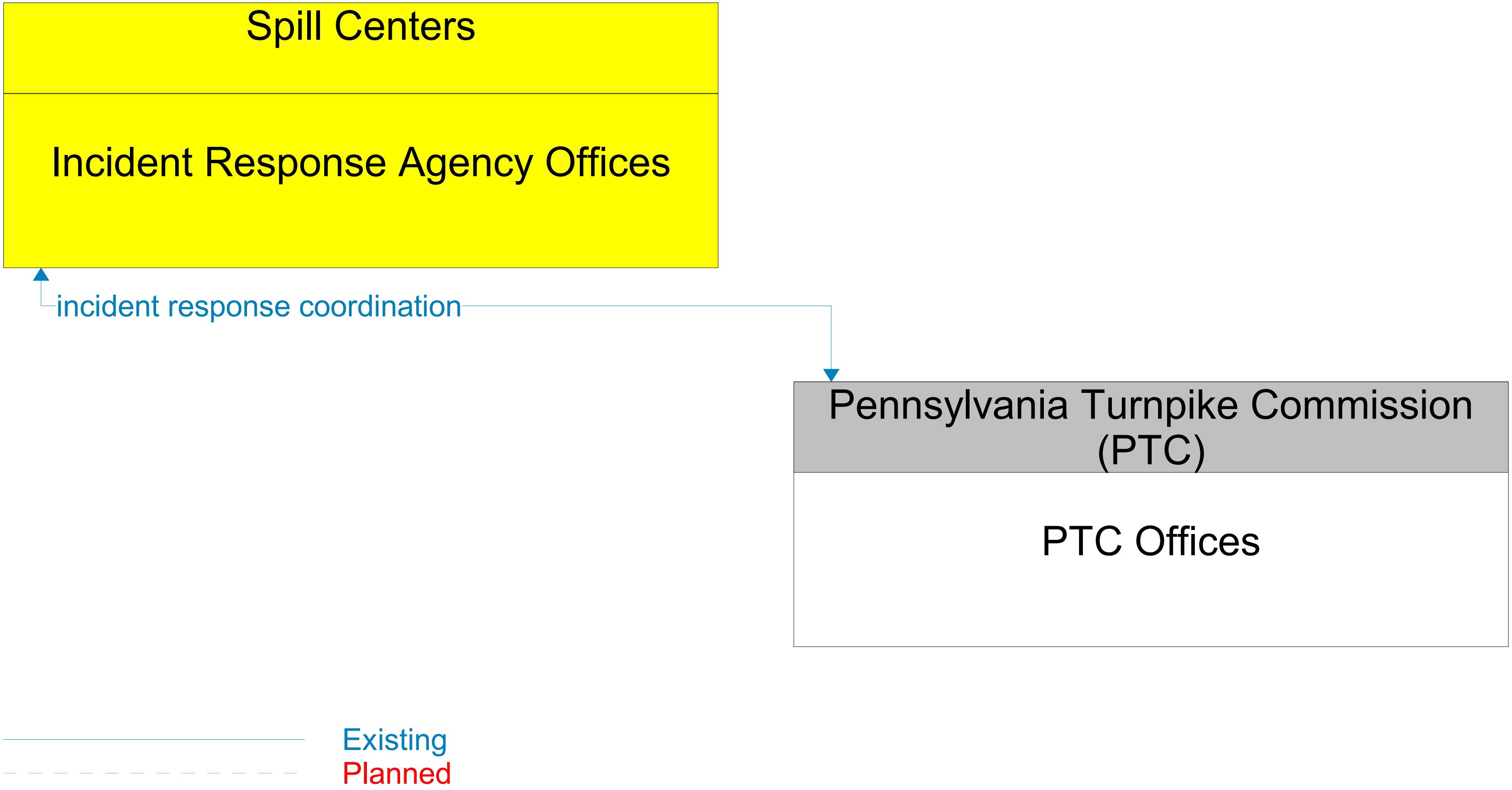
Incident Response Agency Offices

Pennsylvania Turnpike Commission (PTC)

PTC Offices

Existing

Planned



Spill Centers

Incident Response Agency Offices

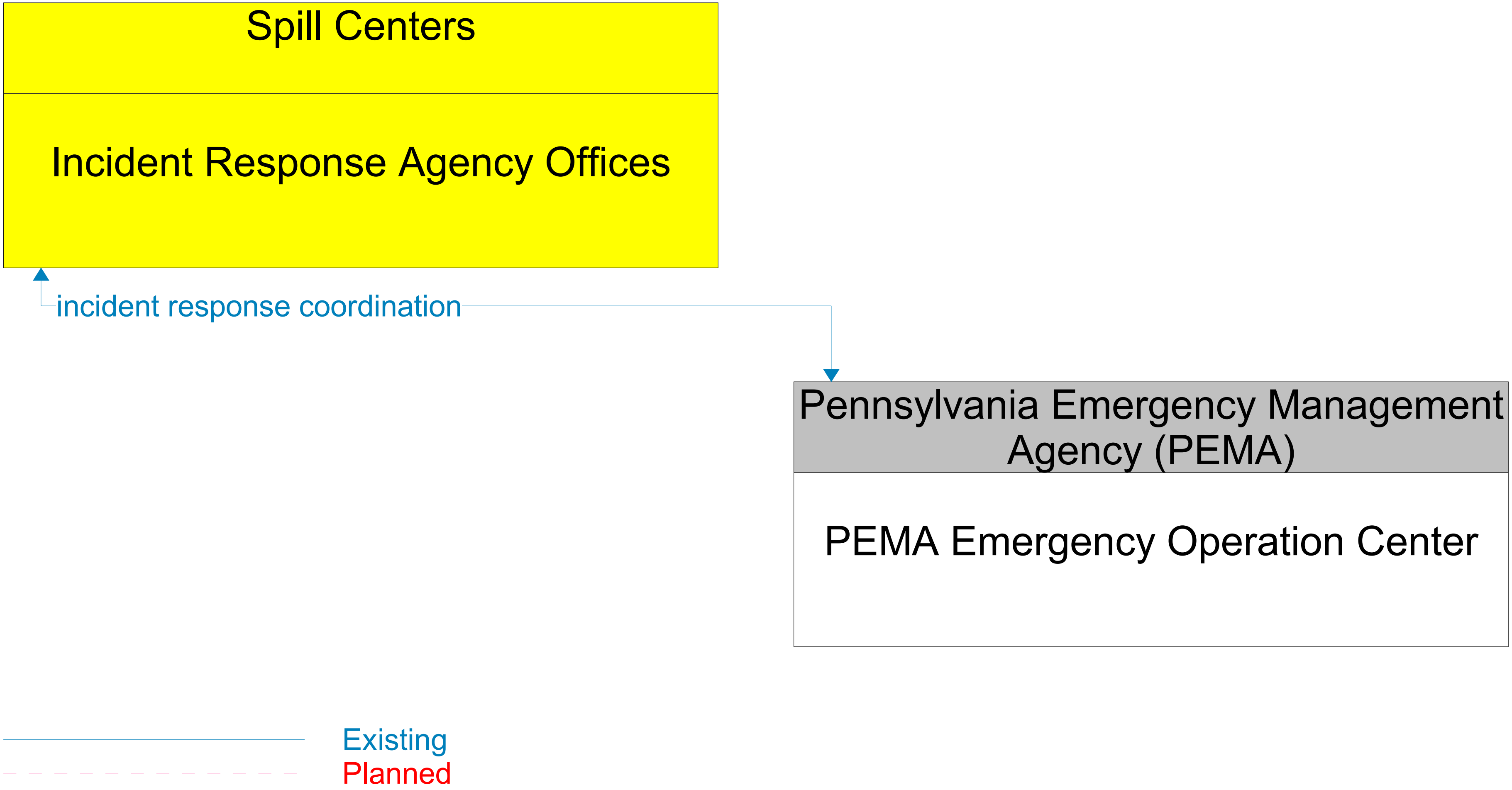
incident response coordination

Pennsylvania Turnpike Commission (PTC)

PTC Offices

Existing

Planned



Spill Centers

Incident Response Agency Offices

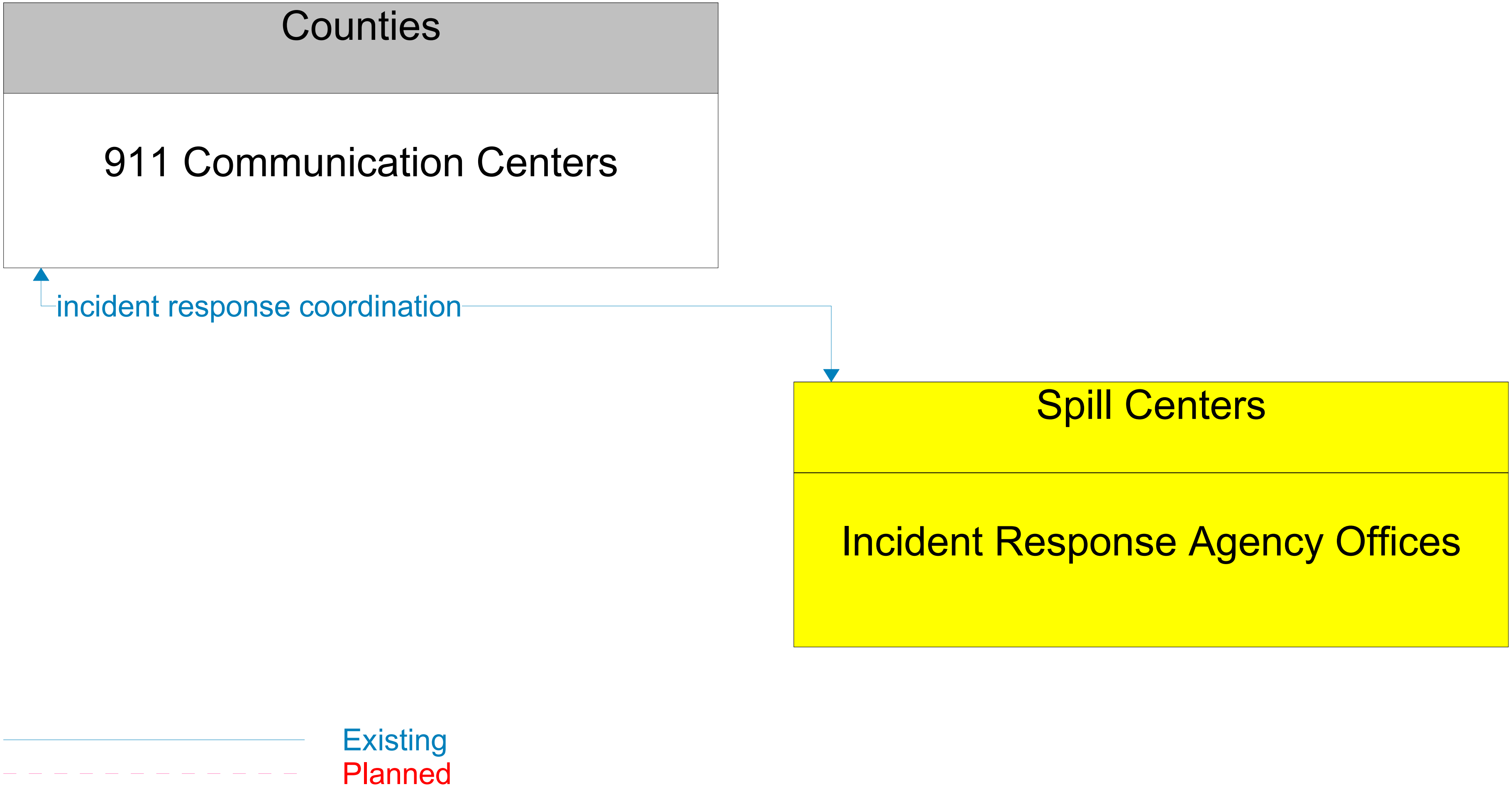
incident response coordination

Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

Existing

Planned



Counties

911 Communication Centers

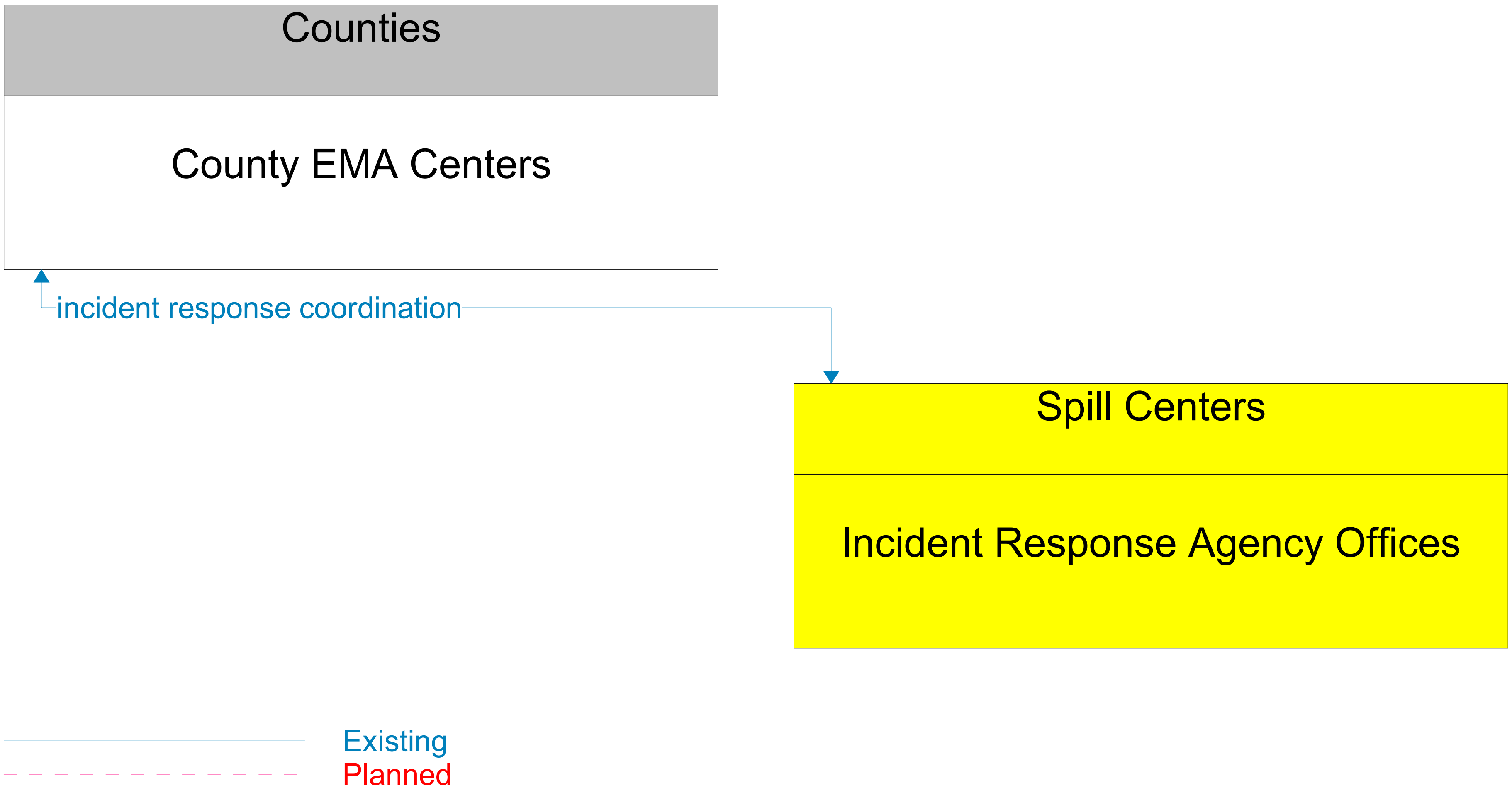
incident response coordination

Spill Centers

Incident Response Agency Offices

Existing

Planned



Counties

County EMA Centers

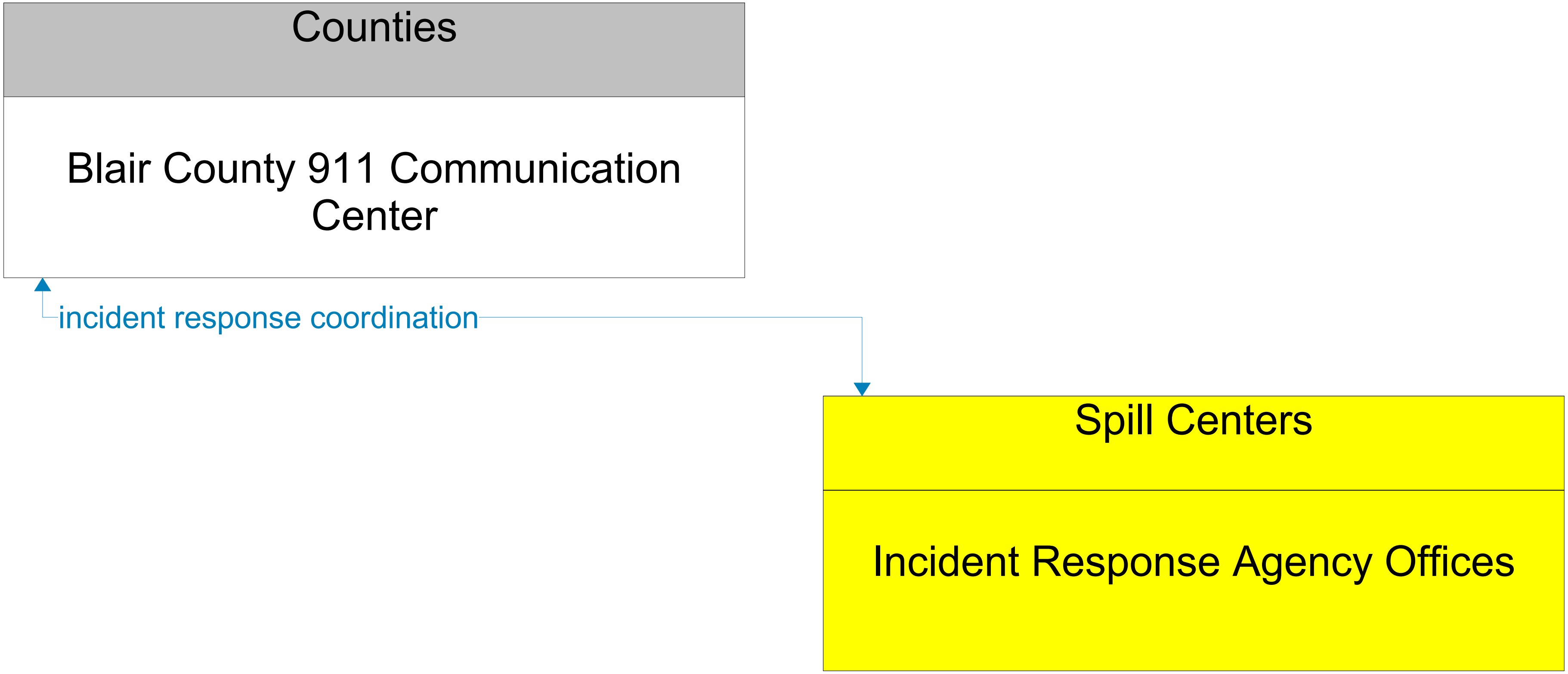
incident response coordination

Spill Centers

Incident Response Agency Offices

Existing

Planned



Counties

Blair County 911 Communication Center

incident response coordination

Spill Centers

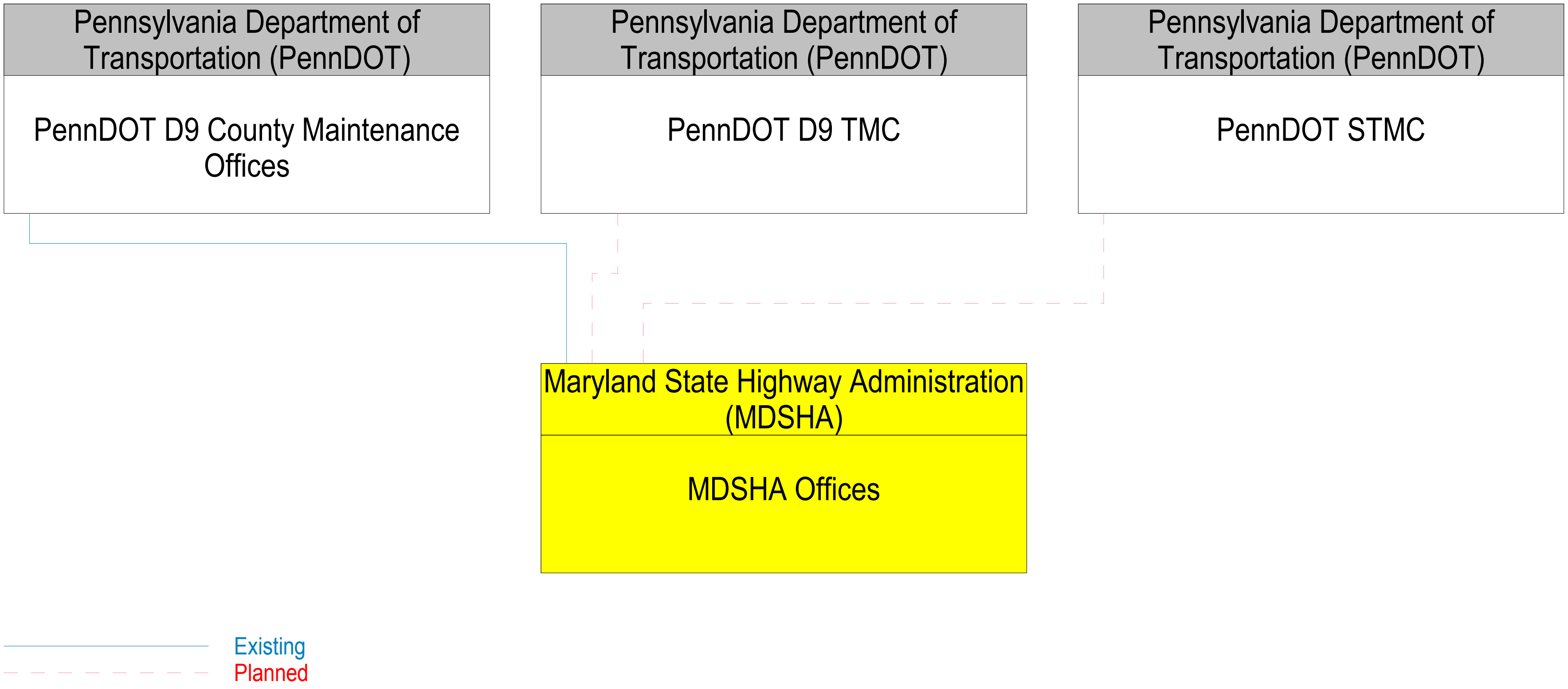
Incident Response Agency Offices

Existing

Planned

MDSHA Offices

MDSHA Offices Interconnect Diagram



Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 County Maintenance Offices

Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 TMC

Pennsylvania Department of Transportation (PennDOT)

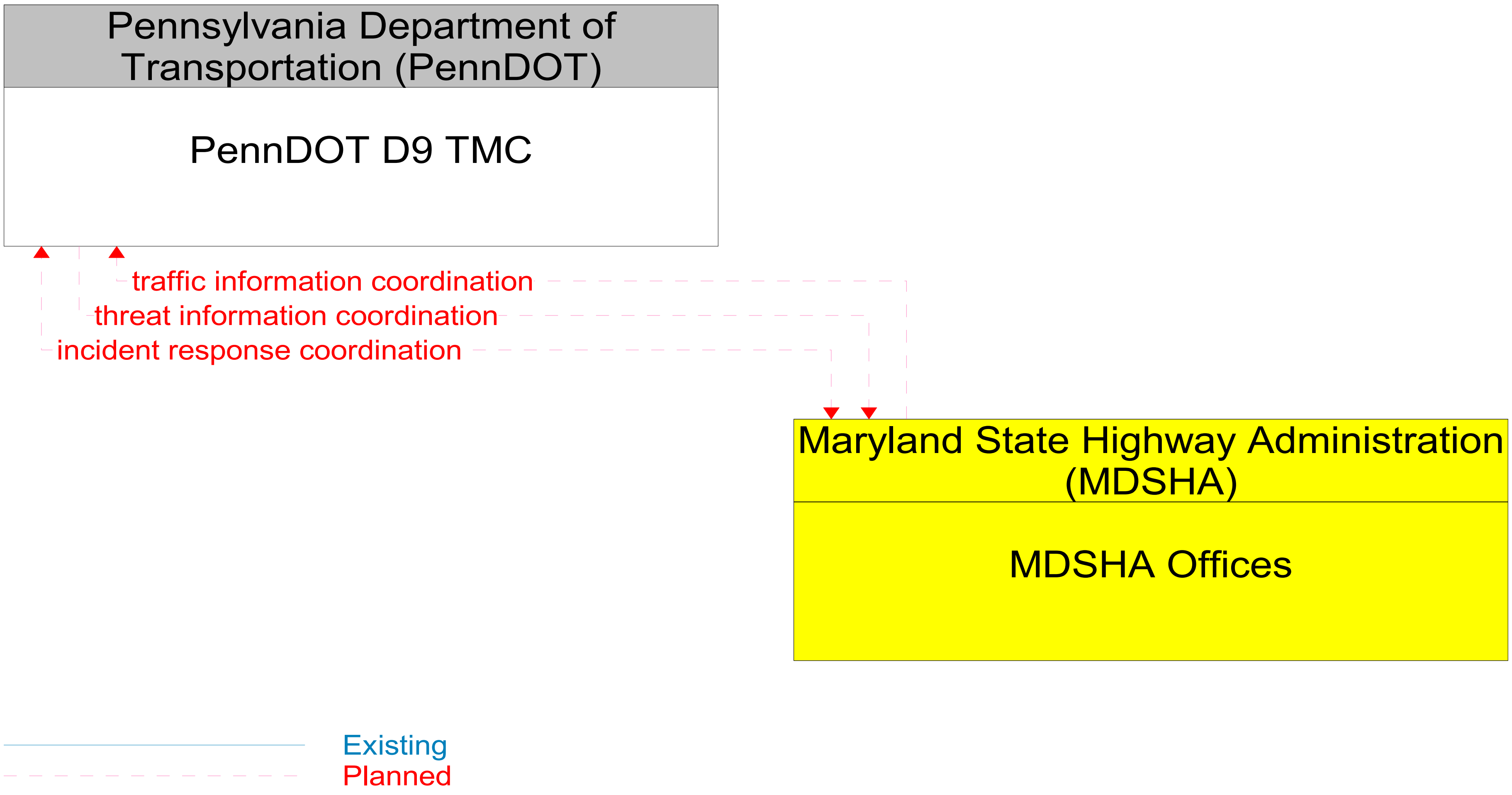
PennDOT STMC

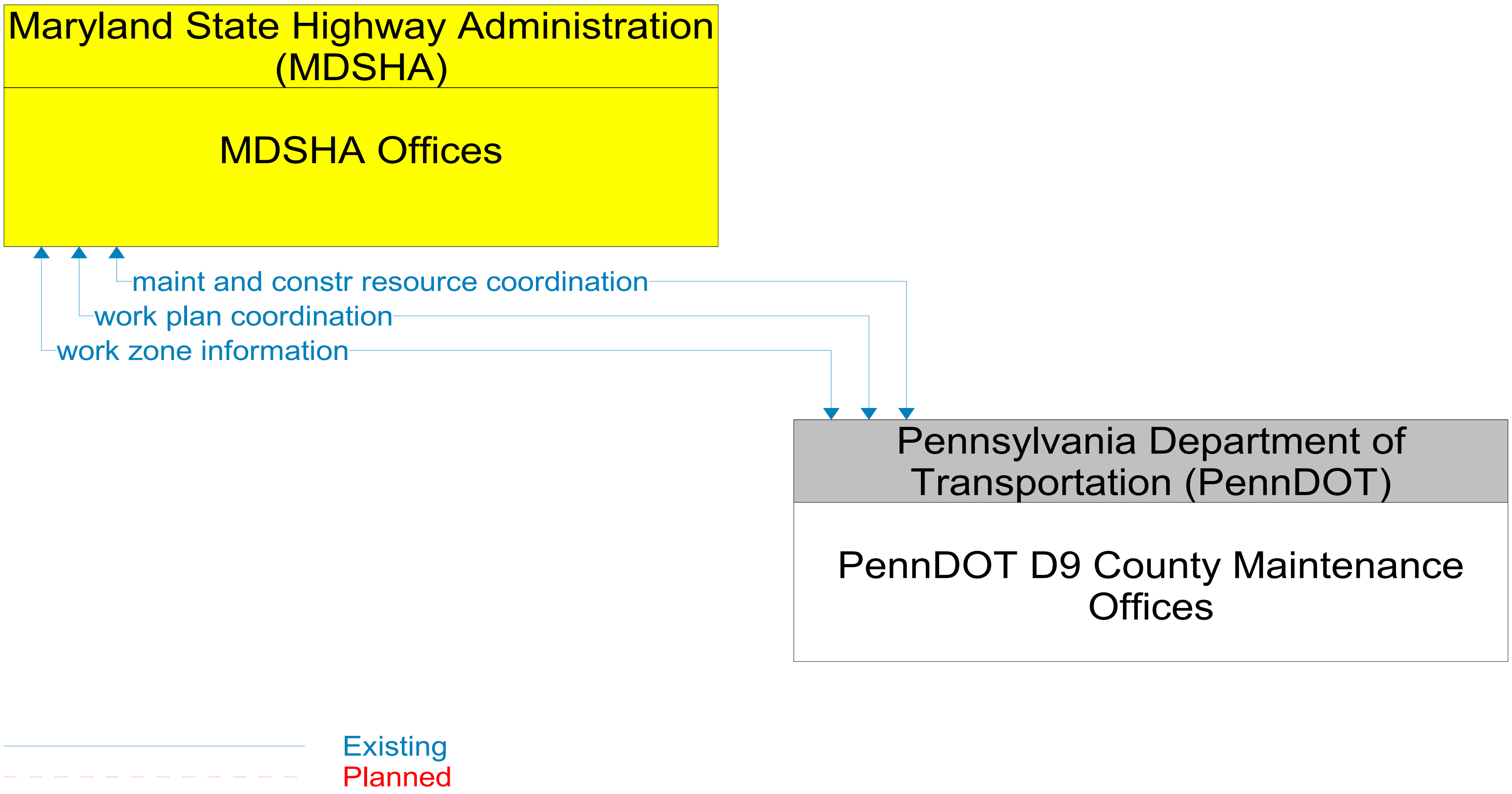
Maryland State Highway Administration (MDSHA)

MDSHA Offices

Existing

Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
traffic information coordination
threat information coordination
incident response coordination
Maryland State Highway Administration (MDSHA)
MDSHA Offices
Existing
Planned



Maryland State Highway Administration (MDSHA)

MDSHA Offices

maint and constr resource coordination

work plan coordination

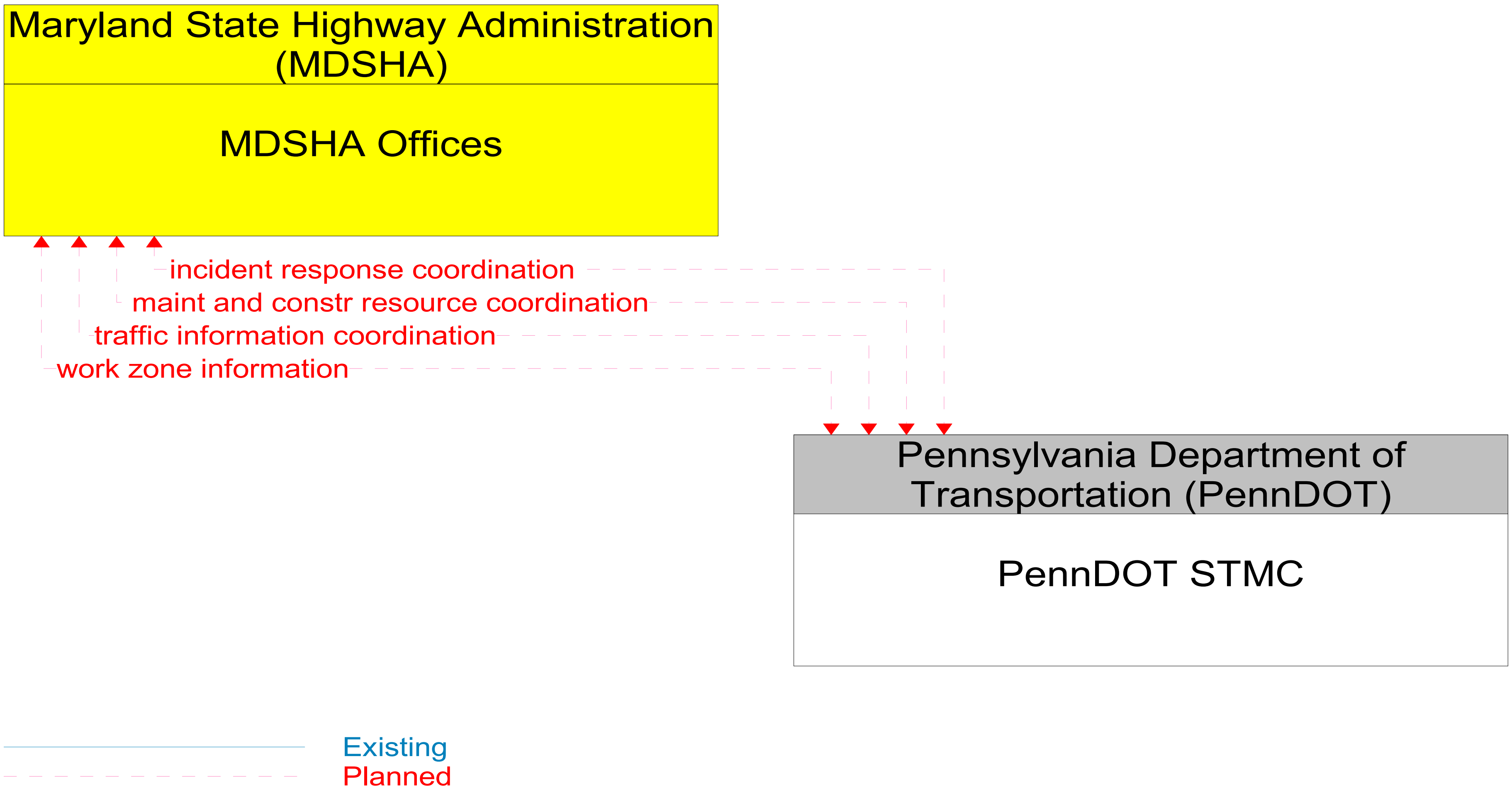
work zone information

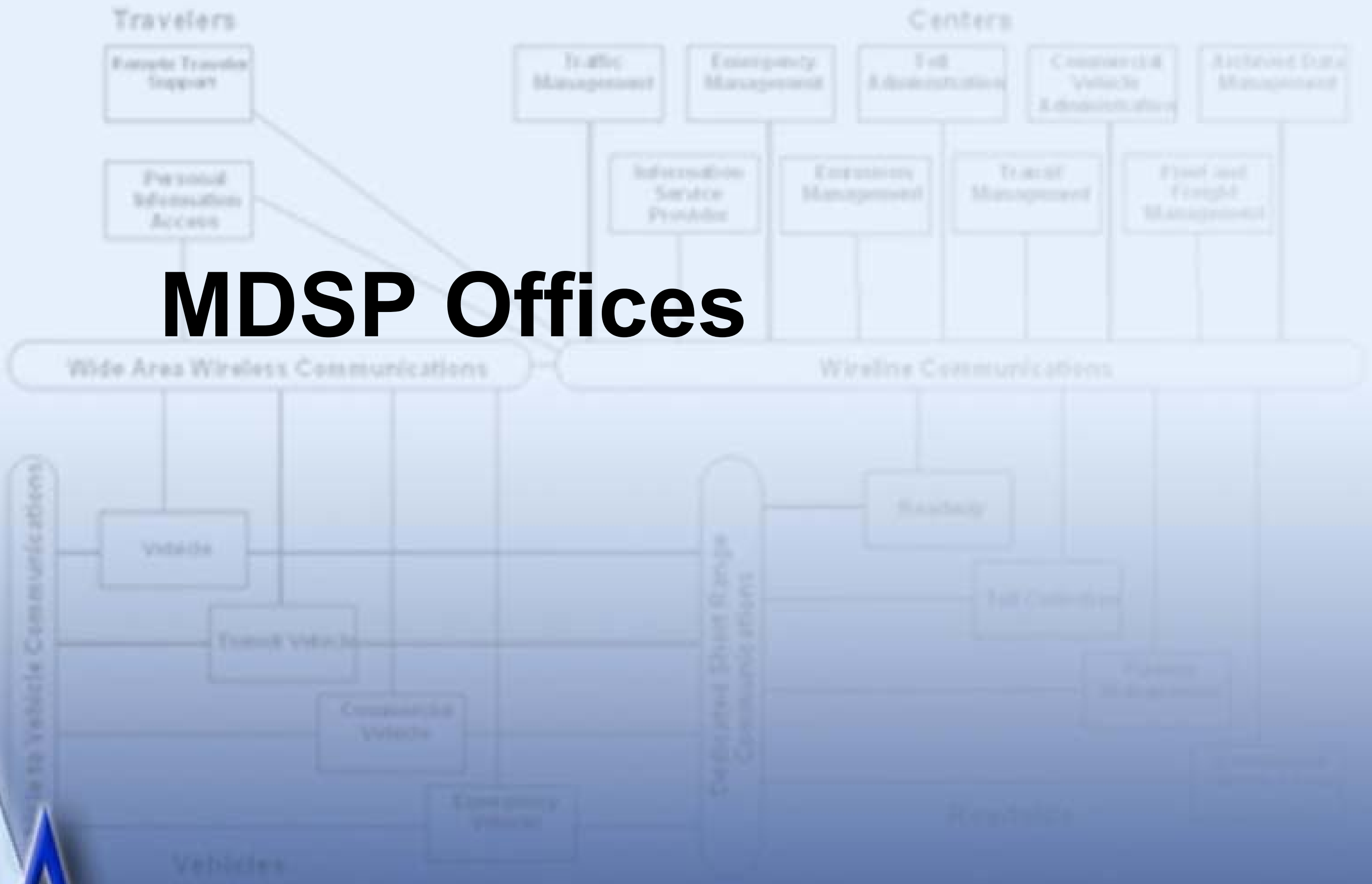
Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 County Maintenance Offices

Existing

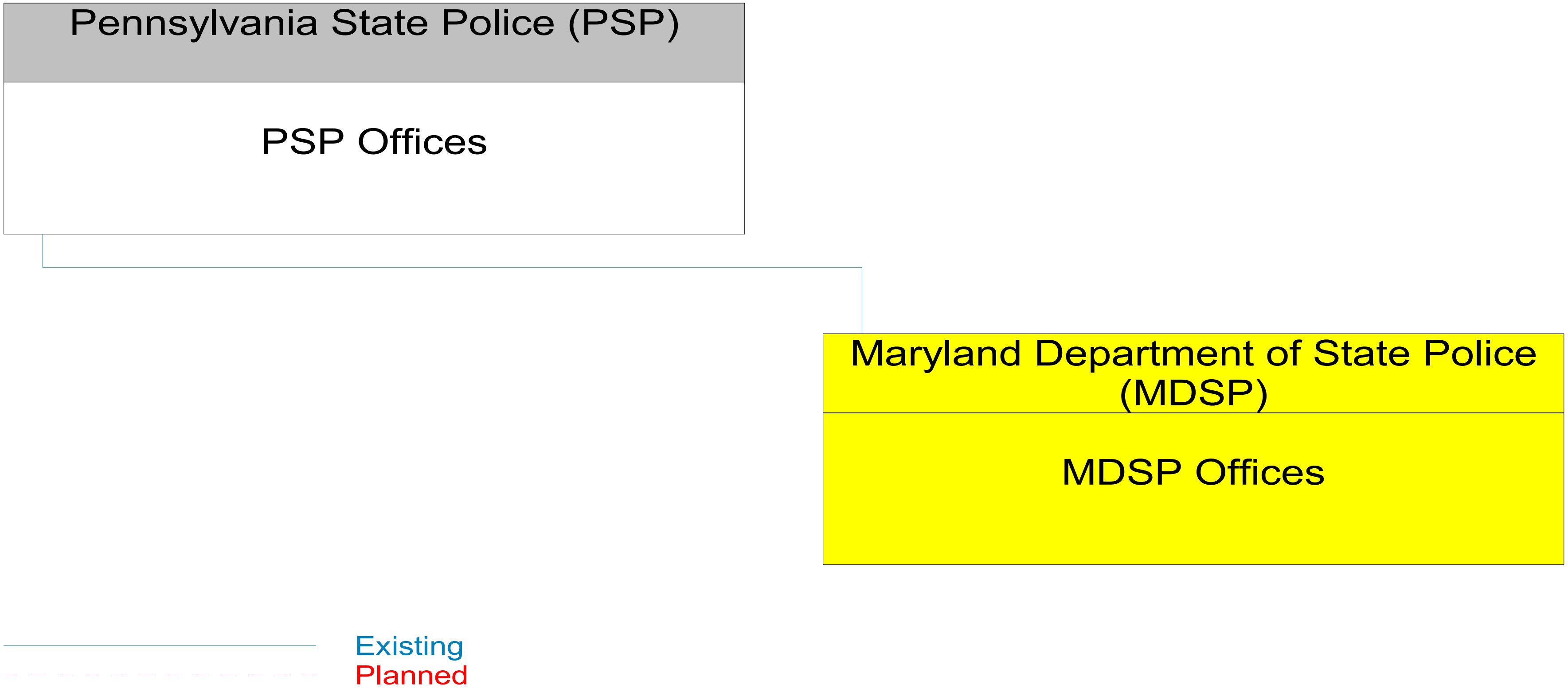
Planned


Maryland State Highway Administration (MDSHA)
MDSHA Offices
incident response coordination
maint and constr resource coordination
traffic information coordination
work zone information
Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC
Existing
Planned


Travelers
Centers
Remote Traveler Support
Personal Information Access
Traffic Management
Emergency Management
Toll Administration
Commercial Vehicle Administration
Archived Data Management
Information Service Provider
Emissions Management
Transit Management
Fleet and Freight Management
Wide Area Wireless Communications
Wireline Communications
Vehicle
Transit Vehicle
Commercial Vehicle
Emergency Vehicle
Vehicles
Dedicated Short Range Communications
Roadway
Toll Collection
Parking Management
Roadside

MDSP Offices

MDSP Offices Interconnect Diagram



Pennsylvania State Police (PSP)

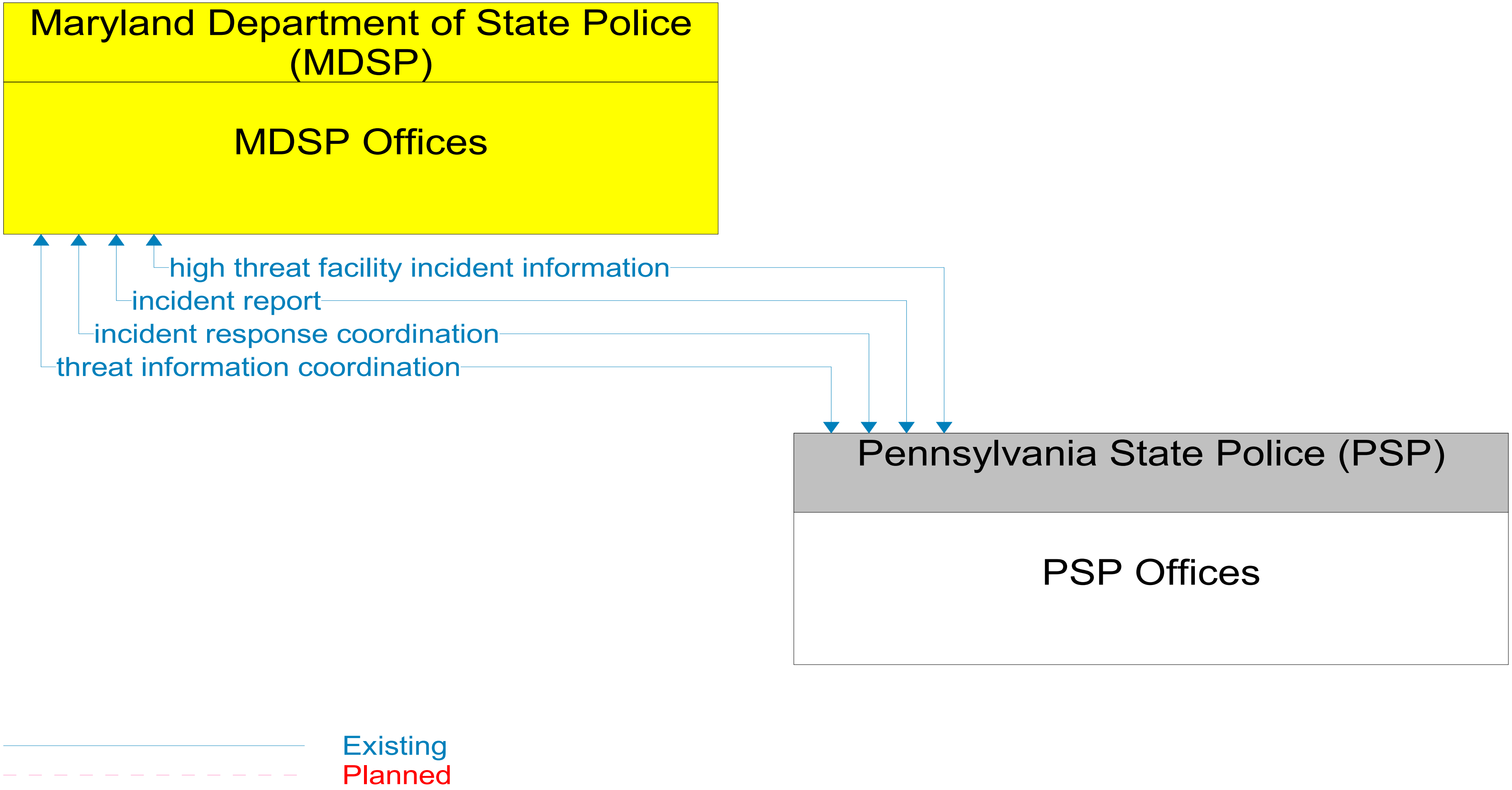
PSP Offices

Maryland Department of State Police (MDSP)

MDSP Offices

Existing

Planned



Maryland Department of State Police (MDSP)

MDSP Offices

high threat facility incident information

incident report

incident response coordination

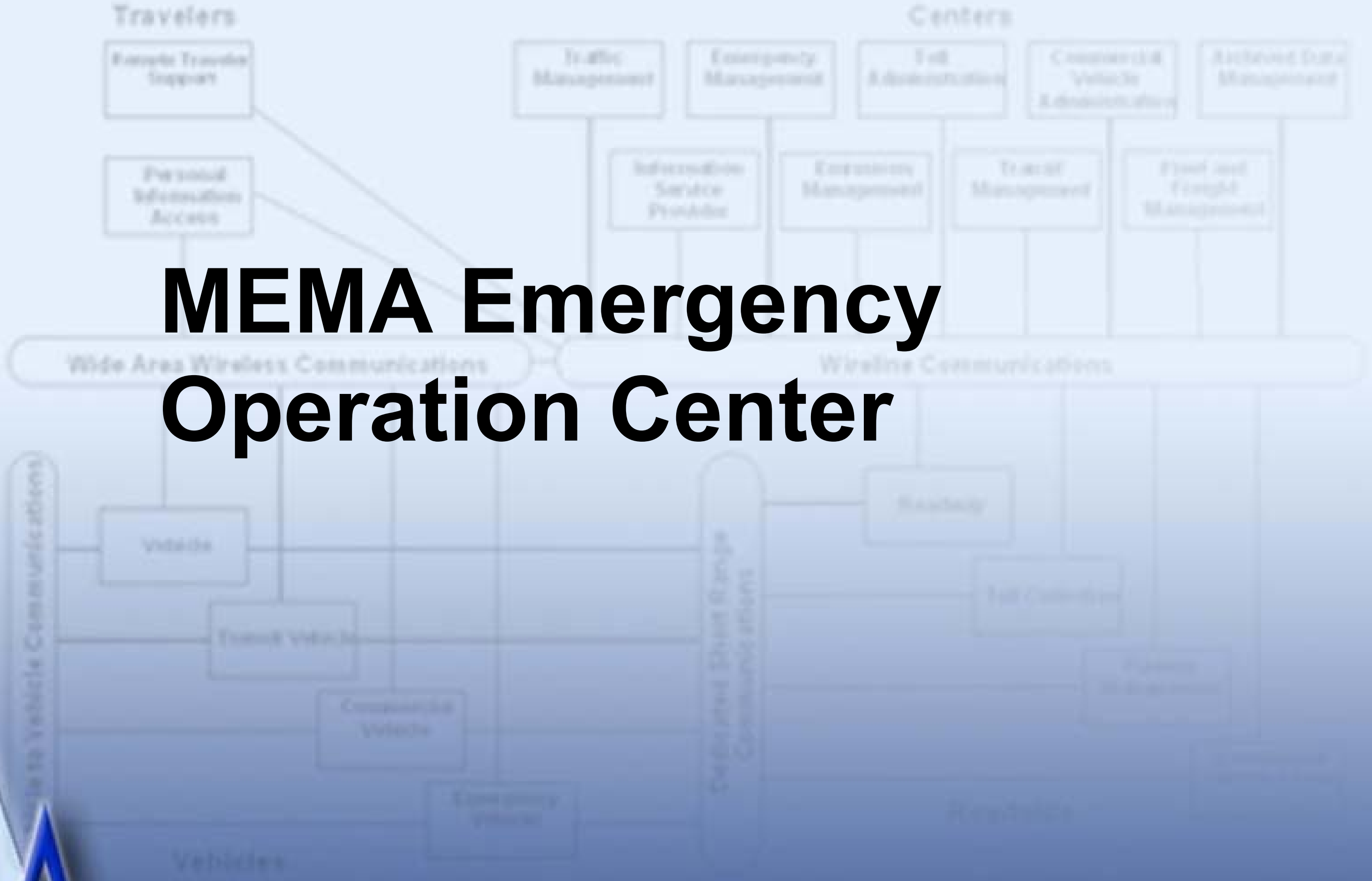
threat information coordination

Pennsylvania State Police (PSP)

PSP Offices

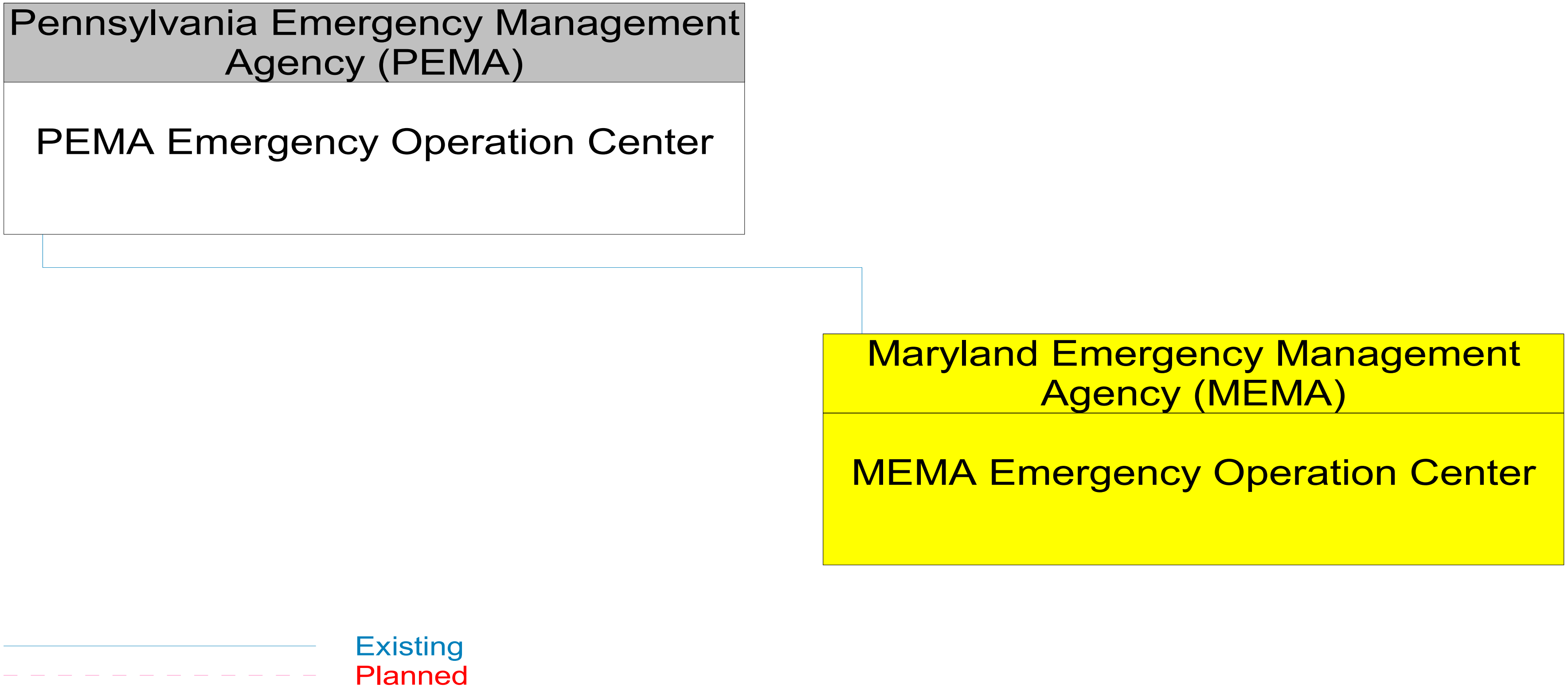
Existing

Planned



MEMA Emergency Operation Center

MEMA Emergency Operation Center Interconnect Diagram



Pennsylvania Emergency Management Agency (PEMA)

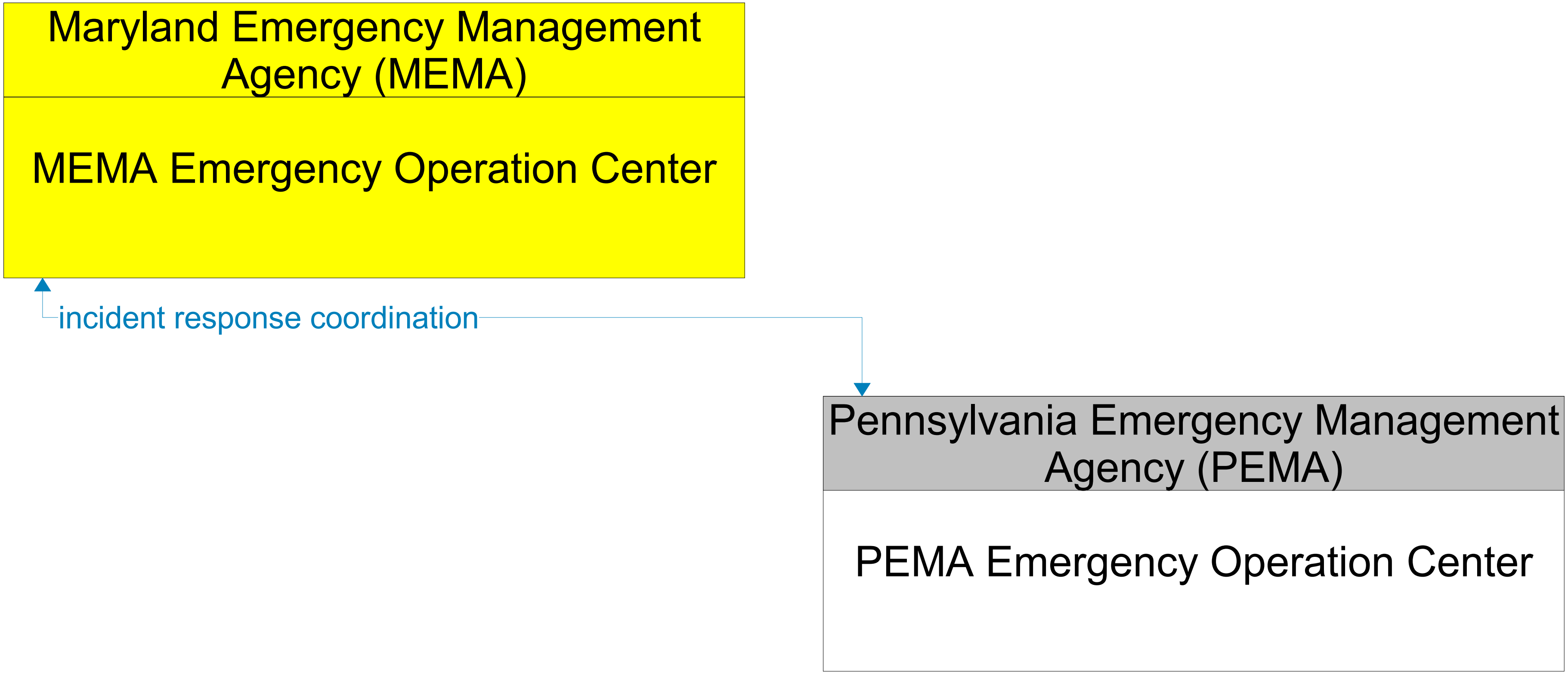
PEMA Emergency Operation Center

Maryland Emergency Management Agency (MEMA)

MEMA Emergency Operation Center

Existing

Planned



Maryland Emergency Management Agency (MEMA)

MEMA Emergency Operation Center

incident response coordination

Pennsylvania Emergency Management Agency (PEMA)

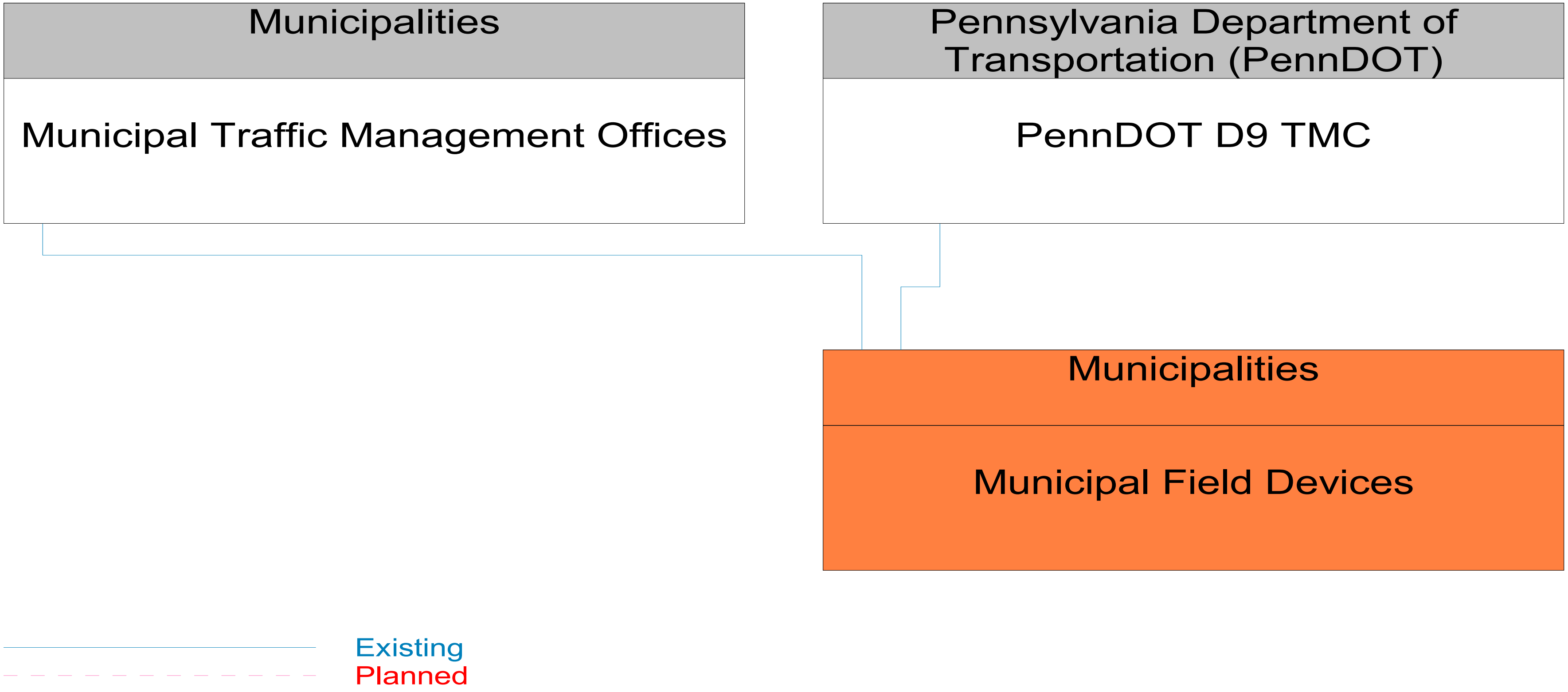
PEMA Emergency Operation Center

Existing

Planned

Municipal Field Devices

Municipal Field Devices Interconnect Diagram



Municipalities

Municipal Traffic Management Offices

Pennsylvania Department of Transportation (PennDOT)

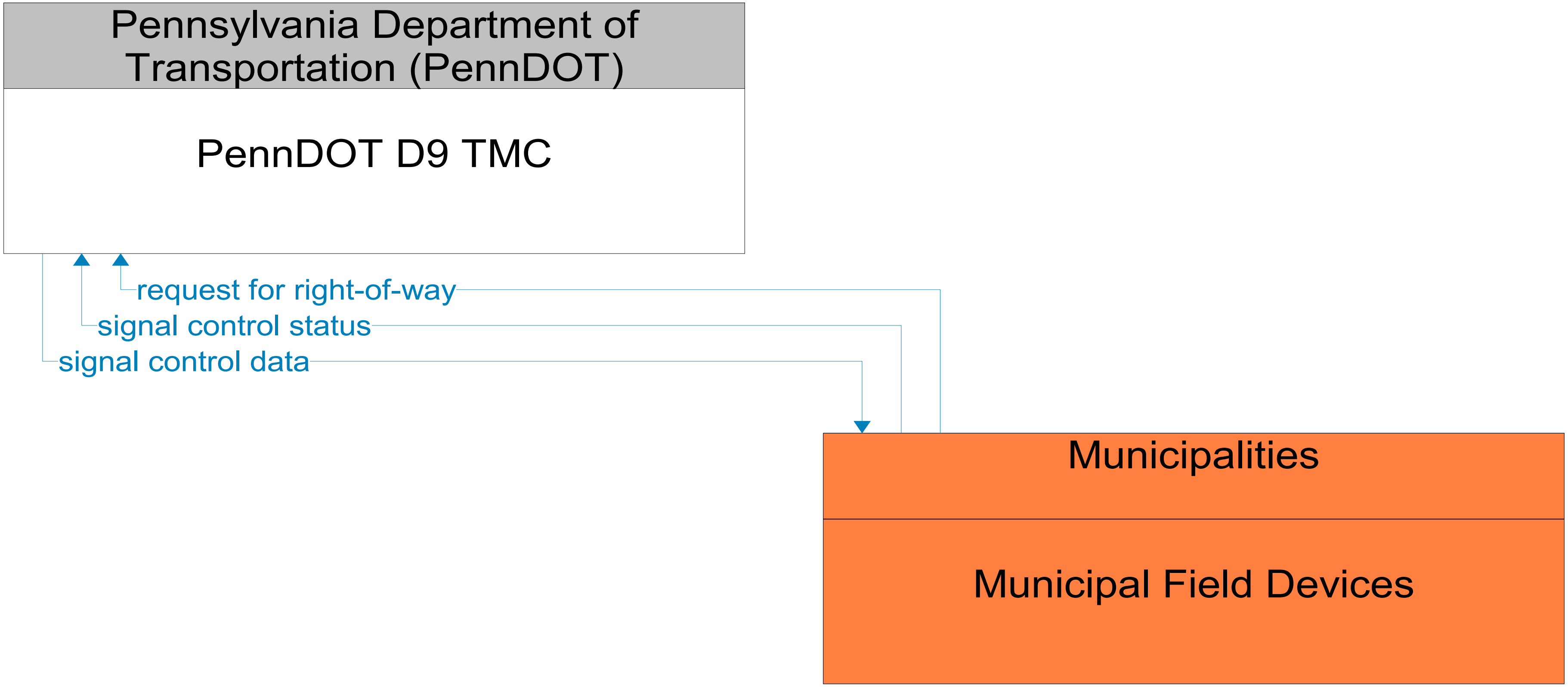
PennDOT D9 TMC

Municipalities

Municipal Field Devices

Existing

Planned



Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 TMC

request for right-of-way

signal control status

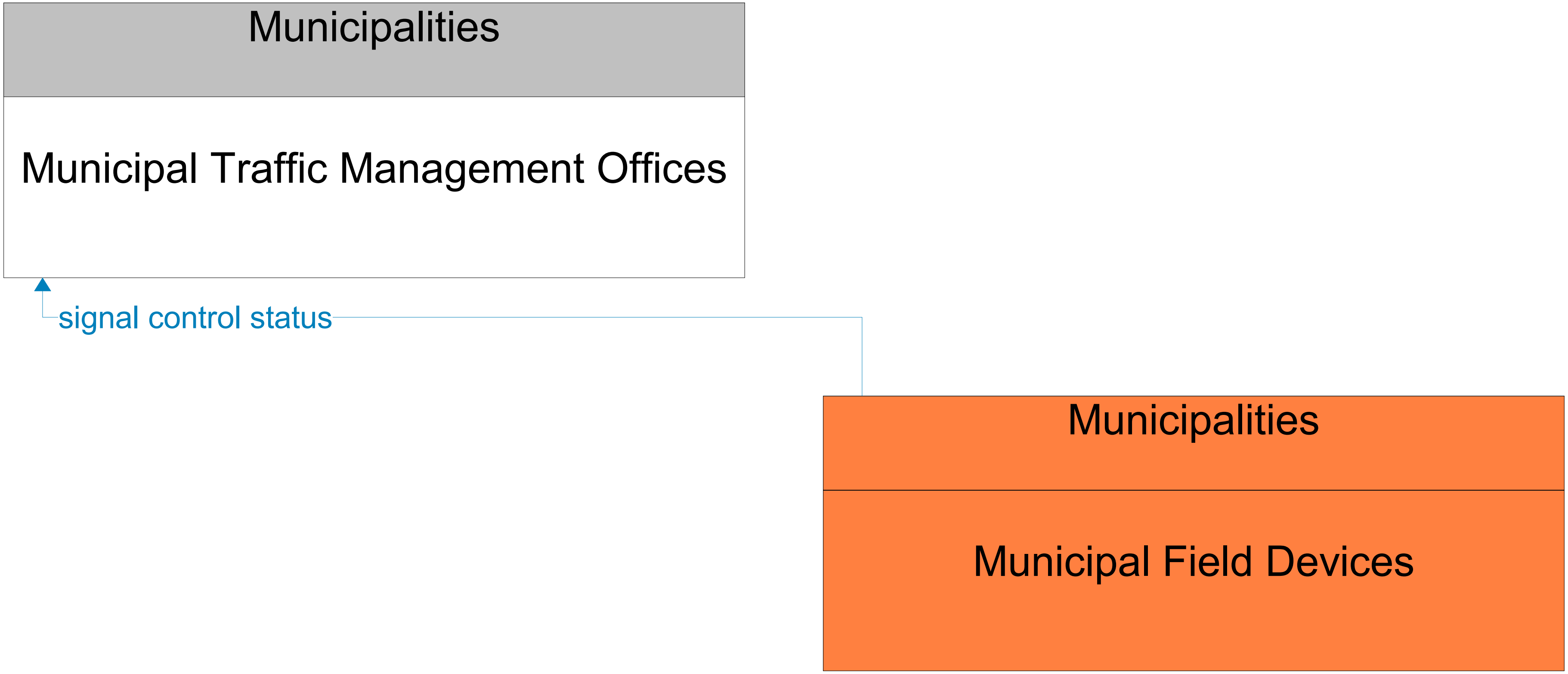
signal control data

Municipalities

Municipal Field Devices

Existing

Planned



Municipalities

Municipal Traffic Management Offices

signal control status

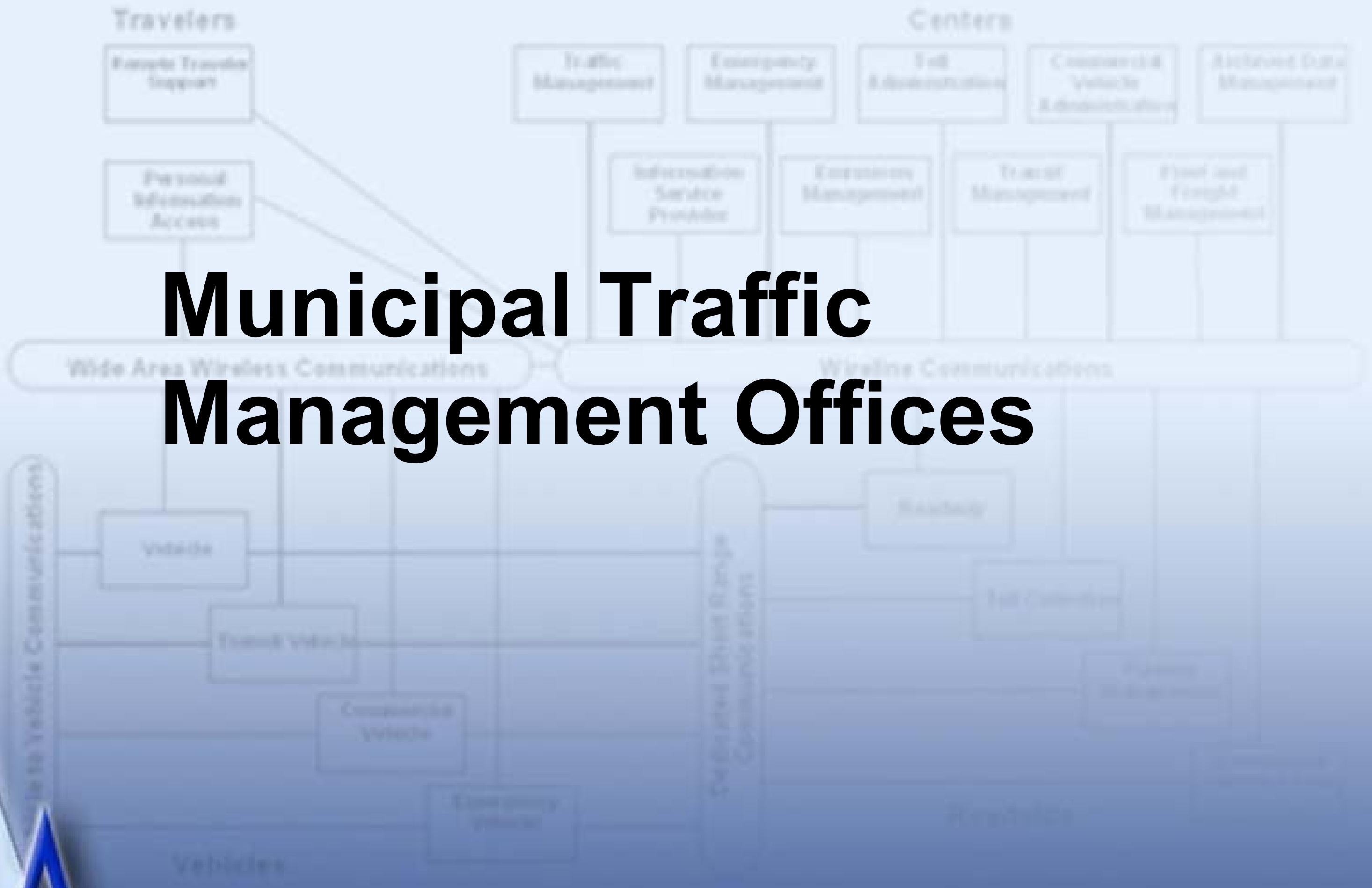
Municipalities

Municipal Field Devices

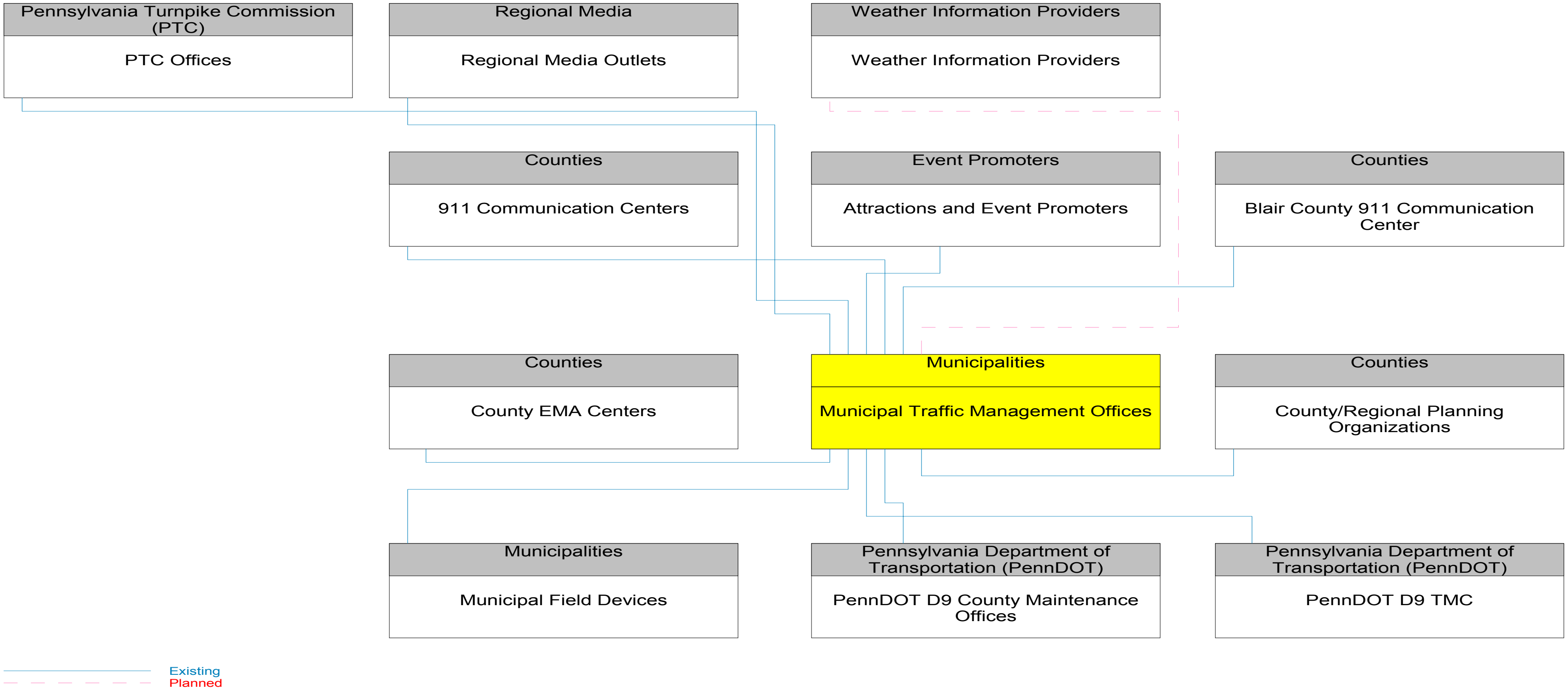
Existing

Planned

Municipal Traffic Management Offices


Travelers
Centers
Remote Traveler Support
Traffic Management
Emergency Management
Toll Administration
Commercial Vehicle Administration
Archived Data Management
Personal Information Access
Information Service Provider
Emissions Management
Transit Management
Fleet and Freight Management
Wide Area Wireless Communications
Wireline Communications
Vehicle to Vehicle Communications
Vehicle
Transit Vehicle
Commercial Vehicle
Emergency Vehicle
Vehicles
Dedicated Short Range Communications
Roadway
Toll Collection
Parking Management
Commercial Vehicle Check
Roadside

Municipal Traffic Management Offices Interconnect Diagram



Pennsylvania Turnpike Commission (PTC)
PTC Offices

Regional Media
Regional Media Outlets

Weather Information Providers
Weather Information Providers

Counties
911 Communication Centers

Event Promoters
Attractions and Event Promoters

Counties
Blair County 911 Communication Center

Counties
County EMA Centers

Municipalities
Municipal Traffic Management Offices

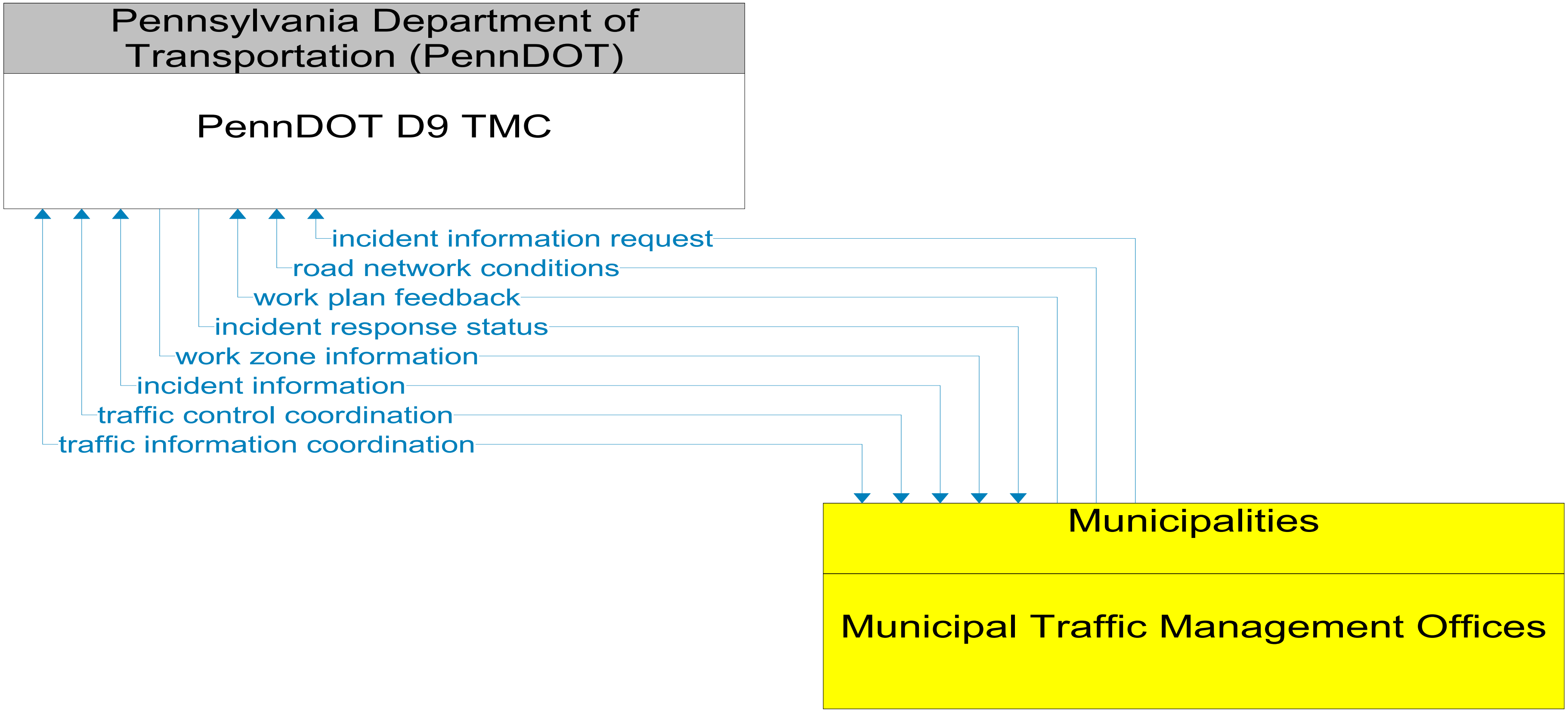
Counties
County/Regional Planning Organizations

Municipalities
Municipal Field Devices

Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 County Maintenance Offices

Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC

Existing
Planned



Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 TMC

incident information request

road network conditions

work plan feedback

incident response status

work zone information

incident information

traffic control coordination

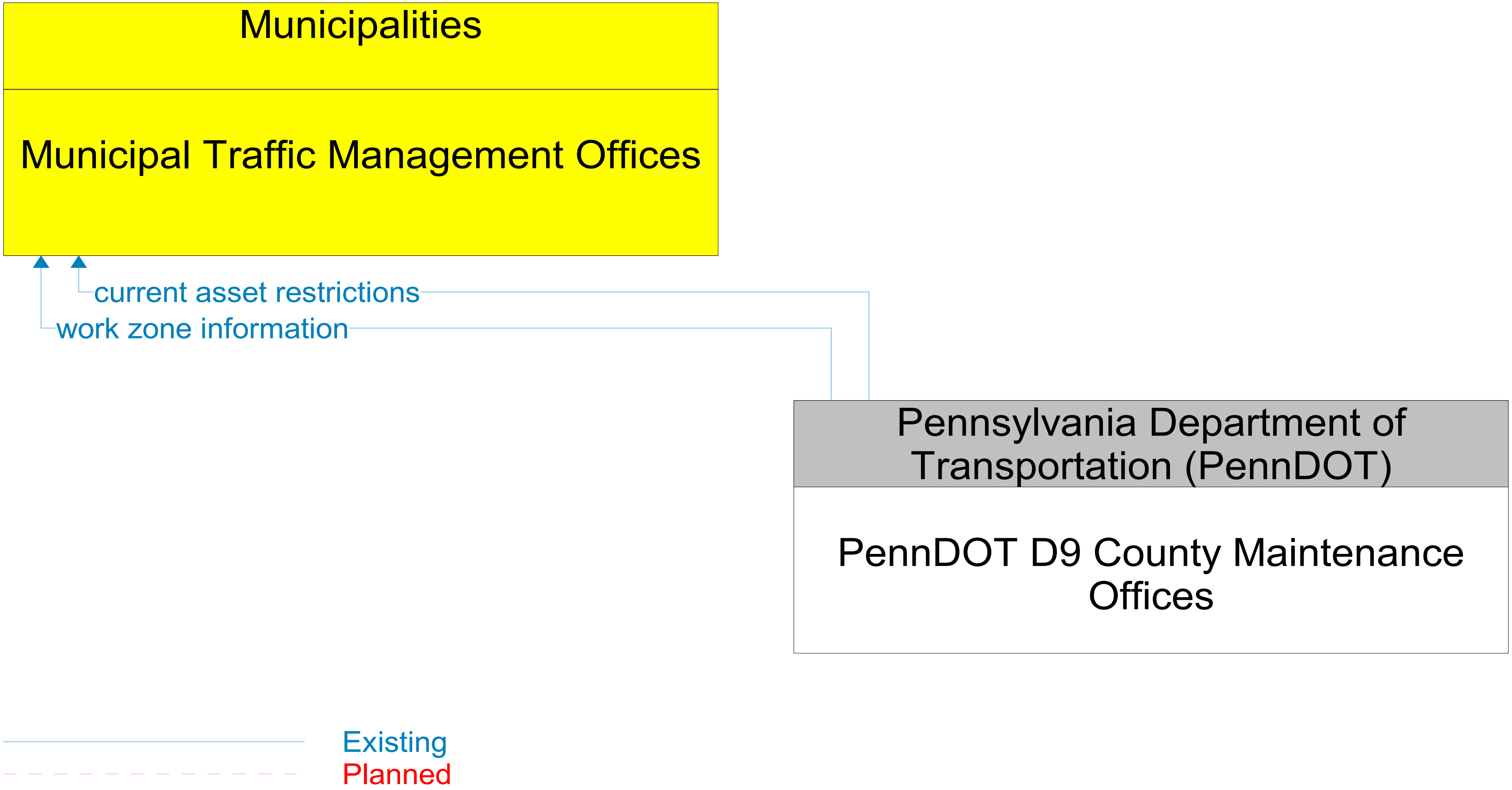
traffic information coordination

Municipalities

Municipal Traffic Management Offices

Existing

Planned



Municipalities

Municipal Traffic Management Offices

current asset restrictions

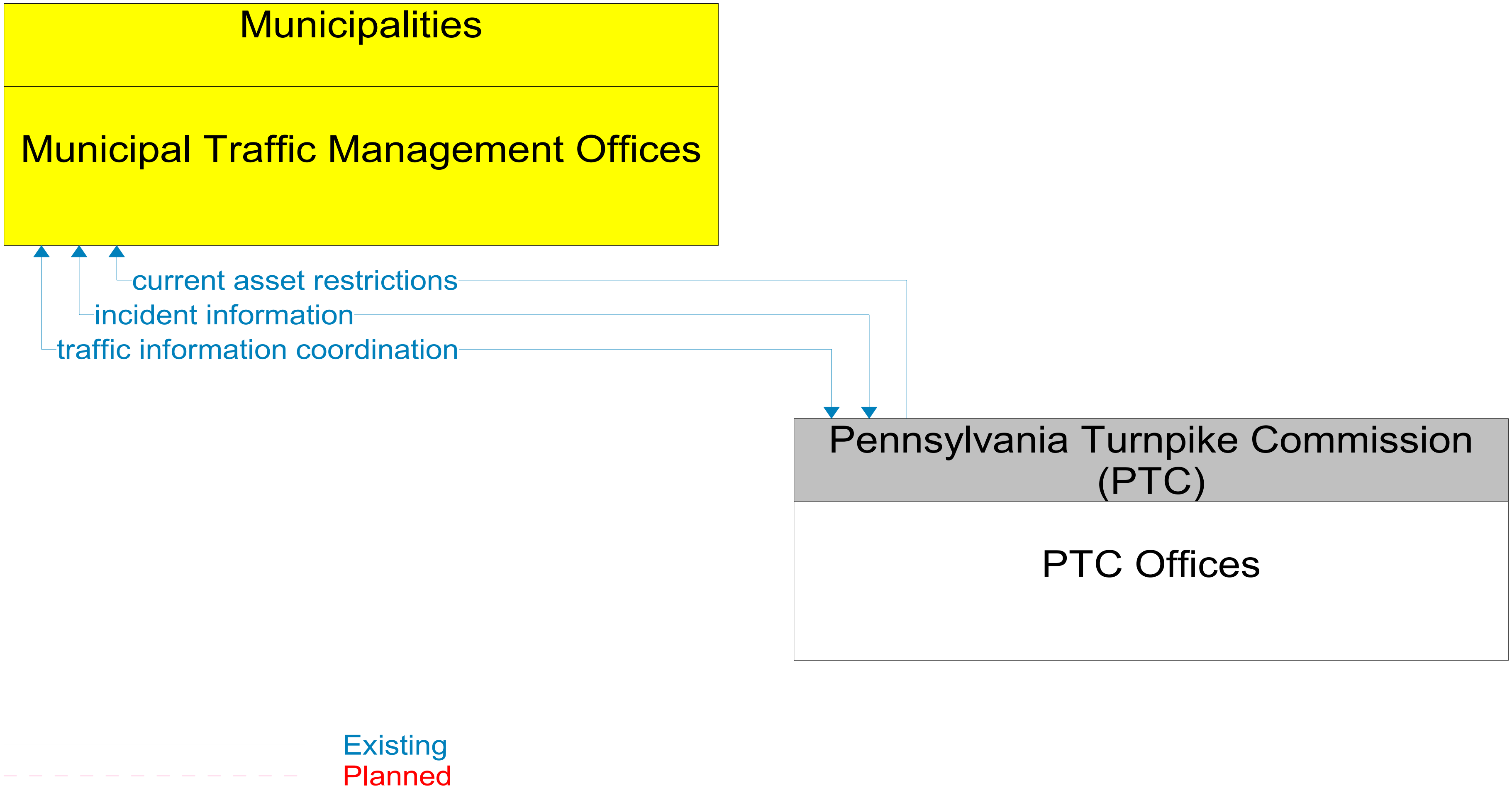
work zone information

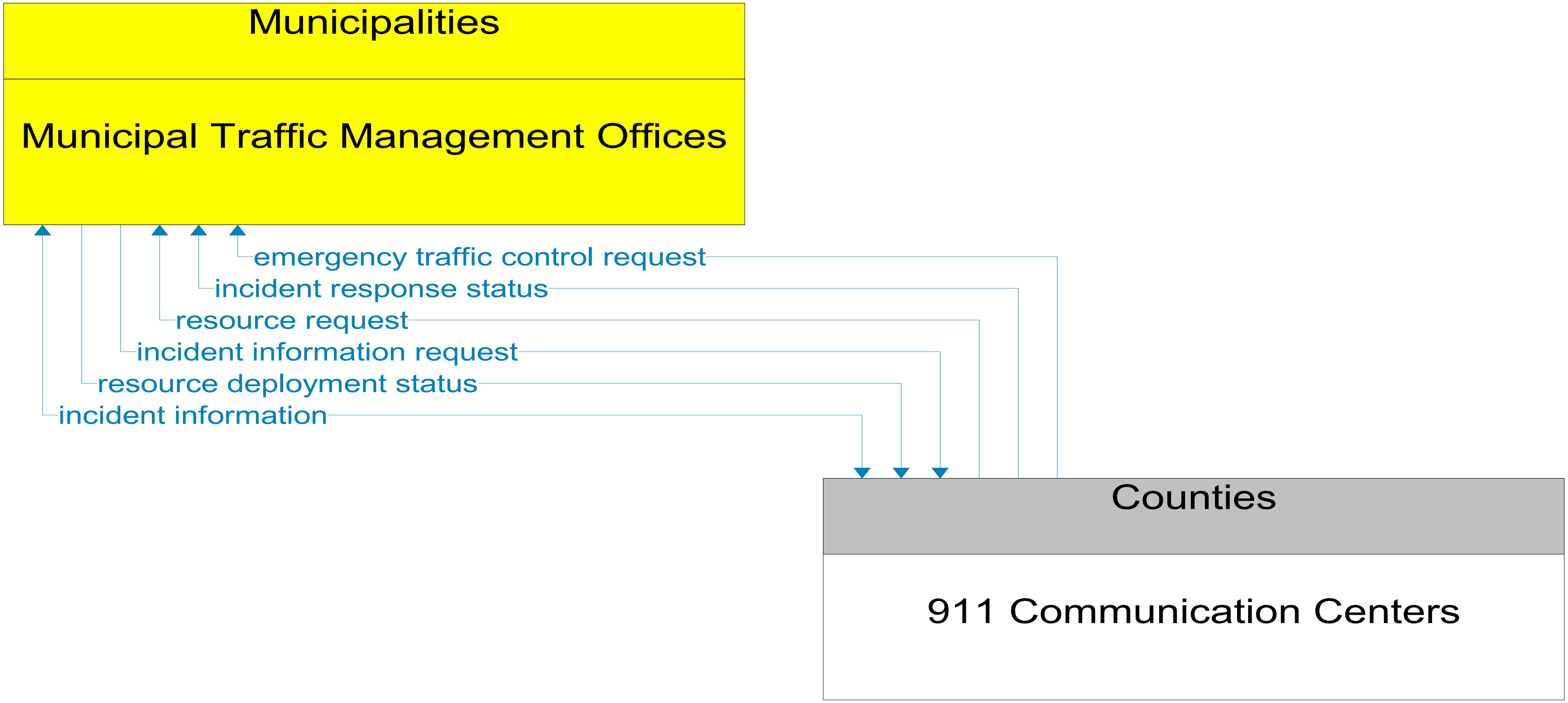
Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 County Maintenance Offices

Existing

Planned


Municipalities
Municipal Traffic Management Offices
current asset restrictions
incident information
traffic information coordination
Pennsylvania Turnpike Commission (PTC)
PTC Offices
Existing
Planned



Municipalities

Municipal Traffic Management Offices

emergency traffic control request

incident response status

resource request

incident information request

resource deployment status

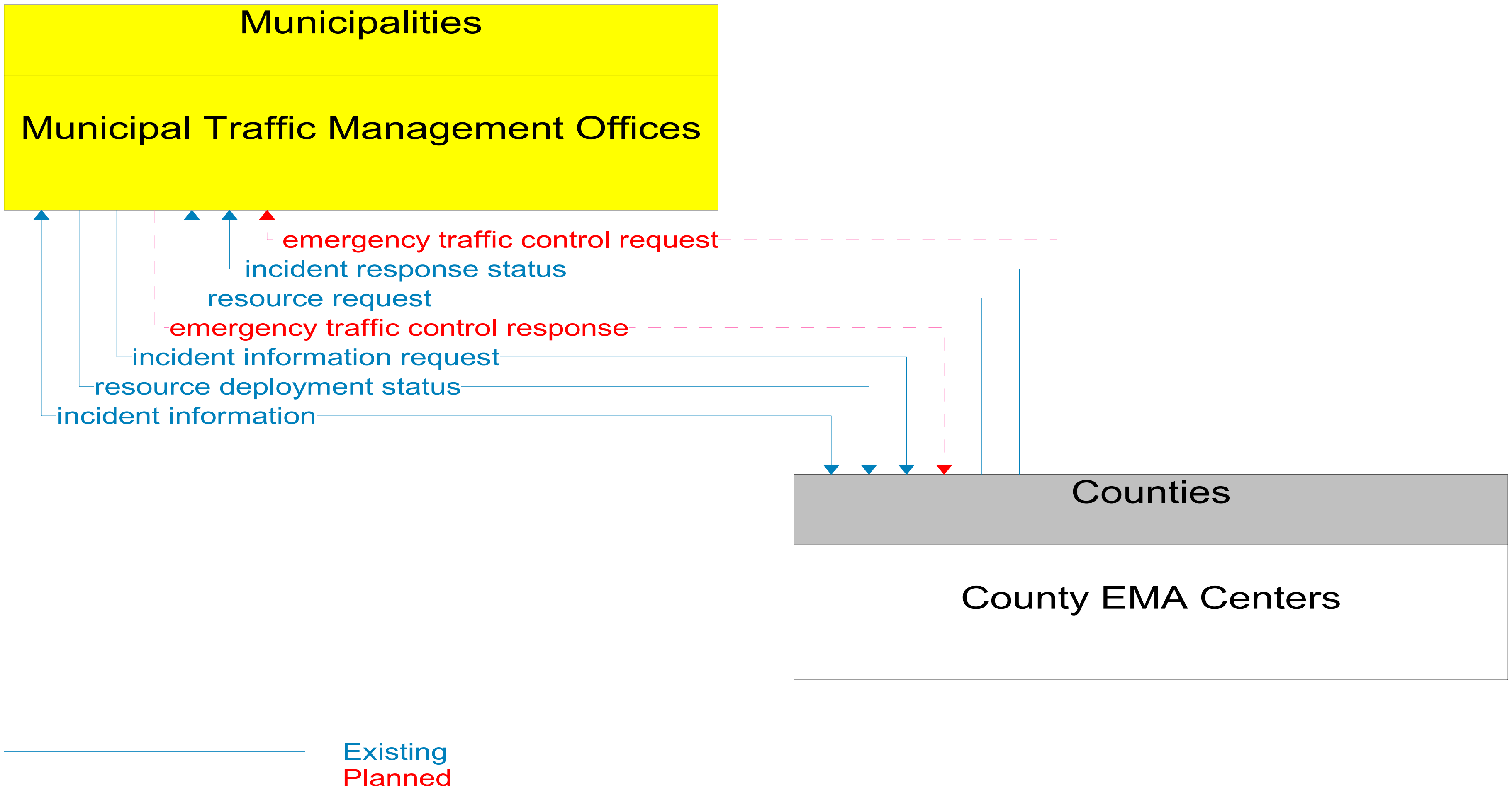
incident information

Counties

911 Communication Centers

Existing

Planned



Municipalities

Municipal Traffic Management Offices

emergency traffic control request

incident response status

resource request

emergency traffic control response

incident information request

resource deployment status

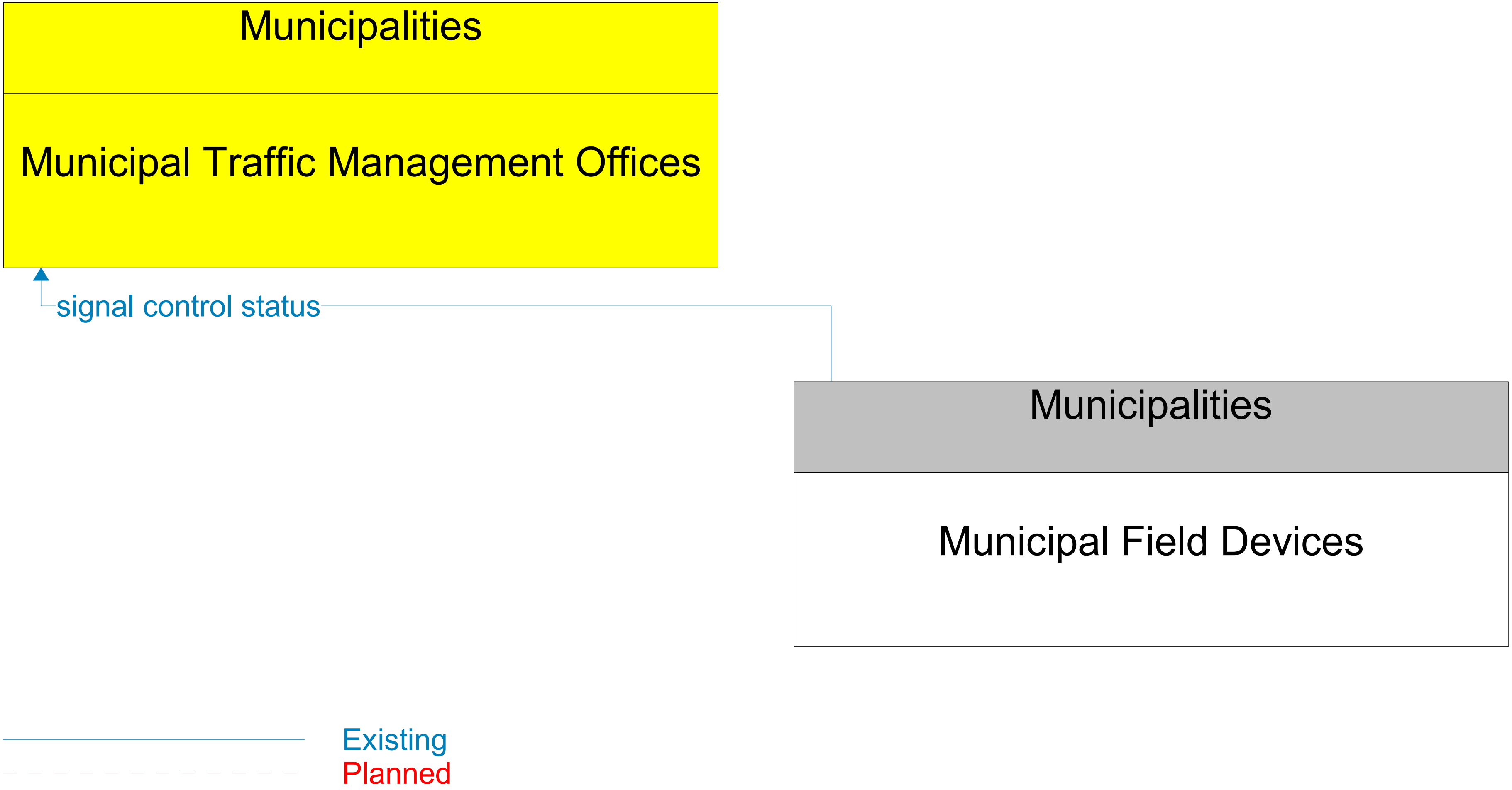
incident information

Counties

County EMA Centers

Existing

Planned



Municipalities

Municipal Traffic Management Offices

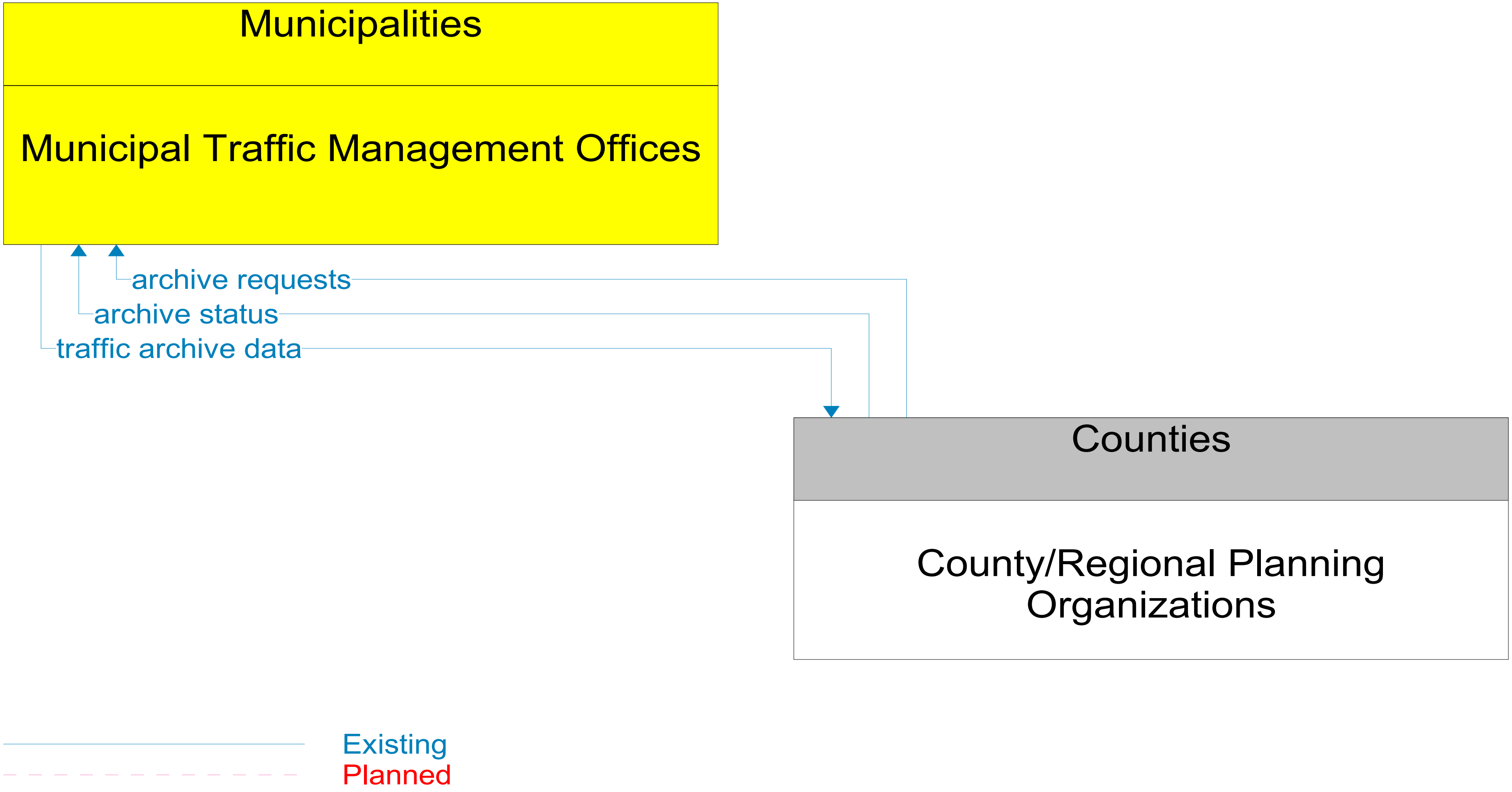
signal control status

Municipalities

Municipal Field Devices

Existing

Planned



Municipalities

Municipal Traffic Management Offices

archive requests

archive status

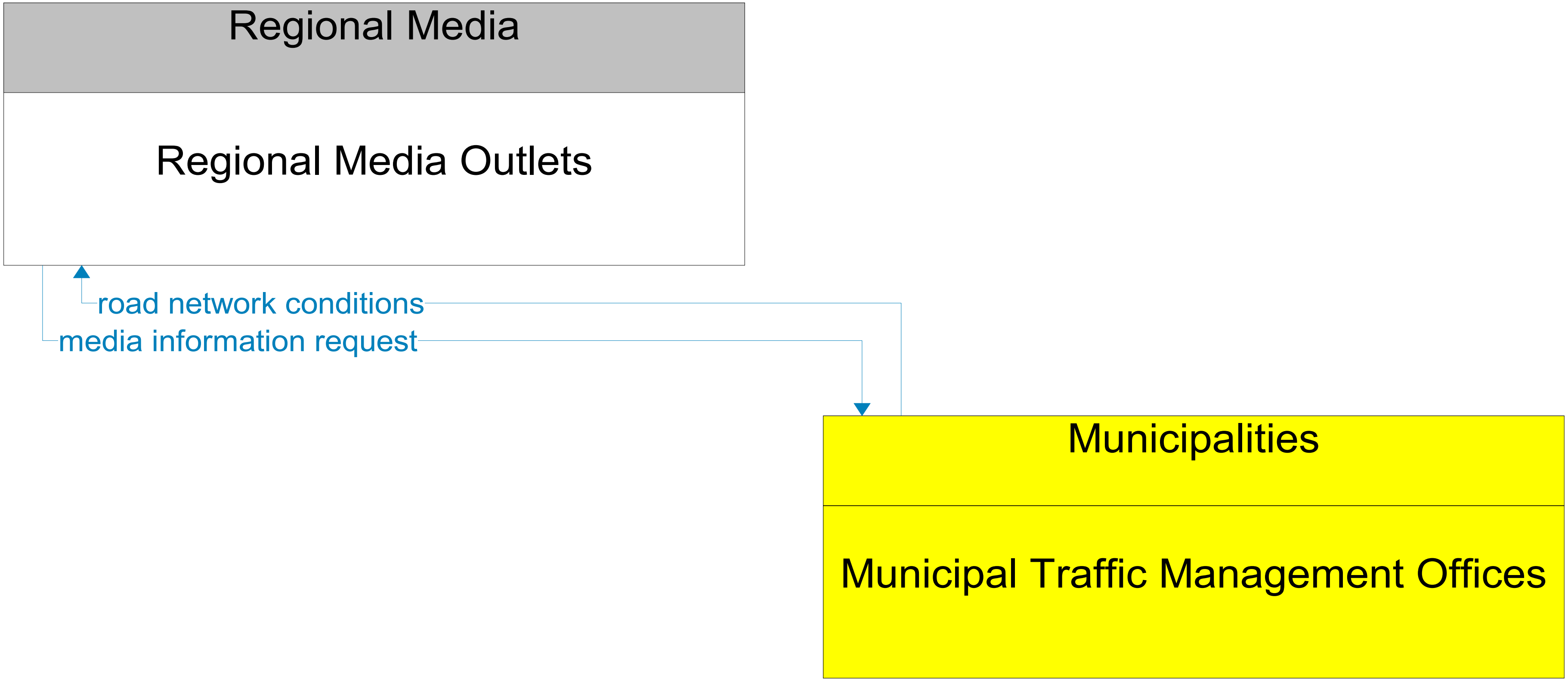
traffic archive data

Counties

County/Regional Planning Organizations

Existing

Planned



Regional Media

Regional Media Outlets

road network conditions

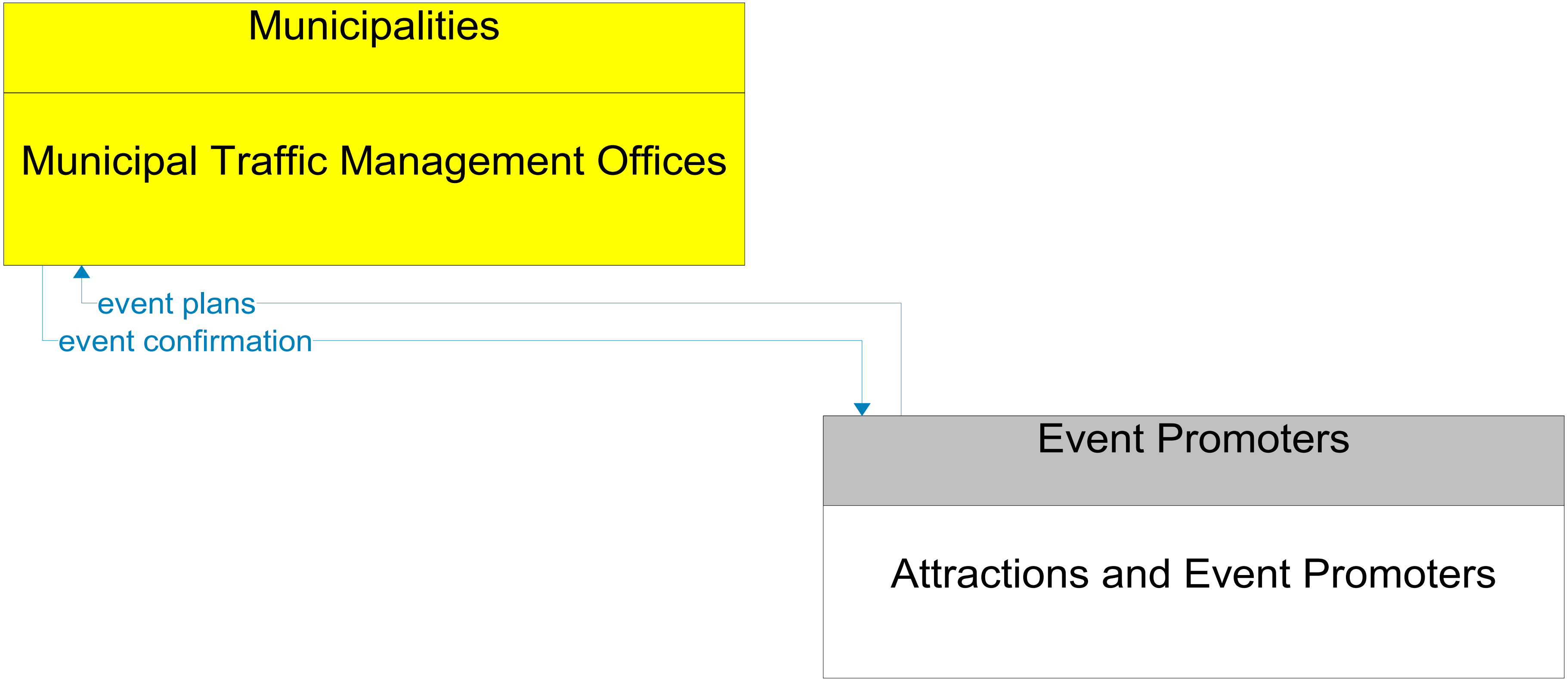
media information request

Municipalities

Municipal Traffic Management Offices

Existing

Planned



Municipalities

Municipal Traffic Management Offices

event plans

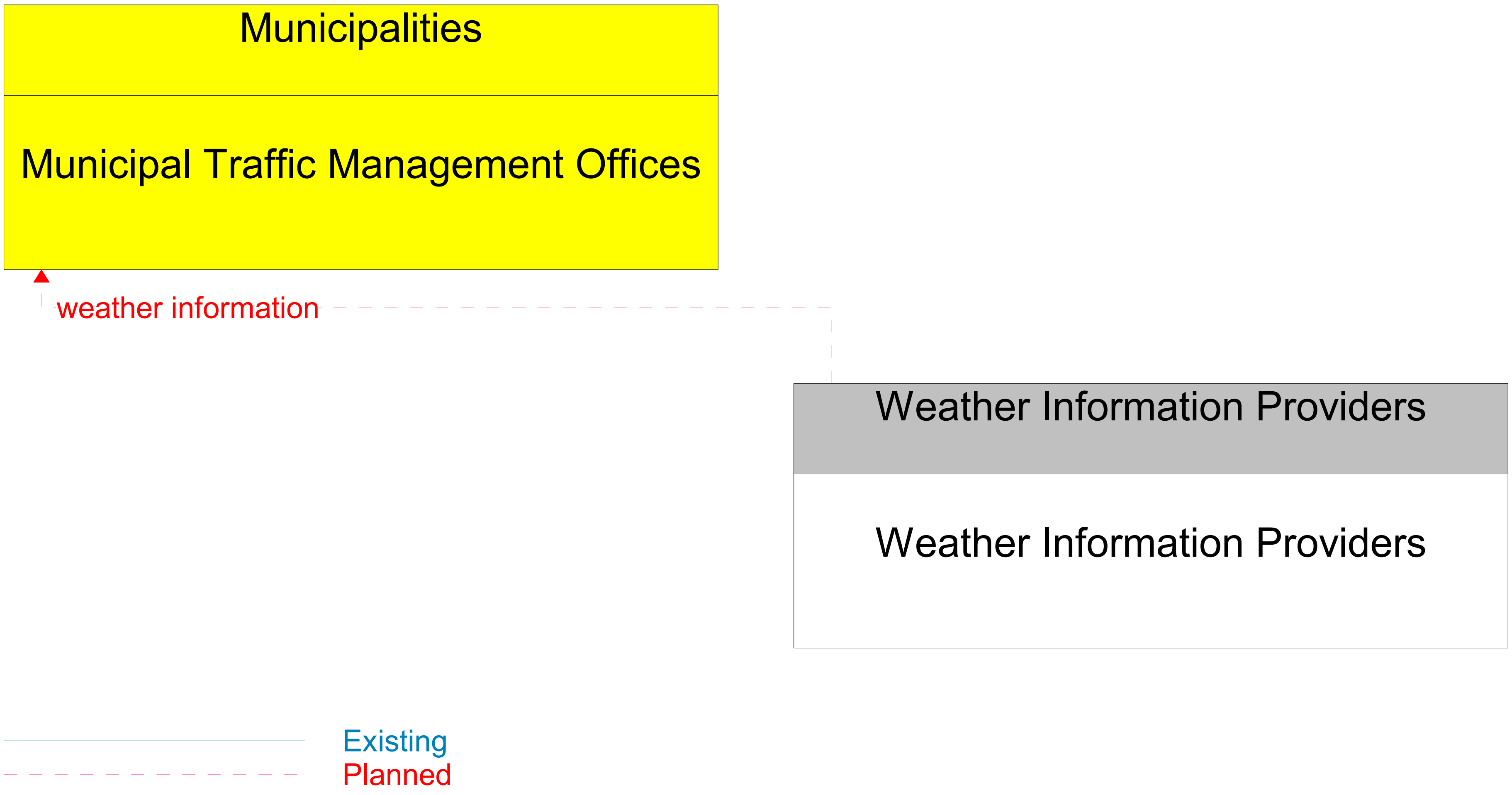
event confirmation

Event Promoters

Attractions and Event Promoters

Existing

Planned



Municipalities

Municipal Traffic Management Offices

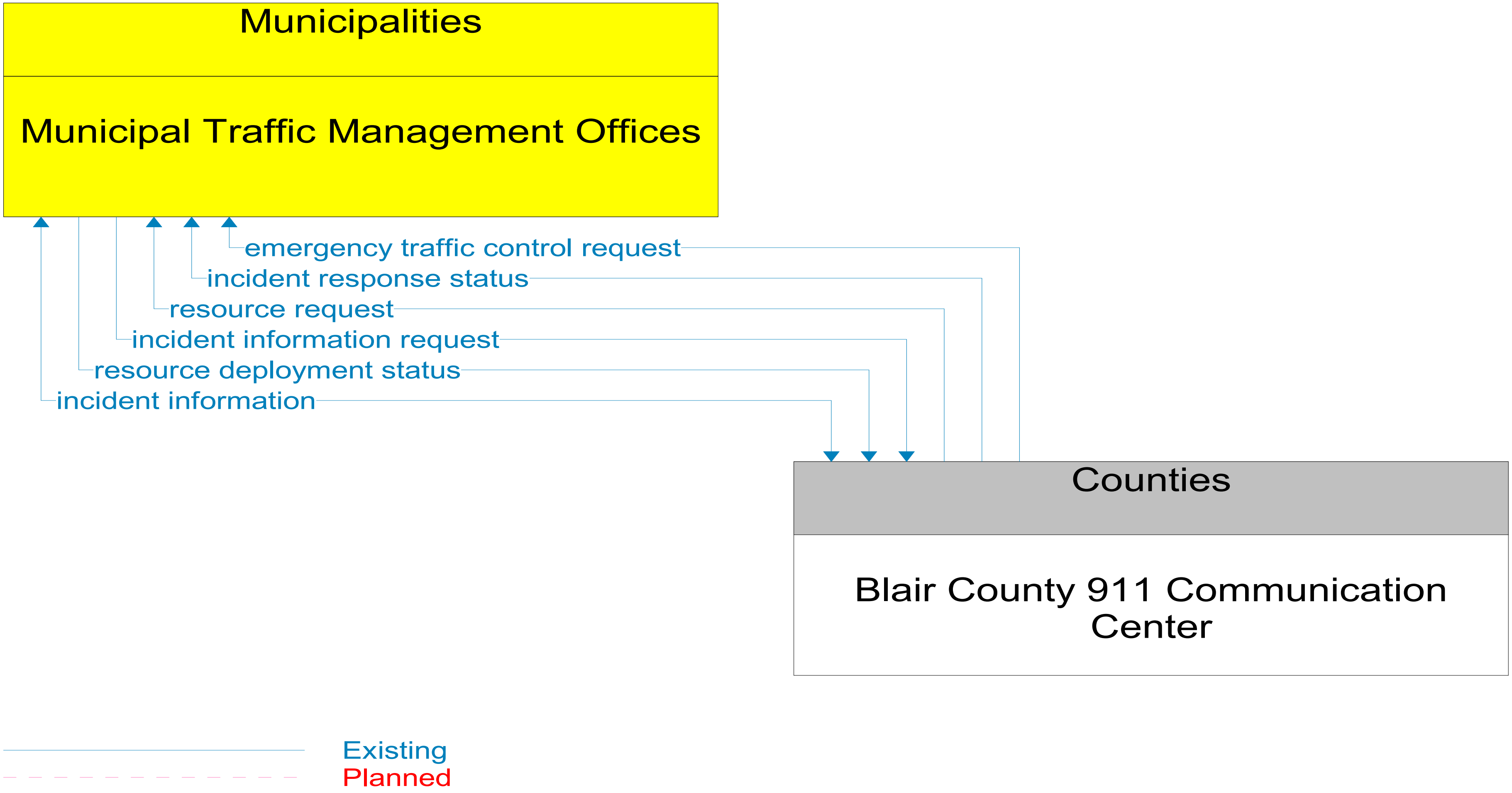
weather information

Weather Information Providers

Weather Information Providers

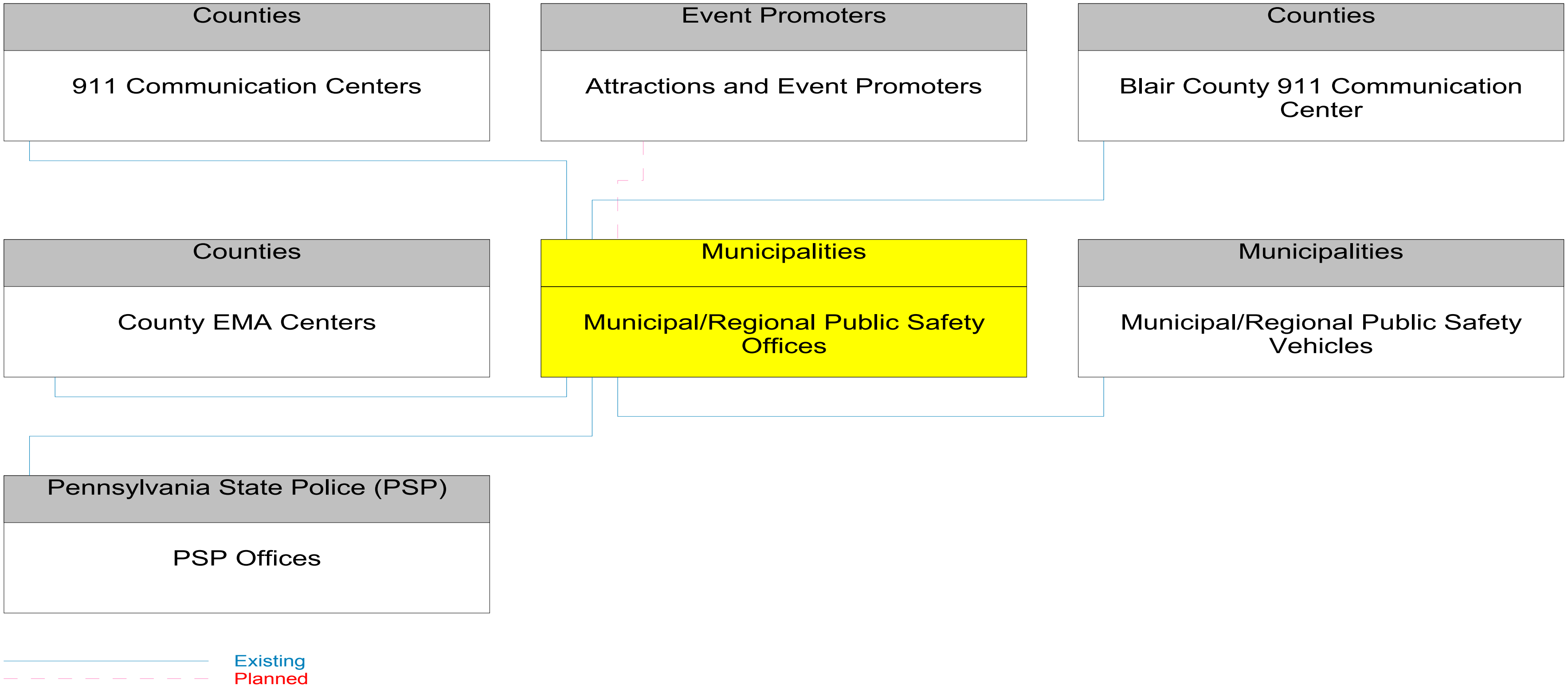
Existing

Planned


Municipalities
Municipal Traffic Management Offices
emergency traffic control request
incident response status
resource request
incident information request
resource deployment status
incident information
Counties
Blair County 911 Communication Center
Existing
Planned

Municipal/Regional Public Safety Offices

Municipal/Regional Public Safety Offices Interconnect Diagram



Counties

911 Communication Centers

Event Promoters

Attractions and Event Promoters

Counties

Blair County 911 Communication Center

Counties

County EMA Centers

Municipalities

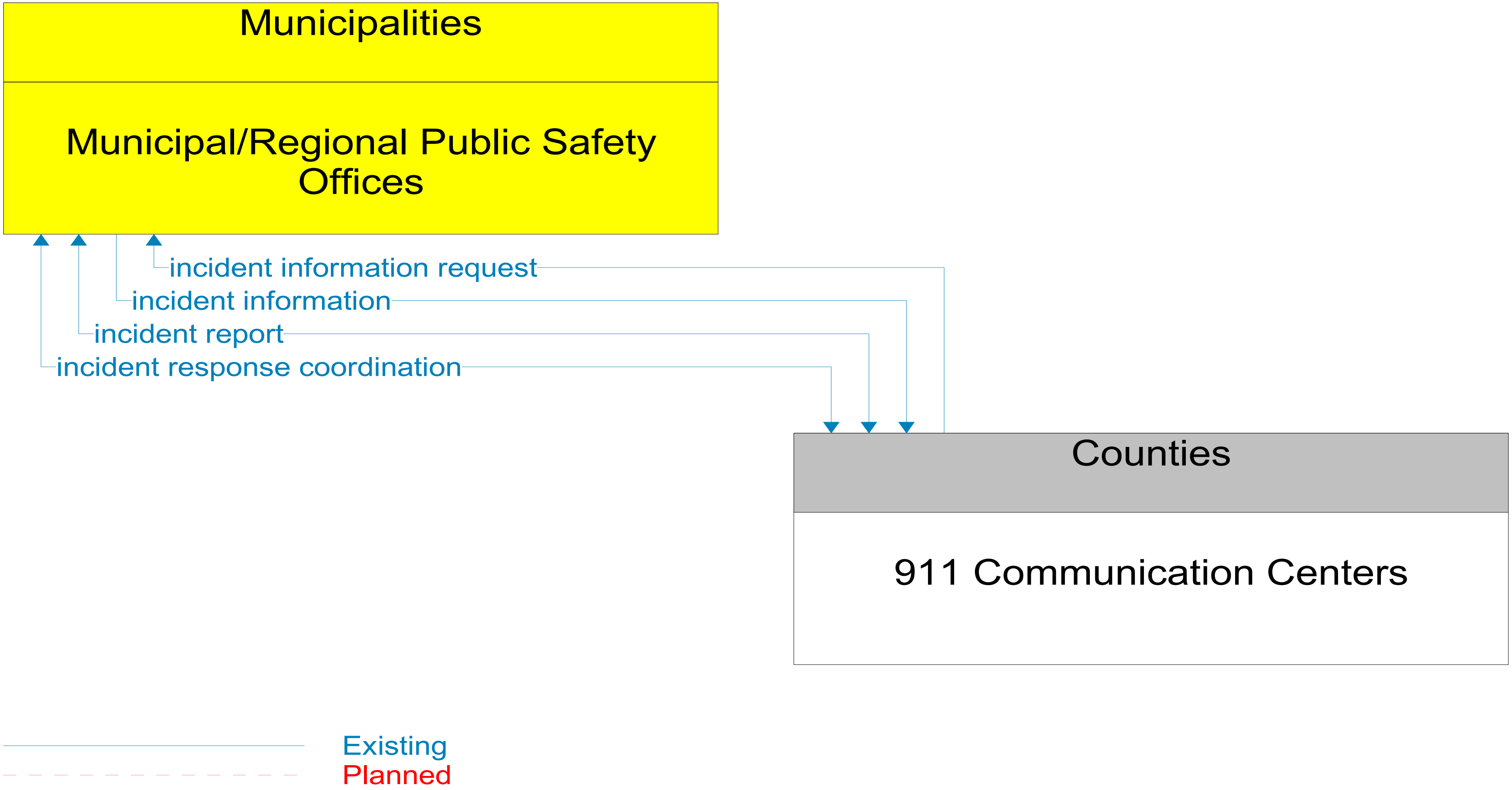
Municipal/Regional Public Safety Offices

Municipalities

Municipal/Regional Public Safety Vehicles

Pennsylvania State Police (PSP)

PSP Offices



Municipalities

Municipal/Regional Public Safety Offices

incident information request

incident information

incident report

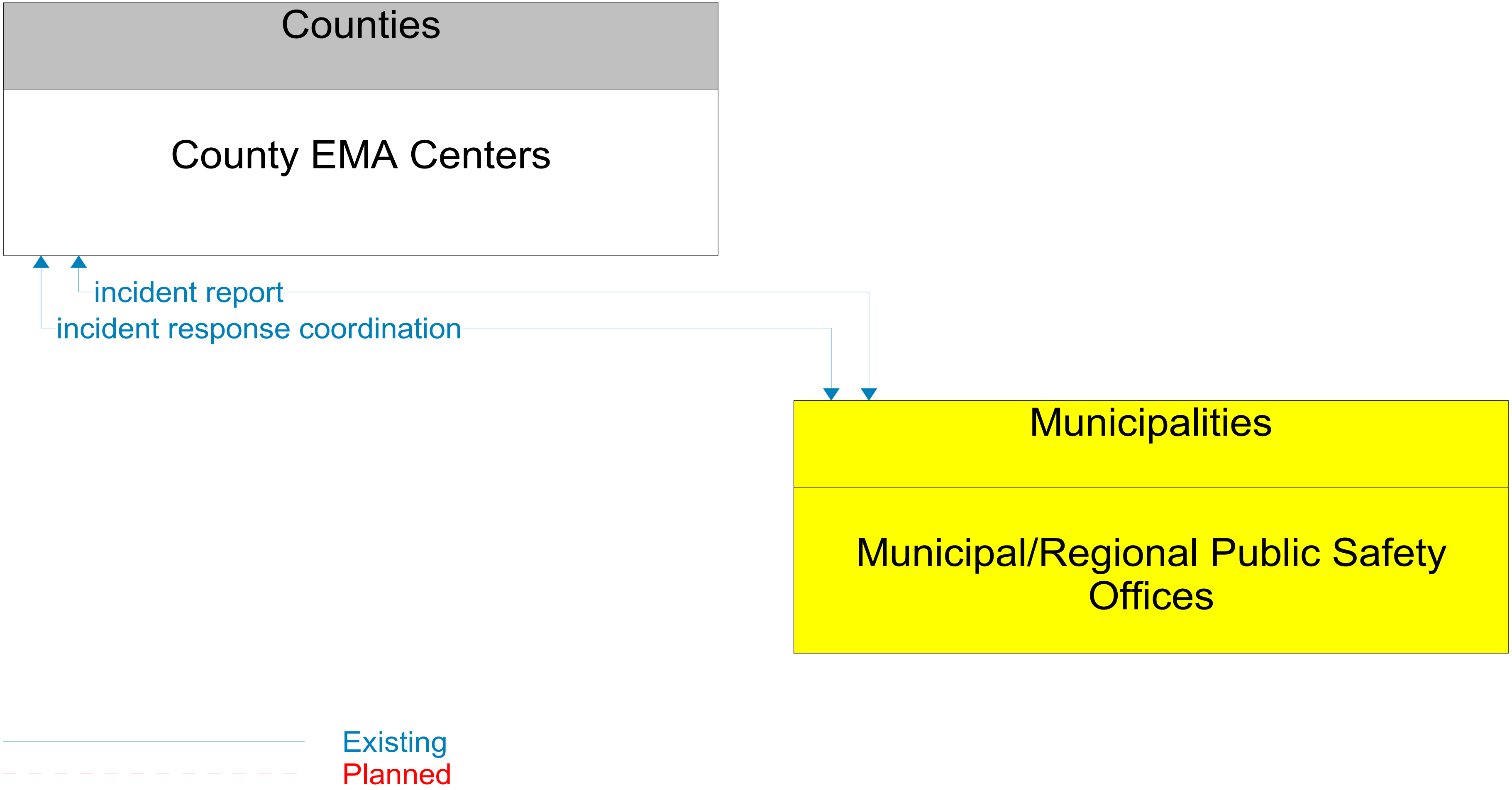
incident response coordination

Counties

911 Communication Centers

Existing

Planned



Counties

County EMA Centers

incident report

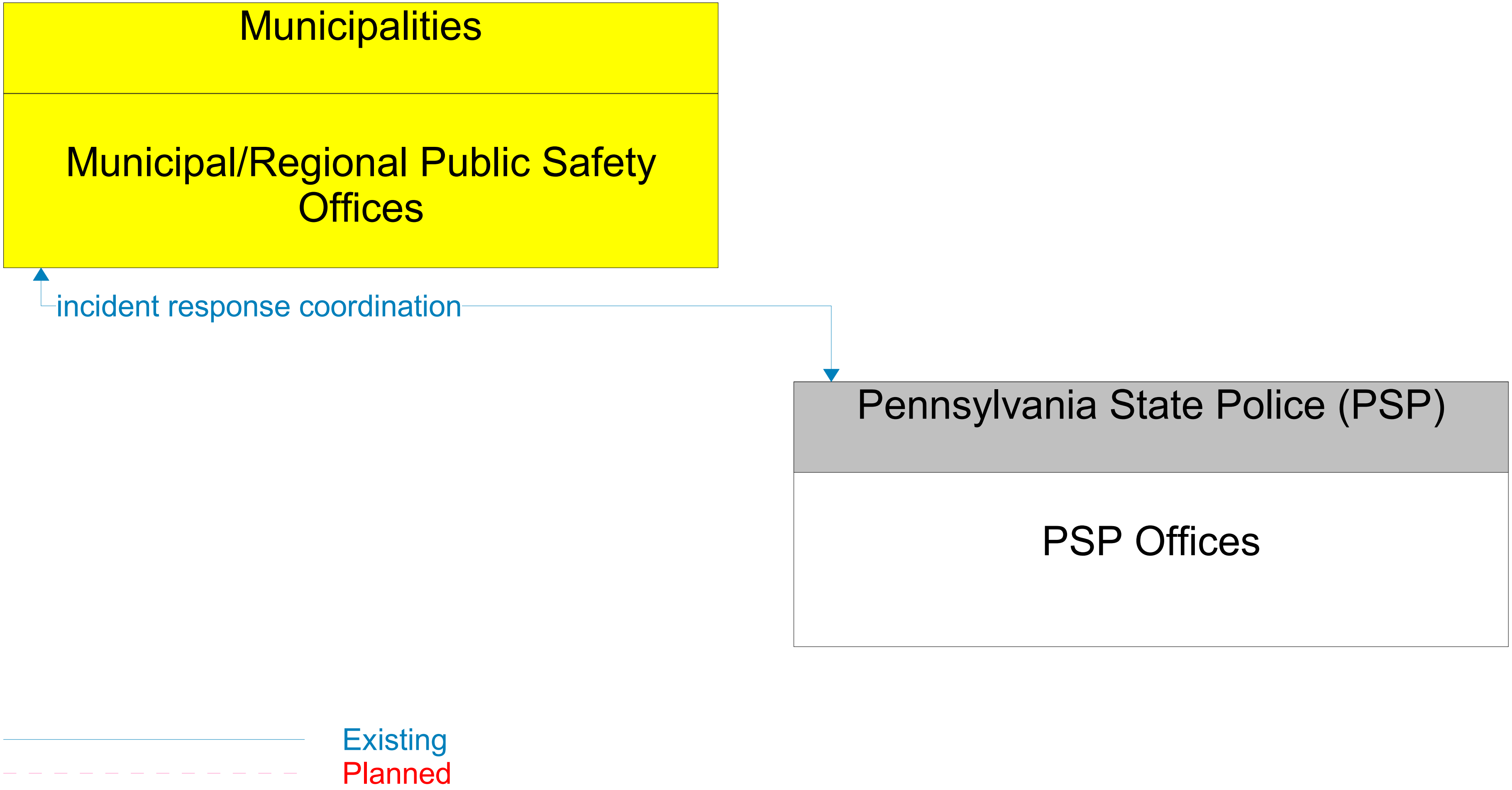
incident response coordination

Municipalities

Municipal/Regional Public Safety Offices

Existing

Planned



Municipalities

Municipal/Regional Public Safety Offices

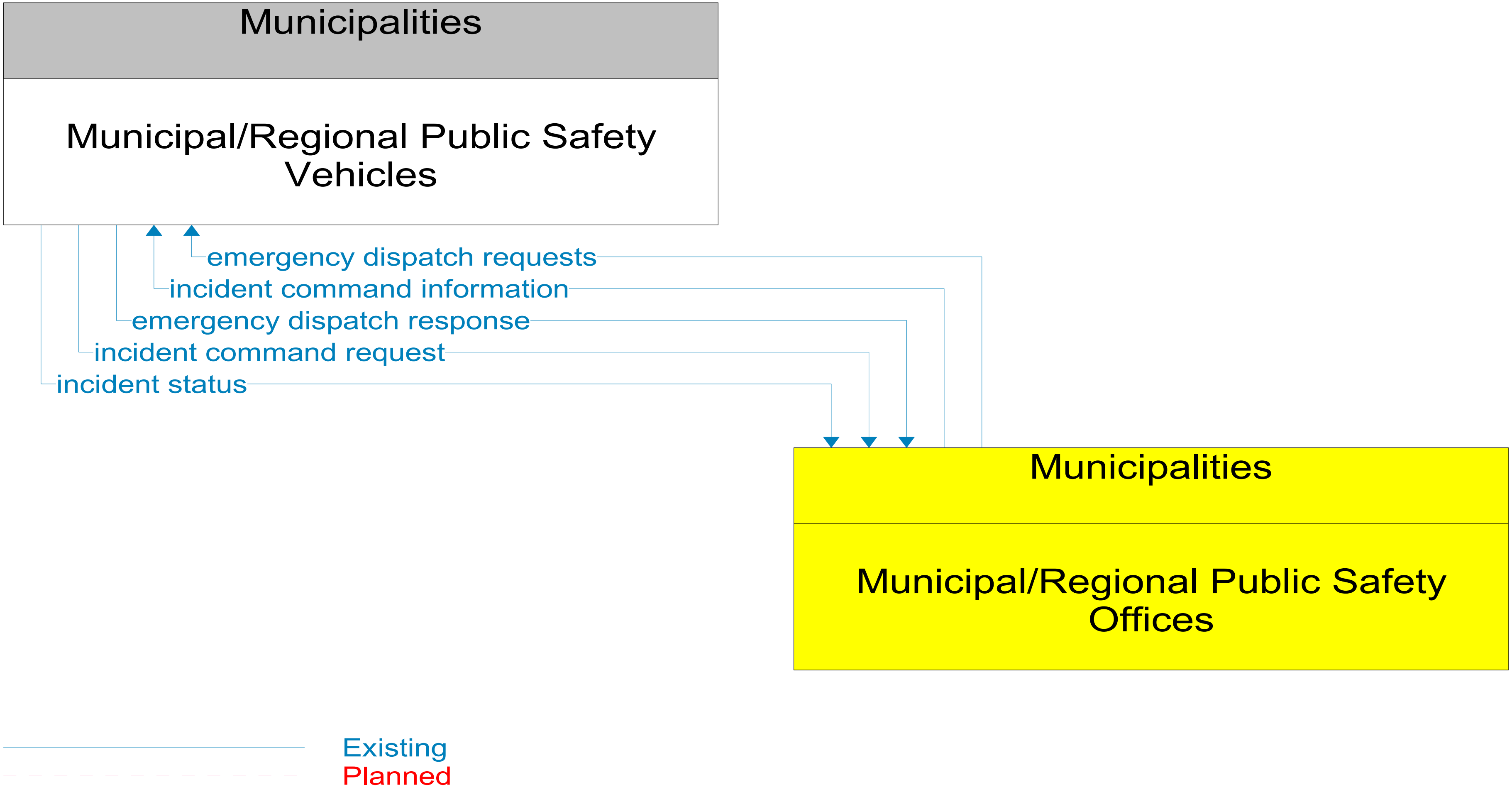
incident response coordination

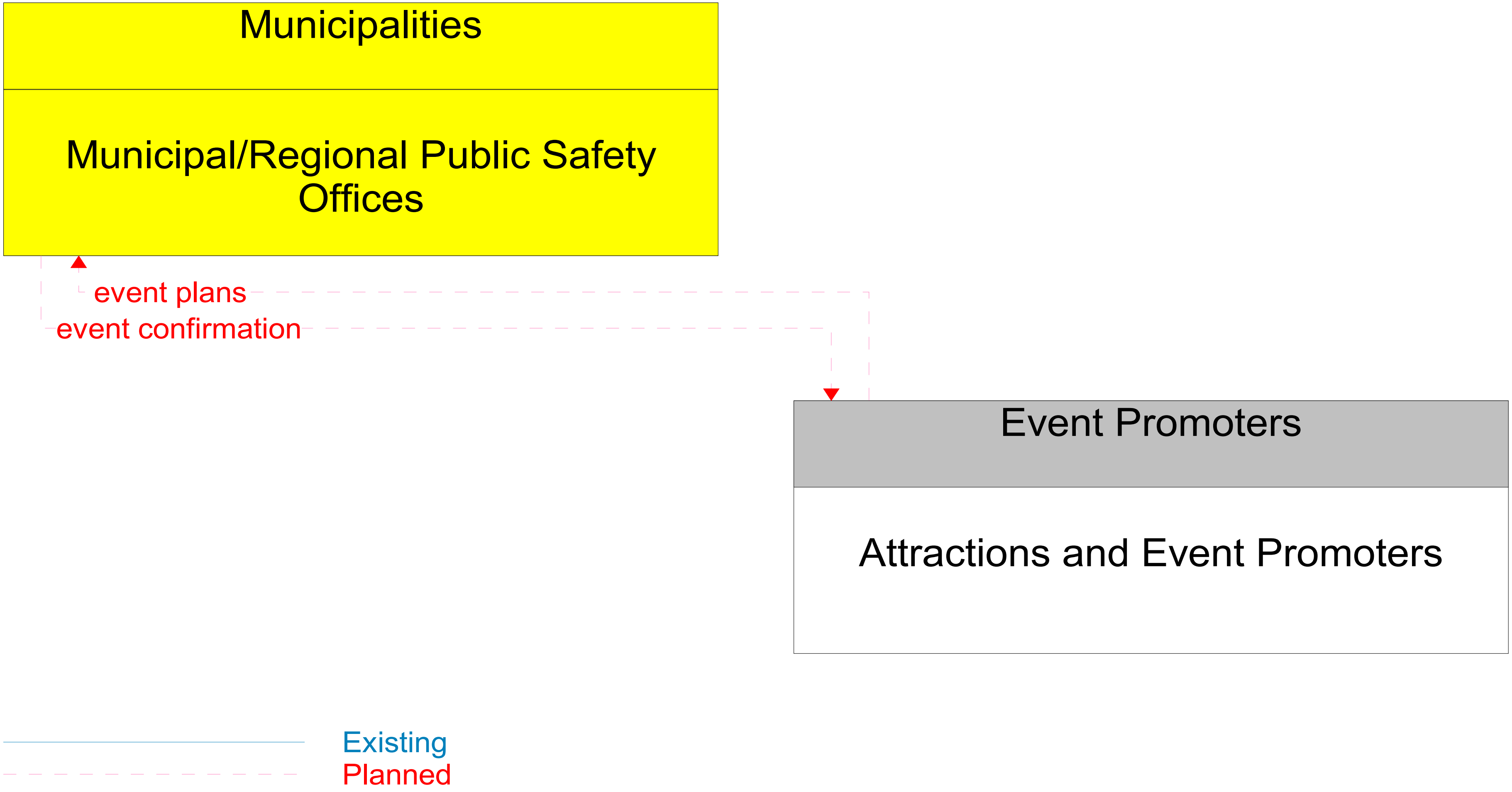
Pennsylvania State Police (PSP)

PSP Offices

Existing

Planned


Municipalities
Municipal/Regional Public Safety Vehicles
emergency dispatch requests
incident command information
emergency dispatch response
incident command request
incident status
Municipalities
Municipal/Regional Public Safety Offices
Existing
Planned



Municipalities

Municipal/Regional Public Safety Offices

event plans

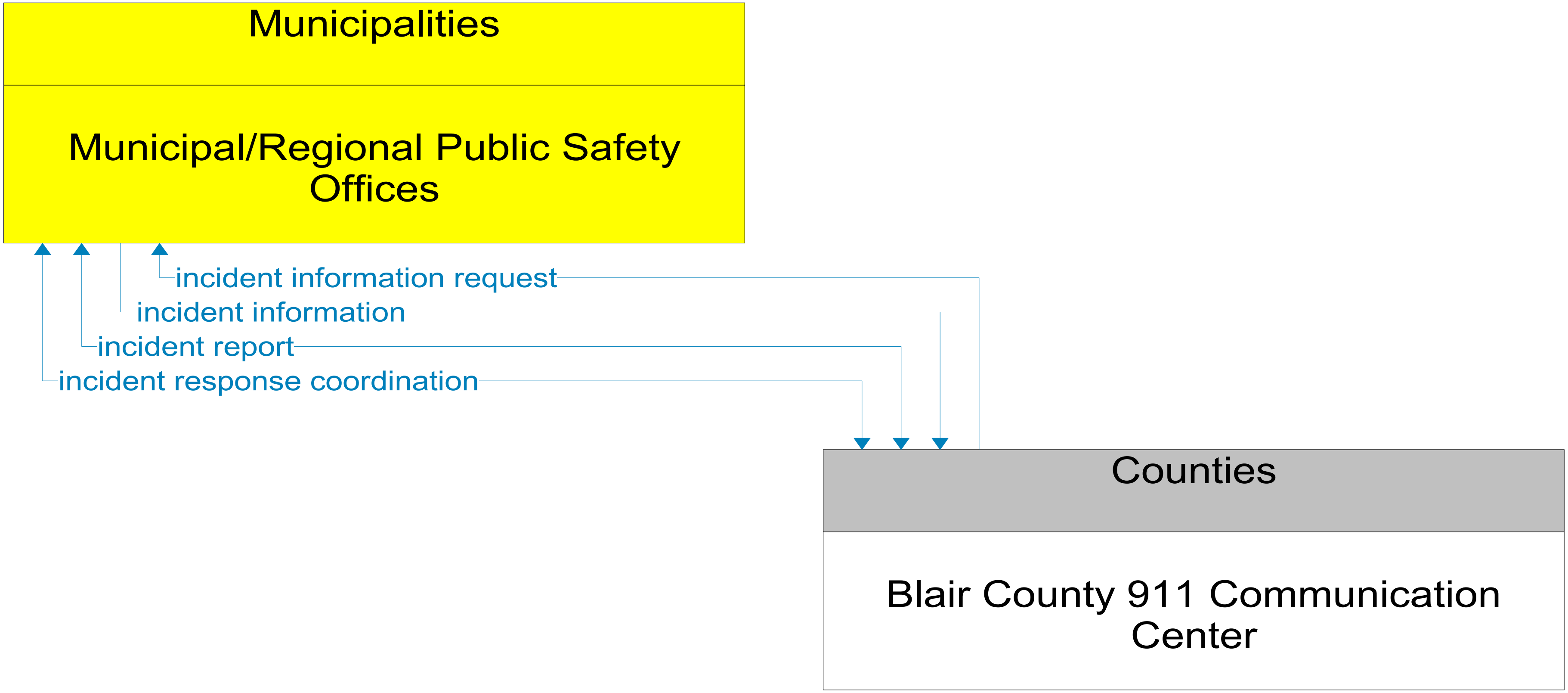
event confirmation

Event Promoters

Attractions and Event Promoters

Existing

Planned



Municipalities

Municipal/Regional Public Safety Offices

incident information request

incident information

incident report

incident response coordination

Counties

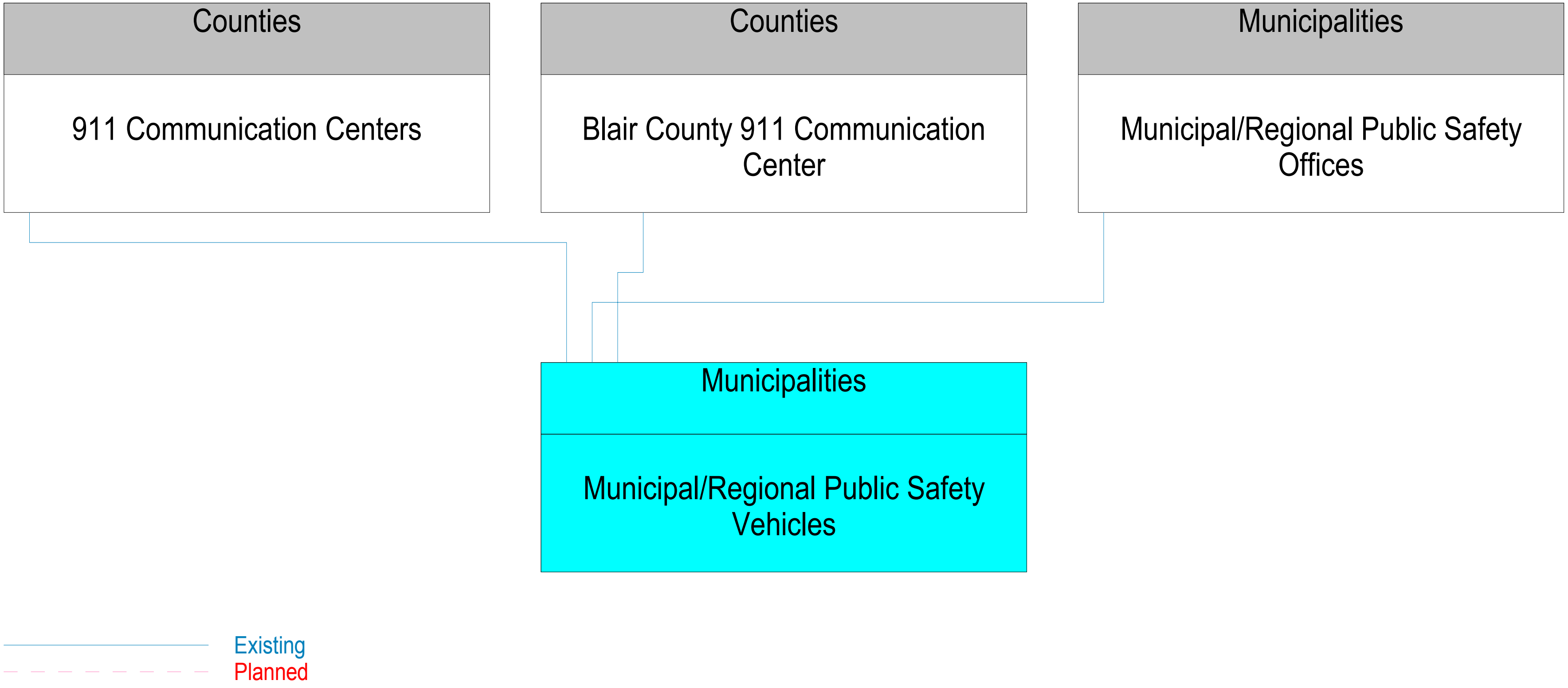
Blair County 911 Communication Center

Existing

Planned

Municipal/Regional Public Safety Vehicles

Municipal/Regional Public Safety Vehicles Interconnect Diagram



Counties

911 Communication Centers

Counties

Blair County 911 Communication Center

Municipalities

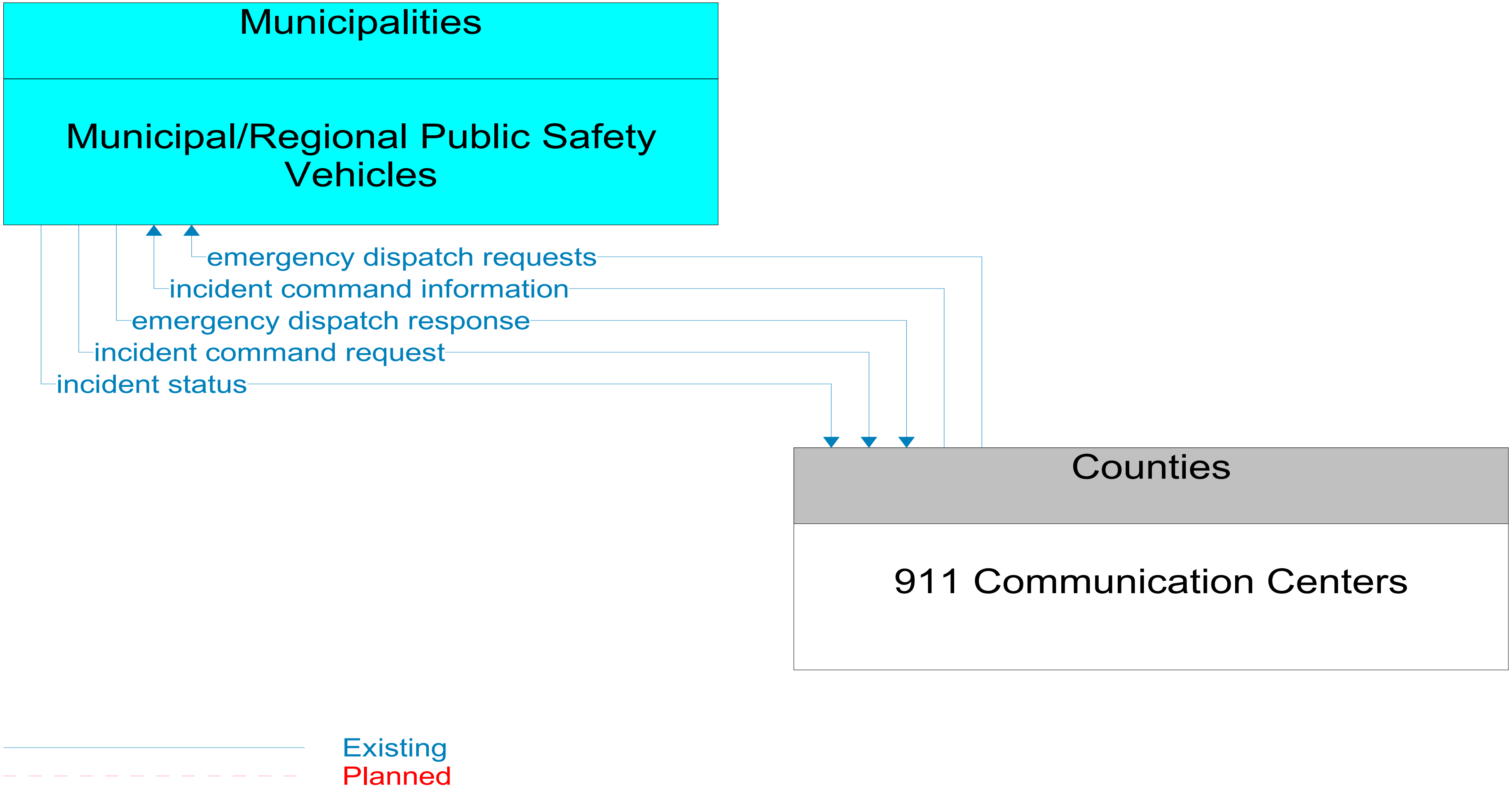
Municipal/Regional Public Safety Offices

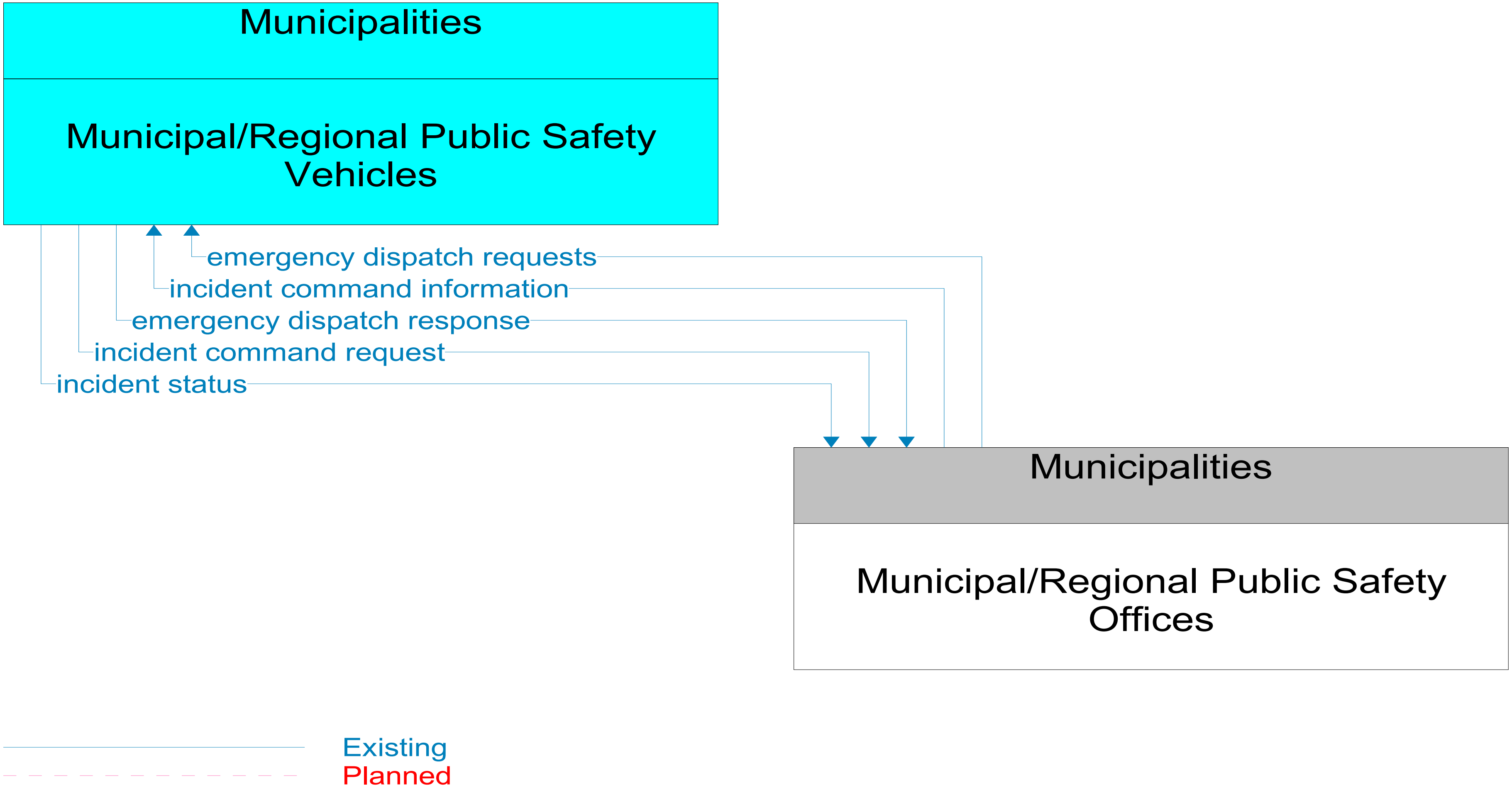
Municipalities

Municipal/Regional Public Safety Vehicles

Existing

Planned


Municipalities
Municipal/Regional Public Safety Vehicles
emergency dispatch requests
incident command information
emergency dispatch response
incident command request
incident status
Counties
911 Communication Centers
Existing
Planned



Municipalities

Municipal/Regional Public Safety Vehicles

emergency dispatch requests

incident command information

emergency dispatch response

incident command request

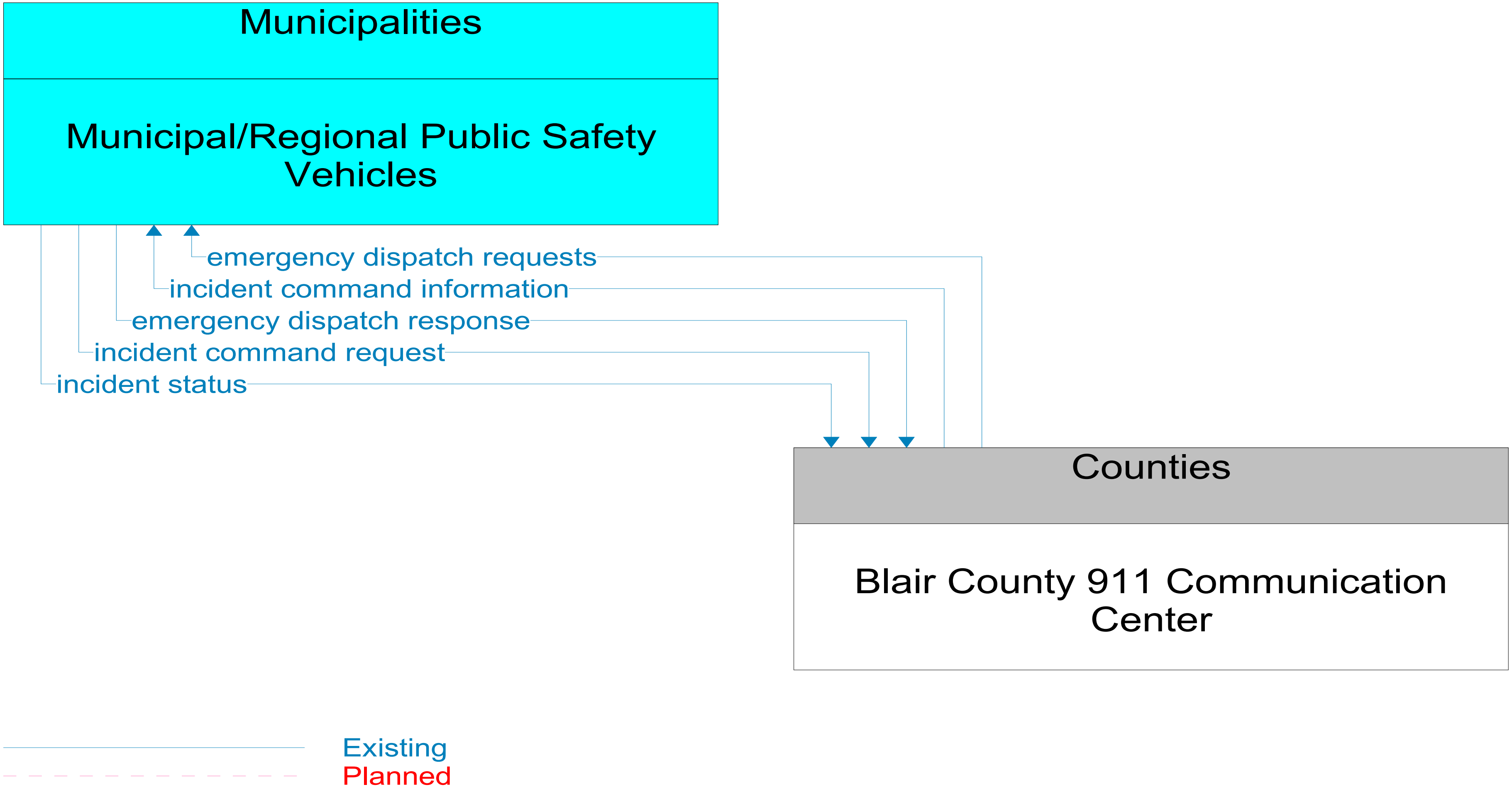
incident status

Municipalities

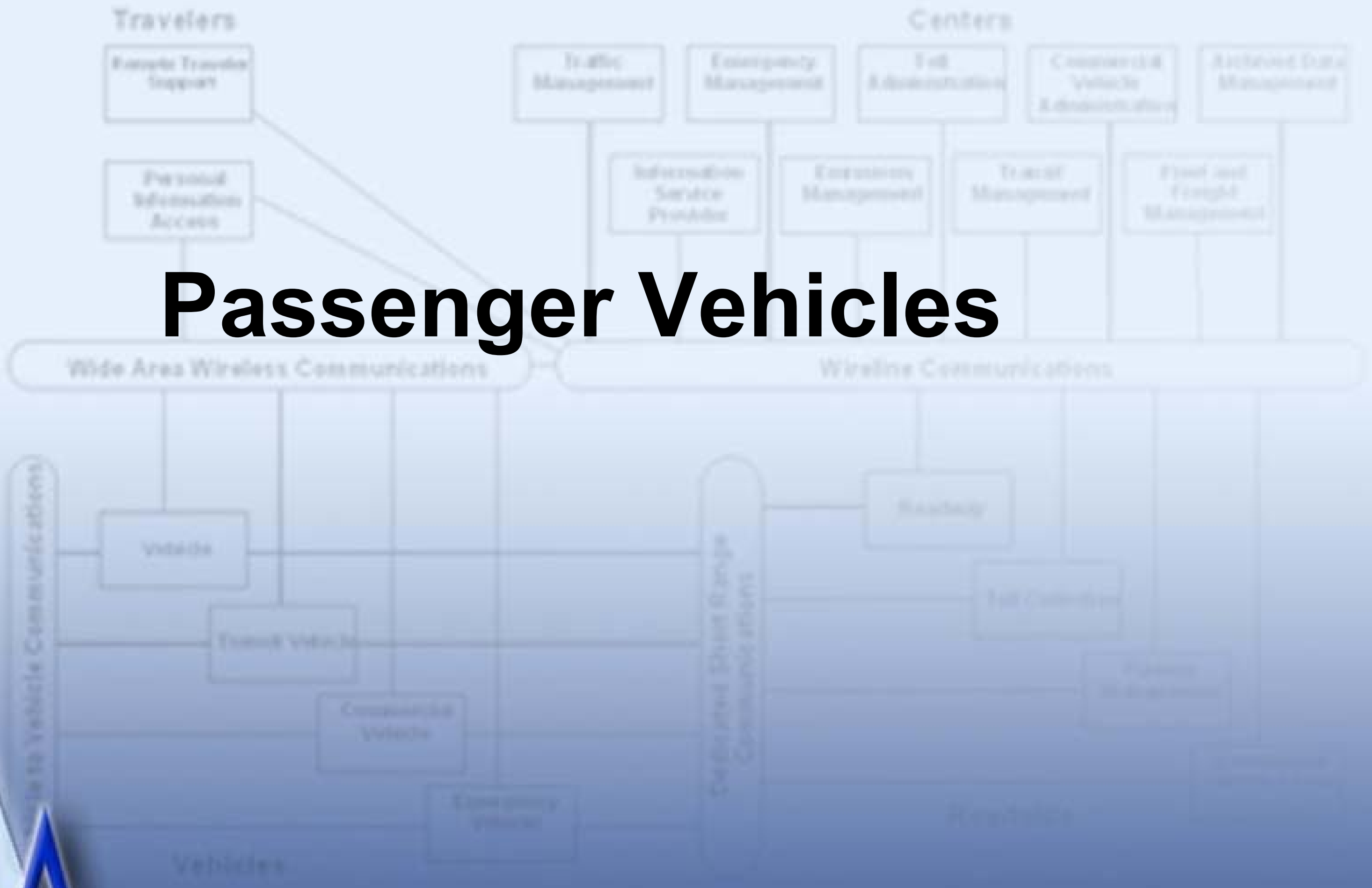
Municipal/Regional Public Safety Offices

Existing

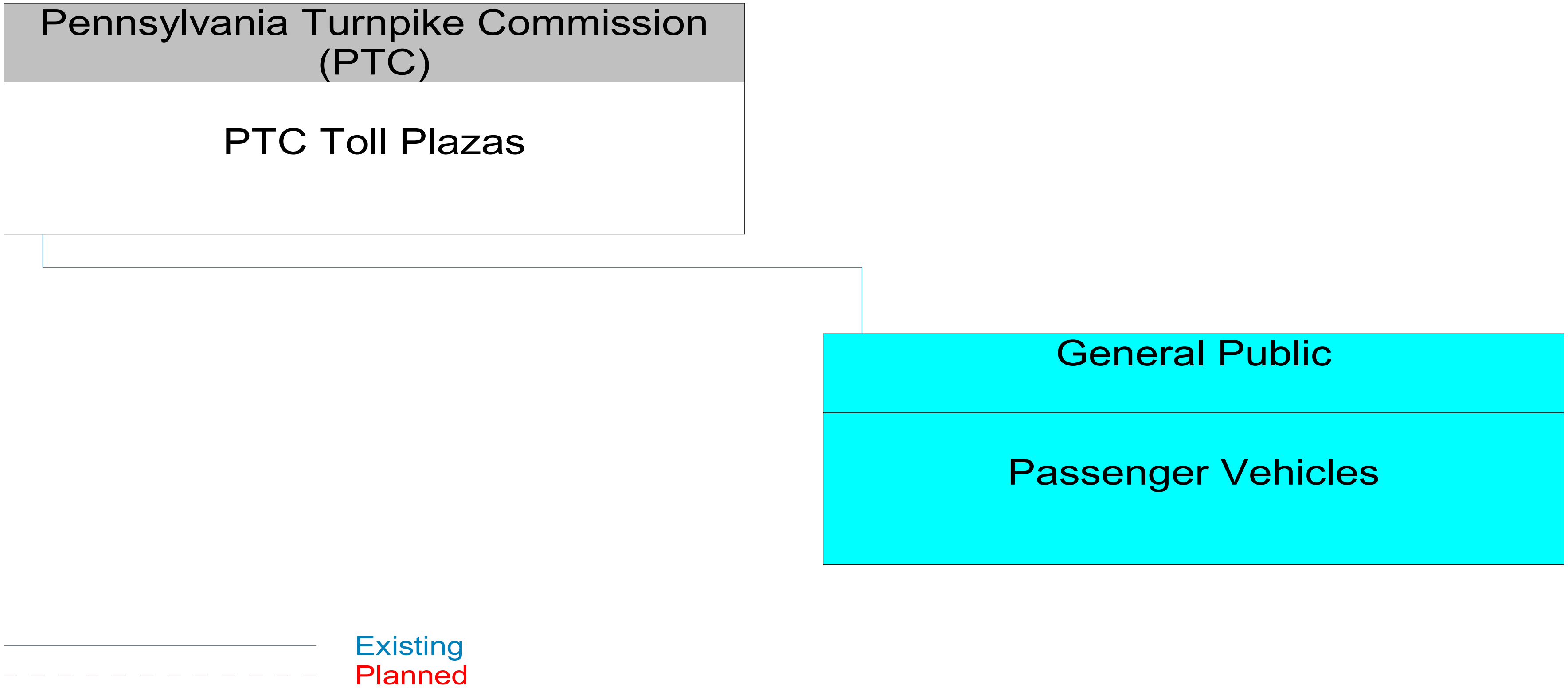
Planned


Municipalities
Municipal/Regional Public Safety Vehicles
emergency dispatch requests
incident command information
emergency dispatch response
incident command request
incident status
Counties
Blair County 911 Communication Center
Existing
Planned

Passenger Vehicles


Travelers
Centers
Remote Traveler Support
Personal Information Access
Traffic Management
Emergency Management
Toll Administration
Commercial Vehicle Administration
Archived Data Management
Information Service Provider
Emissions Management
Transit Management
Fleet and Freight Management
Wide Area Wireless Communications
Wireline Communications
Vehicle
Transit Vehicle
Commercial Vehicle
Emergency Vehicle
Vehicles
Dedicated Short Range Communications
Roadway
Toll Collection
Parking Management
Roadside

Passenger Vehicles Interconnect Diagram



Pennsylvania Turnpike Commission (PTC)

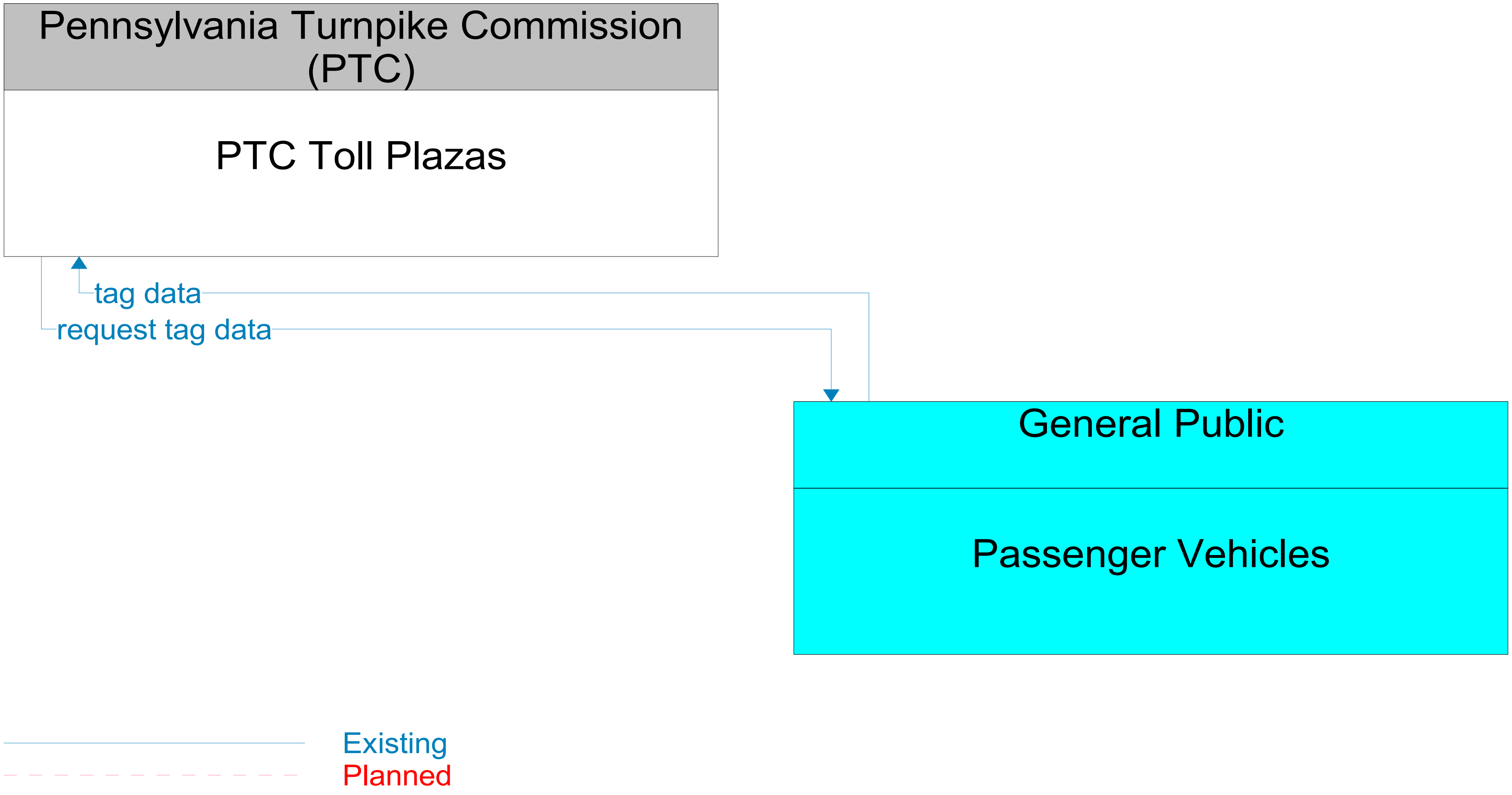
PTC Toll Plazas

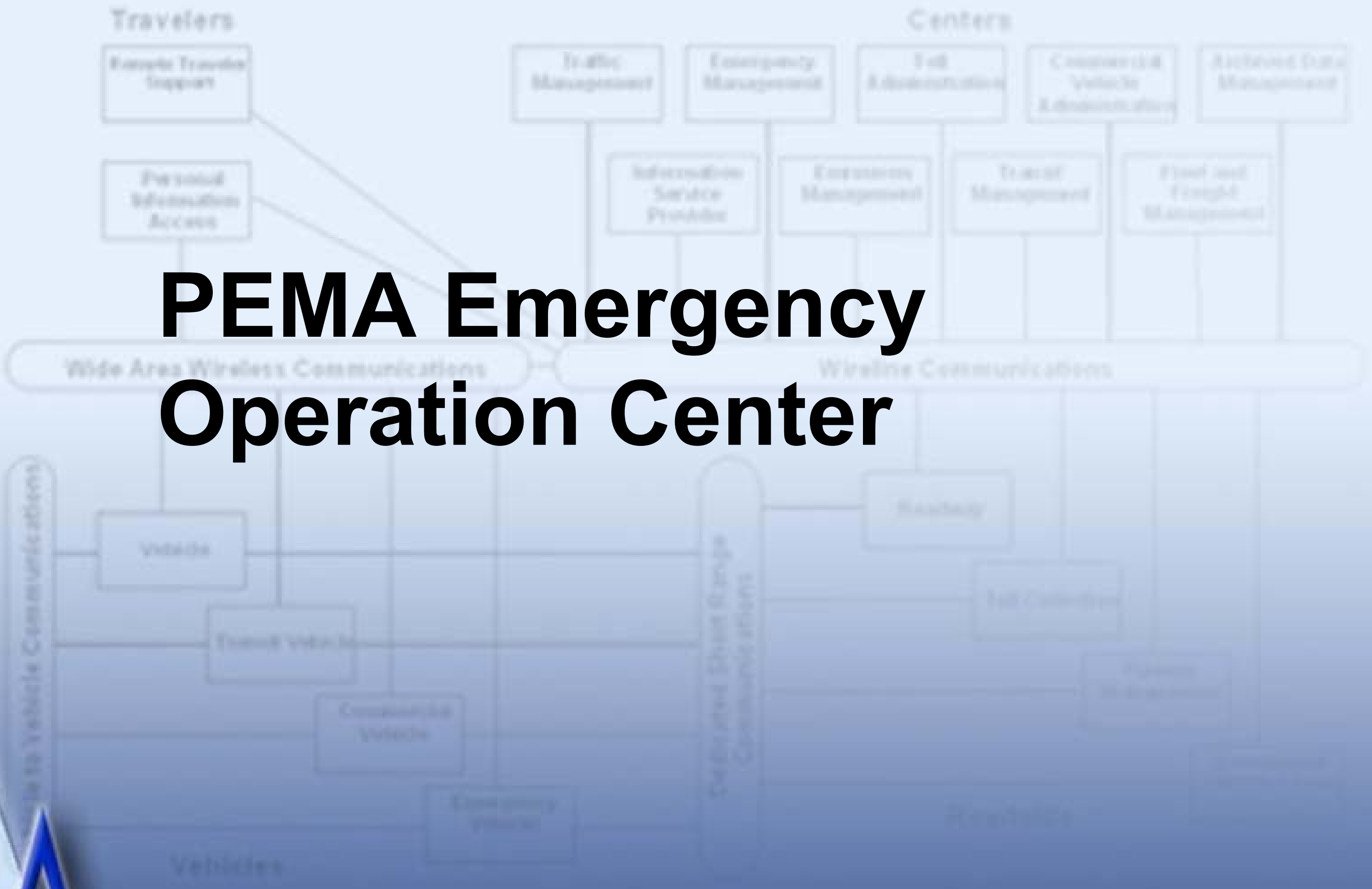
General Public

Passenger Vehicles

Existing

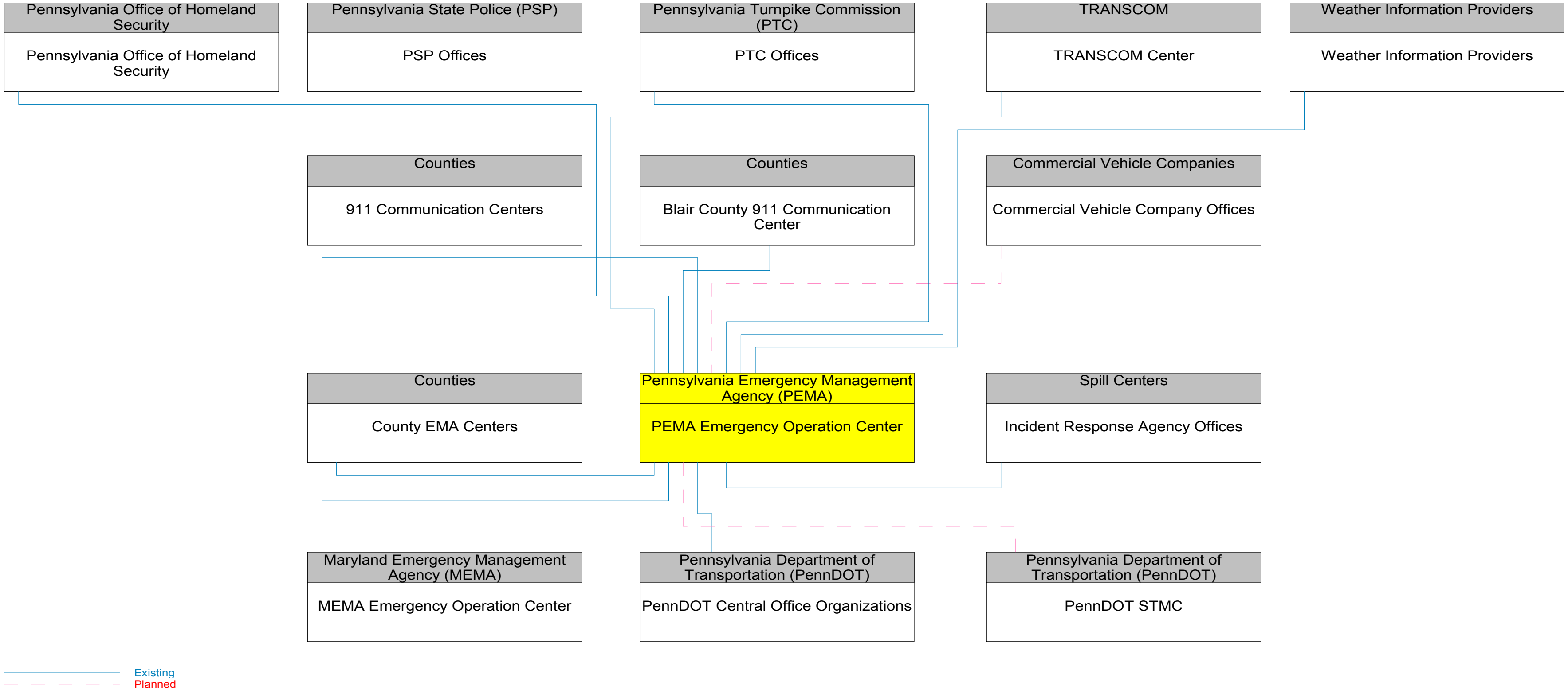
Planned


Pennsylvania Turnpike Commission (PTC)
PTC Toll Plazas
tag data
request tag data
General Public
Passenger Vehicles
Existing
Planned


Travelers
Centers
Traffic Management
Emergency Management
Toll Administration
Commercial Vehicle Administration
Archived Data Management
Personal Information Access
Information Service Provider
Emissions Management
Transit Management
Fleet and Freight Management
Wide Area Wireless Communications
Wireline Communications
Vehicle
Transit Vehicle
Commercial Vehicle
Emergency Vehicle
Vehicles
Roadway
Toll Collection
Roadside

PEMA Emergency Operation Center

PEMA Emergency Operation Center Interconnect Diagram



Pennsylvania Office of Homeland Security
Pennsylvania Office of Homeland Security

Pennsylvania State Police (PSP)
PSP Offices

Pennsylvania Turnpike Commission (PTC)
PTC Offices

TRANSCOM
TRANSCOM Center

Weather Information Providers
Weather Information Providers

Counties
911 Communication Centers

Counties
Blair County 911 Communication Center

Commercial Vehicle Companies
Commercial Vehicle Company Offices

Counties
County EMA Centers

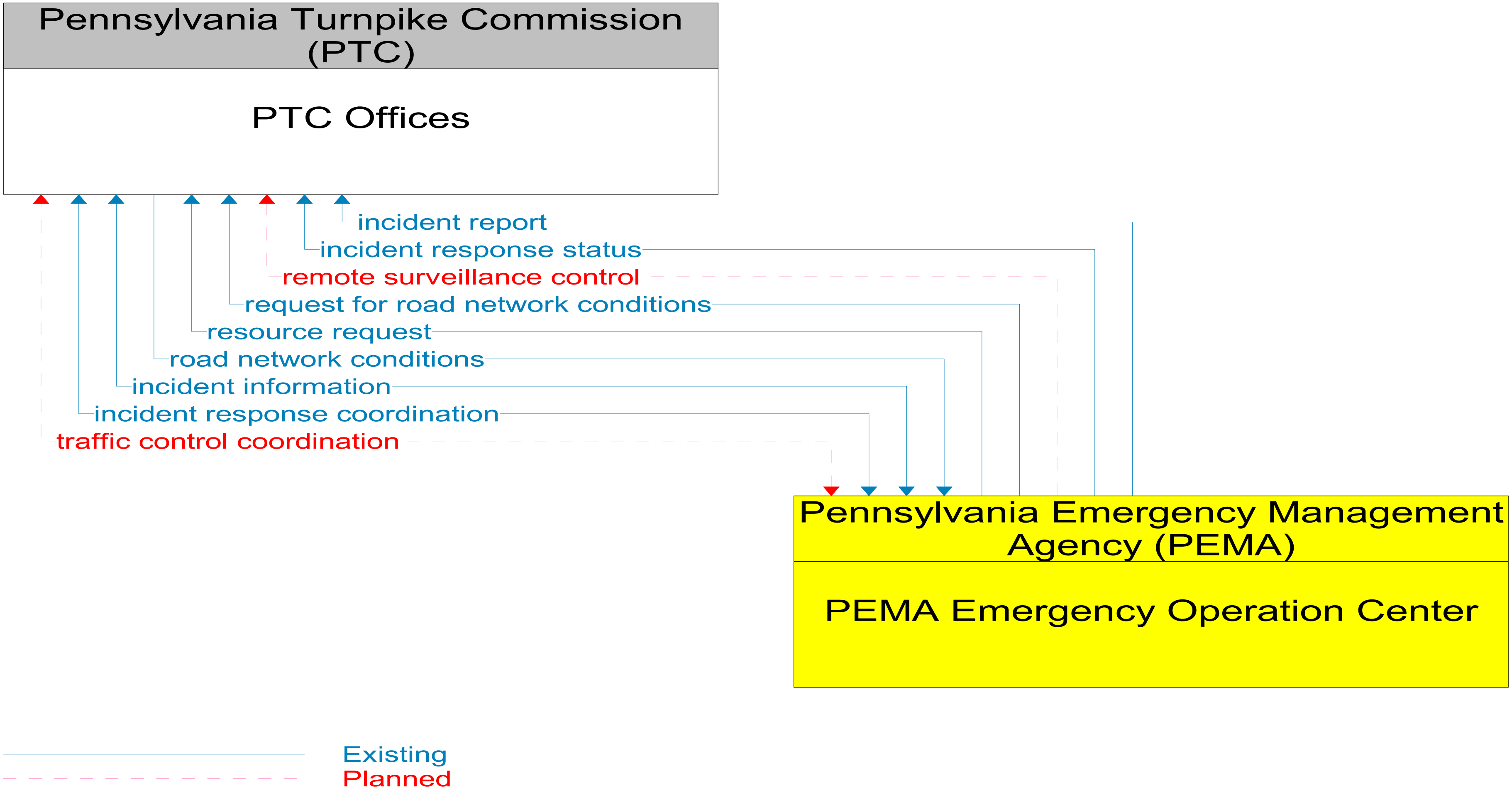
Pennsylvania Emergency Management Agency (PEMA)
PEMA Emergency Operation Center

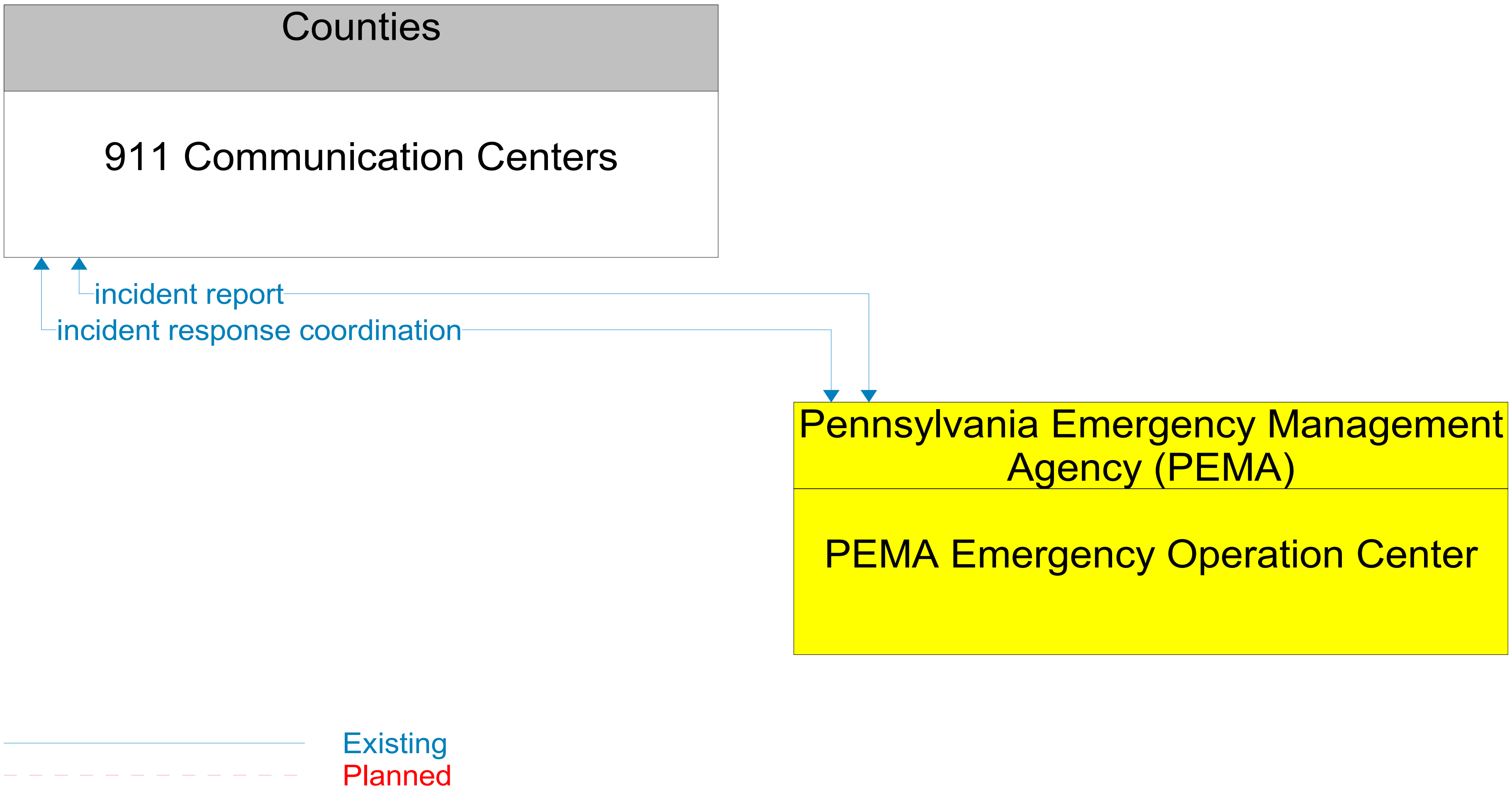
Spill Centers
Incident Response Agency Offices

Maryland Emergency Management Agency (MEMA)
MEMA Emergency Operation Center

Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Organizations

Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC


Pennsylvania Turnpike Commission (PTC)
PTC Offices
incident report
incident response status
remote surveillance control
request for road network conditions
resource request
road network conditions
incident information
incident response coordination
traffic control coordination
Pennsylvania Emergency Management Agency (PEMA)
PEMA Emergency Operation Center
Existing
Planned



Counties

911 Communication Centers

incident report

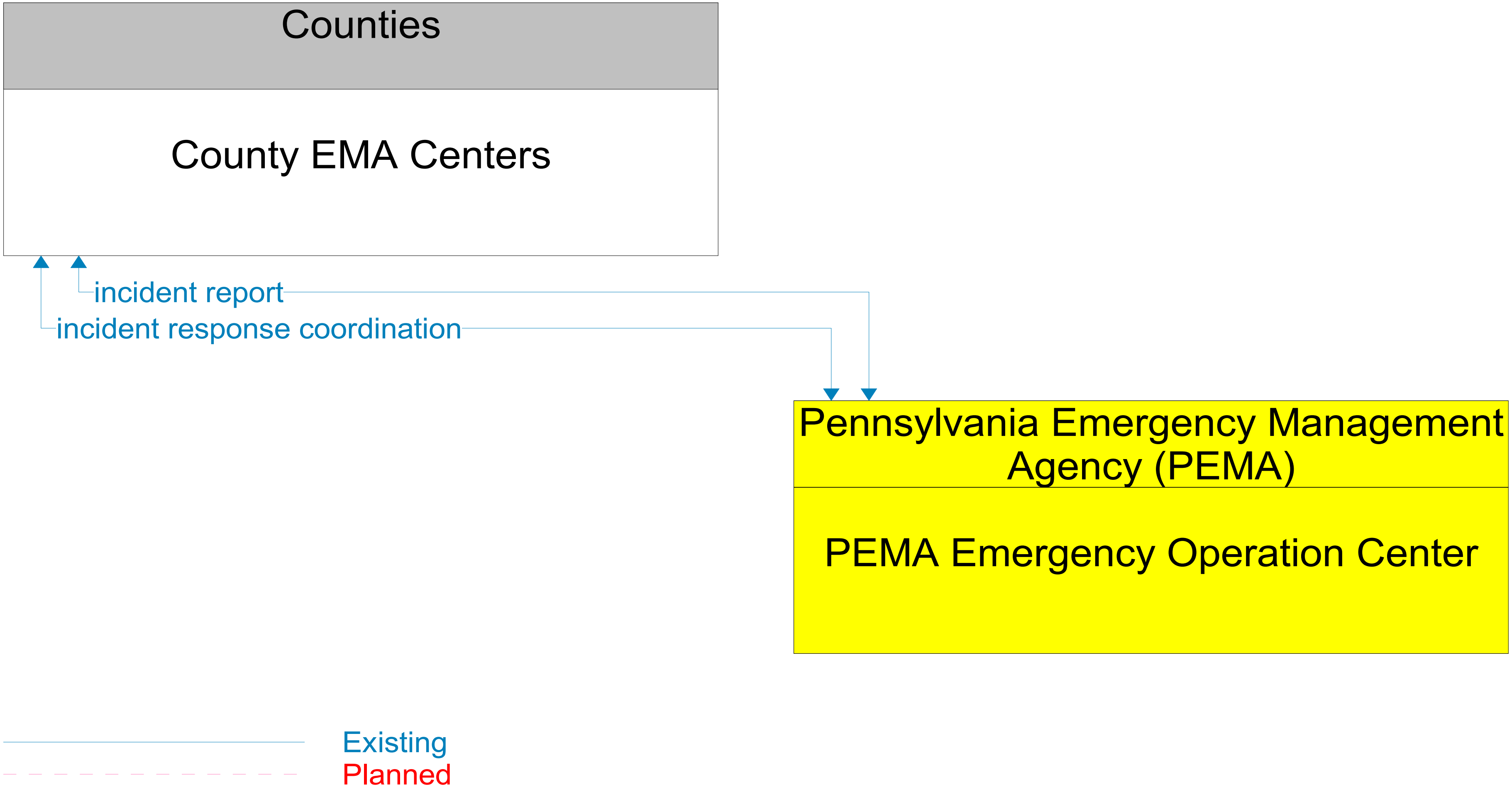
incident response coordination

Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

Existing

Planned



Counties

County EMA Centers

incident report

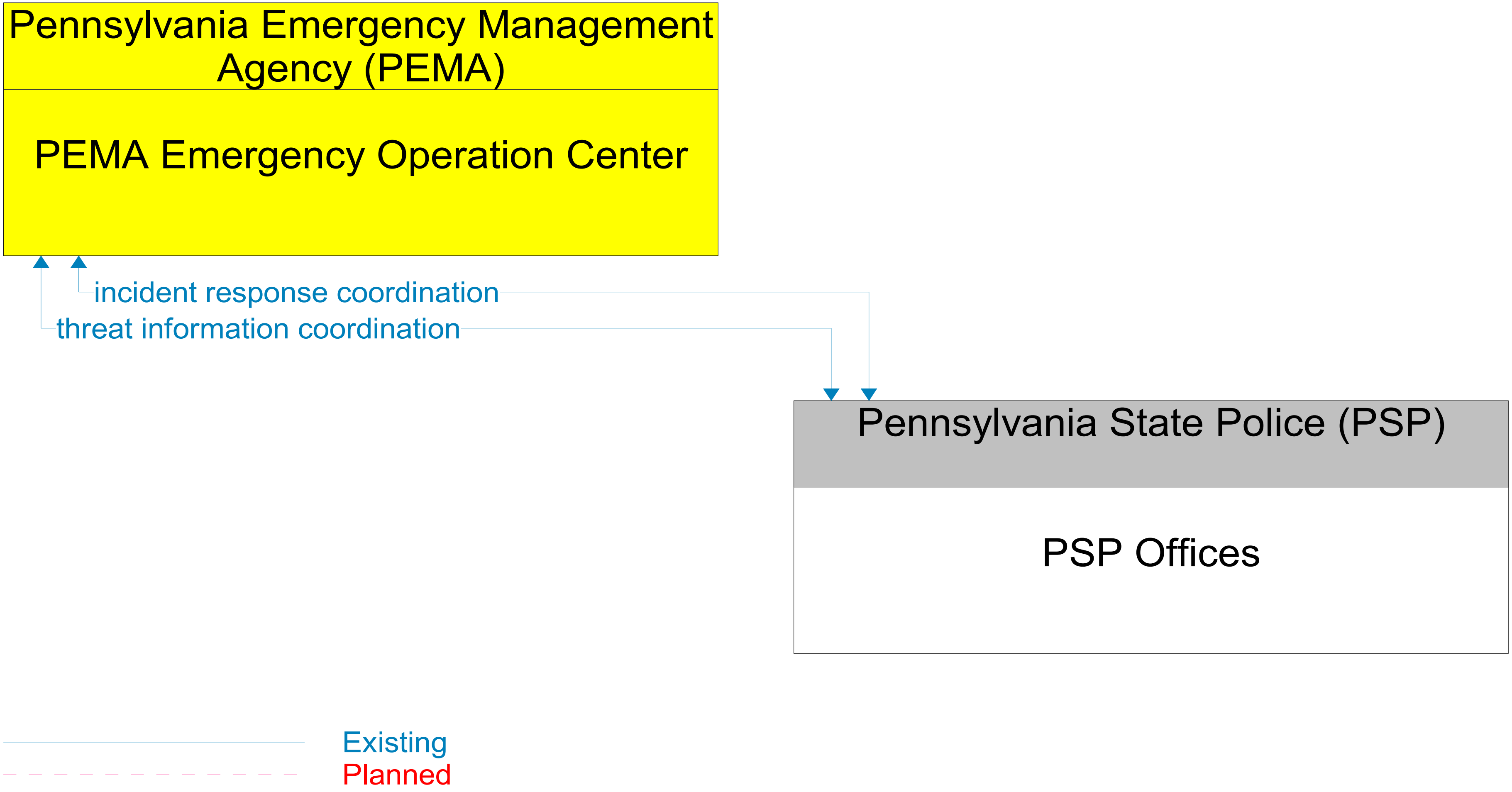
incident response coordination

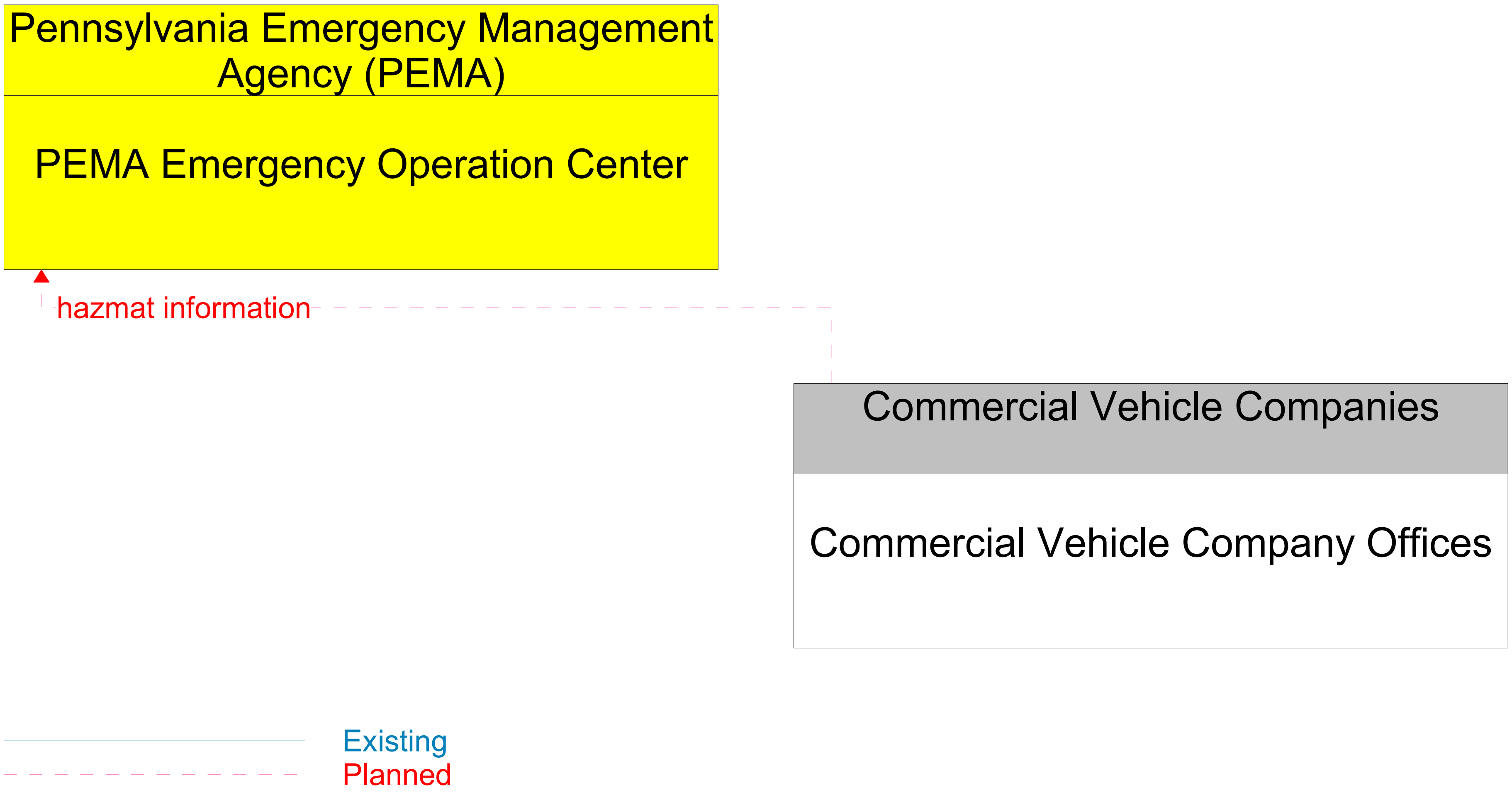
Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

Existing

Planned


Pennsylvania Emergency Management Agency (PEMA)
PEMA Emergency Operation Center
incident response coordination
threat information coordination
Pennsylvania State Police (PSP)
PSP Offices
Existing
Planned



Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

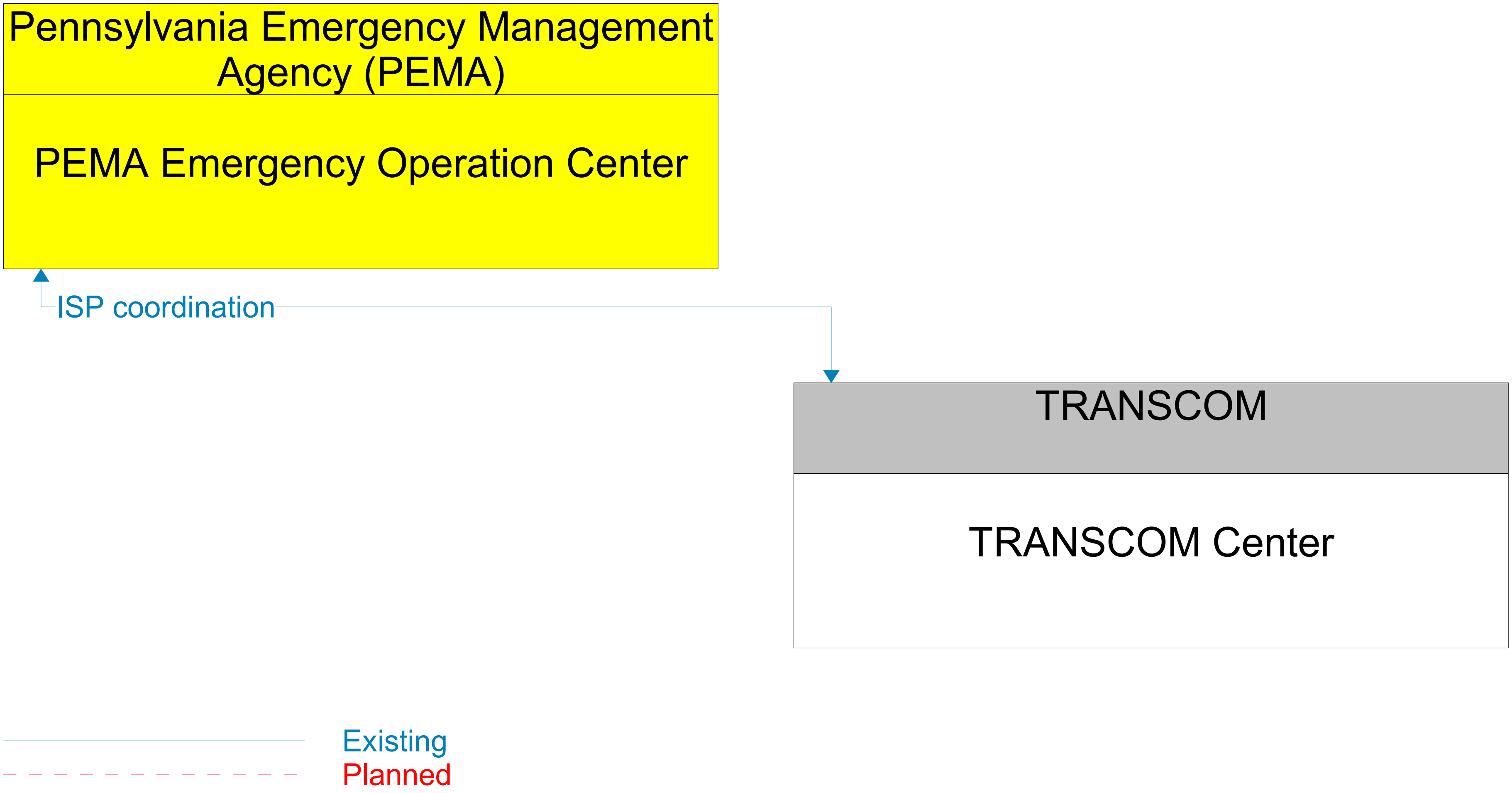
hazmat information

Commercial Vehicle Companies

Commercial Vehicle Company Offices

Existing

Planned



Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

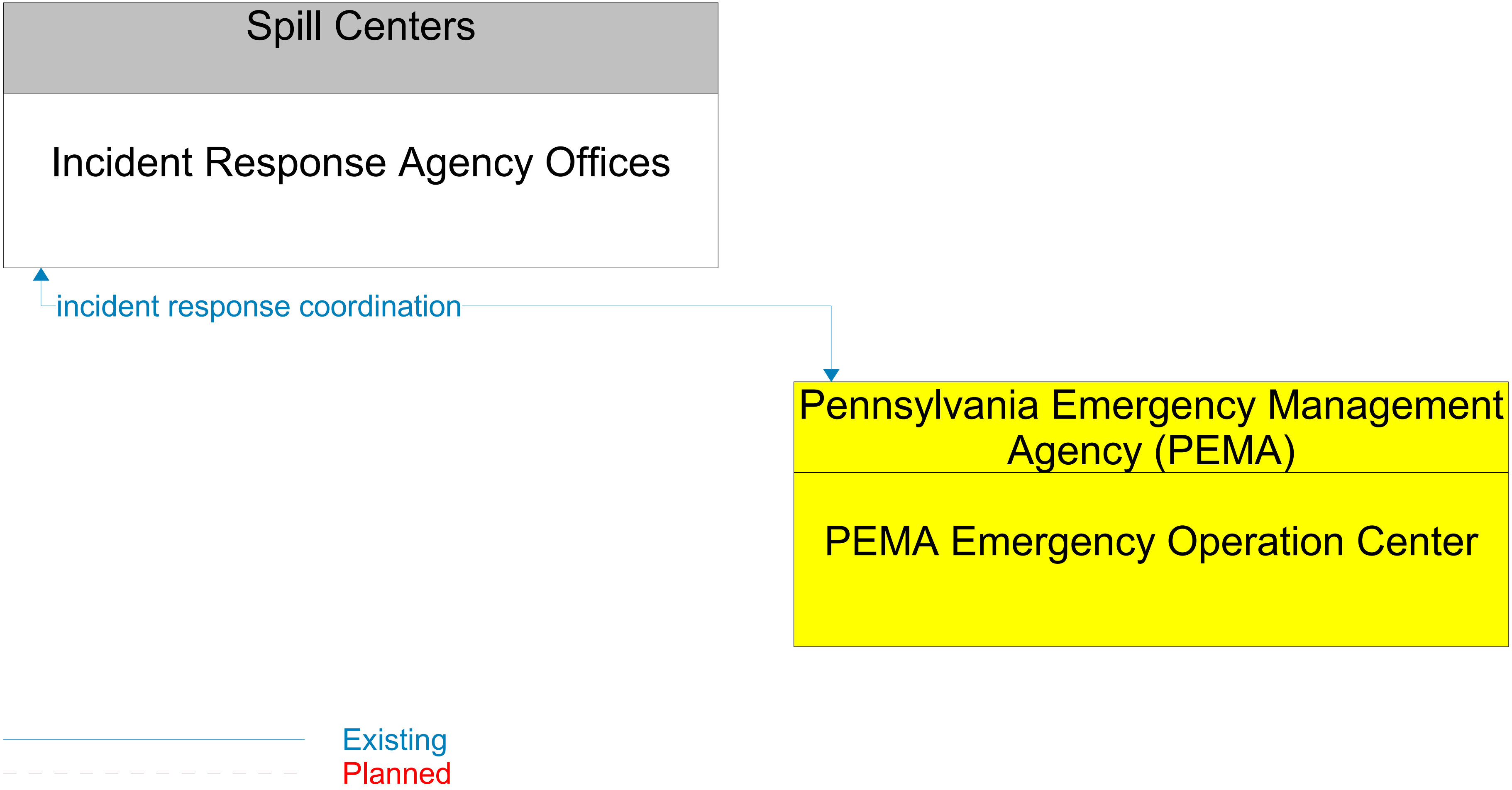
ISP coordination

TRANSCOM

TRANSCOM Center

Existing

Planned



Spill Centers

Incident Response Agency Offices

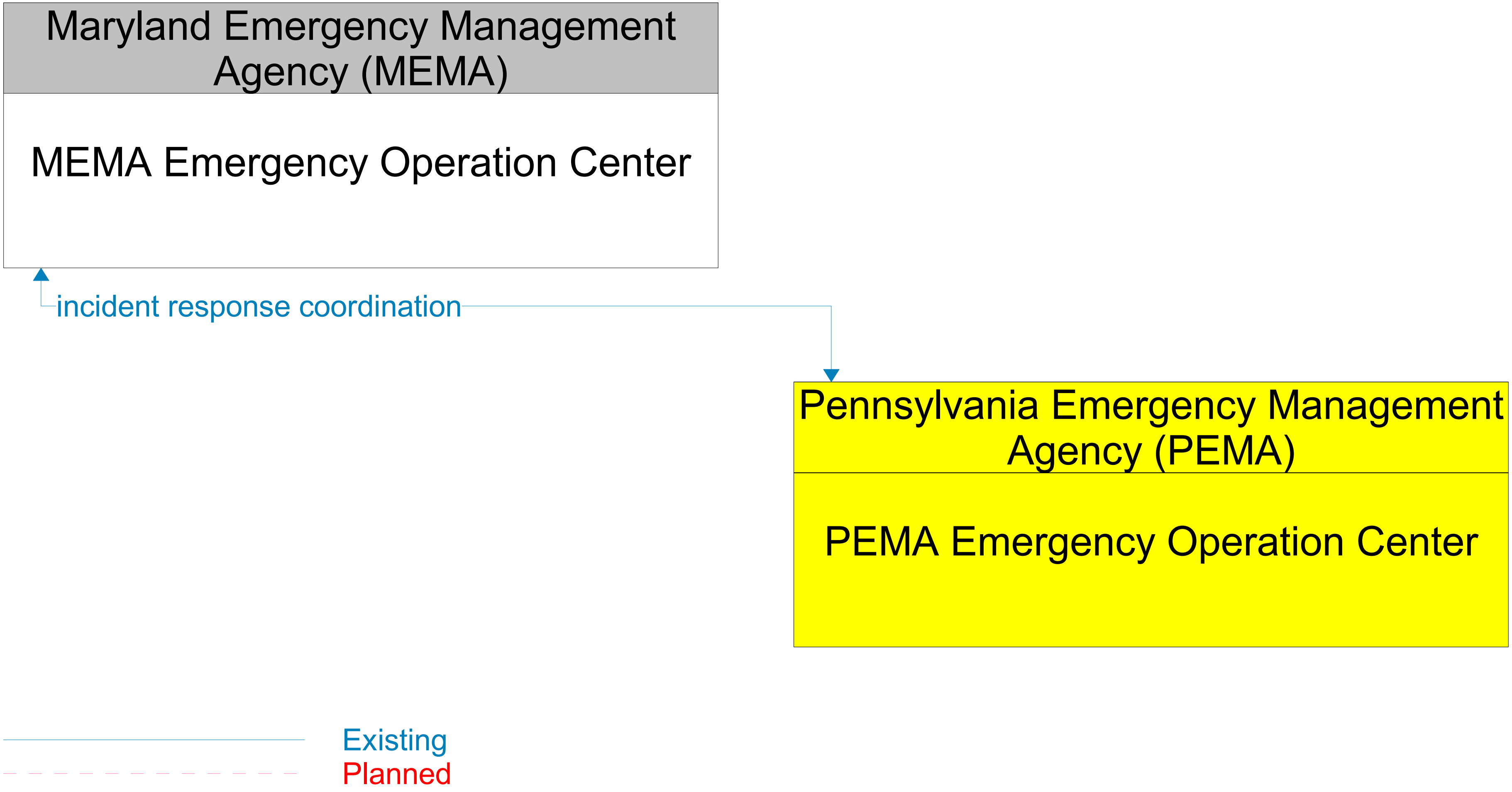
incident response coordination

Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

Existing

Planned



Maryland Emergency Management Agency (MEMA)

MEMA Emergency Operation Center

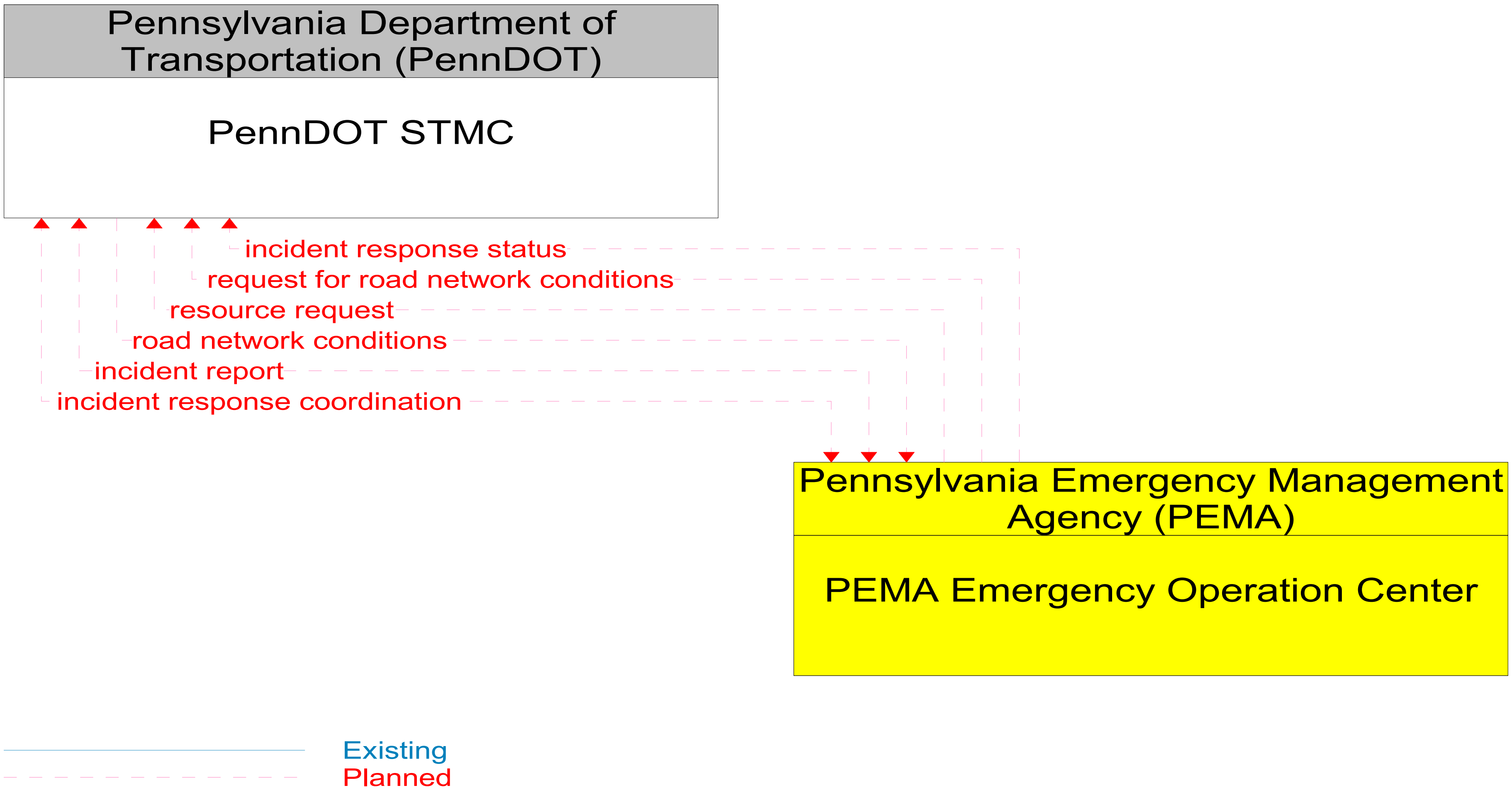
incident response coordination

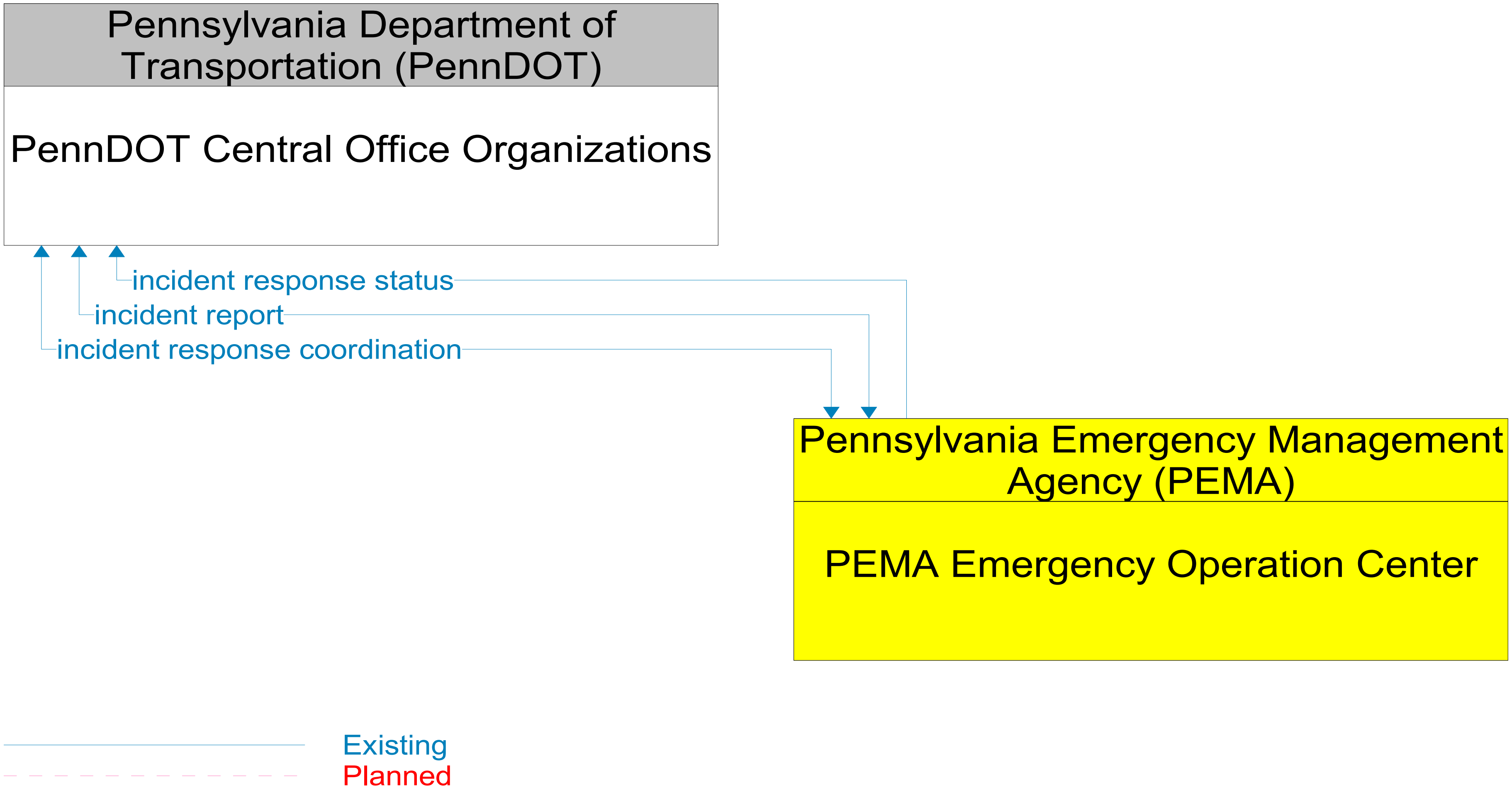
Pennsylvania Emergency Management Agency (PEMA)

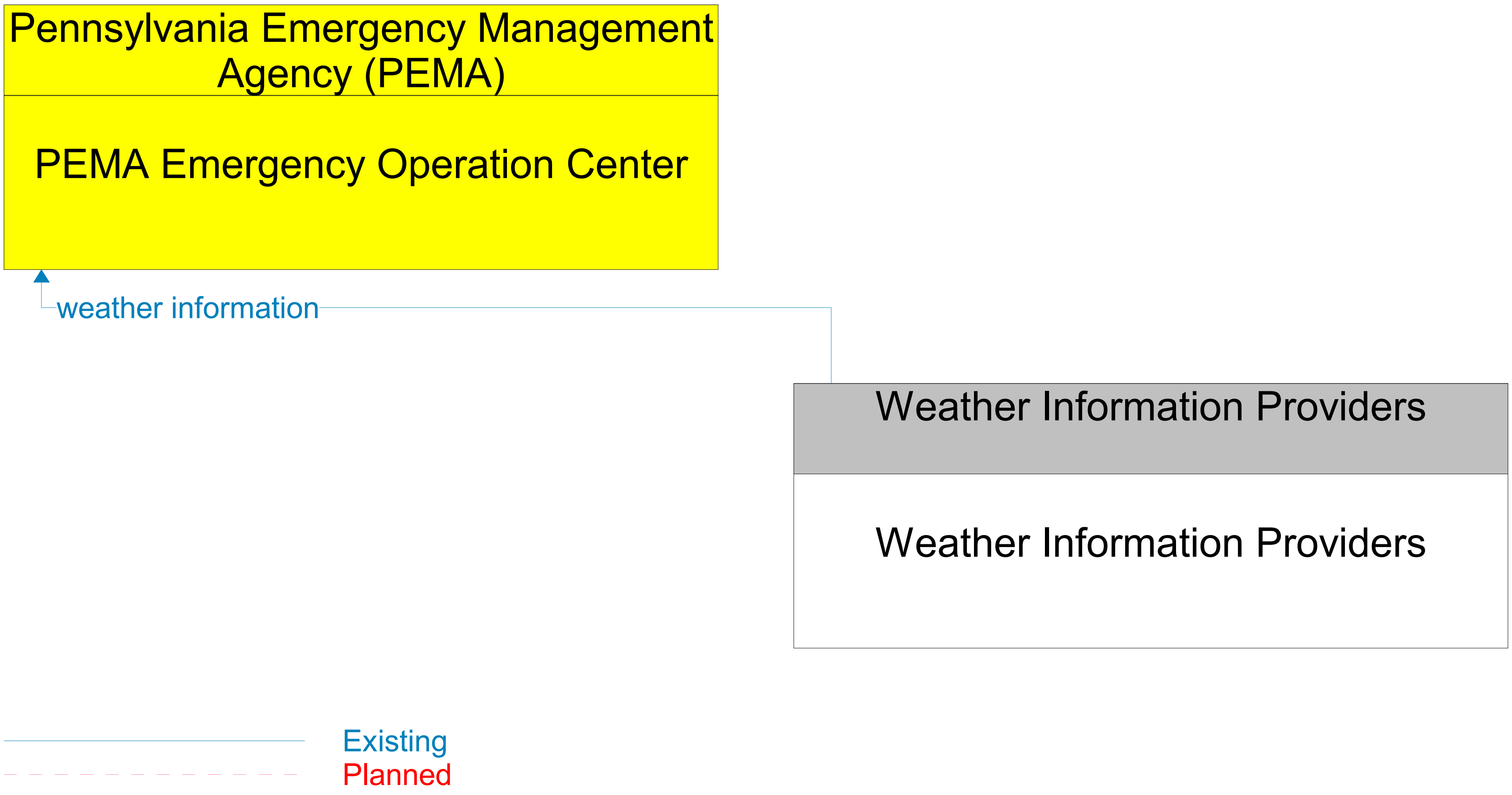
PEMA Emergency Operation Center

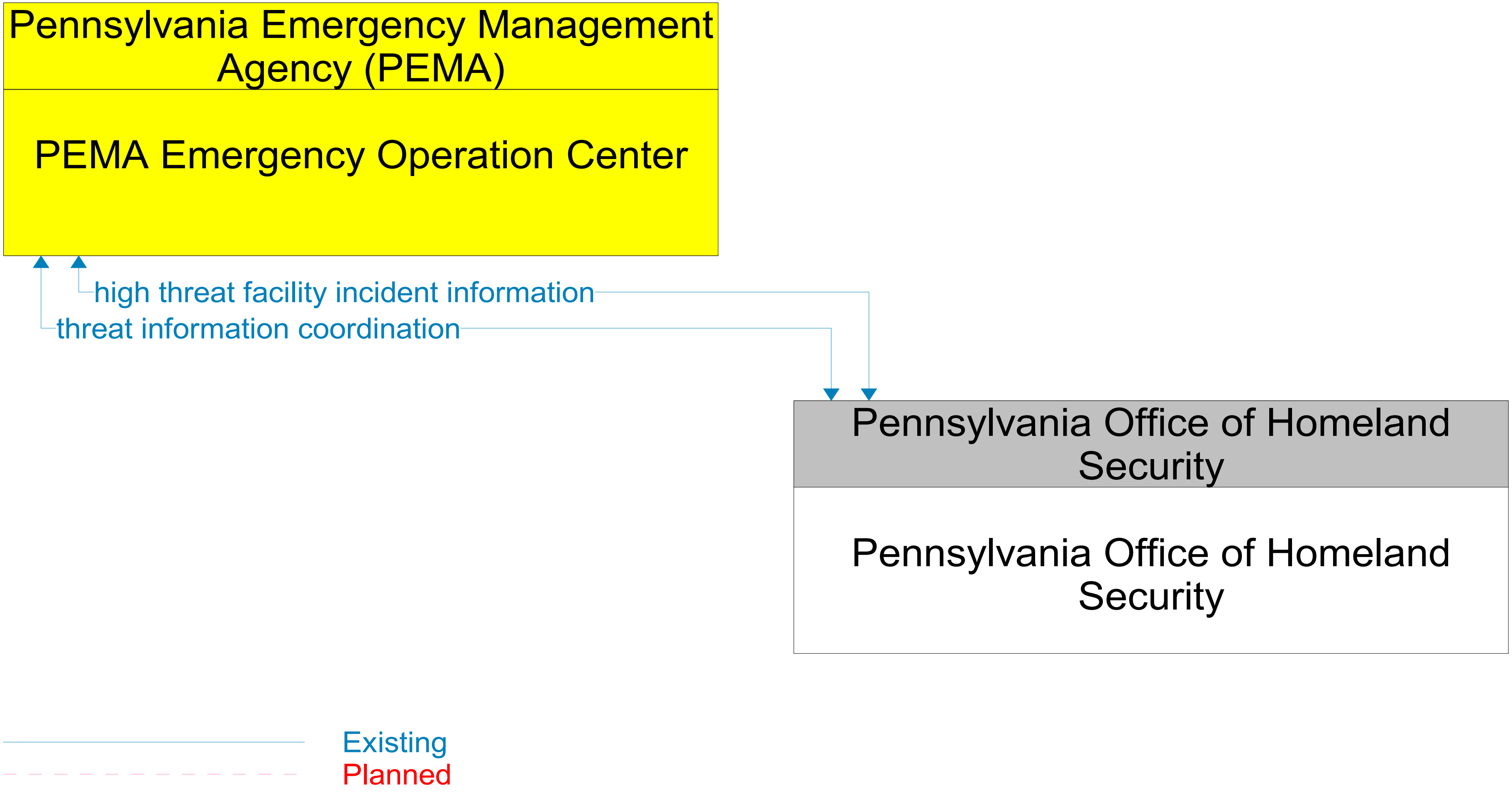
Existing

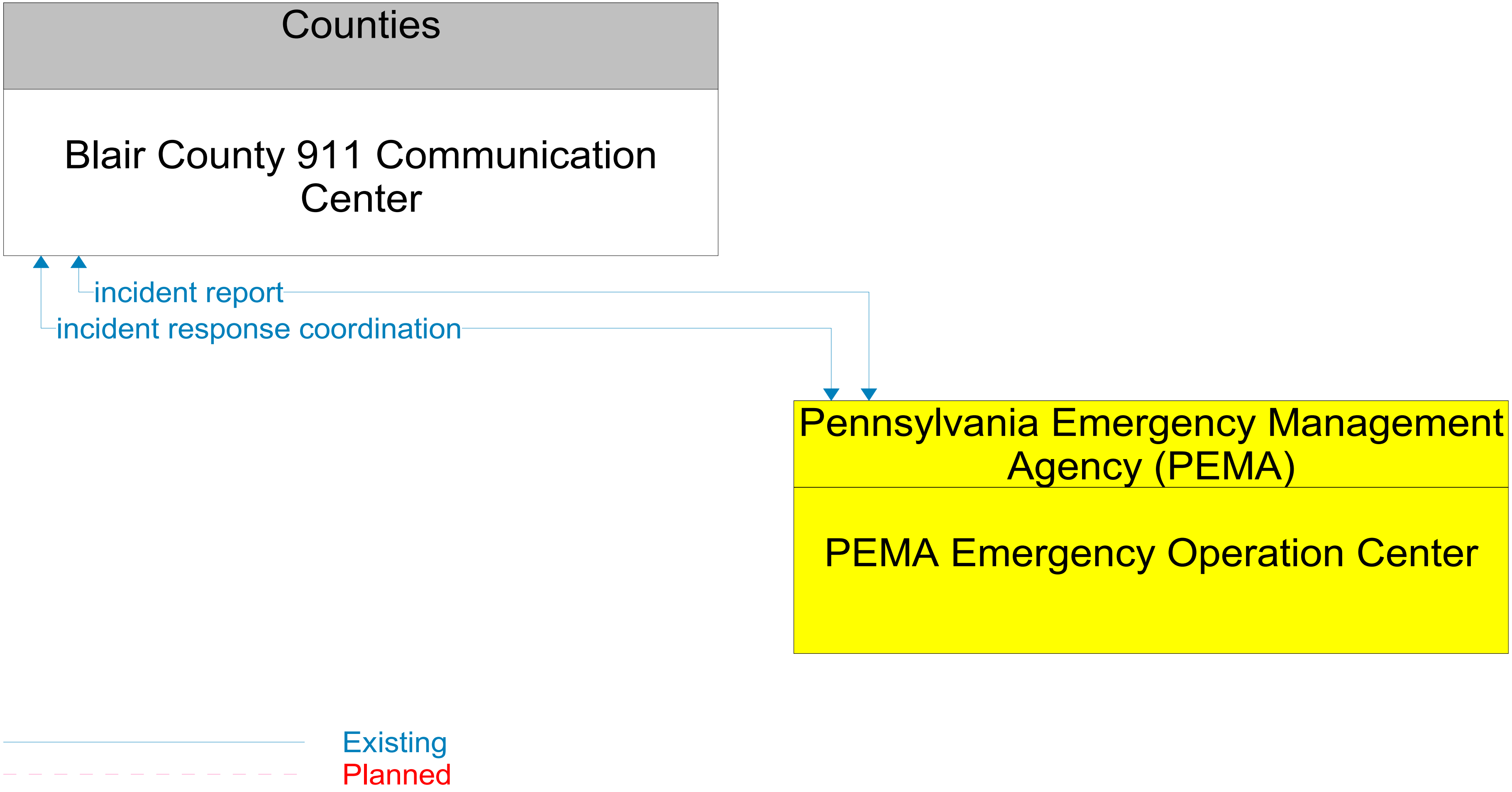
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC
incident response status
request for road network conditions
resource request
road network conditions
incident report
incident response coordination
Pennsylvania Emergency Management Agency (PEMA)
PEMA Emergency Operation Center
Existing
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Organizations
incident response status
incident report
incident response coordination
Pennsylvania Emergency Management Agency (PEMA)
PEMA Emergency Operation Center
Existing
Planned


Pennsylvania Emergency Management Agency (PEMA)
PEMA Emergency Operation Center
weather information
Weather Information Providers
Weather Information Providers
Existing
Planned


Pennsylvania Emergency Management Agency (PEMA)
PEMA Emergency Operation Center
high threat facility incident information
threat information coordination
Pennsylvania Office of Homeland Security
Pennsylvania Office of Homeland Security
Existing
Planned



Counties

Blair County 911 Communication Center

incident report

incident response coordination

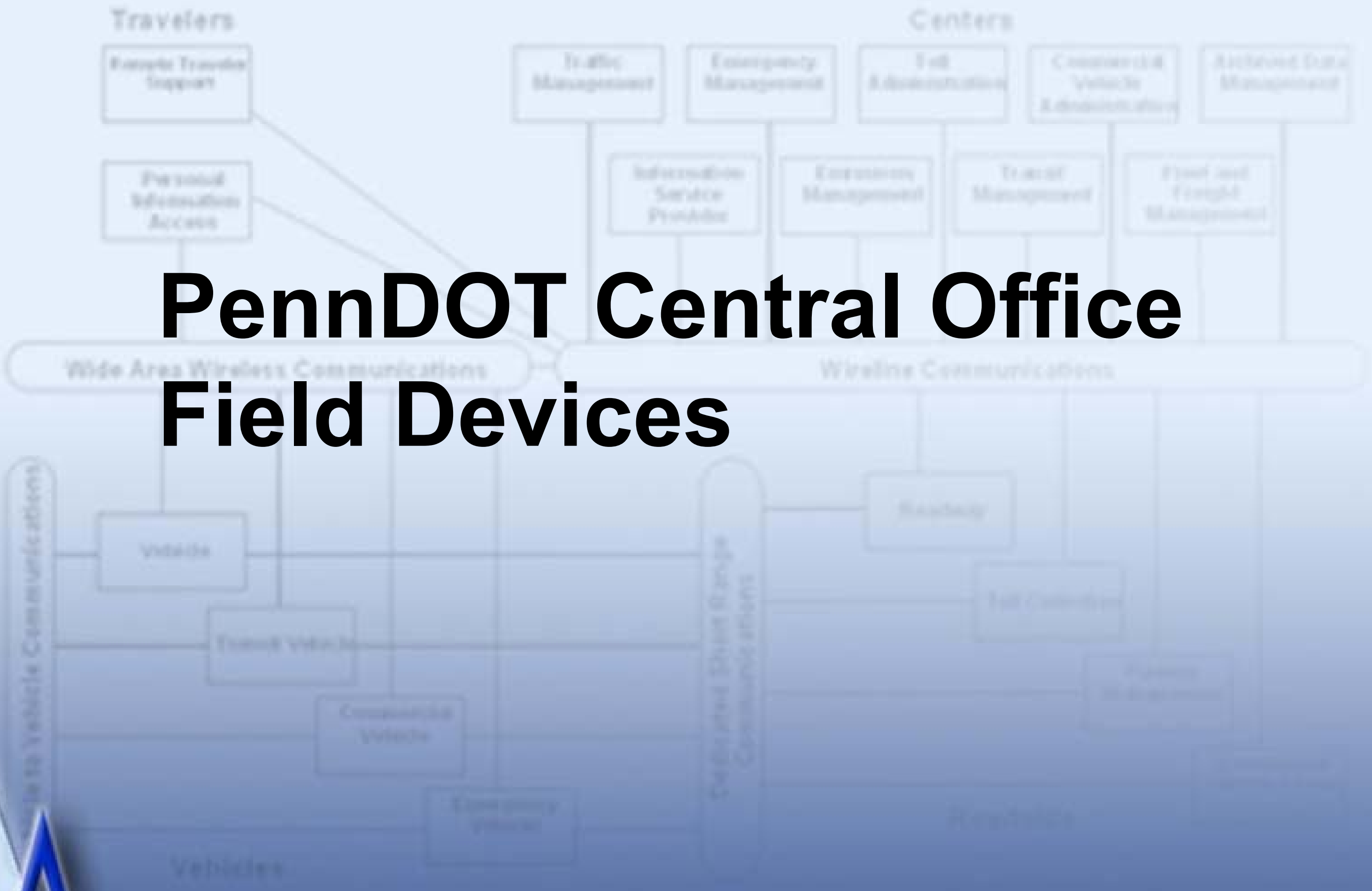
Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

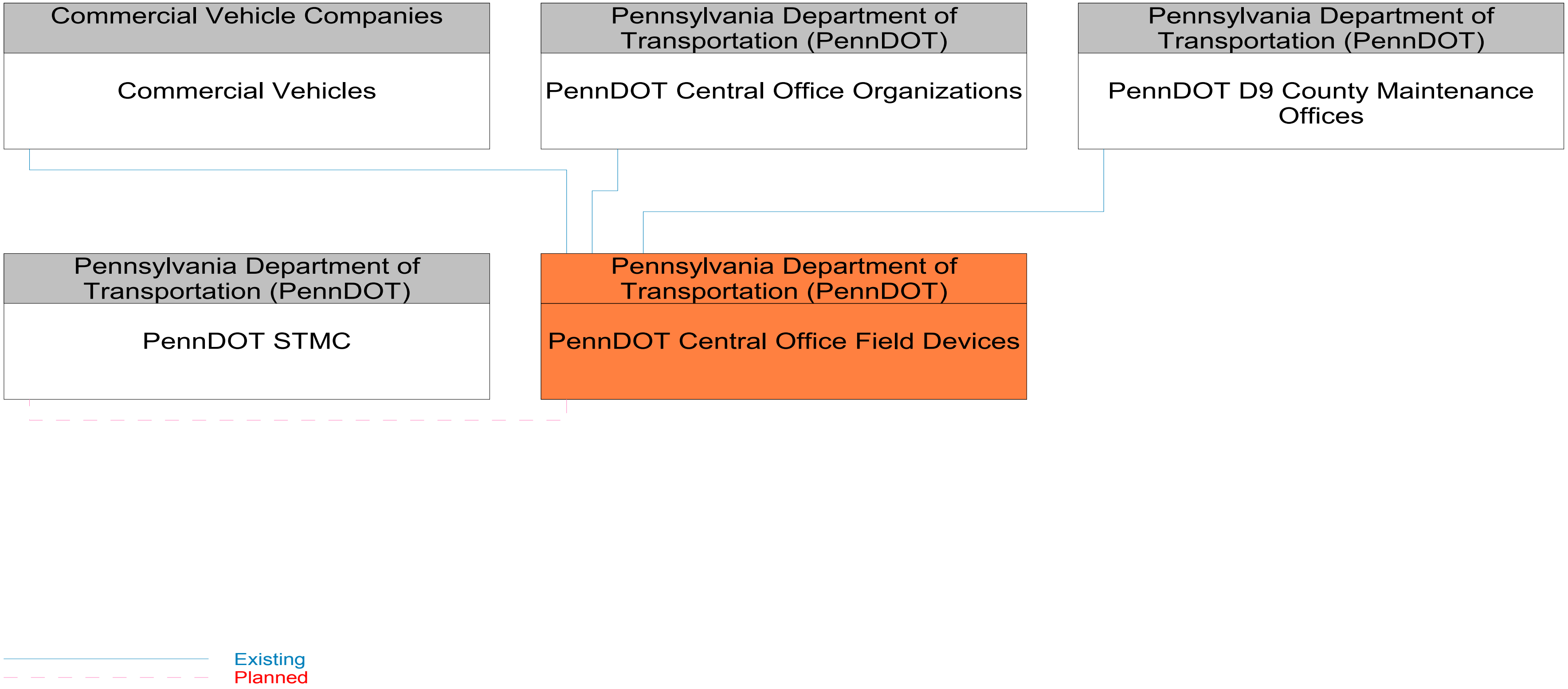
Existing

Planned

PennDOT Central Office Field Devices


Travelers
Centers
Remote Traveler Support
Personal Information Access
Traffic Management
Emergency Management
Toll Administration
Commercial Vehicle Administration
Archived Data Management
Information Service Provider
Emissions Management
Transit Management
Fleet and Freight Management
Wide Area Wireless Communications
Wireline Communications
Vehicle to Vehicle Communications
Vehicle
Transit Vehicle
Commercial Vehicle
Emergency Vehicle
Vehicles
Dedicated Short Range Communications
Roadway
Toll Collection
Parking Management
Roadside

PennDOT Central Office Field Devices Interconnect Diagram



Commercial Vehicle Companies
Commercial Vehicles

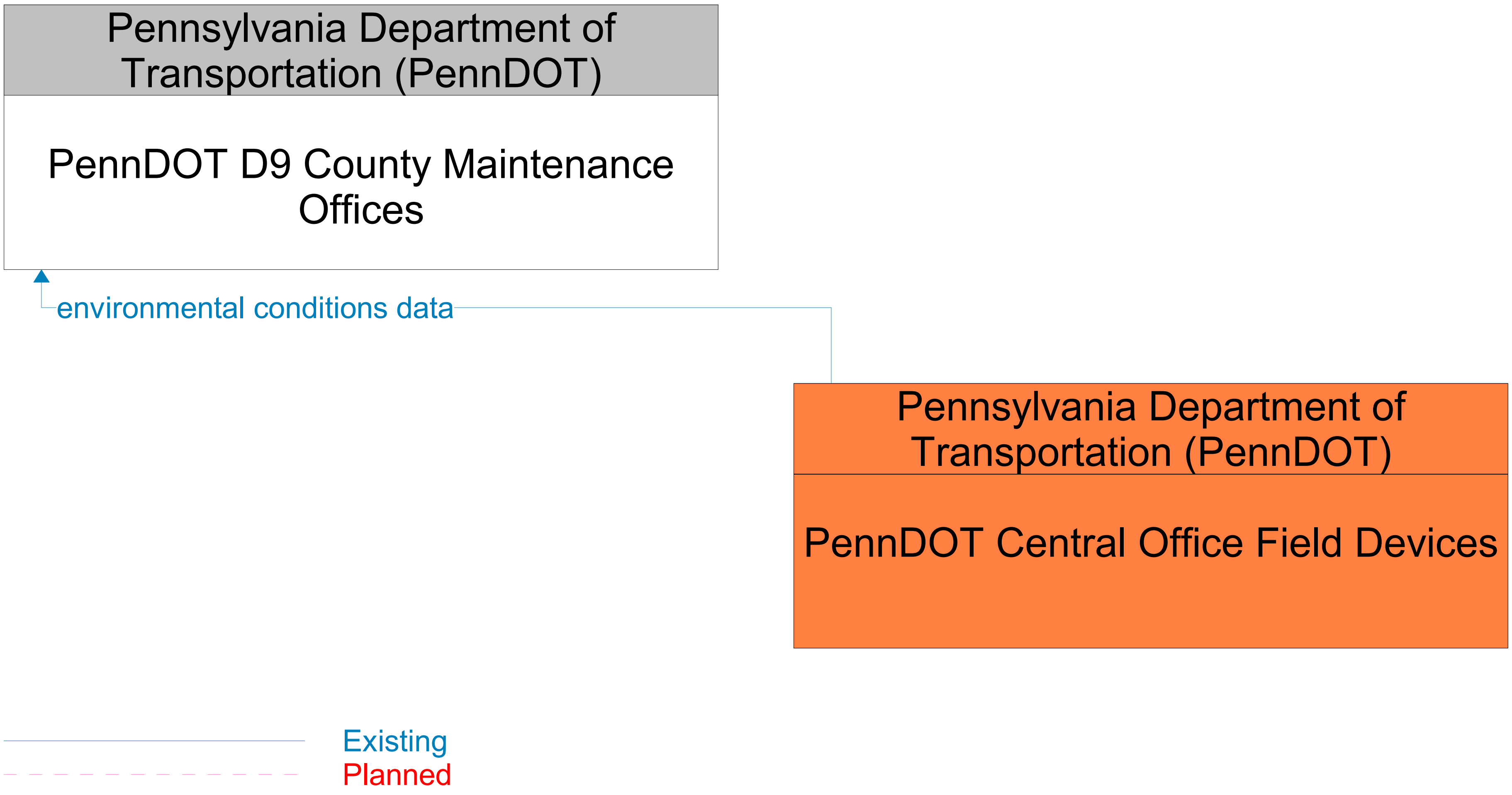
Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Organizations

Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 County Maintenance Offices

Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC

Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Field Devices

Existing
Planned



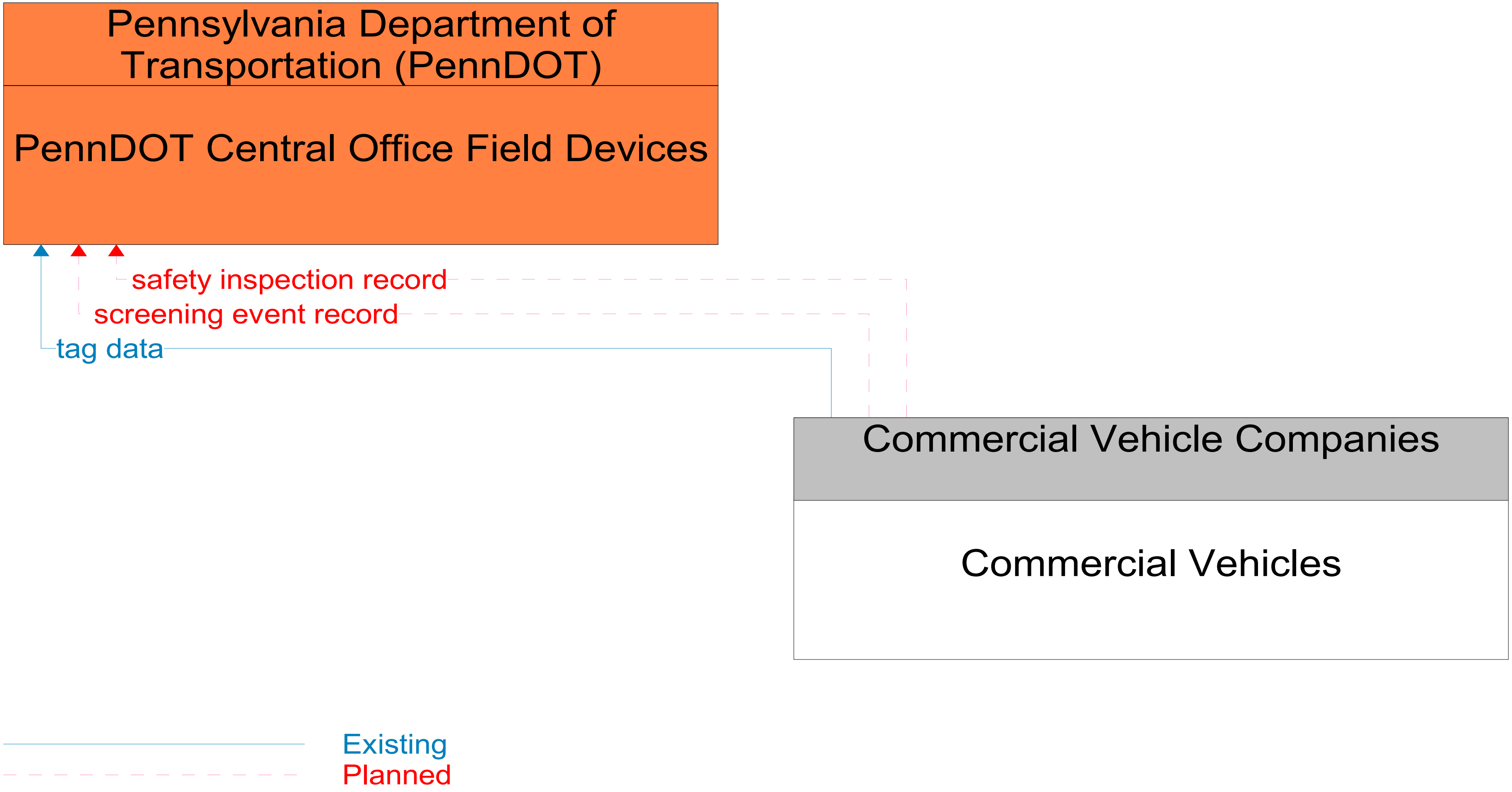
Pennsylvania Department of Transportation (PennDOT)

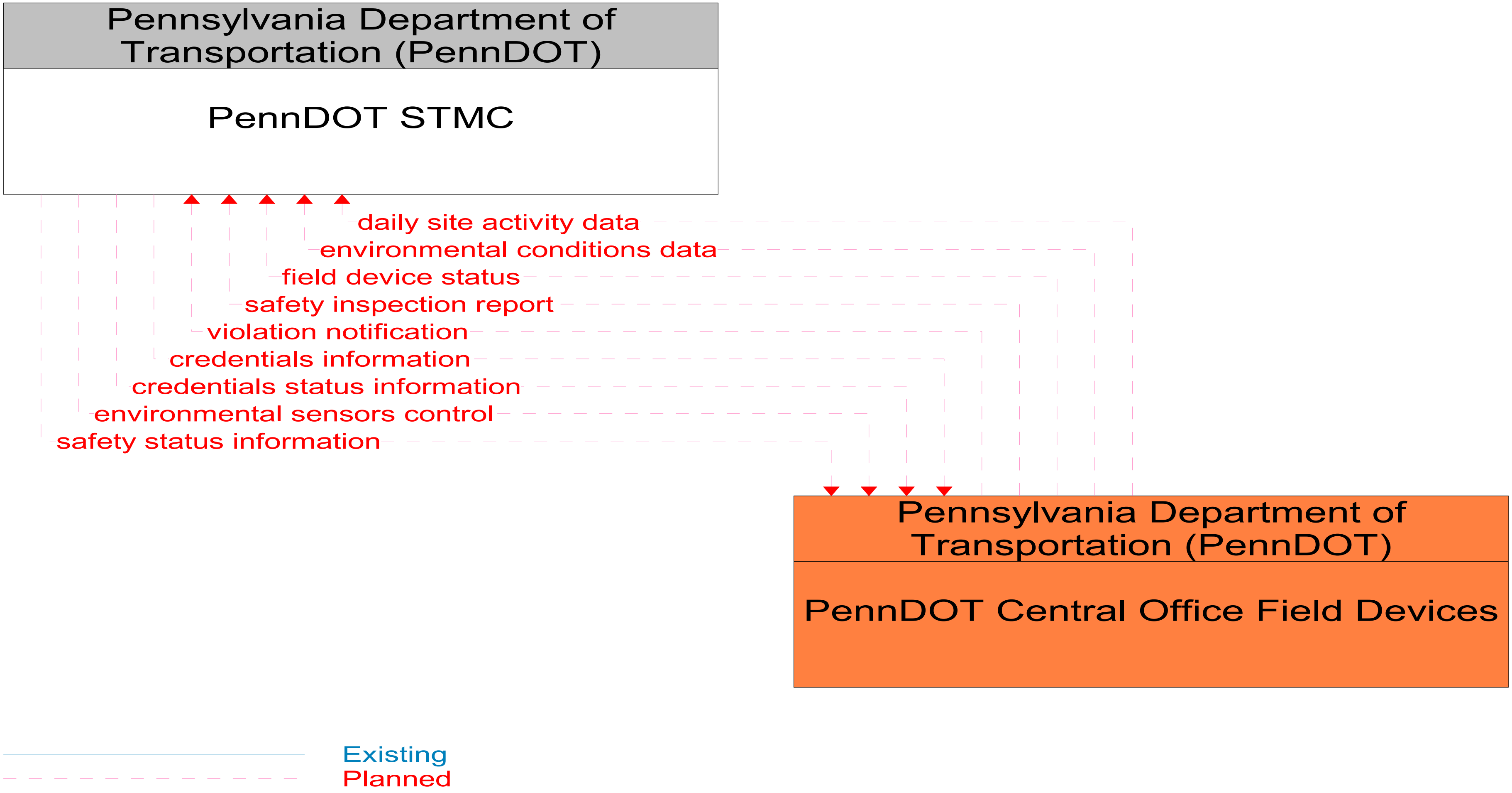
PennDOT D9 County Maintenance Offices

environmental conditions data

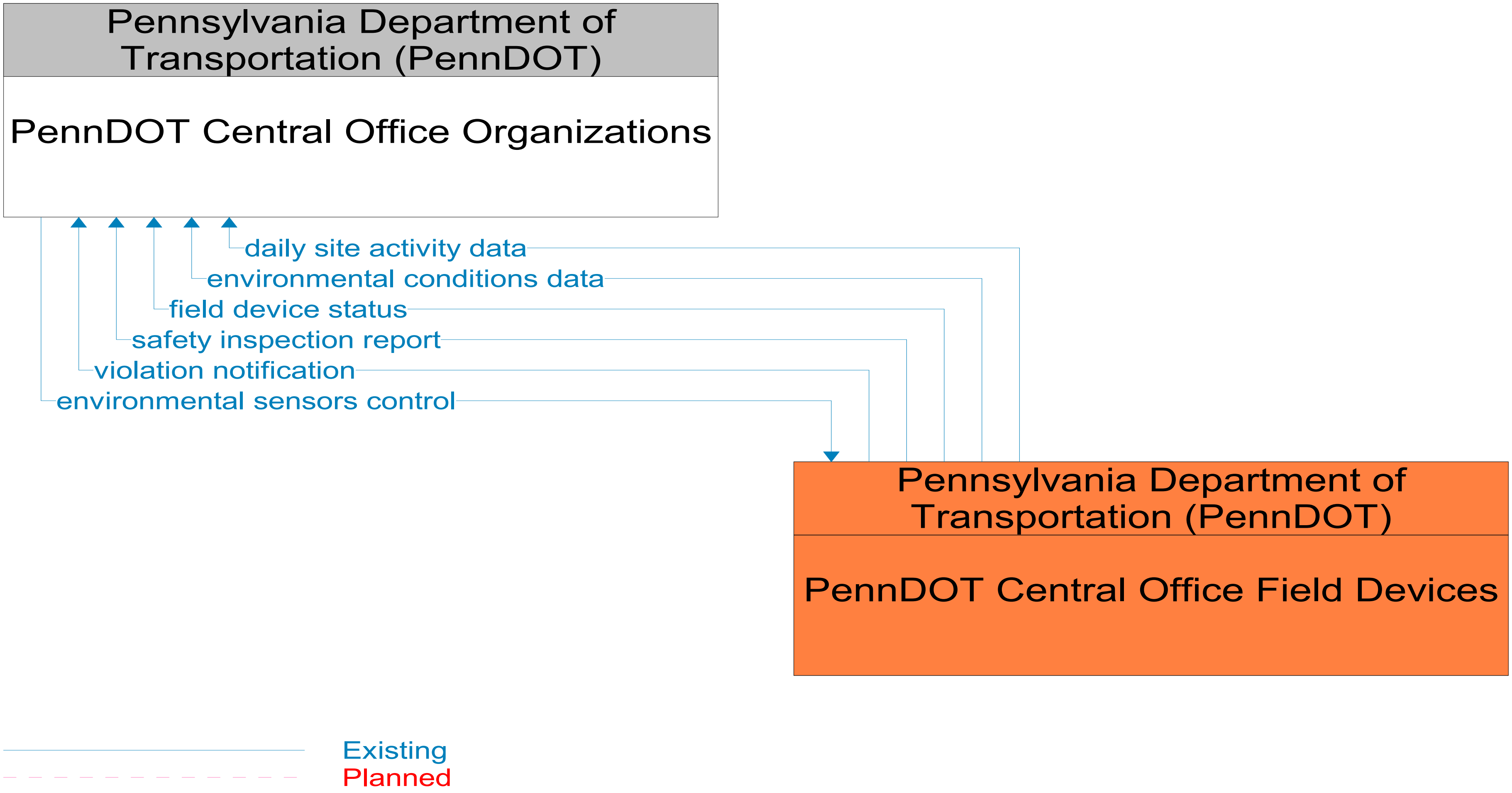
Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Field Devices

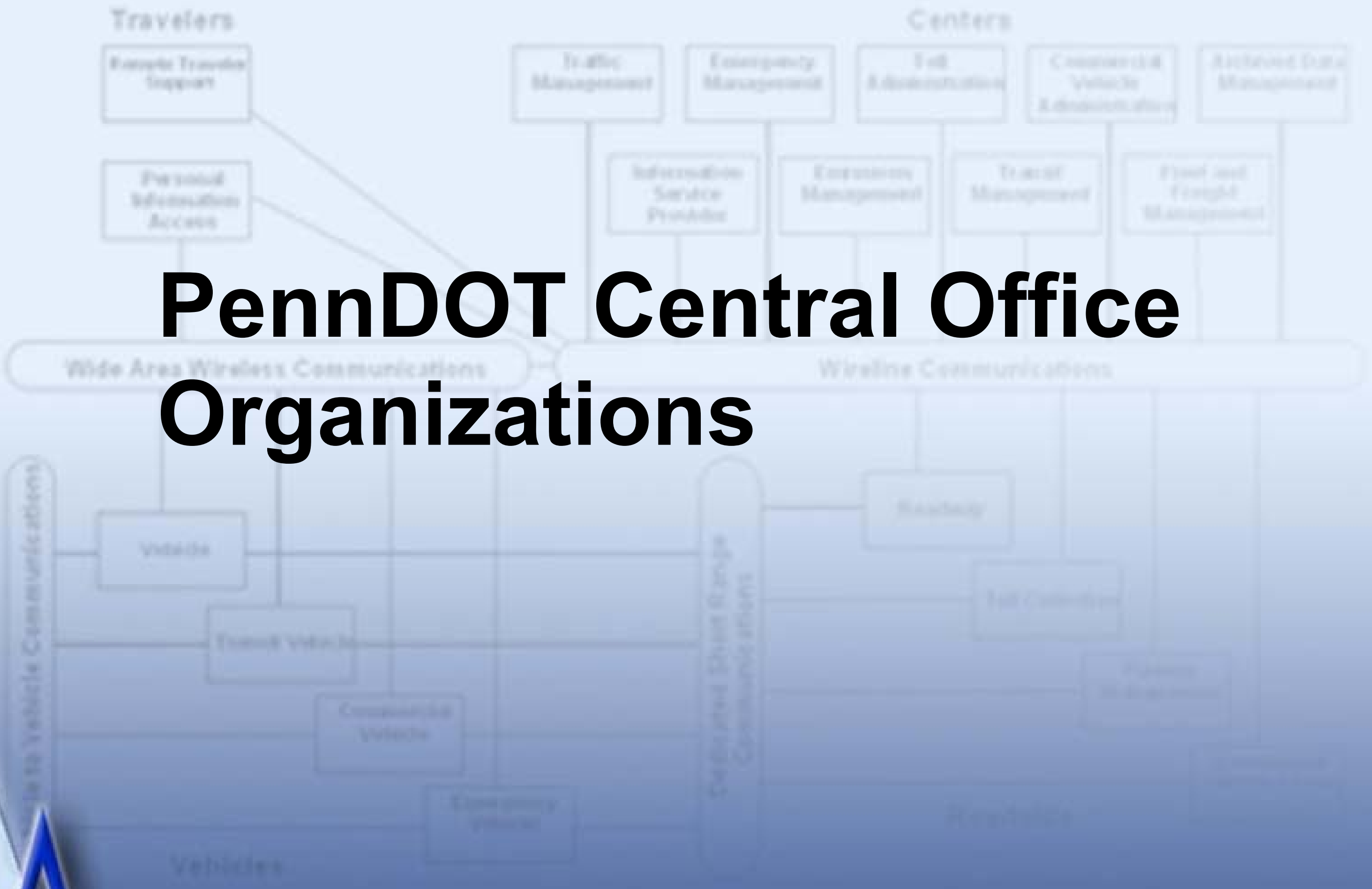

Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Field Devices
safety inspection record
screening event record
tag data
Commercial Vehicle Companies
Commercial Vehicles
Existing
Planned



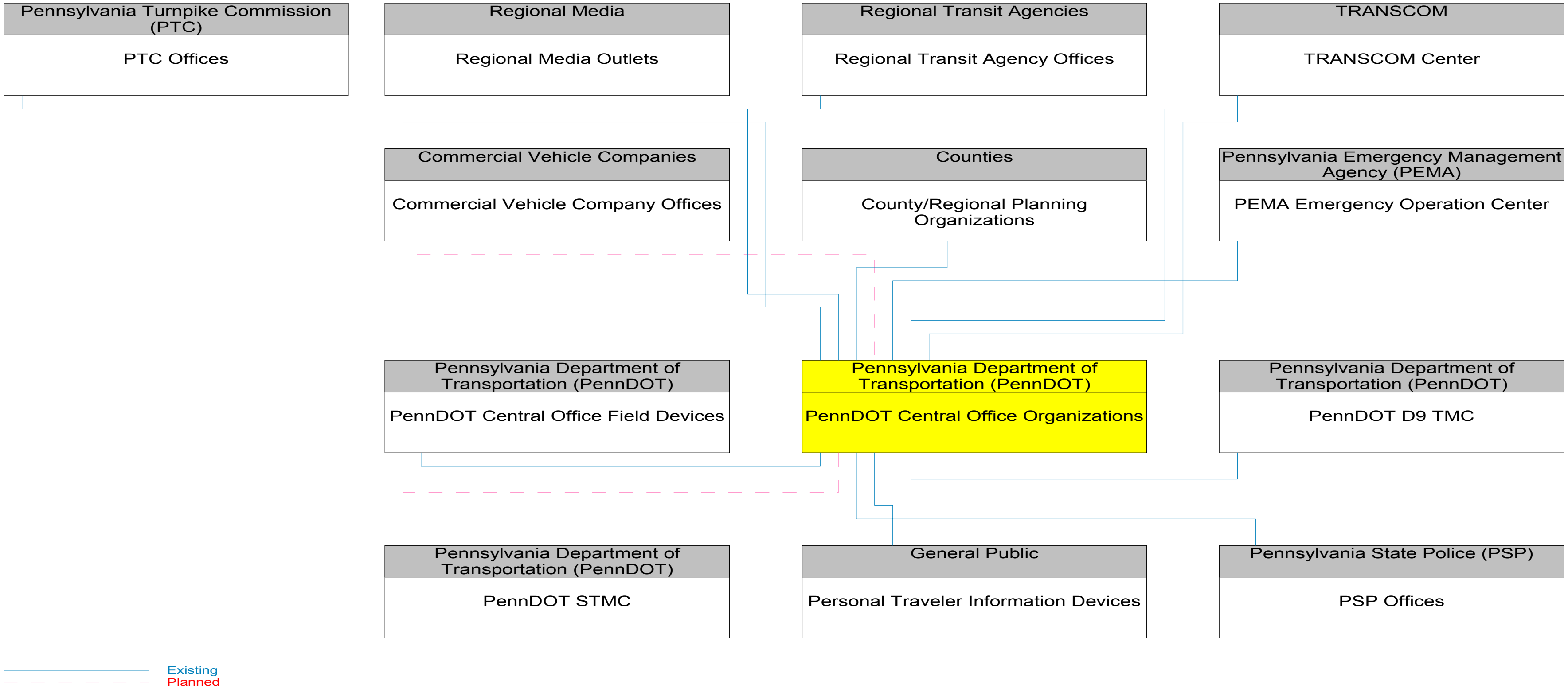
Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC
daily site activity data
environmental conditions data
field device status
safety inspection report
violation notification
credentials information
credentials status information
environmental sensors control
safety status information
Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Field Devices
Existing
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Organizations
daily site activity data
environmental conditions data
field device status
safety inspection report
violation notification
environmental sensors control
Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Field Devices
Existing
Planned

PennDOT Central Office Organizations



PennDOT Central Office Organizations Interconnect Diagram



Pennsylvania Turnpike Commission (PTC)
PTC Offices

Regional Media
Regional Media Outlets

Regional Transit Agencies
Regional Transit Agency Offices

TRANSCOM
TRANSCOM Center

Commercial Vehicle Companies
Commercial Vehicle Company Offices

Counties
County/Regional Planning Organizations

Pennsylvania Emergency Management Agency (PEMA)
PEMA Emergency Operation Center

Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Field Devices

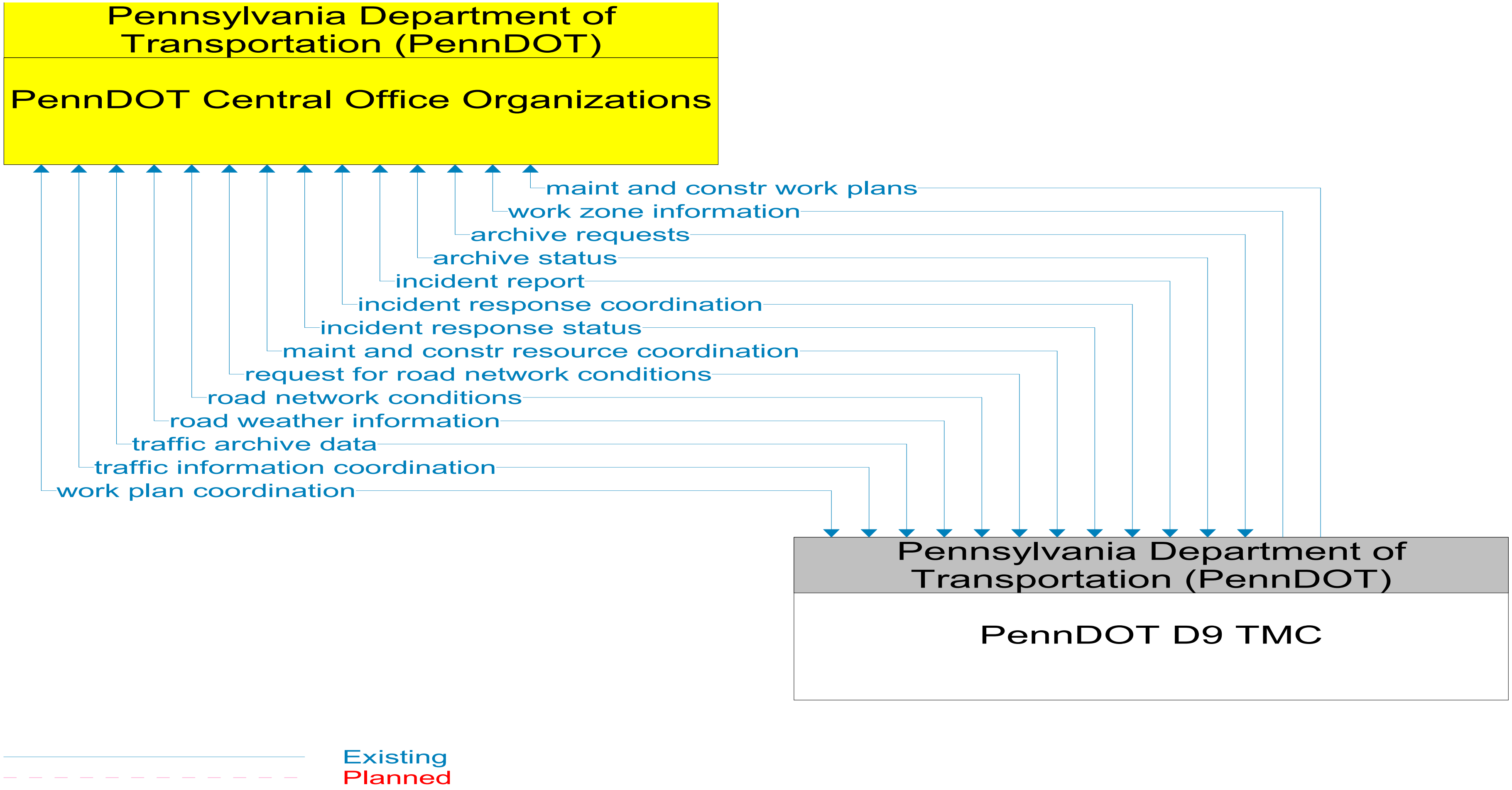
Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Organizations

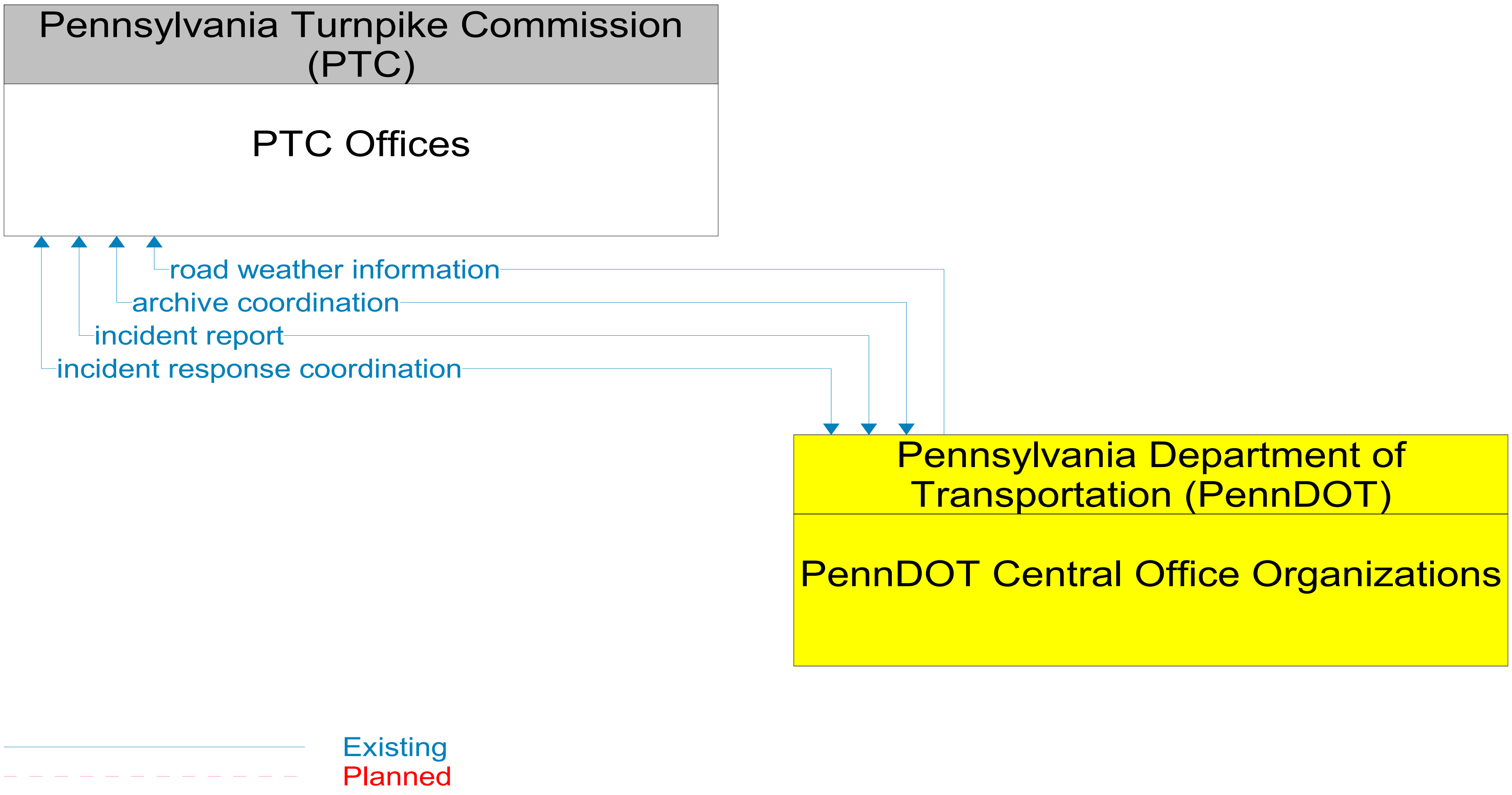
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC

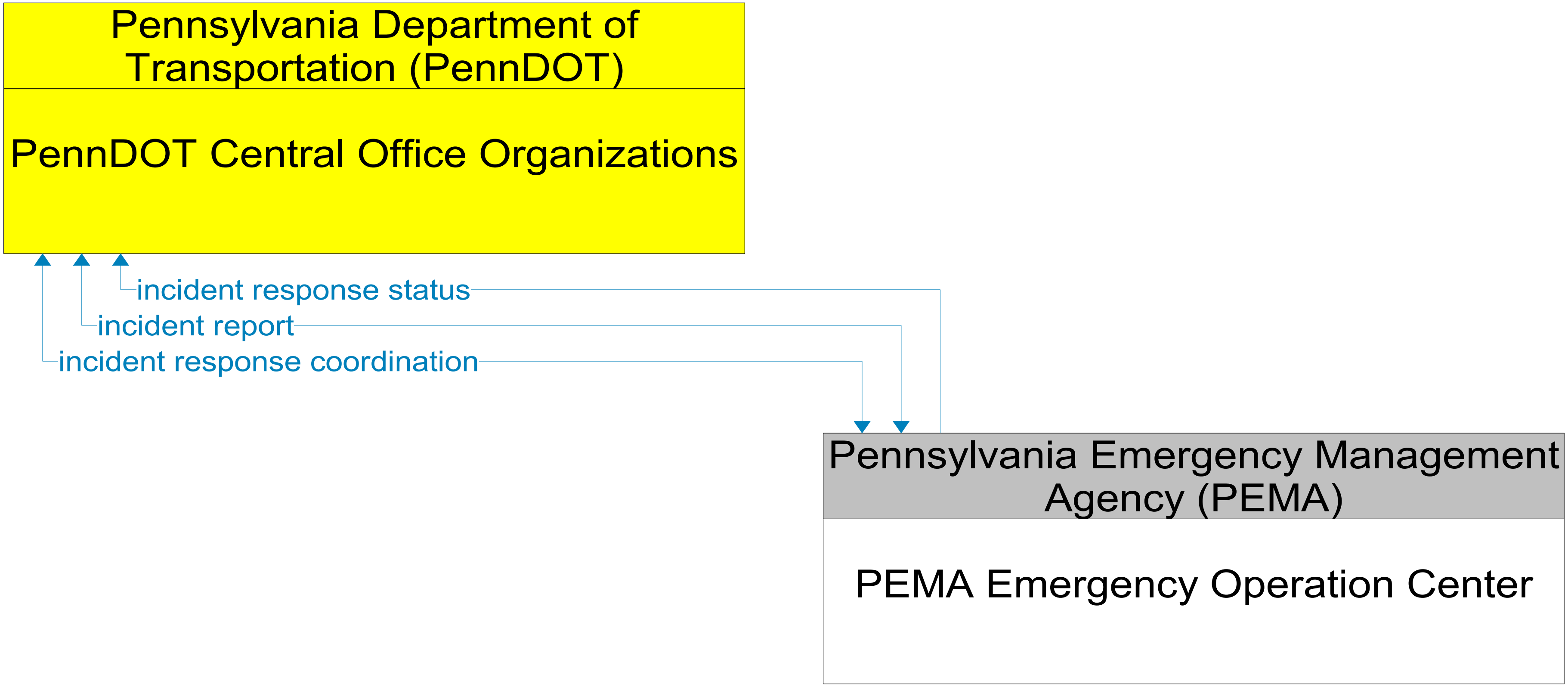
Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC

General Public
Personal Traveler Information Devices

Pennsylvania State Police (PSP)
PSP Offices


Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Organizations
maint and constr work plans
work zone information
archive requests
archive status
incident report
incident response coordination
incident response status
maint and constr resource coordination
request for road network conditions
road network conditions
road weather information
traffic archive data
traffic information coordination
work plan coordination
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
Existing
Planned


Pennsylvania Turnpike Commission (PTC)
PTC Offices
road weather information
archive coordination
incident report
incident response coordination
Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Organizations
Existing
Planned



Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Organizations

incident response status

incident report

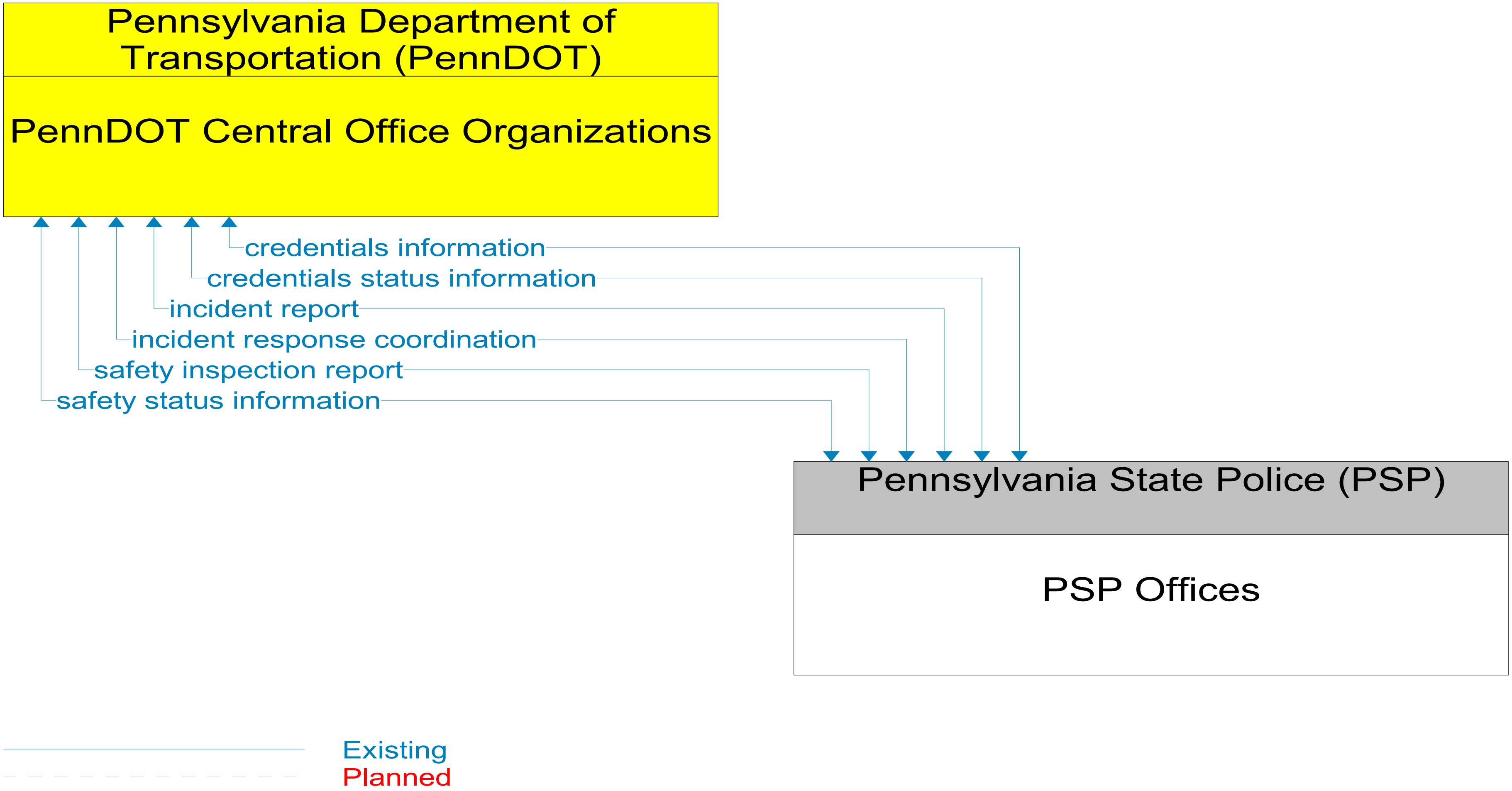
incident response coordination

Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

Existing

Planned



Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Organizations

credentials information

credentials status information

incident report

incident response coordination

safety inspection report

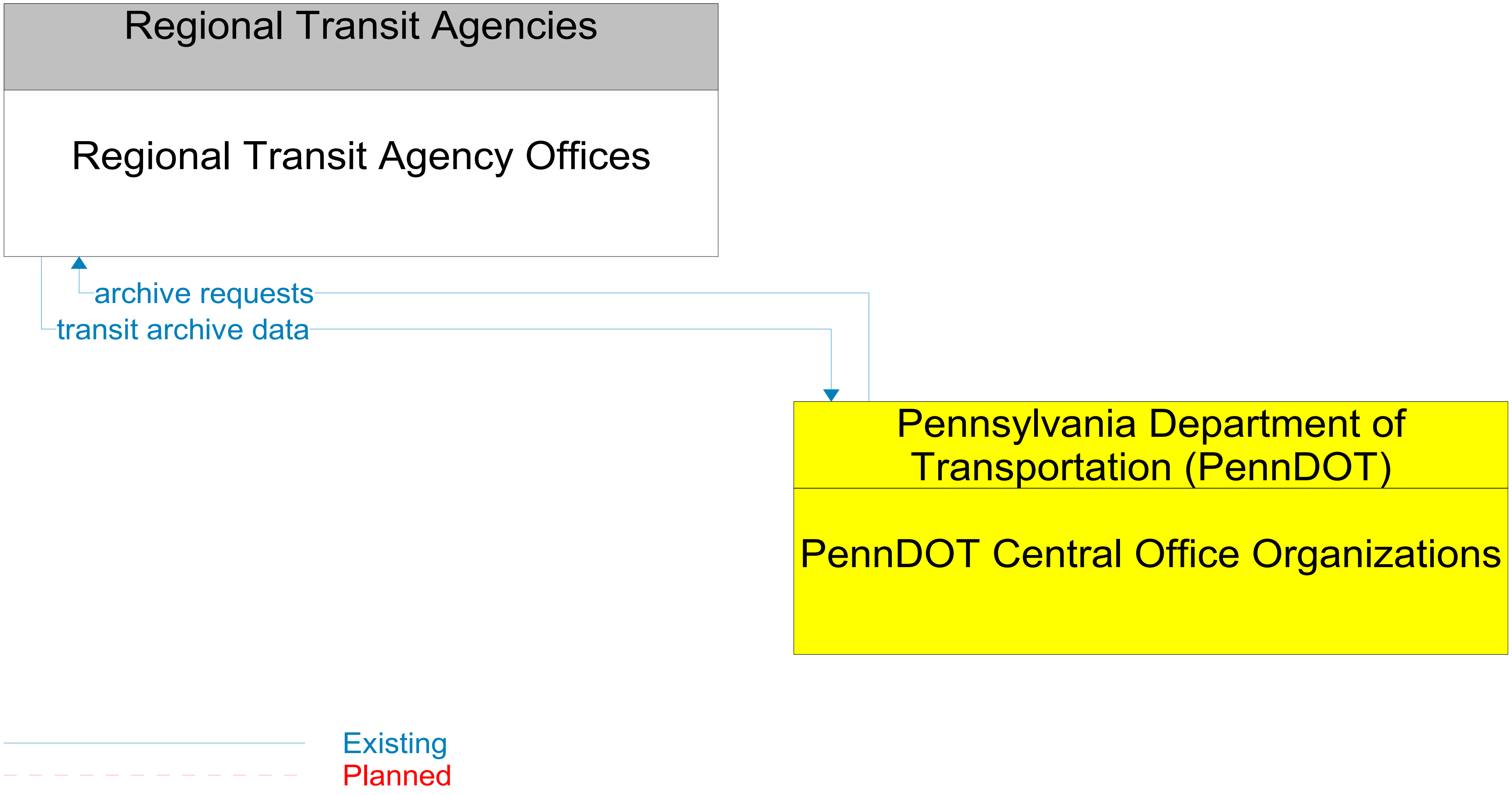
safety status information

Pennsylvania State Police (PSP)

PSP Offices

Existing

Planned



Regional Transit Agencies

Regional Transit Agency Offices

archive requests

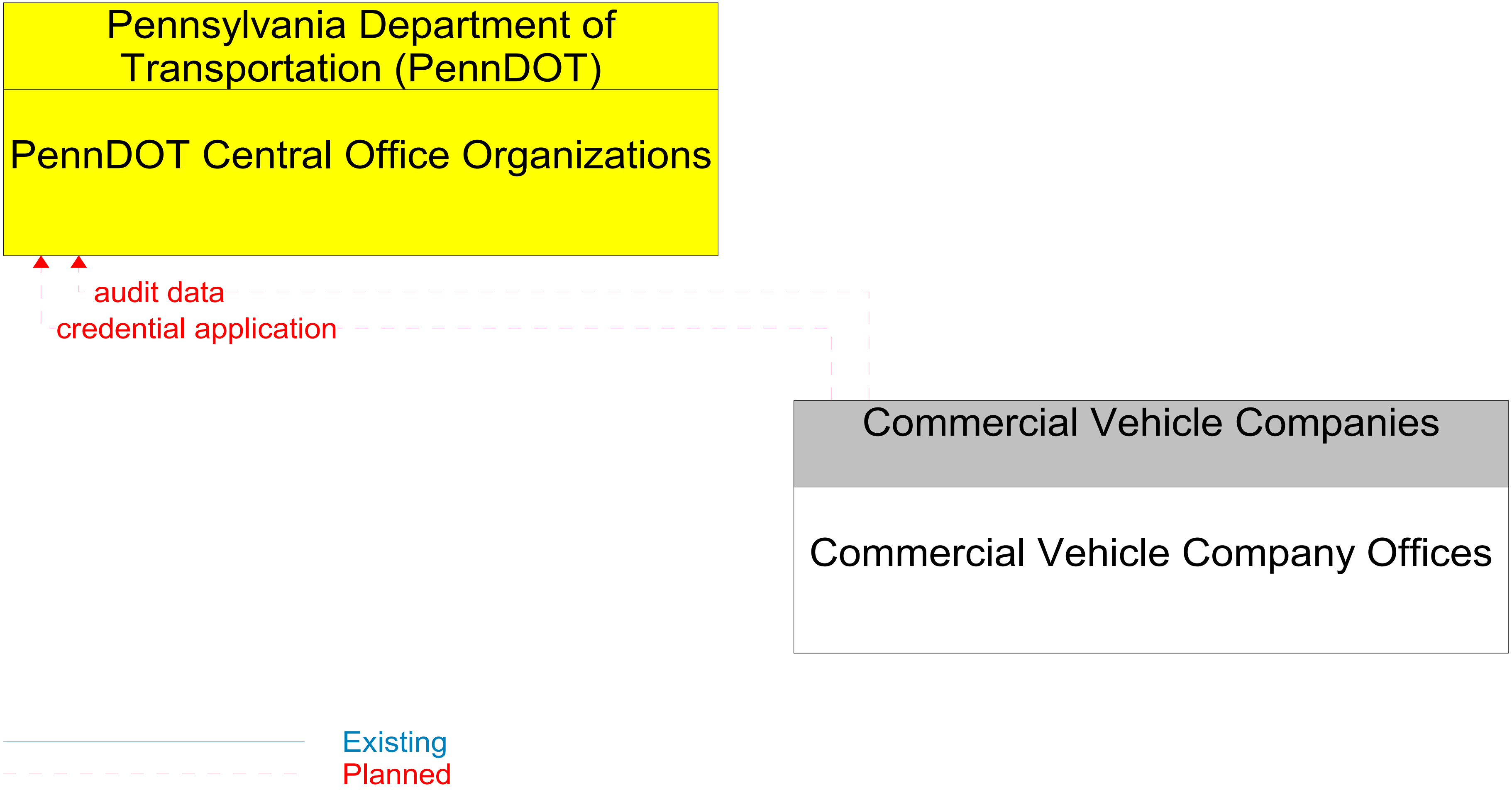
transit archive data

Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Organizations

Existing

Planned



Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Organizations

audit data

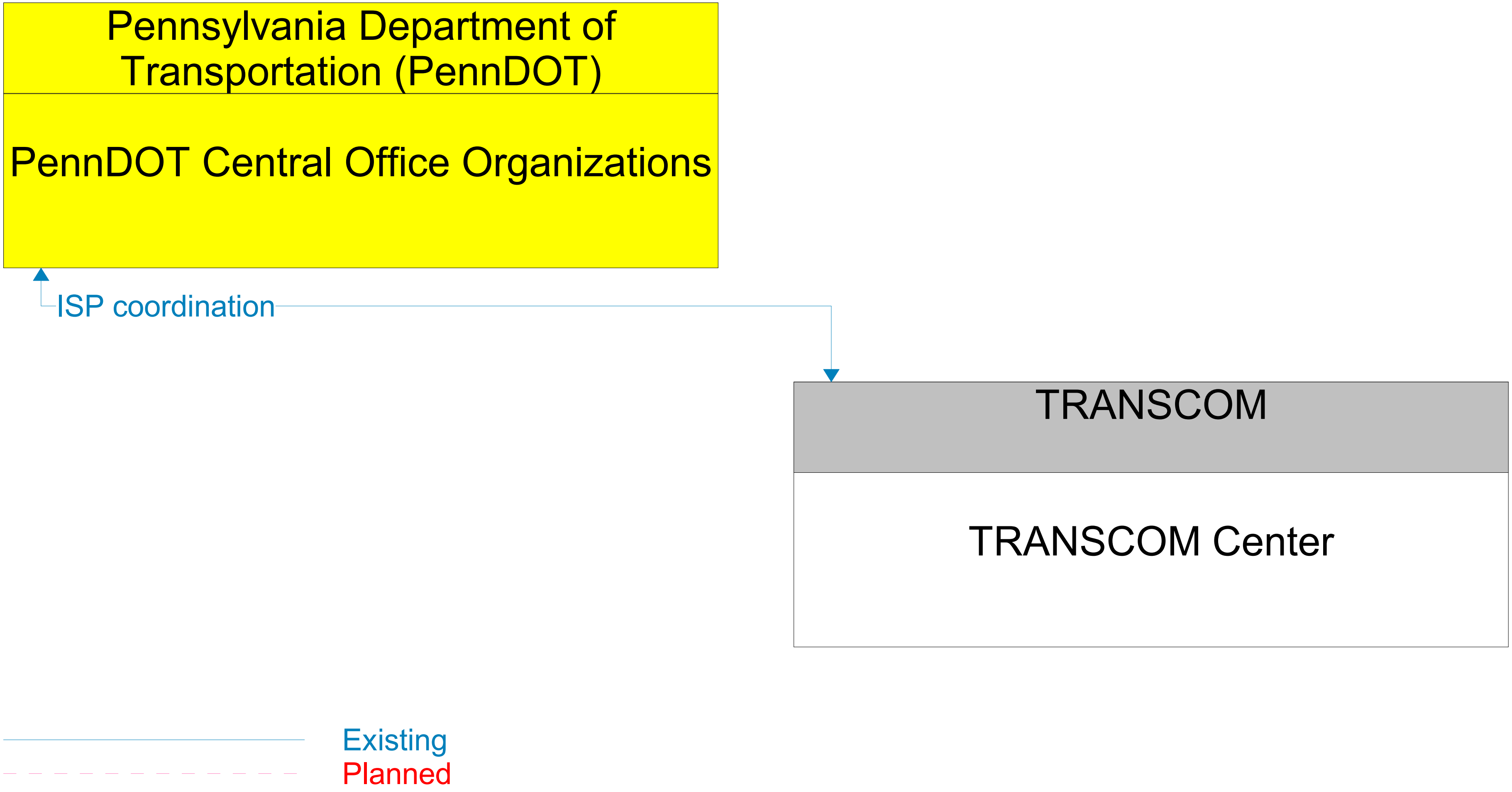
credential application

Commercial Vehicle Companies

Commercial Vehicle Company Offices

Existing

Planned



Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Organizations

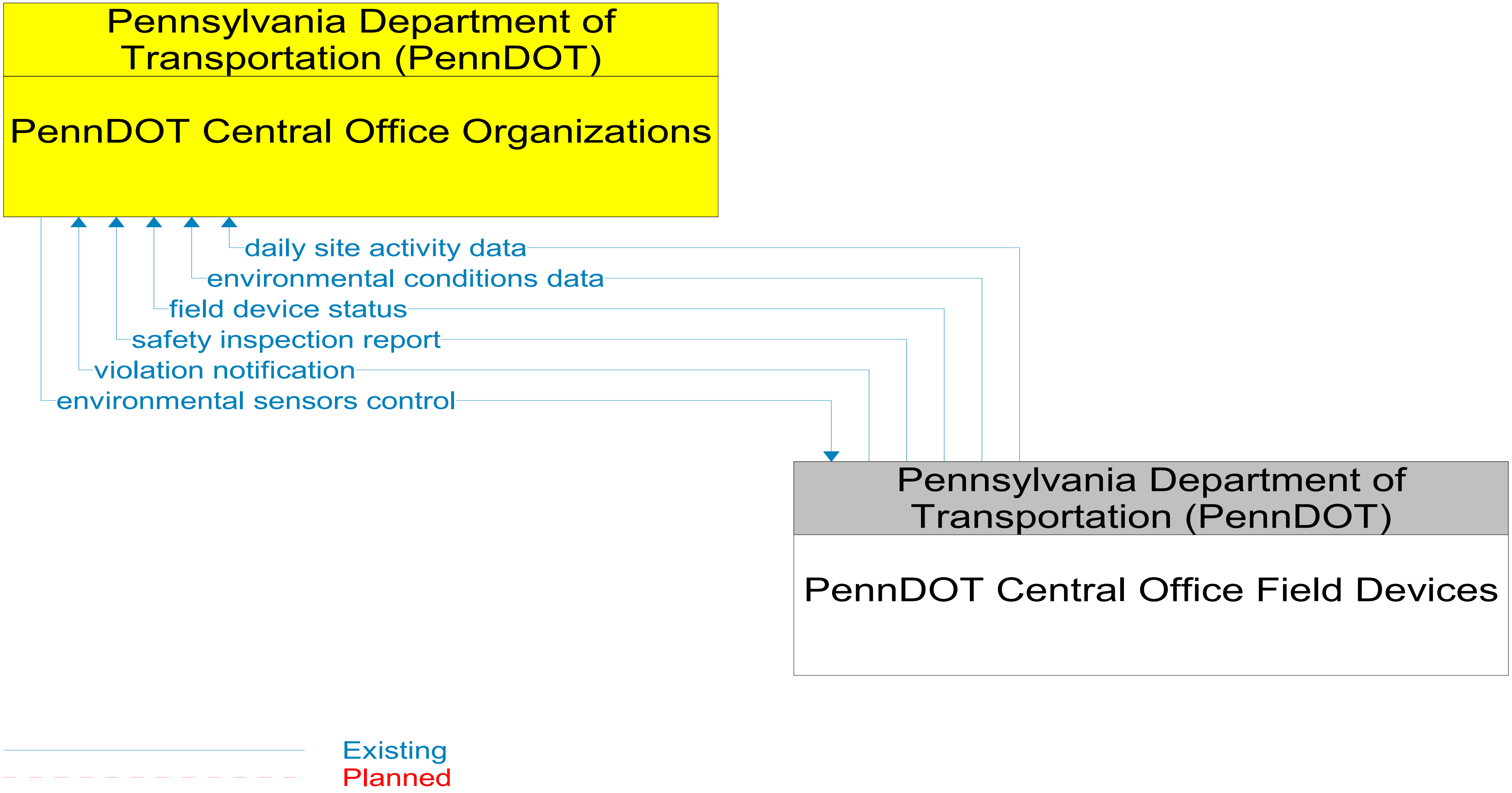
ISP coordination

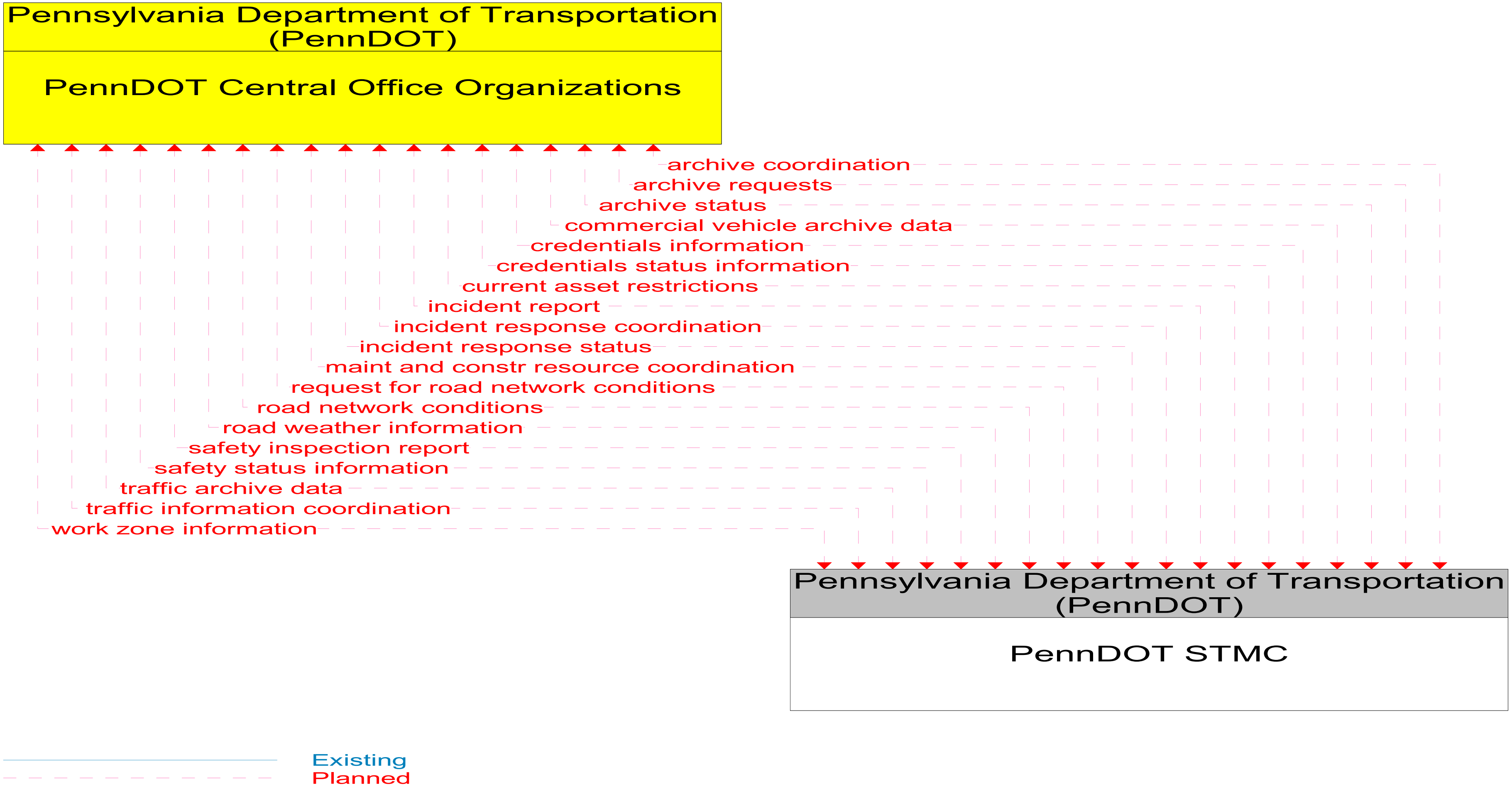
TRANSCOM

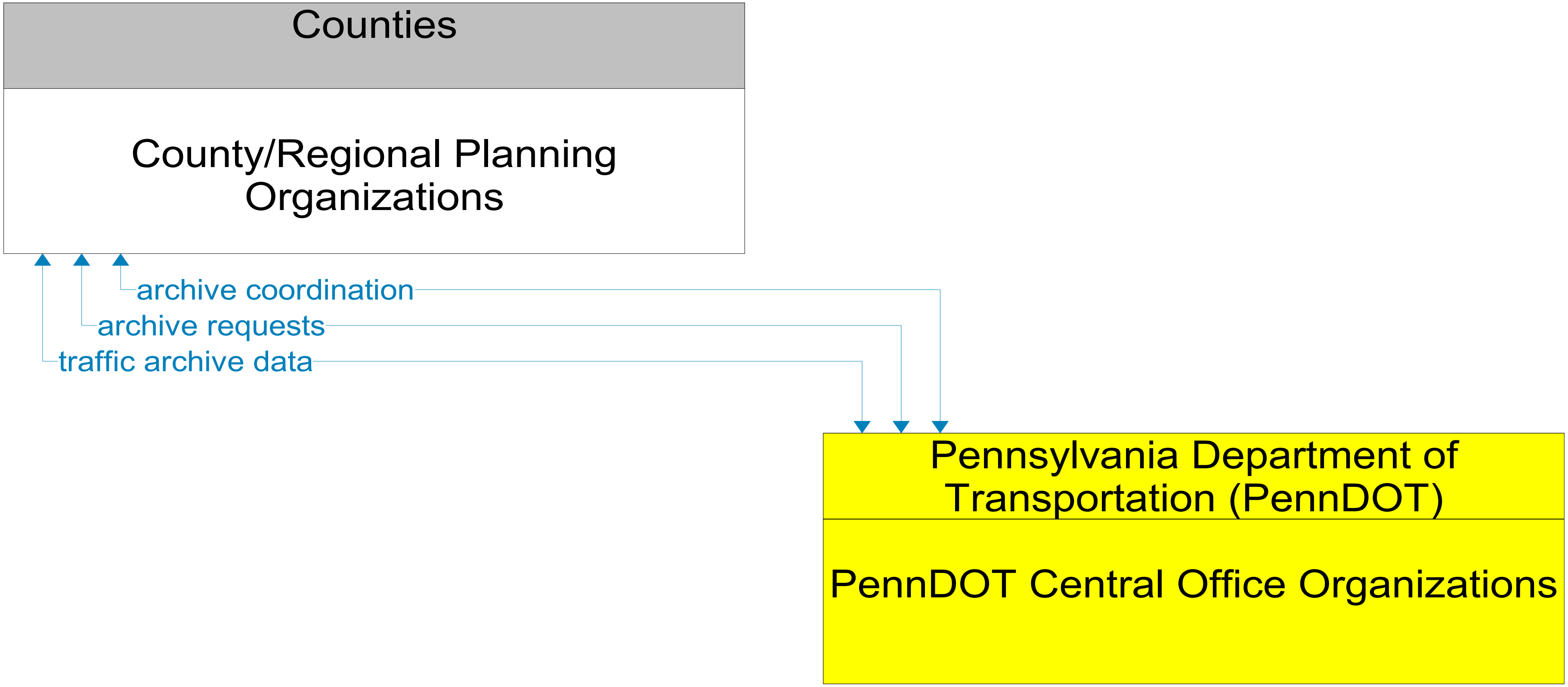
TRANSCOM Center

Existing

Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Organizations
daily site activity data
environmental conditions data
field device status
safety inspection report
violation notification
environmental sensors control
Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Field Devices
Existing
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Organizations
archive coordination
archive requests
archive status
commercial vehicle archive data
credentials information
credentials status information
current asset restrictions
incident report
incident response coordination
incident response status
maint and constr resource coordination
request for road network conditions
road network conditions
road weather information
safety inspection report
safety status information
traffic archive data
traffic information coordination
work zone information
Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC
Existing
Planned



Counties

County/Regional Planning Organizations

archive coordination

archive requests

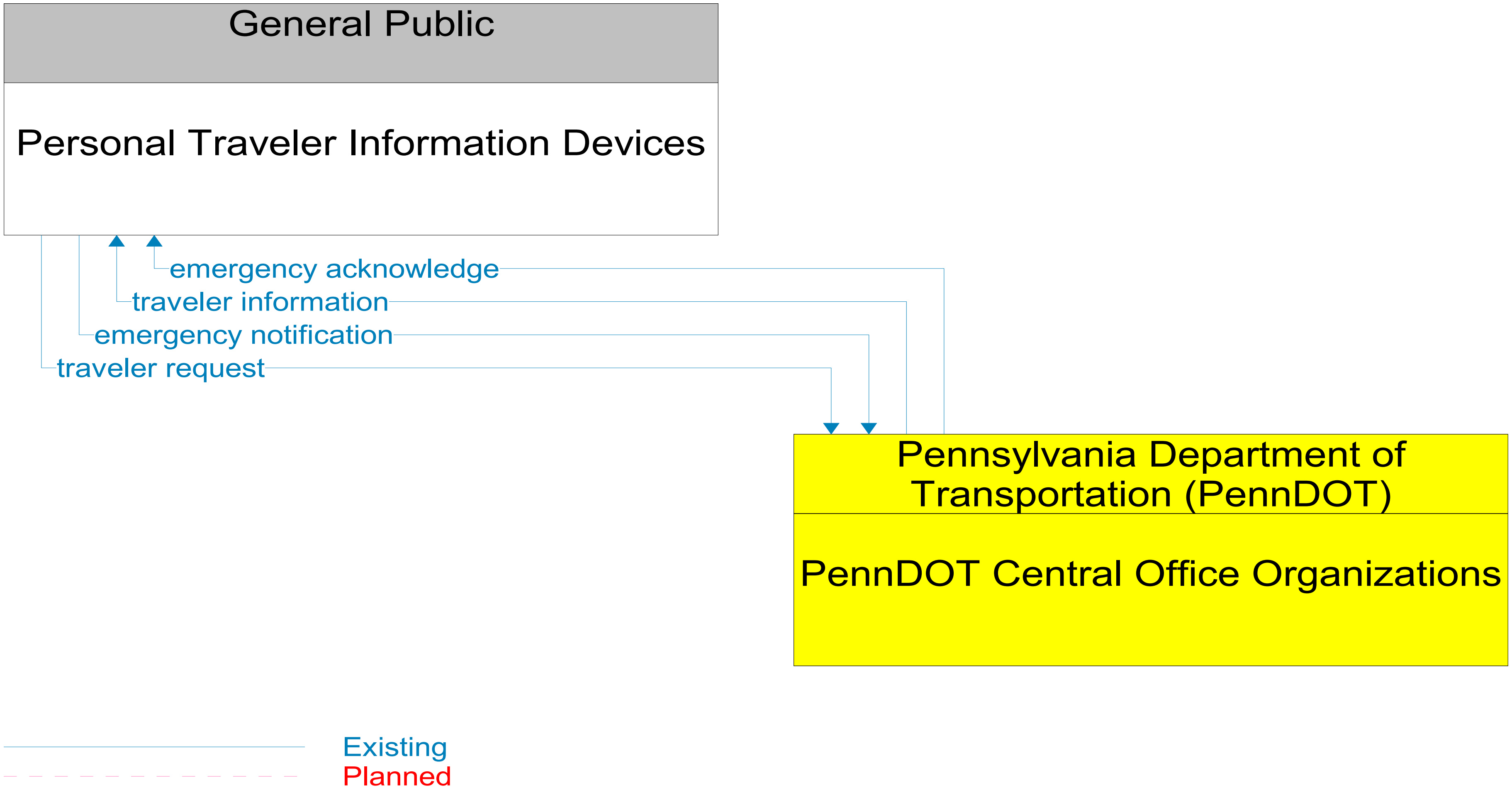
traffic archive data

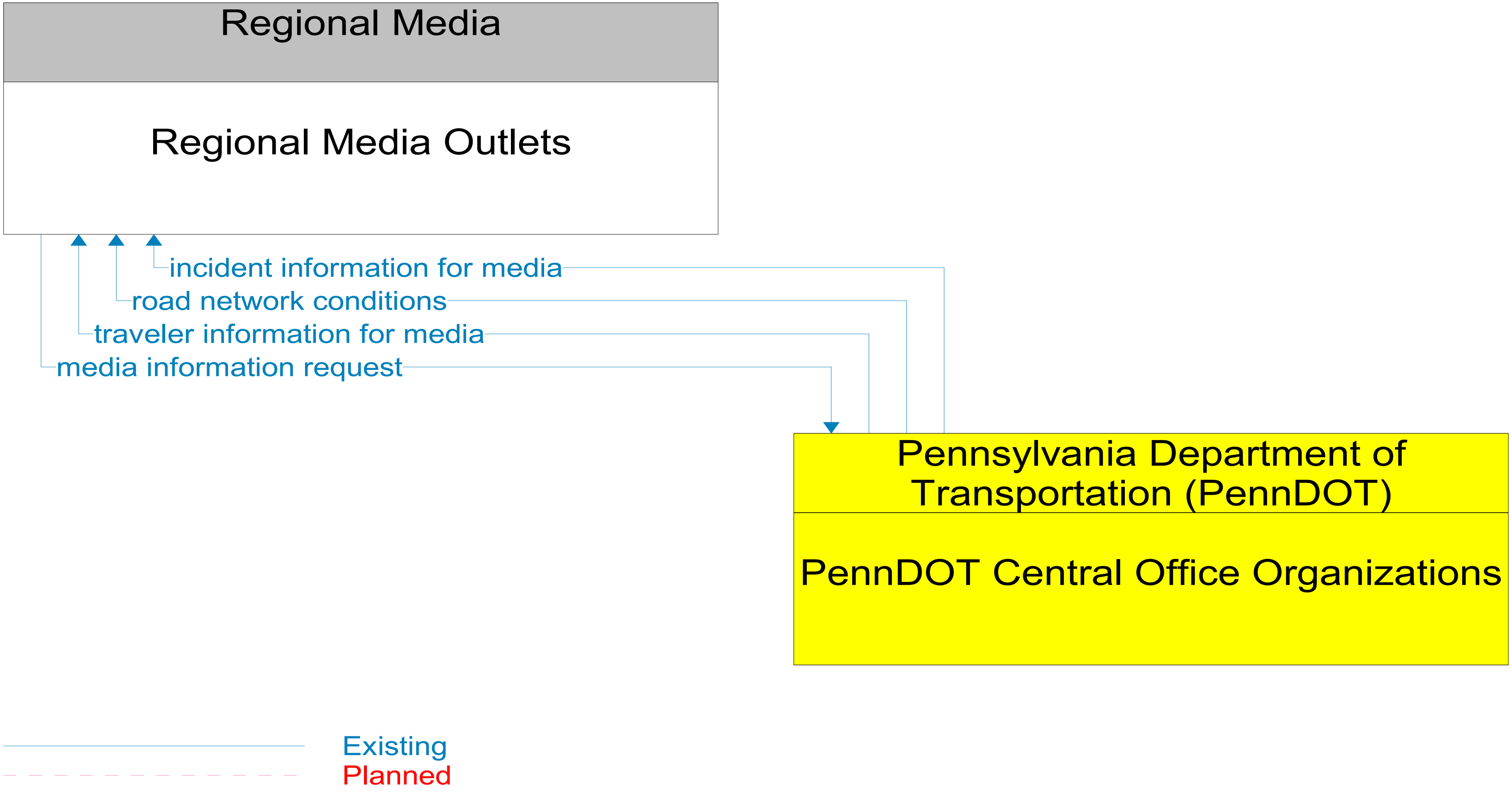
Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Organizations

Existing

Planned


General Public
Personal Traveler Information Devices
emergency acknowledge
traveler information
emergency notification
traveler request
Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Organizations
Existing
Planned



Regional Media

Regional Media Outlets

incident information for media

road network conditions

traveler information for media

media information request

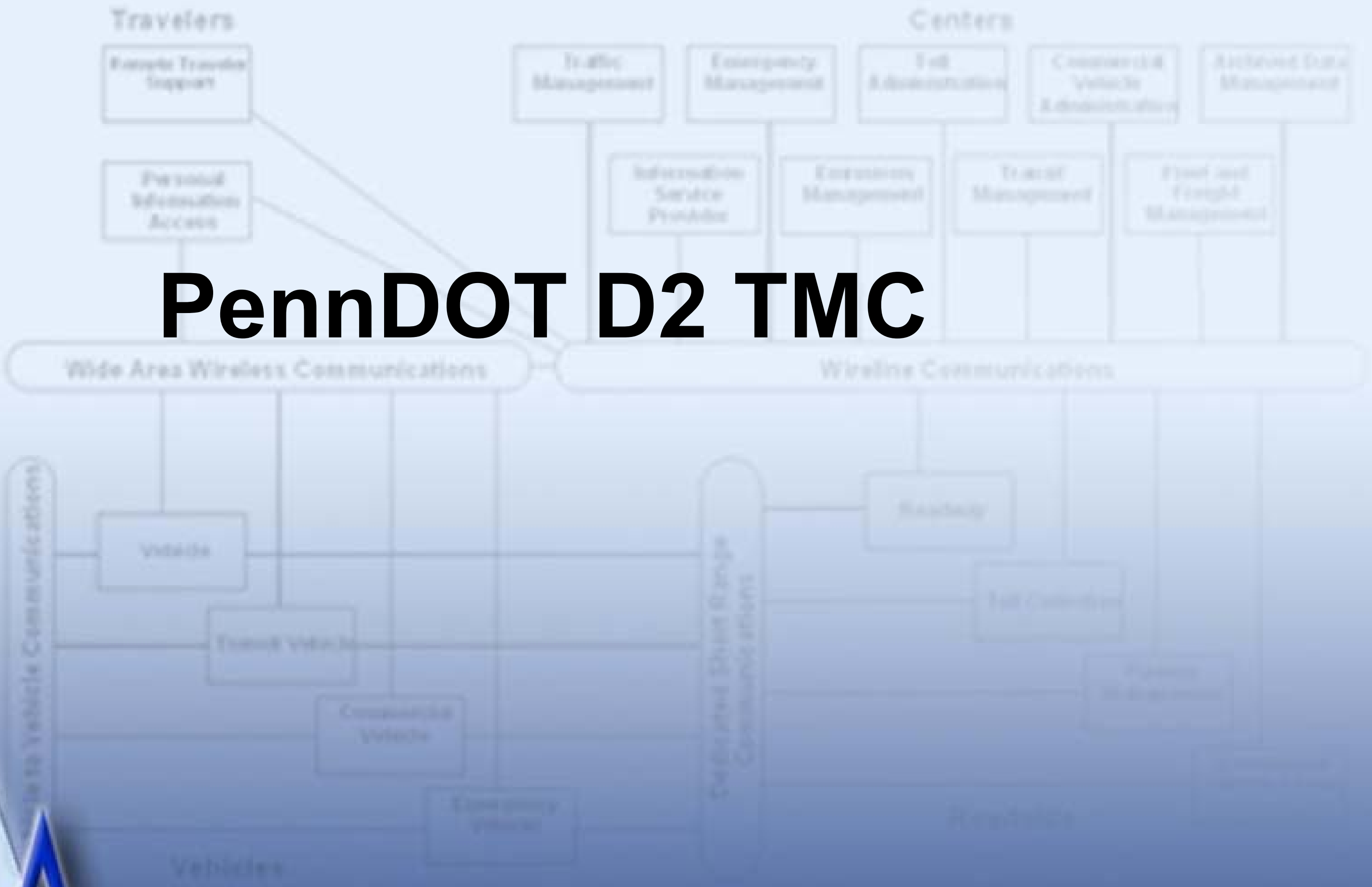
Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Organizations

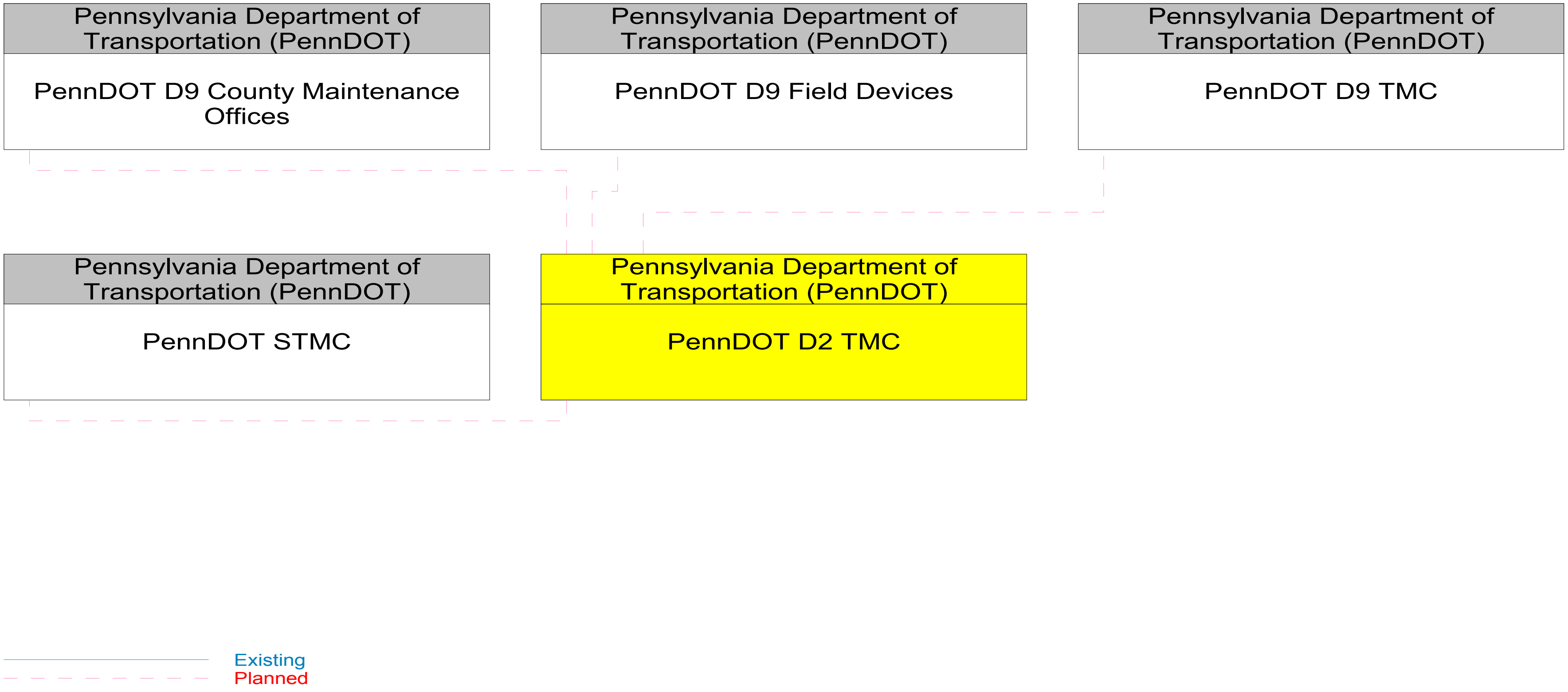
Existing

Planned

PennDOT D2 TMC


Travelers
Remote Traveler Support
Personal Information Access
Centers
Traffic Management
Emergency Management
Toll Administration
Commercial Vehicle Administration
Archived Data Management
Information Service Provider
Emissions Management
Transit Management
Fleet and Freight Management
Wide Area Wireless Communications
Wireline Communications
Vehicle to Vehicle Communications
Vehicle
Transit Vehicle
Commercial Vehicle
Emergency Vehicle
Vehicles
Dedicated Short Range Communications
Roadway
Toll Collection
Parking Management
Roadside

PennDOT D2 TMC Interconnect Diagram



Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 County Maintenance Offices

Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 Field Devices

Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 TMC

Pennsylvania Department of Transportation (PennDOT)

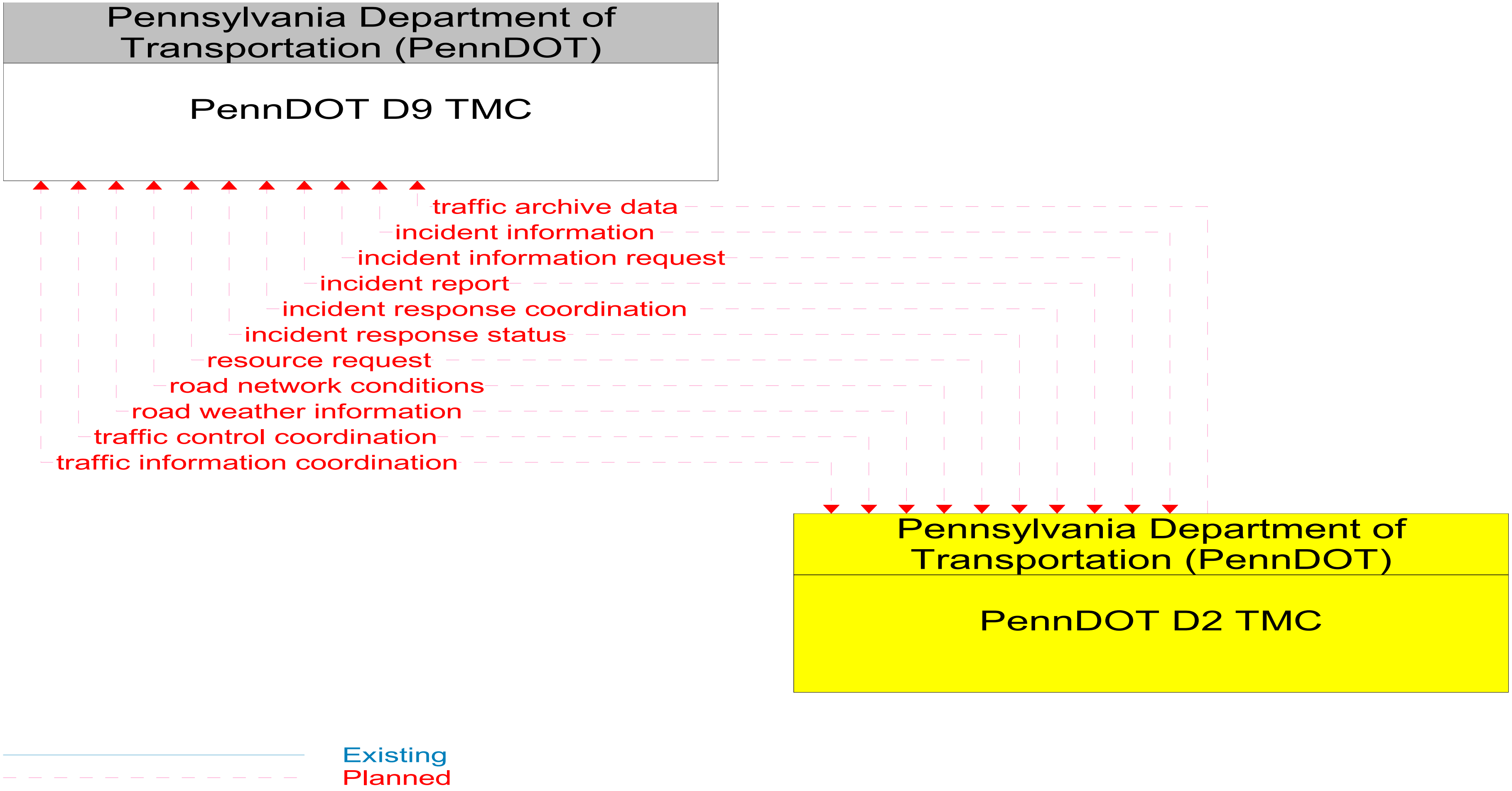
PennDOT STMC

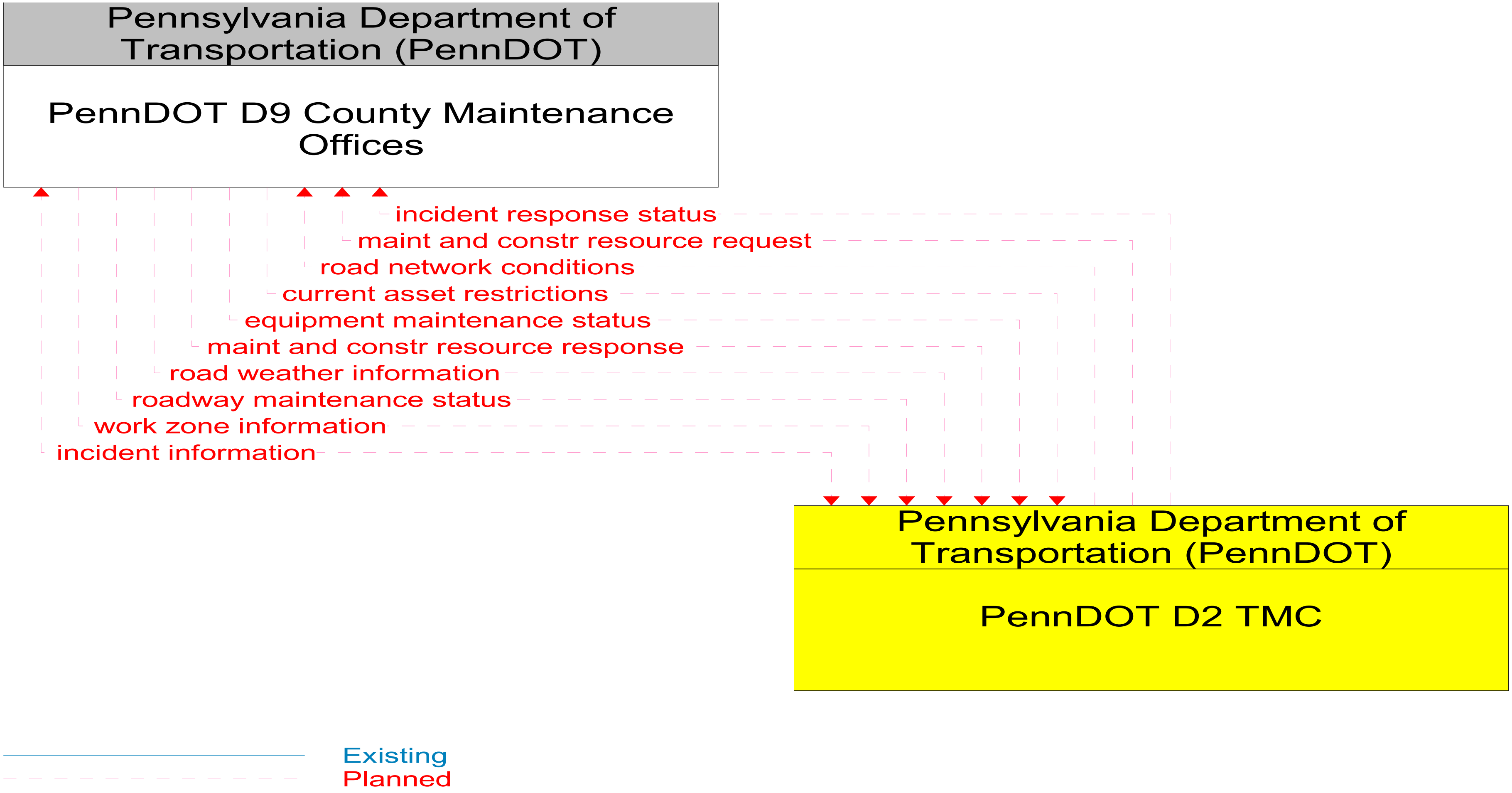
Pennsylvania Department of Transportation (PennDOT)

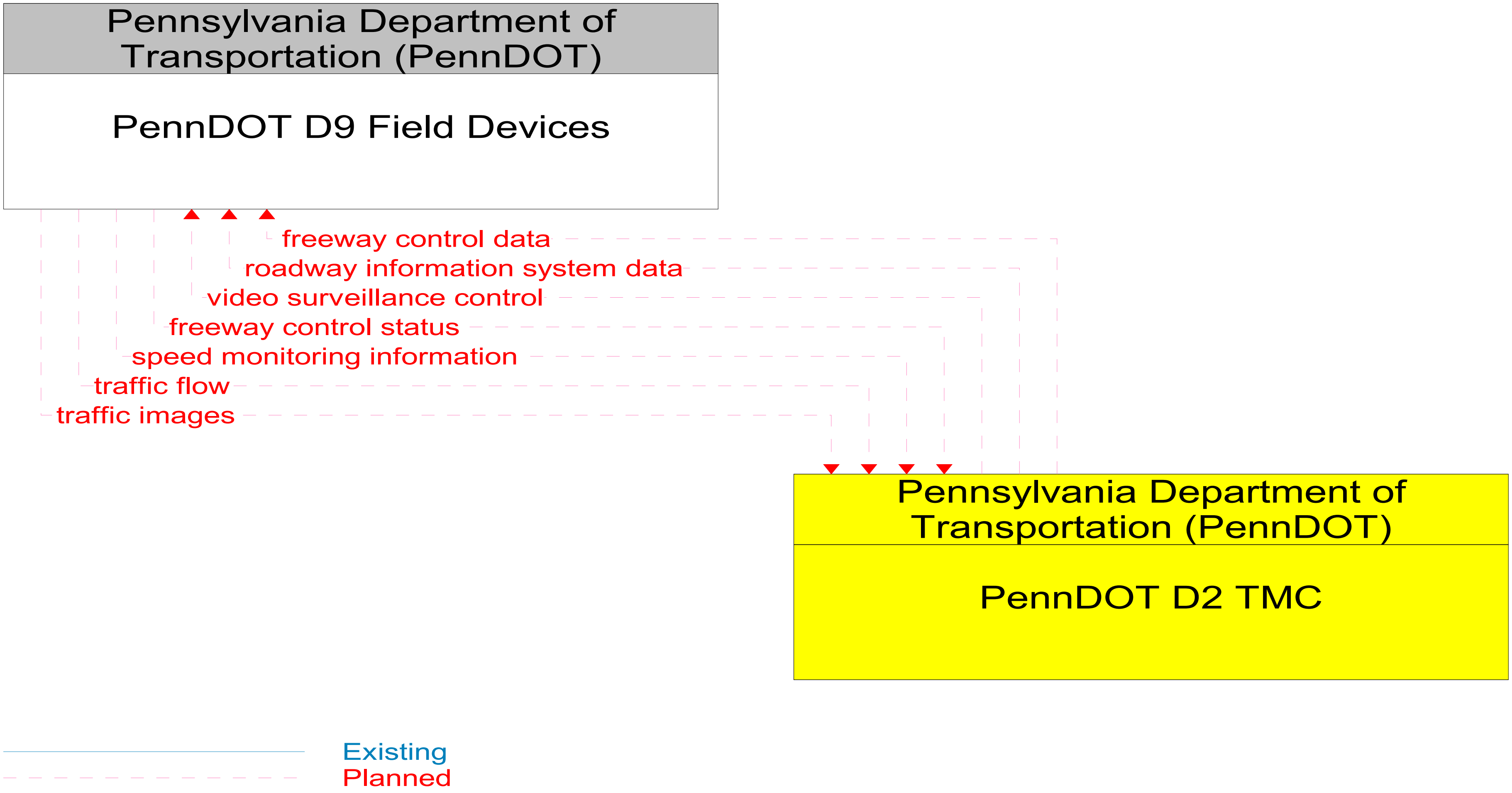
PennDOT D2 TMC

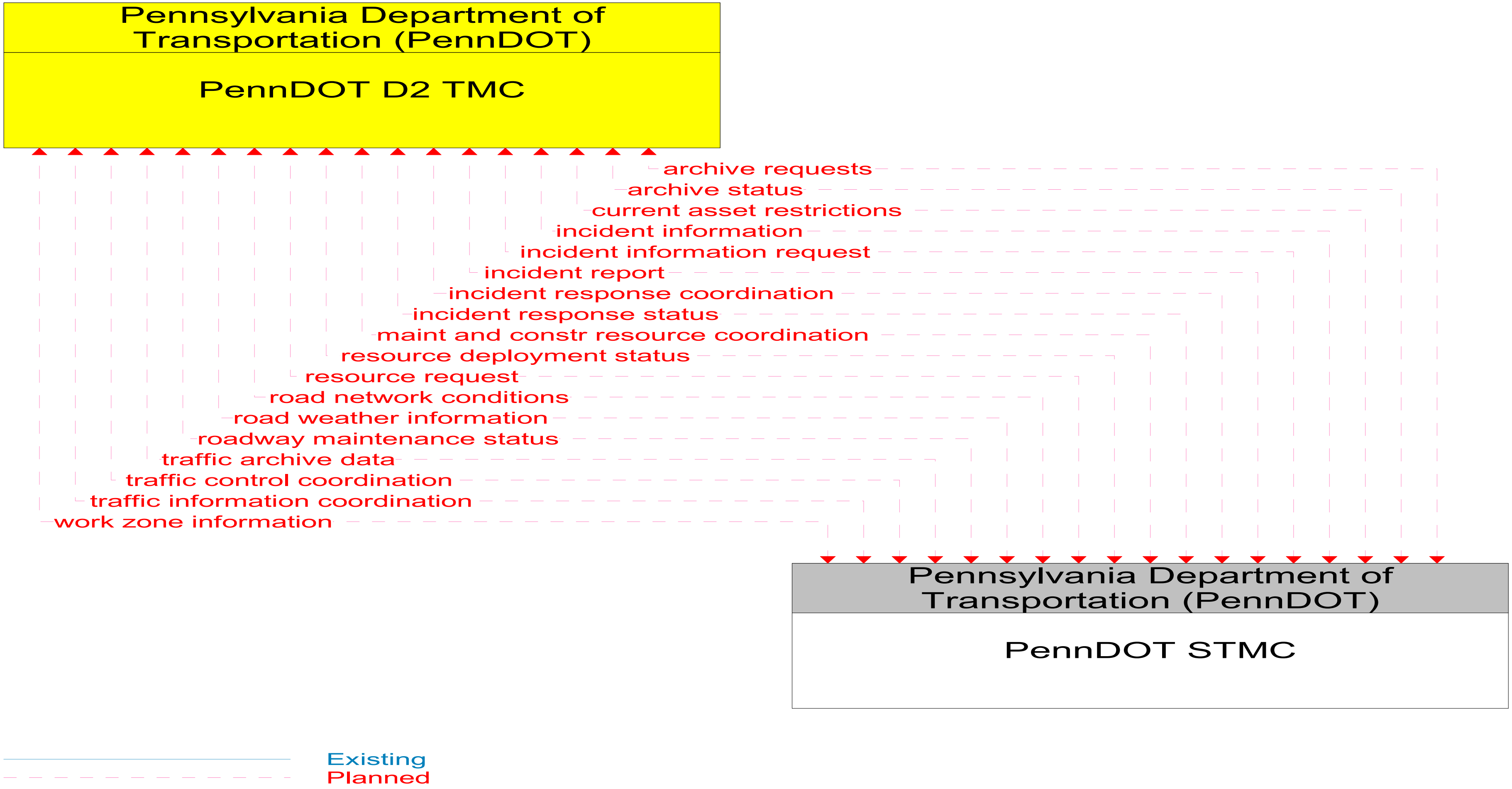
Existing

Planned

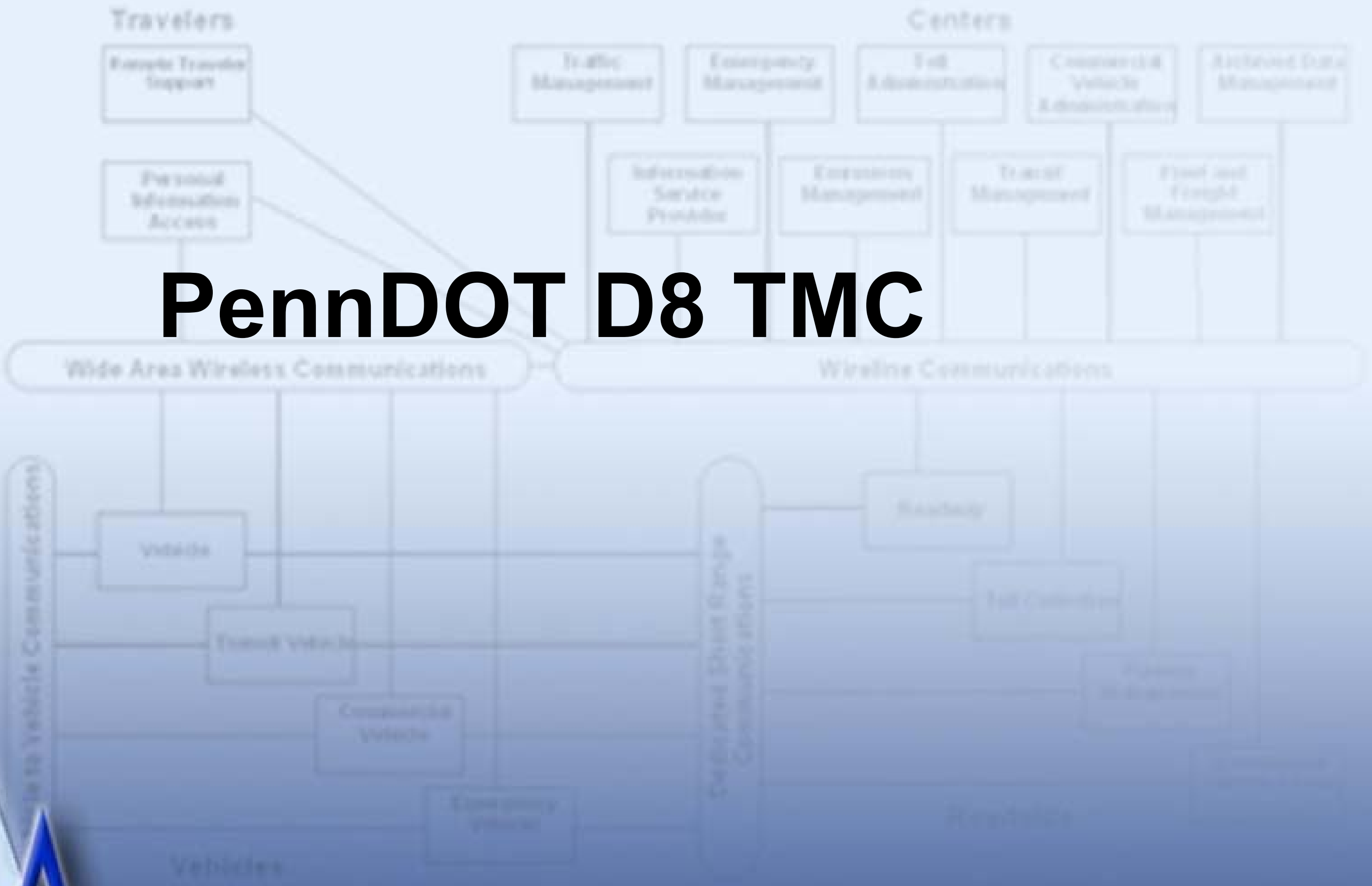

Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
traffic archive data
incident information
incident information request
incident report
incident response coordination
incident response status
resource request
road network conditions
road weather information
traffic control coordination
traffic information coordination
Pennsylvania Department of Transportation (PennDOT)
PennDOT D2 TMC
Existing
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 County Maintenance Offices
incident response status
maint and constr resource request
road network conditions
current asset restrictions
equipment maintenance status
maint and constr resource response
road weather information
roadway maintenance status
work zone information
incident information
Pennsylvania Department of Transportation (PennDOT)
PennDOT D2 TMC
Existing
Planned

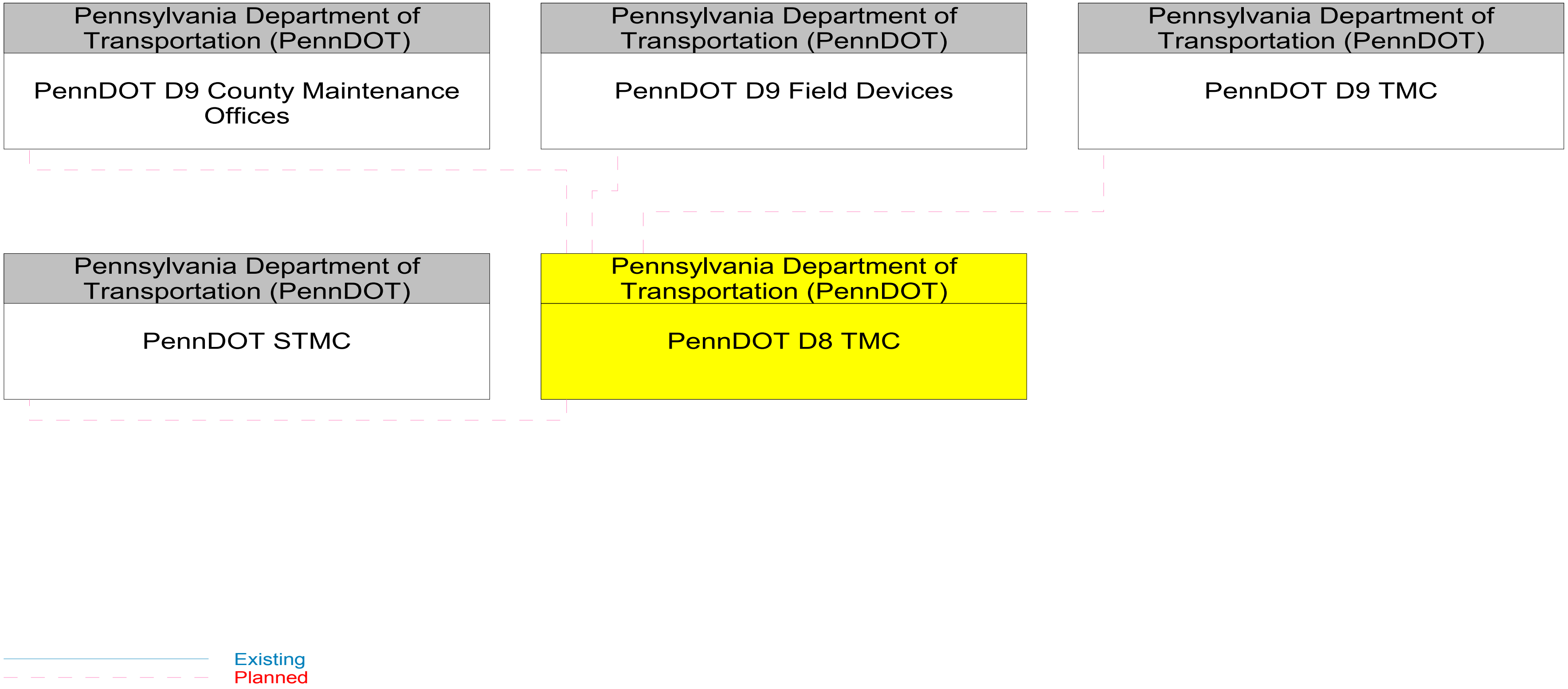

Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 Field Devices
freeway control data
roadway information system data
video surveillance control
freeway control status
speed monitoring information
traffic flow
traffic images
Pennsylvania Department of Transportation (PennDOT)
PennDOT D2 TMC
Existing
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT D2 TMC
archive requests
archive status
current asset restrictions
incident information
incident information request
incident report
incident response coordination
incident response status
maint and constr resource coordination
resource deployment status
resource request
road network conditions
road weather information
roadway maintenance status
traffic archive data
traffic control coordination
traffic information coordination
work zone information
Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC
Existing
Planned

PennDOT D8 TMC



PennDOT D8 TMC Interconnect Diagram



Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 County Maintenance Offices

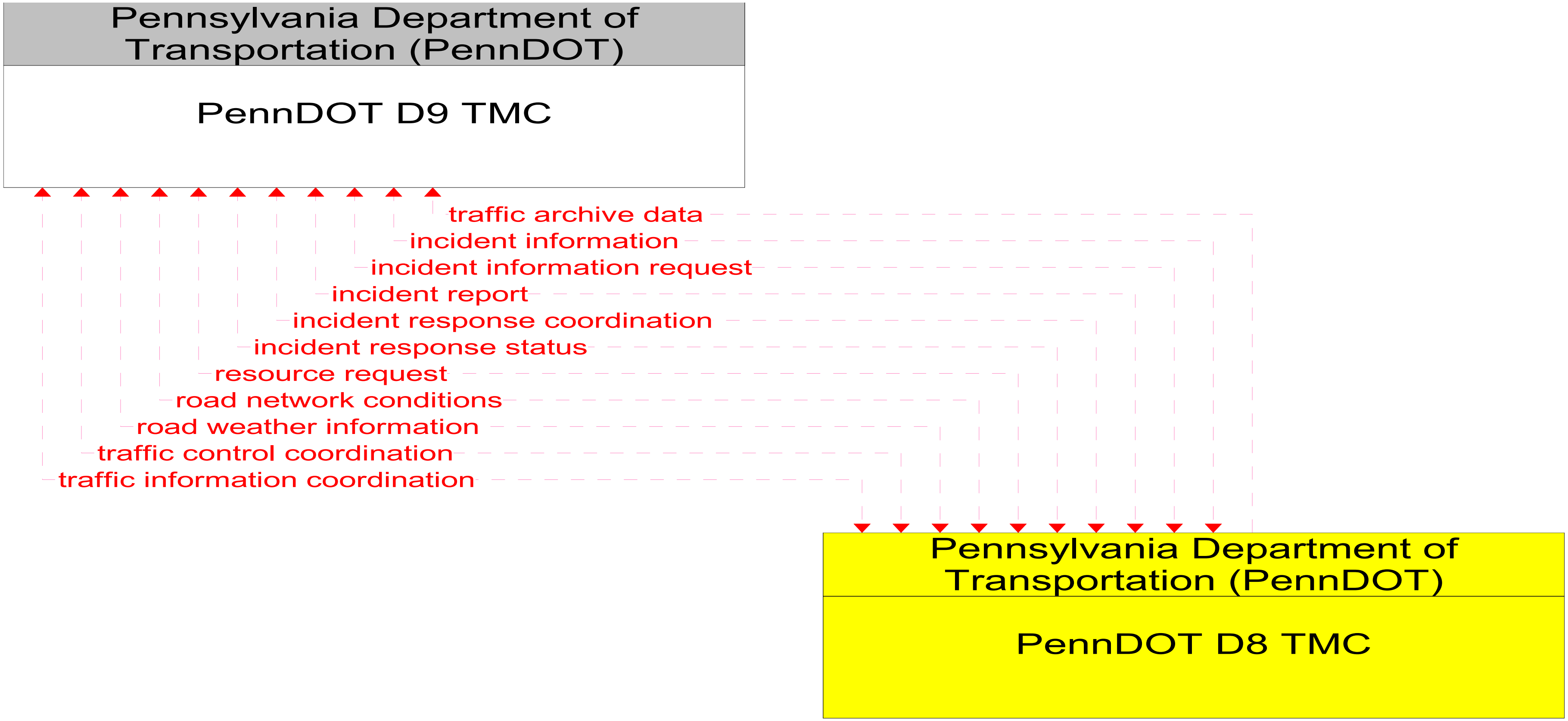
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 Field Devices

Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC

Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC

Pennsylvania Department of Transportation (PennDOT)
PennDOT D8 TMC

Existing
Planned



Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 TMC

traffic archive data

incident information

incident information request

incident report

incident response coordination

incident response status

resource request

road network conditions

road weather information

traffic control coordination

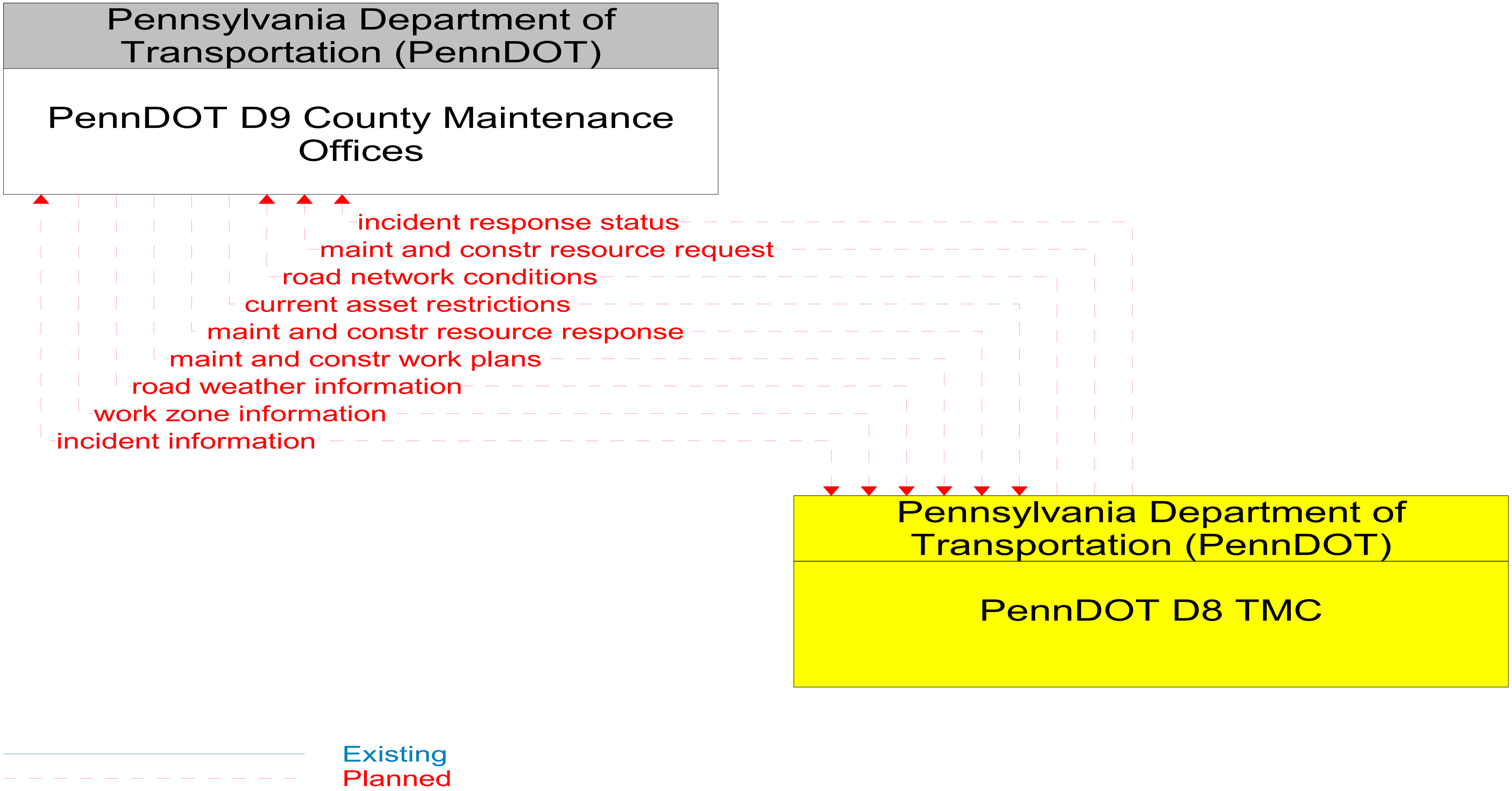
traffic information coordination

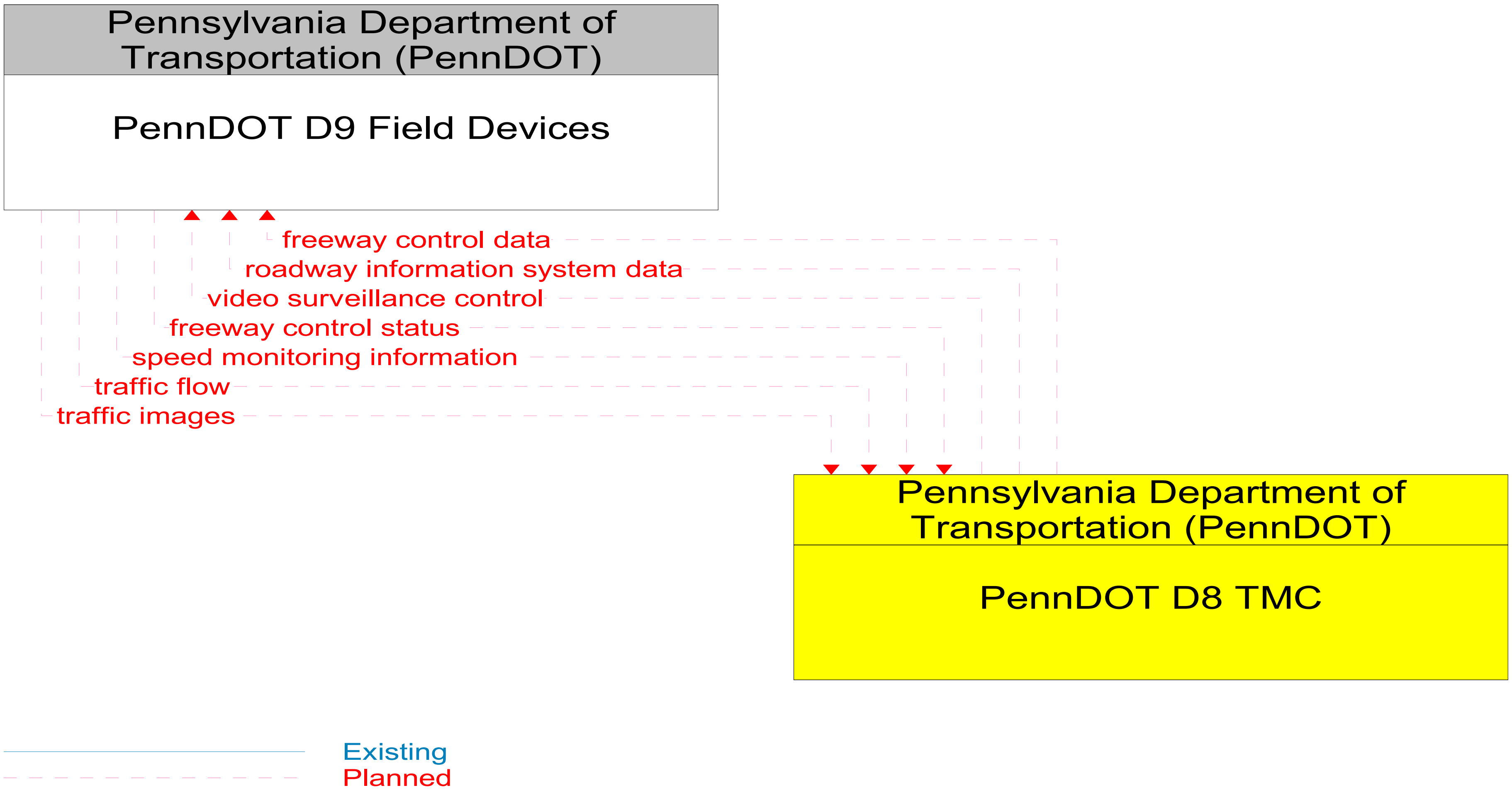
Pennsylvania Department of Transportation (PennDOT)

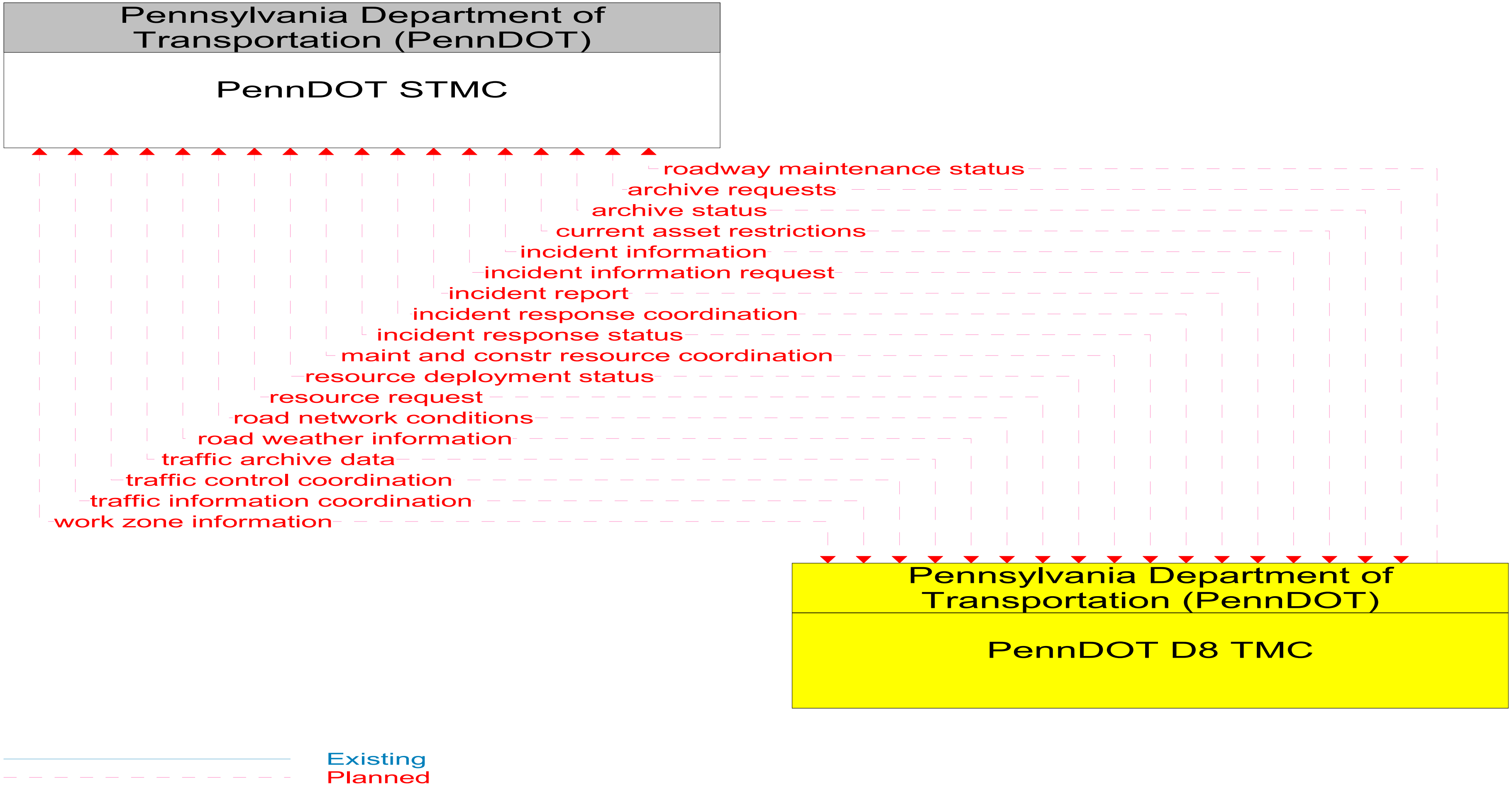
PennDOT D8 TMC

Existing

Planned

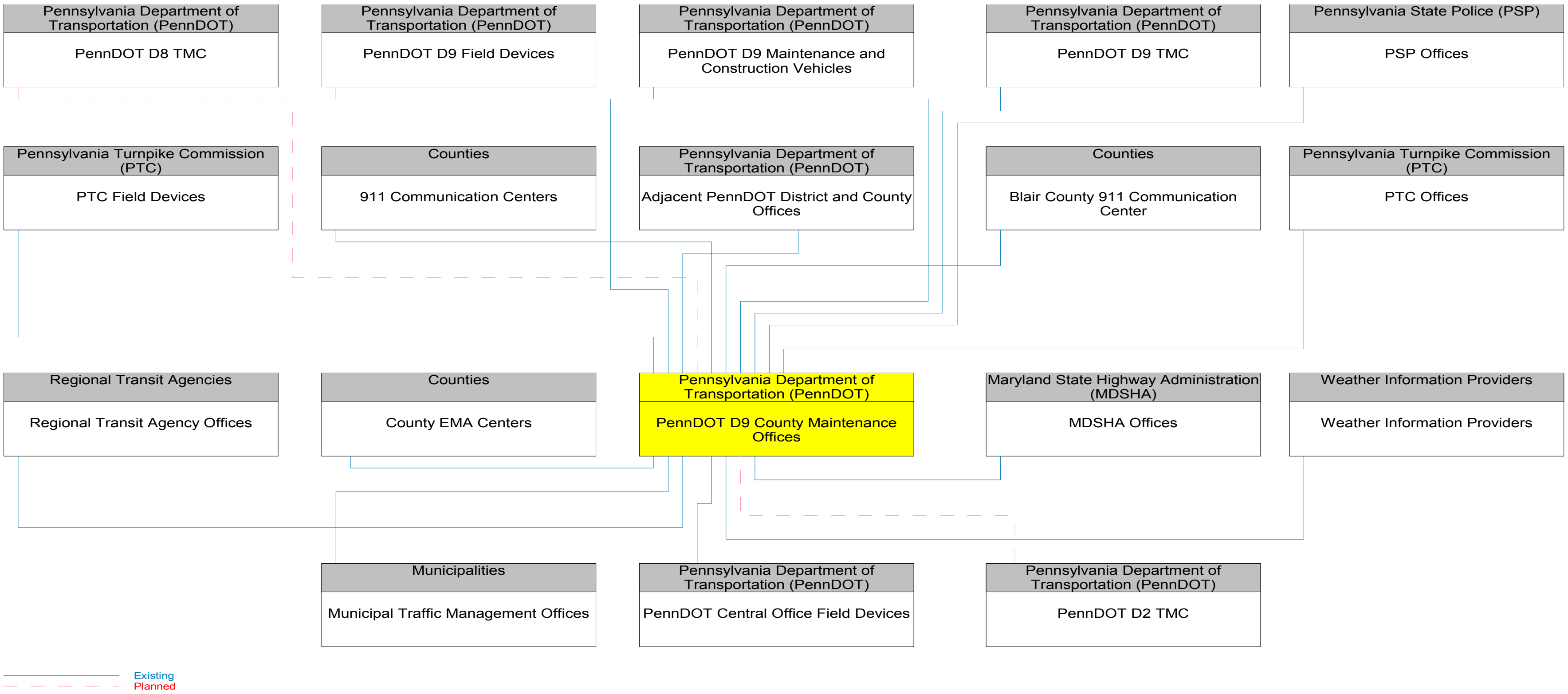

Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 County Maintenance Offices
incident response status
maint and constr resource request
road network conditions
current asset restrictions
maint and constr resource response
maint and constr work plans
road weather information
work zone information
incident information
Pennsylvania Department of Transportation (PennDOT)
PennDOT D8 TMC
Existing
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 Field Devices
freeway control data
roadway information system data
video surveillance control
freeway control status
speed monitoring information
traffic flow
traffic images
Pennsylvania Department of Transportation (PennDOT)
PennDOT D8 TMC
Existing
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC
roadway maintenance status
archive requests
archive status
current asset restrictions
incident information
incident information request
incident report
incident response coordination
incident response status
maint and constr resource coordination
resource deployment status
resource request
road network conditions
road weather information
traffic archive data
traffic control coordination
traffic information coordination
work zone information
Pennsylvania Department of Transportation (PennDOT)
PennDOT D8 TMC
Existing
Planned

PennDOT D9 County Maintenance Offices

PennDOT D9 County Maintenance Offices Interconnect Diagram



Pennsylvania Department of Transportation (PennDOT)
PennDOT D8 TMC

Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 Field Devices

Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 Maintenance and Construction Vehicles

Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC

Pennsylvania State Police (PSP)
PSP Offices

Pennsylvania Turnpike Commission (PTC)
PTC Field Devices

Counties
911 Communication Centers

Pennsylvania Department of Transportation (PennDOT)
Adjacent PennDOT District and County Offices

Counties
Blair County 911 Communication Center

Pennsylvania Turnpike Commission (PTC)
PTC Offices

Regional Transit Agencies
Regional Transit Agency Offices

Counties
County EMA Centers

Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 County Maintenance Offices

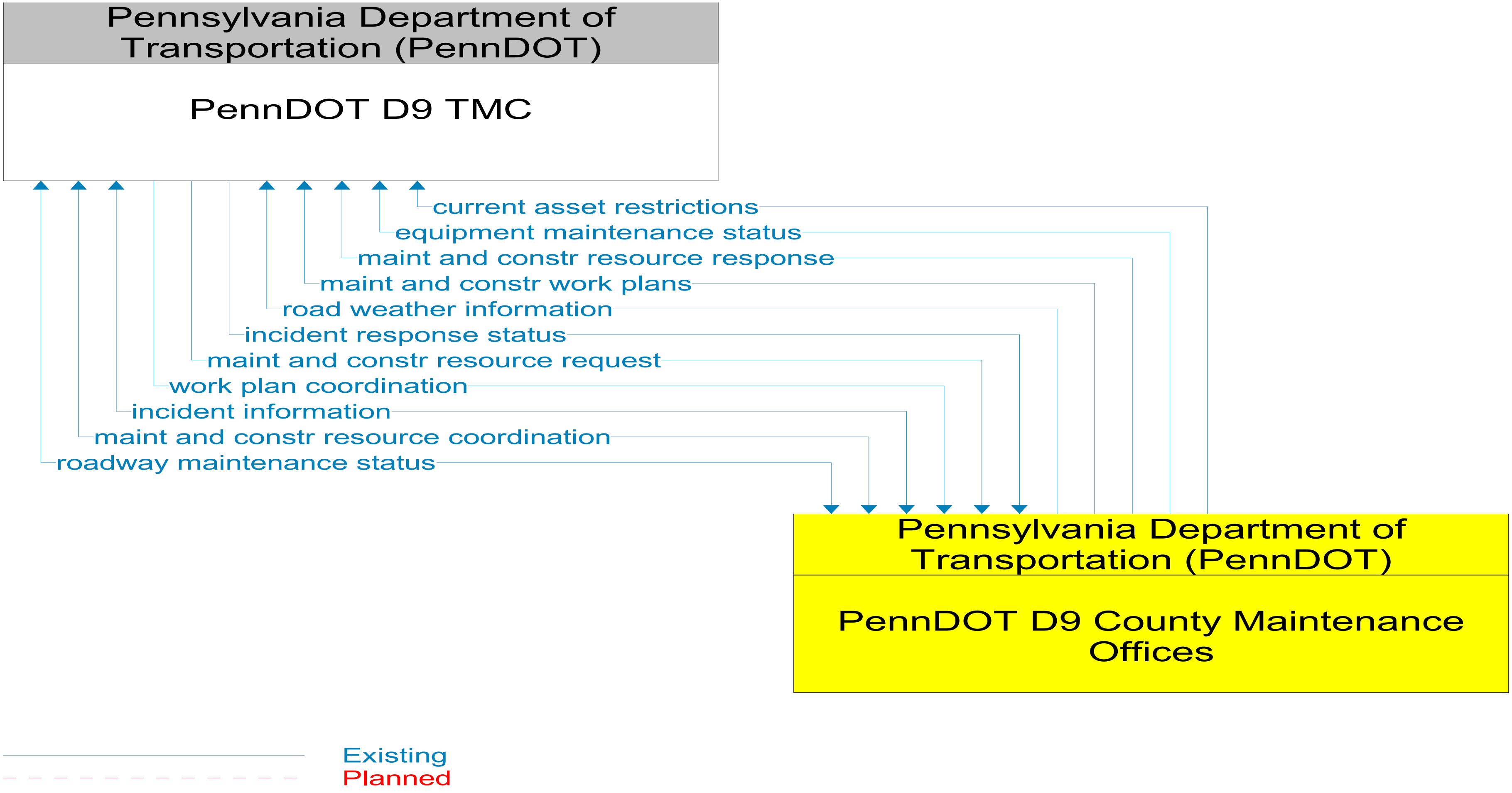
Maryland State Highway Administration (MDSHA)
MDSHA Offices

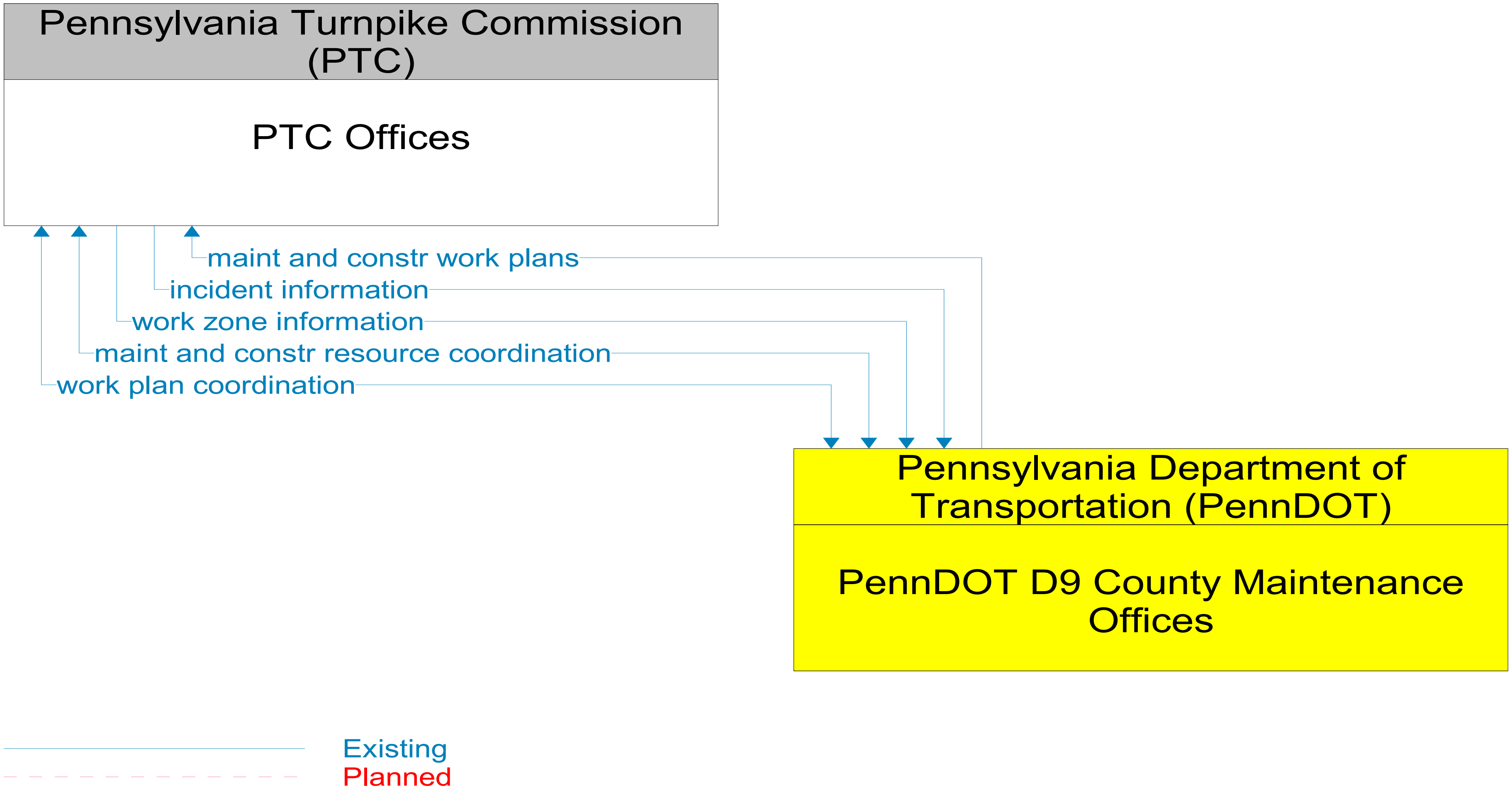
Weather Information Providers
Weather Information Providers

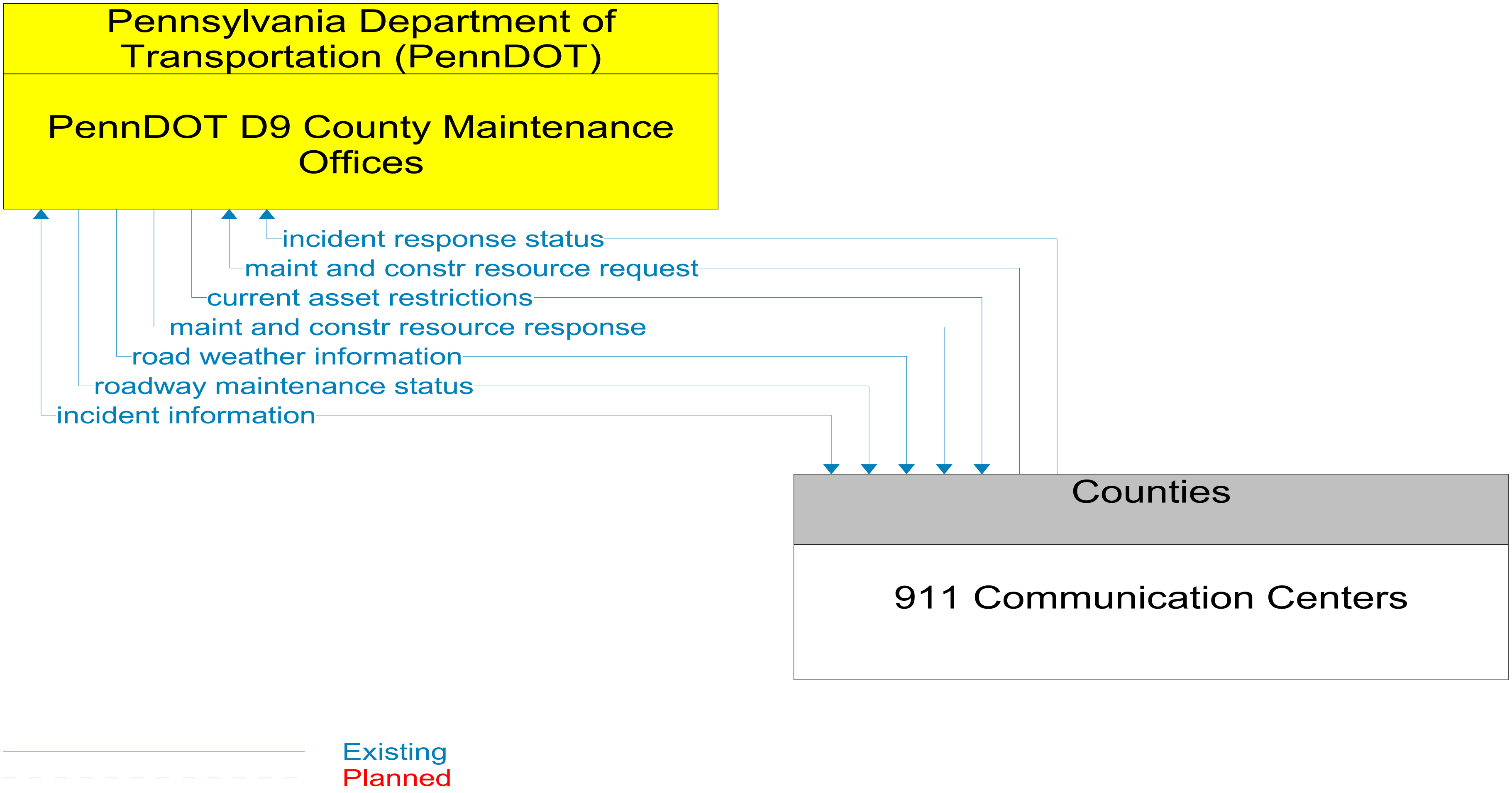
Municipalities
Municipal Traffic Management Offices

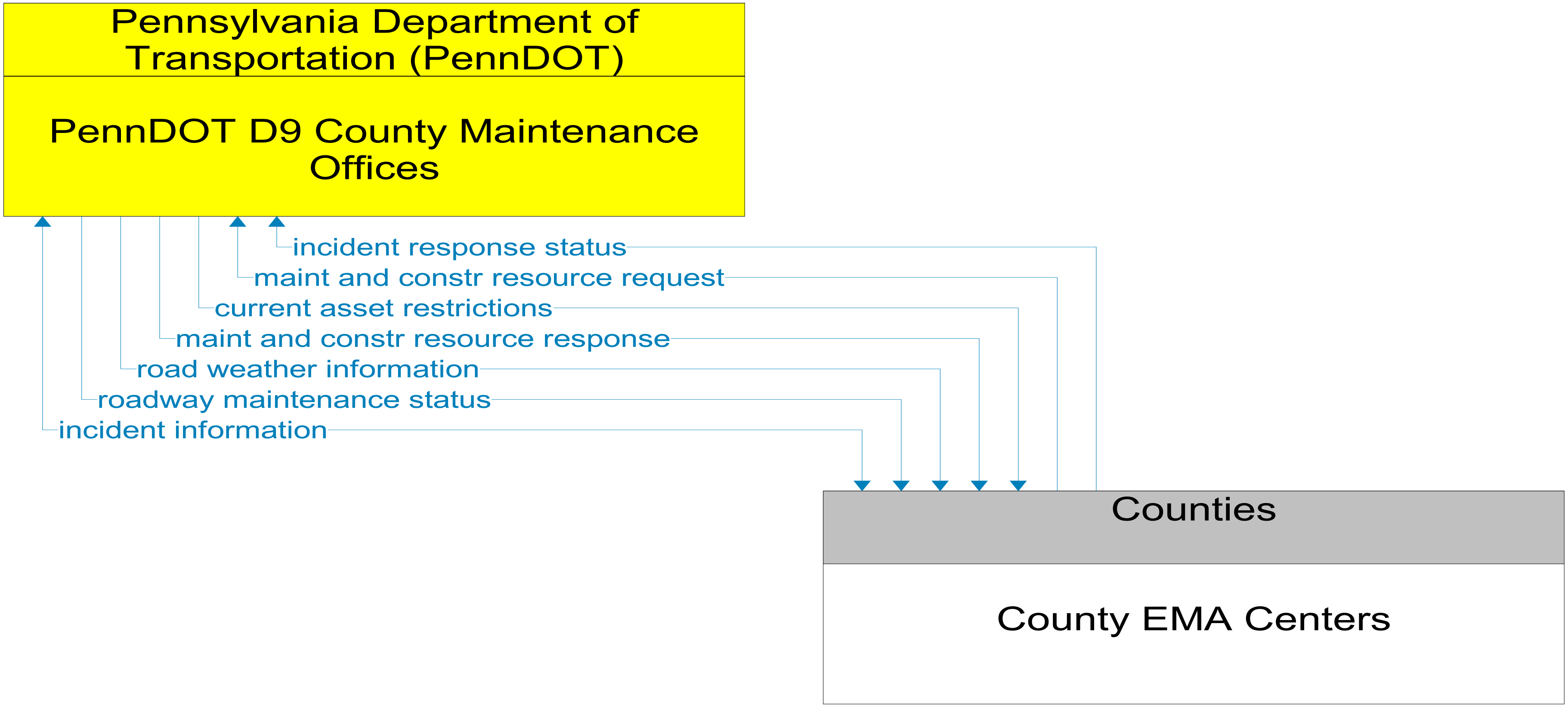
Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Field Devices

Pennsylvania Department of Transportation (PennDOT)
PennDOT D2 TMC


Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
current asset restrictions
equipment maintenance status
maint and constr resource response
maint and constr work plans
road weather information
incident response status
maint and constr resource request
work plan coordination
incident information
maint and constr resource coordination
roadway maintenance status
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 County Maintenance Offices
Existing
Planned


Pennsylvania Turnpike Commission (PTC)
PTC Offices
maint and constr work plans
incident information
work zone information
maint and constr resource coordination
work plan coordination
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 County Maintenance Offices
Existing
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 County Maintenance Offices
incident response status
maint and constr resource request
current asset restrictions
maint and constr resource response
road weather information
roadway maintenance status
incident information
Counties
911 Communication Centers
Existing
Planned



Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 County Maintenance Offices

incident response status

maint and constr resource request

current asset restrictions

maint and constr resource response

road weather information

roadway maintenance status

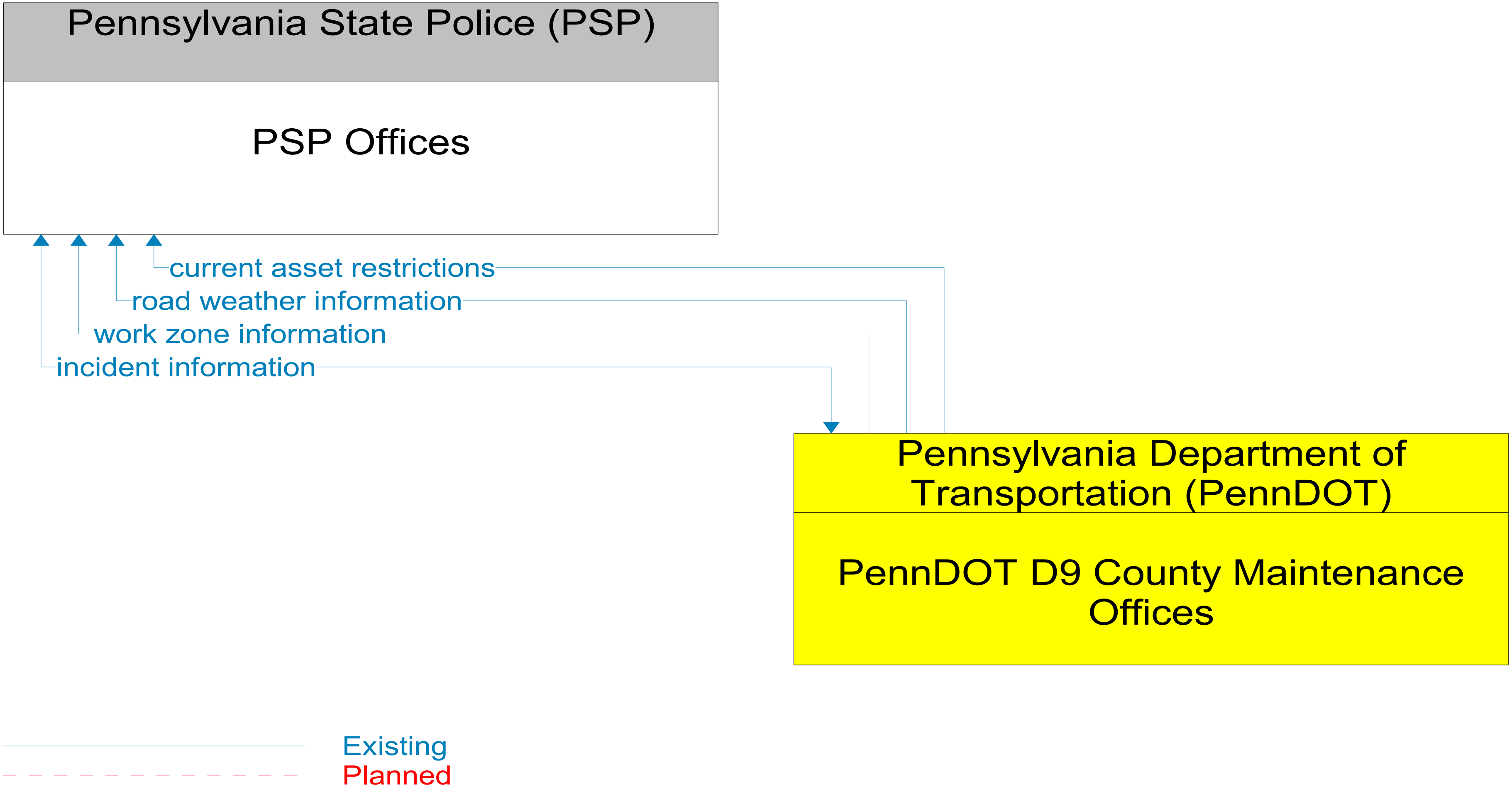
incident information

Counties

County EMA Centers

Existing

Planned



Pennsylvania State Police (PSP)

PSP Offices

current asset restrictions

road weather information

work zone information

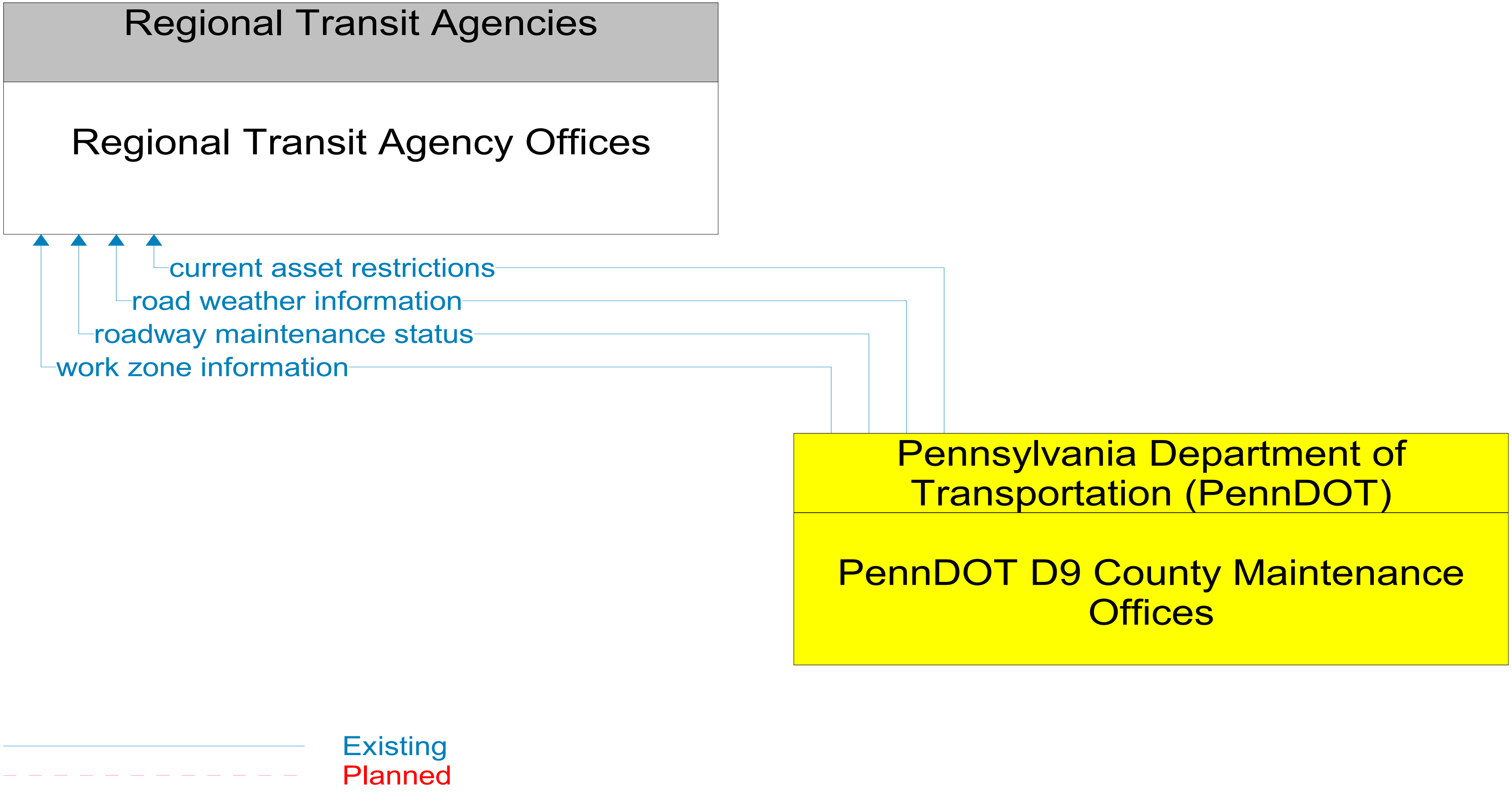
incident information

Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 County Maintenance Offices

Existing

Planned



Regional Transit Agencies

Regional Transit Agency Offices

current asset restrictions

road weather information

roadway maintenance status

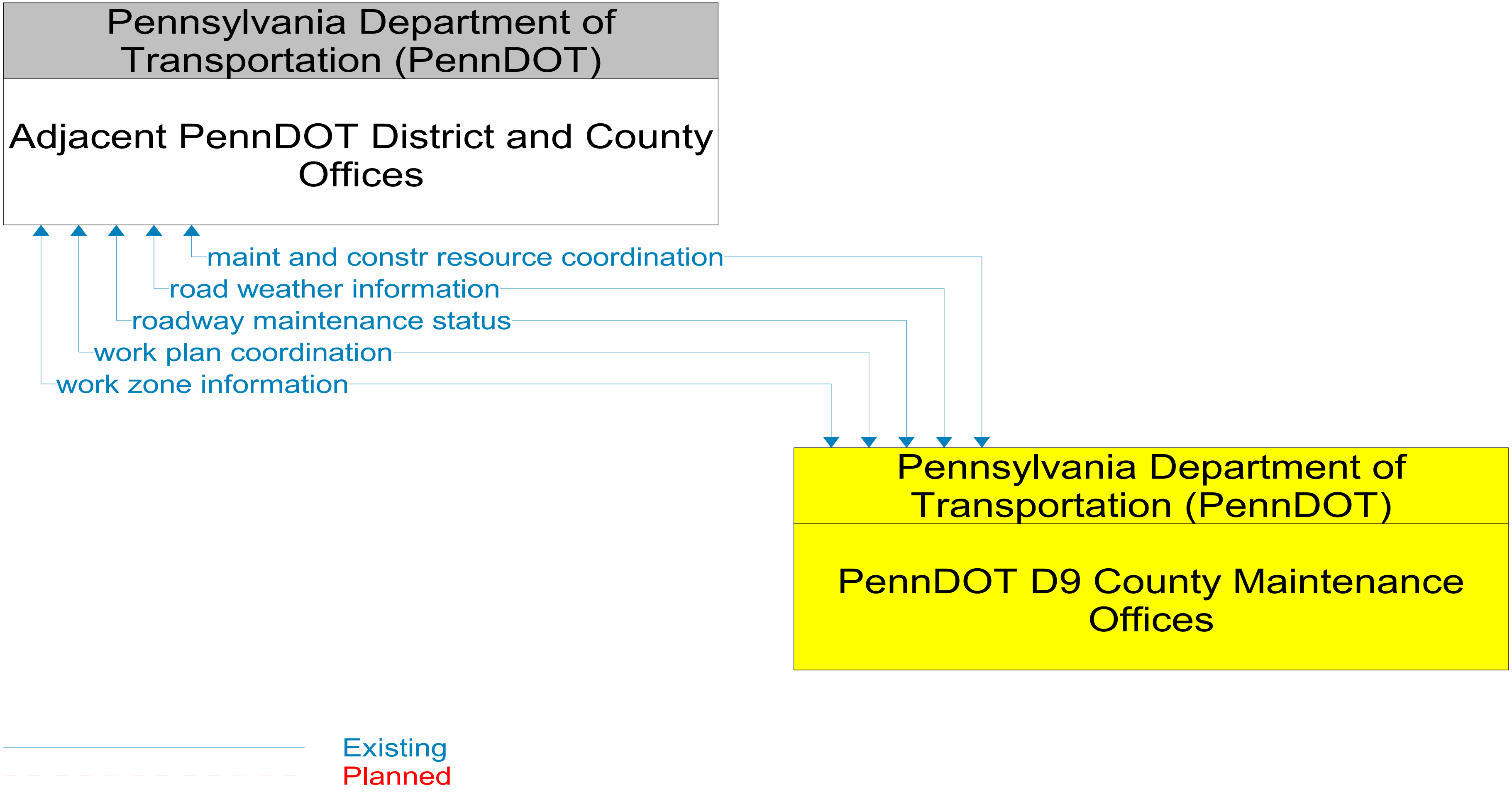
work zone information

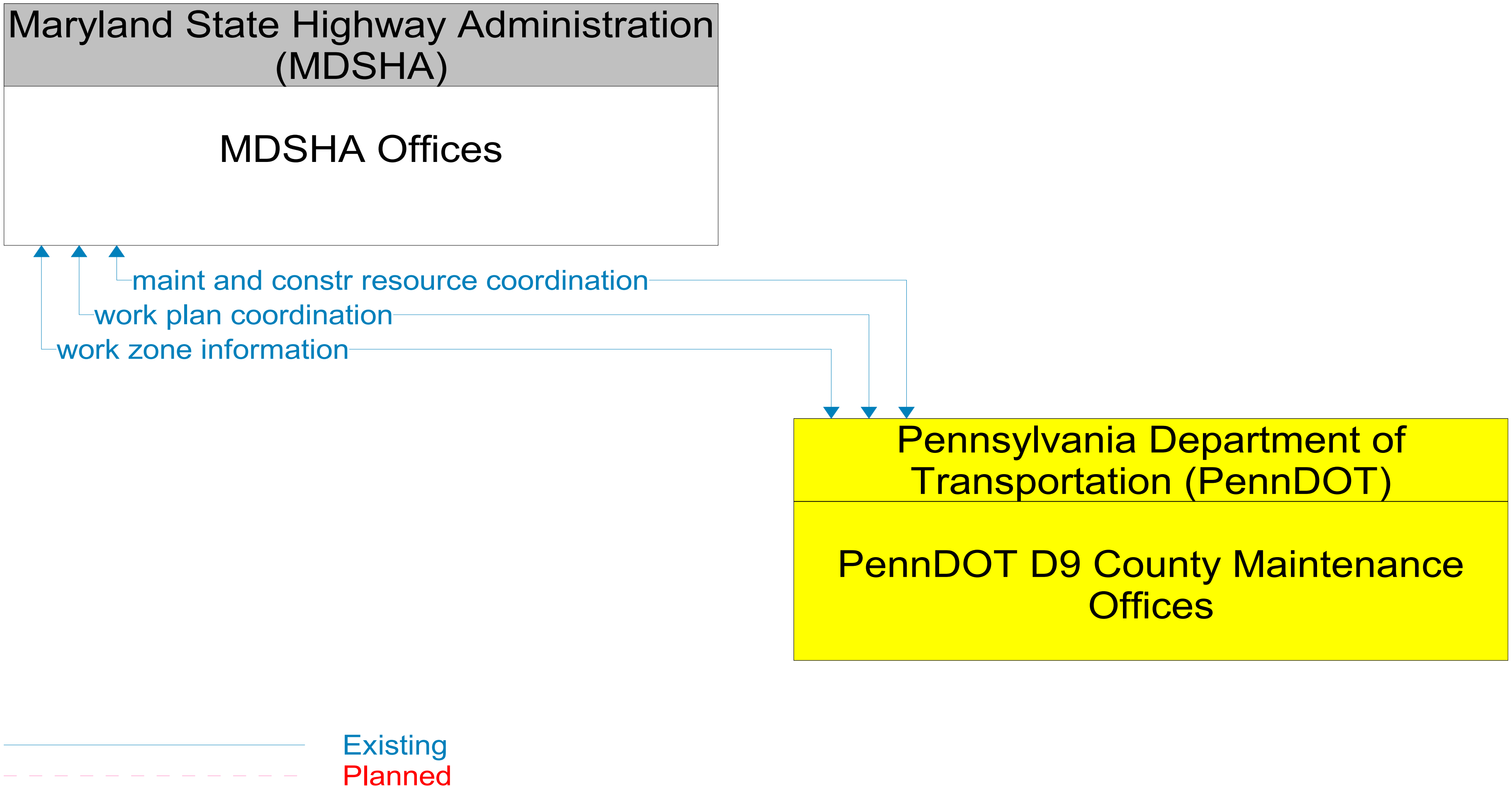
Pennsylvania Department of Transportation (PennDOT)

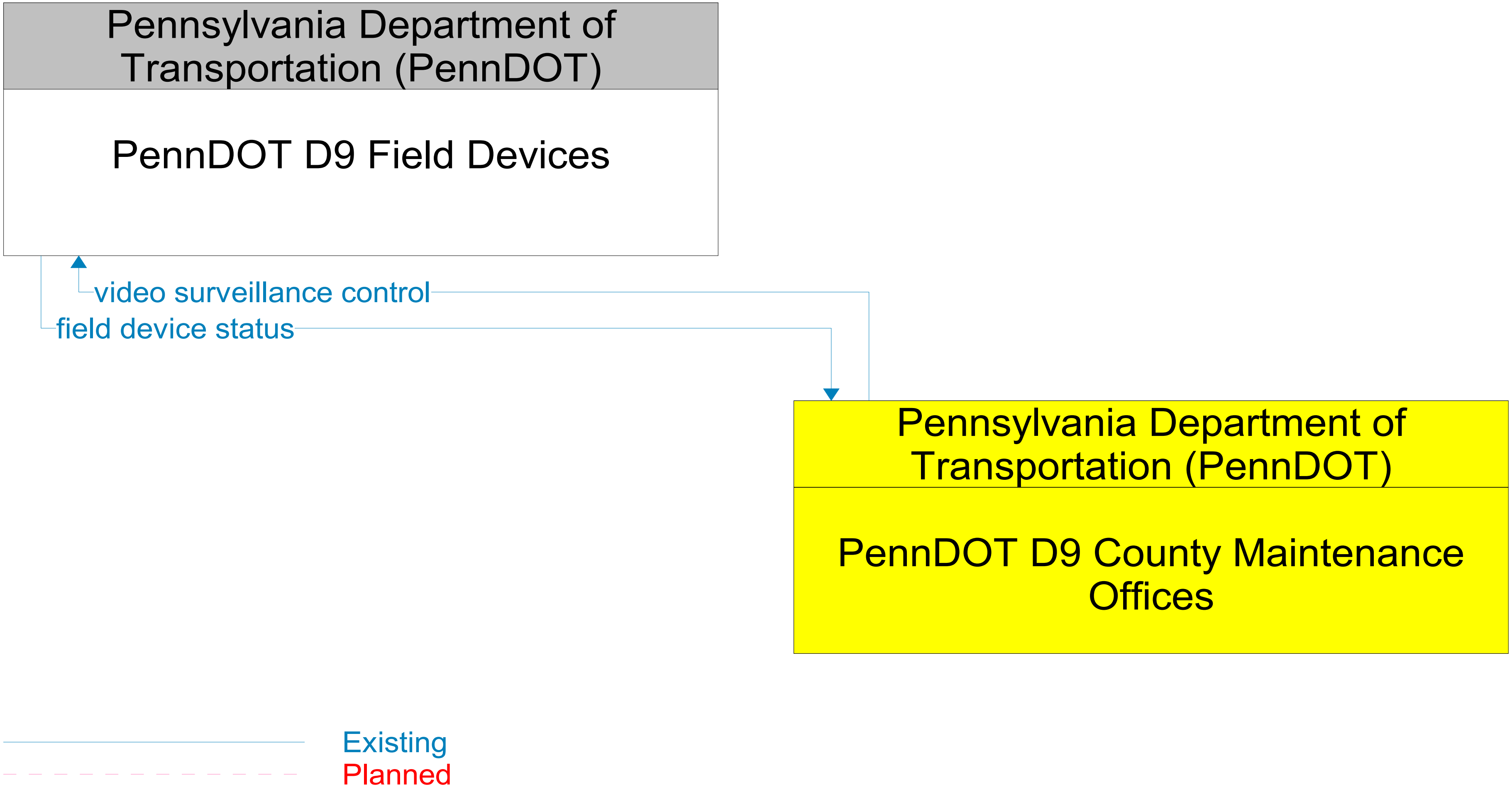
PennDOT D9 County Maintenance Offices

Existing

Planned


Pennsylvania Department of Transportation (PennDOT)
Adjacent PennDOT District and County Offices
maint and constr resource coordination
road weather information
roadway maintenance status
work plan coordination
work zone information
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 County Maintenance Offices
Existing
Planned


Maryland State Highway Administration (MDSHA)
MDSHA Offices
maint and constr resource coordination
work plan coordination
work zone information
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 County Maintenance Offices
Existing
Planned



Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 Field Devices

video surveillance control

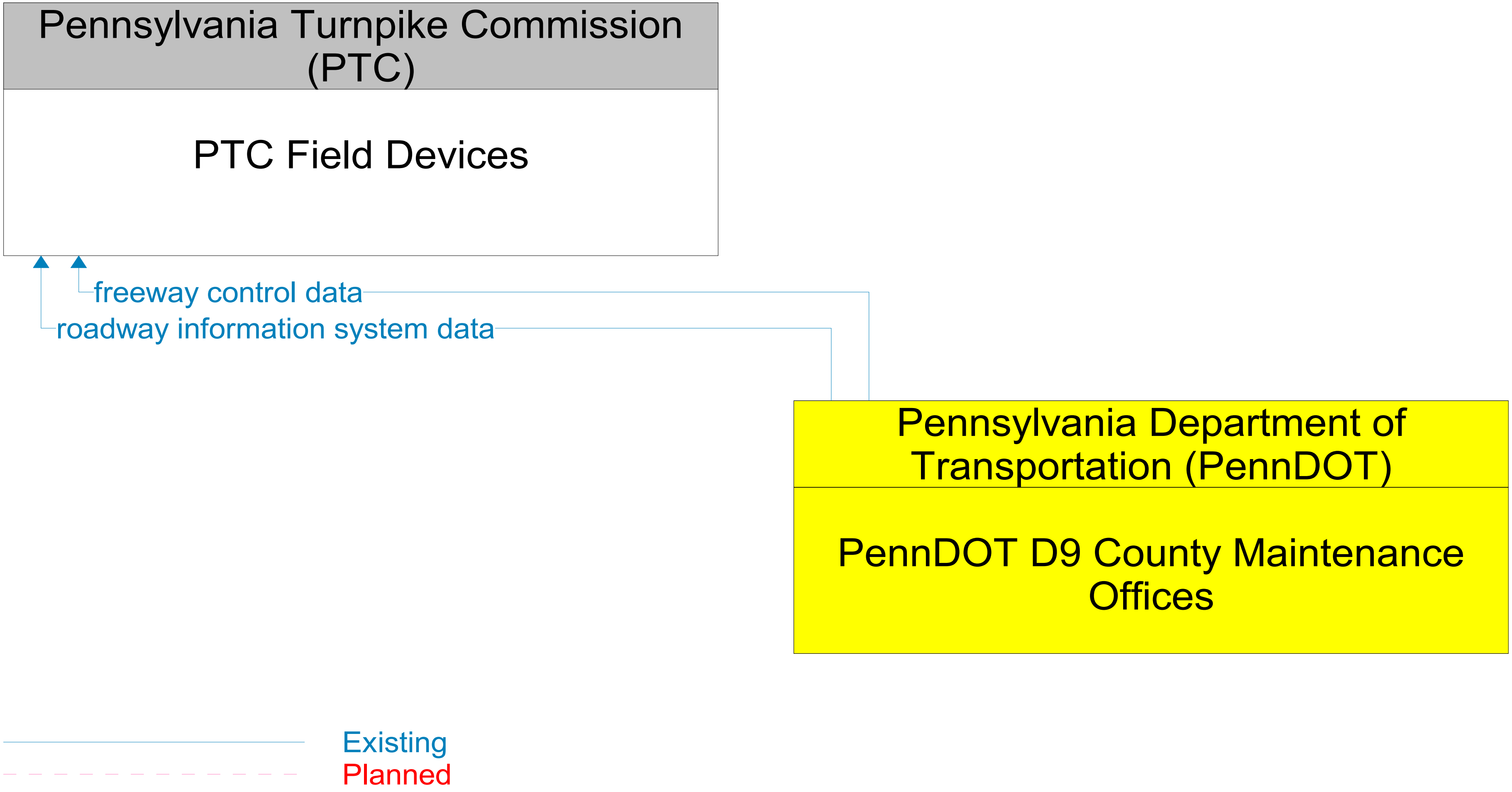
field device status

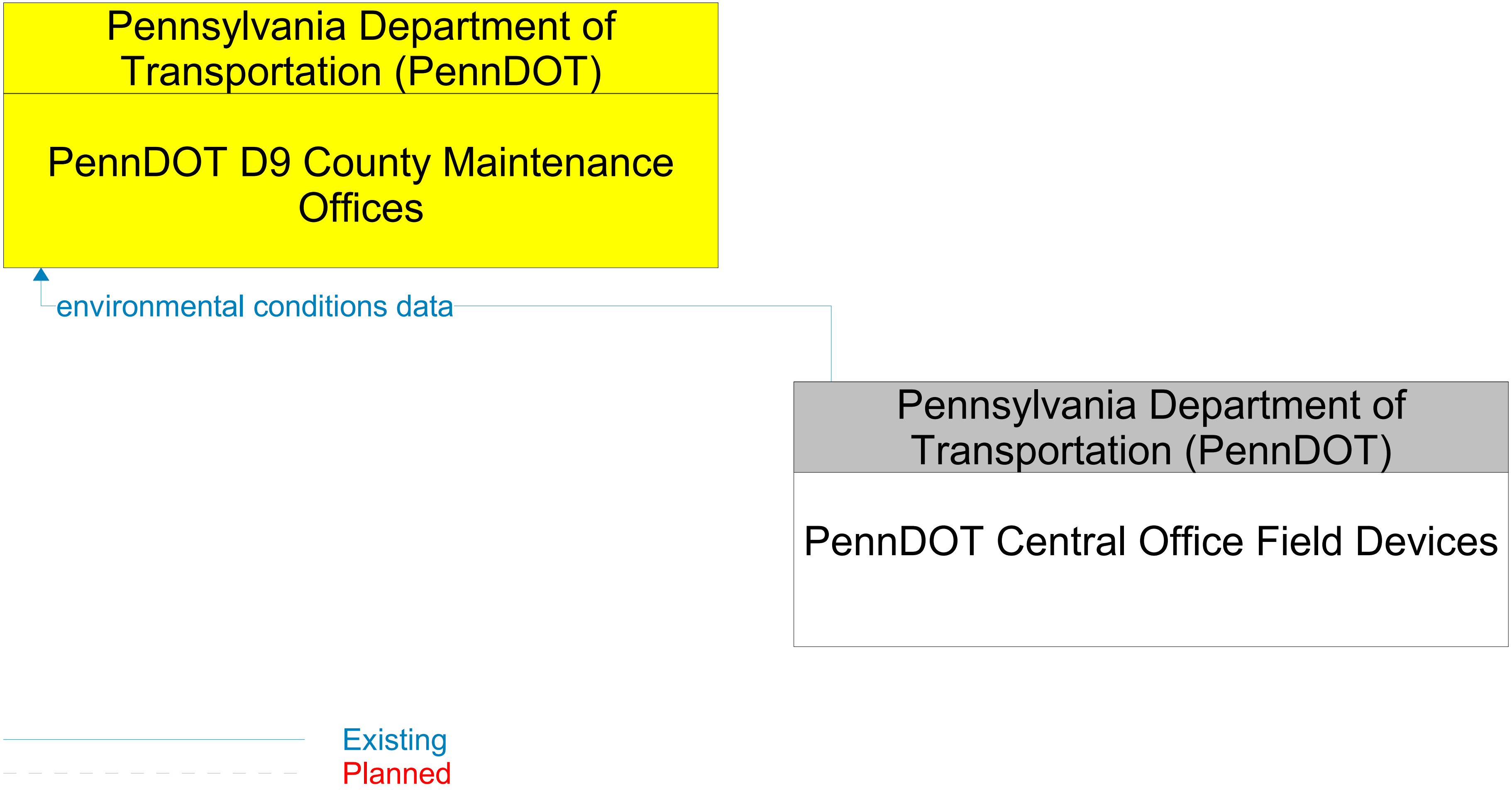
Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 County Maintenance Offices

Existing

Planned


Pennsylvania Turnpike Commission (PTC)
PTC Field Devices
freeway control data
roadway information system data
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 County Maintenance Offices
Existing
Planned



Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 County Maintenance Offices

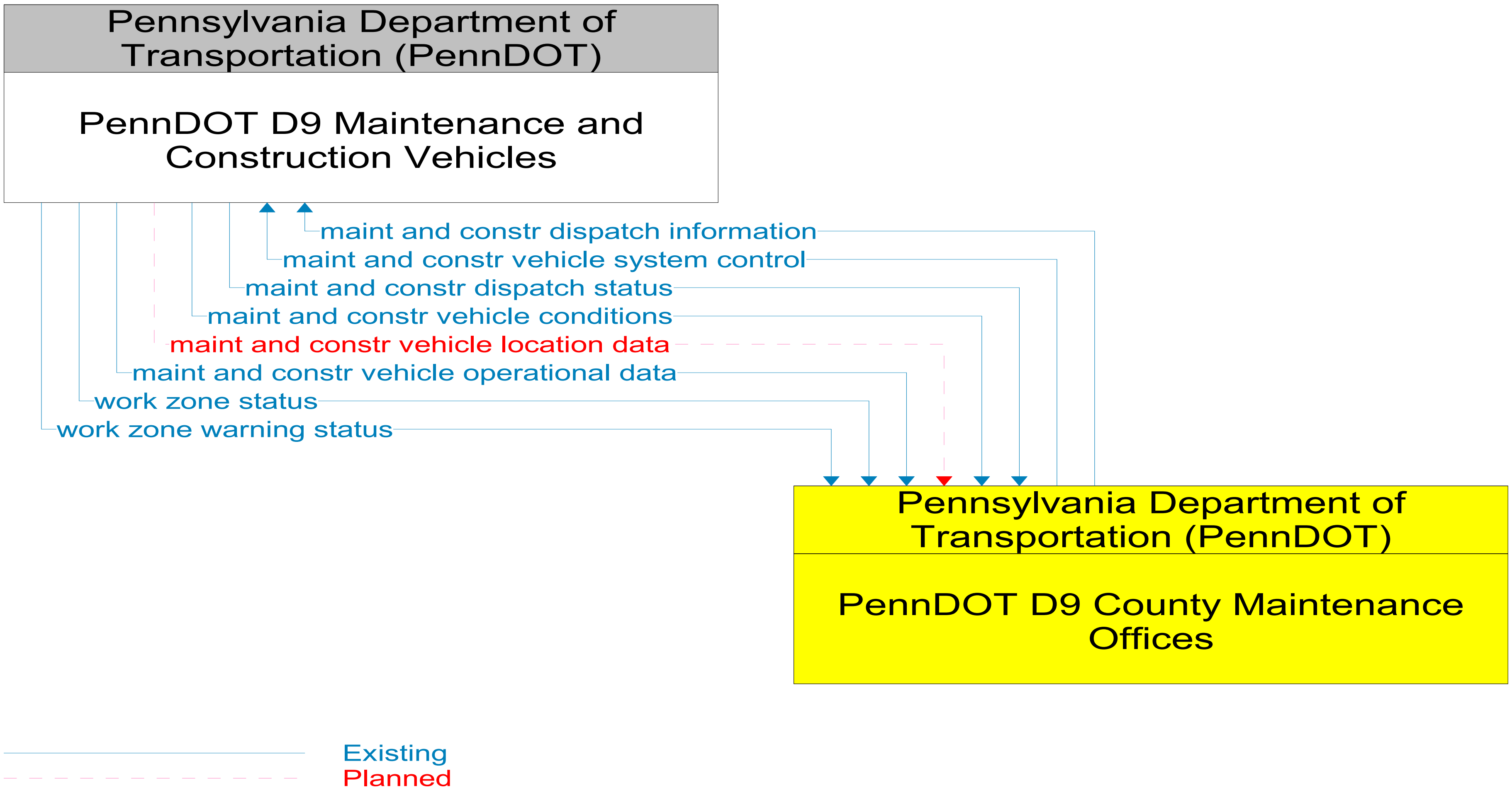
environmental conditions data

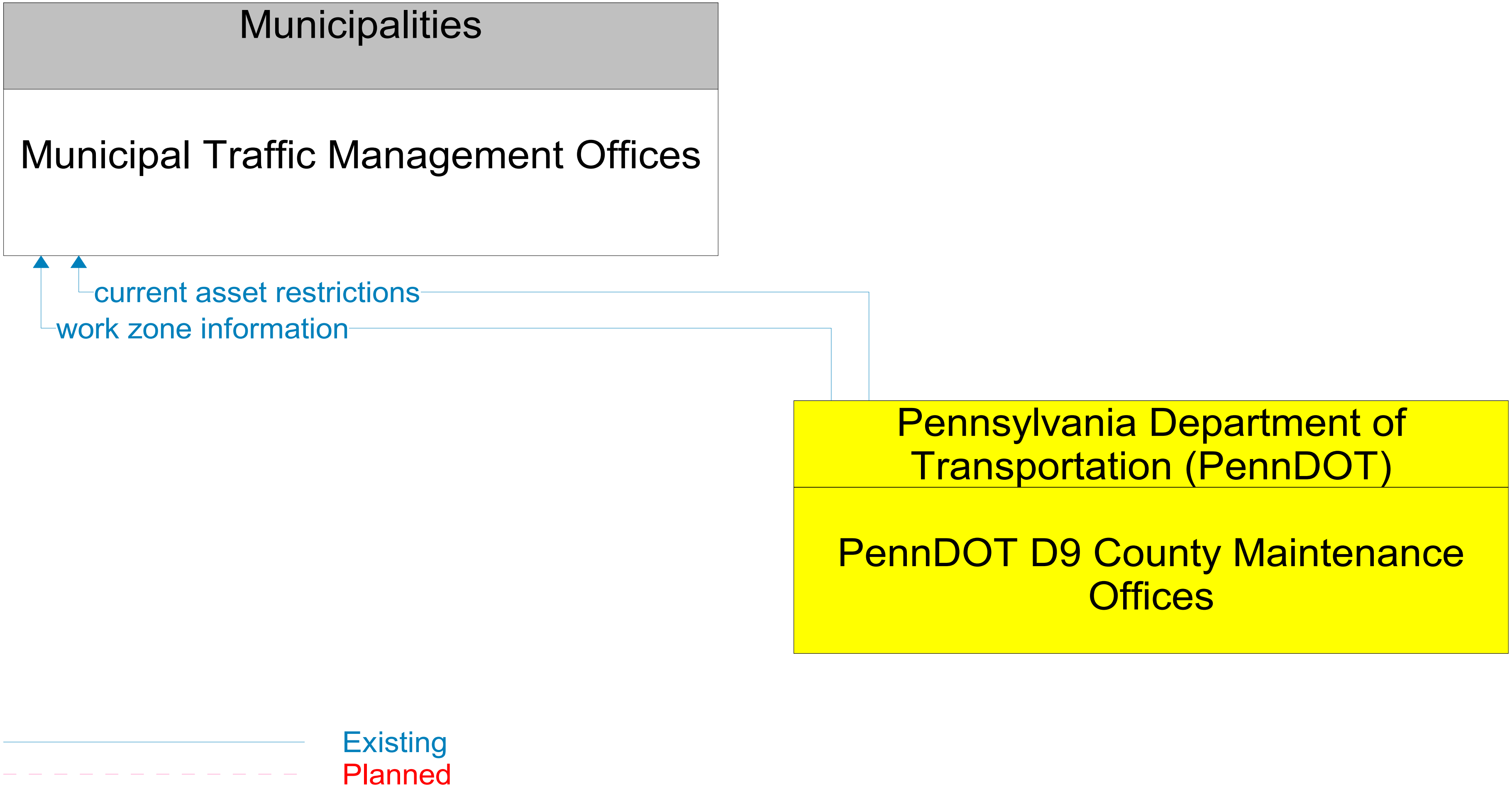
Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Field Devices

Existing

Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 Maintenance and Construction Vehicles
maint and constr dispatch information
maint and constr vehicle system control
maint and constr dispatch status
maint and constr vehicle conditions
maint and constr vehicle location data
maint and constr vehicle operational data
work zone status
work zone warning status
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 County Maintenance Offices
Existing
Planned



Municipalities

Municipal Traffic Management Offices

current asset restrictions

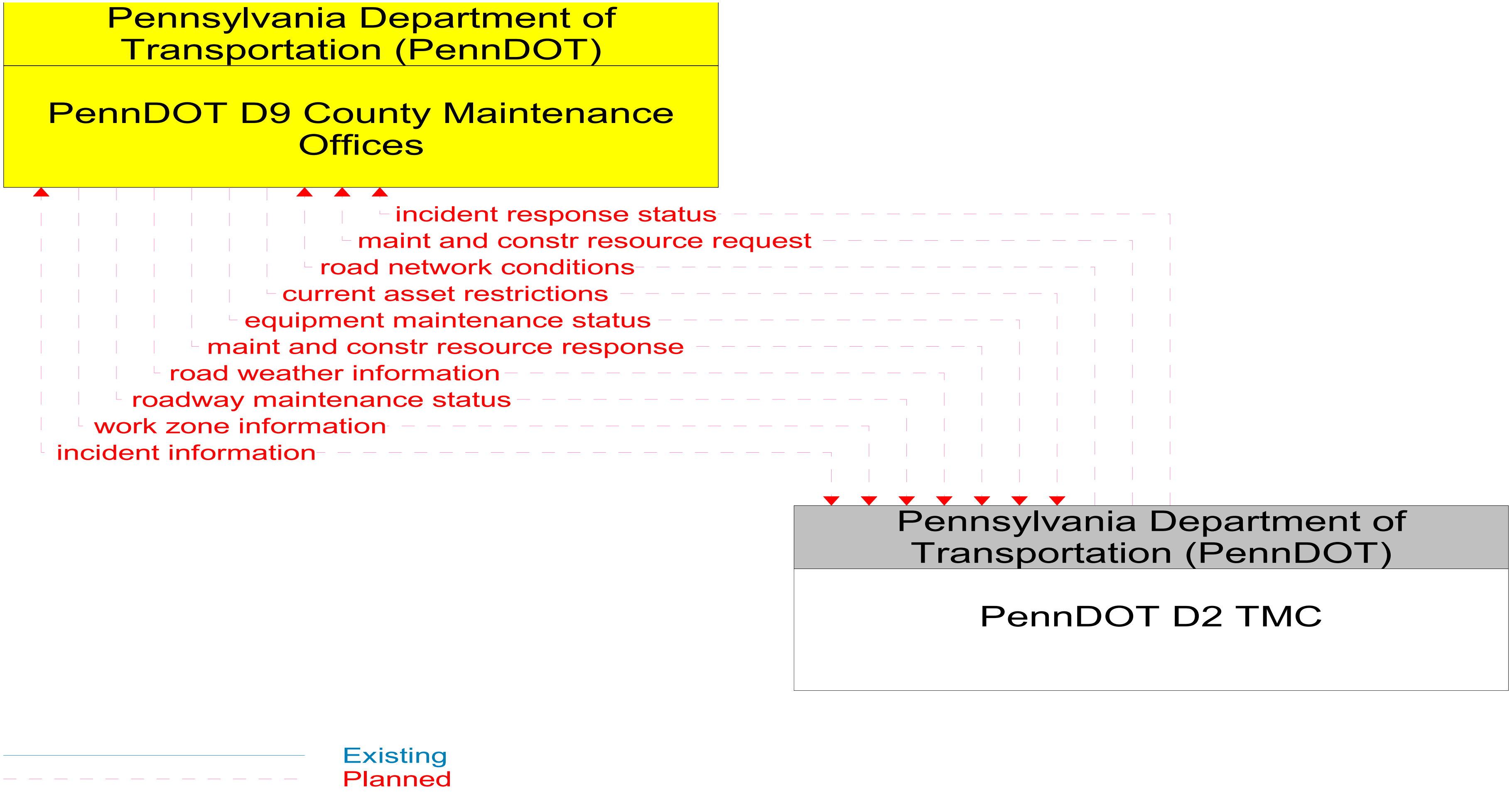
work zone information

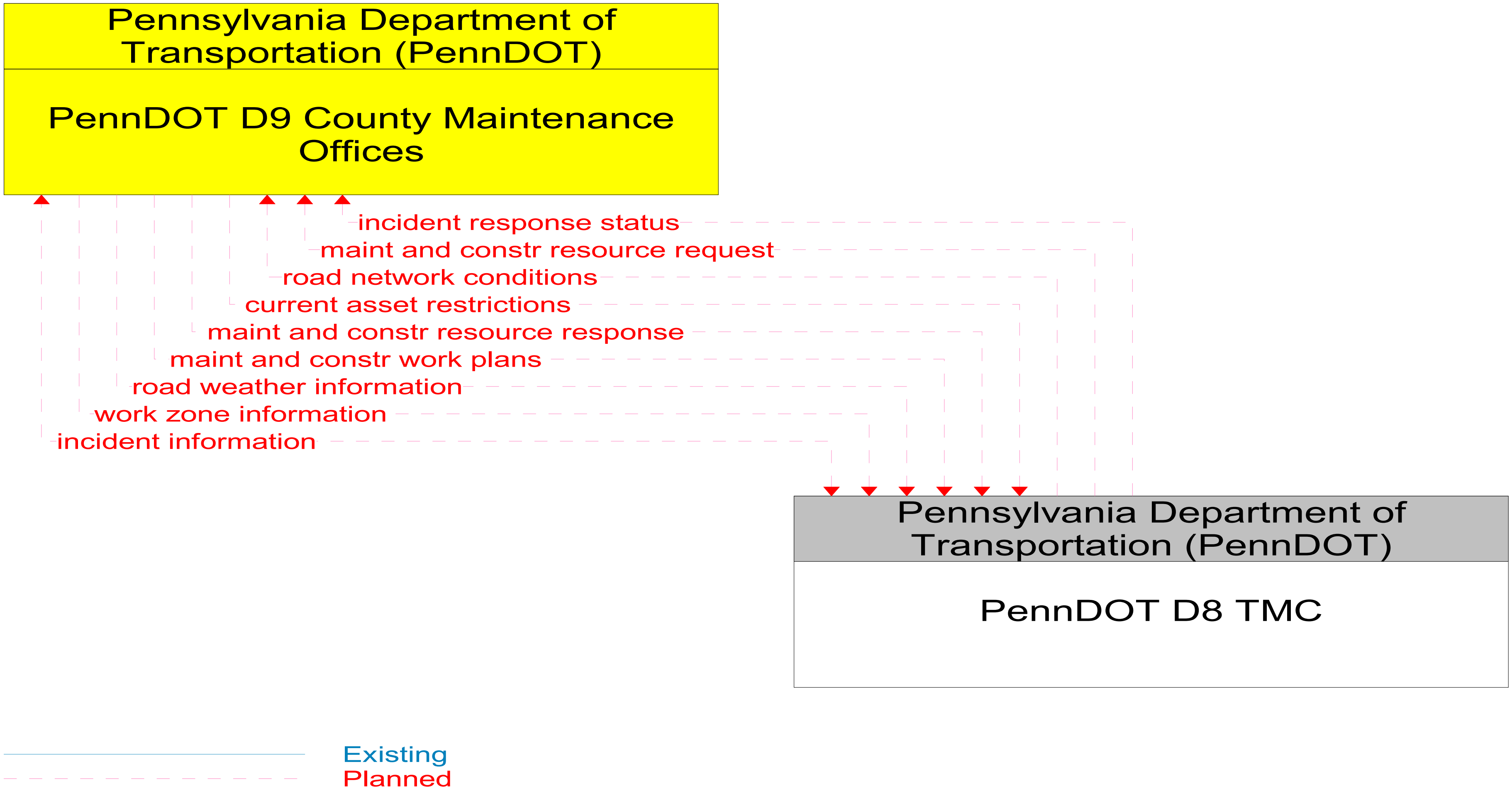
Pennsylvania Department of Transportation (PennDOT)

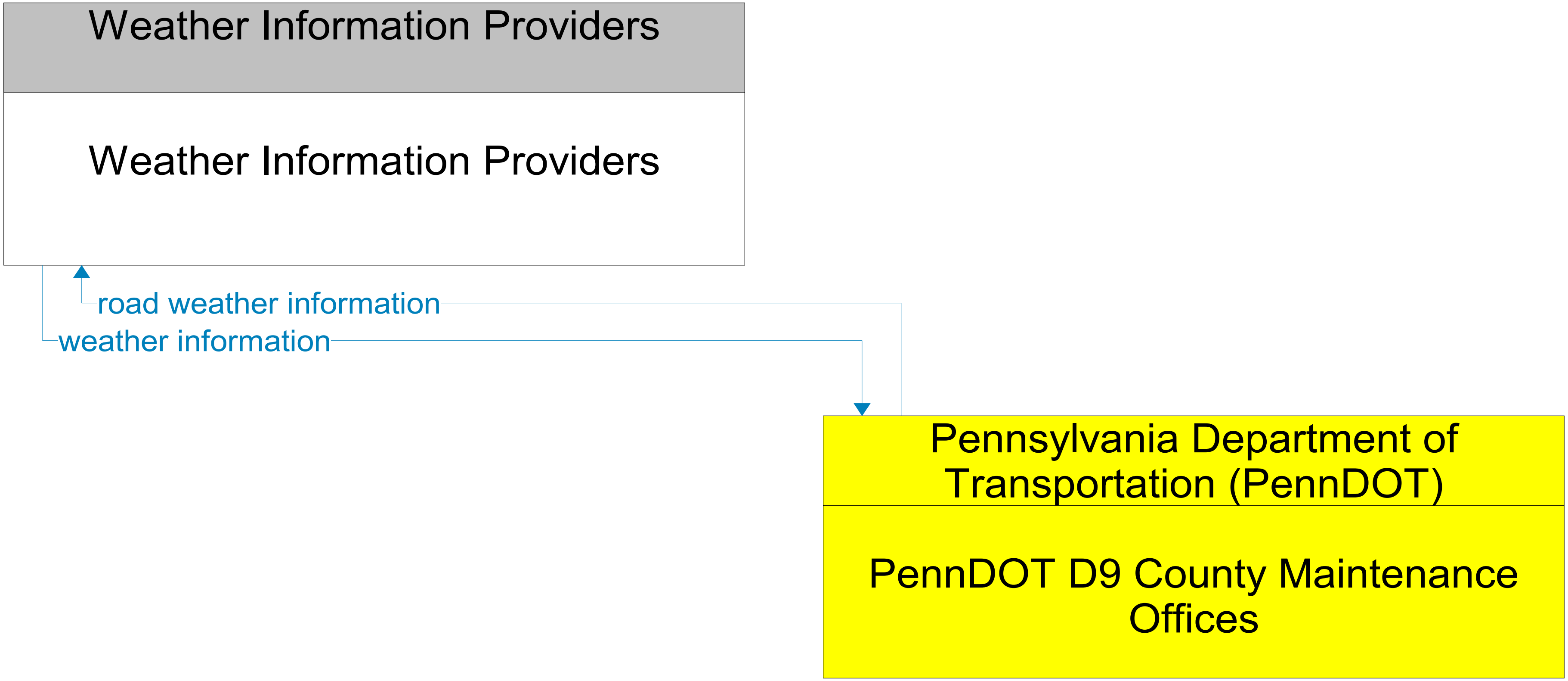
PennDOT D9 County Maintenance Offices

Existing

Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 County Maintenance Offices
incident response status
maint and constr resource request
road network conditions
current asset restrictions
equipment maintenance status
maint and constr resource response
road weather information
roadway maintenance status
work zone information
incident information
Pennsylvania Department of Transportation (PennDOT)
PennDOT D2 TMC
Existing
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 County Maintenance Offices
incident response status
maint and constr resource request
road network conditions
current asset restrictions
maint and constr resource response
maint and constr work plans
road weather information
work zone information
incident information
Pennsylvania Department of Transportation (PennDOT)
PennDOT D8 TMC
Existing
Planned



Weather Information Providers

Weather Information Providers

road weather information

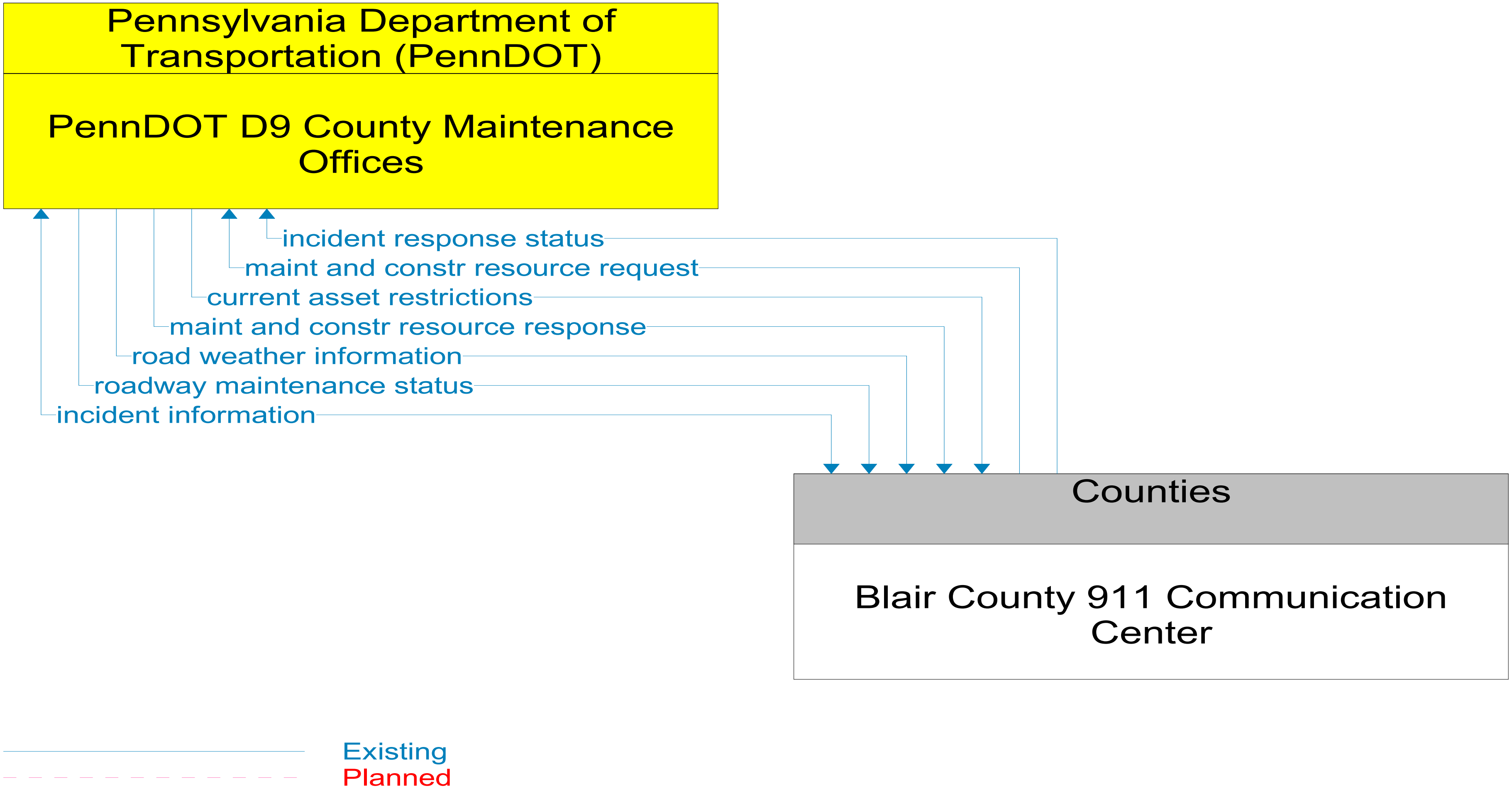
weather information

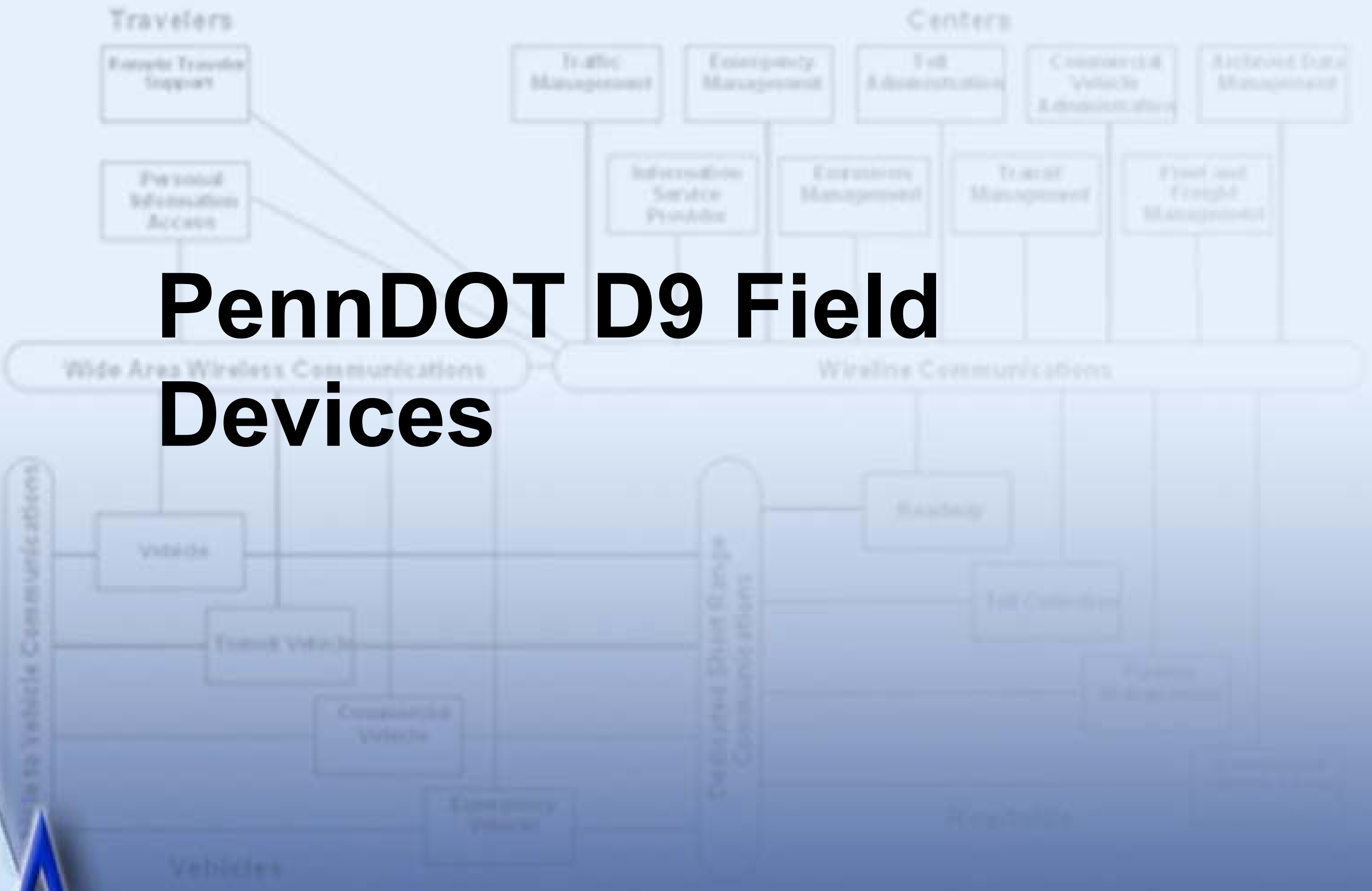
Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 County Maintenance Offices

Existing

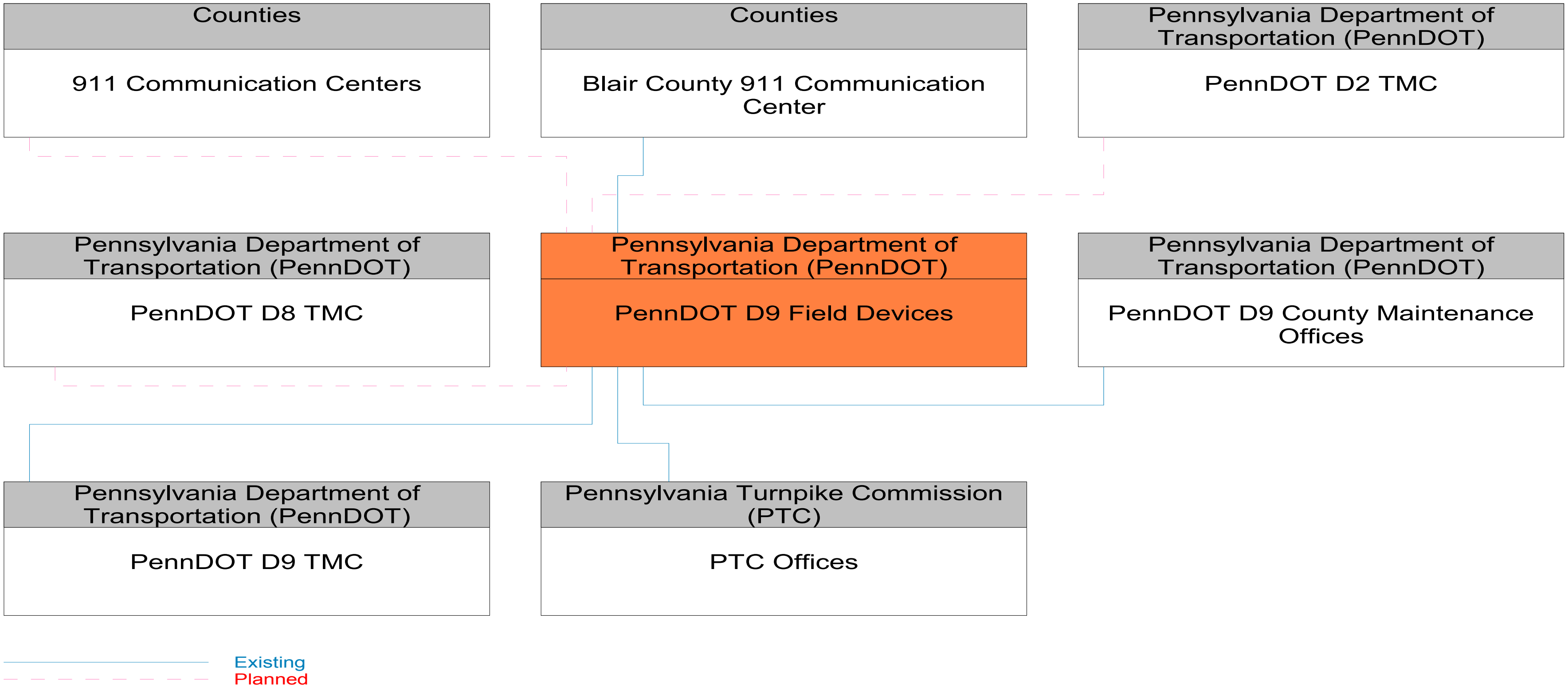
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 County Maintenance Offices
incident response status
maint and constr resource request
current asset restrictions
maint and constr resource response
road weather information
roadway maintenance status
incident information
Counties
Blair County 911 Communication Center
Existing
Planned


Travelers
Centers
Wide Area Wireless Communications
Wireline Communications
Vehicles

PennDOT D9 Field Devices

PennDOT D9 Field Devices Interconnect Diagram



Counties
911 Communication Centers

Counties
Blair County 911 Communication Center

Pennsylvania Department of Transportation (PennDOT)
PennDOT D2 TMC

Pennsylvania Department of Transportation (PennDOT)
PennDOT D8 TMC

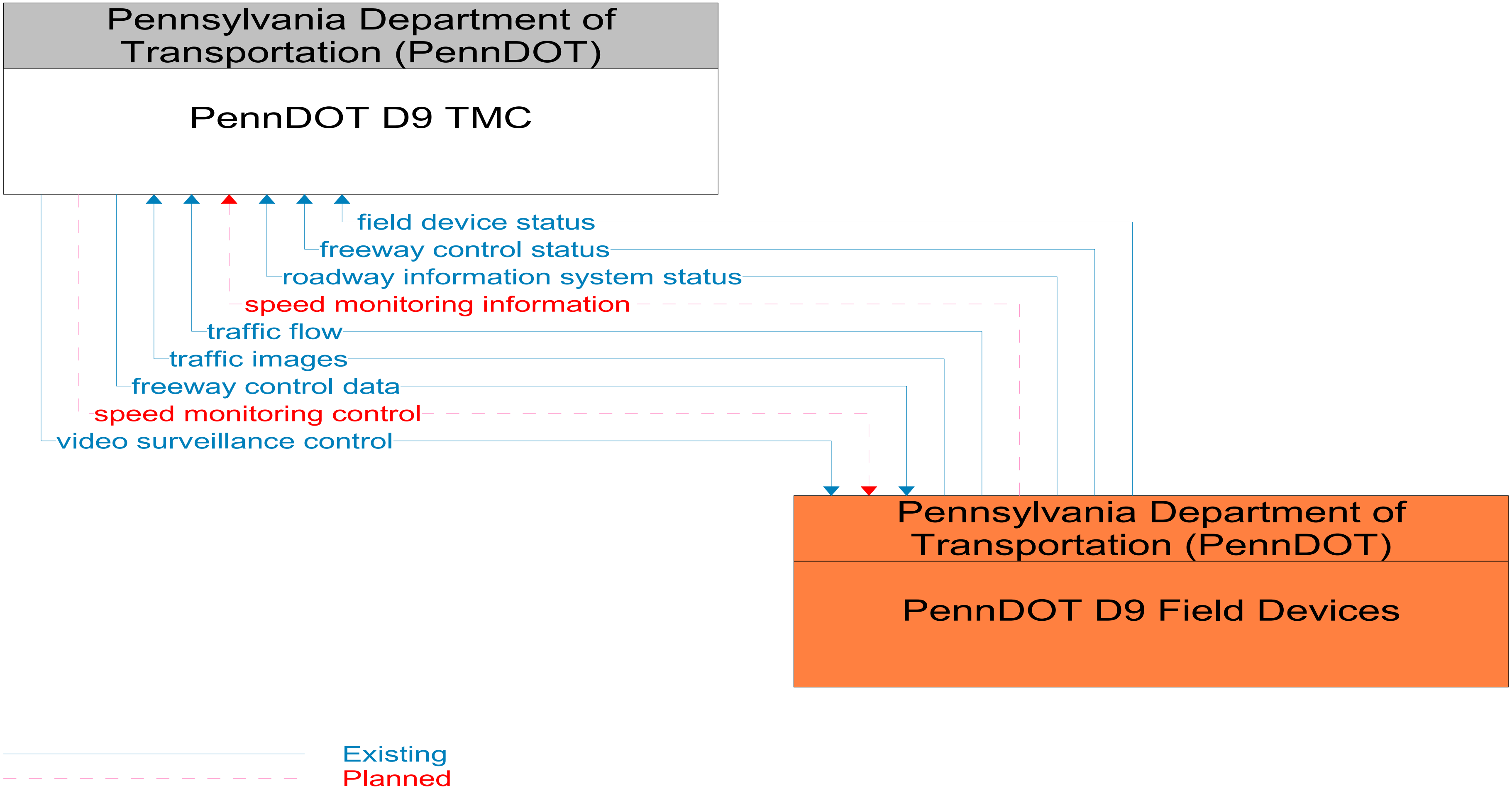
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 Field Devices

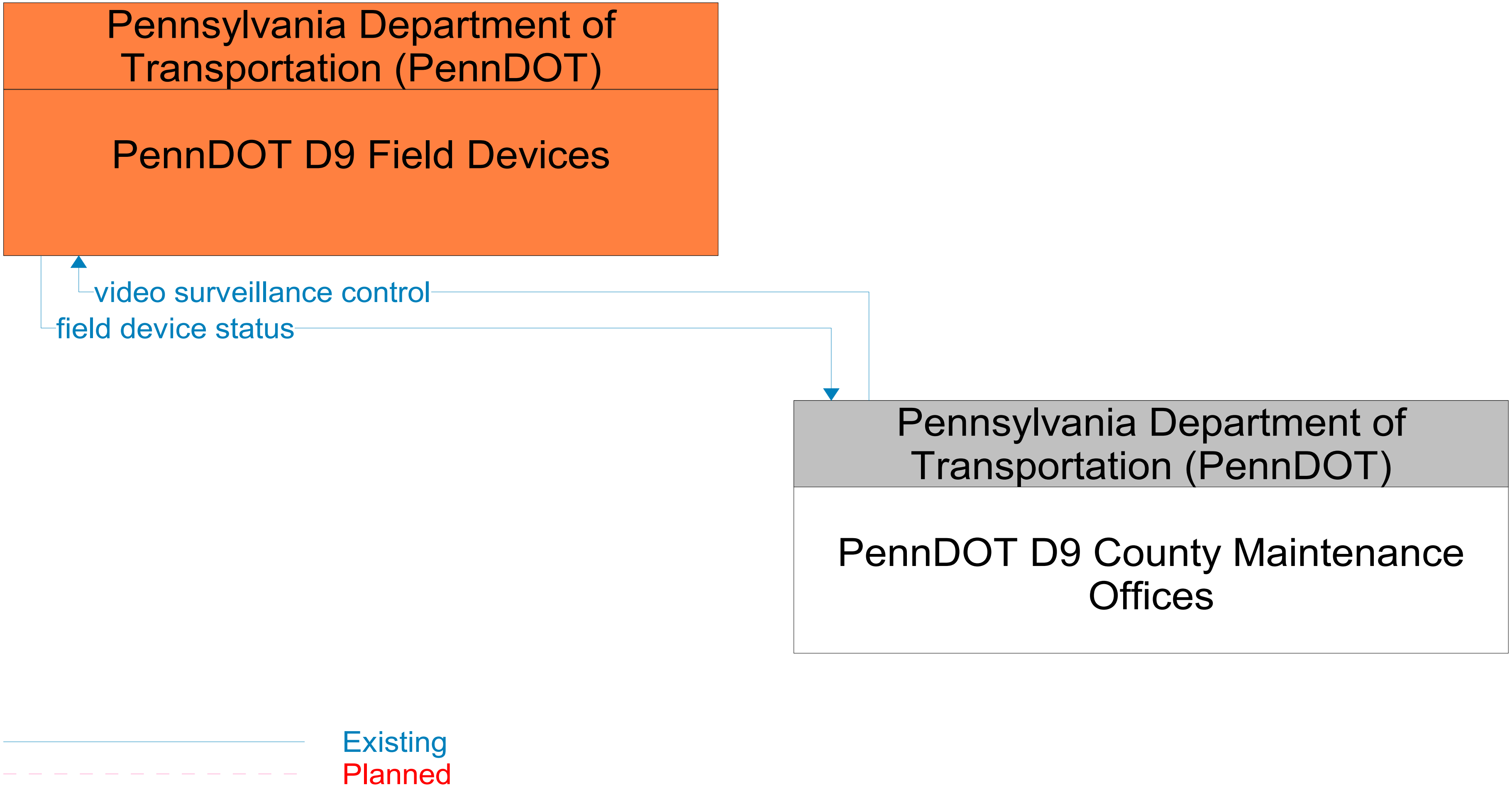
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 County Maintenance Offices

Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC

Pennsylvania Turnpike Commission (PTC)
PTC Offices

Existing
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
field device status
freeway control status
roadway information system status
speed monitoring information
traffic flow
traffic images
freeway control data
speed monitoring control
video surveillance control
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 Field Devices
Existing
Planned



Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 Field Devices

video surveillance control

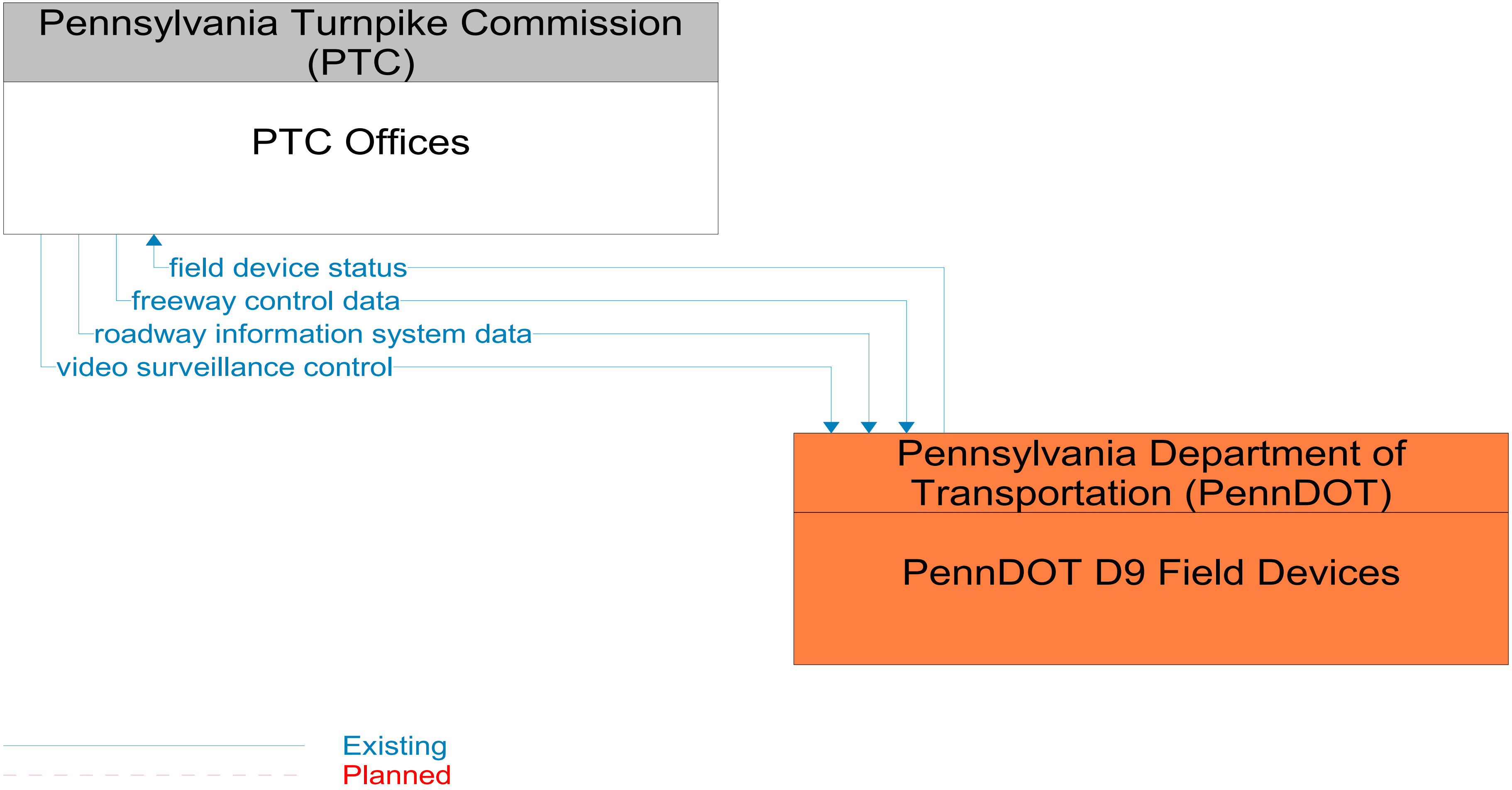
field device status

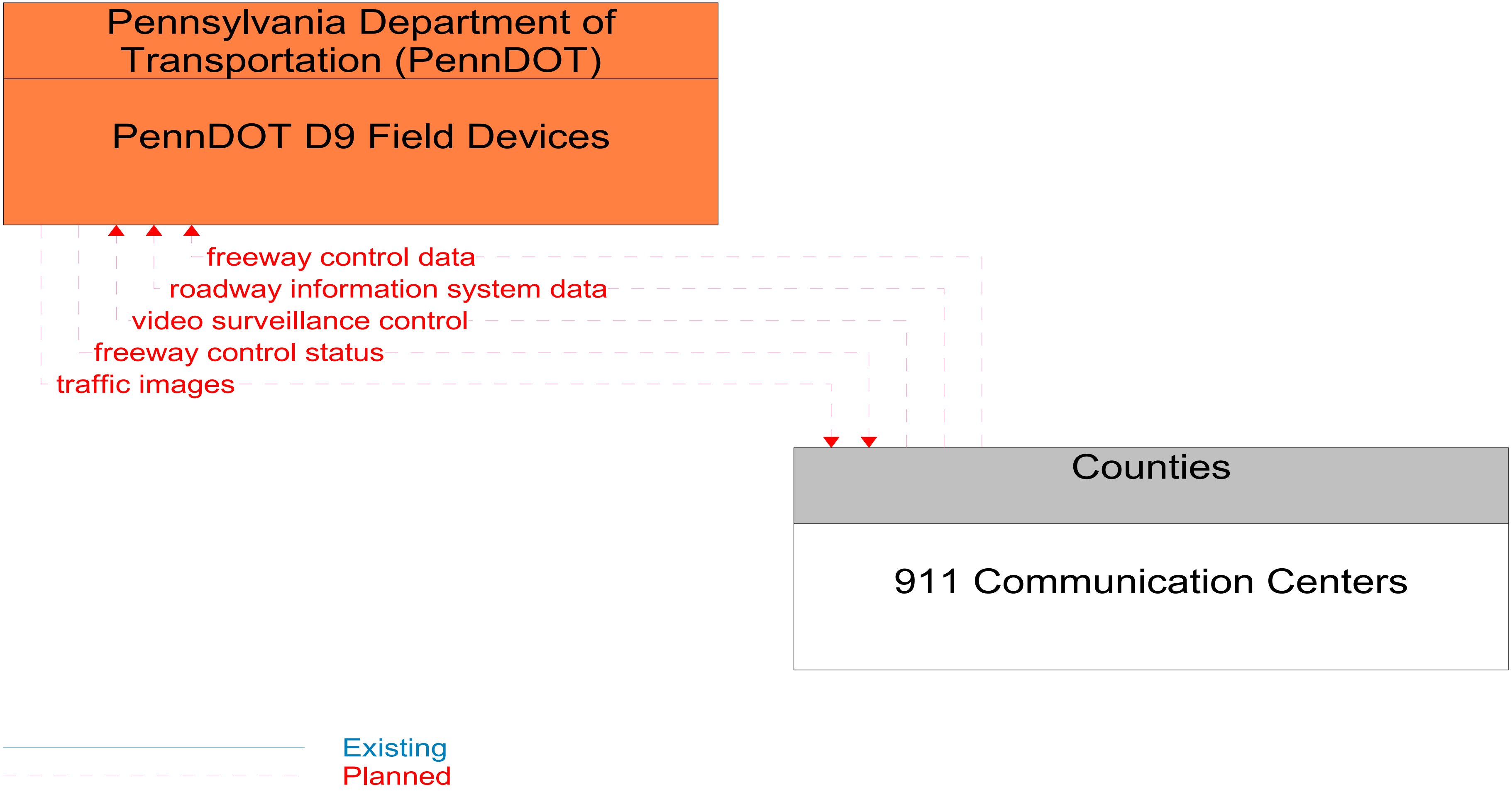
Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 County Maintenance Offices

Existing

Planned


Pennsylvania Turnpike Commission (PTC)
PTC Offices
field device status
freeway control data
roadway information system data
video surveillance control
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 Field Devices
Existing
Planned



Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 Field Devices

freeway control data

roadway information system data

video surveillance control

freeway control status

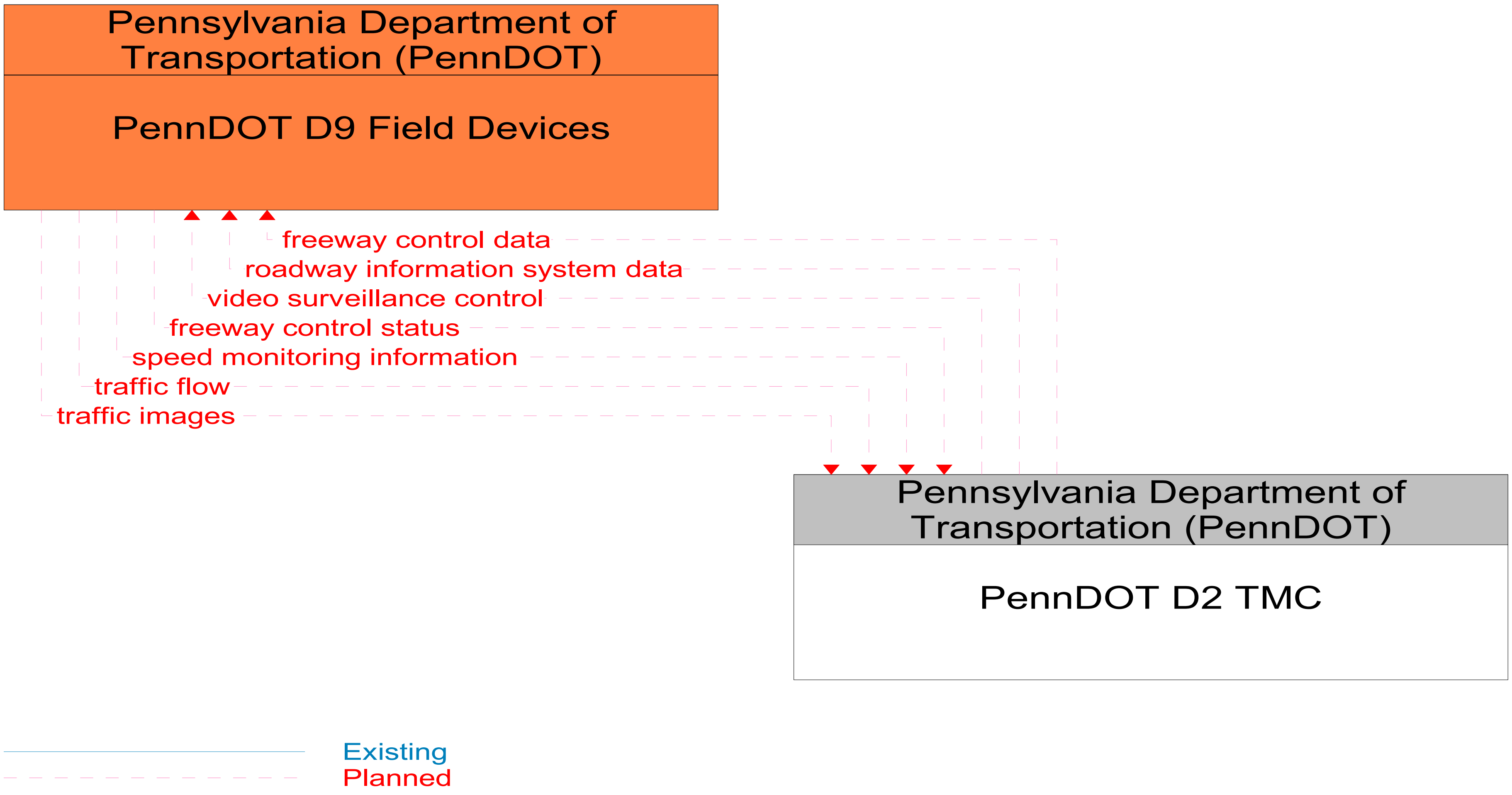
traffic images

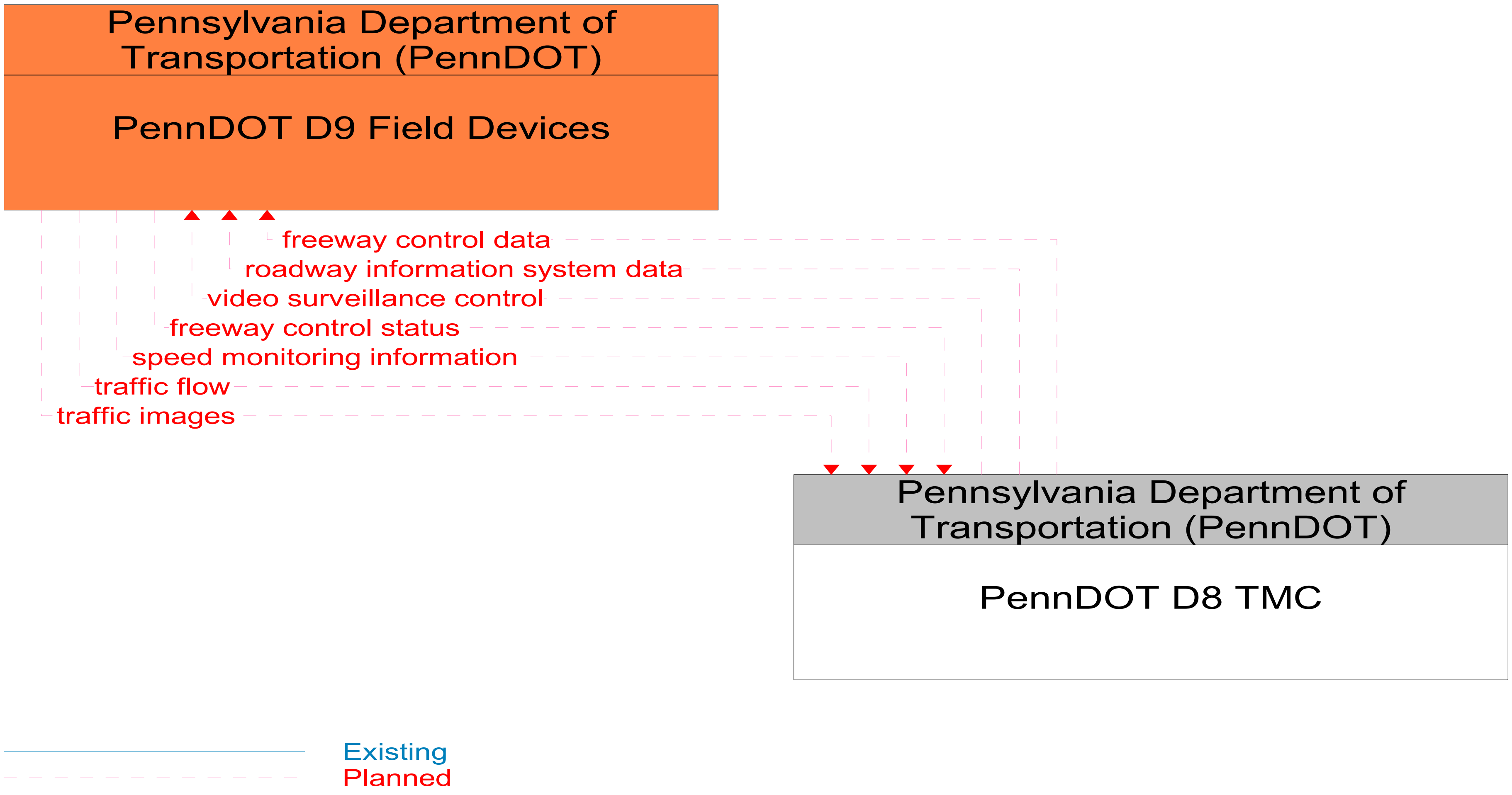
Counties

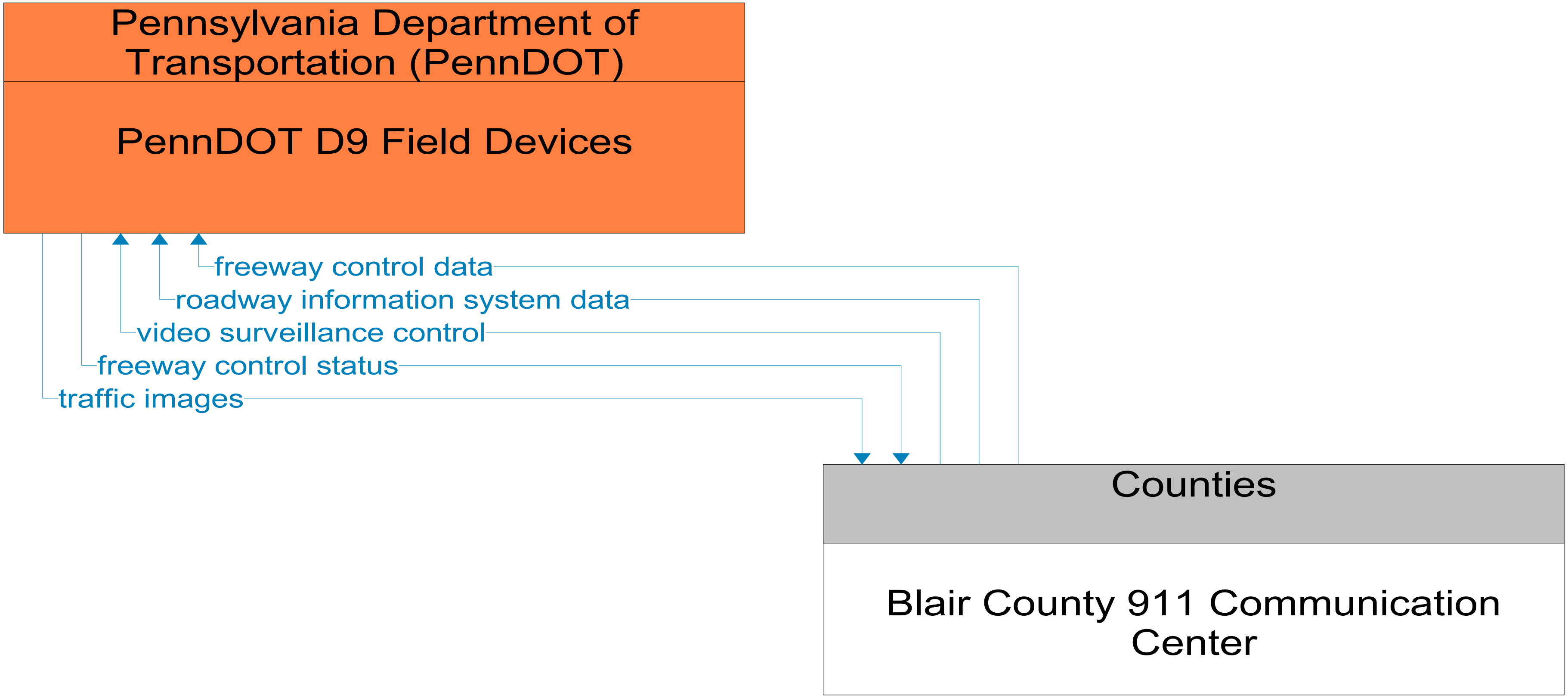
911 Communication Centers

Existing

Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 Field Devices
freeway control data
roadway information system data
video surveillance control
freeway control status
speed monitoring information
traffic flow
traffic images
Pennsylvania Department of Transportation (PennDOT)
PennDOT D2 TMC
Existing
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 Field Devices
freeway control data
roadway information system data
video surveillance control
freeway control status
speed monitoring information
traffic flow
traffic images
Pennsylvania Department of Transportation (PennDOT)
PennDOT D8 TMC
Existing
Planned



Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 Field Devices

freeway control data

roadway information system data

video surveillance control

freeway control status

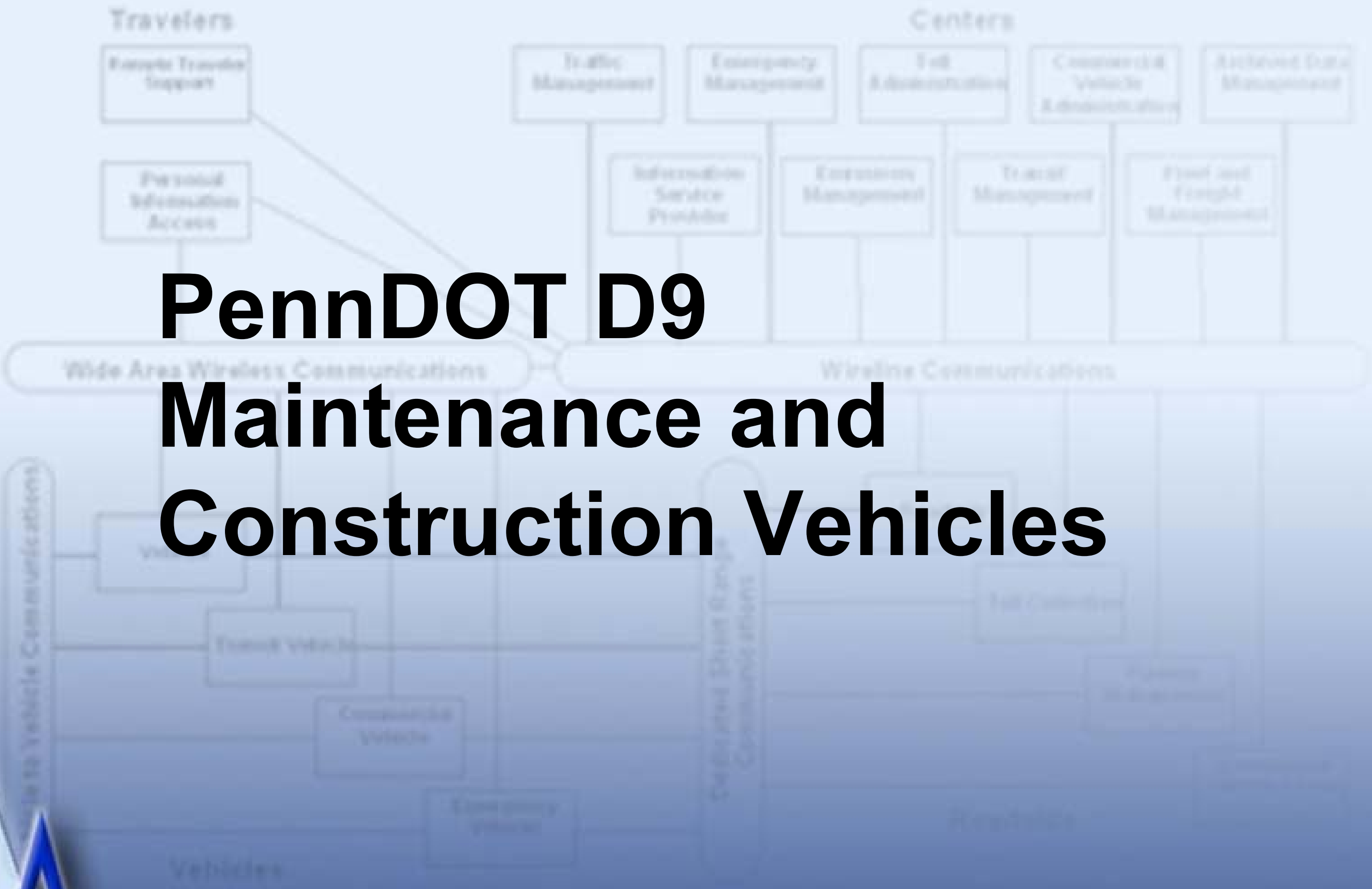
traffic images

Counties

Blair County 911 Communication Center

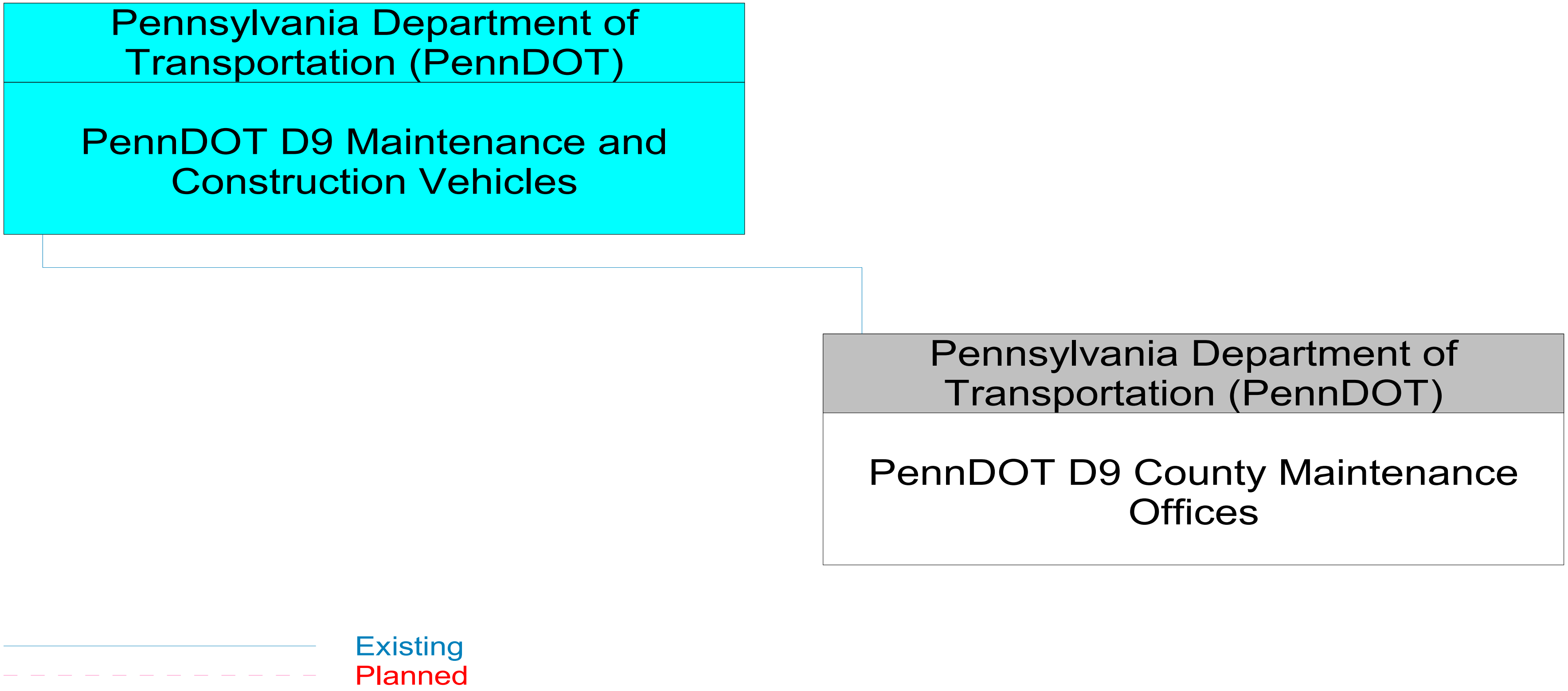
Existing

Planned



PennDOT D9 Maintenance and Construction Vehicles

PennDOT D9 Maintenance and Construction Vehicles Interconnect Diagram



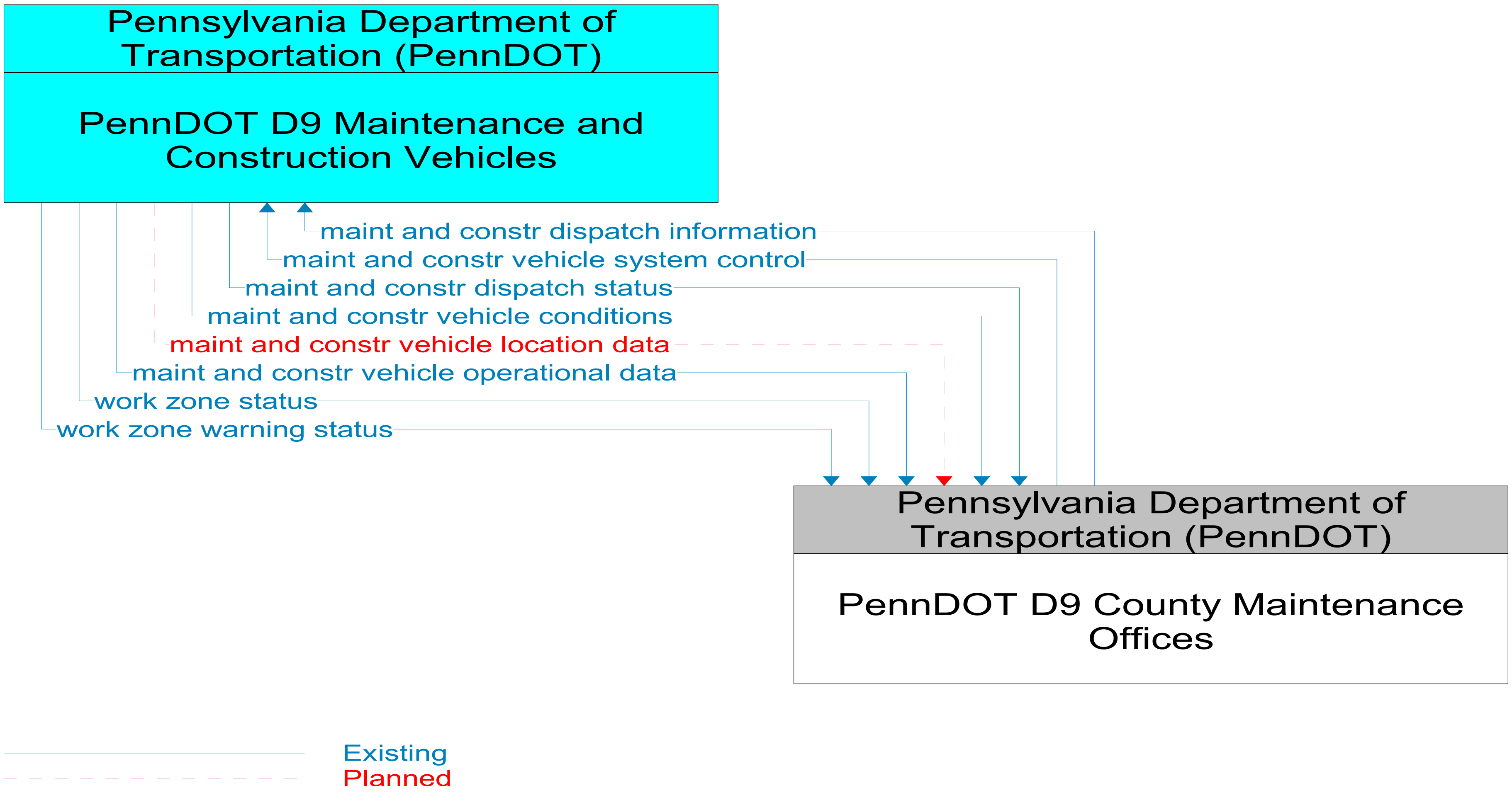
Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 Maintenance and Construction Vehicles

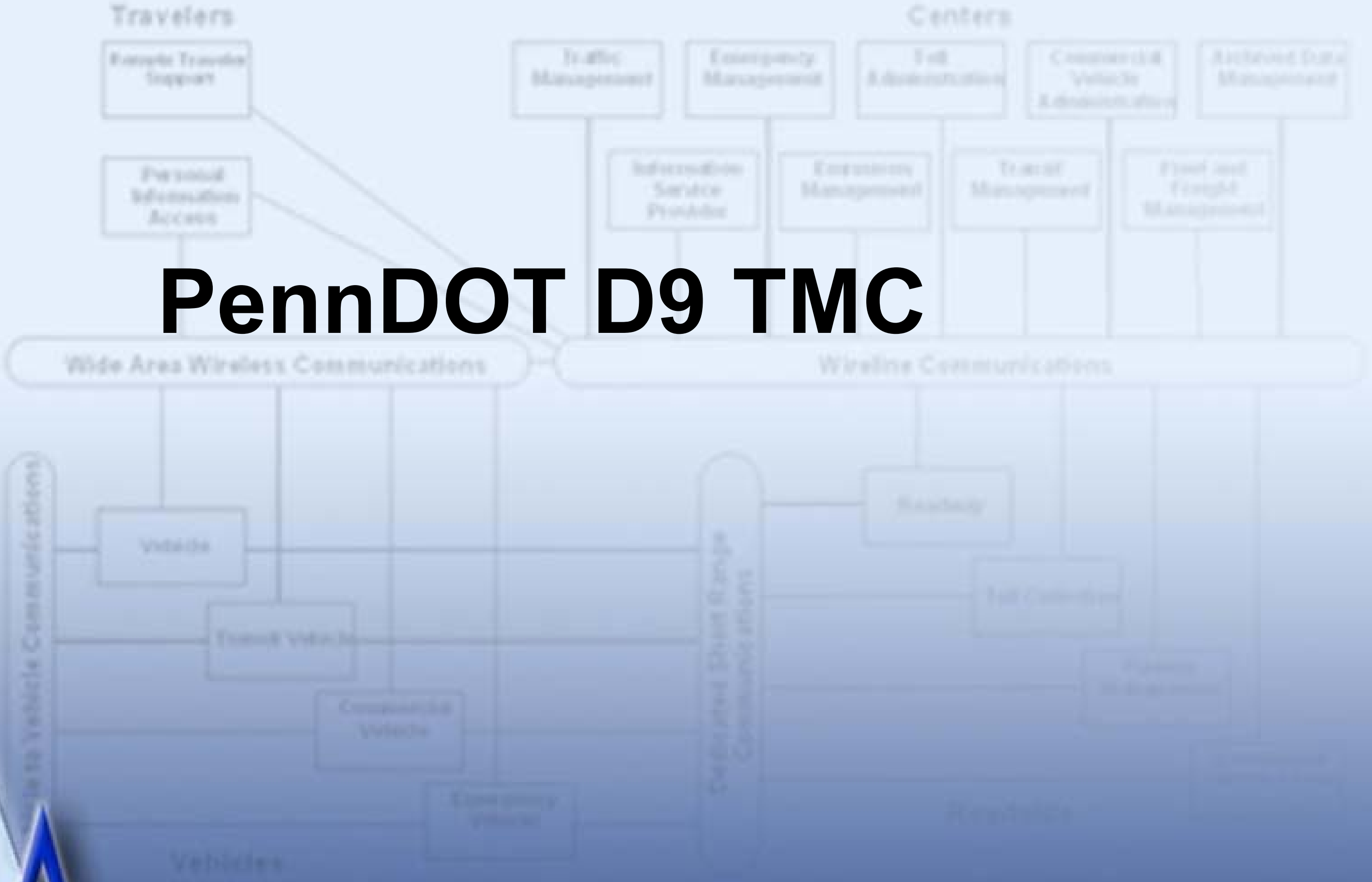
Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 County Maintenance Offices

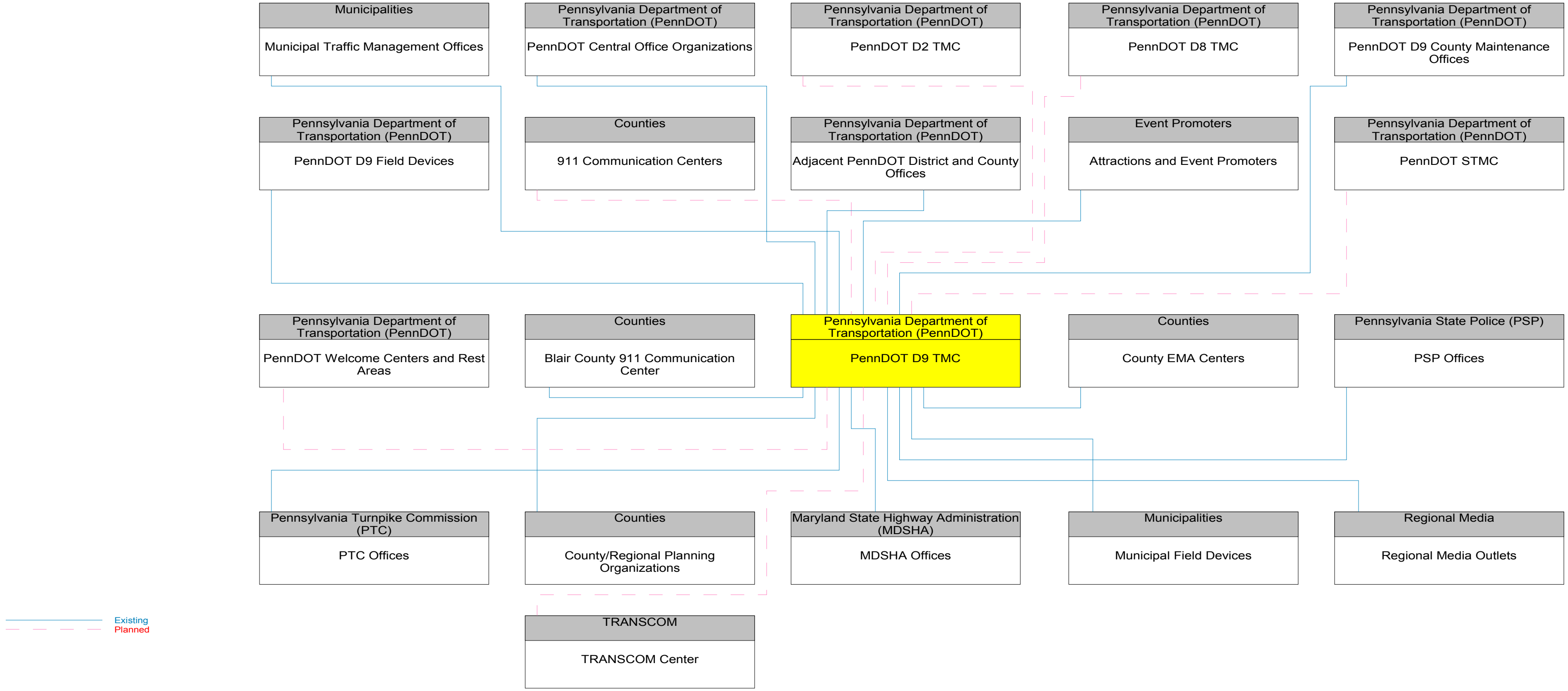
Existing
Planned

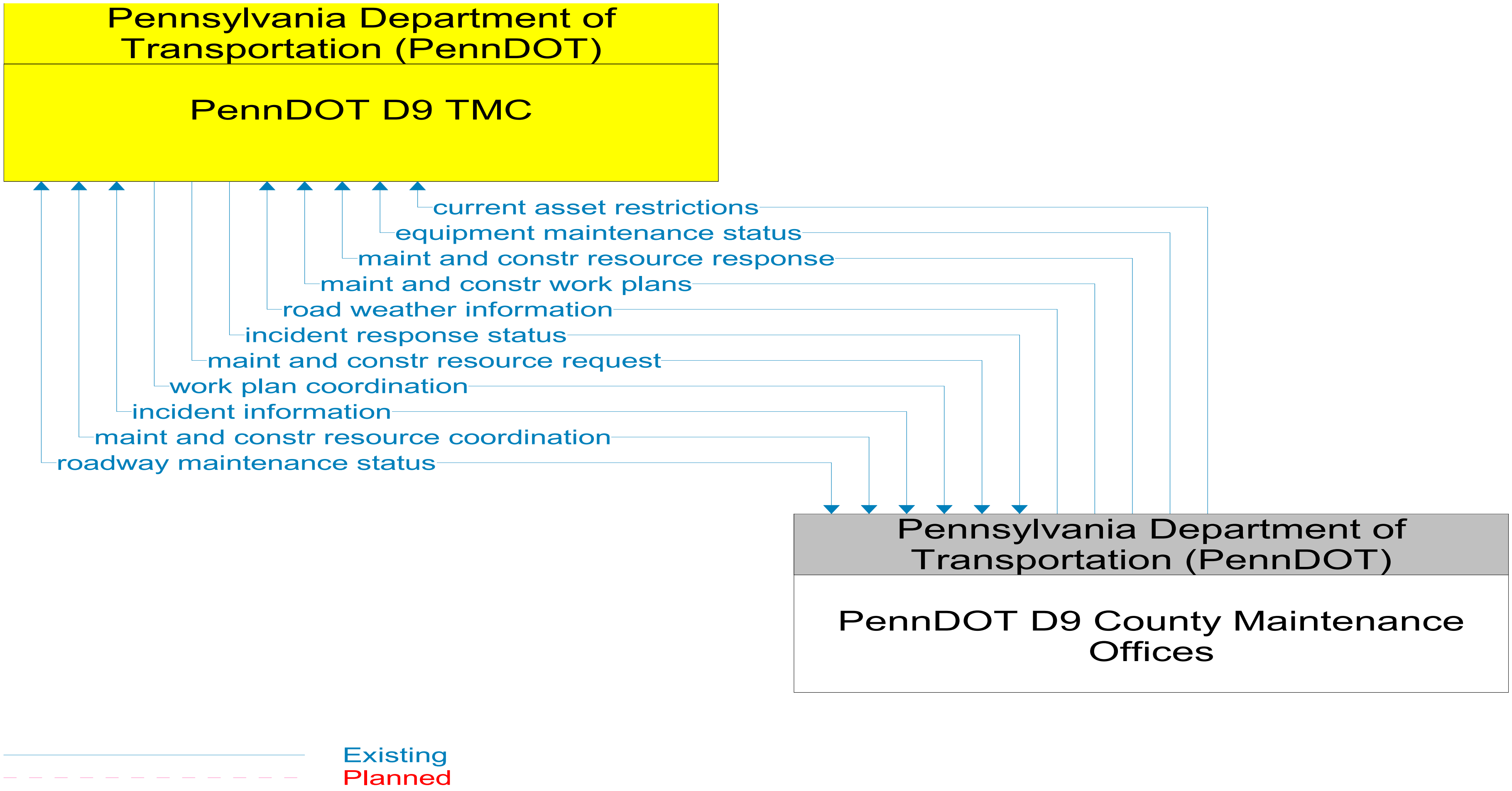

Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 Maintenance and Construction Vehicles
maint and constr dispatch information
maint and constr vehicle system control
maint and constr dispatch status
maint and constr vehicle conditions
maint and constr vehicle location data
maint and constr vehicle operational data
work zone status
work zone warning status
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 County Maintenance Offices
Existing
Planned

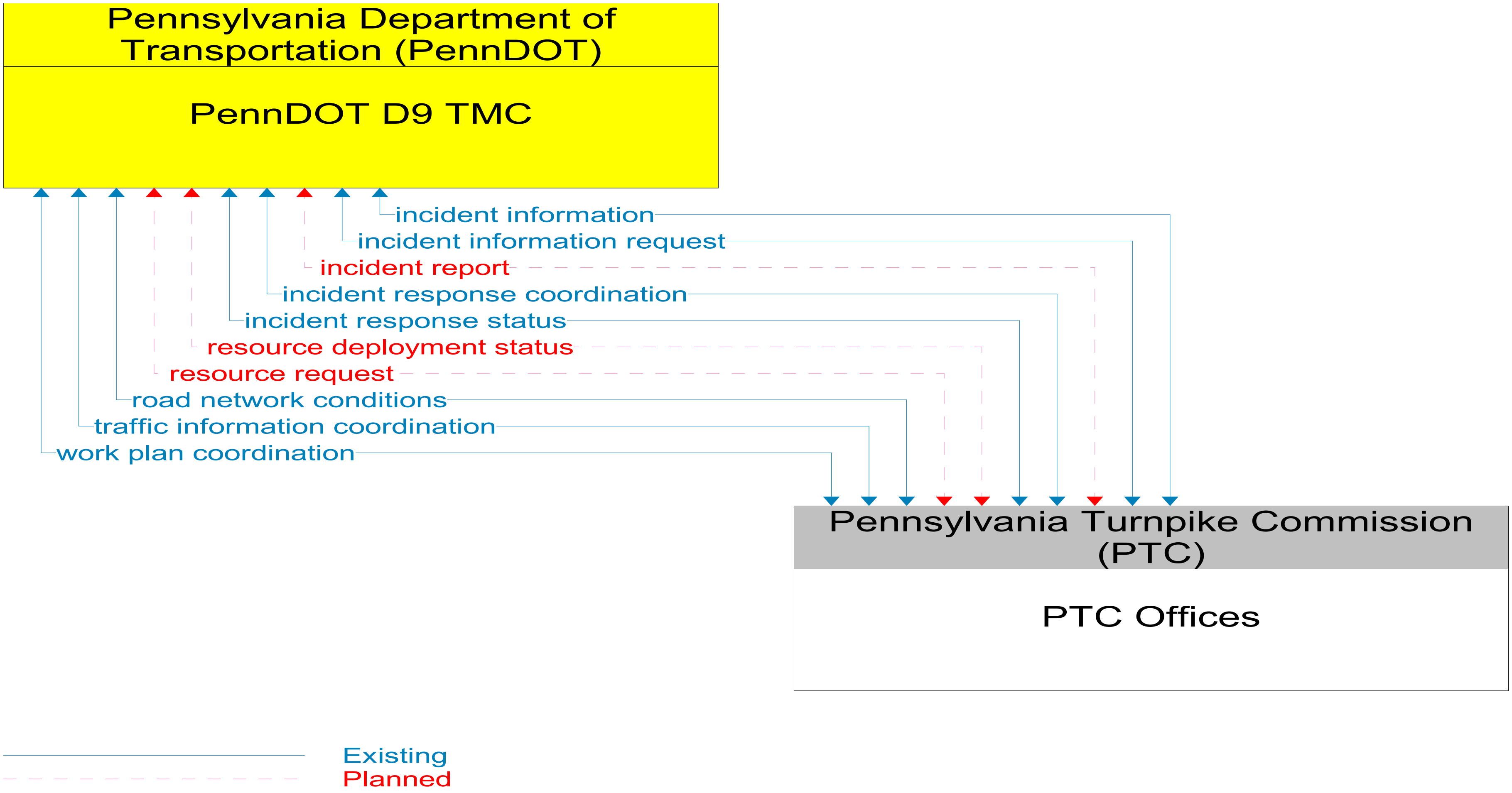
PennDOT D9 TMC

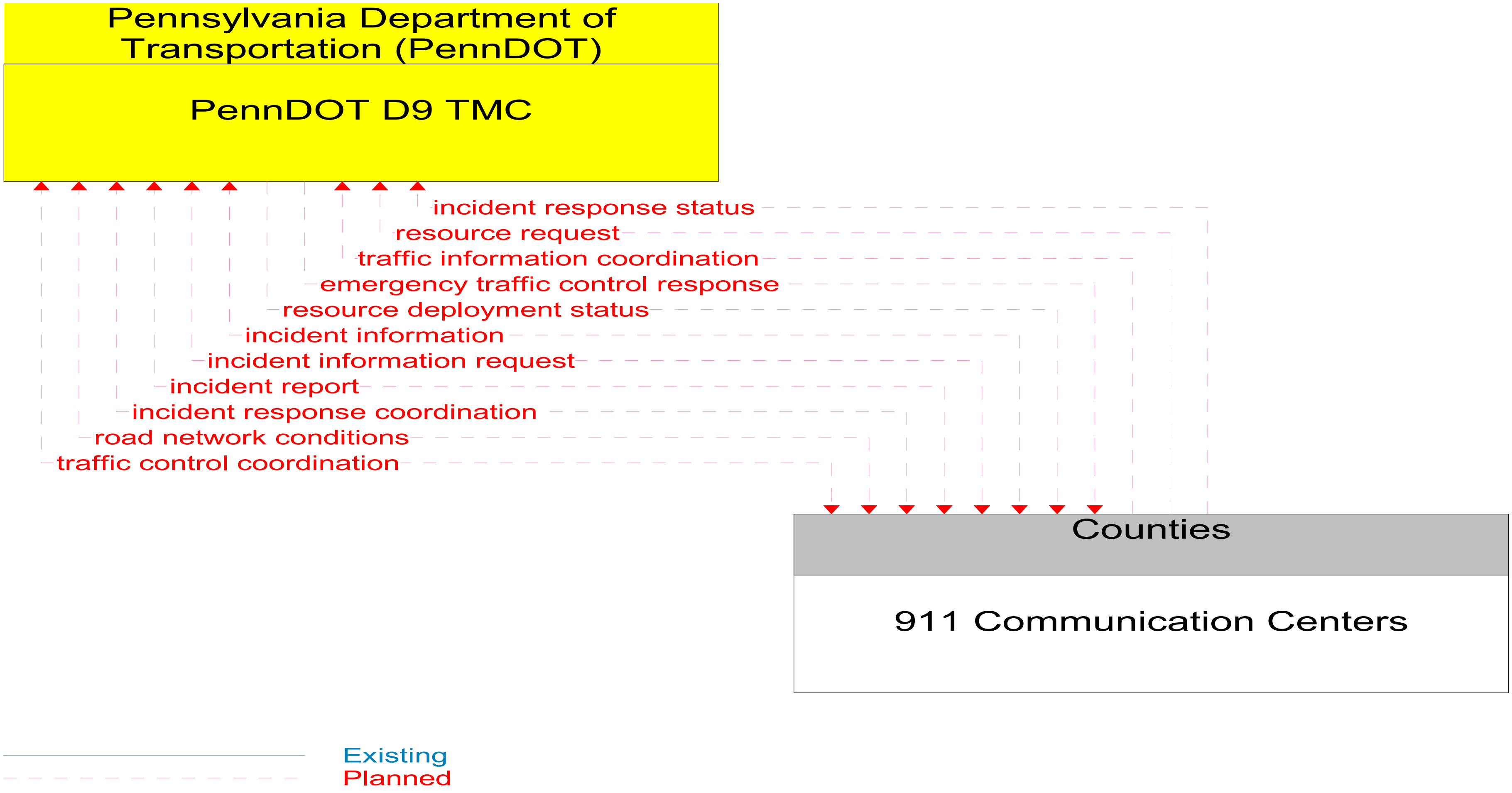

Travelers
Centers
Wide Area Wireless Communications
Wireline Communications
Vehicles

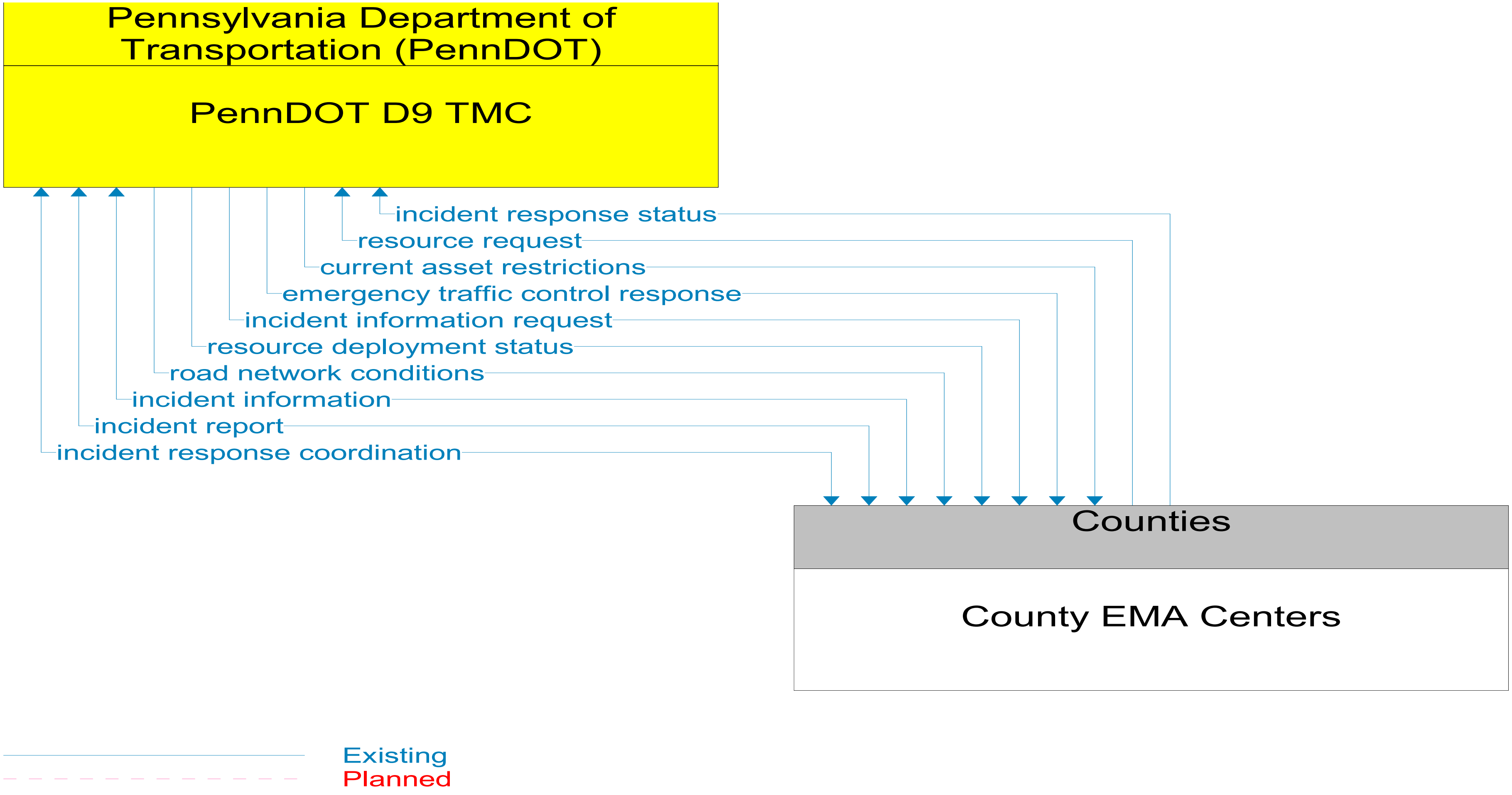
PennDOT D9 TMC Interconnect Diagram

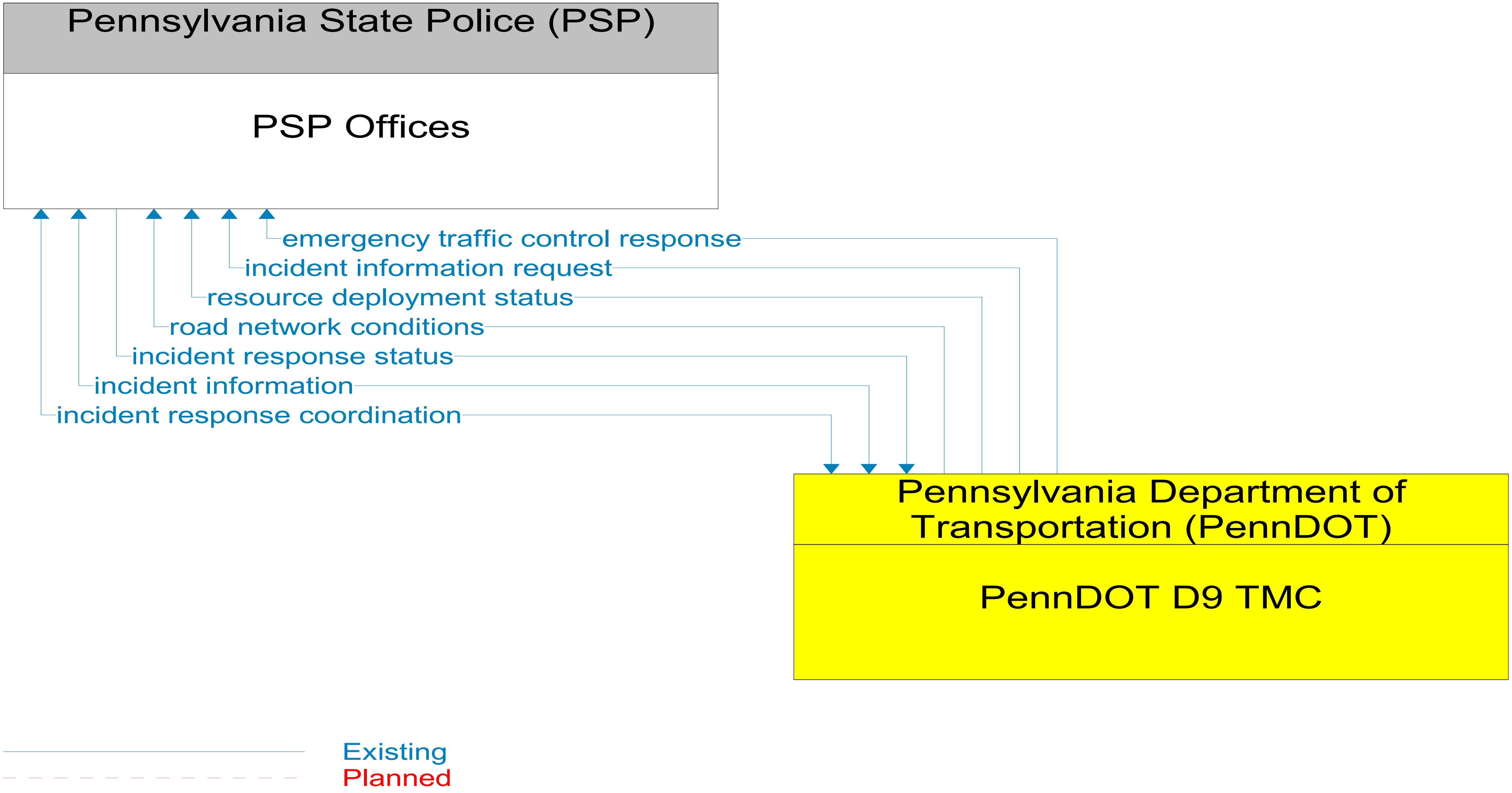

Municipalities
Municipal Traffic Management Offices
Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Organizations
Pennsylvania Department of Transportation (PennDOT)
PennDOT D2 TMC
Pennsylvania Department of Transportation (PennDOT)
PennDOT D8 TMC
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 County Maintenance Offices
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 Field Devices
Counties
911 Communication Centers
Pennsylvania Department of Transportation (PennDOT)
Adjacent PennDOT District and County Offices
Event Promoters
Attractions and Event Promoters
Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC
Pennsylvania Department of Transportation (PennDOT)
PennDOT Welcome Centers and Rest Areas
Counties
Blair County 911 Communication Center
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
Counties
County EMA Centers
Pennsylvania State Police (PSP)
PSP Offices
Pennsylvania Turnpike Commission (PTC)
PTC Offices
Counties
County/Regional Planning Organizations
Maryland State Highway Administration (MDSHA)
MDSHA Offices
Municipalities
Municipal Field Devices
Regional Media
Regional Media Outlets
TRANSCOM
TRANSCOM Center
Existing
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
current asset restrictions
equipment maintenance status
maint and constr resource response
maint and constr work plans
road weather information
incident response status
maint and constr resource request
work plan coordination
incident information
maint and constr resource coordination
roadway maintenance status
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 County Maintenance Offices
Existing
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
incident information
incident information request
incident report
incident response coordination
incident response status
resource deployment status
resource request
road network conditions
traffic information coordination
work plan coordination
Pennsylvania Turnpike Commission (PTC)
PTC Offices
Existing
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
incident response status
resource request
traffic information coordination
emergency traffic control response
resource deployment status
incident information
incident information request
incident report
incident response coordination
road network conditions
traffic control coordination
Counties
911 Communication Centers
Existing
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
incident response status
resource request
current asset restrictions
emergency traffic control response
incident information request
resource deployment status
road network conditions
incident information
incident report
incident response coordination
Counties
County EMA Centers
Existing
Planned



Pennsylvania State Police (PSP)

PSP Offices

emergency traffic control response

incident information request

resource deployment status

road network conditions

incident response status

incident information

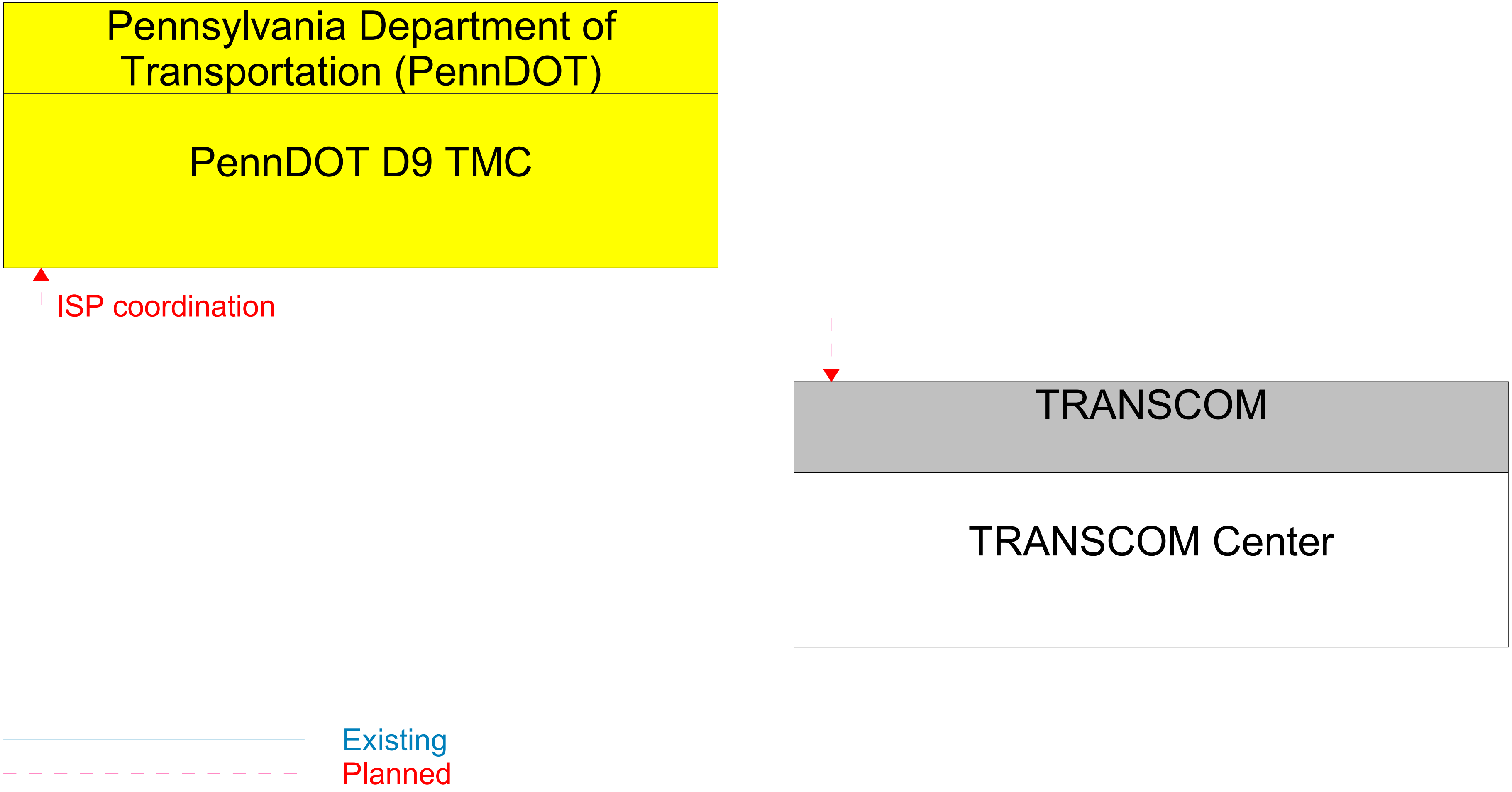
incident response coordination

Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 TMC

Existing

Planned



Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 TMC

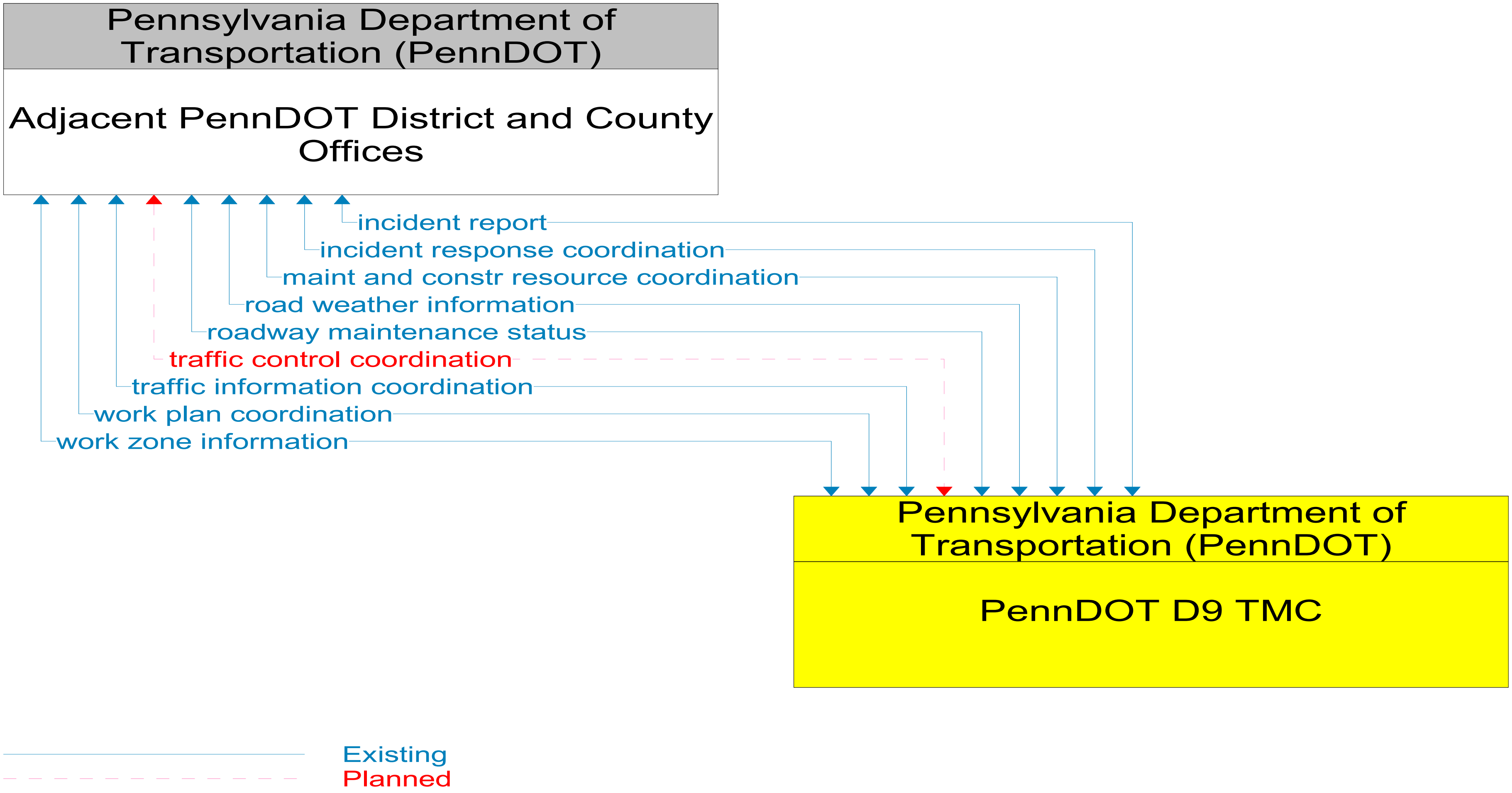
ISP coordination

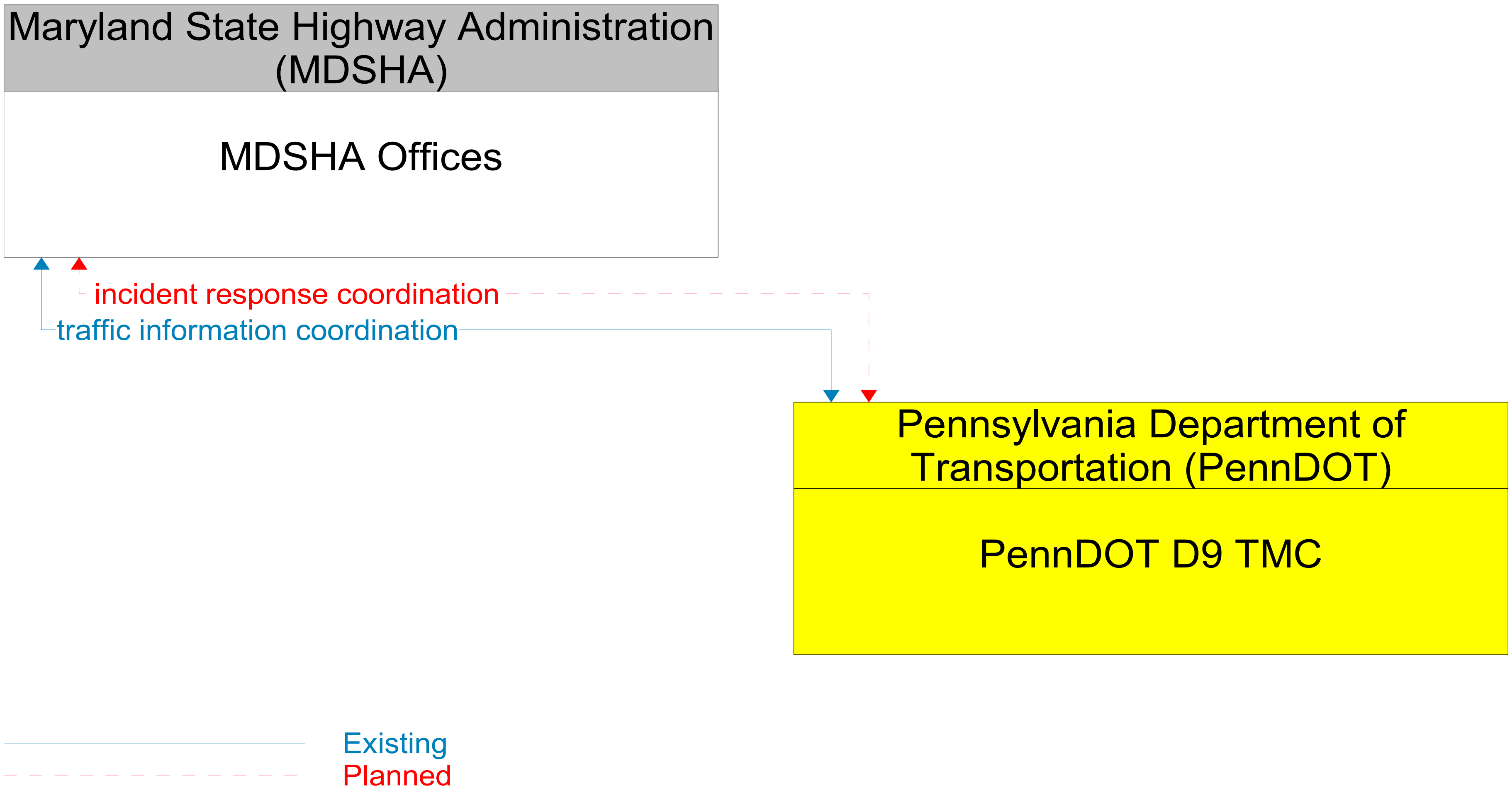
TRANSCOM

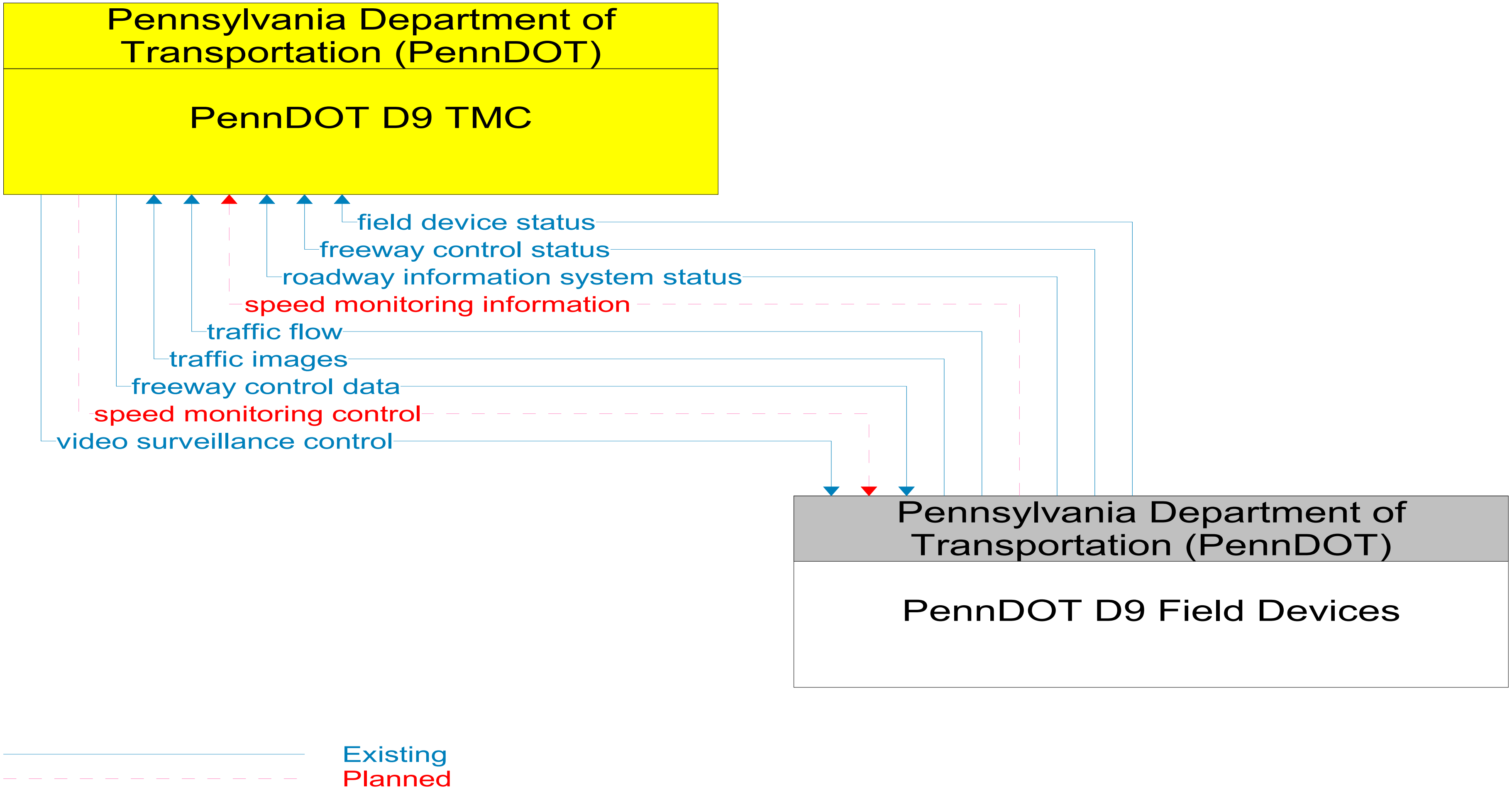
TRANSCOM Center

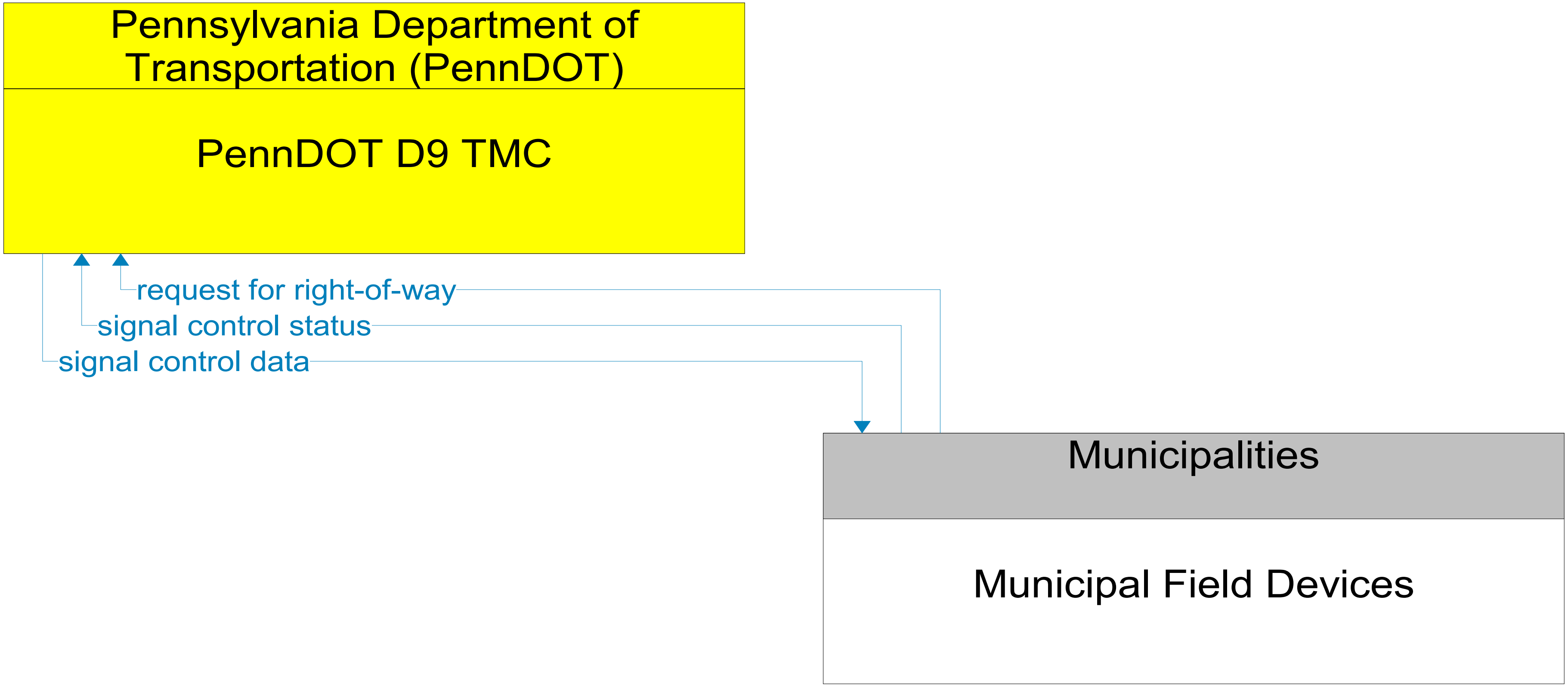
Existing

Planned


Pennsylvania Department of Transportation (PennDOT)
Adjacent PennDOT District and County Offices
incident report
incident response coordination
maint and constr resource coordination
road weather information
roadway maintenance status
traffic control coordination
traffic information coordination
work plan coordination
work zone information
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
Existing
Planned


Maryland State Highway Administration (MDSHA)
MDSHA Offices
incident response coordination
traffic information coordination
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
Existing
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
field device status
freeway control status
roadway information system status
speed monitoring information
traffic flow
traffic images
freeway control data
speed monitoring control
video surveillance control
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 Field Devices
Existing
Planned



Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 TMC

request for right-of-way

signal control status

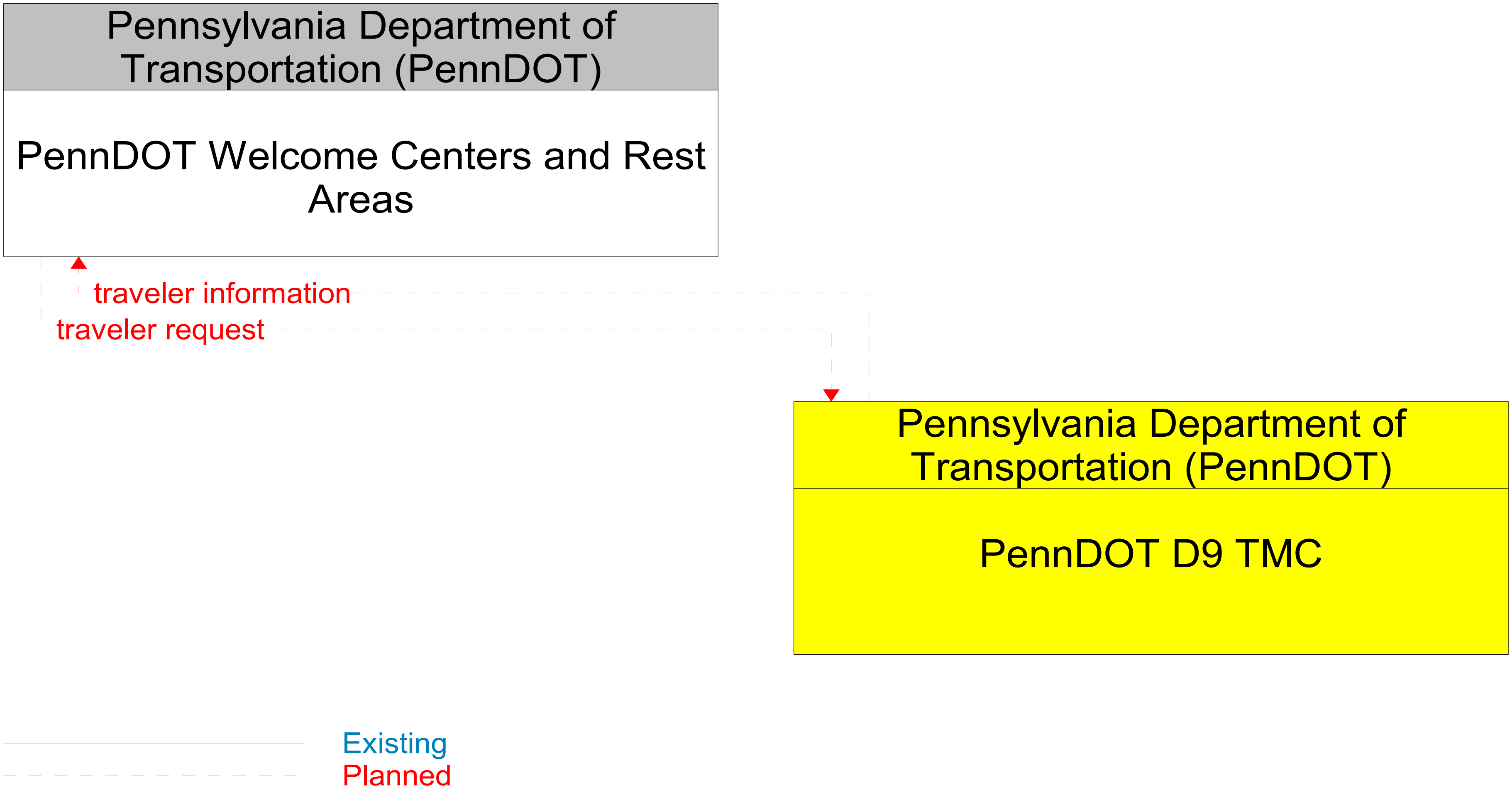
signal control data

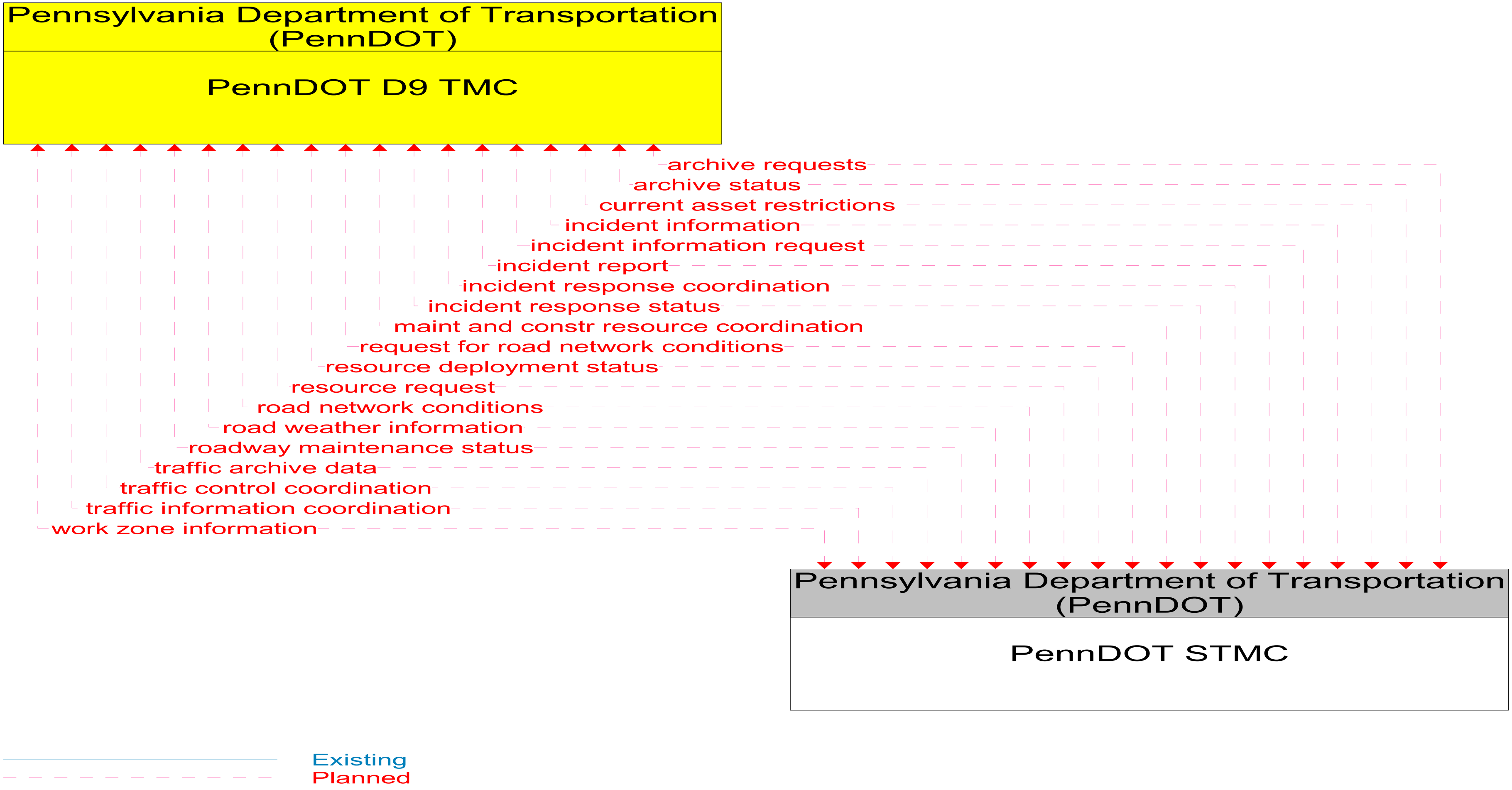
Municipalities

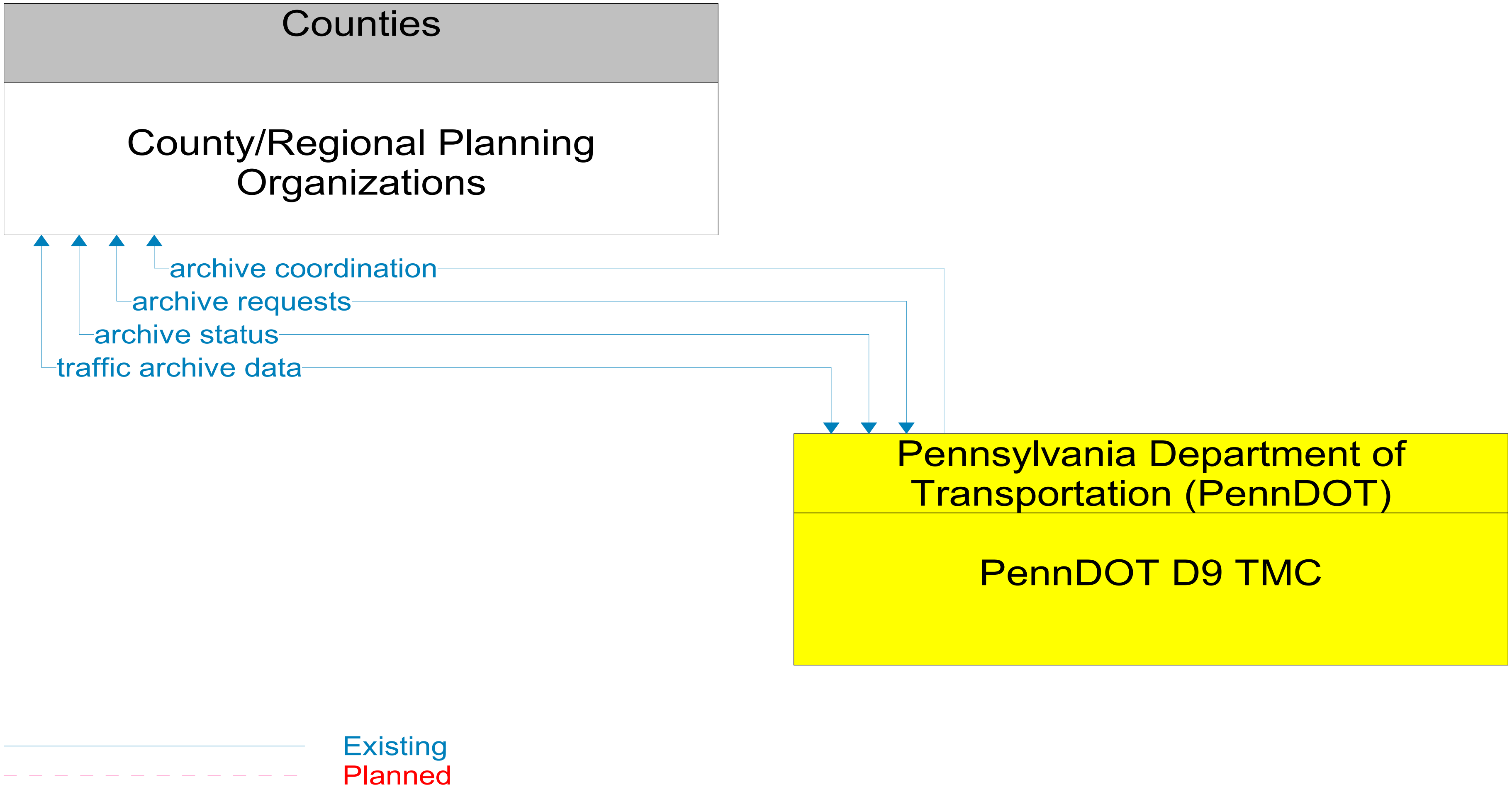
Municipal Field Devices

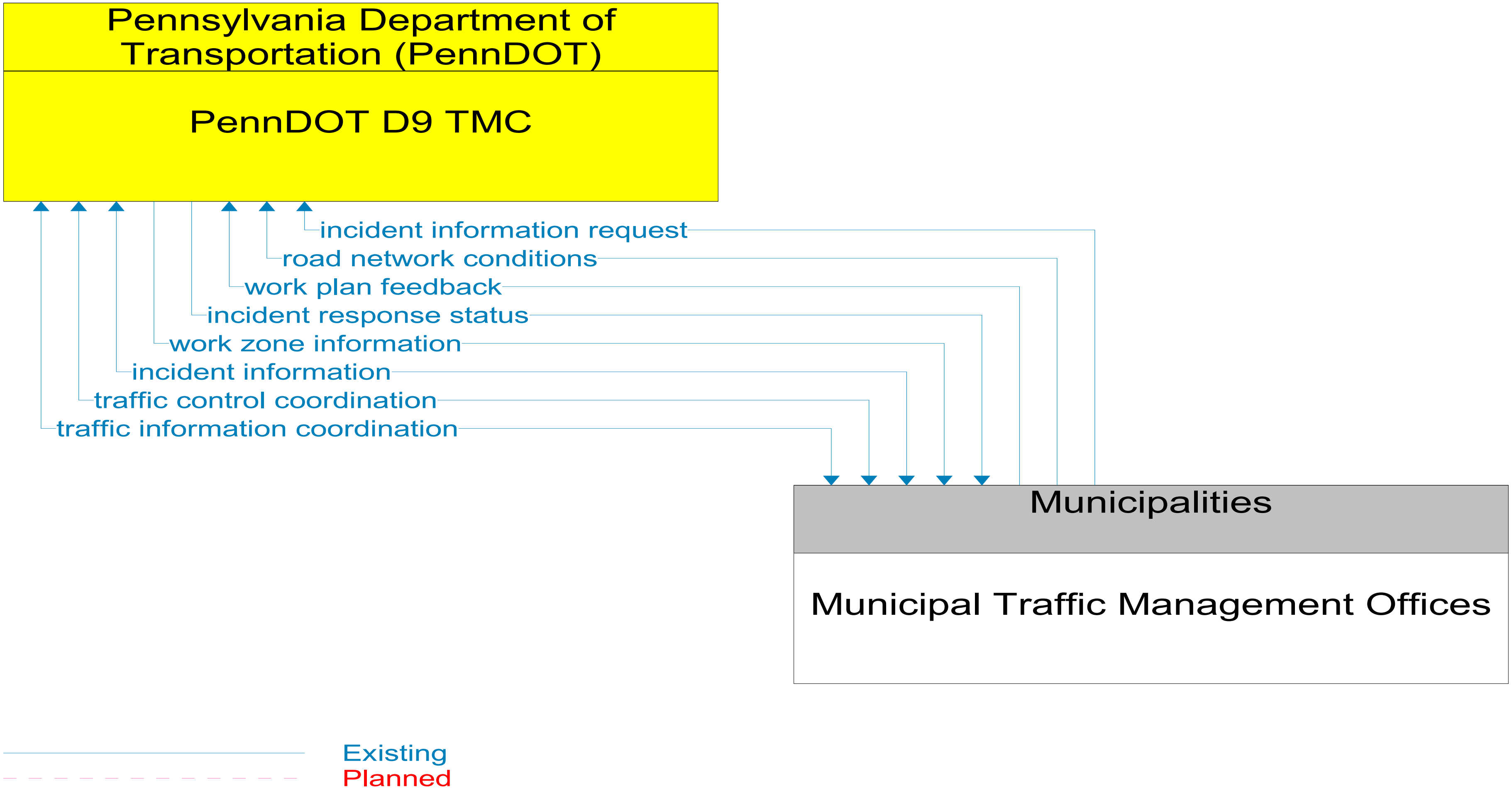
Existing

Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT Welcome Centers and Rest Areas
traveler information
traveler request
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
Existing
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
archive requests
archive status
current asset restrictions
incident information
incident information request
incident report
incident response coordination
incident response status
maint and constr resource coordination
request for road network conditions
resource deployment status
resource request
road network conditions
road weather information
roadway maintenance status
traffic archive data
traffic control coordination
traffic information coordination
work zone information
Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC
Existing
Planned


Counties
County/Regional Planning Organizations
archive coordination
archive requests
archive status
traffic archive data
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
Existing
Planned



Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 TMC

incident information request

road network conditions

work plan feedback

incident response status

work zone information

incident information

traffic control coordination

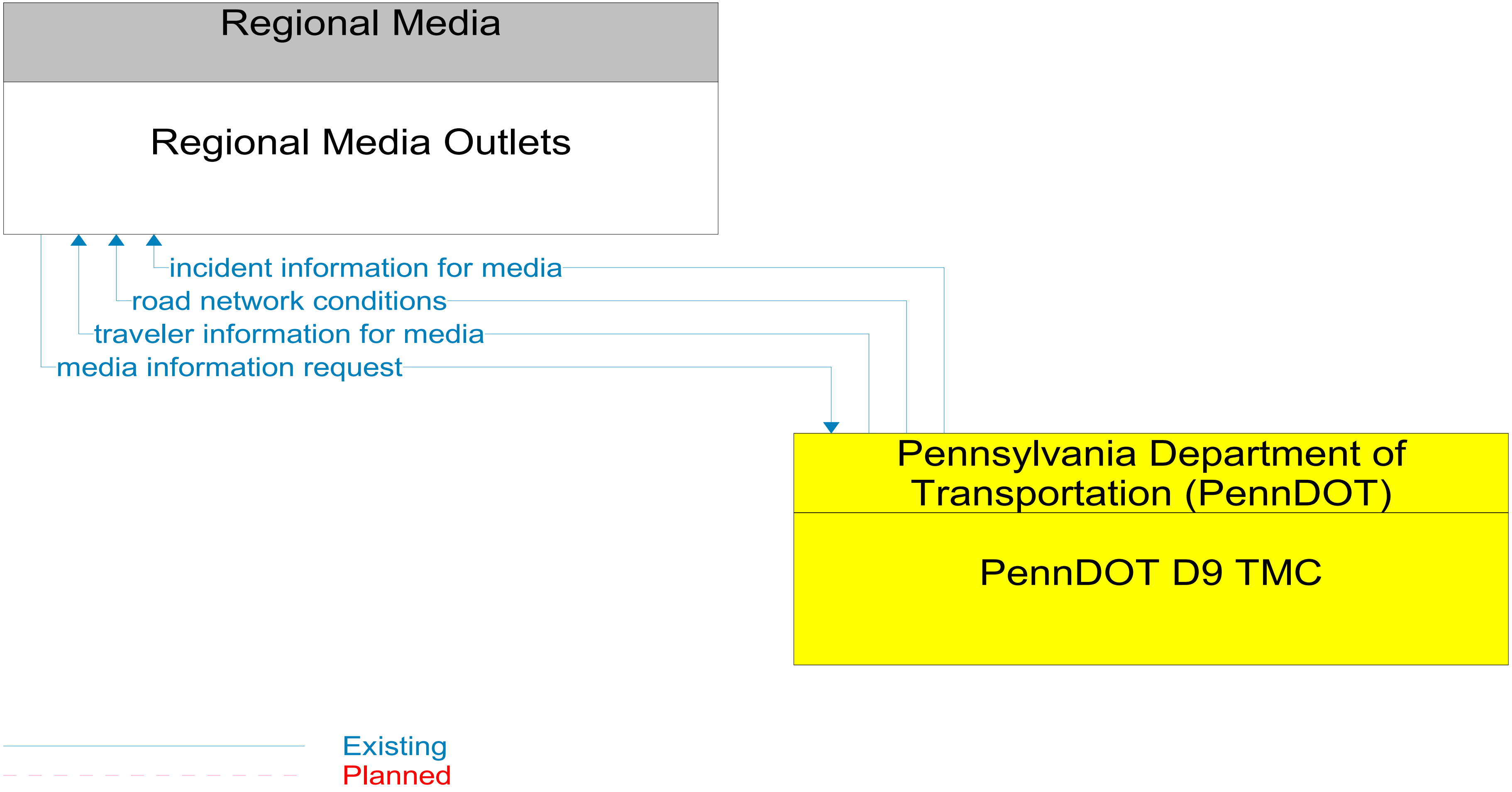
traffic information coordination

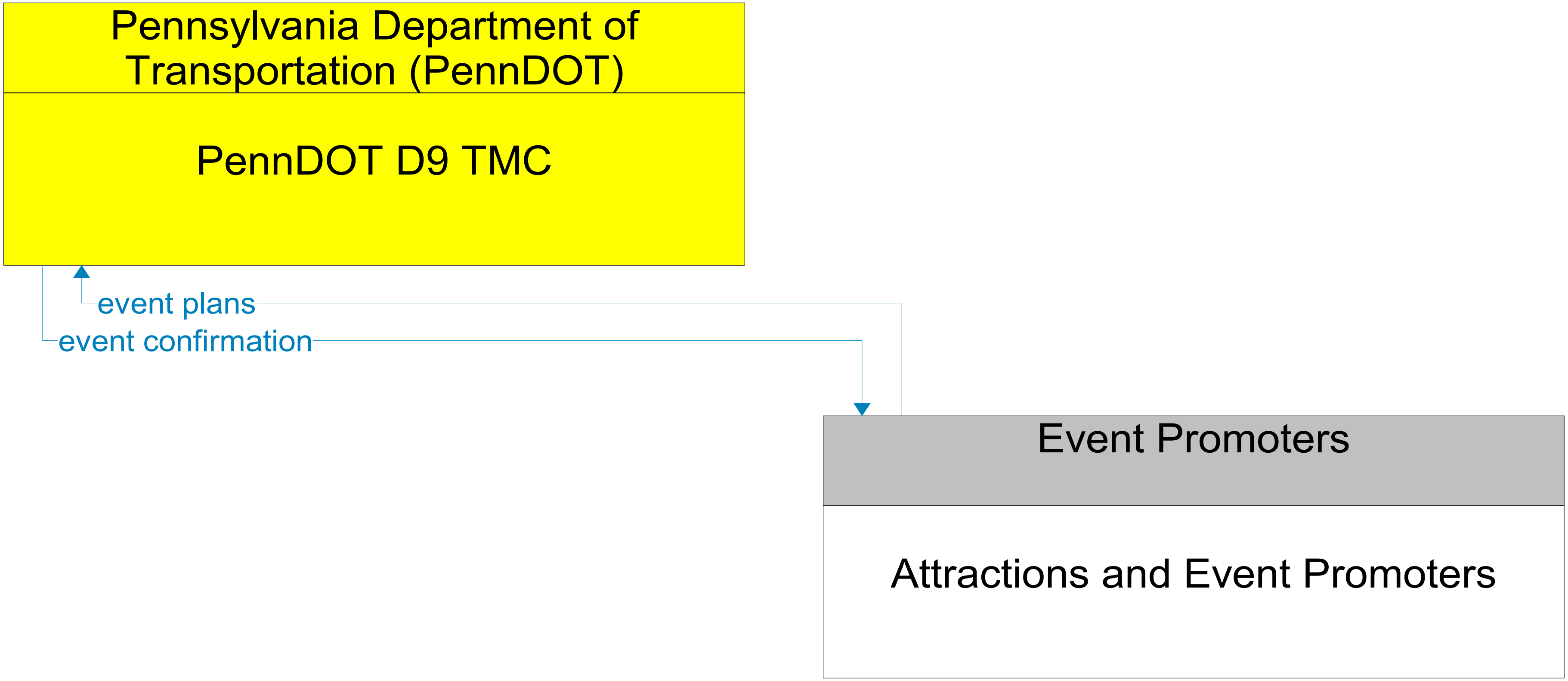
Municipalities

Municipal Traffic Management Offices

Existing

Planned


Regional Media
Regional Media Outlets
incident information for media
road network conditions
traveler information for media
media information request
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
Existing
Planned



Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 TMC

event plans

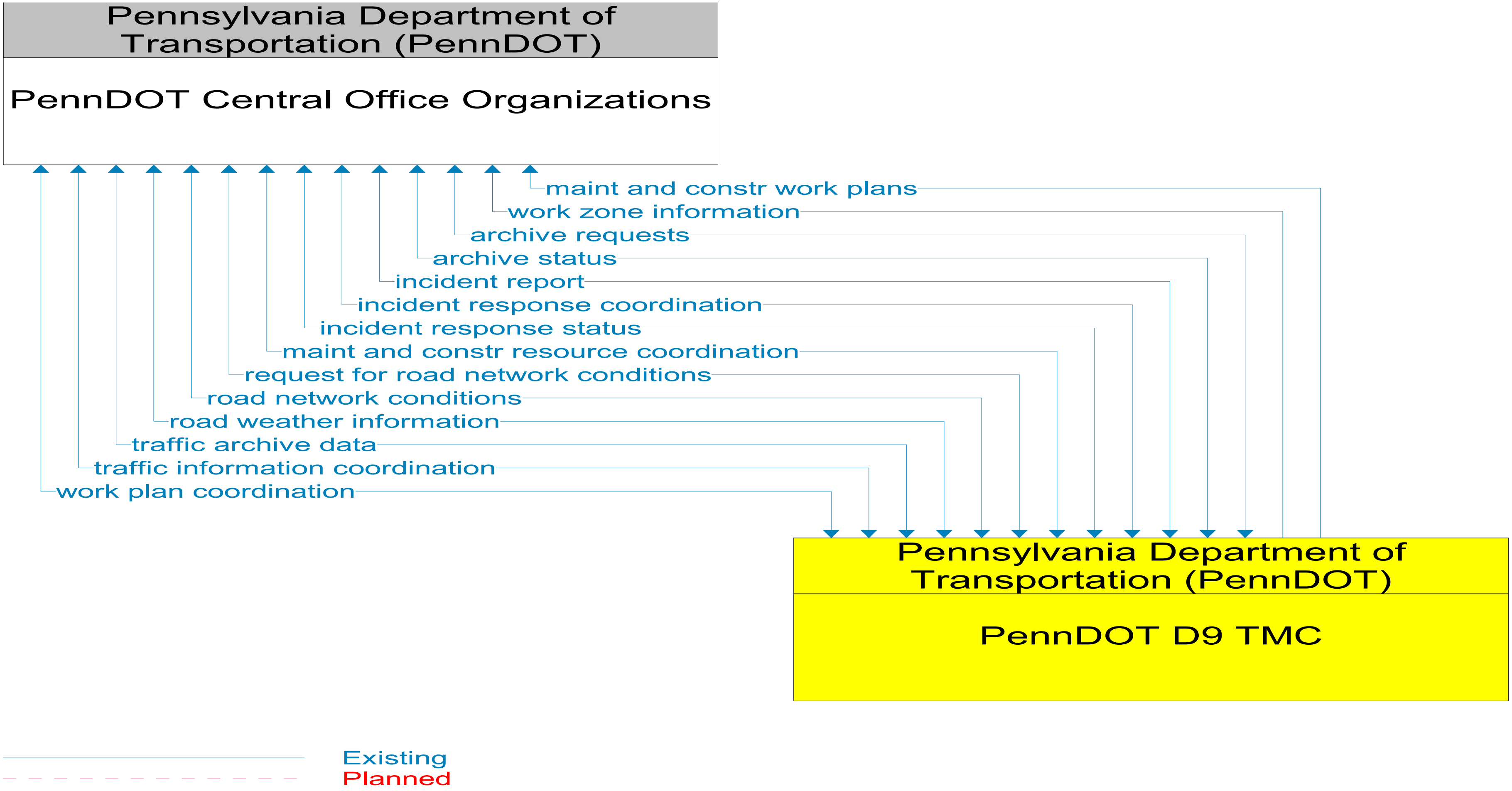
event confirmation

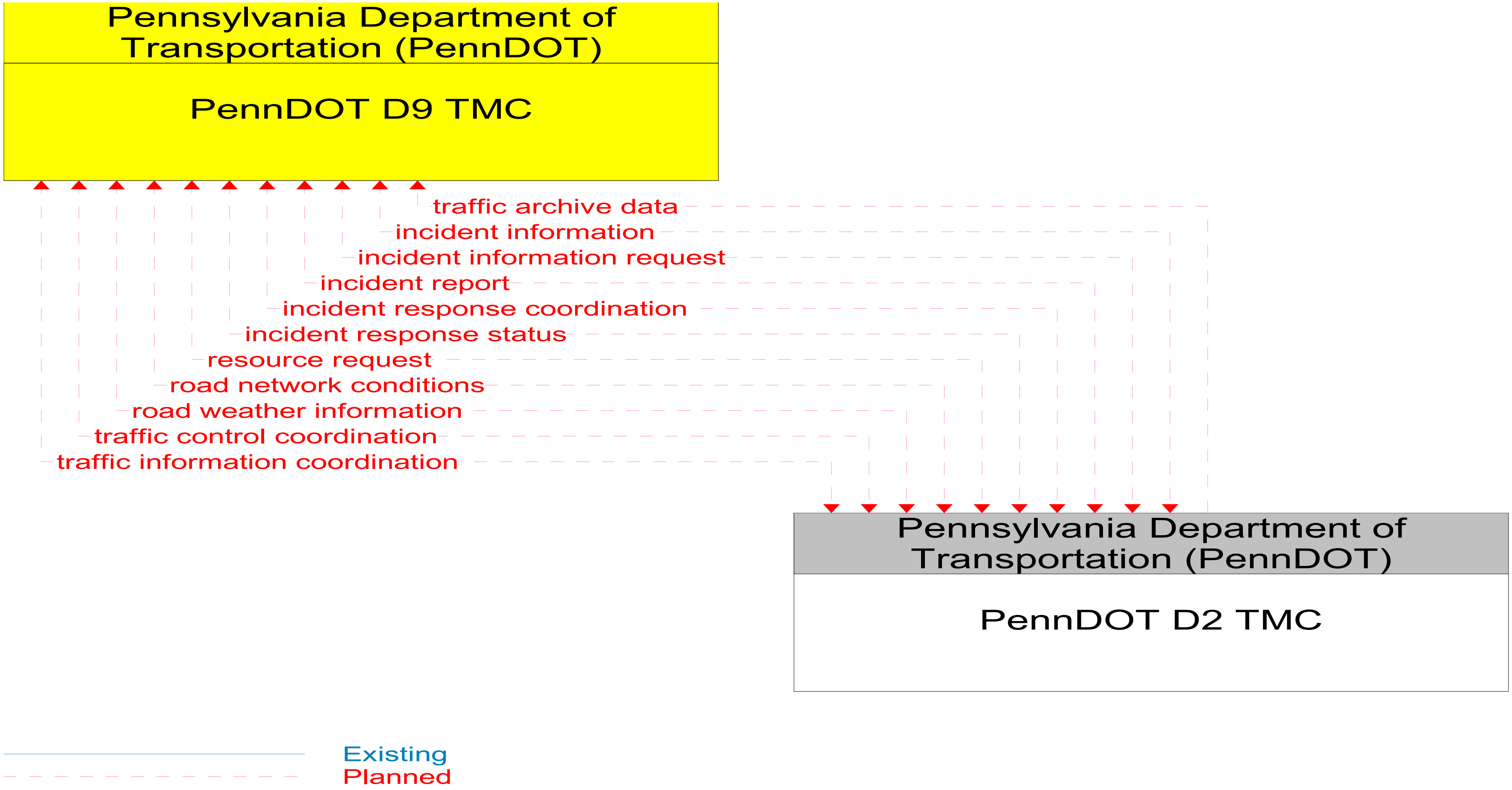
Event Promoters

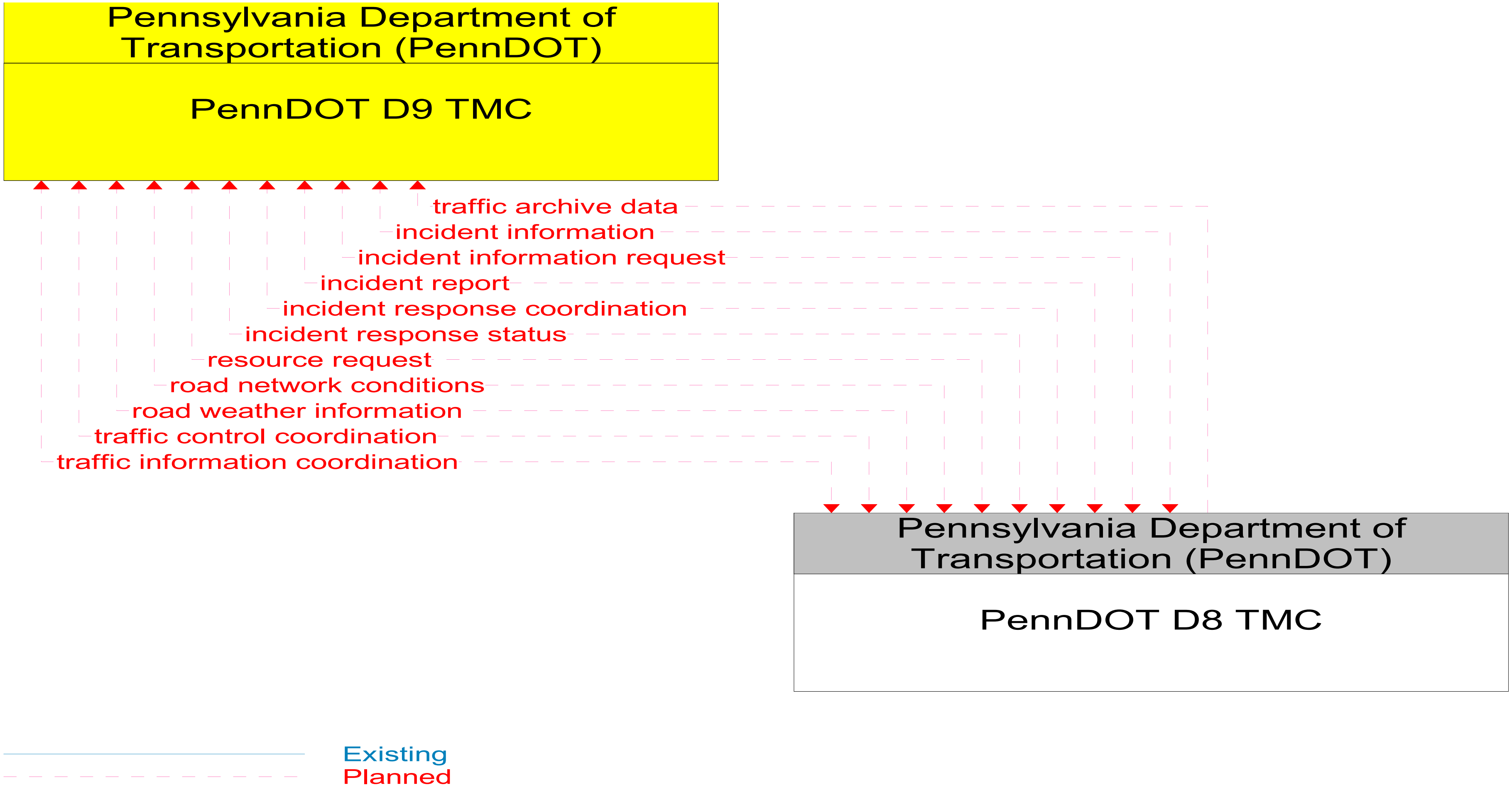
Attractions and Event Promoters

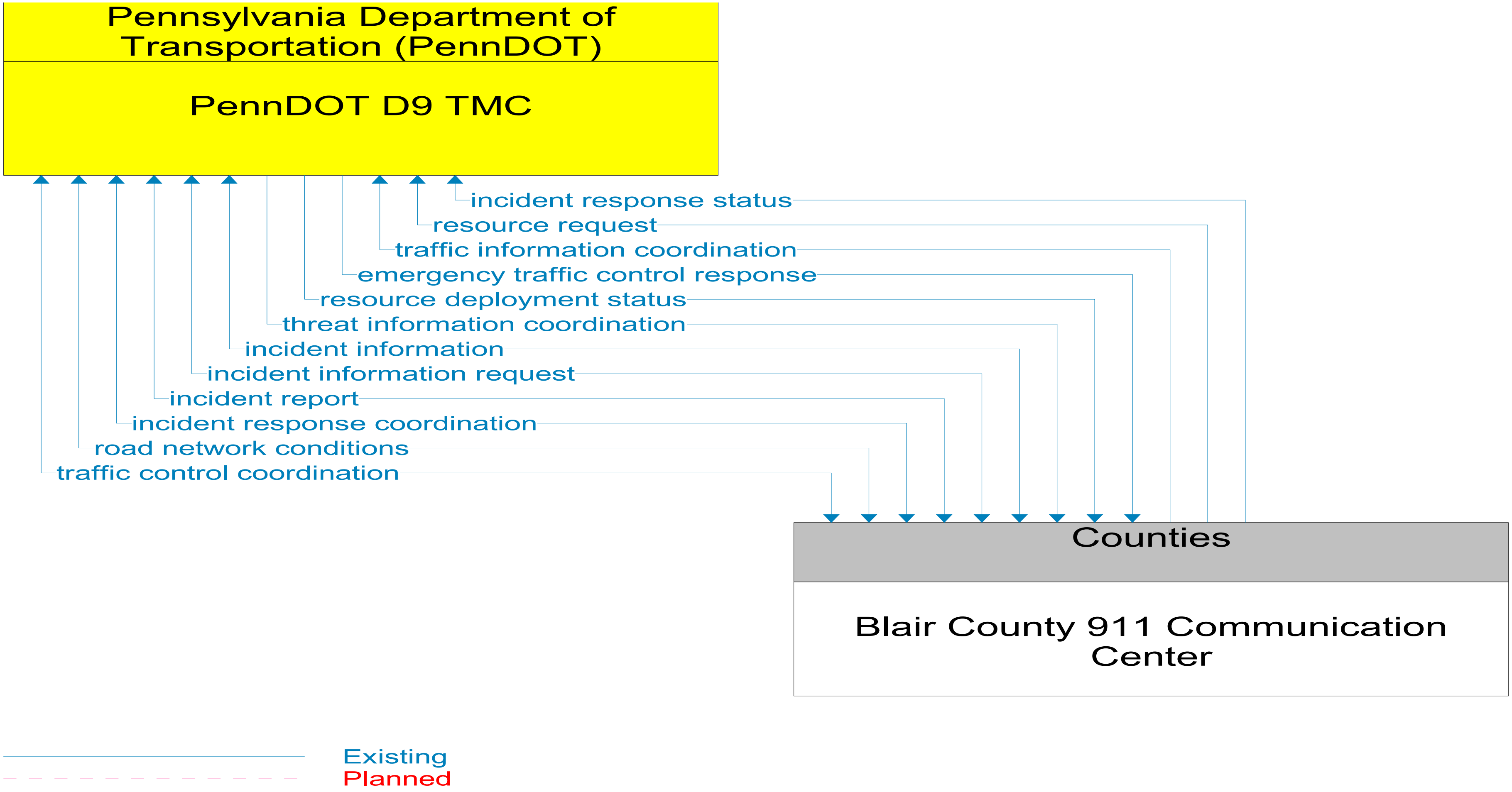
Existing

Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Organizations
maint and constr work plans
work zone information
archive requests
archive status
incident report
incident response coordination
incident response status
maint and constr resource coordination
request for road network conditions
road network conditions
road weather information
traffic archive data
traffic information coordination
work plan coordination
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
Existing
Planned

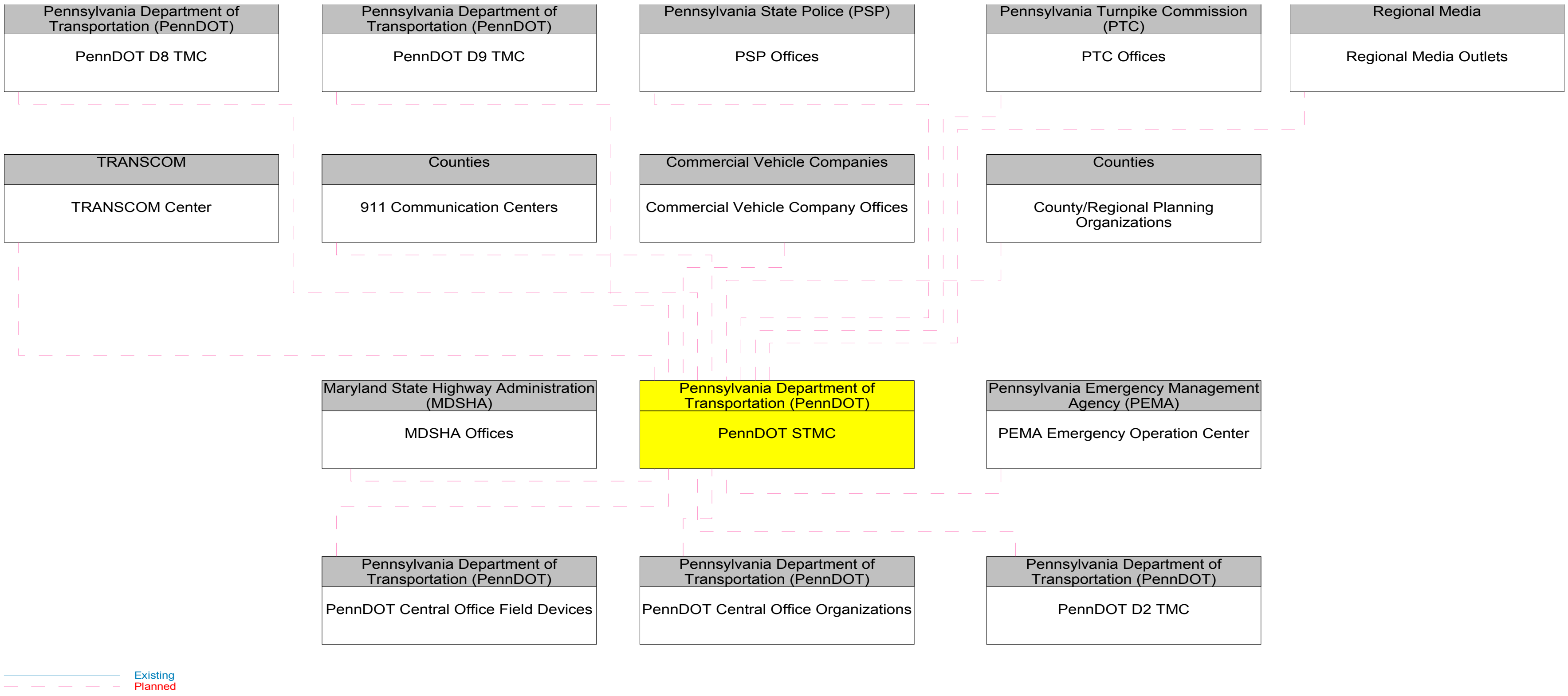

Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
traffic archive data
incident information
incident information request
incident report
incident response coordination
incident response status
resource request
road network conditions
road weather information
traffic control coordination
traffic information coordination
Pennsylvania Department of Transportation (PennDOT)
PennDOT D2 TMC
Existing
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
traffic archive data
incident information
incident information request
incident report
incident response coordination
incident response status
resource request
road network conditions
road weather information
traffic control coordination
traffic information coordination
Pennsylvania Department of Transportation (PennDOT)
PennDOT D8 TMC
Existing
Planned

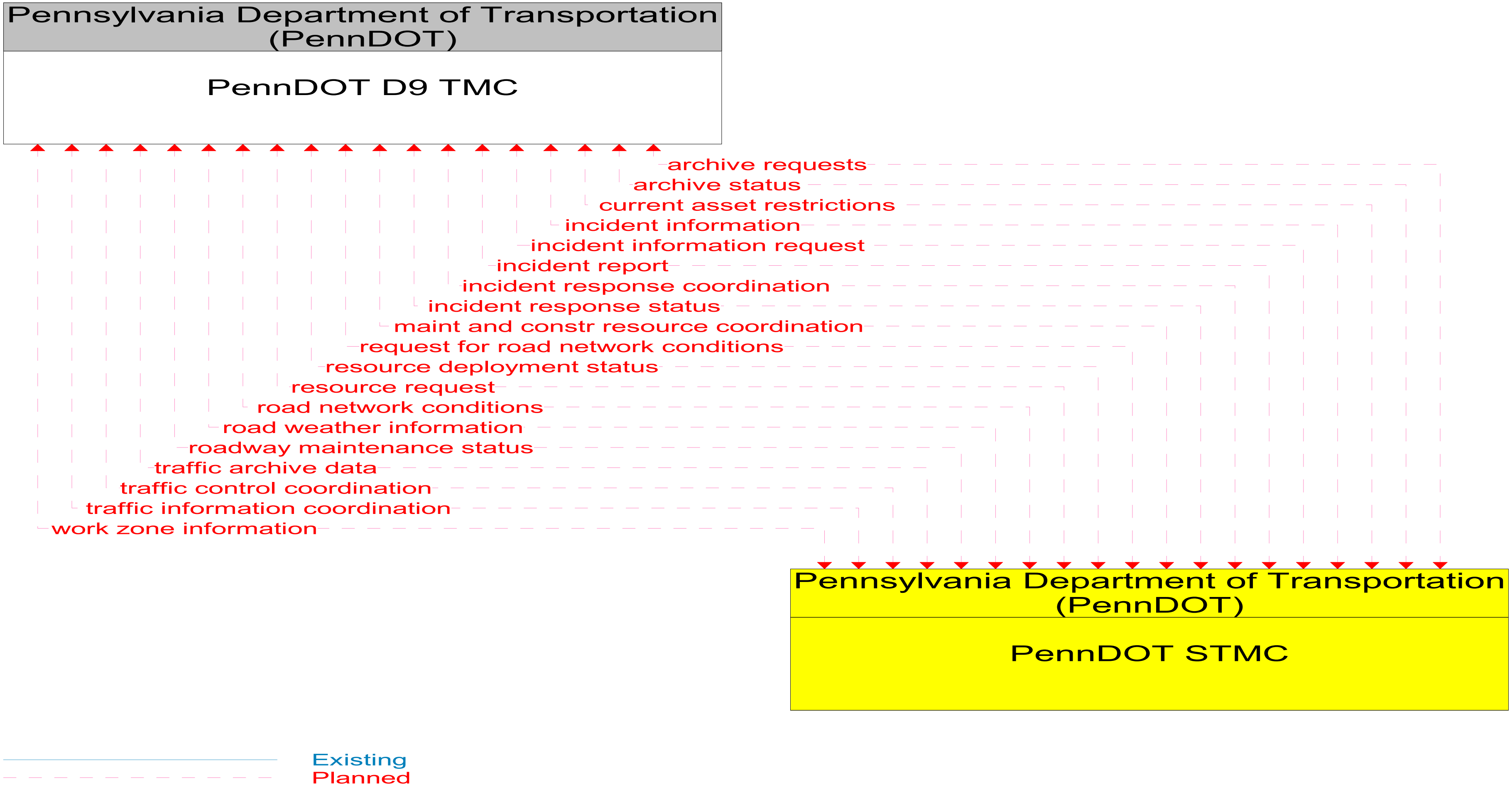

Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
incident response status
resource request
traffic information coordination
emergency traffic control response
resource deployment status
threat information coordination
incident information
incident information request
incident report
incident response coordination
road network conditions
traffic control coordination
Counties
Blair County 911 Communication Center
Existing
Planned

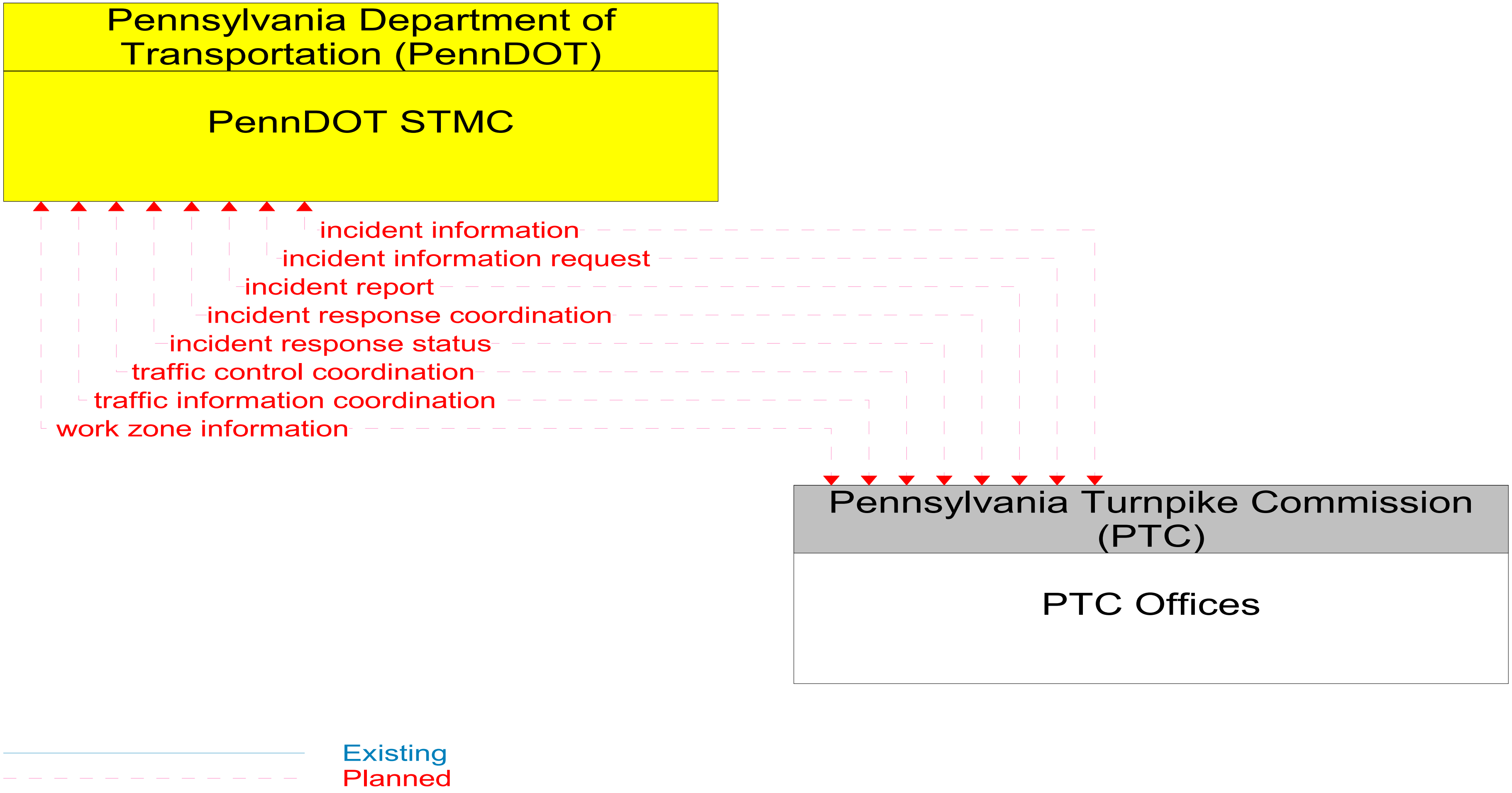
PennDOT STMC

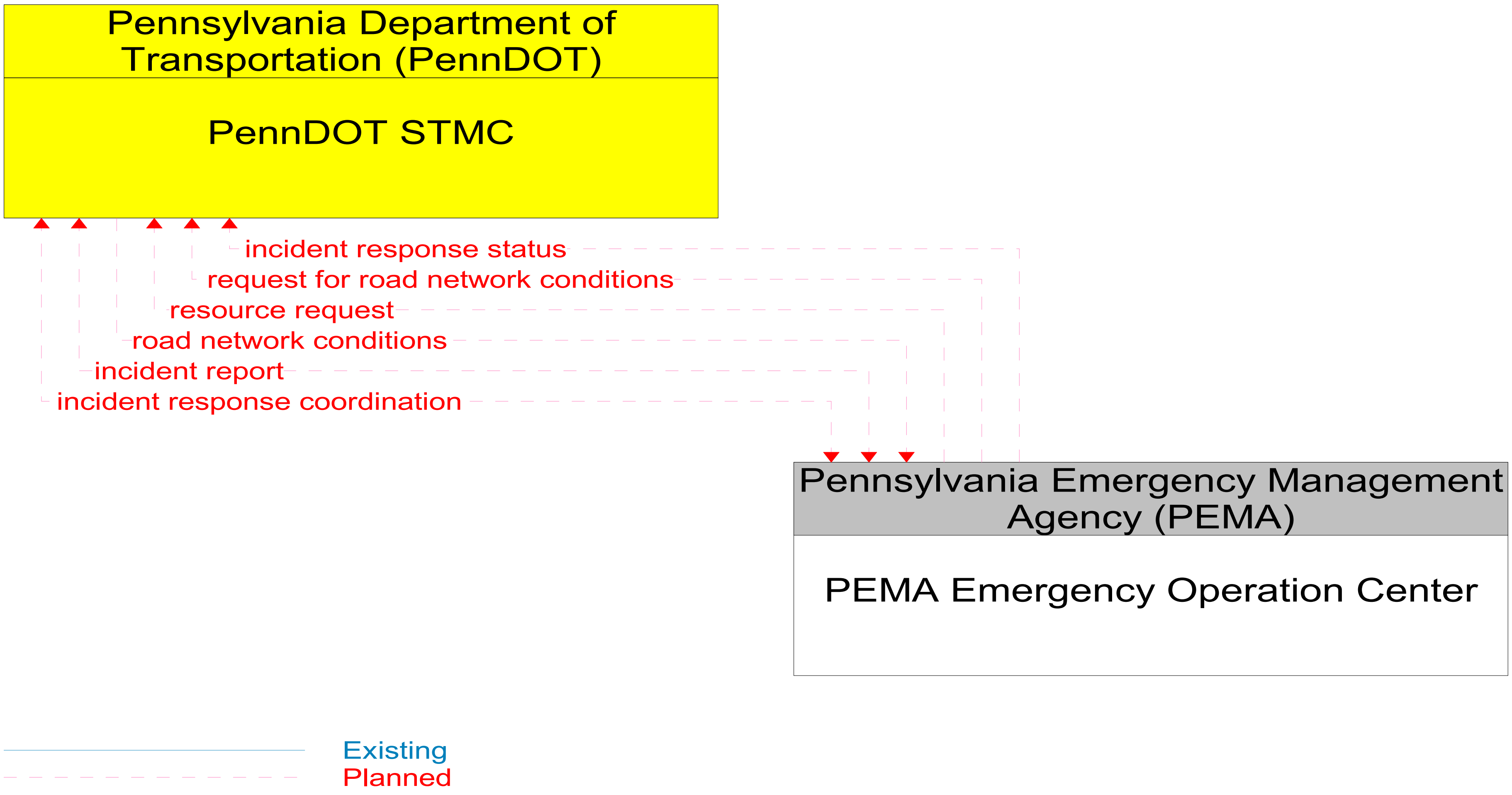
PennDOT STMC Interconnect Diagram

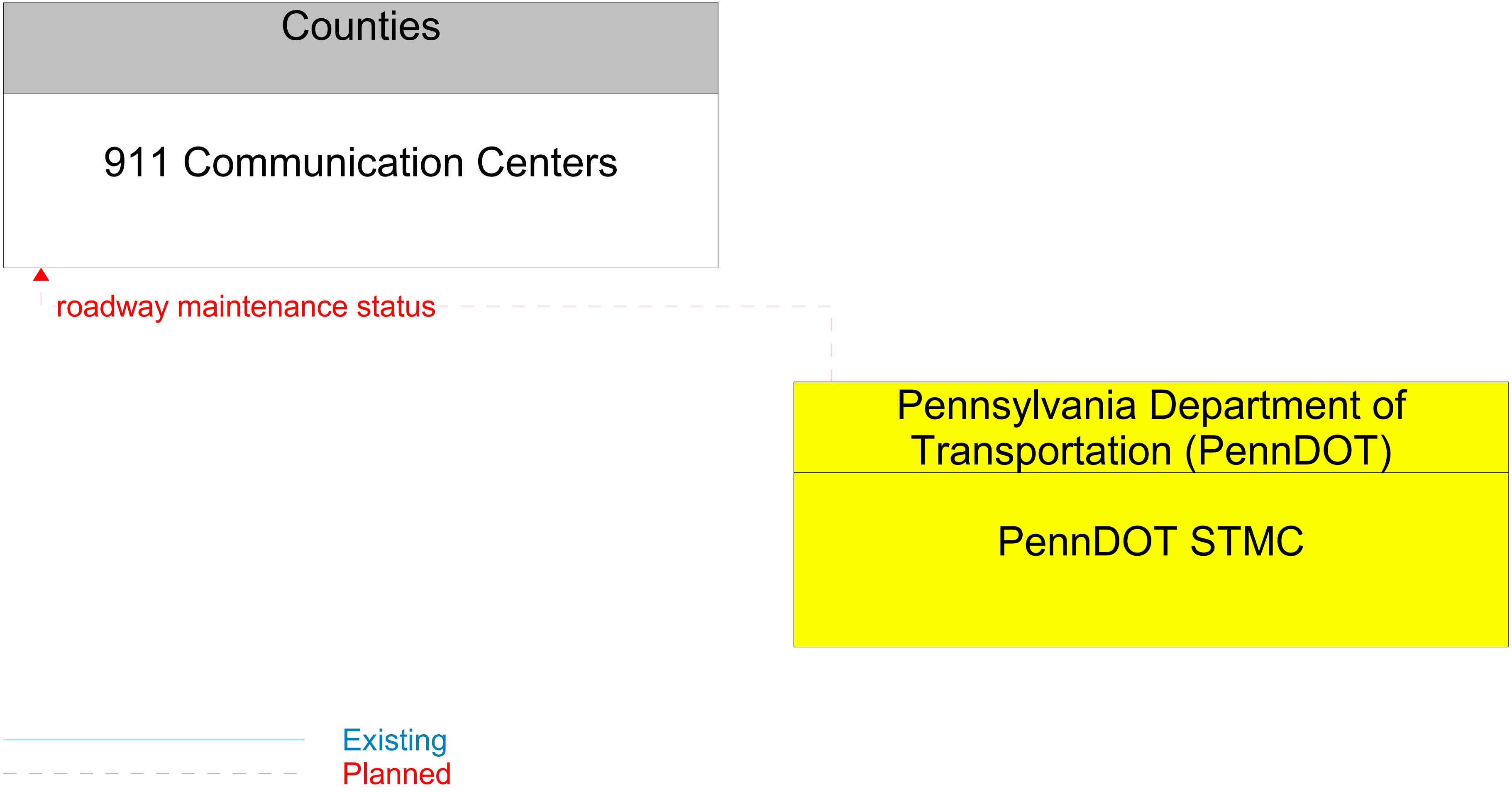


Pennsylvania Department of Transportation (PennDOT)
PennDOT D8 TMC
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
Pennsylvania State Police (PSP)
PSP Offices
Pennsylvania Turnpike Commission (PTC)
PTC Offices
Regional Media
Regional Media Outlets
TRANSCOM
TRANSCOM Center
Counties
911 Communication Centers
Commercial Vehicle Companies
Commercial Vehicle Company Offices
Counties
County/Regional Planning Organizations
Maryland State Highway Administration (MDSHA)
MDSHA Offices
Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC
Pennsylvania Emergency Management Agency (PEMA)
PEMA Emergency Operation Center
Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Field Devices
Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Organizations
Pennsylvania Department of Transportation (PennDOT)
PennDOT D2 TMC
Existing
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
archive requests
archive status
current asset restrictions
incident information
incident information request
incident report
incident response coordination
incident response status
maint and constr resource coordination
request for road network conditions
resource deployment status
resource request
road network conditions
road weather information
roadway maintenance status
traffic archive data
traffic control coordination
traffic information coordination
work zone information
Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC
Existing
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC
incident information
incident information request
incident report
incident response coordination
incident response status
traffic control coordination
traffic information coordination
work zone information
Pennsylvania Turnpike Commission (PTC)
PTC Offices
Existing
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC
incident response status
request for road network conditions
resource request
road network conditions
incident report
incident response coordination
Pennsylvania Emergency Management Agency (PEMA)
PEMA Emergency Operation Center
Existing
Planned



Counties

911 Communication Centers

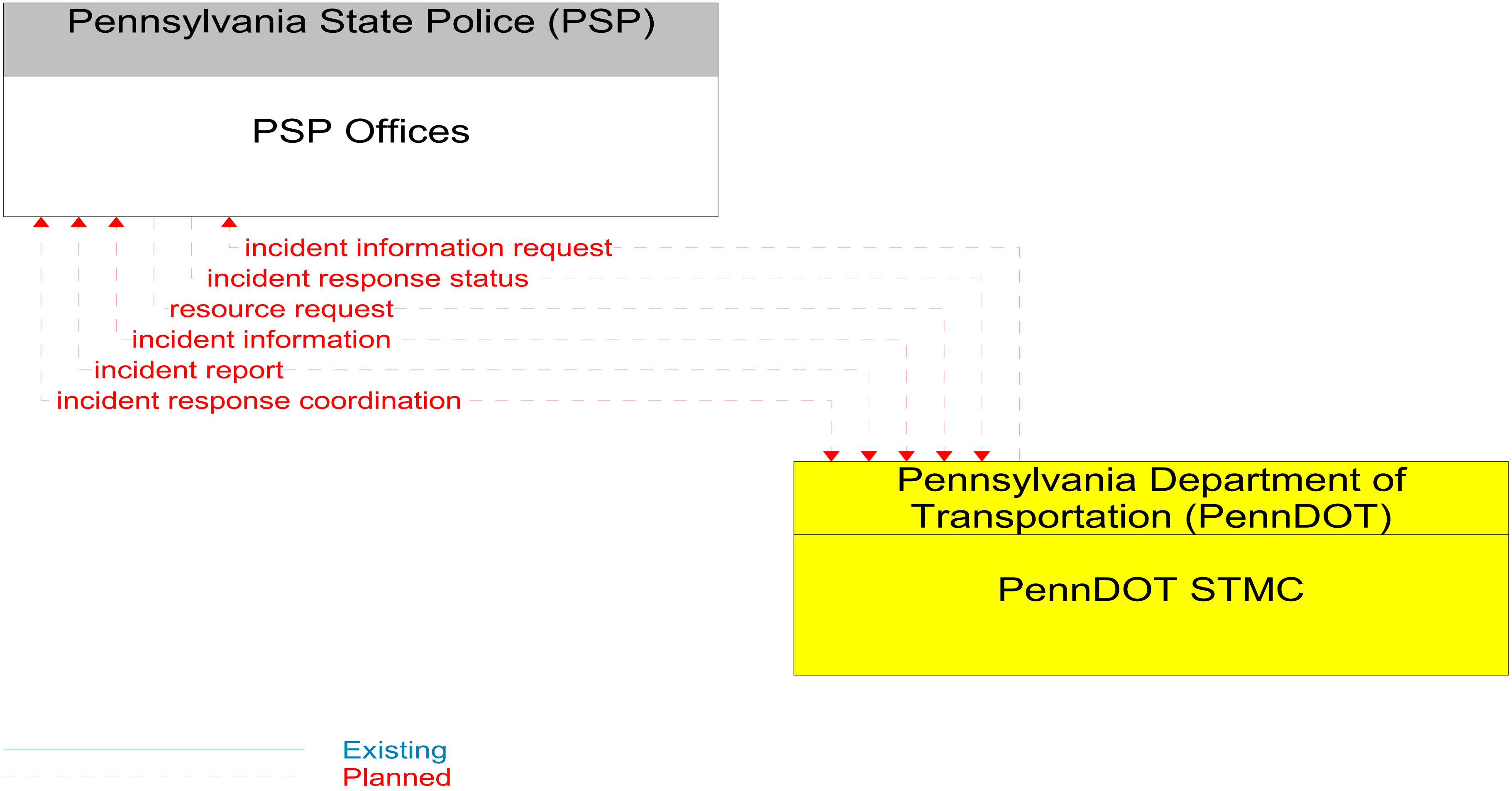
roadway maintenance status

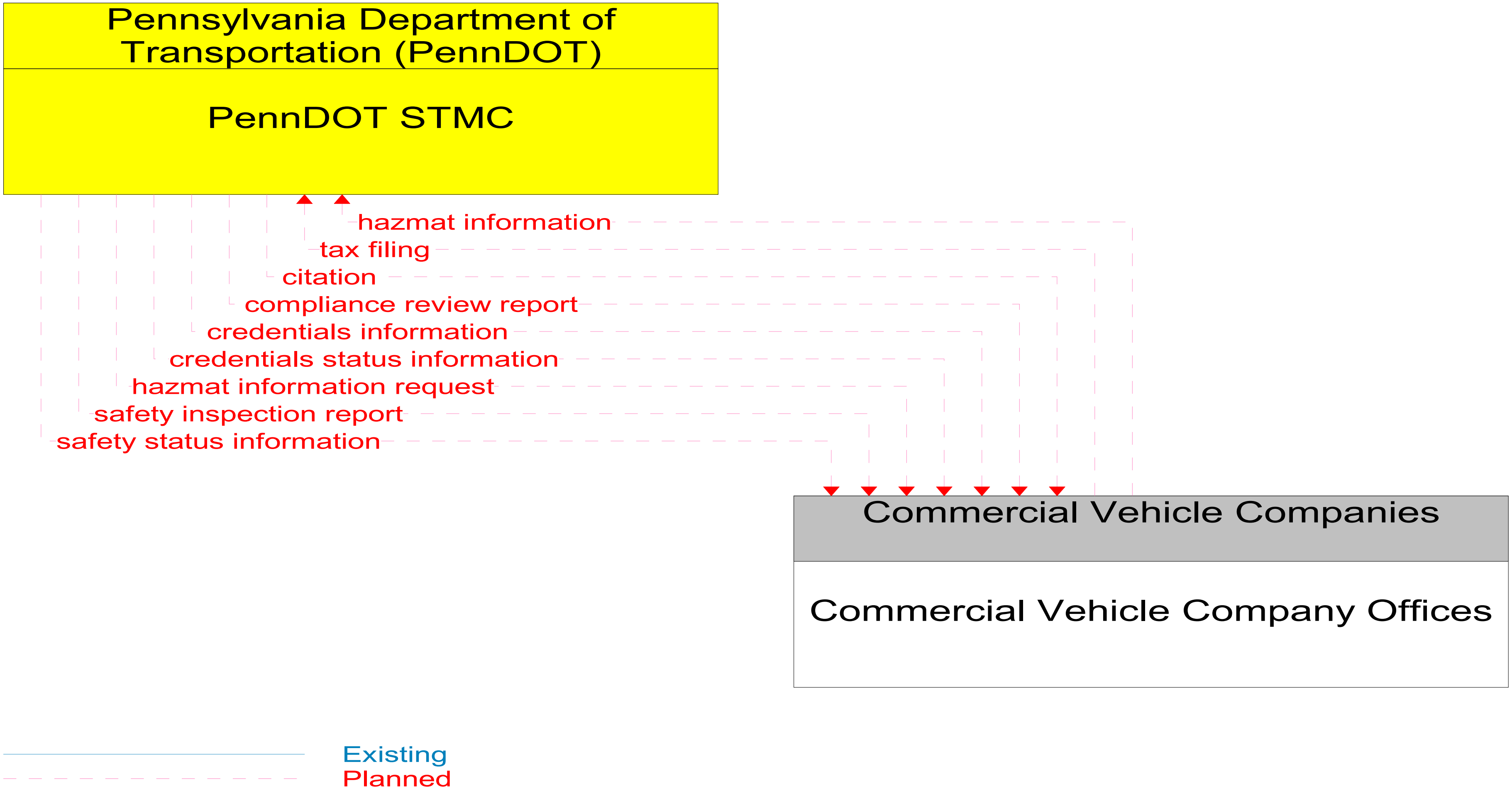
Pennsylvania Department of Transportation (PennDOT)

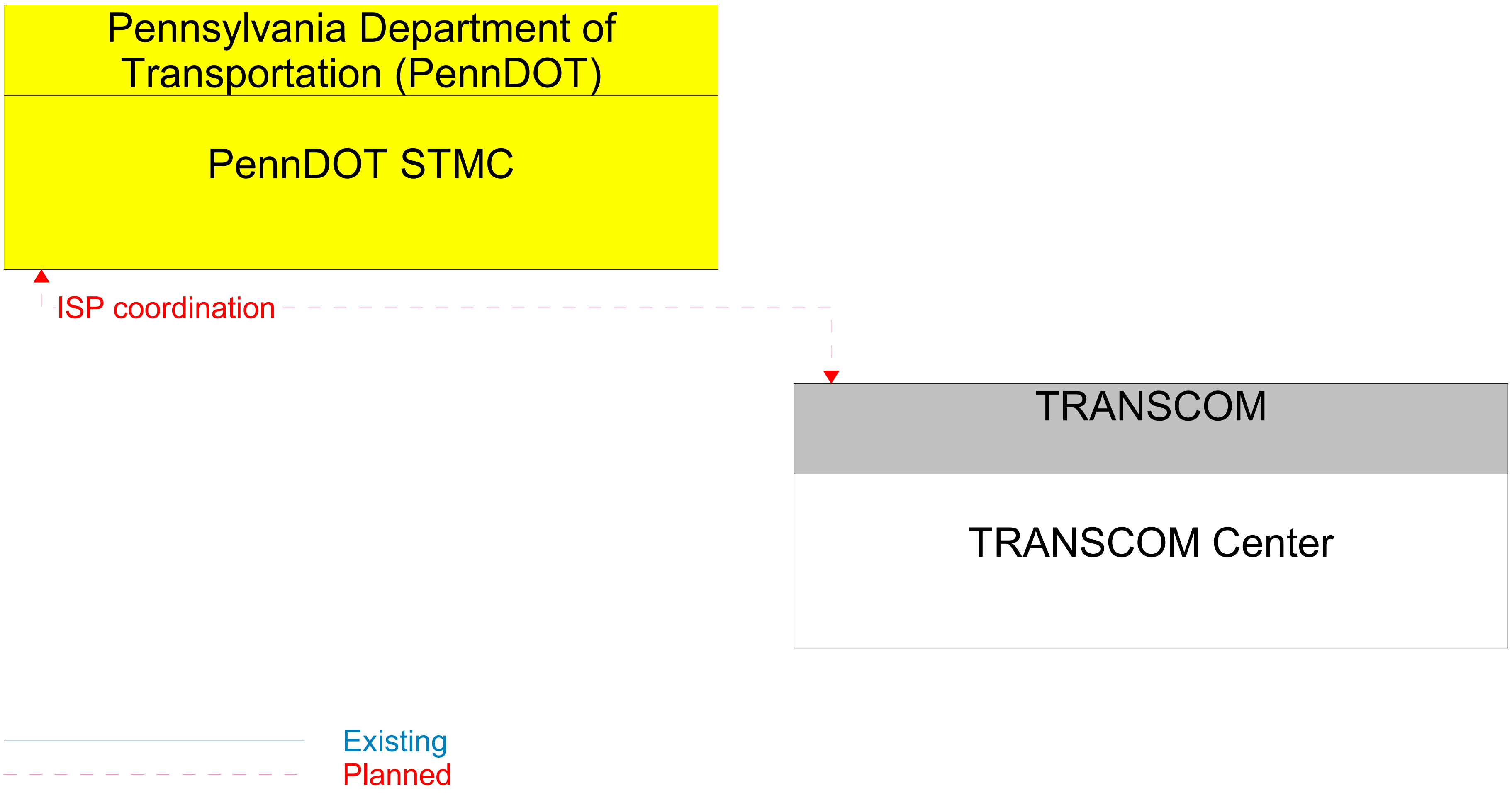
PennDOT STMC

Existing

Planned


Pennsylvania State Police (PSP)
PSP Offices
incident information request
incident response status
resource request
incident information
incident report
incident response coordination
Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC
Existing
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC
hazmat information
tax filing
citation
compliance review report
credentials information
credentials status information
hazmat information request
safety inspection report
safety status information
Commercial Vehicle Companies
Commercial Vehicle Company Offices
Existing
Planned



Pennsylvania Department of Transportation (PennDOT)

PennDOT STMC

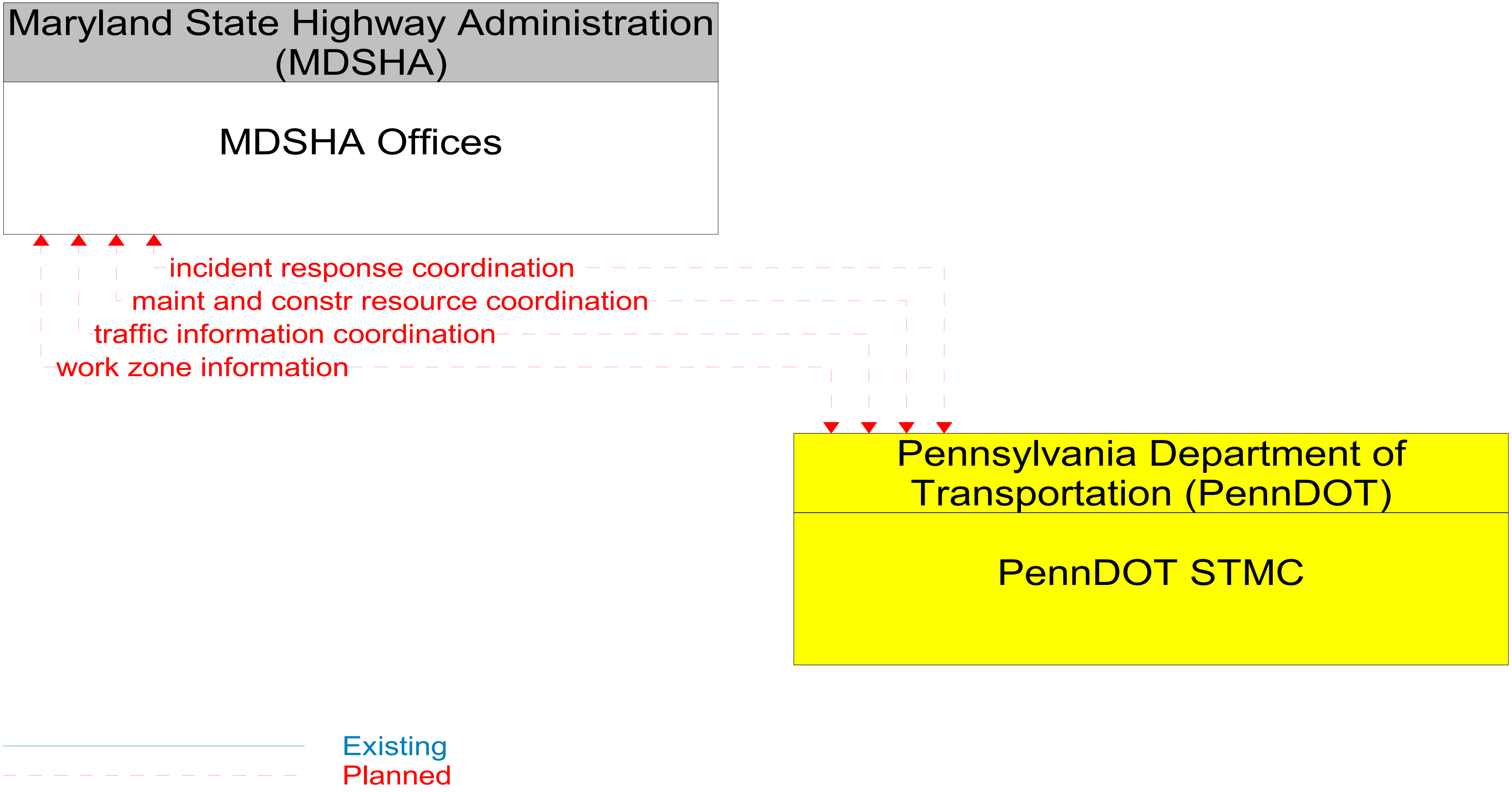
ISP coordination

TRANSCOM

TRANSCOM Center

Existing

Planned



Maryland State Highway Administration (MDSHA)

MDSHA Offices

incident response coordination

maint and constr resource coordination

traffic information coordination

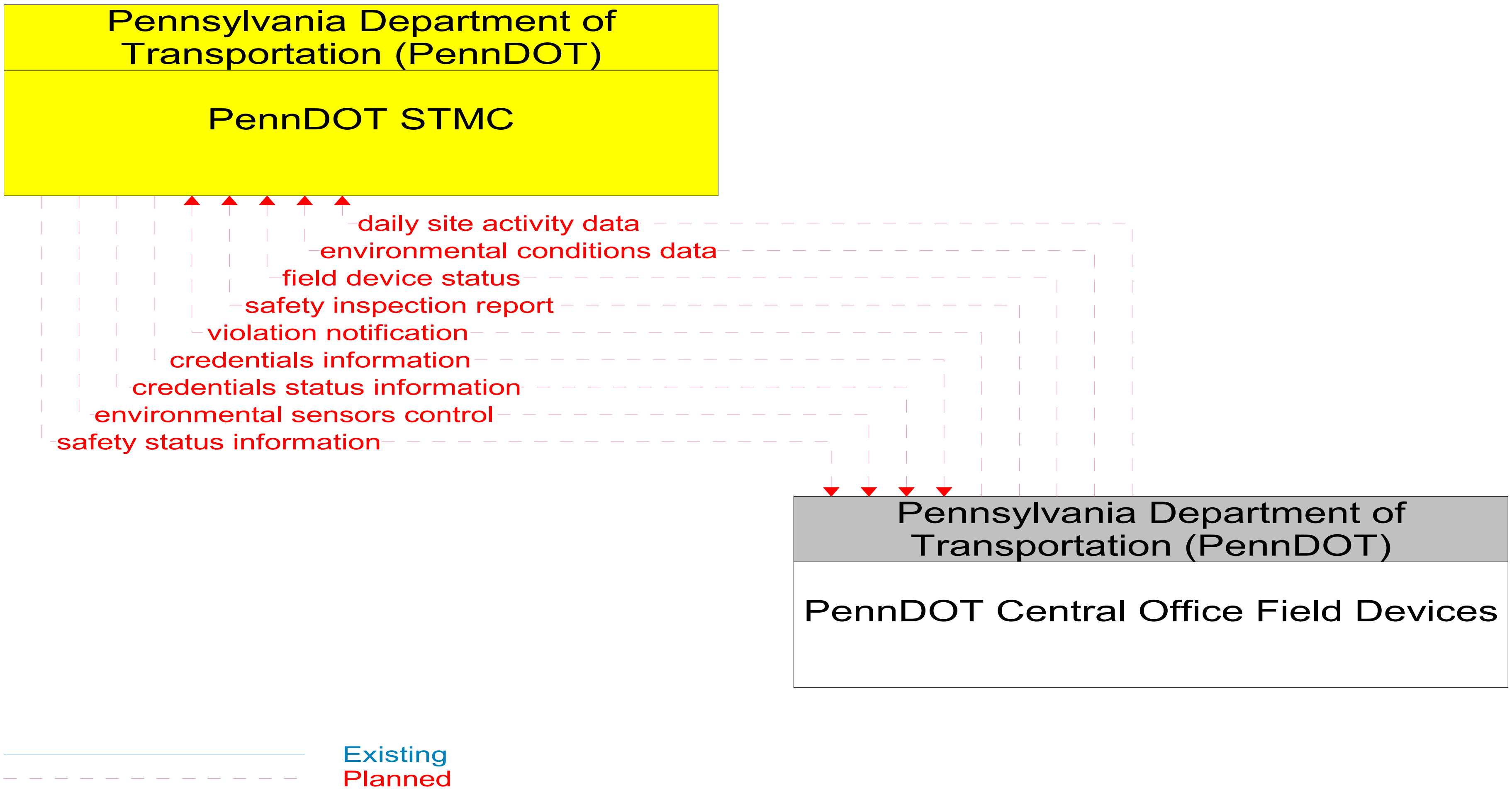
work zone information

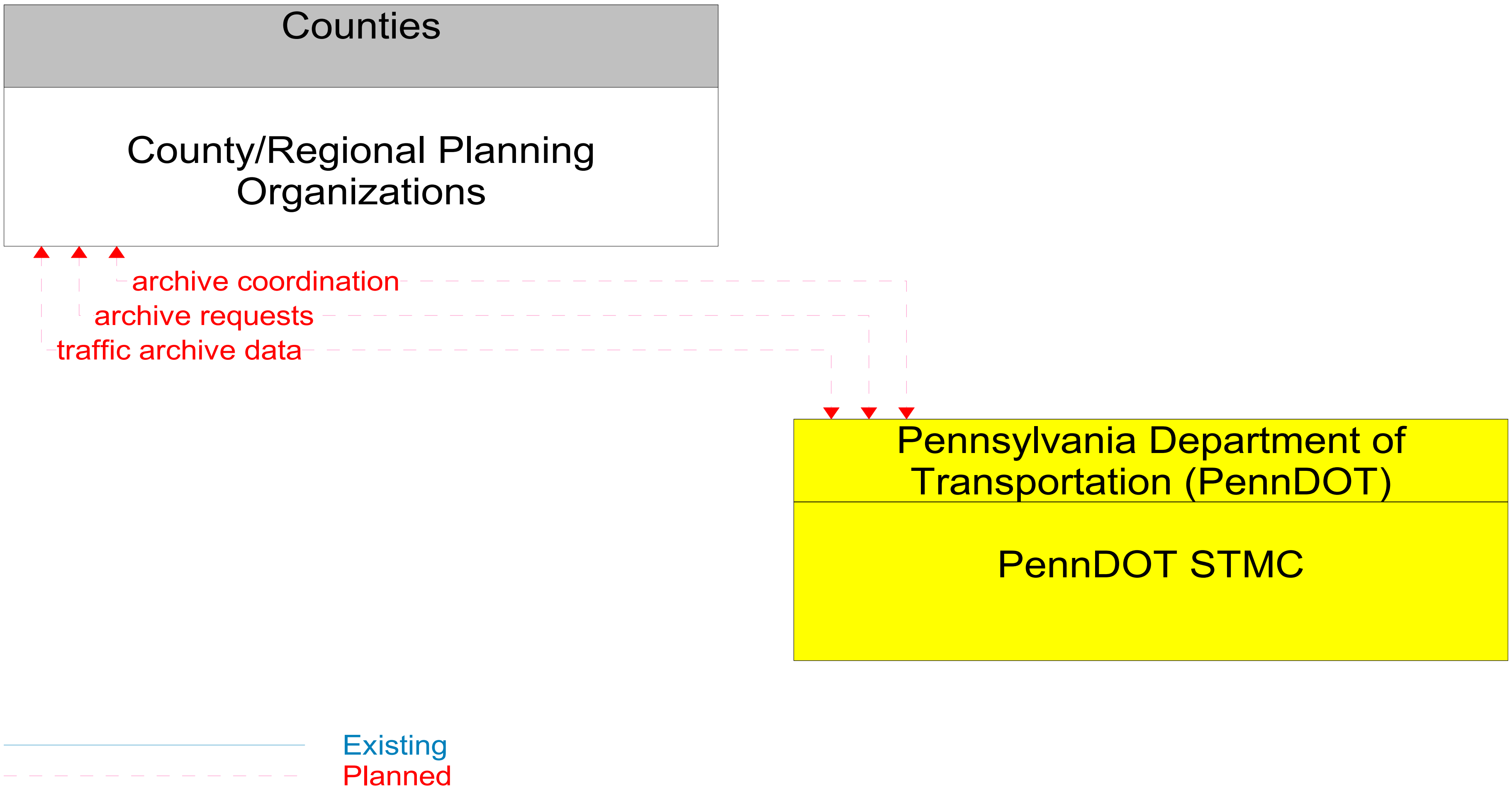
Pennsylvania Department of Transportation (PennDOT)

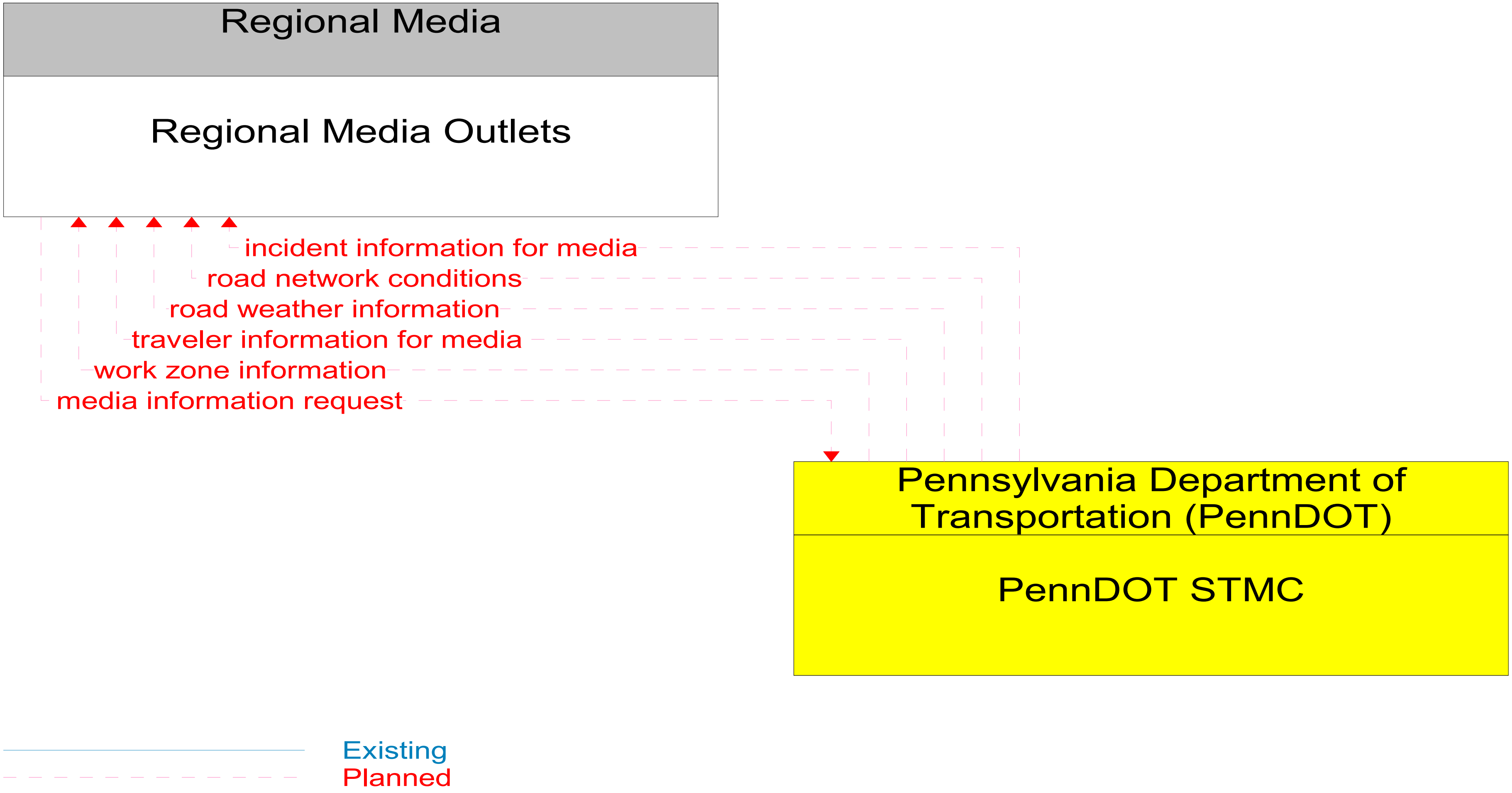
PennDOT STMC

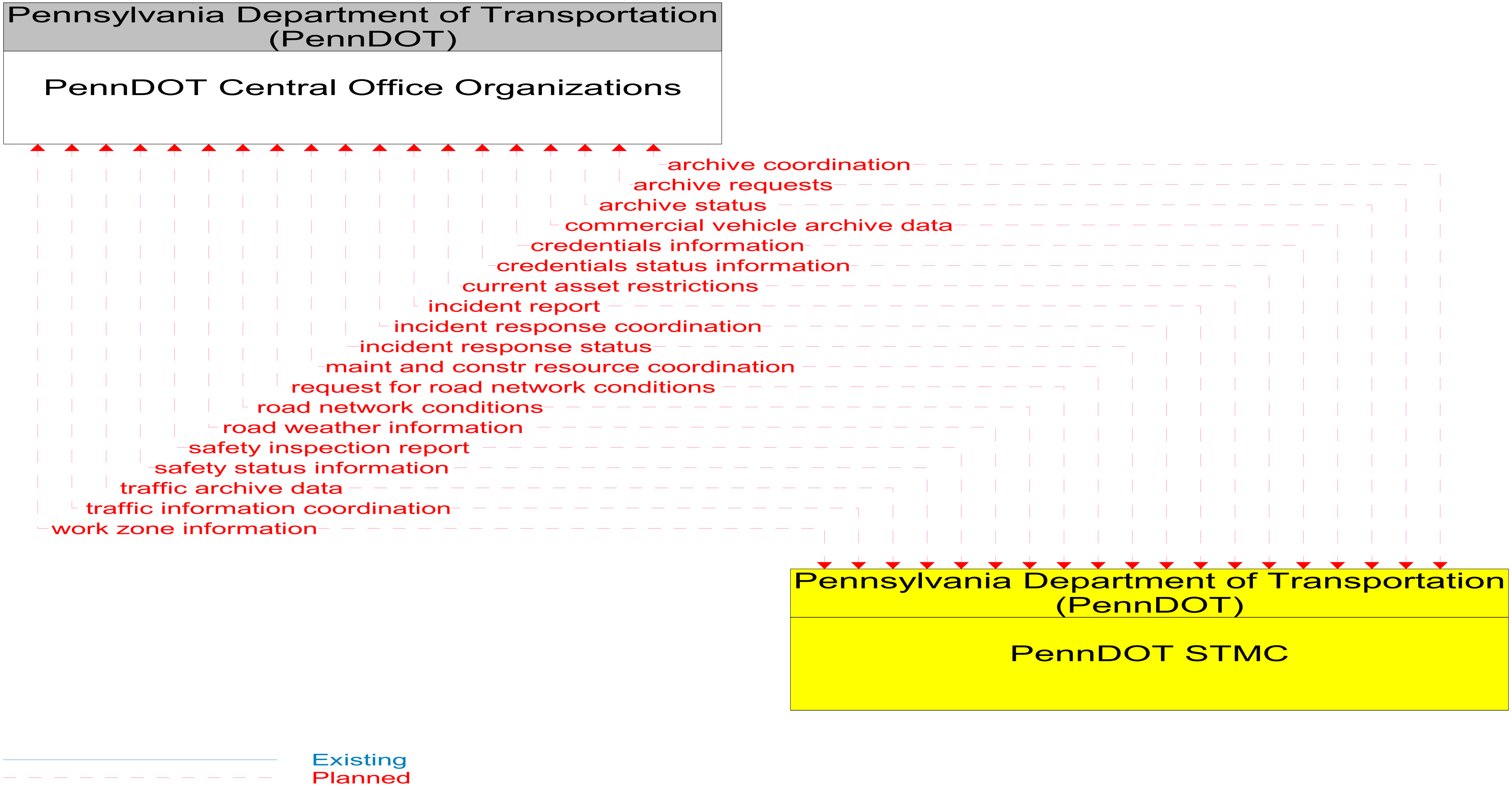
Existing

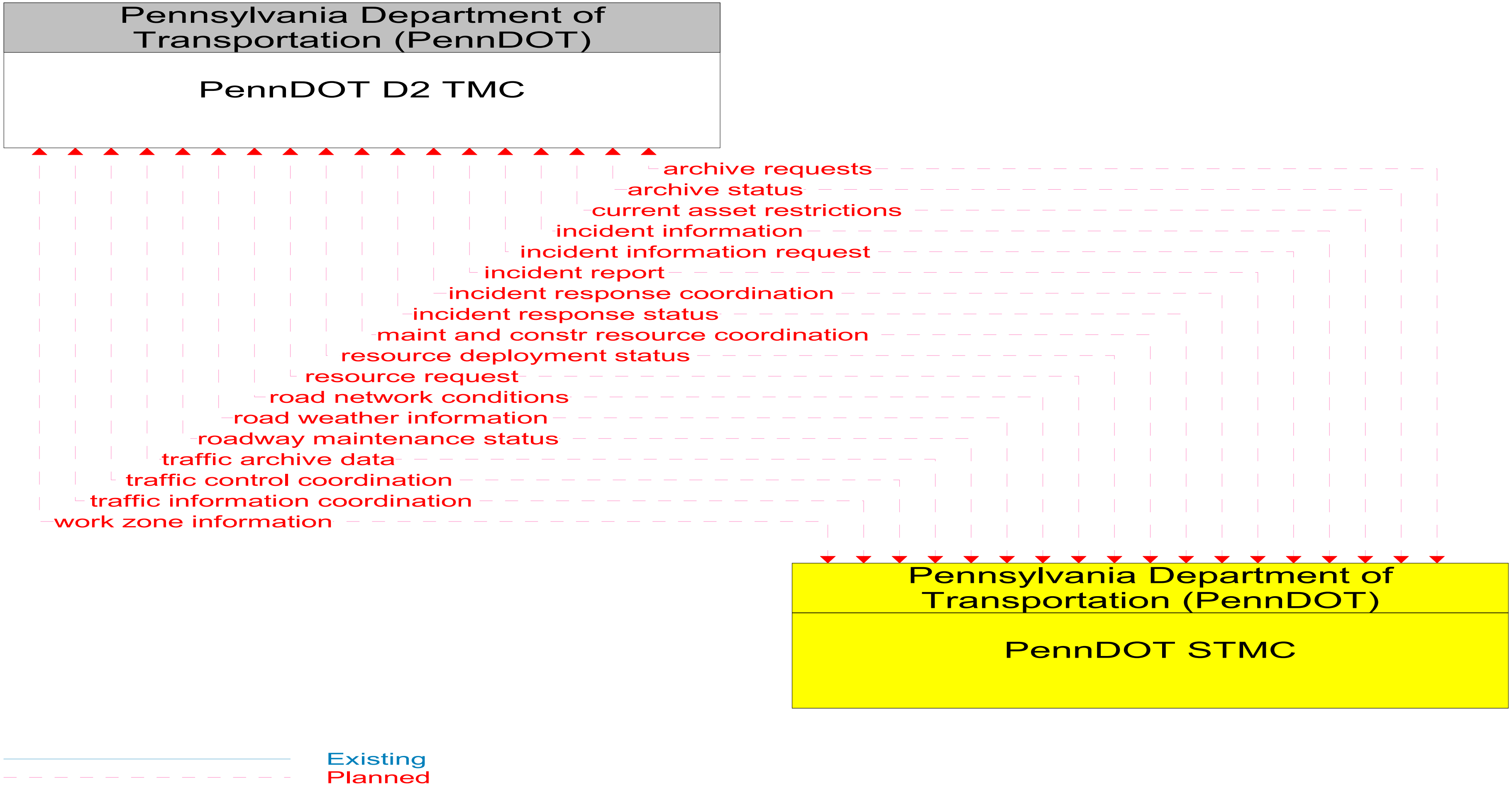
Planned

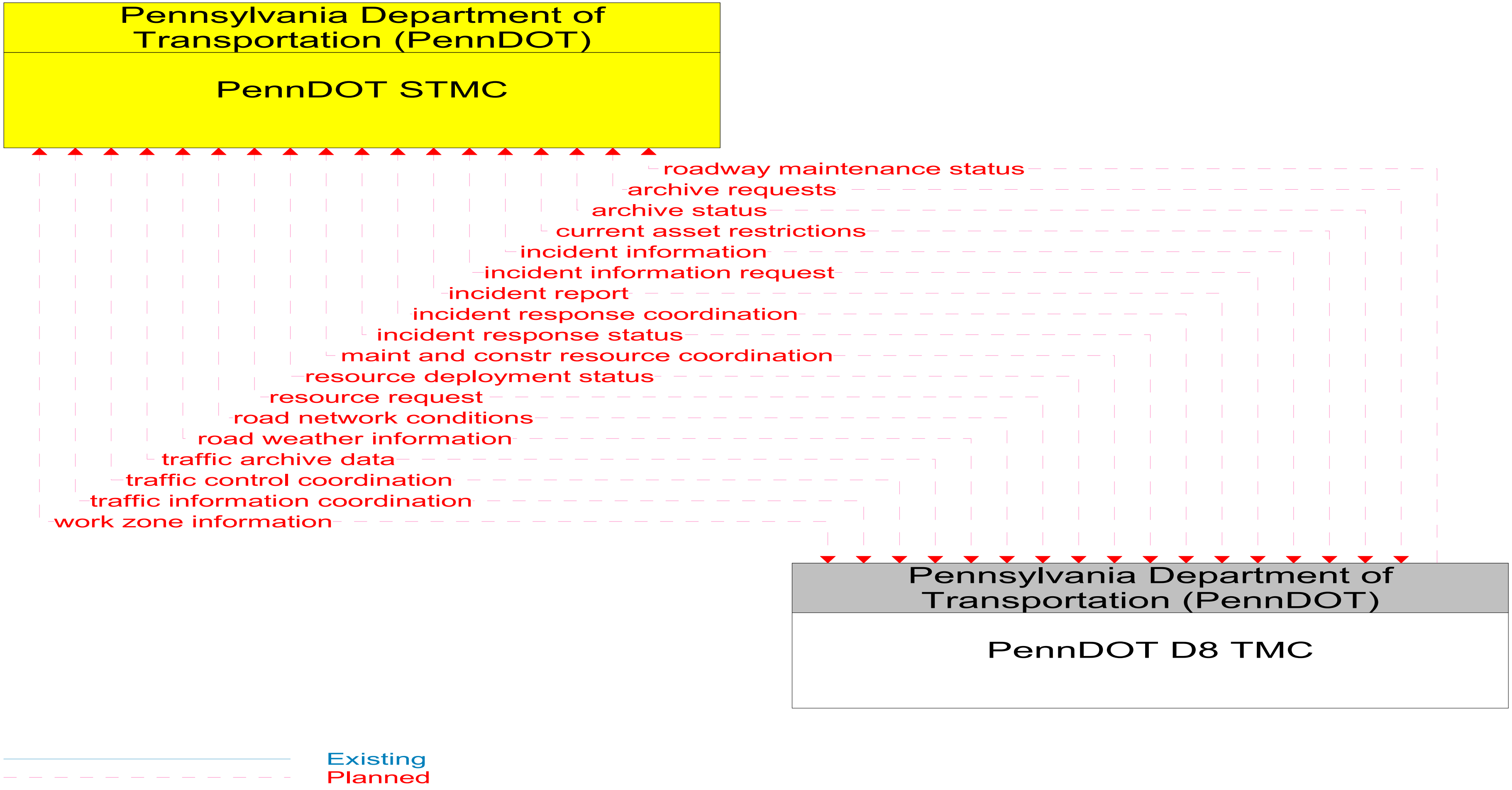

Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC
daily site activity data
environmental conditions data
field device status
safety inspection report
violation notification
credentials information
credentials status information
environmental sensors control
safety status information
Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Field Devices
Existing
Planned

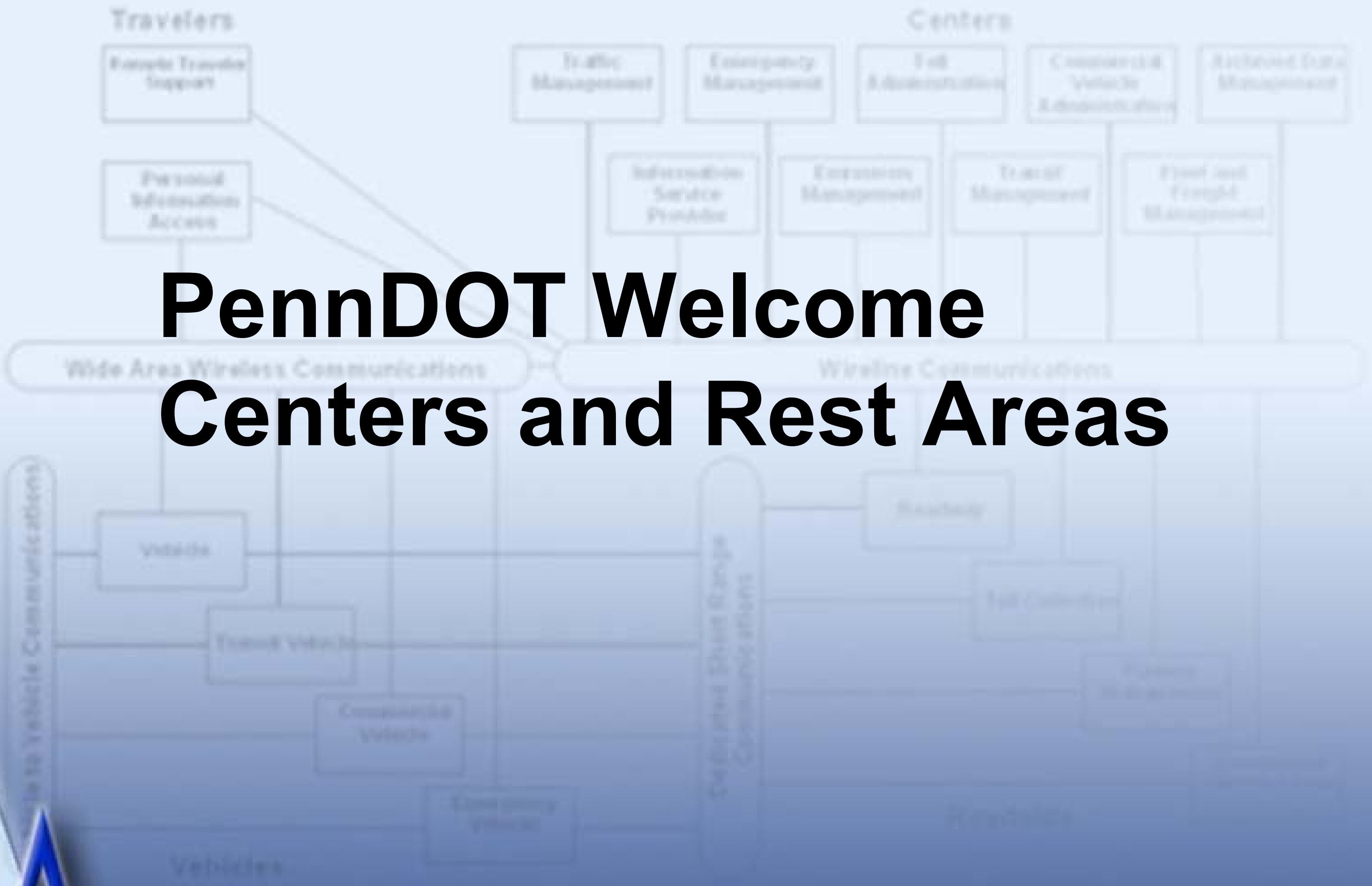

Counties
County/Regional Planning Organizations
archive coordination
archive requests
traffic archive data
Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC
Existing
Planned


Regional Media
Regional Media Outlets
incident information for media
road network conditions
road weather information
traveler information for media
work zone information
media information request
Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC
Existing
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Organizations
archive coordination
archive requests
archive status
commercial vehicle archive data
credentials information
credentials status information
current asset restrictions
incident report
incident response coordination
incident response status
maint and constr resource coordination
request for road network conditions
road network conditions
road weather information
safety inspection report
safety status information
traffic archive data
traffic information coordination
work zone information
Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC
Existing
Planned

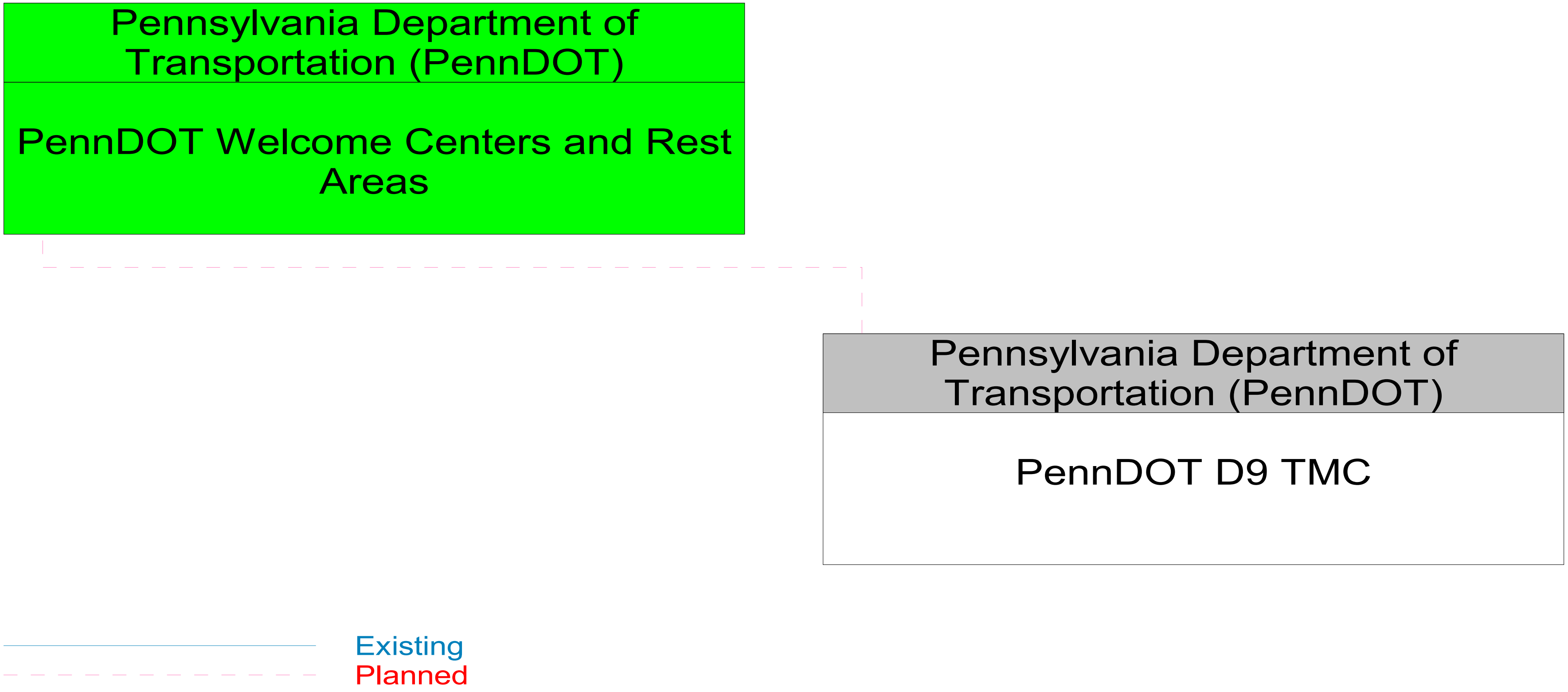

Pennsylvania Department of Transportation (PennDOT)
PennDOT D2 TMC
archive requests
archive status
current asset restrictions
incident information
incident information request
incident report
incident response coordination
incident response status
maint and constr resource coordination
resource deployment status
resource request
road network conditions
road weather information
roadway maintenance status
traffic archive data
traffic control coordination
traffic information coordination
work zone information
Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC
Existing
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC
roadway maintenance status
archive requests
archive status
current asset restrictions
incident information
incident information request
incident report
incident response coordination
incident response status
maint and constr resource coordination
resource deployment status
resource request
road network conditions
road weather information
traffic archive data
traffic control coordination
traffic information coordination
work zone information
Pennsylvania Department of Transportation (PennDOT)
PennDOT D8 TMC
Existing
Planned



PennDOT Welcome Centers and Rest Areas

PennDOT Welcome Centers and Rest Areas Interconnect Diagram



Pennsylvania Department of Transportation (PennDOT)

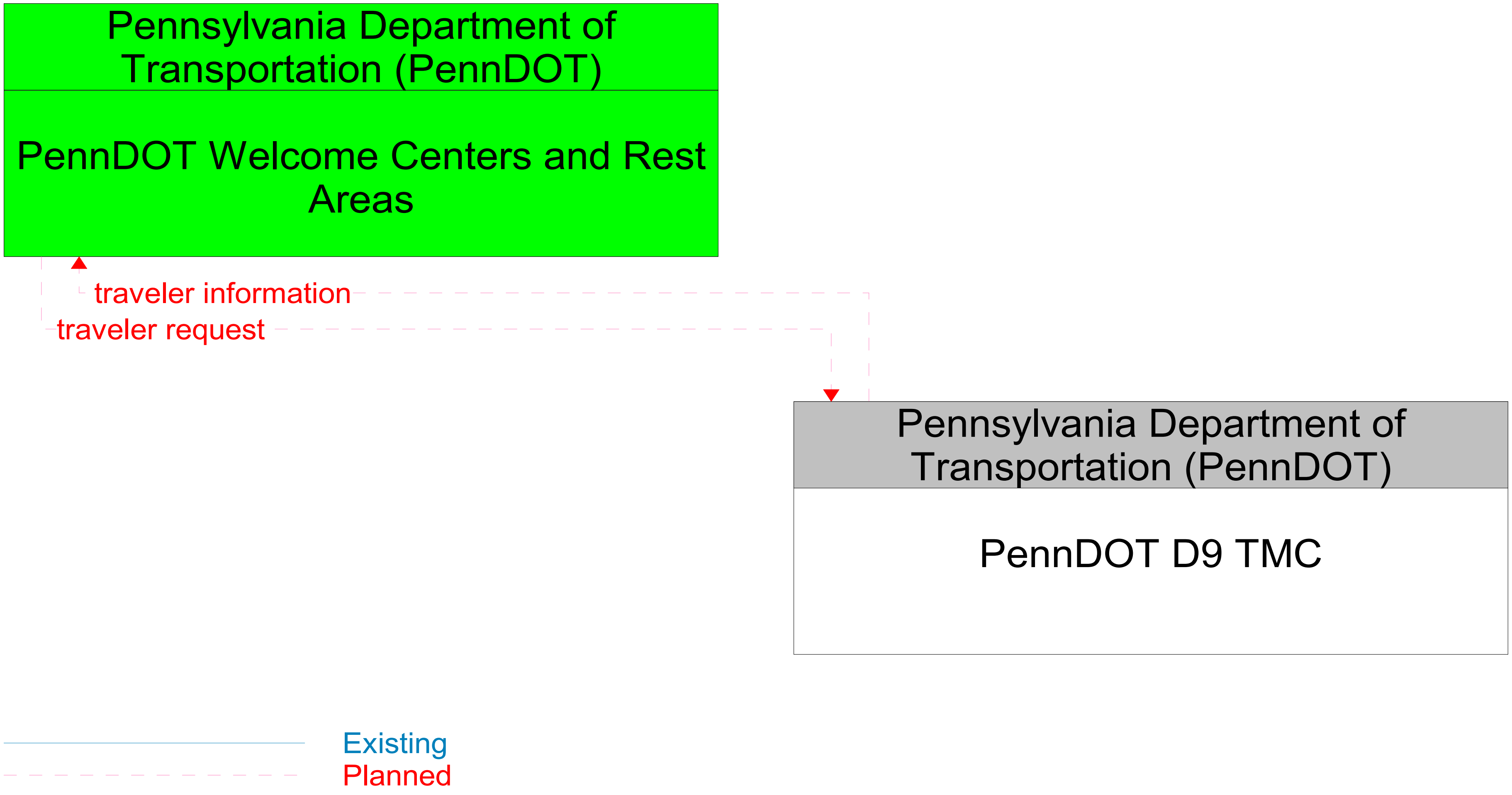
PennDOT Welcome Centers and Rest Areas

Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 TMC

Existing

Planned



Pennsylvania Department of Transportation (PennDOT)

PennDOT Welcome Centers and Rest Areas

traveler information

traveler request

Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 TMC

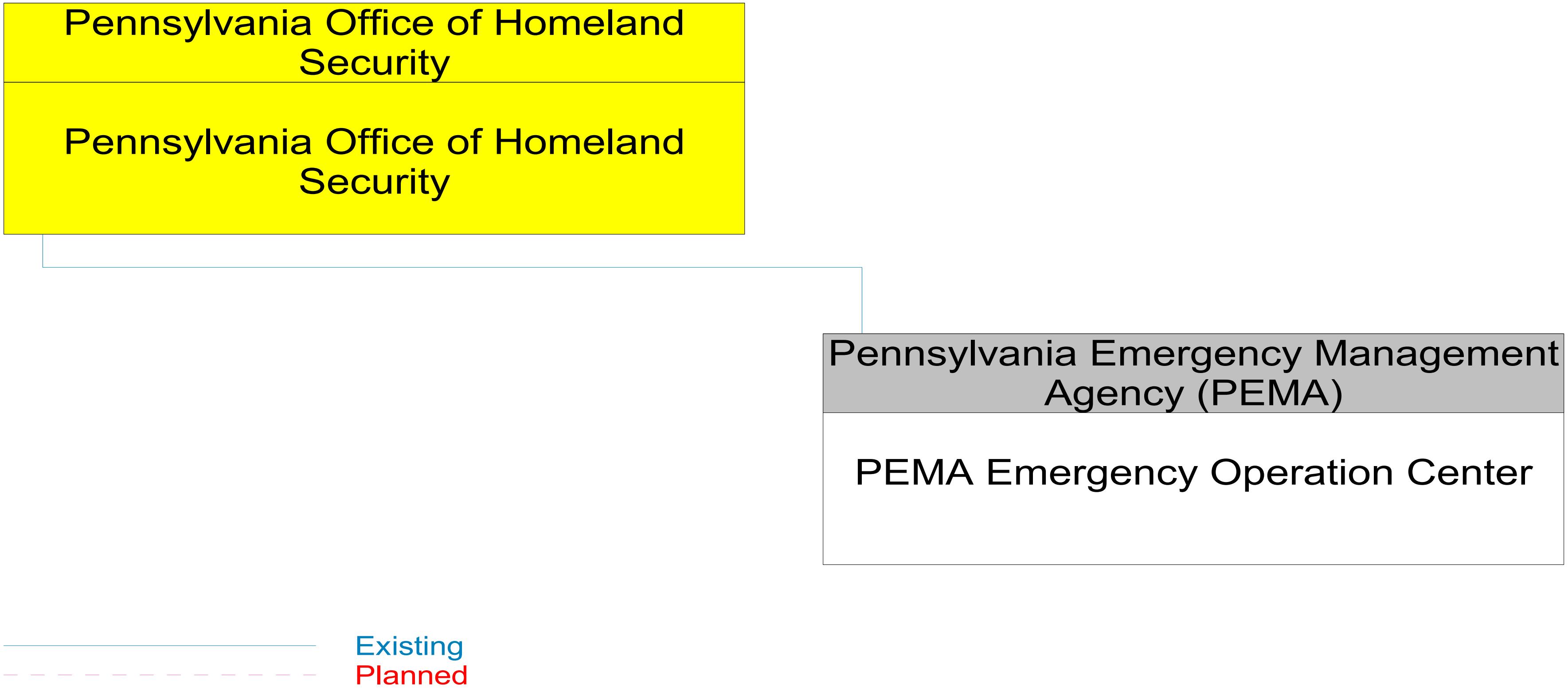
Existing

Planned

Travelers
Centers
Remote Traveler Support
Traffic Management
Emergency Management
Toll Administration
Commercial Vehicle Administration
Archived Data Management
Personal Information Access
Information Service Provider
Emissions Management
Transit Management
Fleet and Freight Management
Wide Area Wireless Communications
Wireline Communications
Vehicle to Vehicle Communications
Vehicle
Transit Vehicle
Commercial Vehicle
Emergency Vehicle
Vehicles
Dedicated Short Range Communications
Roadway
Toll Collection
Parking Management
Roadside

Pennsylvania Office of Homeland Security

Pennsylvania Office of Homeland Security Interconnect Diagram



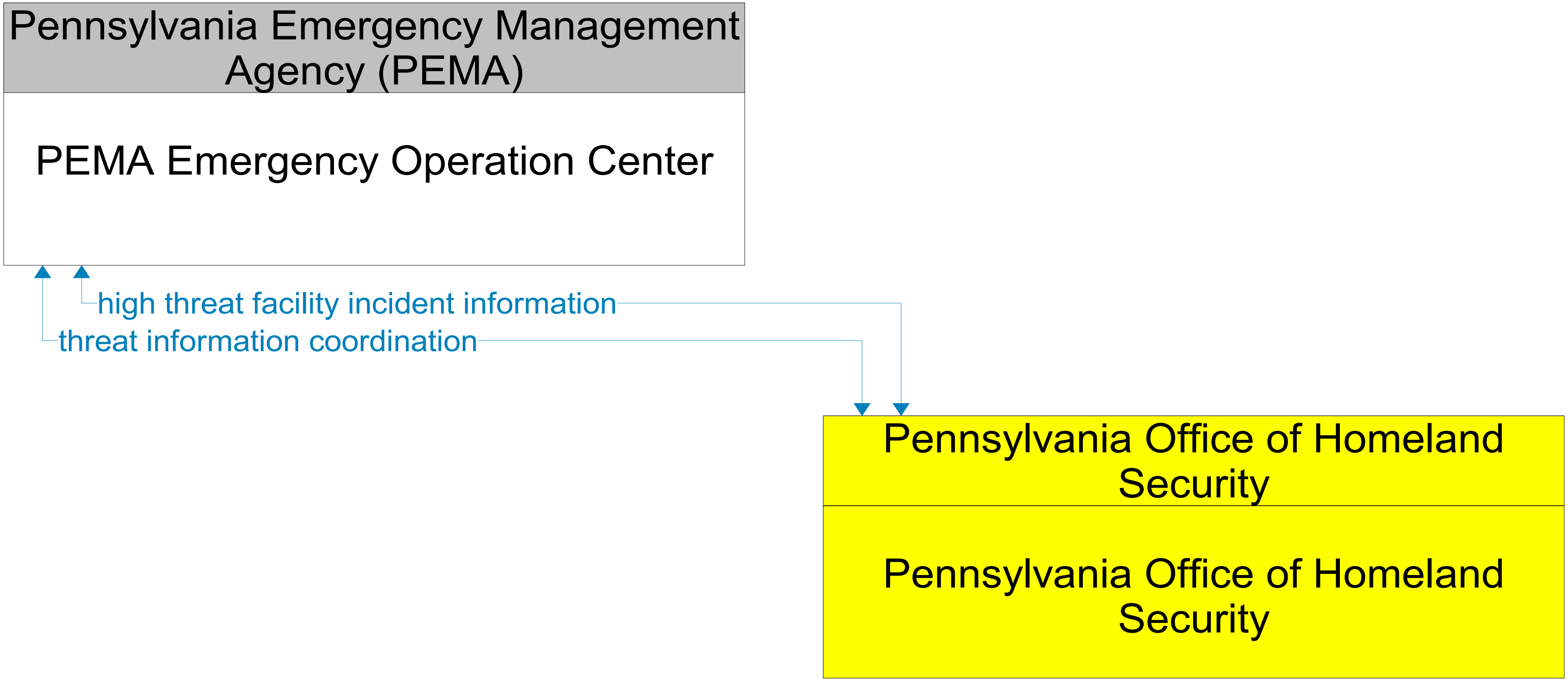
Pennsylvania Office of Homeland Security

Pennsylvania Office of Homeland Security

Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

Existing
Planned



Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

high threat facility incident information

threat information coordination

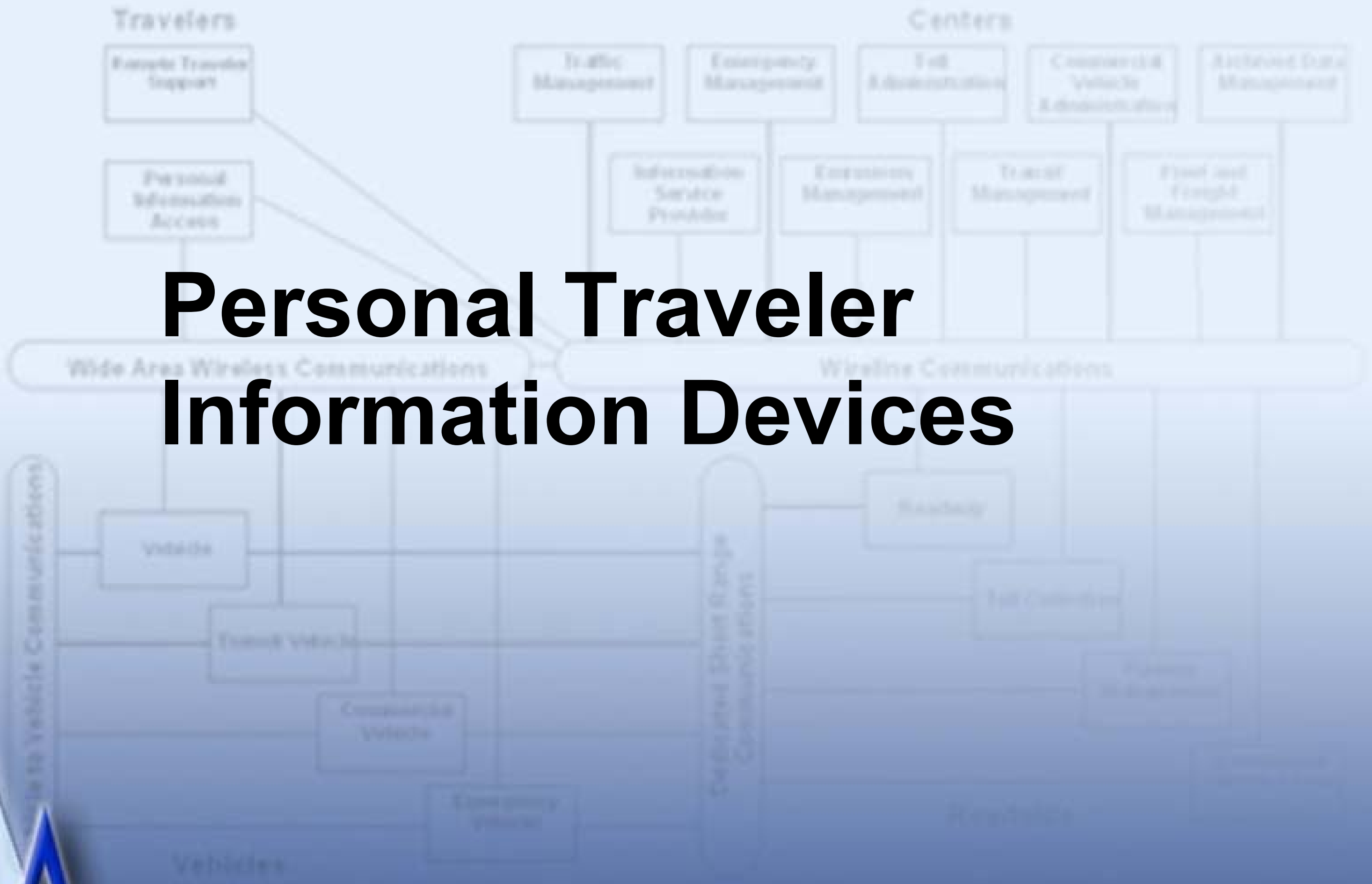
Pennsylvania Office of Homeland Security

Pennsylvania Office of Homeland Security

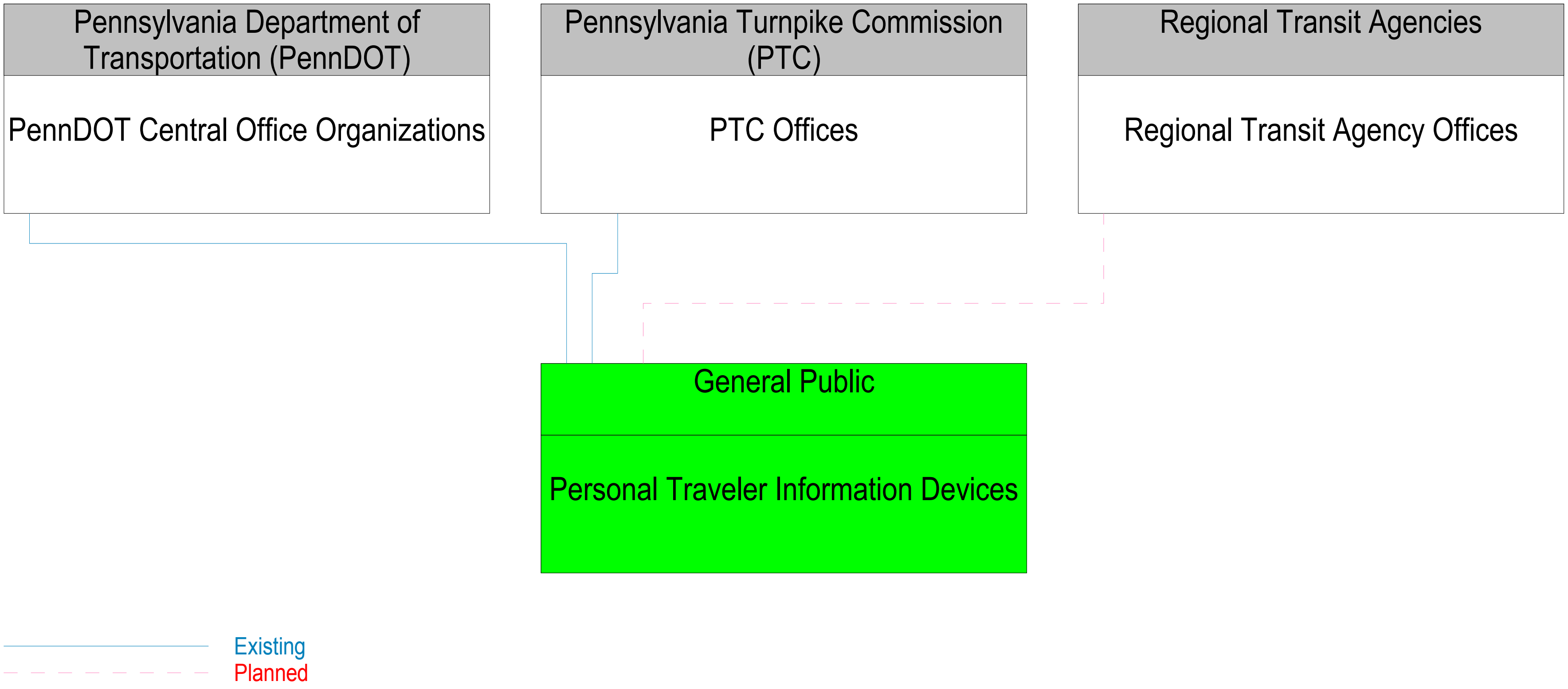
Existing

Planned

Personal Traveler Information Devices


Travelers
Centers
Remote Traveler Support
Personal Information Access
Traffic Management
Emergency Management
Toll Administration
Commercial Vehicle Administration
Archived Data Management
Information Service Provider
Emissions Management
Transit Management
Fleet and Freight Management
Wide Area Wireless Communications
Wireline Communications
Vehicle to Vehicle Communications
Vehicle
Transit Vehicle
Commercial Vehicle
Emergency Vehicle
Vehicles
Dedicated Short Range Communications
Roadway
Toll Collection
Parking Management
Roadside

Personal Traveler Information Devices Interconnect Diagram



Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Organizations

Pennsylvania Turnpike Commission (PTC)

PTC Offices

Regional Transit Agencies

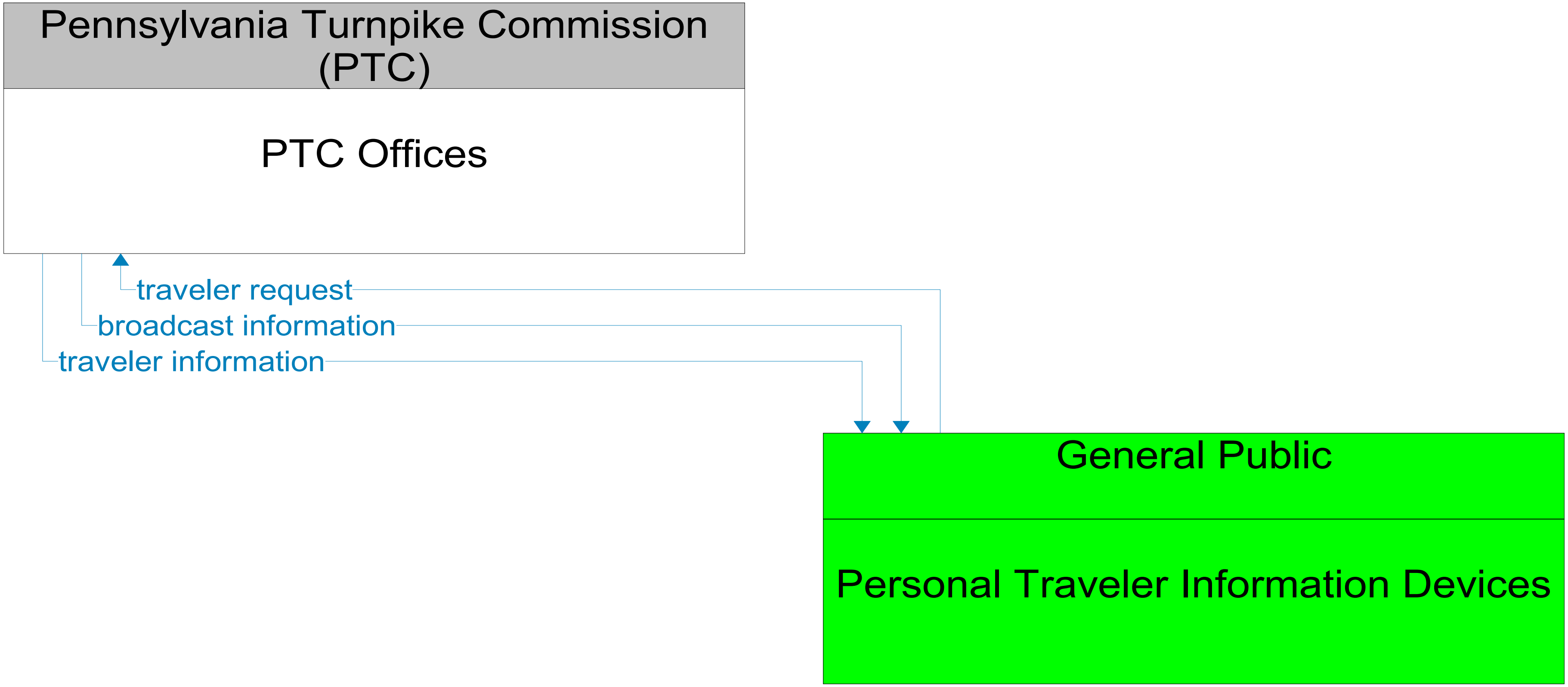
Regional Transit Agency Offices

General Public

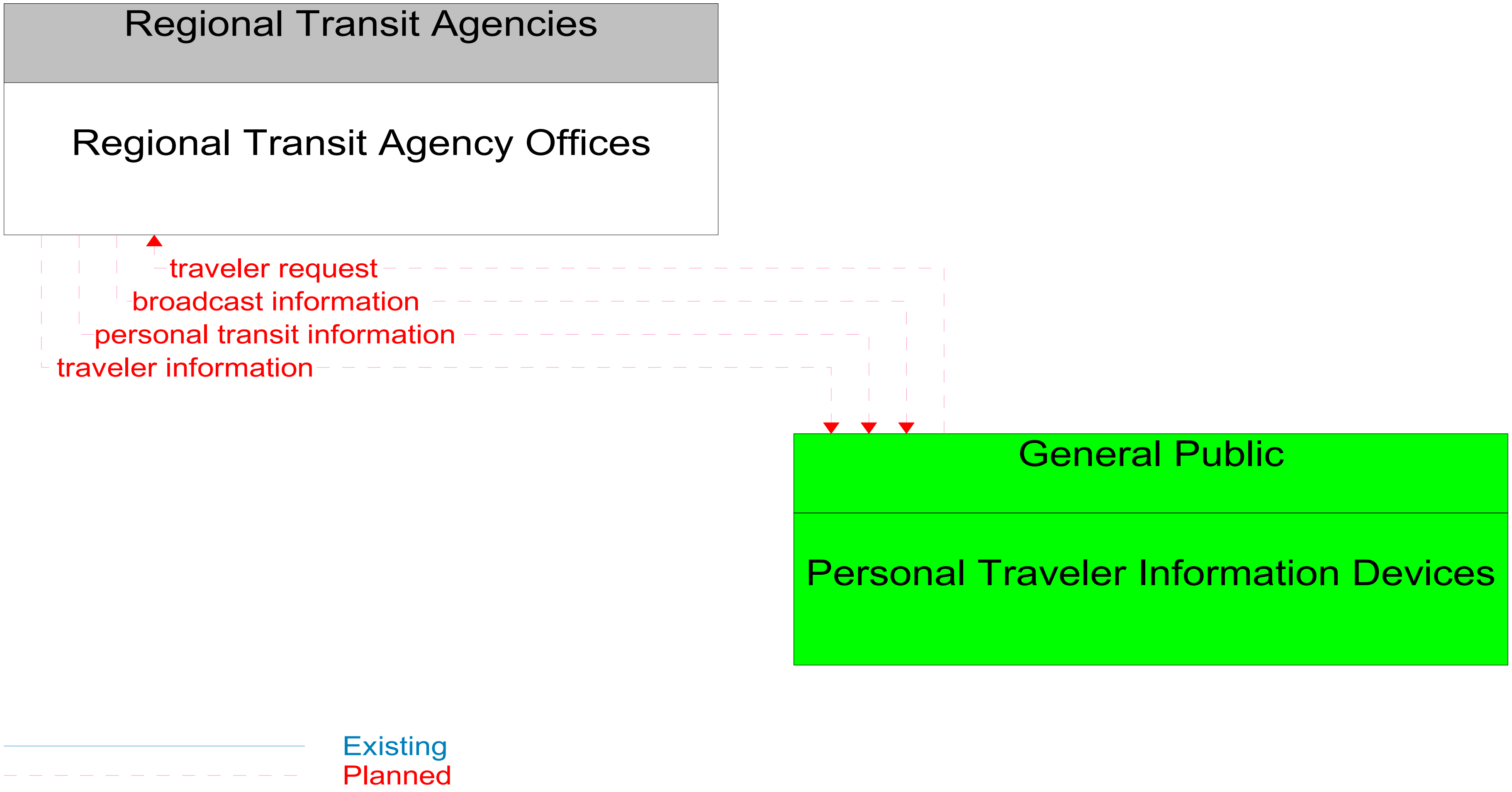
Personal Traveler Information Devices

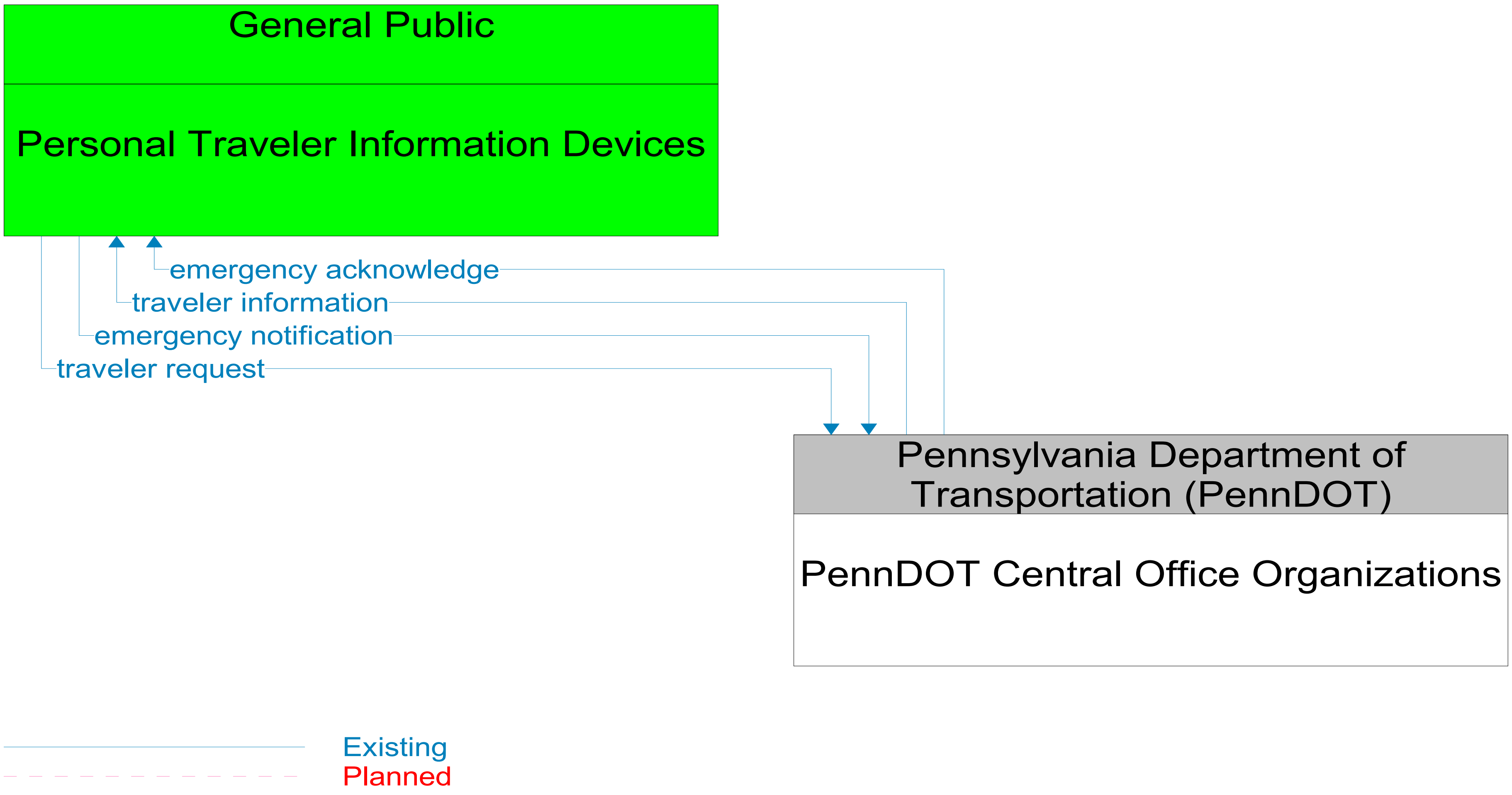
Existing

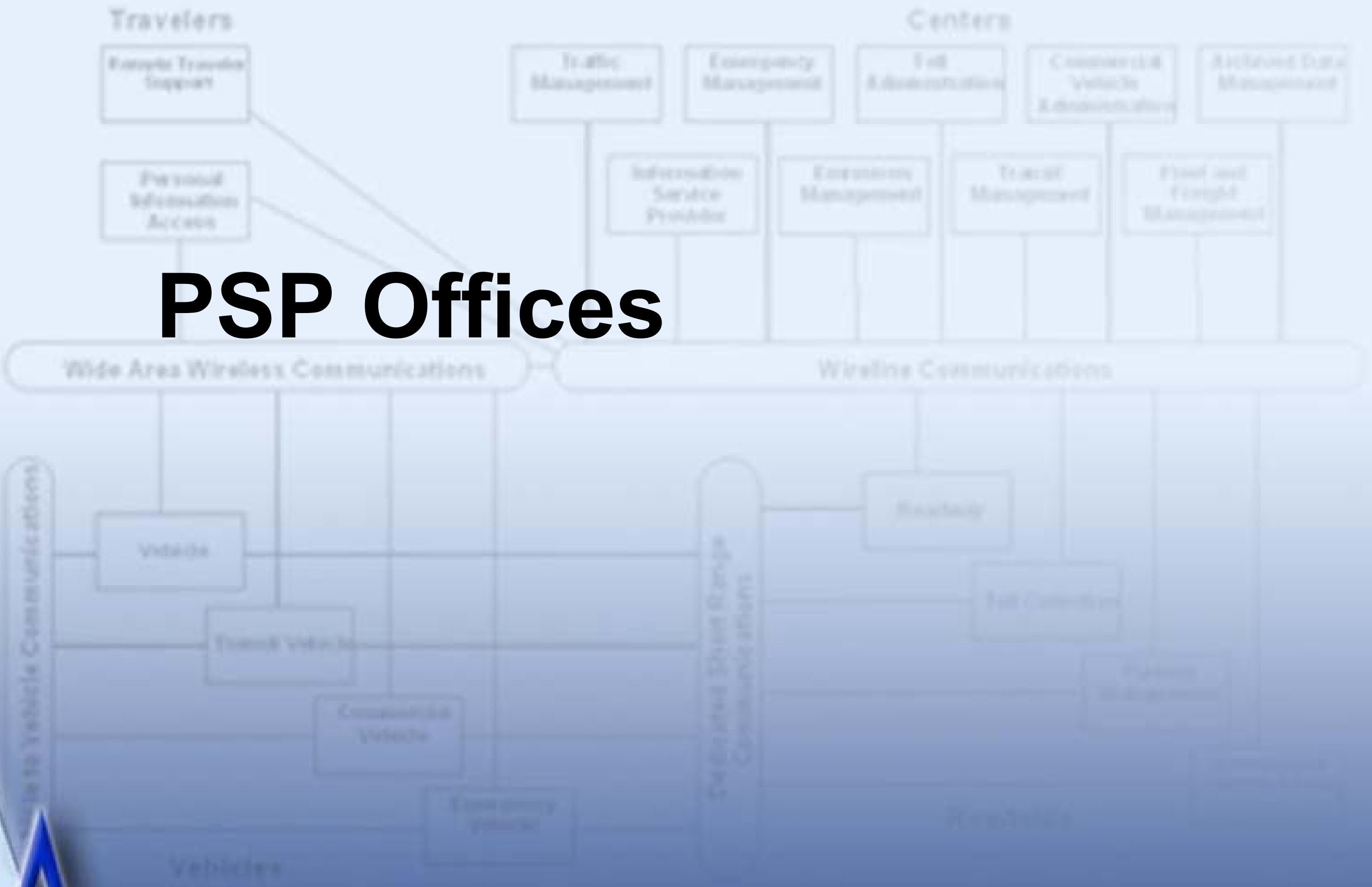
Planned


Pennsylvania Turnpike Commission (PTC)
PTC Offices
traveler request
broadcast information
traveler information
General Public
Personal Traveler Information Devices

Existing
Planned

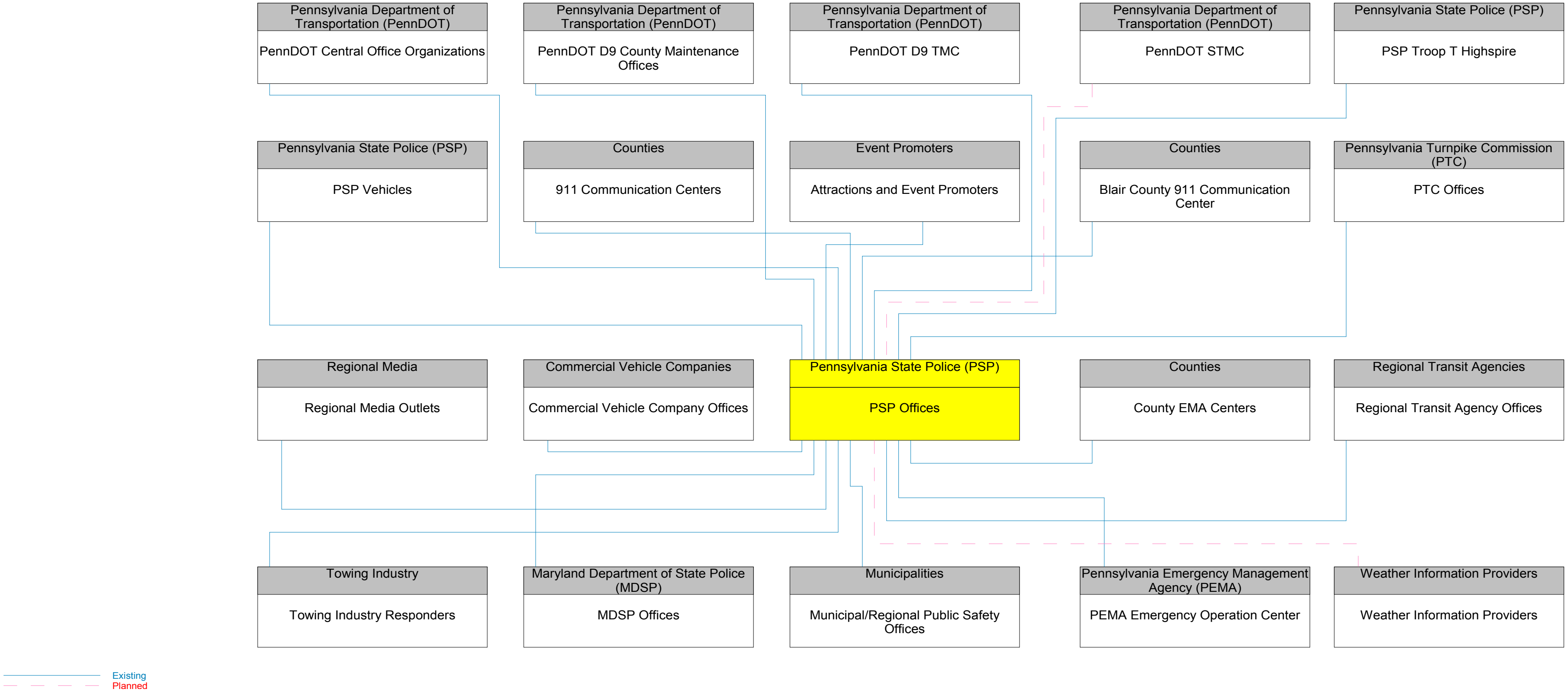

Regional Transit Agencies
Regional Transit Agency Offices
traveler request
broadcast information
personal transit information
traveler information
General Public
Personal Traveler Information Devices
Existing
Planned


General Public
Personal Traveler Information Devices
emergency acknowledge
traveler information
emergency notification
traveler request
Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Organizations
Existing
Planned


Travelers
Remote Traveler Support
Personal Information Access
Centers
Traffic Management
Emergency Management
Toll Administration
Commercial Vehicle Administration
Archived Data Management
Information Service Provider
Emissions Management
Transit Management
Fleet and Freight Management
Wide Area Wireless Communications
Wireline Communications
Vehicle
Transit Vehicle
Commercial Vehicle
Emergency Vehicle
Vehicles
Dedicated Short Range Communications
Roadway
Toll Collection
Parking Management
Roadside

PSP Offices

PSP Offices Interconnect Diagram



Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Organizations

Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 County Maintenance Offices

Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC

Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC

Pennsylvania State Police (PSP)
PSP Troop T Highspire

Pennsylvania State Police (PSP)
PSP Vehicles

Counties
911 Communication Centers

Event Promoters
Attractions and Event Promoters

Counties
Blair County 911 Communication Center

Pennsylvania Turnpike Commission (PTC)
PTC Offices

Regional Media
Regional Media Outlets

Commercial Vehicle Companies
Commercial Vehicle Company Offices

Pennsylvania State Police (PSP)
PSP Offices

Counties
County EMA Centers

Regional Transit Agencies
Regional Transit Agency Offices

Towing Industry
Towing Industry Responders

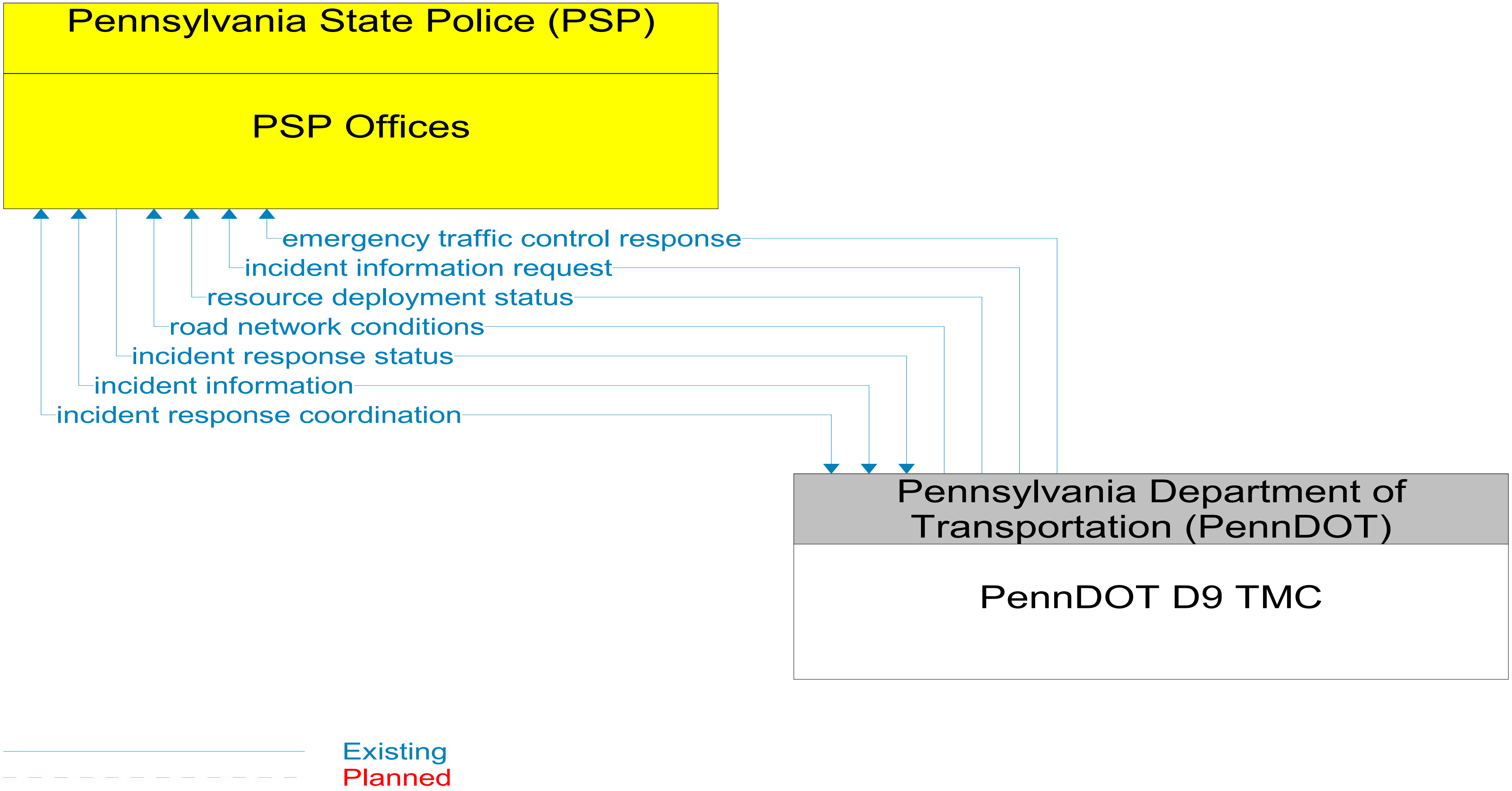
Maryland Department of State Police (MDSP)
MDSP Offices

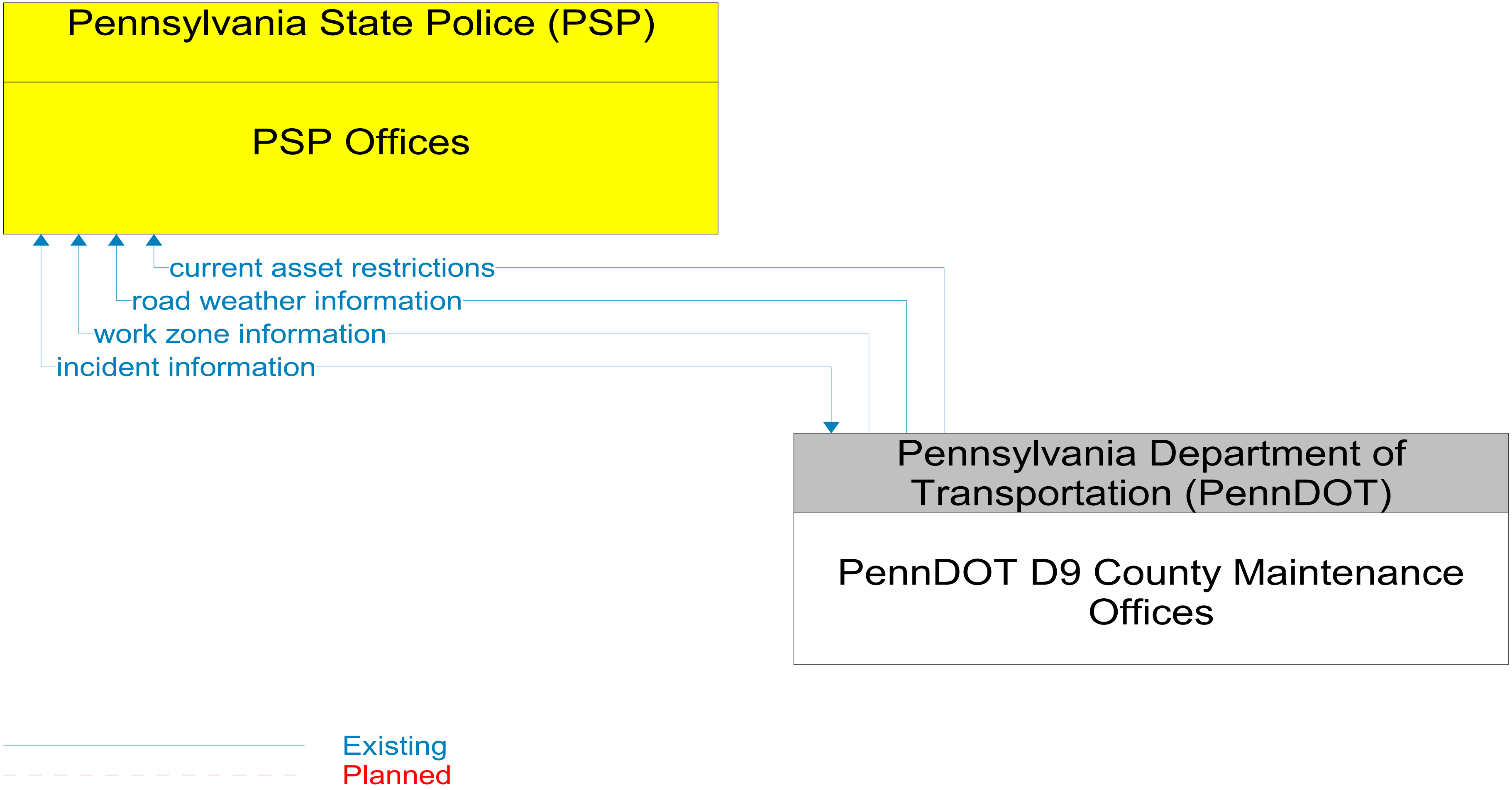
Municipalities
Municipal/Regional Public Safety Offices

Pennsylvania Emergency Management Agency (PEMA)
PEMA Emergency Operation Center

Weather Information Providers
Weather Information Providers

Existing
Planned


Pennsylvania State Police (PSP)
PSP Offices
emergency traffic control response
incident information request
resource deployment status
road network conditions
incident response status
incident information
incident response coordination
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
Existing
Planned



Pennsylvania State Police (PSP)

PSP Offices

current asset restrictions

road weather information

work zone information

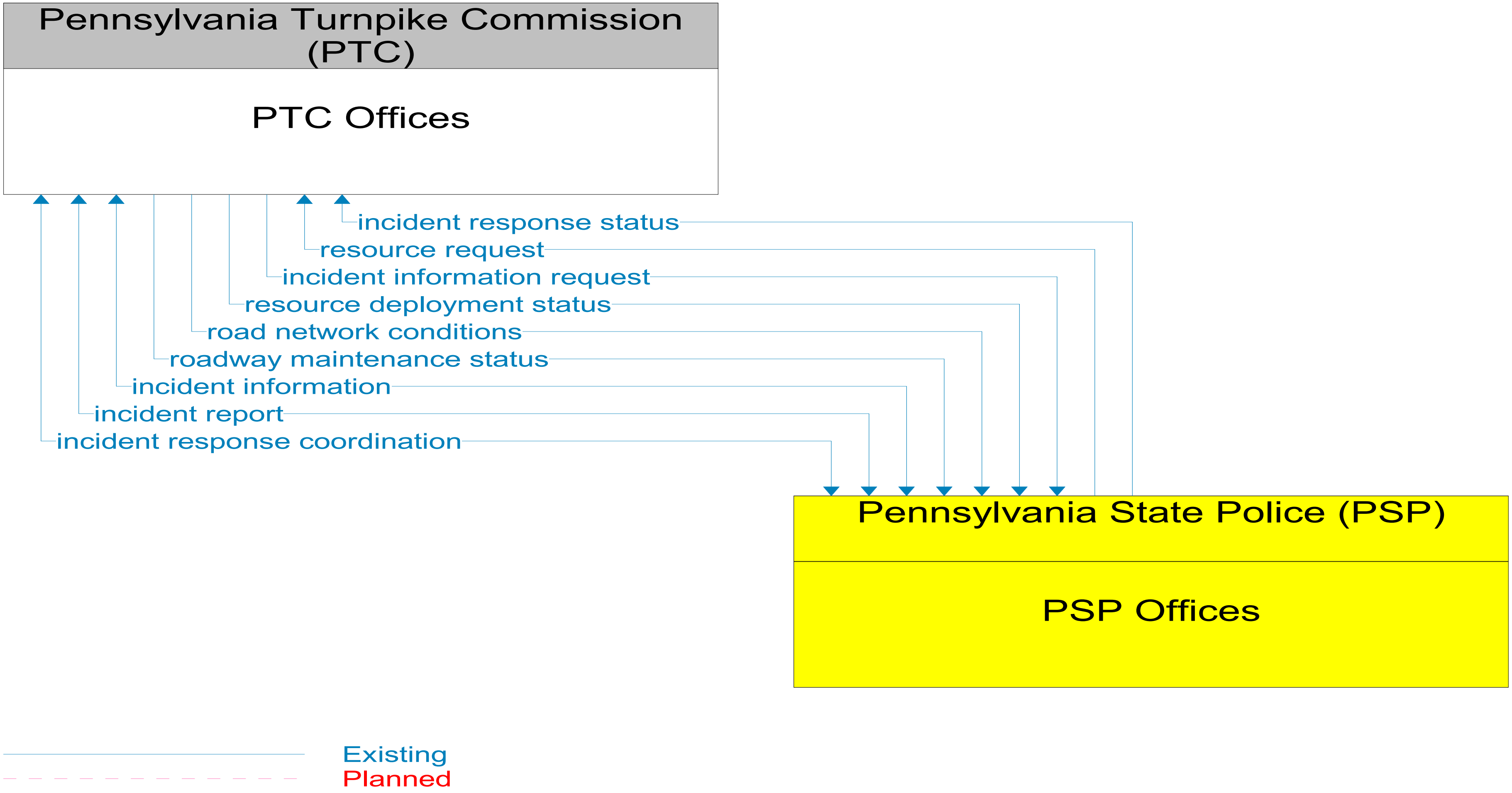
incident information

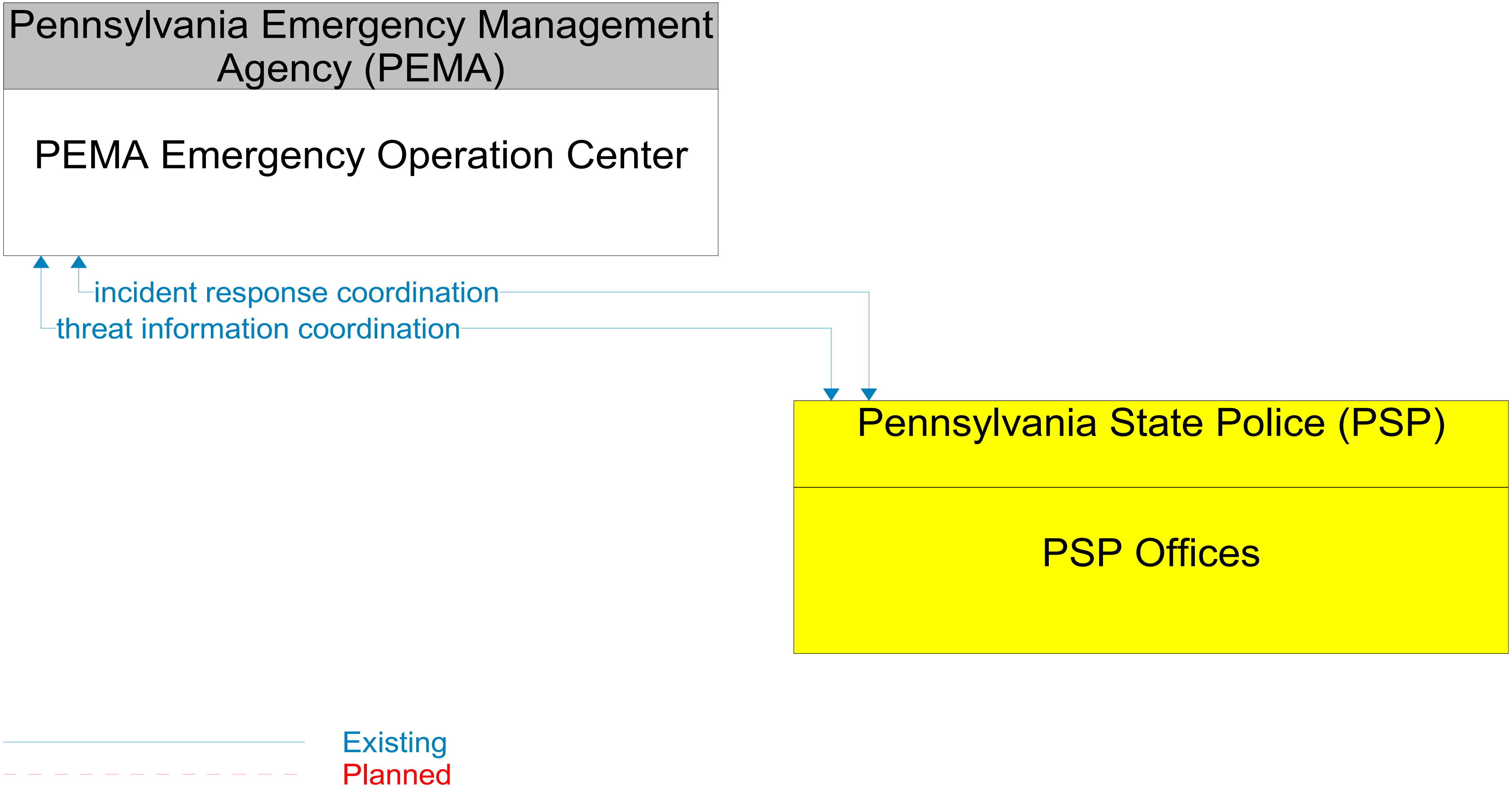
Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 County Maintenance Offices

Existing

Planned


Pennsylvania Turnpike Commission (PTC)
PTC Offices
incident response status
resource request
incident information request
resource deployment status
road network conditions
roadway maintenance status
incident information
incident report
incident response coordination
Pennsylvania State Police (PSP)
PSP Offices
Existing
Planned



Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

incident response coordination

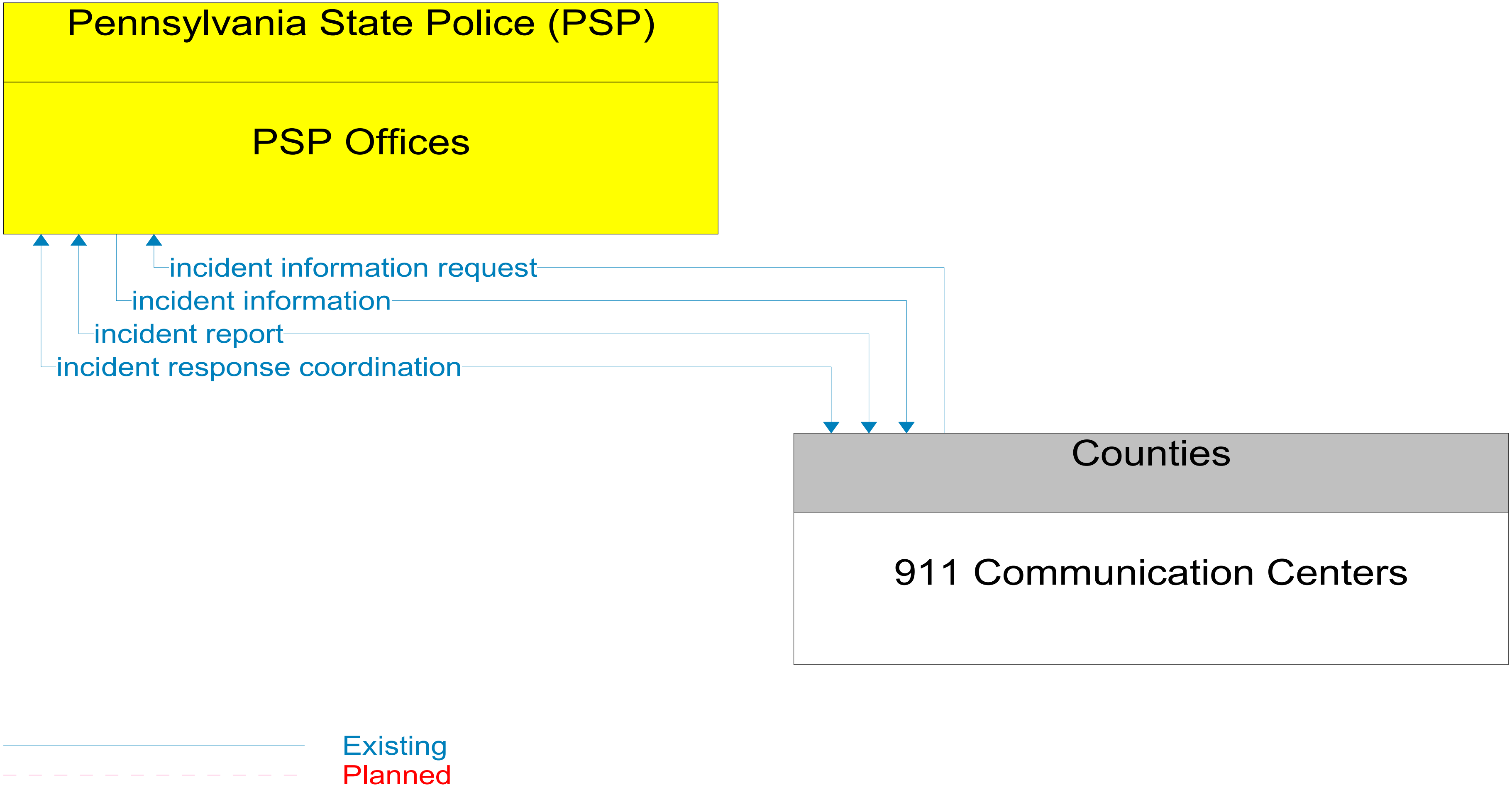
threat information coordination

Pennsylvania State Police (PSP)

PSP Offices

Existing

Planned



Pennsylvania State Police (PSP)

PSP Offices

incident information request

incident information

incident report

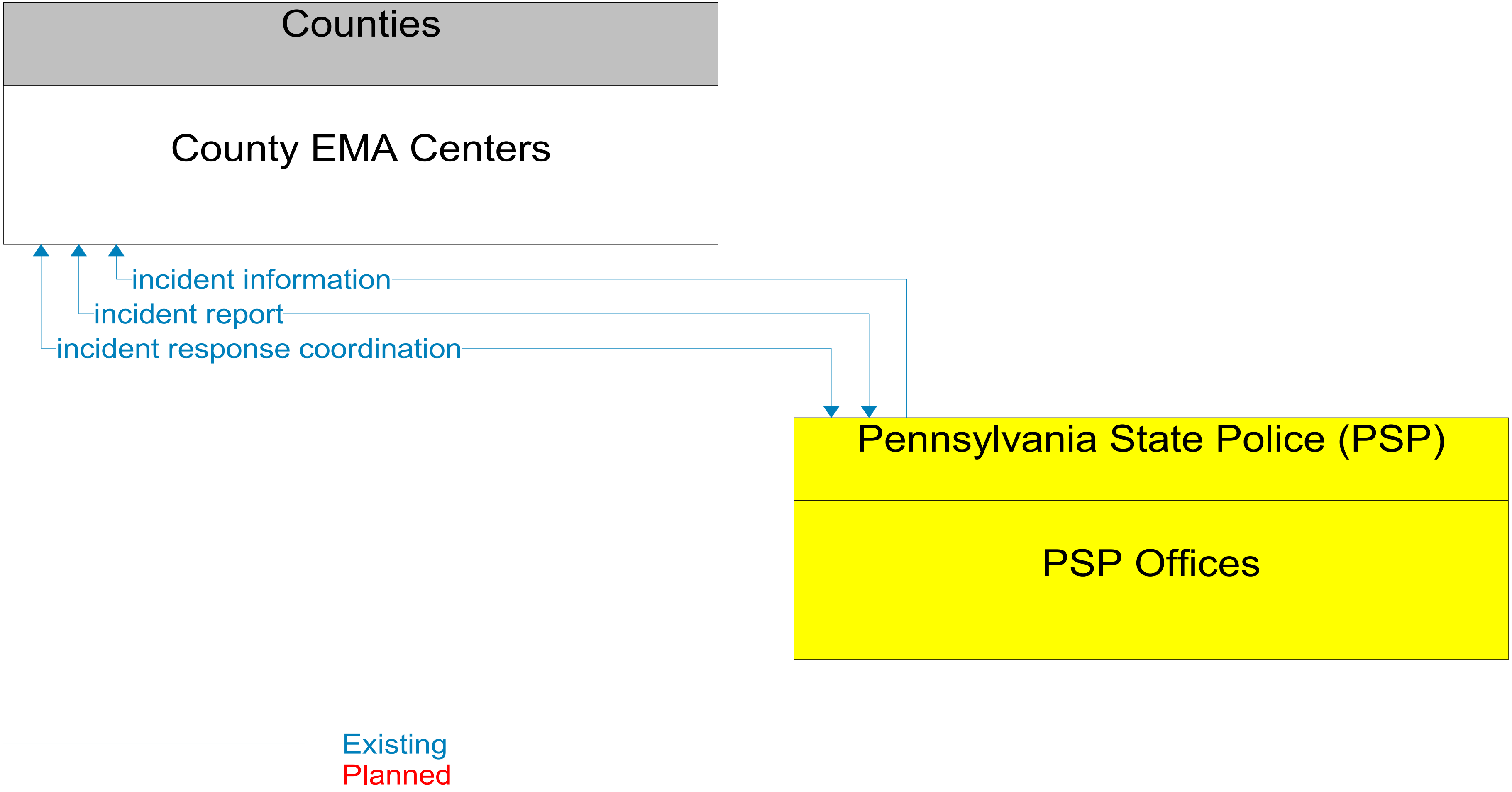
incident response coordination

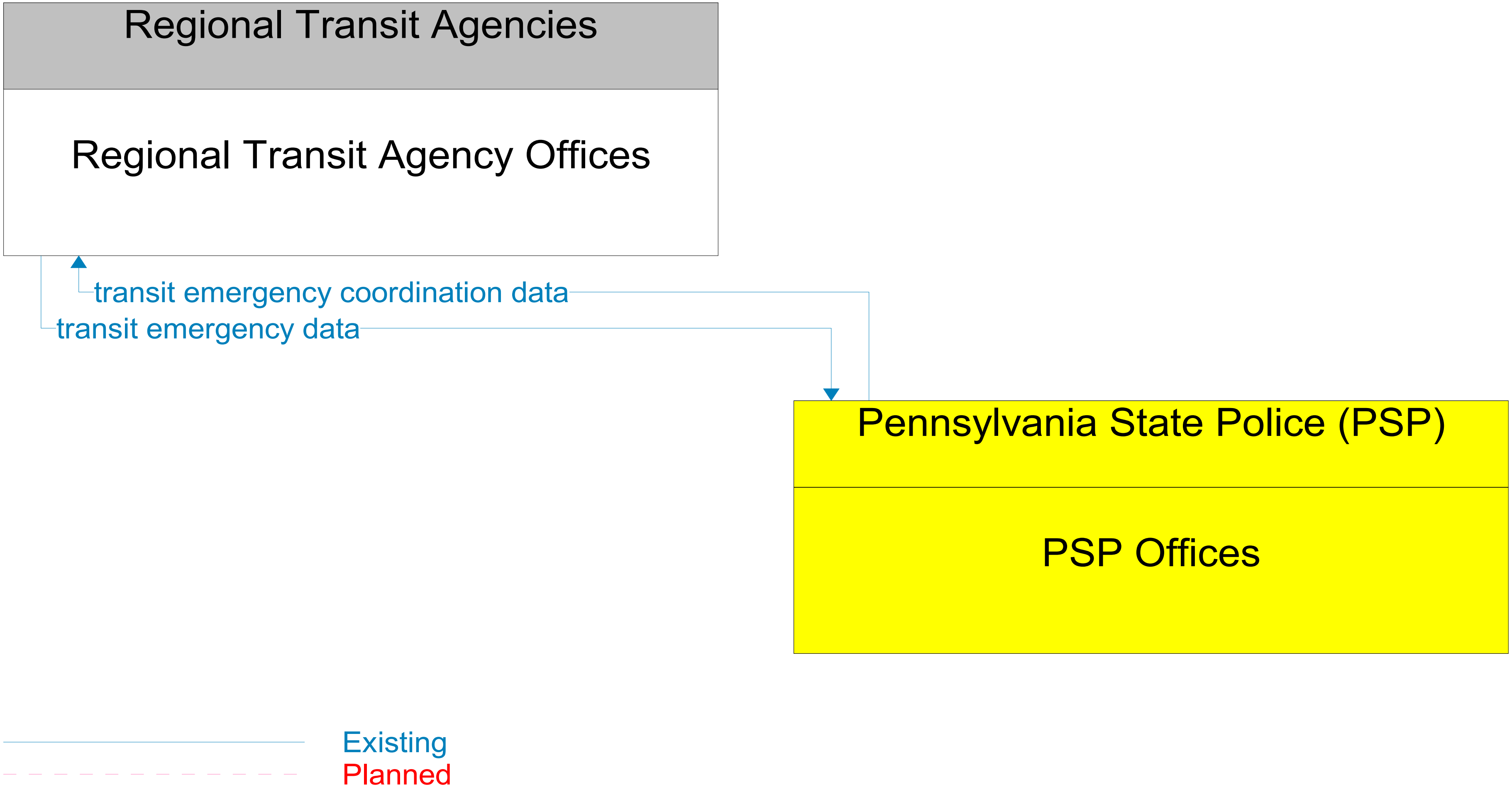
Counties

911 Communication Centers

Existing

Planned


Counties
County EMA Centers
incident information
incident report
incident response coordination
Pennsylvania State Police (PSP)
PSP Offices
Existing
Planned



Regional Transit Agencies

Regional Transit Agency Offices

transit emergency coordination data

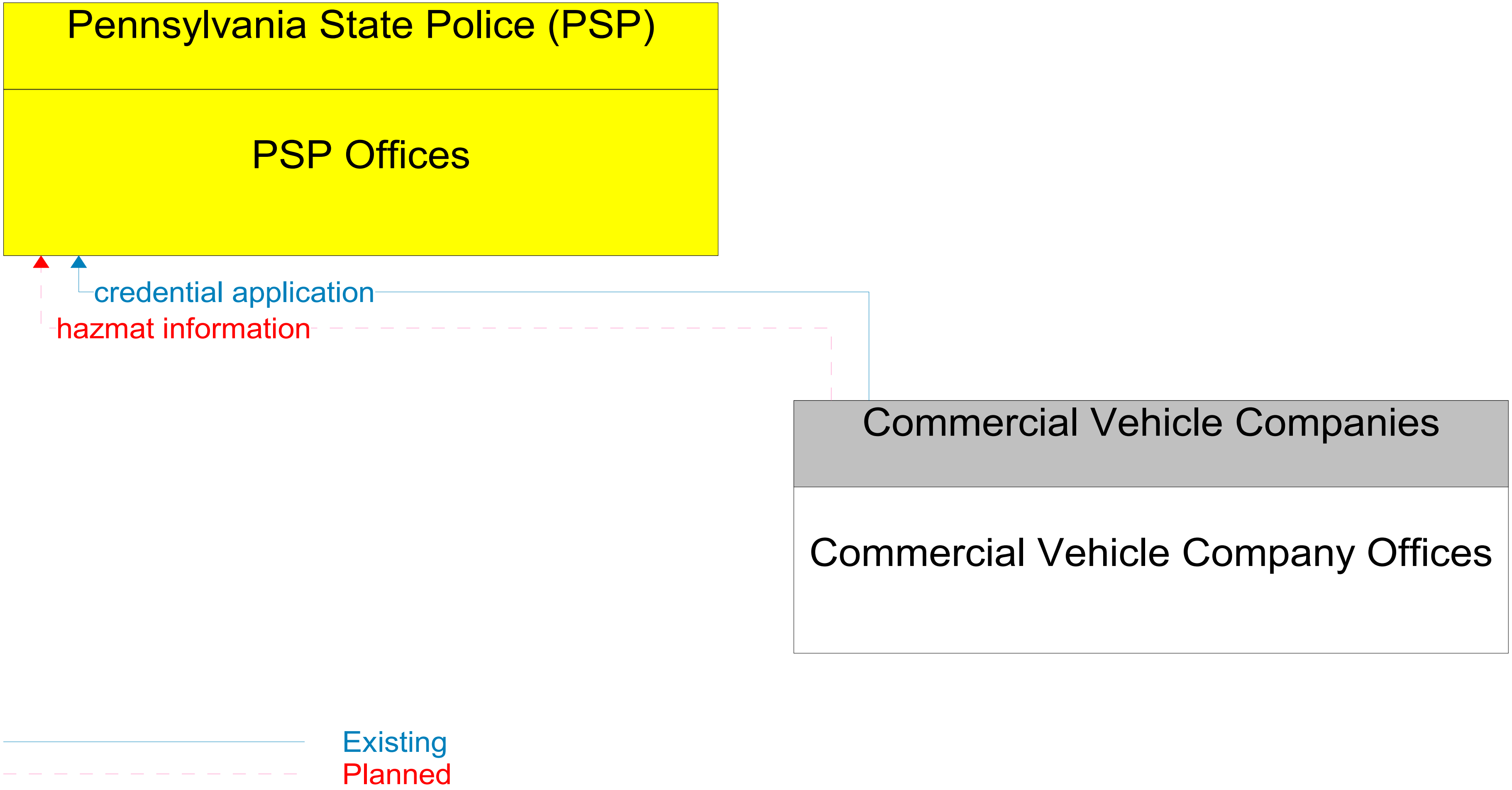
transit emergency data

Pennsylvania State Police (PSP)

PSP Offices

Existing

Planned



Pennsylvania State Police (PSP)

PSP Offices

credential application

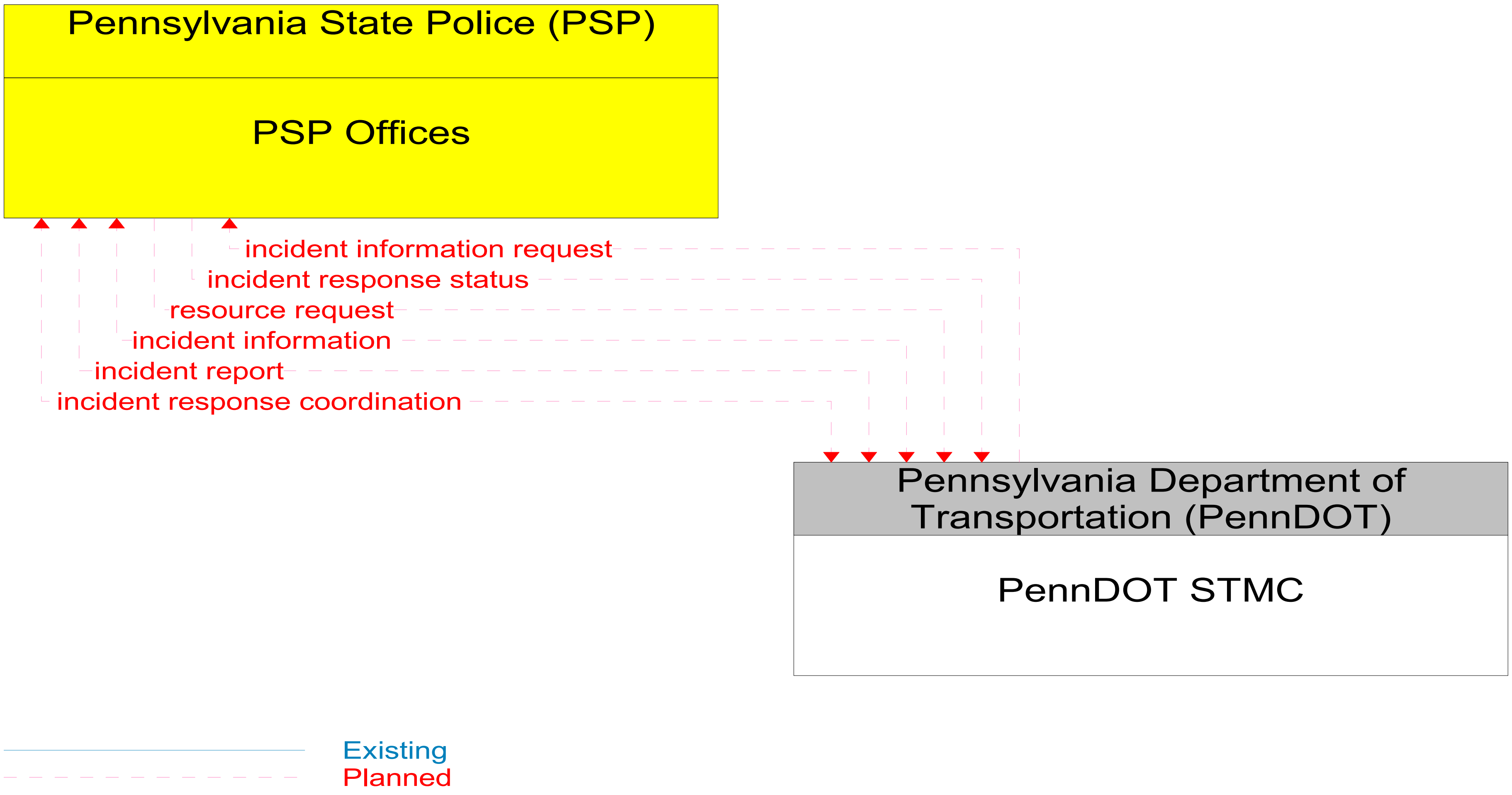
hazmat information

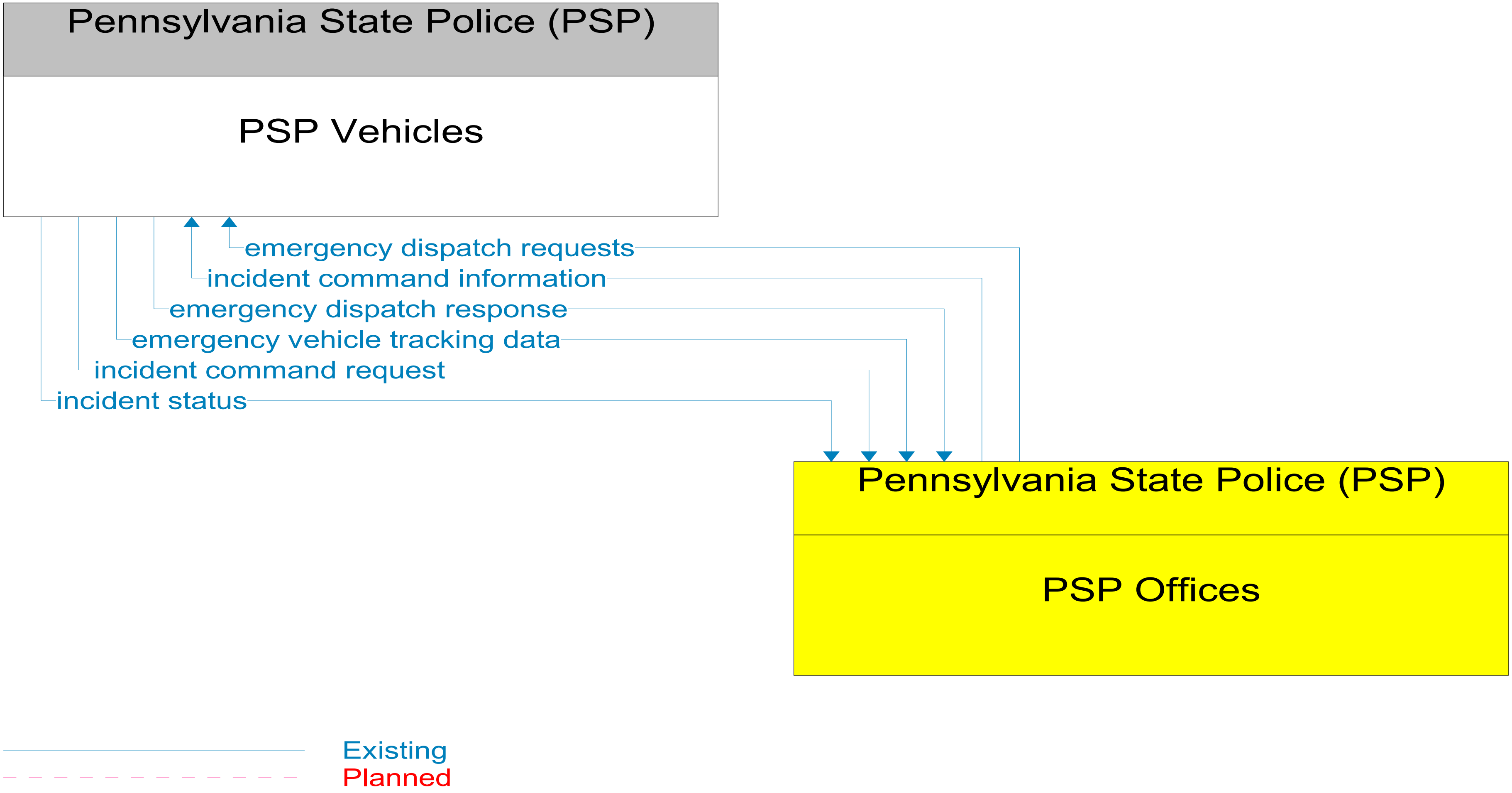
Commercial Vehicle Companies

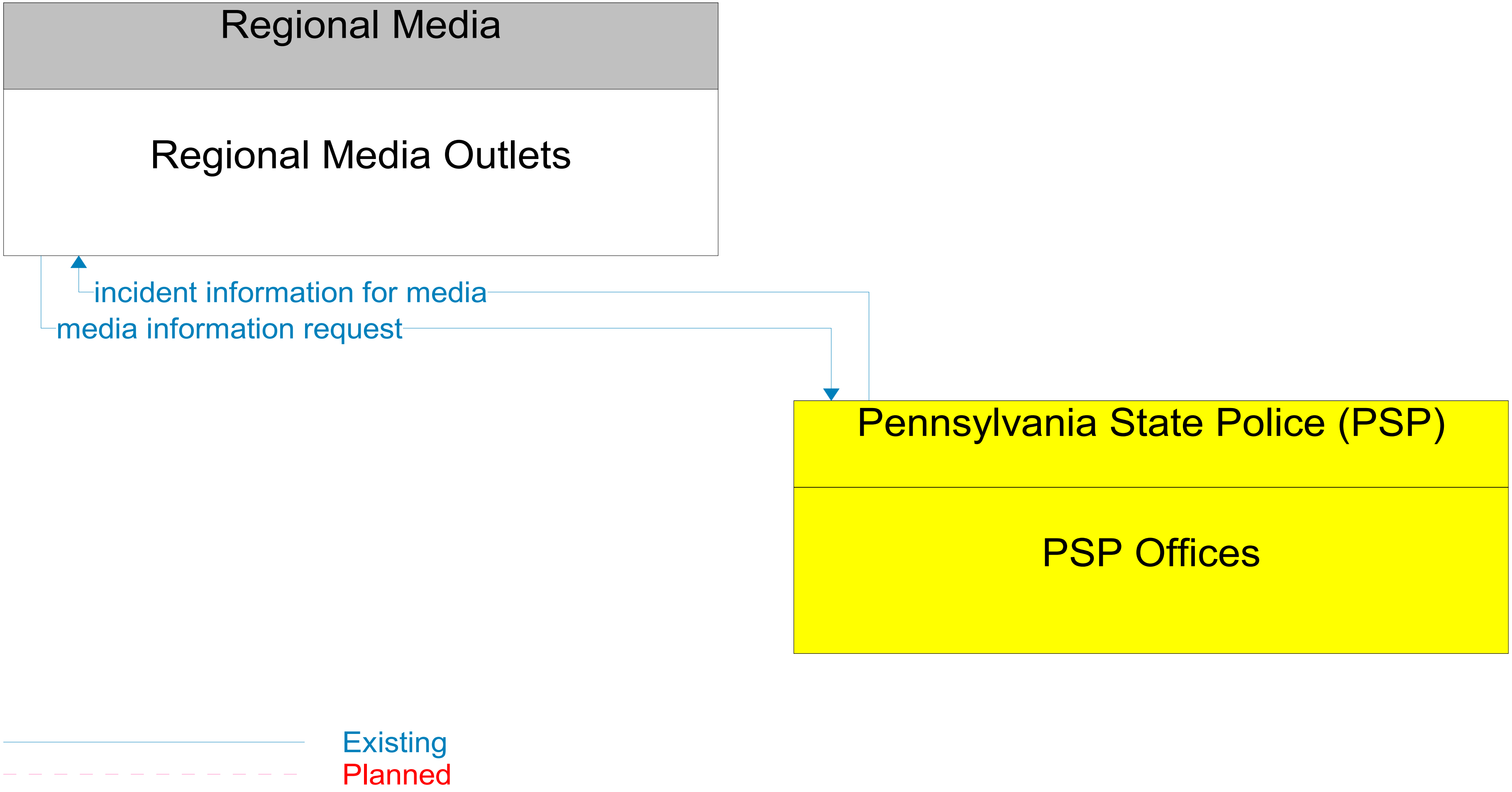
Commercial Vehicle Company Offices

Existing

Planned


Pennsylvania State Police (PSP)
PSP Offices
incident information request
incident response status
resource request
incident information
incident report
incident response coordination
Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC
Existing
Planned


Pennsylvania State Police (PSP)
PSP Vehicles
emergency dispatch requests
incident command information
emergency dispatch response
emergency vehicle tracking data
incident command request
incident status
Pennsylvania State Police (PSP)
PSP Offices
Existing
Planned



Regional Media

Regional Media Outlets

incident information for media

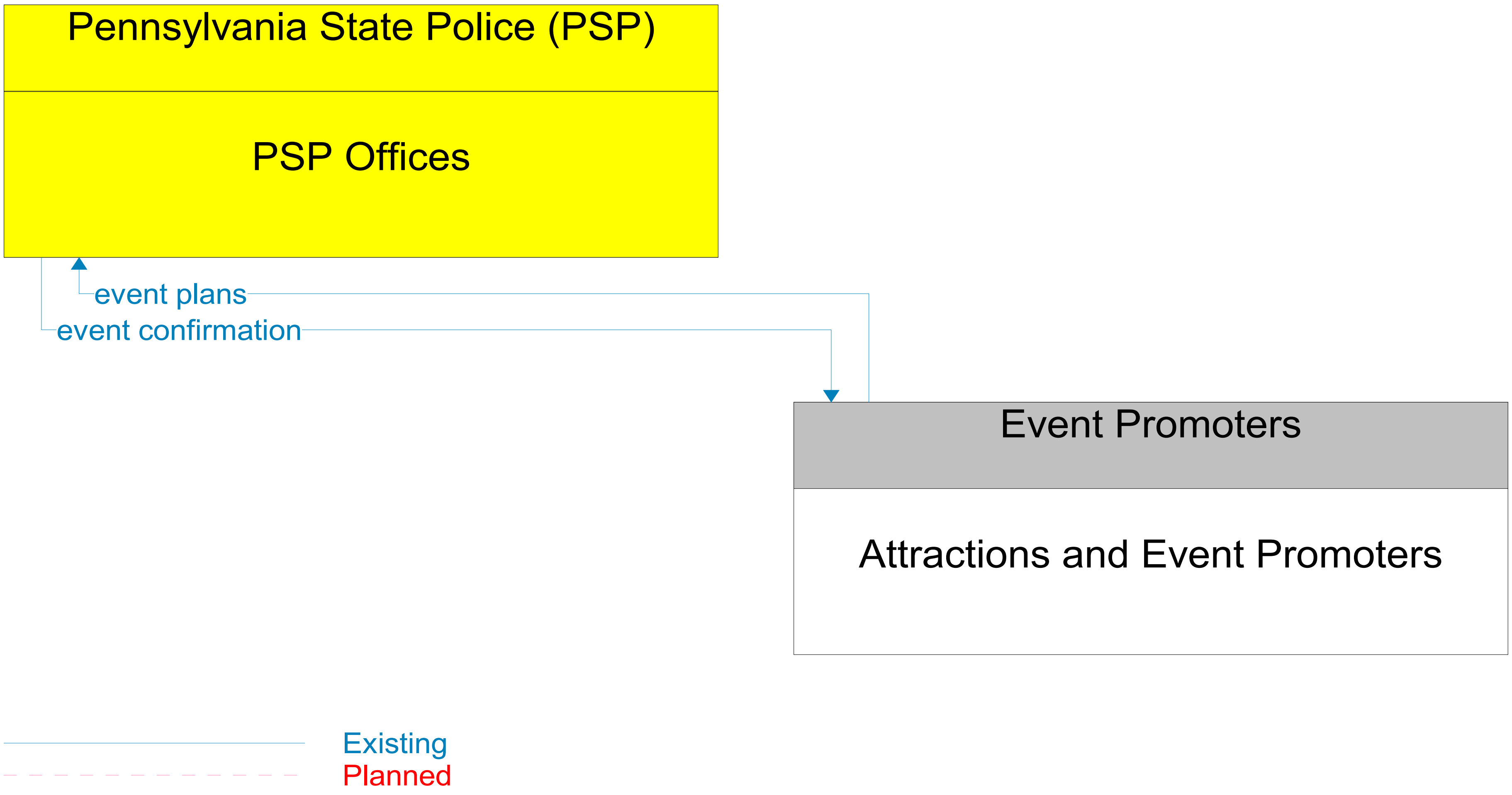
media information request

Pennsylvania State Police (PSP)

PSP Offices

Existing

Planned



Pennsylvania State Police (PSP)

PSP Offices

event plans

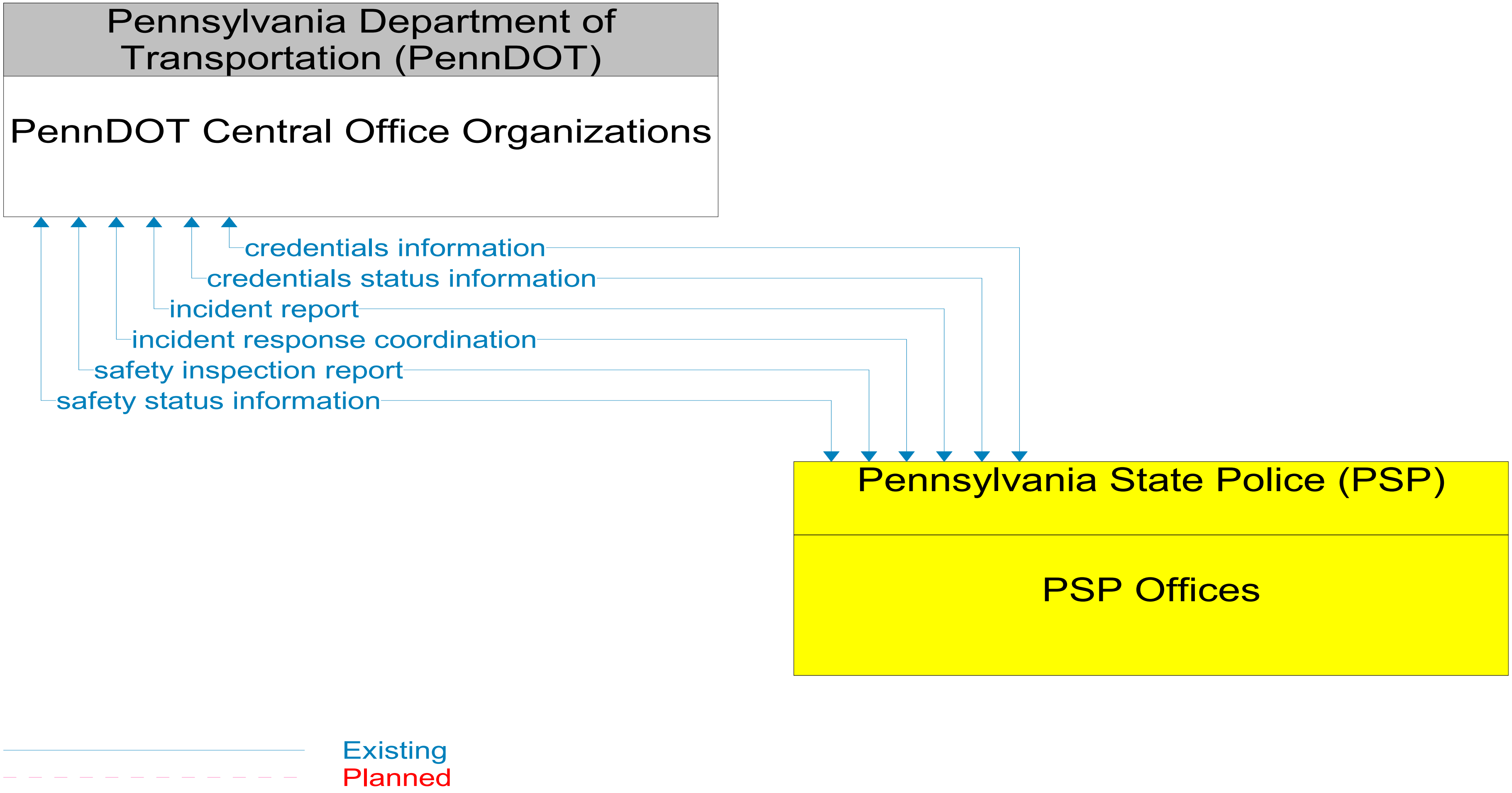
event confirmation

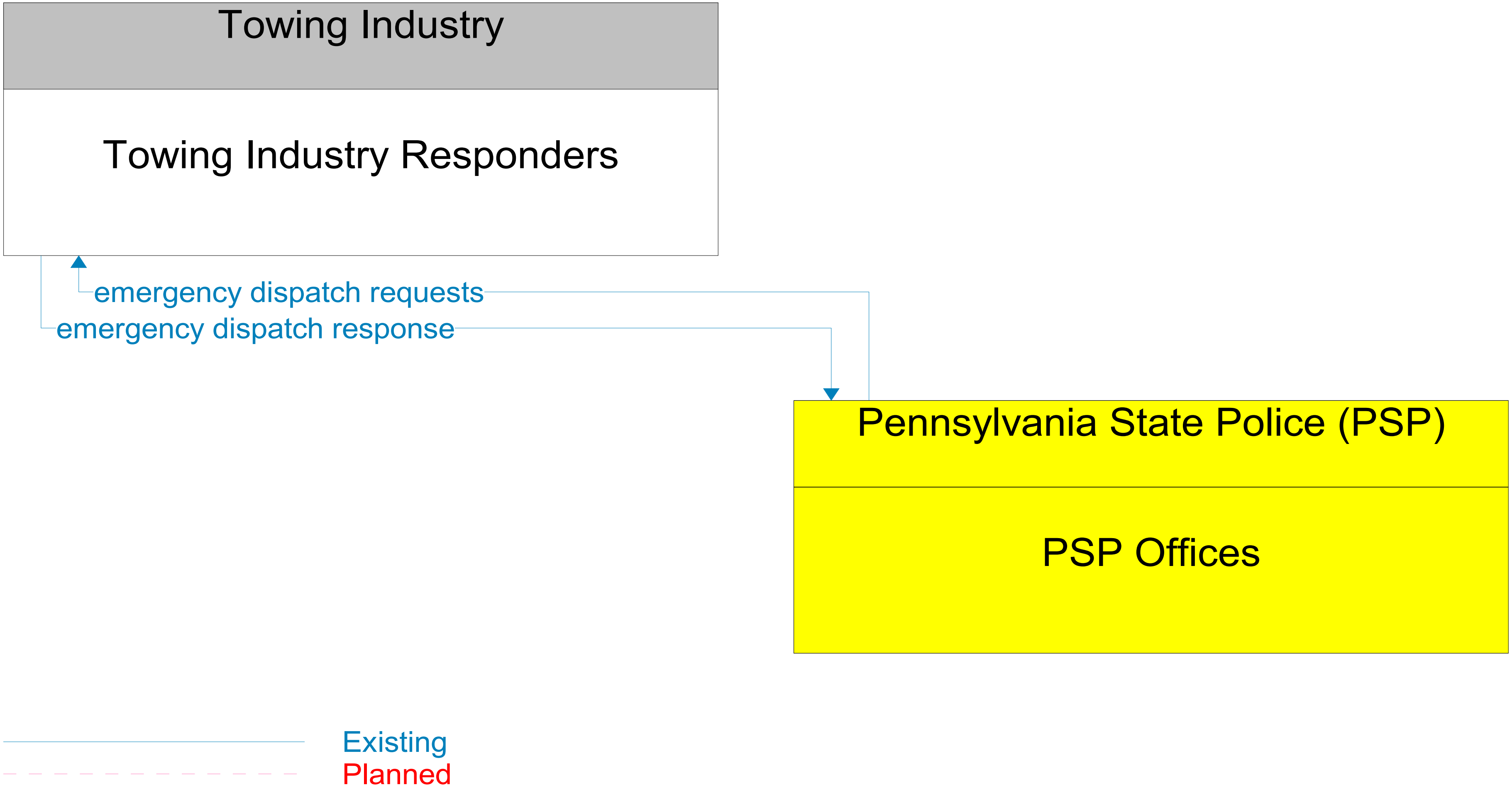
Event Promoters

Attractions and Event Promoters

Existing

Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Organizations
credentials information
credentials status information
incident report
incident response coordination
safety inspection report
safety status information
Pennsylvania State Police (PSP)
PSP Offices
Existing
Planned



Towing Industry

Towing Industry Responders

emergency dispatch requests

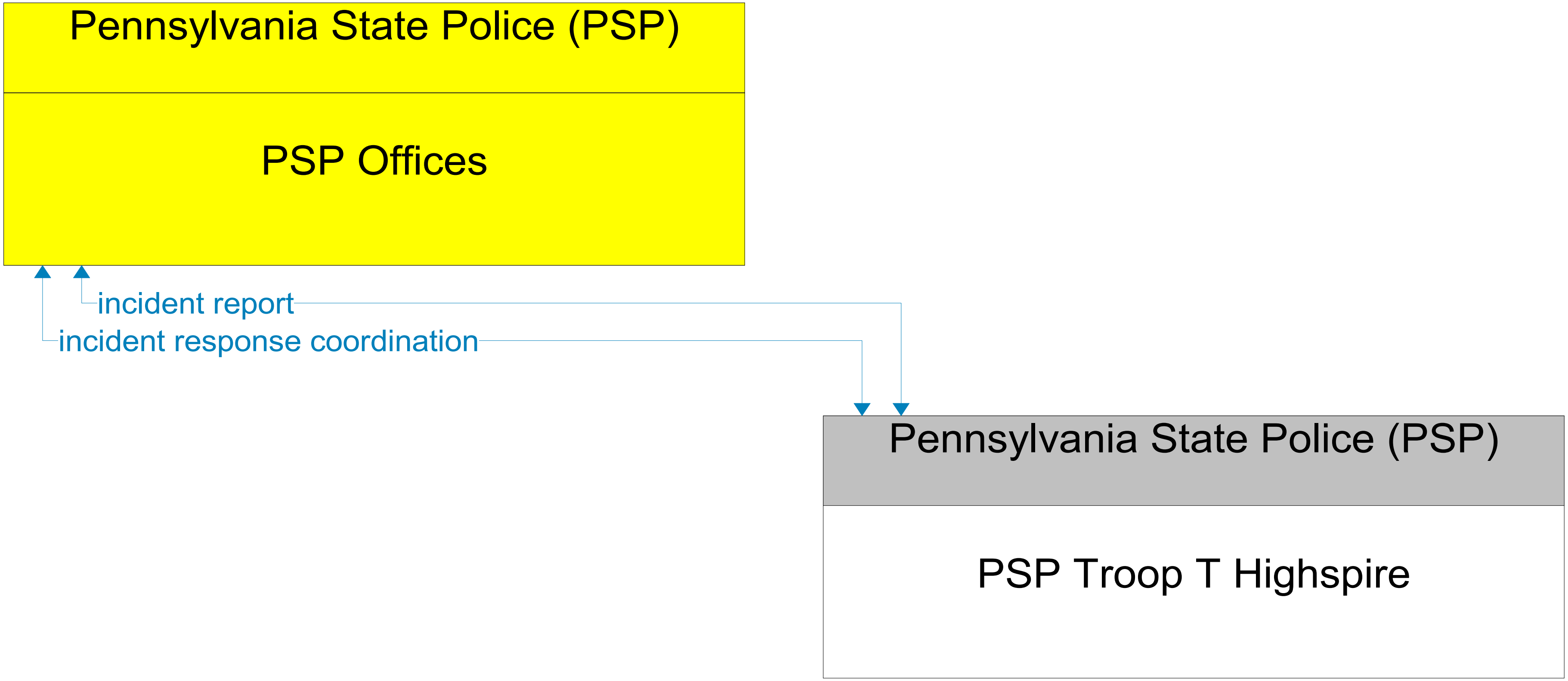
emergency dispatch response

Pennsylvania State Police (PSP)

PSP Offices

Existing

Planned



Pennsylvania State Police (PSP)

PSP Offices

incident report

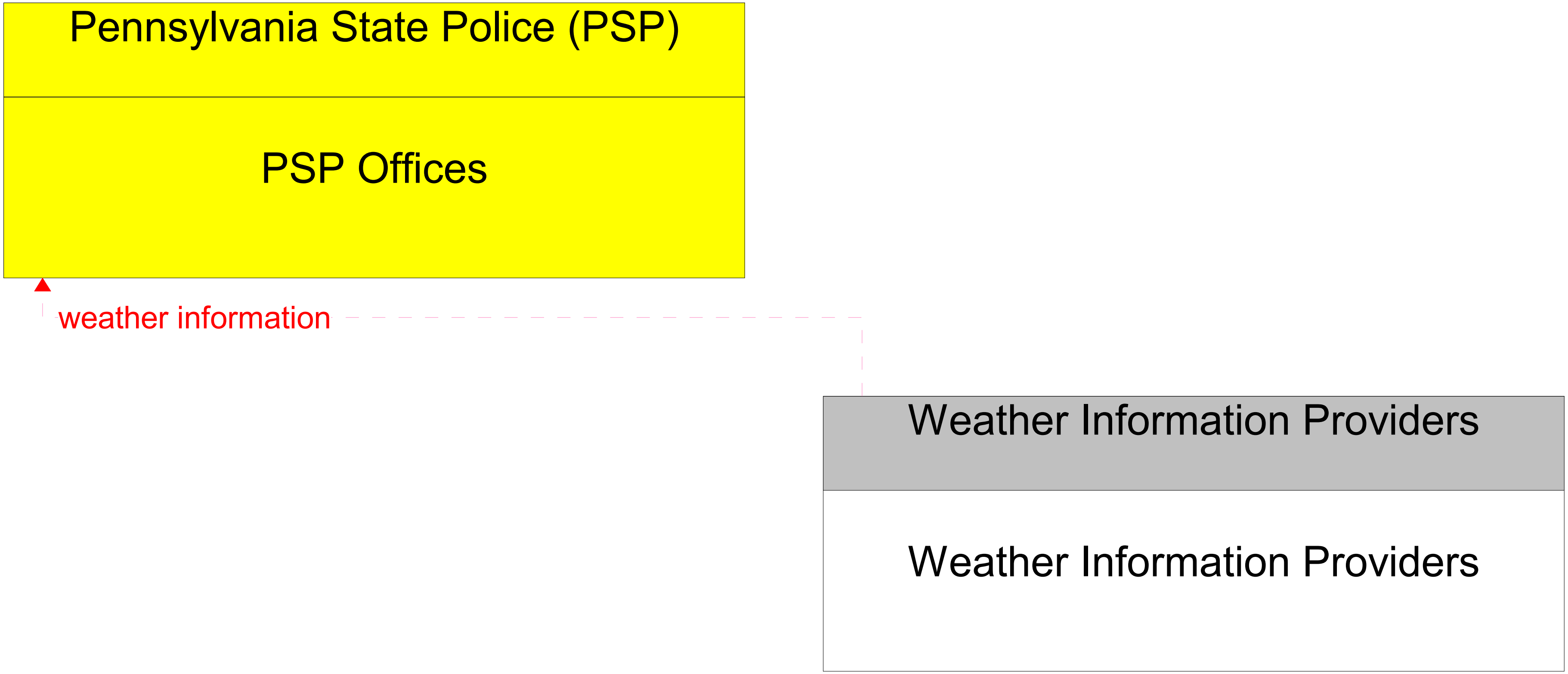
incident response coordination

Pennsylvania State Police (PSP)

PSP Troop T Highspire

Existing

Planned



Pennsylvania State Police (PSP)

PSP Offices

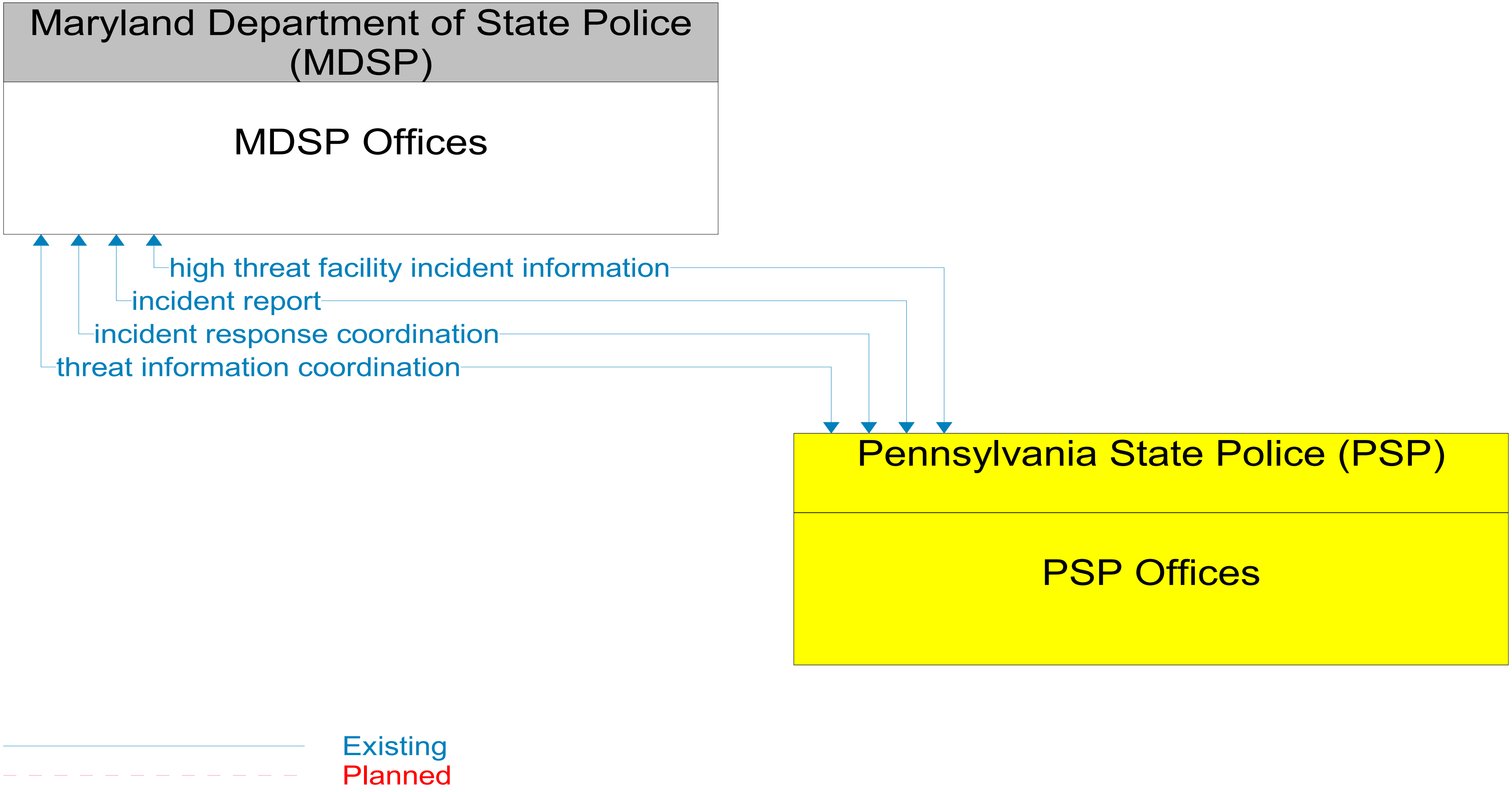
weather information

Weather Information Providers

Weather Information Providers

Existing

Planned



Maryland Department of State Police (MDSP)

MDSP Offices

high threat facility incident information

incident report

incident response coordination

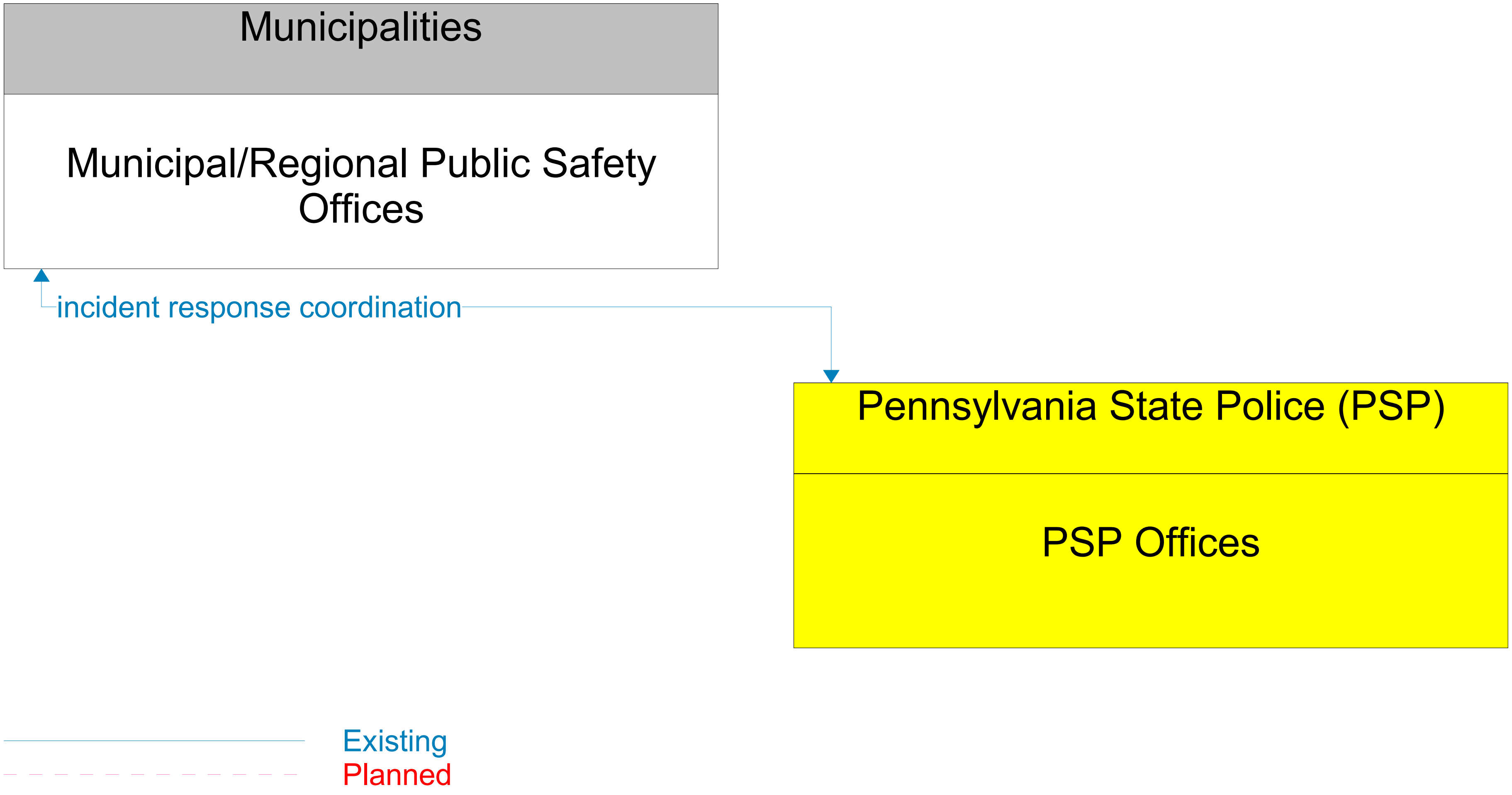
threat information coordination

Pennsylvania State Police (PSP)

PSP Offices

Existing

Planned



Municipalities

Municipal/Regional Public Safety Offices

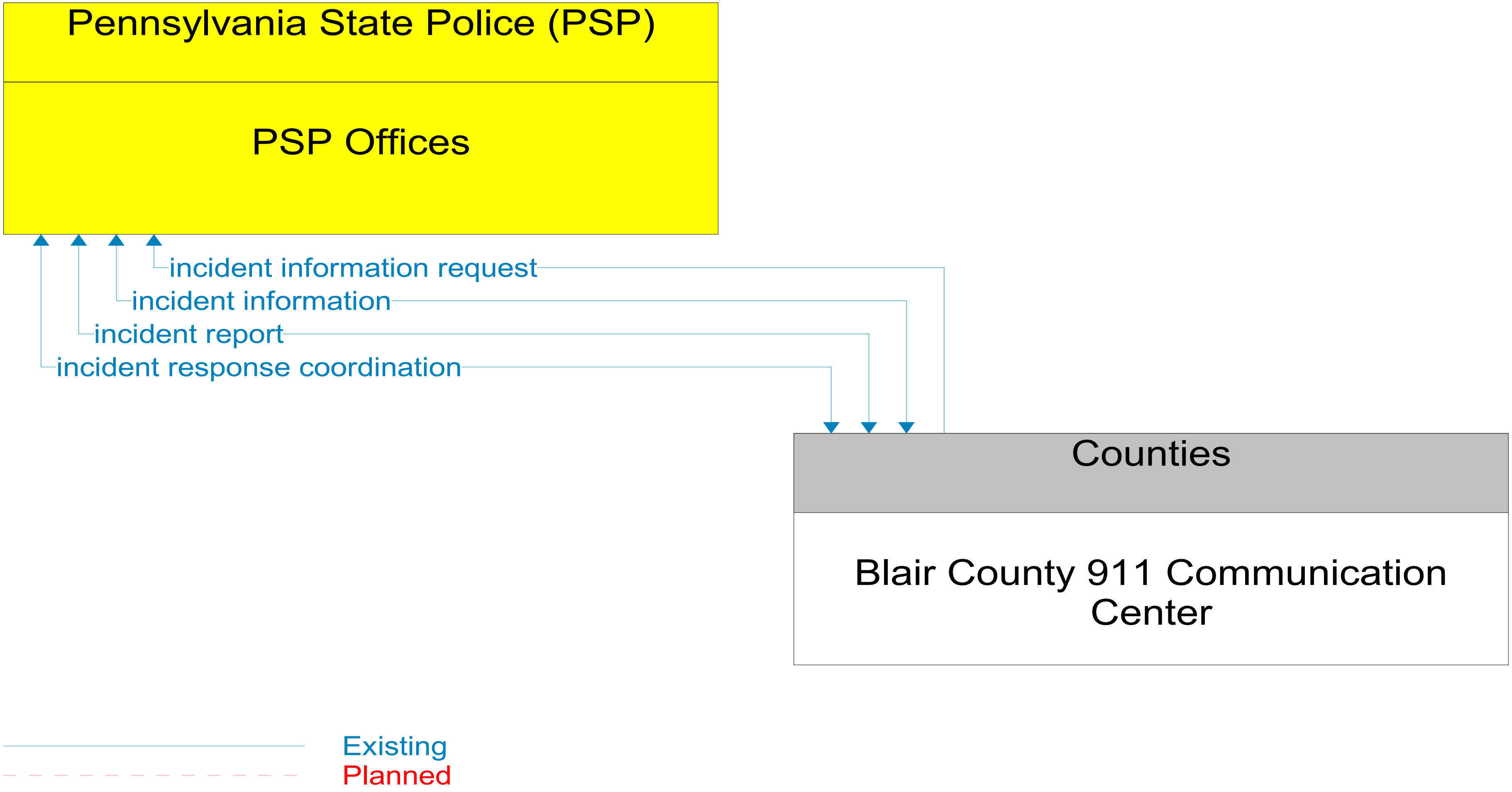
incident response coordination

Pennsylvania State Police (PSP)

PSP Offices

Existing

Planned



Pennsylvania State Police (PSP)

PSP Offices

incident information request

incident information

incident report

incident response coordination

Counties

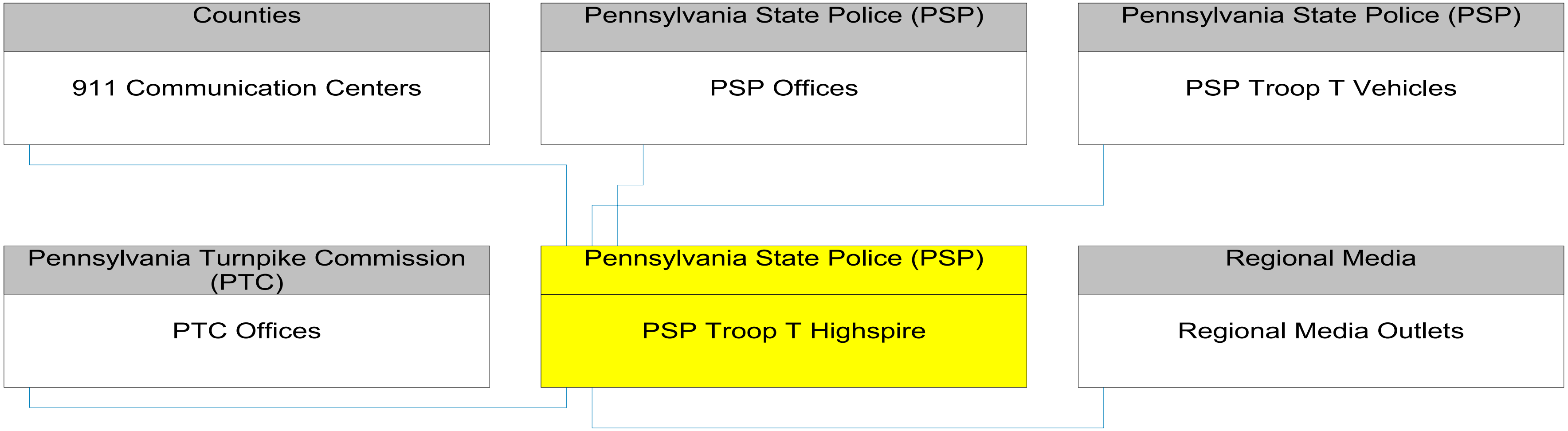
Blair County 911 Communication Center

Existing

Planned

PSP Troop T Highspire

PSP Troop T Highspire Interconnect Diagram



Counties
911 Communication Centers

Pennsylvania State Police (PSP)
PSP Offices

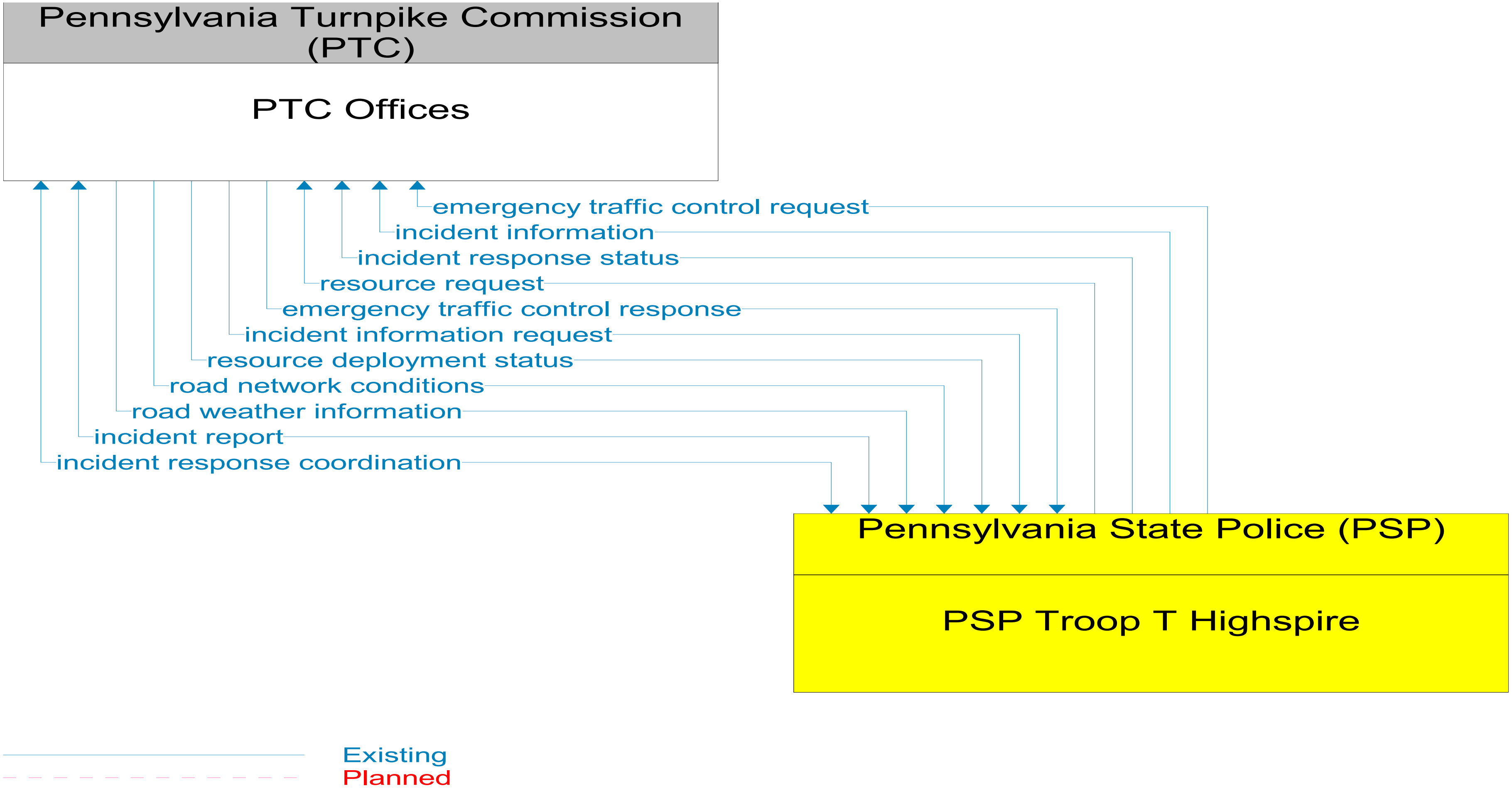
Pennsylvania State Police (PSP)
PSP Troop T Vehicles

Pennsylvania Turnpike Commission (PTC)
PTC Offices

Pennsylvania State Police (PSP)
PSP Troop T Highspire

Regional Media
Regional Media Outlets

——— Existing
— — — Planned



Pennsylvania Turnpike Commission (PTC)

PTC Offices

emergency traffic control request

incident information

incident response status

resource request

emergency traffic control response

incident information request

resource deployment status

road network conditions

road weather information

incident report

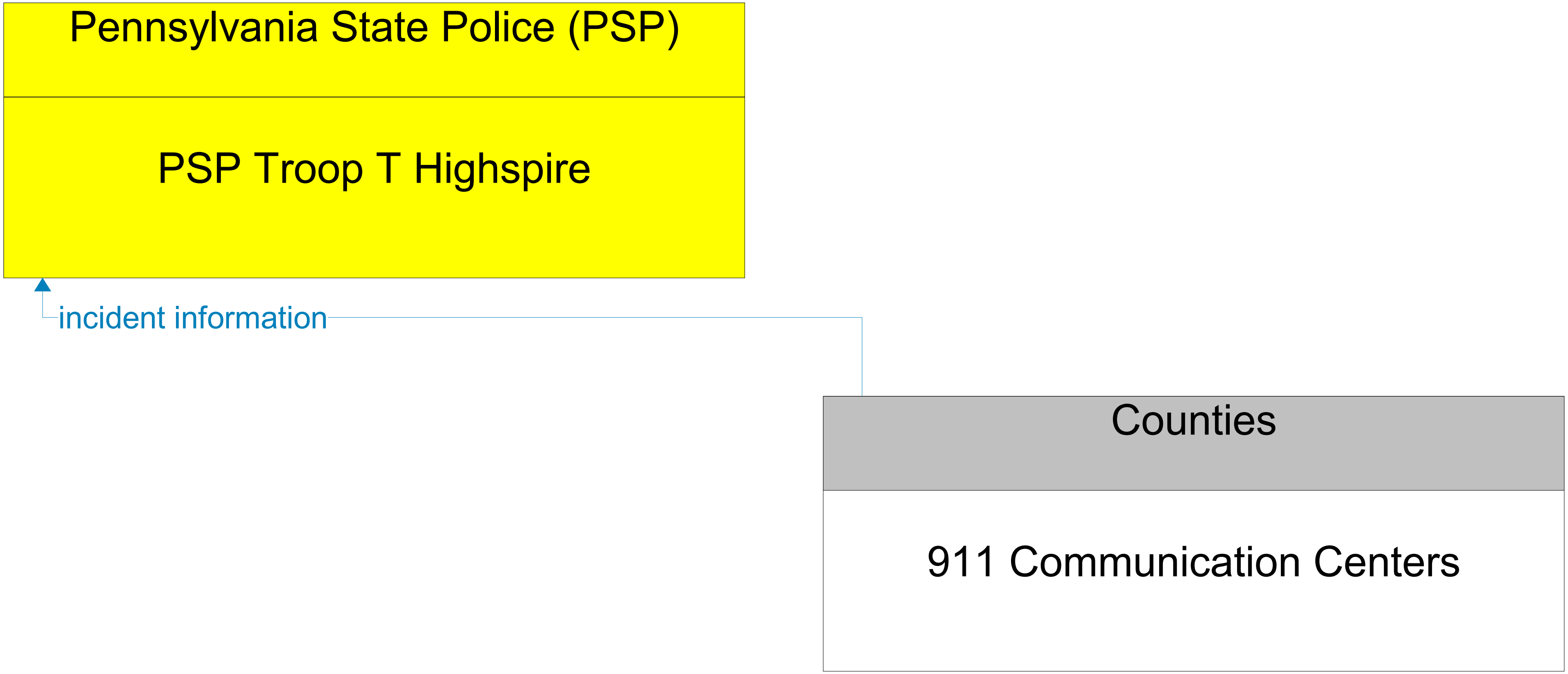
incident response coordination

Pennsylvania State Police (PSP)

PSP Troop T Highspire

Existing

Planned



Pennsylvania State Police (PSP)

PSP Troop T Highspire

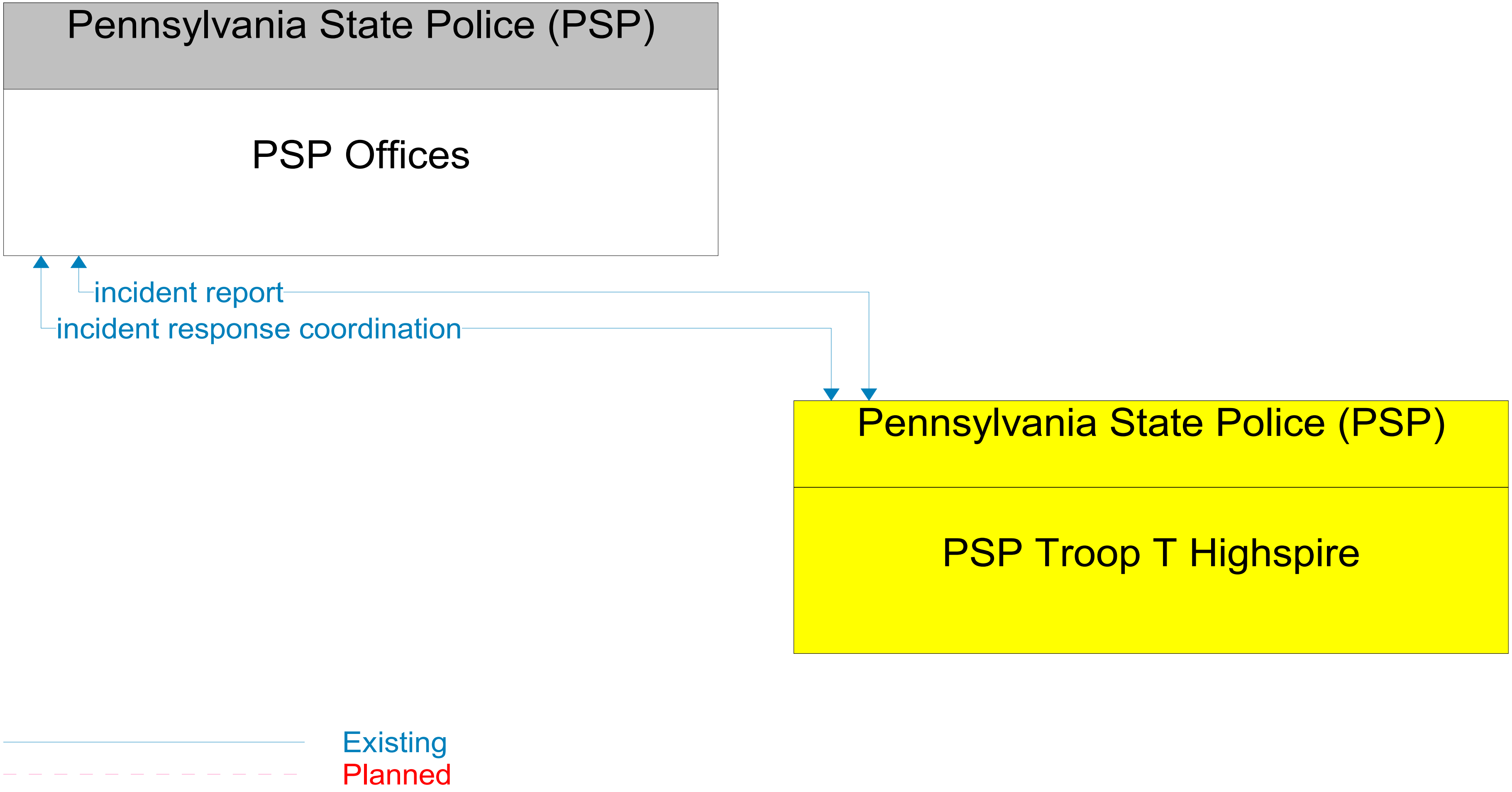
incident information

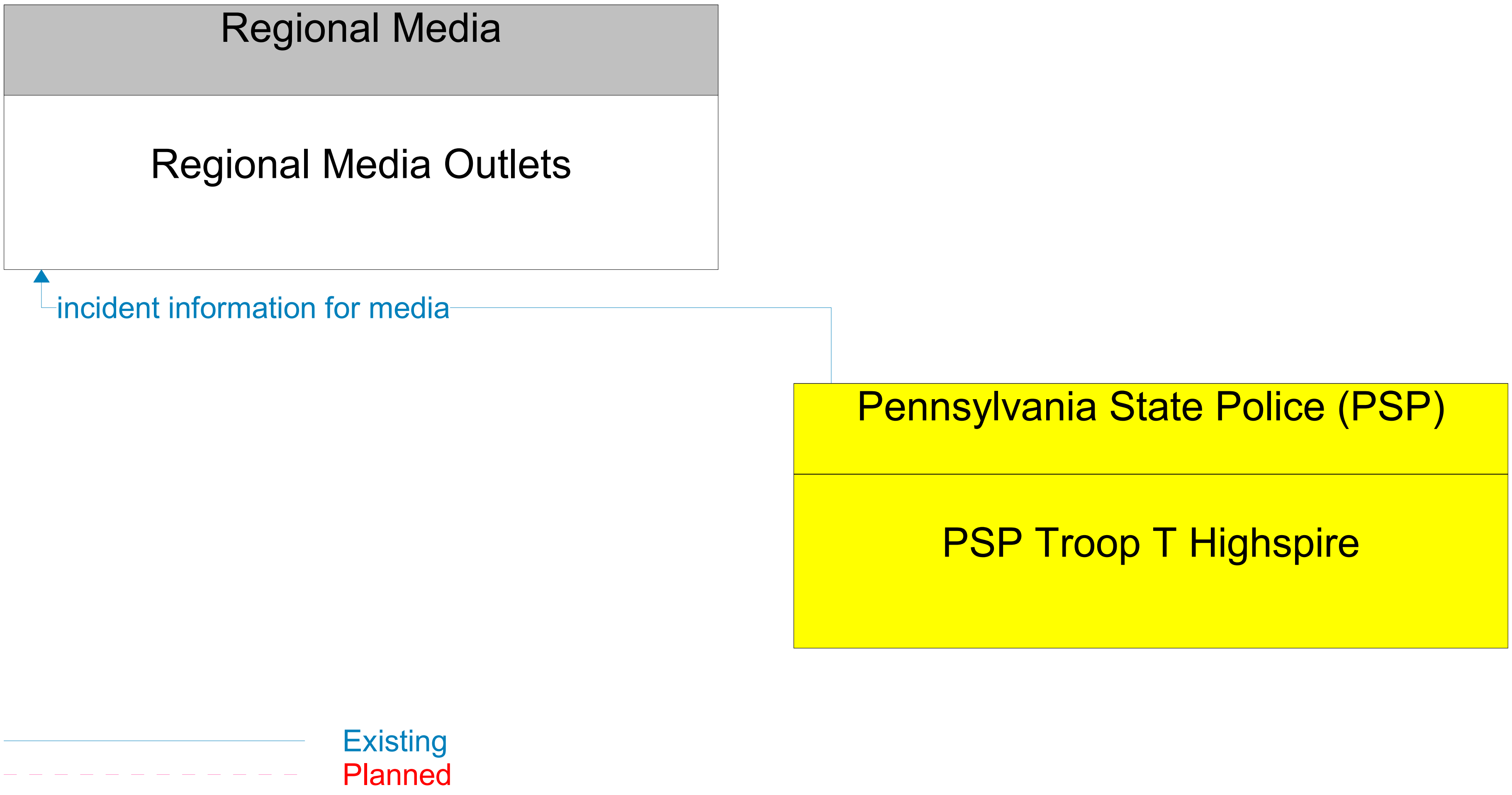
Counties

911 Communication Centers

Existing

Planned


Pennsylvania State Police (PSP)
PSP Offices
incident report
incident response coordination
Pennsylvania State Police (PSP)
PSP Troop T Highspire
Existing
Planned



Regional Media

Regional Media Outlets

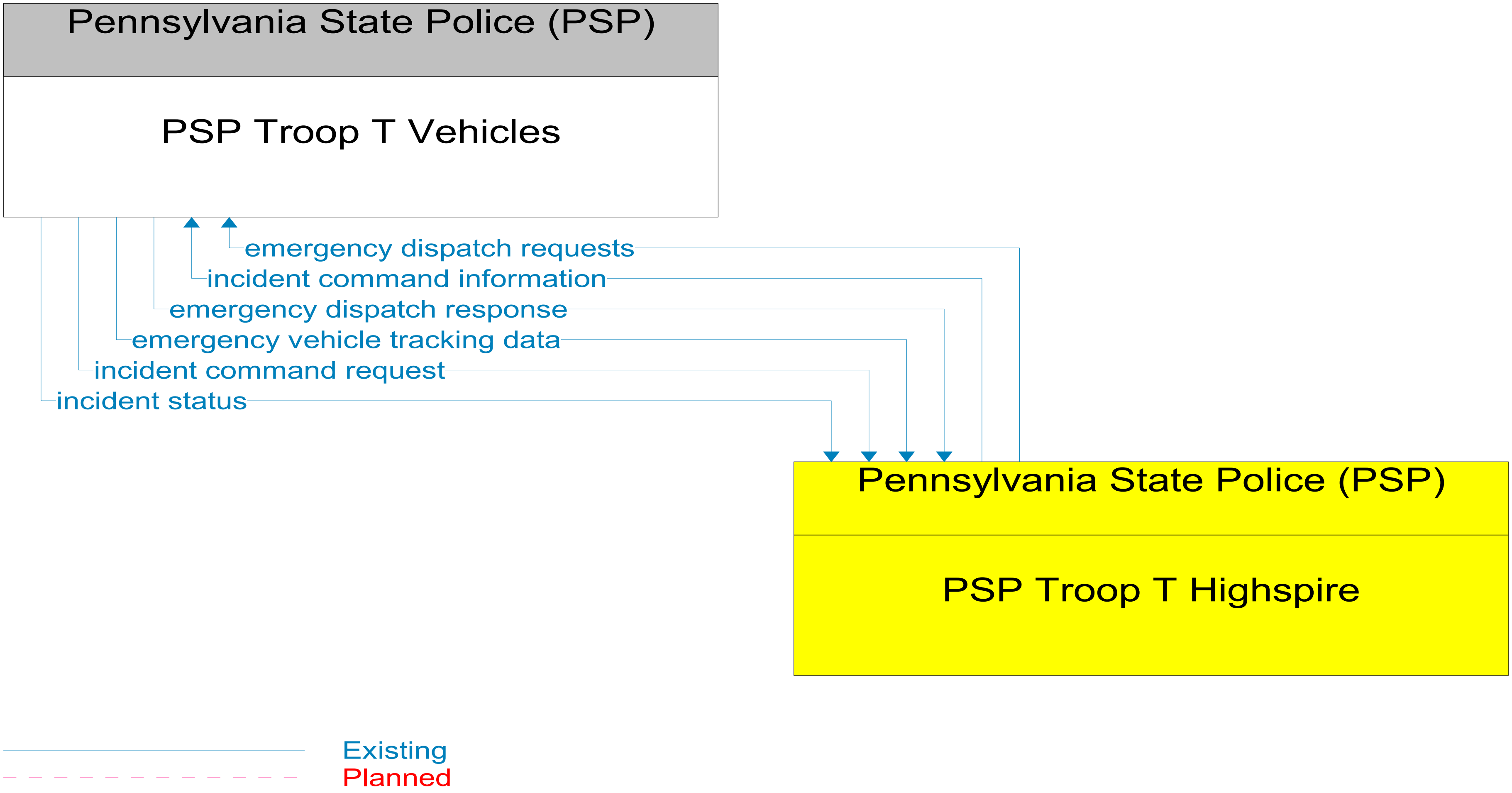
incident information for media

Pennsylvania State Police (PSP)

PSP Troop T Highspire

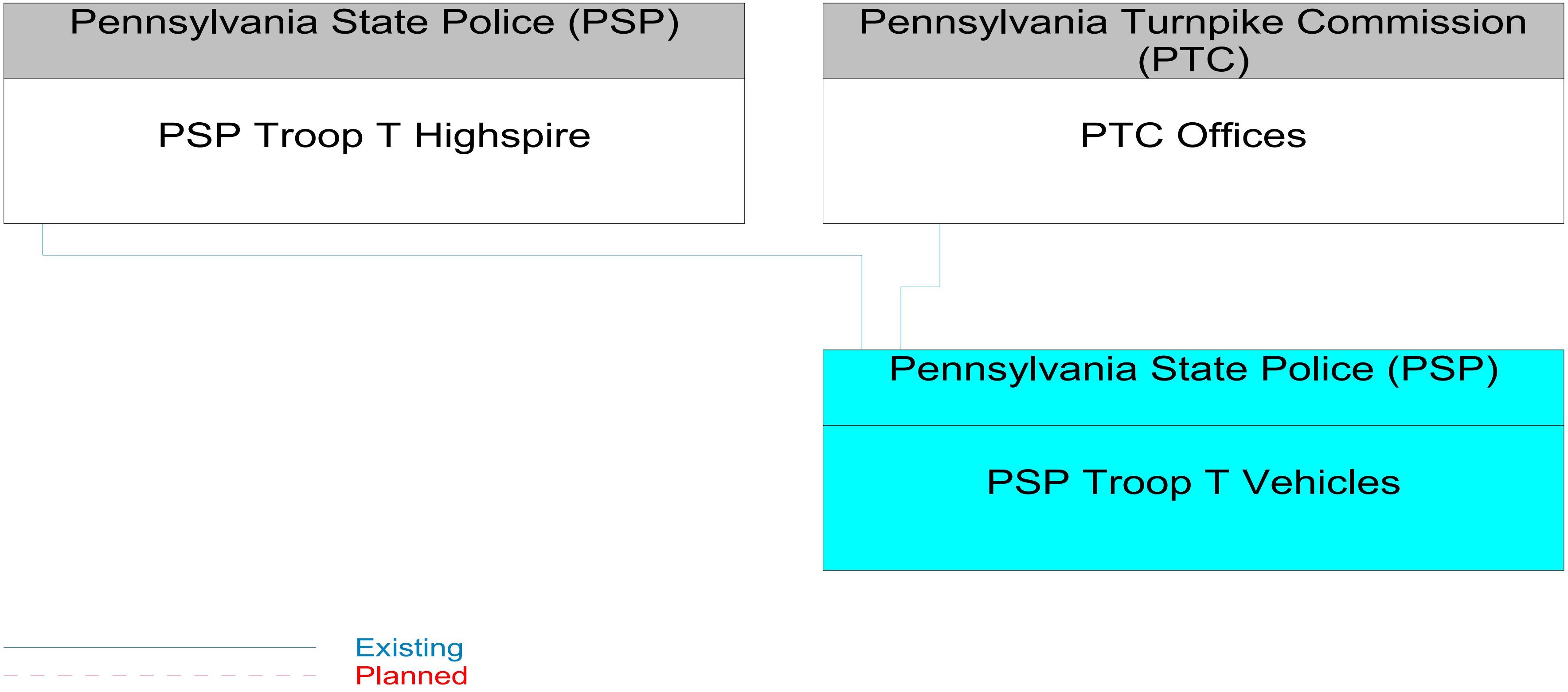
Existing

Planned


Pennsylvania State Police (PSP)
PSP Troop T Vehicles
emergency dispatch requests
incident command information
emergency dispatch response
emergency vehicle tracking data
incident command request
incident status
Pennsylvania State Police (PSP)
PSP Troop T Highspire
Existing
Planned

PSP Troop T Vehicles

PSP Troop T Vehicles Interconnect Diagram



Pennsylvania State Police (PSP)

PSP Troop T Highspire

Pennsylvania Turnpike Commission (PTC)

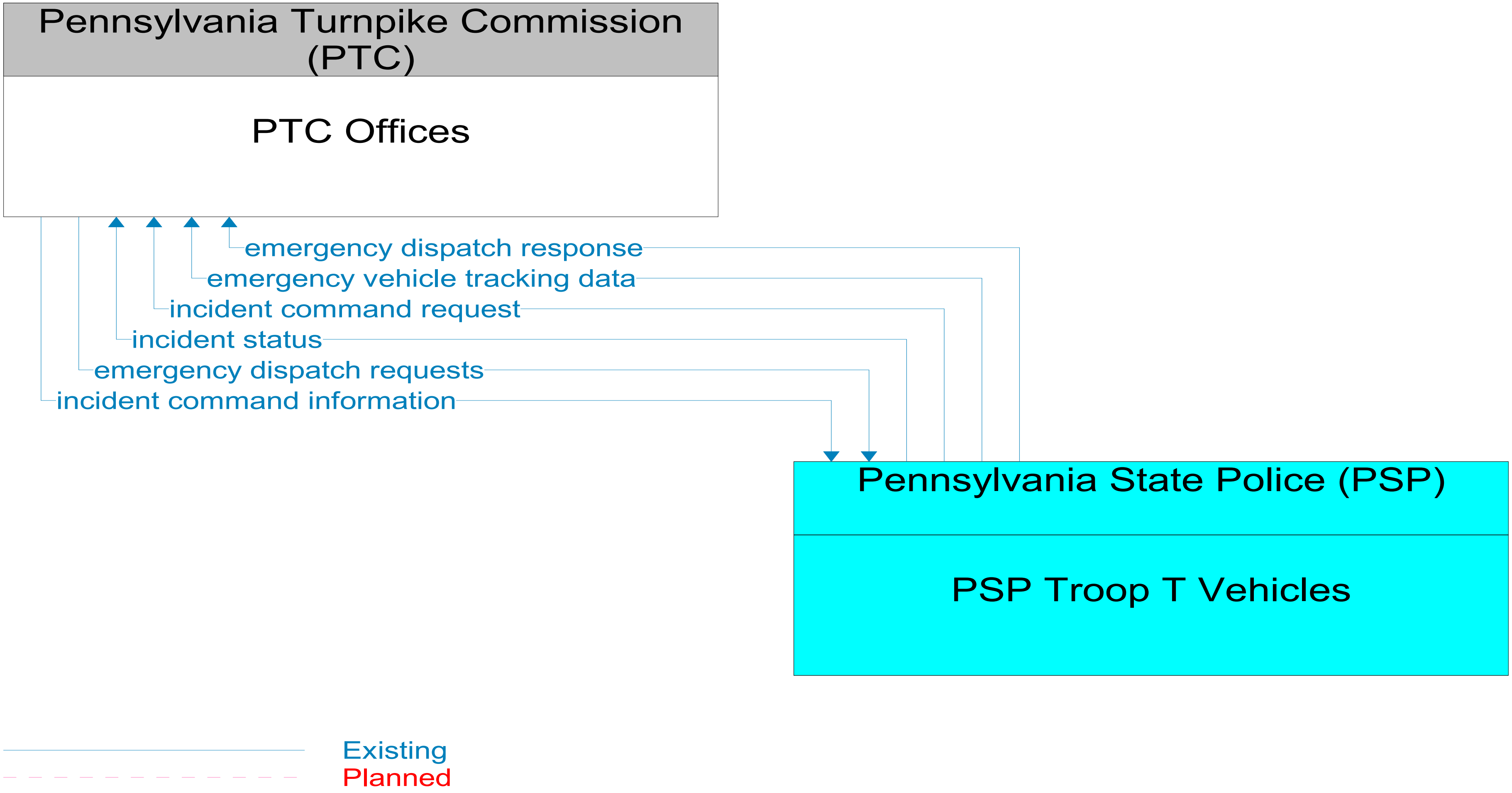
PTC Offices

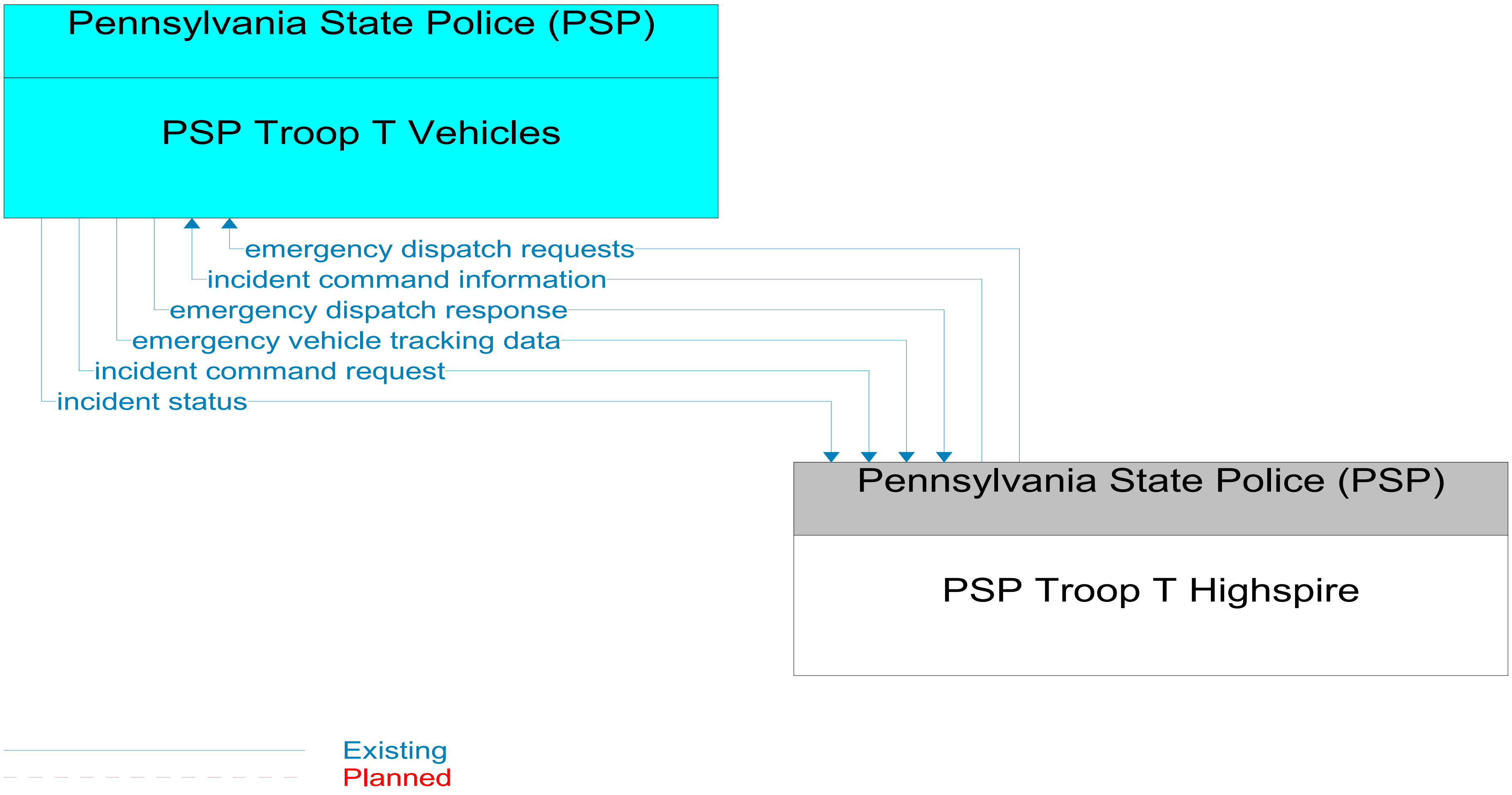
Pennsylvania State Police (PSP)

PSP Troop T Vehicles

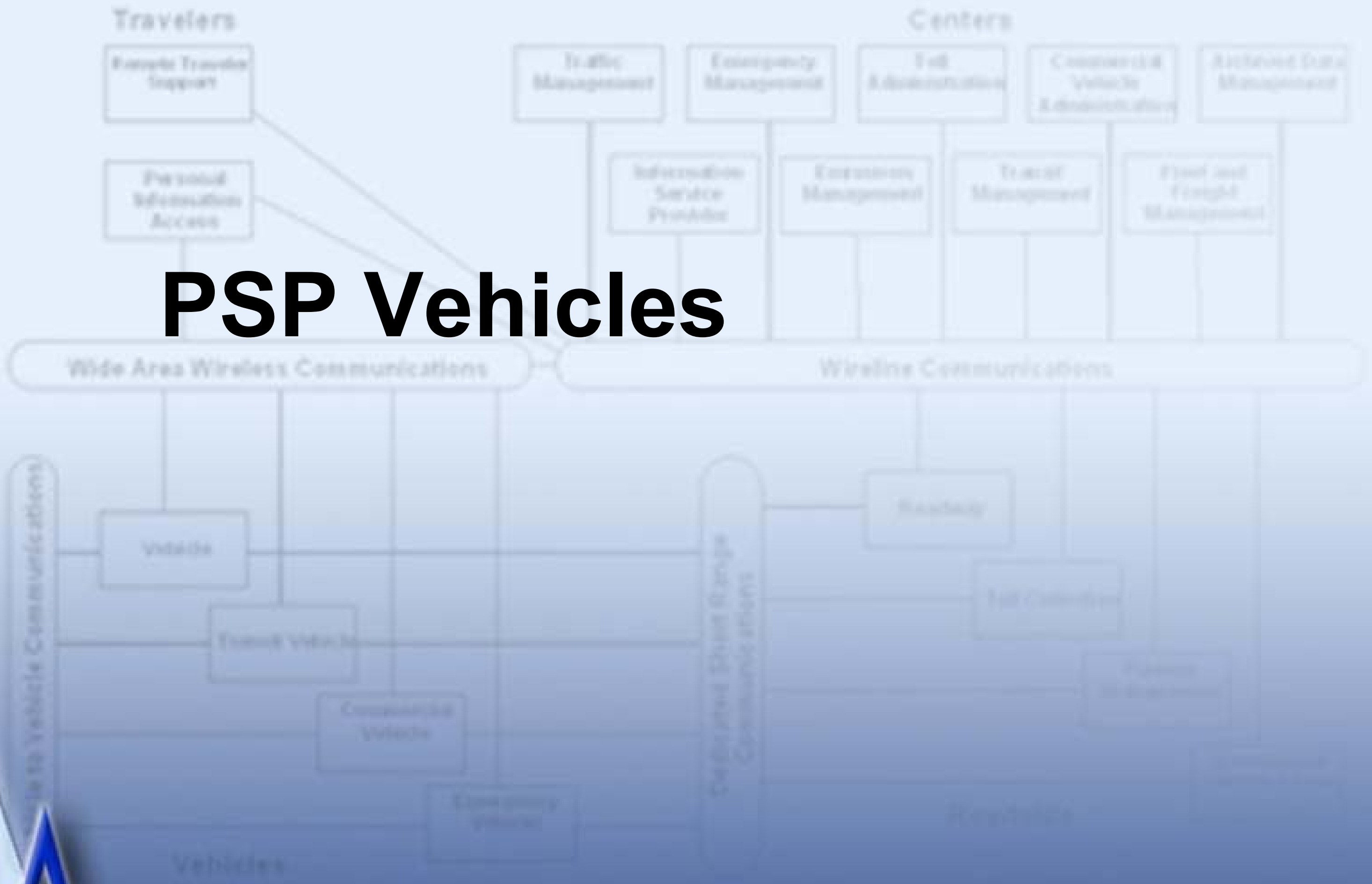
Existing

Planned

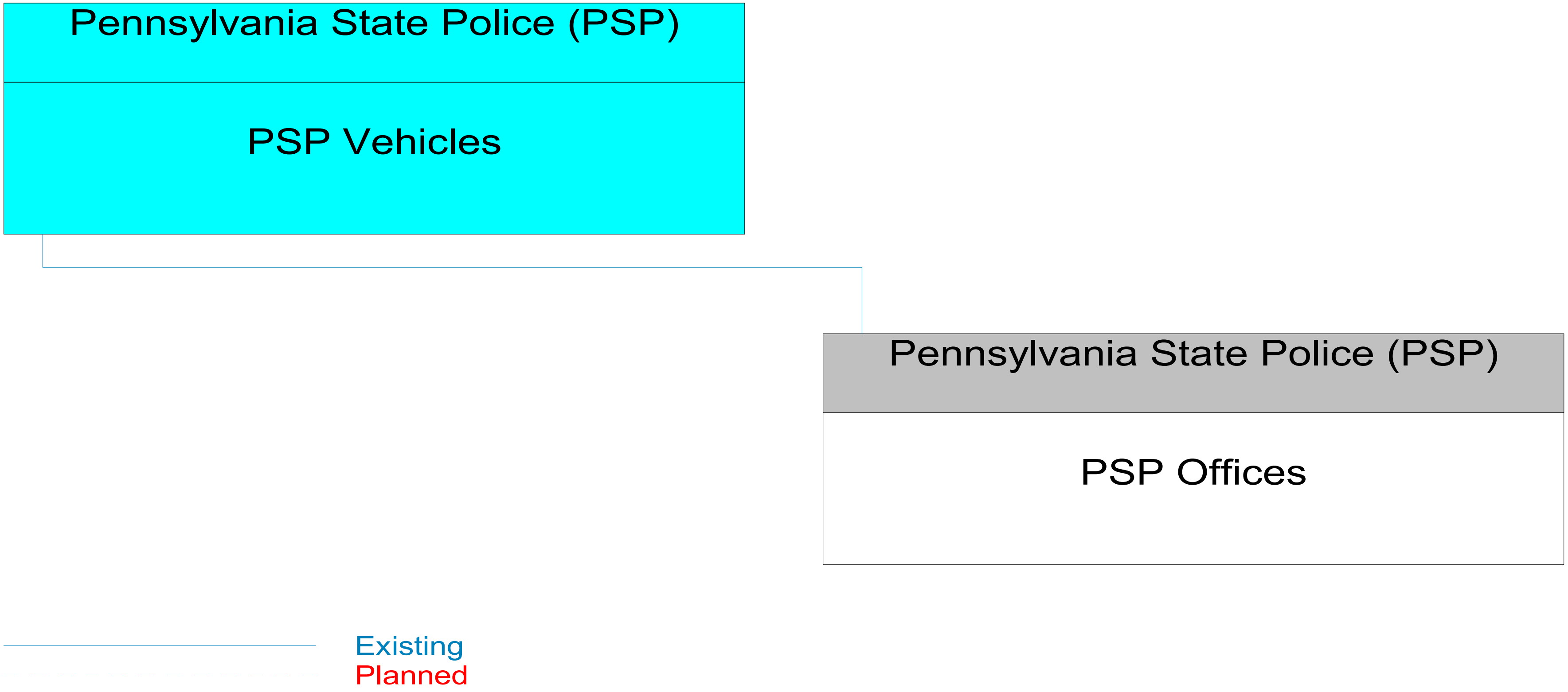

Pennsylvania Turnpike Commission (PTC)
PTC Offices
emergency dispatch response
emergency vehicle tracking data
incident command request
incident status
emergency dispatch requests
incident command information
Pennsylvania State Police (PSP)
PSP Troop T Vehicles
Existing
Planned


Pennsylvania State Police (PSP)
PSP Troop T Vehicles
emergency dispatch requests
incident command information
emergency dispatch response
emergency vehicle tracking data
incident command request
incident status
Pennsylvania State Police (PSP)
PSP Troop T Highspire
Existing
Planned

PSP Vehicles


Travelers
Centers
Remote Traveler Support
Personal Information Access
Traffic Management
Emergency Management
Toll Administration
Commercial Vehicle Administration
Archived Data Management
Information Service Provider
Emissions Management
Transit Management
Fleet and Freight Management
Wide Area Wireless Communications
Wireline Communications
Vehicle to Vehicle Communications
Dedicated Short Range Communications
Vehicle
Transit Vehicle
Commercial Vehicle
Emergency Vehicle
Vehicles
Roadway
Toll Collection
Parking Management
Roadside

PSP Vehicles Interconnect Diagram



Pennsylvania State Police (PSP)

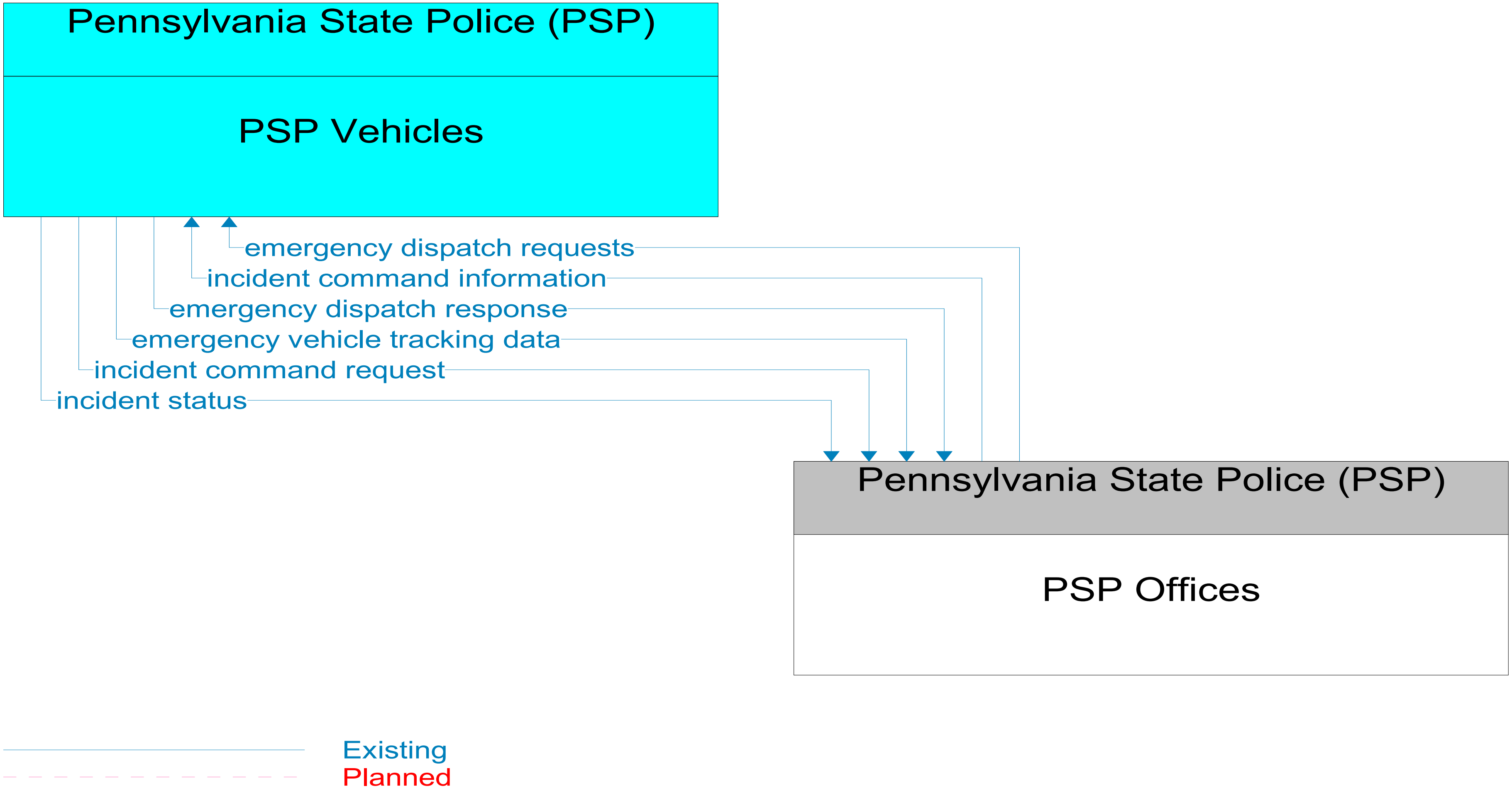
PSP Vehicles

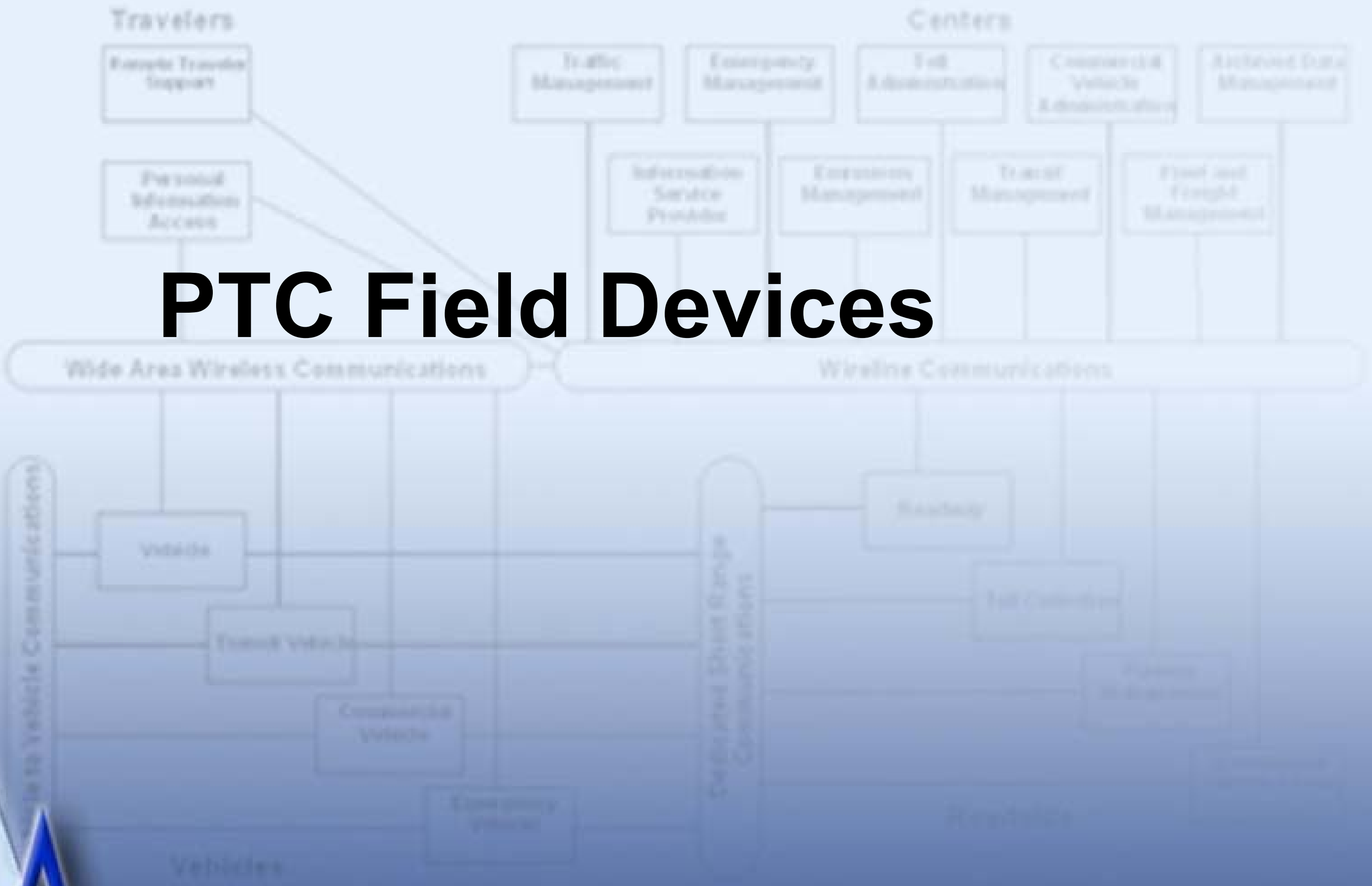
Pennsylvania State Police (PSP)

PSP Offices

Existing

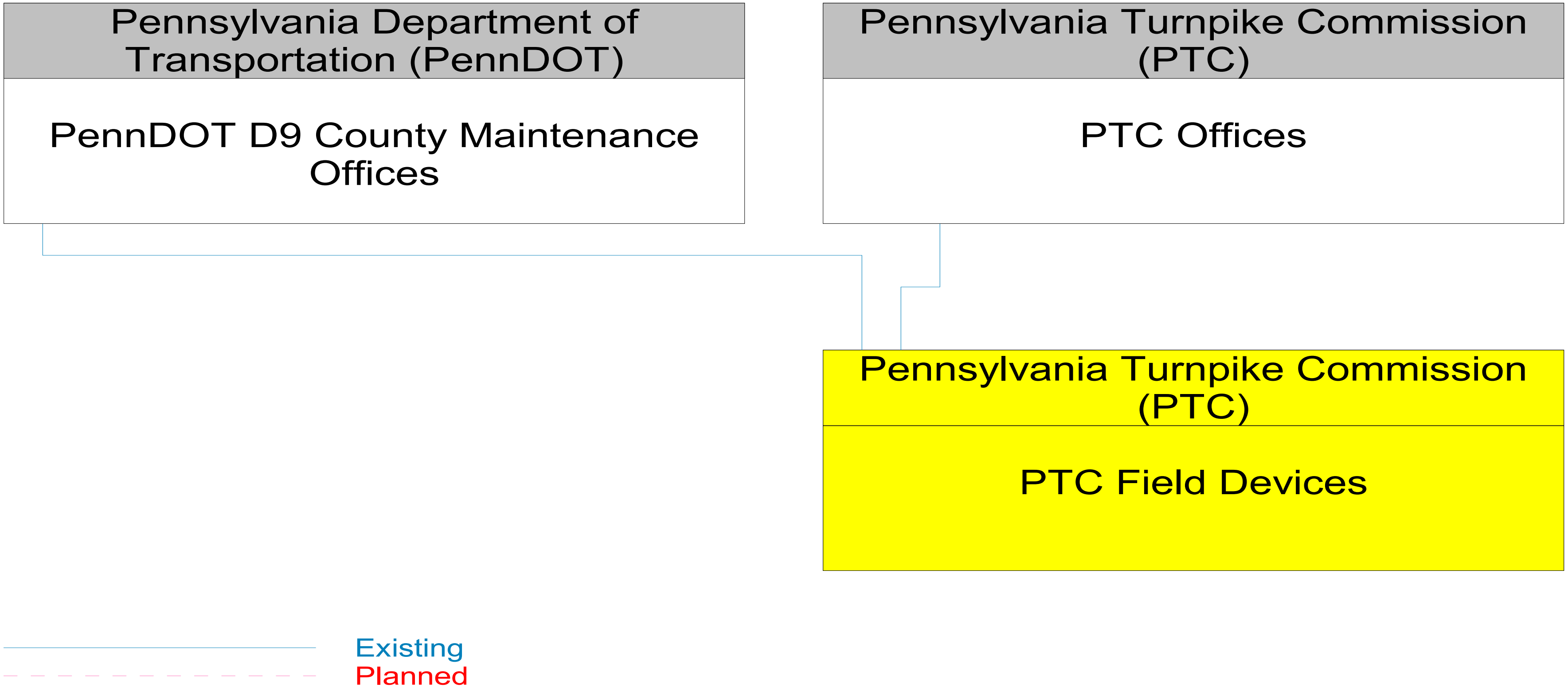
Planned


Pennsylvania State Police (PSP)
PSP Vehicles
emergency dispatch requests
incident command information
emergency dispatch response
emergency vehicle tracking data
incident command request
incident status
Pennsylvania State Police (PSP)
PSP Offices
Existing
Planned


Travelers
Centers
Remote Traveler Support
Traffic Management
Emergency Management
Toll Administration
Commercial Vehicle Administration
Archived Data Management
Personal Information Access
Information Service Provider
Emissions Management
Transit Management
Fleet and Freight Management
Wide Area Wireless Communications
Wireline Communications
Vehicle to Vehicle Communications
Vehicle
Transit Vehicle
Commercial Vehicle
Emergency Vehicle
Vehicles
Dedicated Short Range Communications
Roadway
Toll Collection
Parking Management
Roadside

PTC Field Devices

PTC Field Devices Interconnect Diagram



Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 County Maintenance Offices

Pennsylvania Turnpike Commission (PTC)

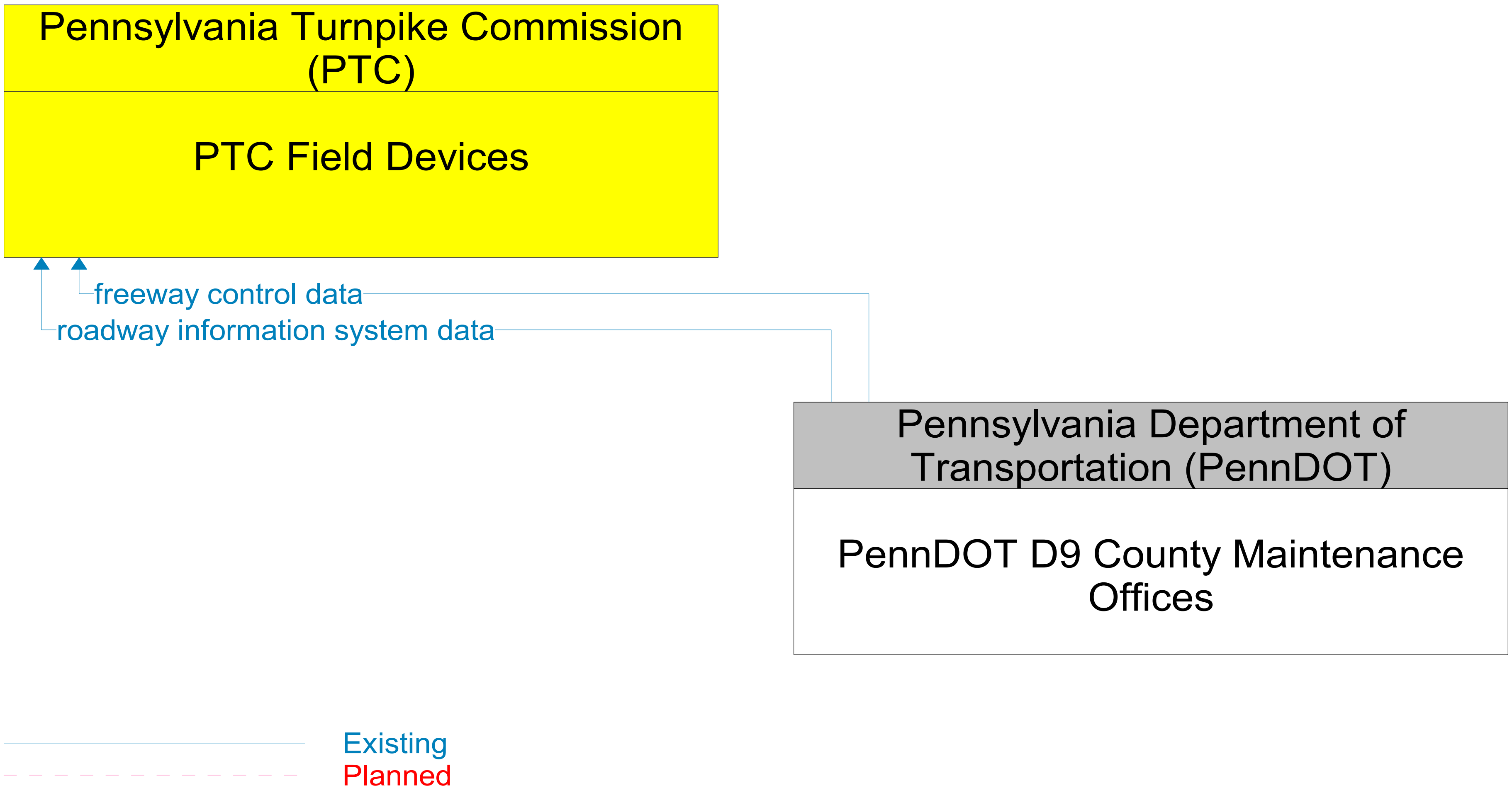
PTC Offices

Pennsylvania Turnpike Commission (PTC)

PTC Field Devices

Existing

Planned



Pennsylvania Turnpike Commission (PTC)

PTC Field Devices

freeway control data

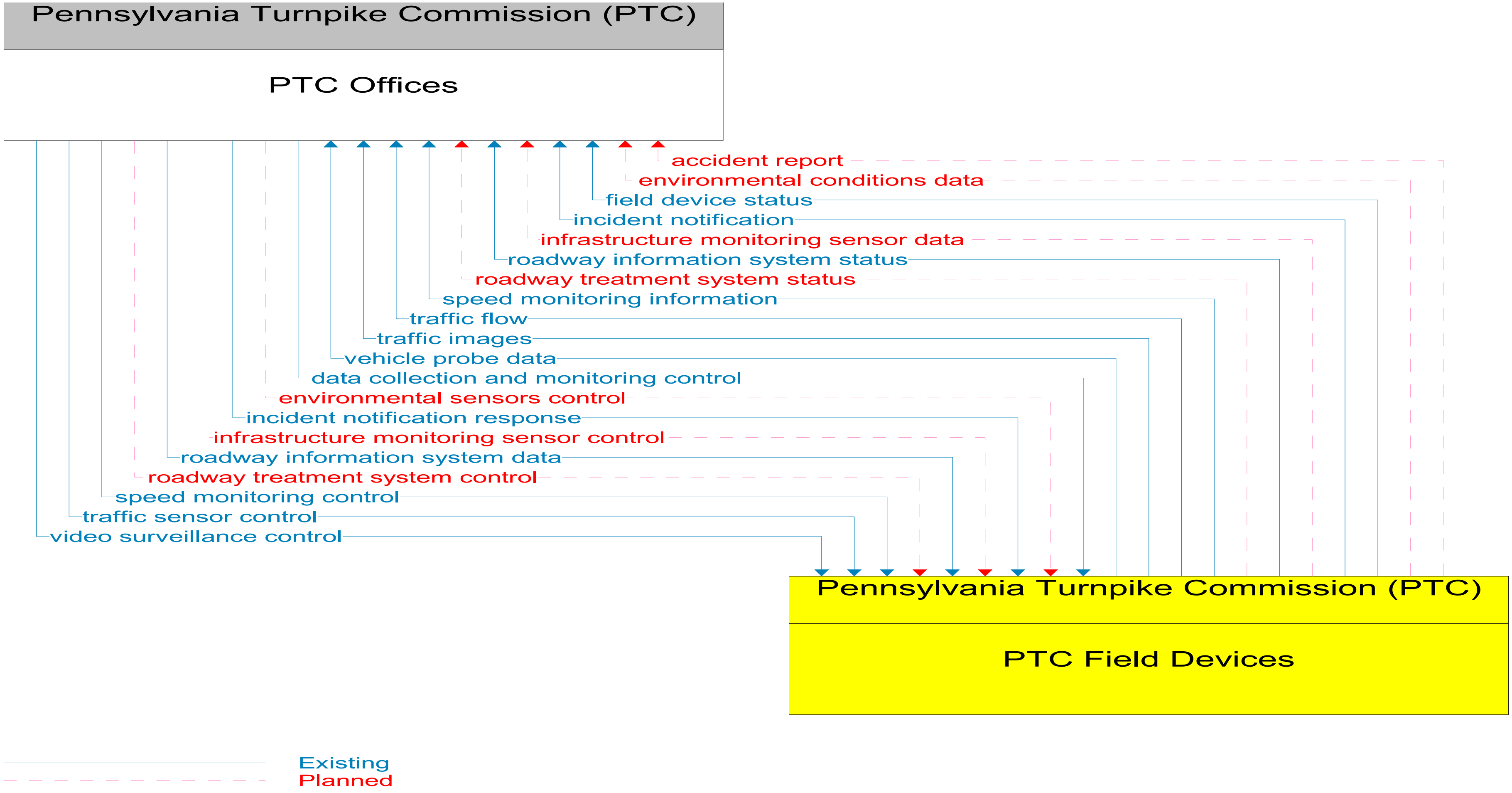
roadway information system data

Pennsylvania Department of Transportation (PennDOT)

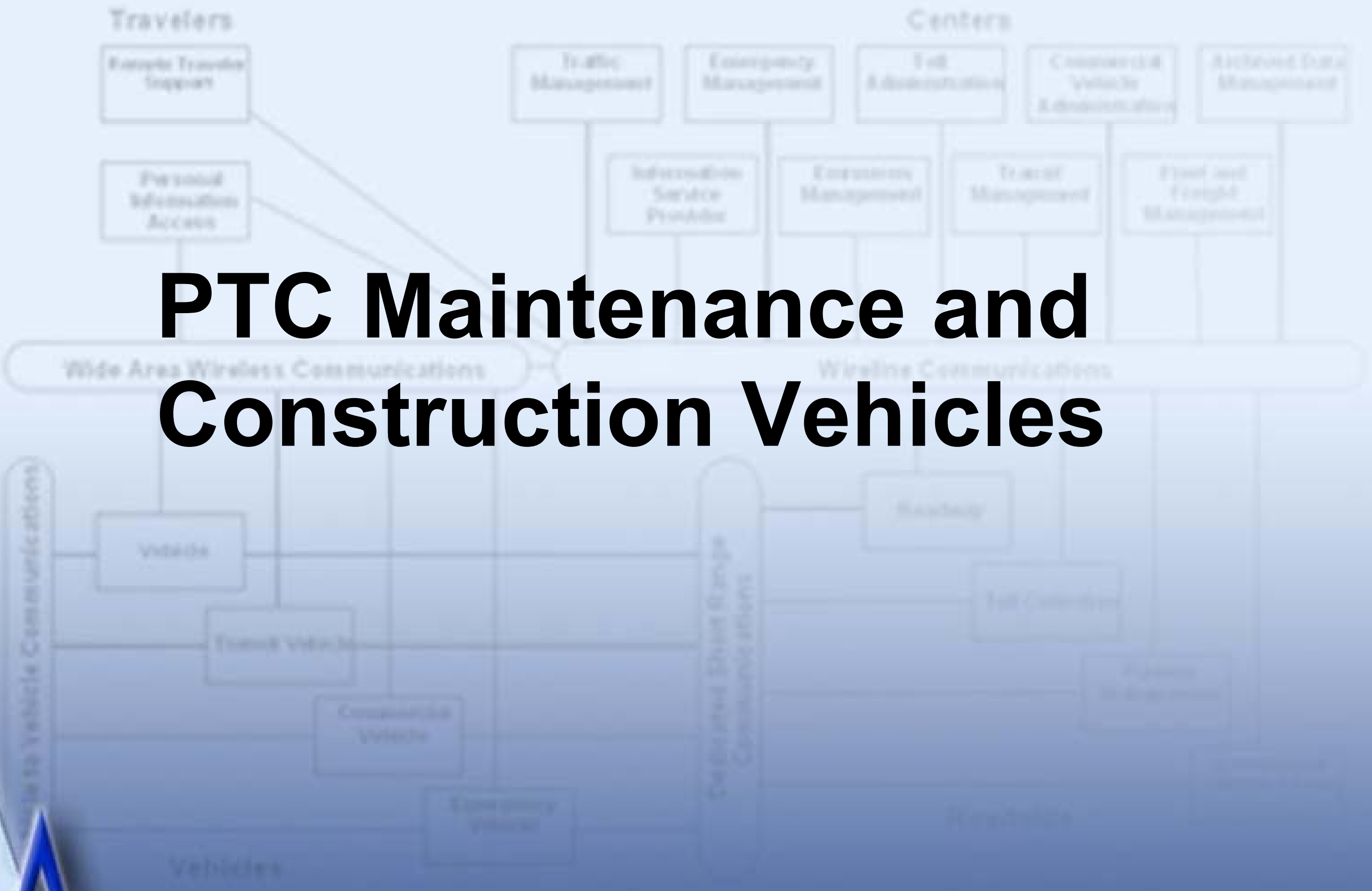
PennDOT D9 County Maintenance Offices

Existing

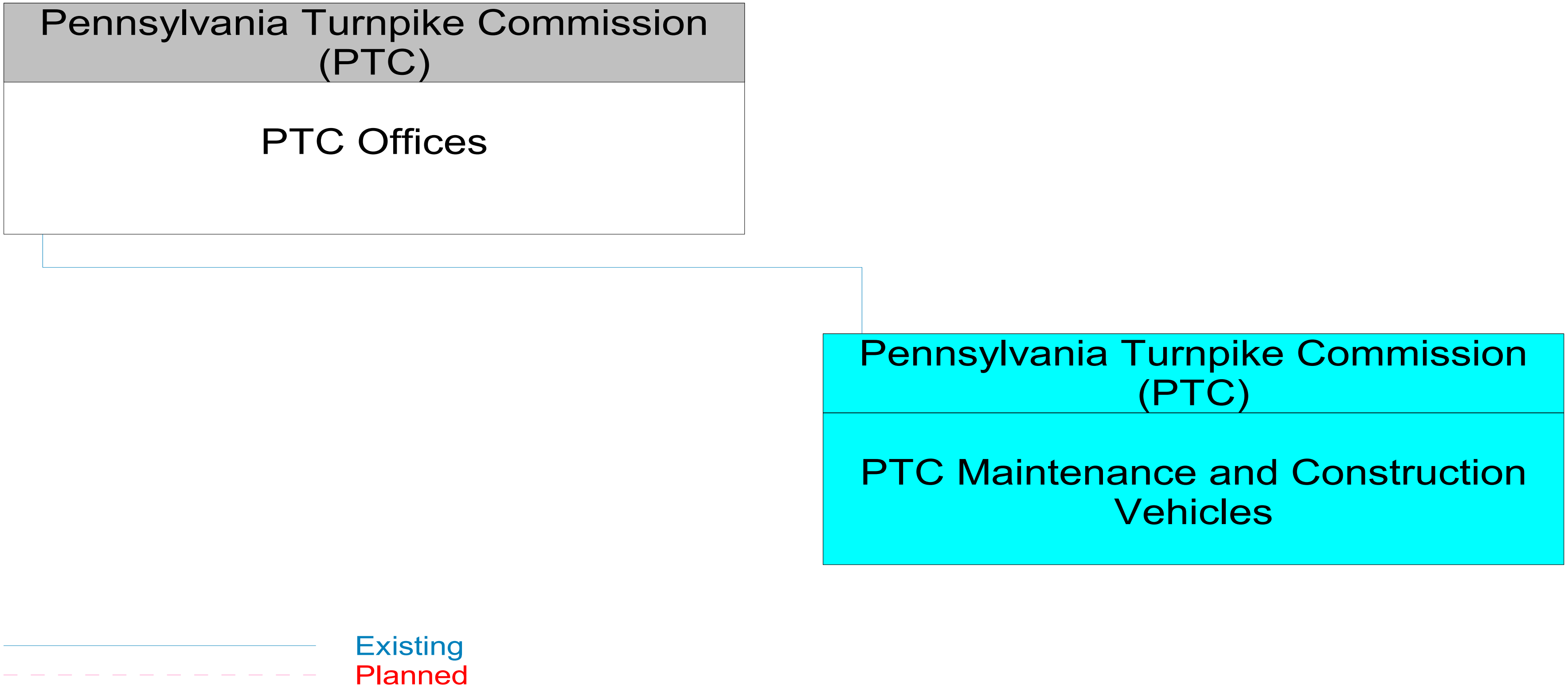
Planned


Pennsylvania Turnpike Commission (PTC)
PTC Offices
accident report
environmental conditions data
field device status
incident notification
infrastructure monitoring sensor data
roadway information system status
roadway treatment system status
speed monitoring information
traffic flow
traffic images
vehicle probe data
data collection and monitoring control
environmental sensors control
incident notification response
infrastructure monitoring sensor control
roadway information system data
roadway treatment system control
speed monitoring control
traffic sensor control
video surveillance control
Pennsylvania Turnpike Commission (PTC)
PTC Field Devices
Existing
Planned

PTC Maintenance and Construction Vehicles


Travelers
Centers
Remote Traveler Support
Personal Information Access
Traffic Management
Emergency Management
Toll Administration
Commercial Vehicle Administration
Archived Data Management
Information Service Provider
Emissions Management
Transit Management
Fleet and Freight Management
Wide Area Wireless Communications
Wireline Communications
Vehicle
Transit Vehicle
Commercial Vehicle
Emergency Vehicle
Vehicles
Roadway
Toll Collection
Parking Management
Roadside

PTC Maintenance and Construction Vehicles Interconnect Diagram



Pennsylvania Turnpike Commission (PTC)

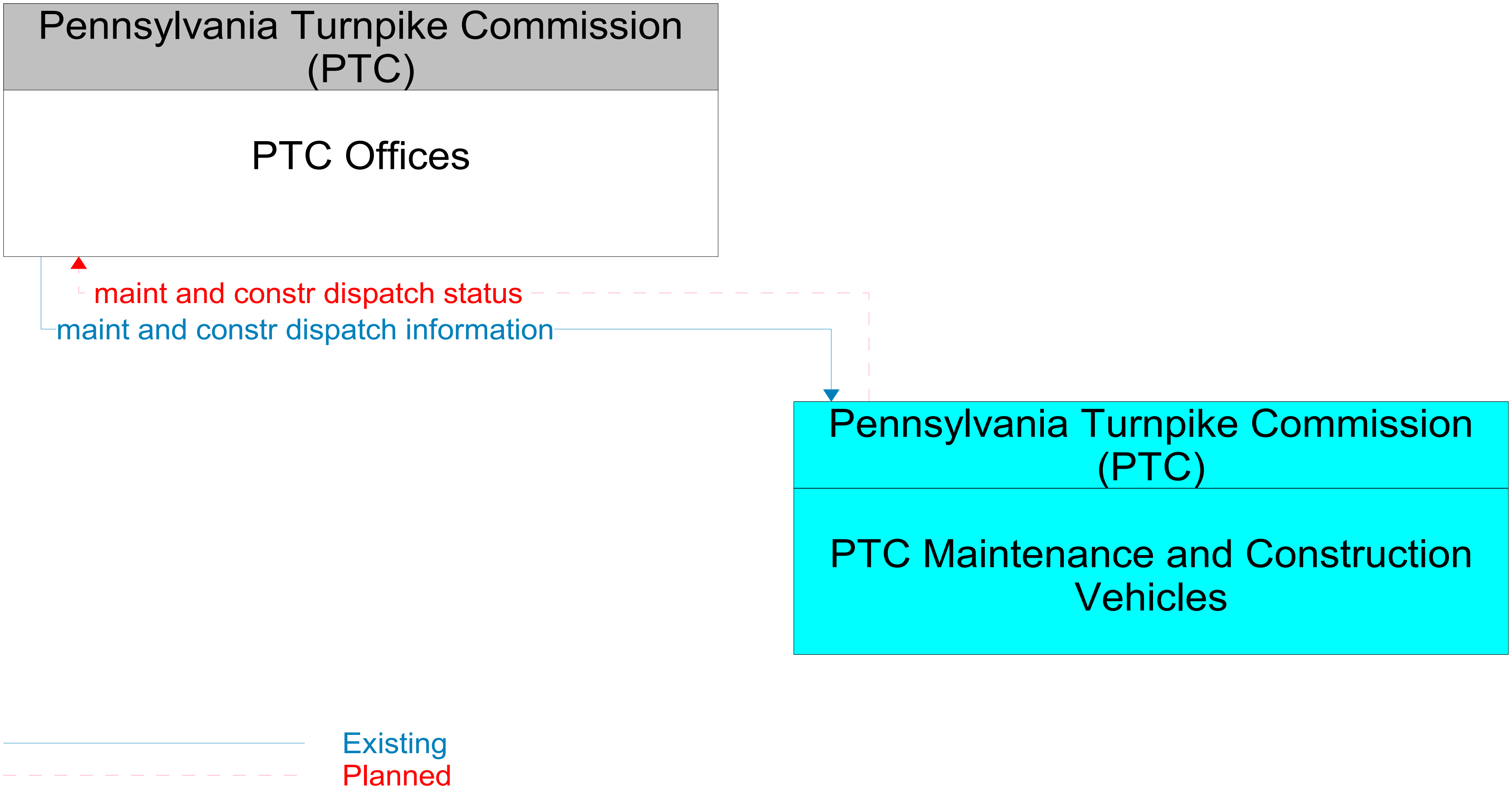
PTC Offices

Pennsylvania Turnpike Commission (PTC)

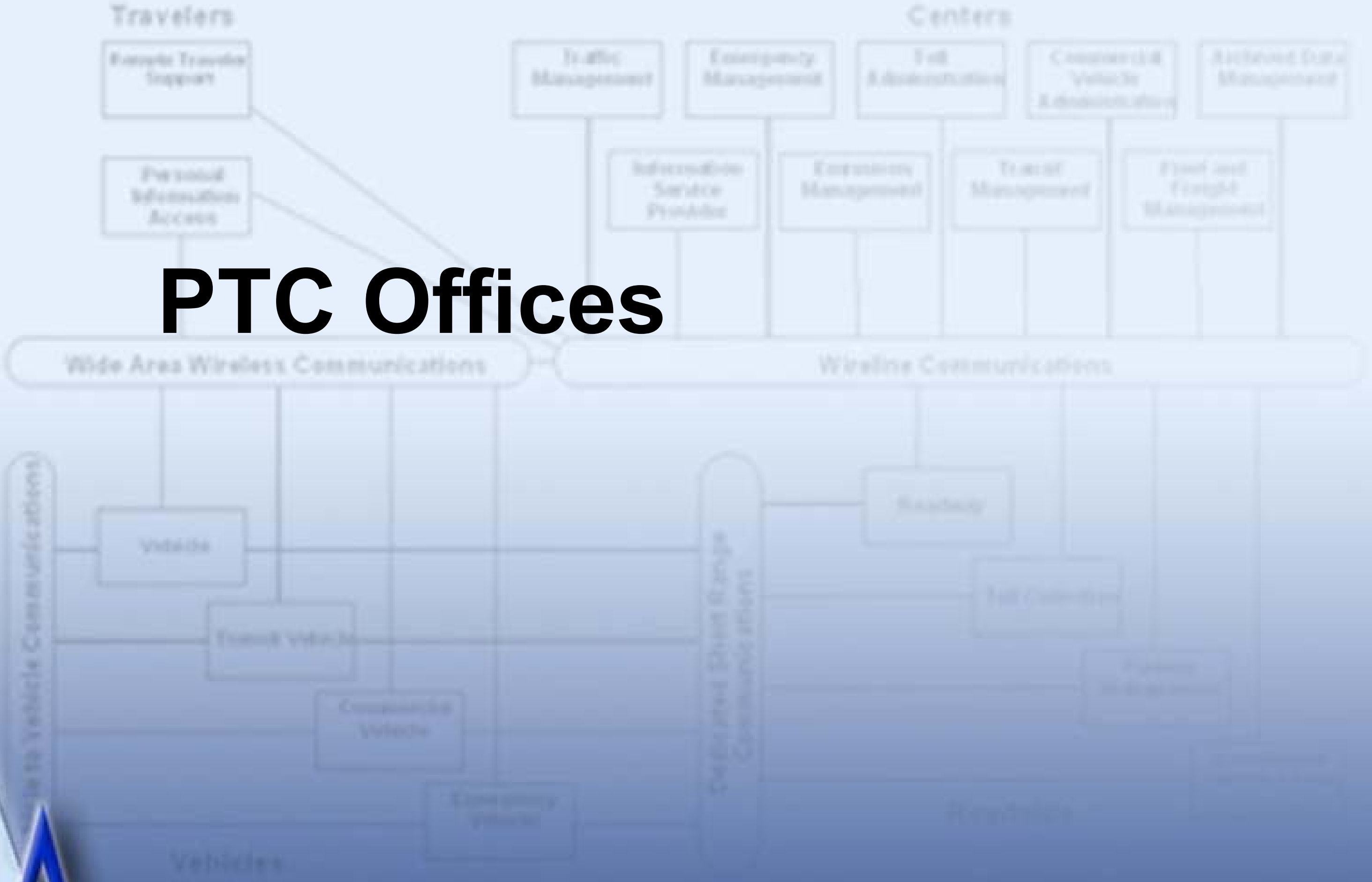
PTC Maintenance and Construction Vehicles

Existing

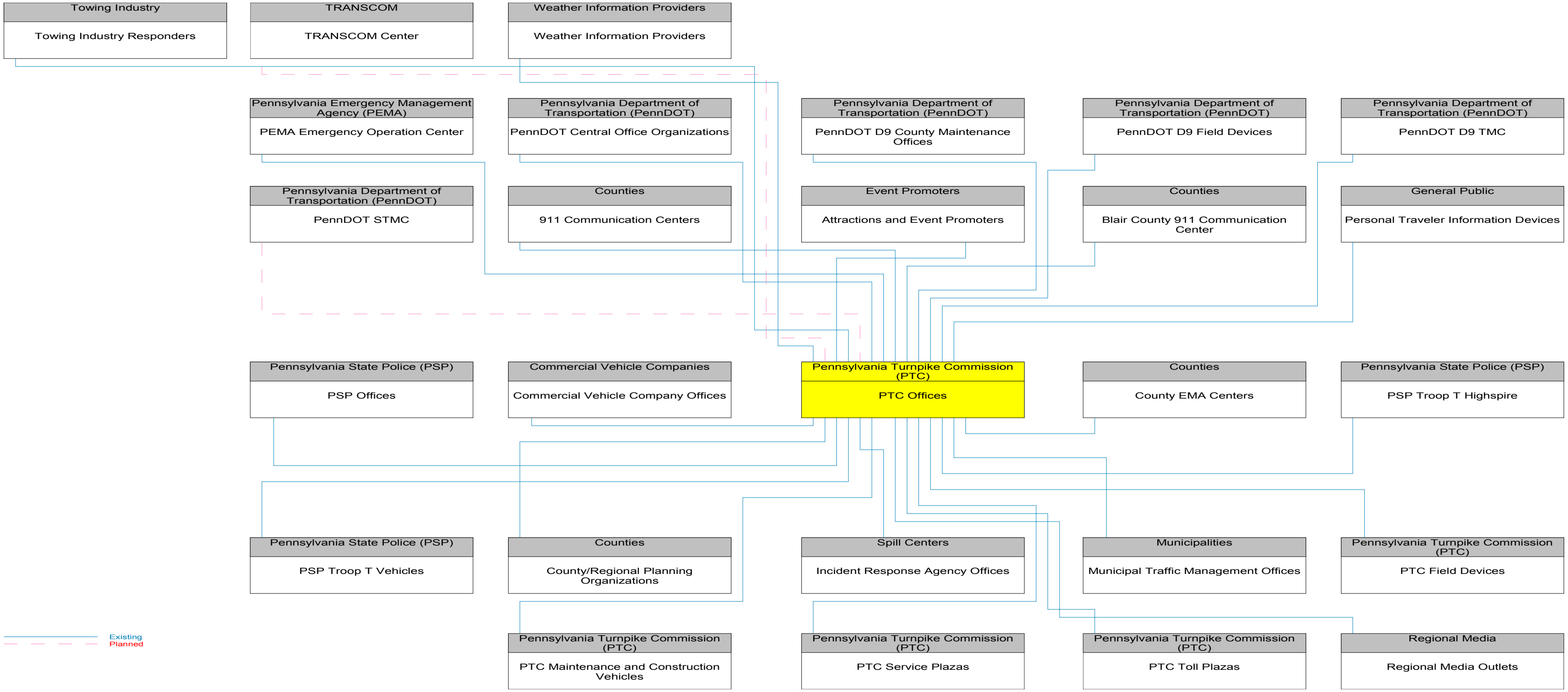
Planned


Pennsylvania Turnpike Commission (PTC)
PTC Offices
maint and constr dispatch status
maint and constr dispatch information
Pennsylvania Turnpike Commission (PTC)
PTC Maintenance and Construction Vehicles
Existing
Planned

PTC Offices


Travelers
Centers
Remote Traveler Support
Personal Information Access
Traffic Management
Emergency Management
Toll Administration
Commercial Vehicle Administration
Archived Data Management
Information Service Provider
Emissions Management
Transit Management
Fleet and Freight Management
Wide Area Wireless Communications
Wireline Communications
Vehicle to Vehicle Communications
Vehicle
Transit Vehicle
Commercial Vehicle
Emergency Vehicle
Vehicles
Dedicated Short Range Communications
Roadway
Toll Collection
Parking Management
Roadside

PTC Offices Interconnect Diagram



Towing Industry
Towing Industry Responders

TRANSCOM
TRANSCOM Center

Weather Information Providers
Weather Information Providers

Pennsylvania Emergency Management Agency (PEMA)
PEMA Emergency Operation Center

Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Organizations

Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 County Maintenance Offices

Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 Field Devices

Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC

Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC

Counties
911 Communication Centers

Event Promoters
Attractions and Event Promoters

Counties
Blair County 911 Communication Center

General Public
Personal Traveler Information Devices

Pennsylvania State Police (PSP)
PSP Offices

Commercial Vehicle Companies
Commercial Vehicle Company Offices

Pennsylvania Turnpike Commission (PTC)
PTC Offices

Counties
County EMA Centers

Pennsylvania State Police (PSP)
PSP Troop T Highspire

Pennsylvania State Police (PSP)
PSP Troop T Vehicles

Counties
County/Regional Planning Organizations

Spill Centers
Incident Response Agency Offices

Municipalities
Municipal Traffic Management Offices

Pennsylvania Turnpike Commission (PTC)
PTC Field Devices

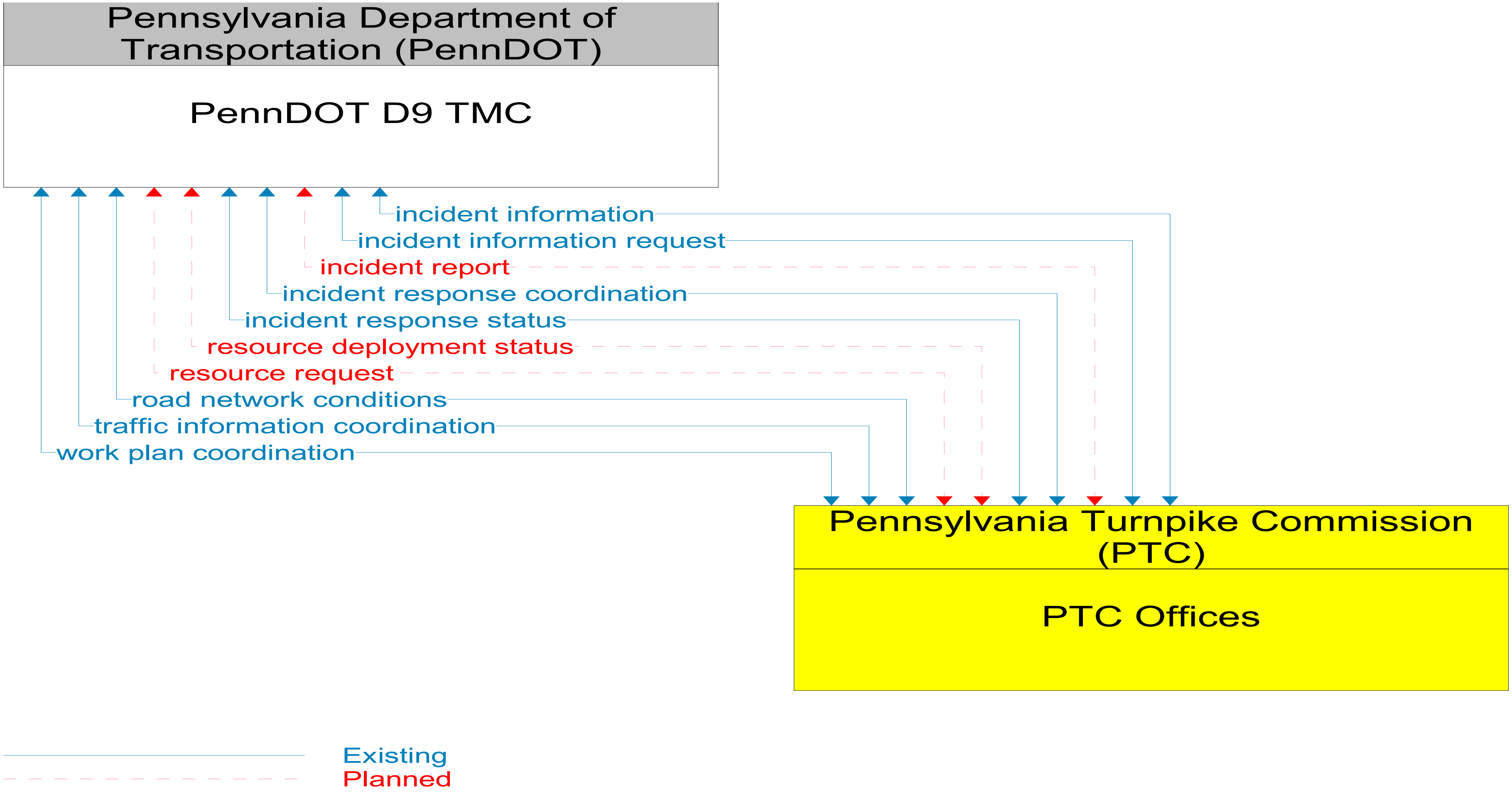
Pennsylvania Turnpike Commission (PTC)
PTC Maintenance and Construction Vehicles

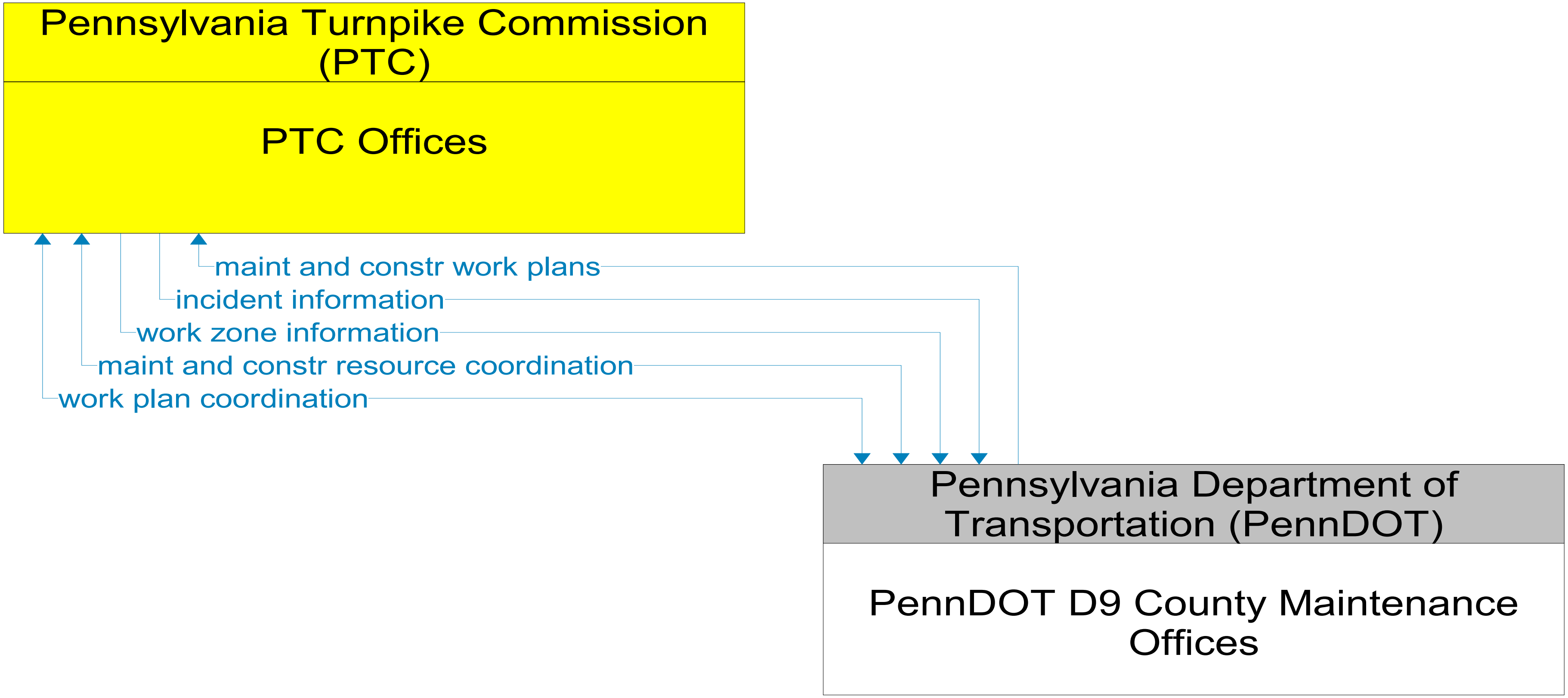
Pennsylvania Turnpike Commission (PTC)
PTC Service Plazas

Pennsylvania Turnpike Commission (PTC)
PTC Toll Plazas

Regional Media
Regional Media Outlets

Existing
Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
incident information
incident information request
incident report
incident response coordination
incident response status
resource deployment status
resource request
road network conditions
traffic information coordination
work plan coordination
Pennsylvania Turnpike Commission (PTC)
PTC Offices
Existing
Planned



Pennsylvania Turnpike Commission (PTC)

PTC Offices

maint and constr work plans

incident information

work zone information

maint and constr resource coordination

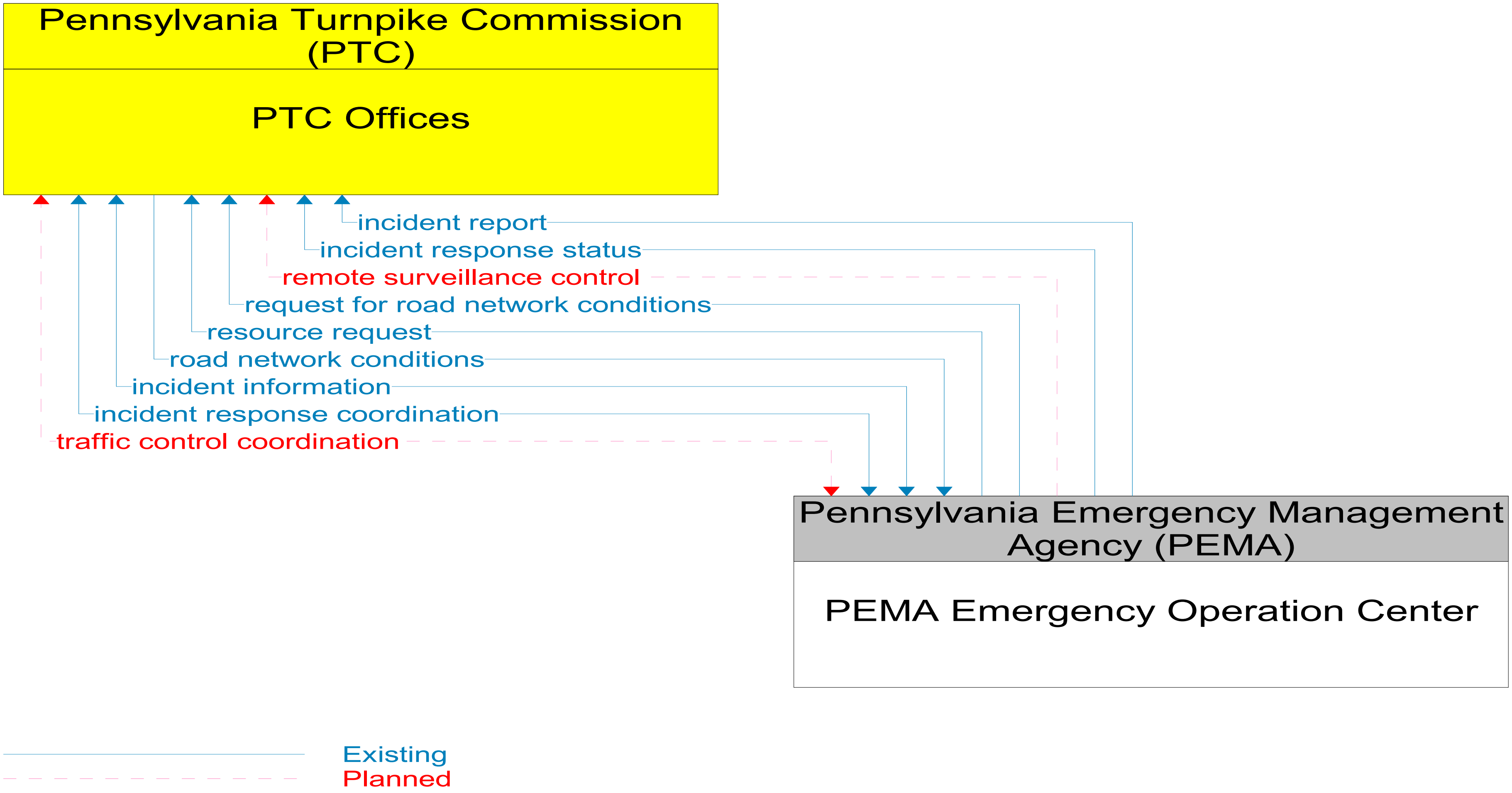
work plan coordination

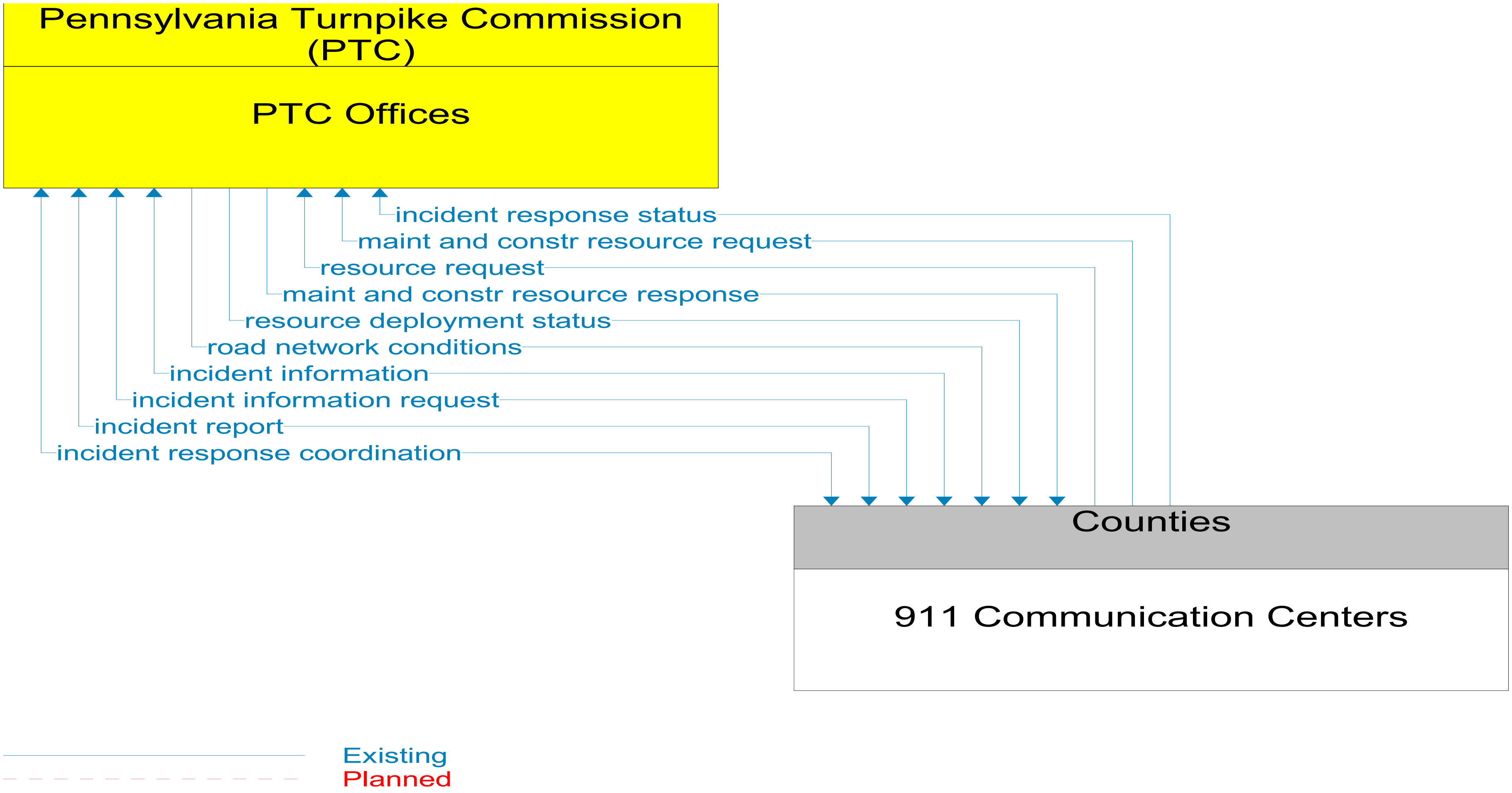
Pennsylvania Department of Transportation (PennDOT)

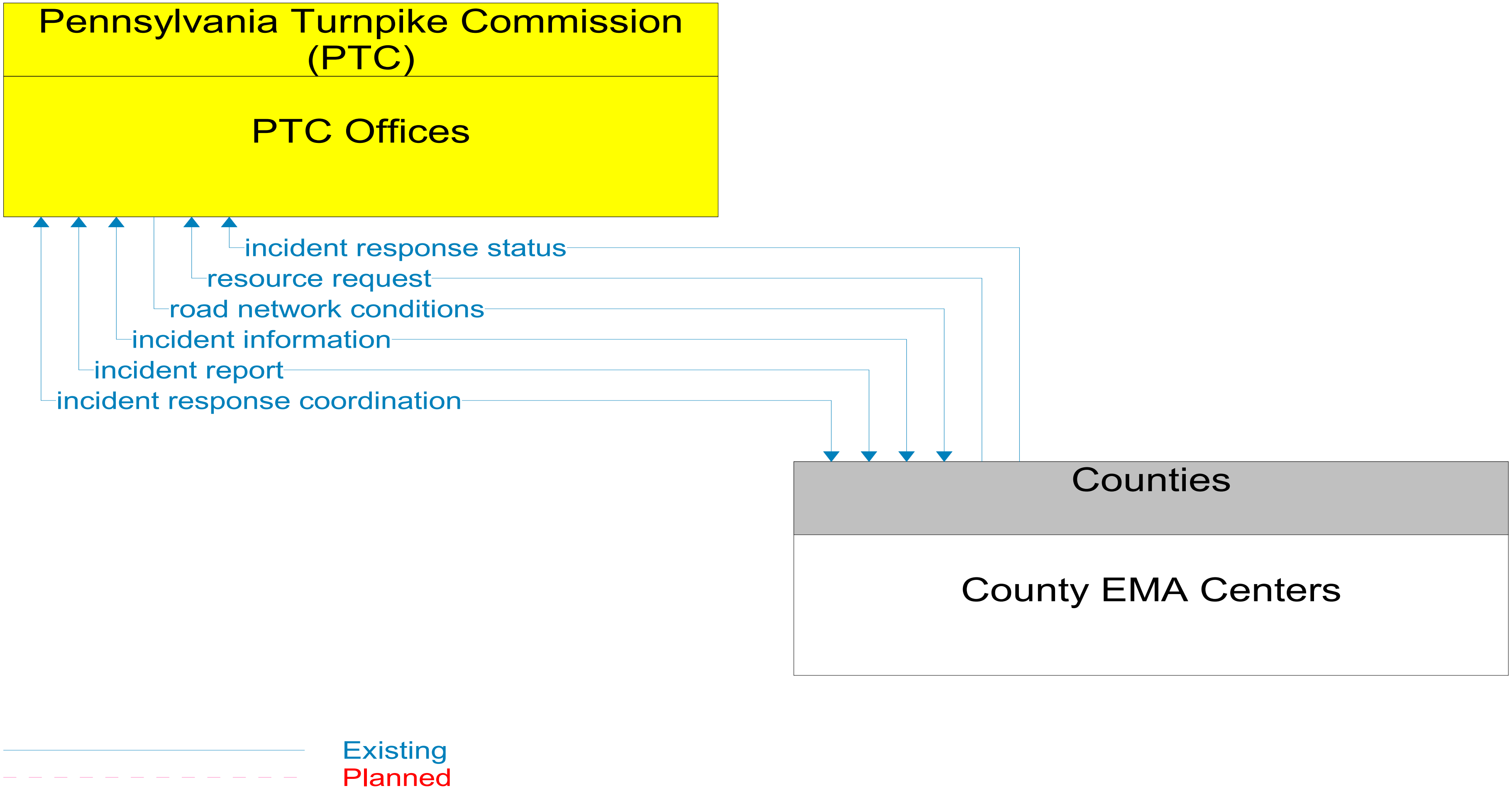
PennDOT D9 County Maintenance Offices

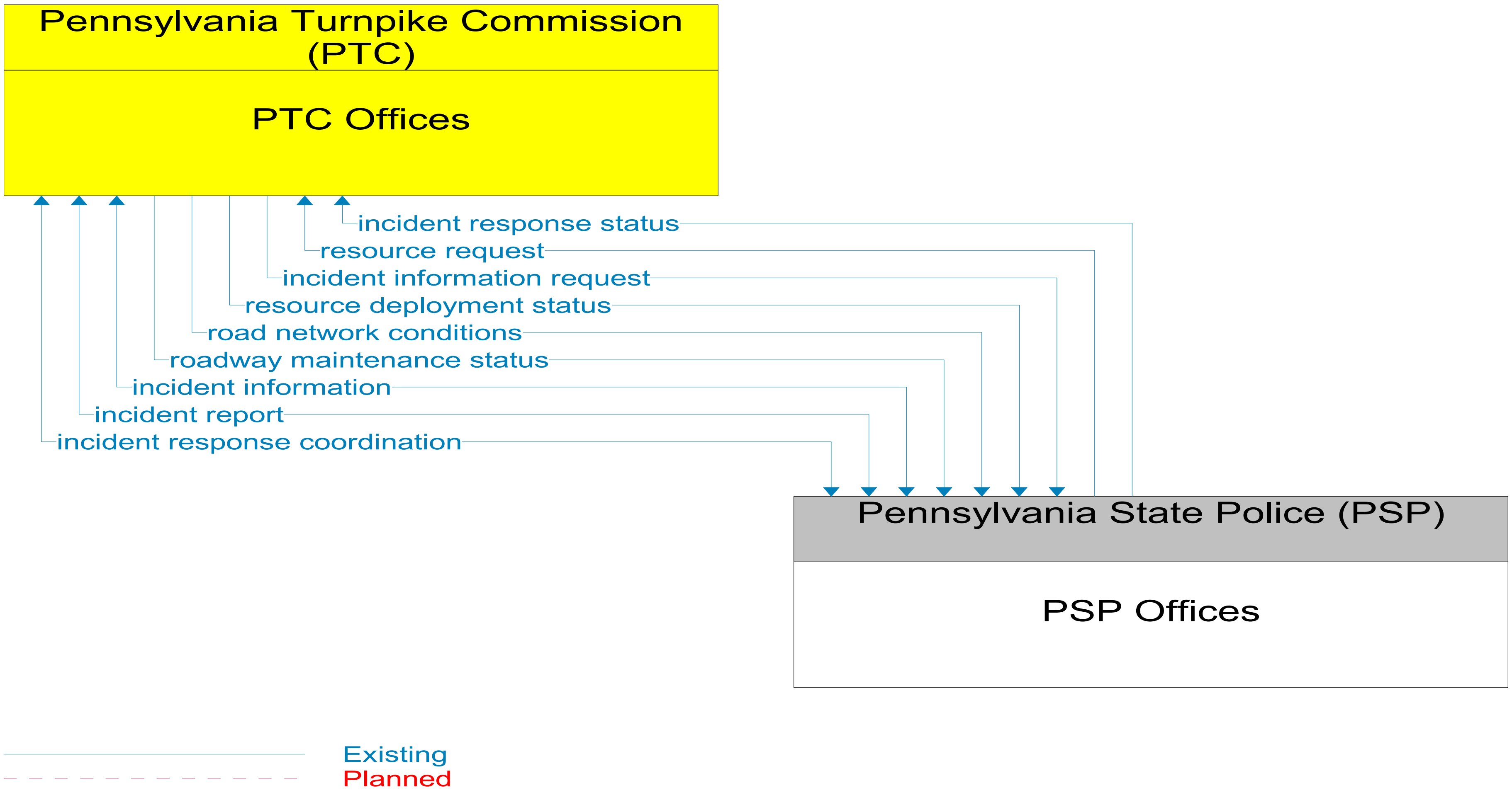
Existing

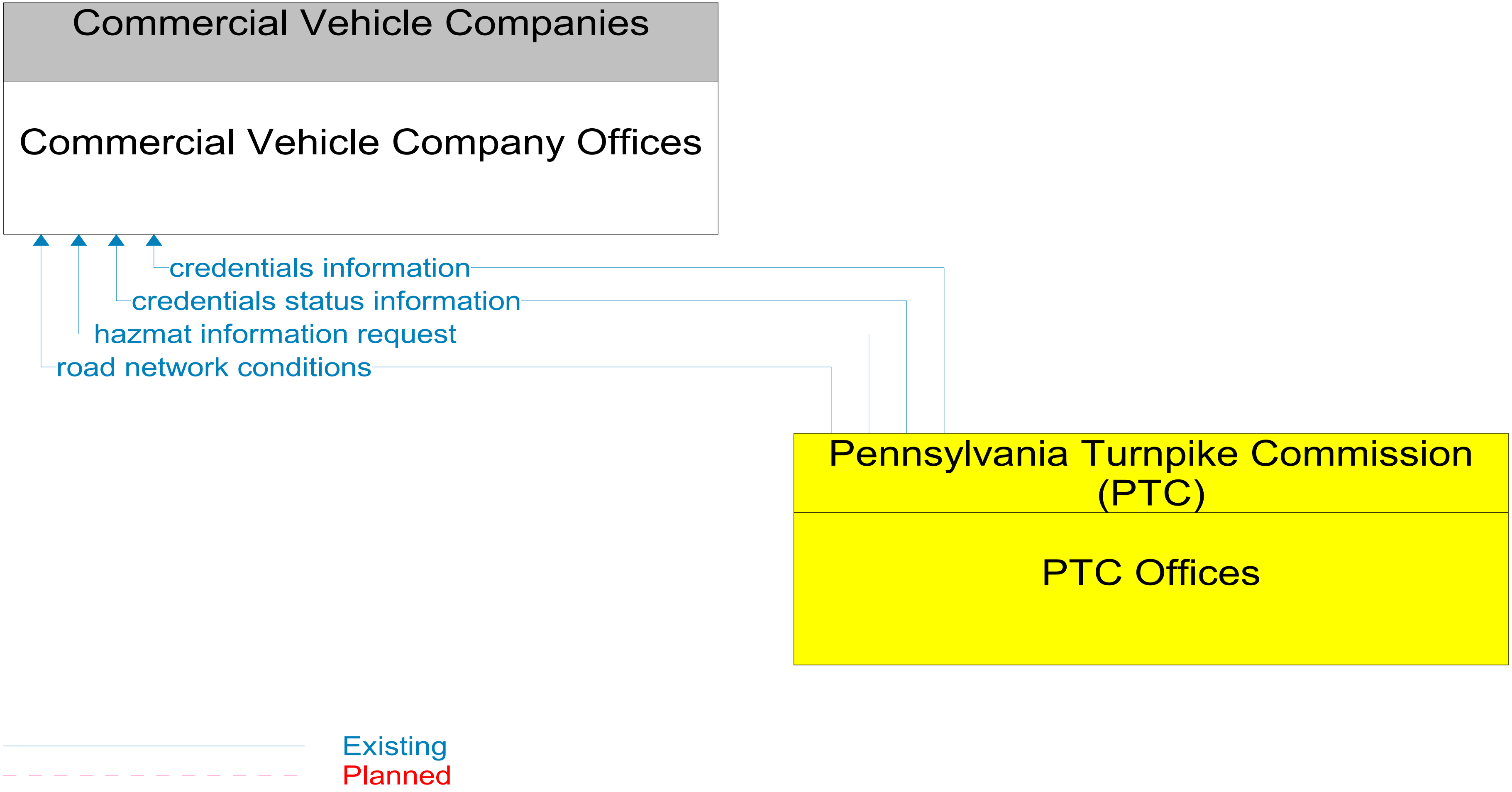
Planned

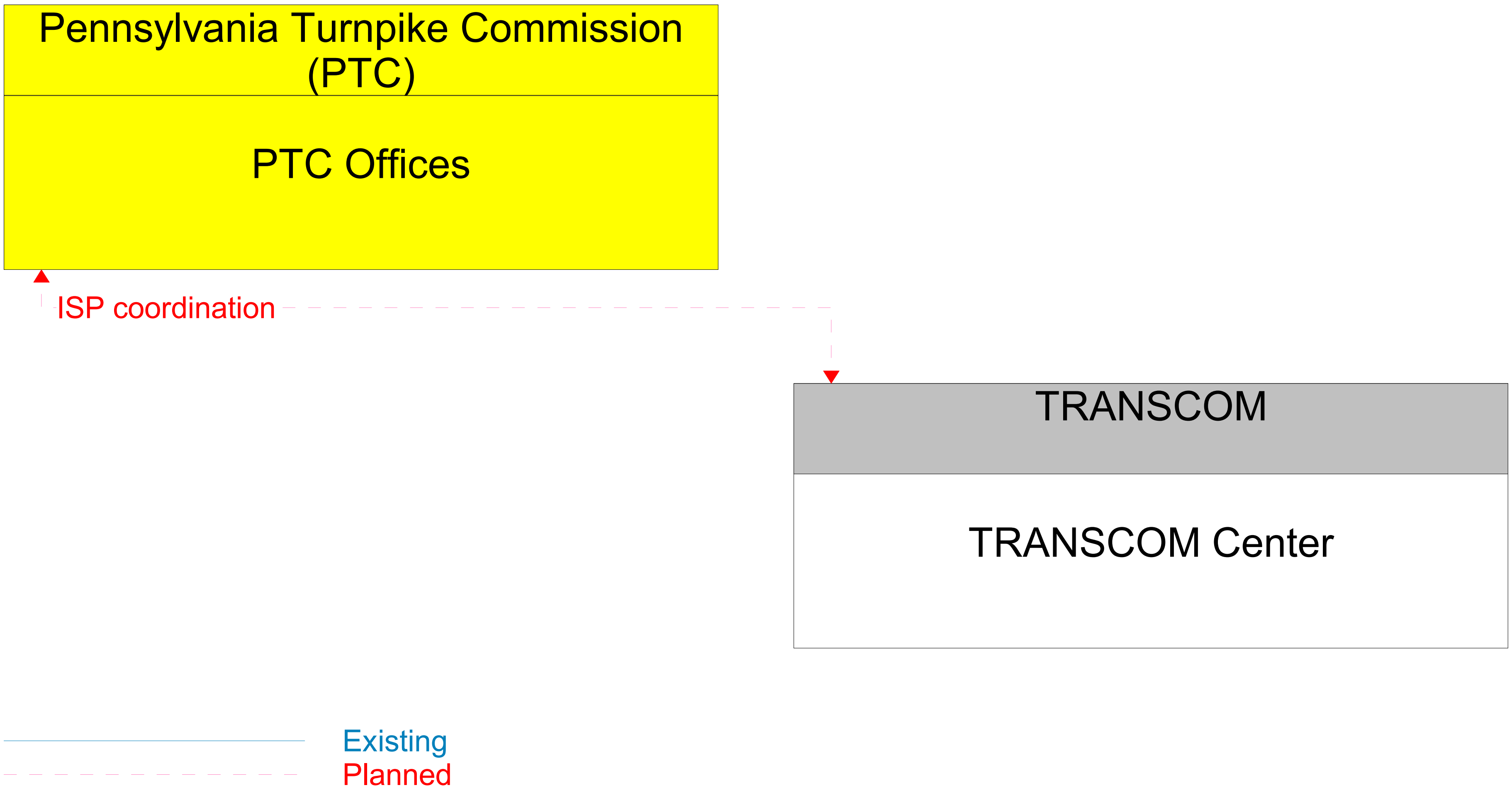

Pennsylvania Turnpike Commission (PTC)
PTC Offices
incident report
incident response status
remote surveillance control
request for road network conditions
resource request
road network conditions
incident information
incident response coordination
traffic control coordination
Pennsylvania Emergency Management Agency (PEMA)
PEMA Emergency Operation Center
Existing
Planned


Pennsylvania Turnpike Commission (PTC)
PTC Offices
incident response status
maint and constr resource request
resource request
maint and constr resource response
resource deployment status
road network conditions
incident information
incident information request
incident report
incident response coordination
Counties
911 Communication Centers
Existing
Planned


Pennsylvania Turnpike Commission (PTC)
PTC Offices
incident response status
resource request
road network conditions
incident information
incident report
incident response coordination
Counties
County EMA Centers
Existing
Planned


Pennsylvania Turnpike Commission (PTC)
PTC Offices
incident response status
resource request
incident information request
resource deployment status
road network conditions
roadway maintenance status
incident information
incident report
incident response coordination
Pennsylvania State Police (PSP)
PSP Offices
Existing
Planned


Commercial Vehicle Companies
Commercial Vehicle Company Offices
credentials information
credentials status information
hazmat information request
road network conditions
Pennsylvania Turnpike Commission (PTC)
PTC Offices
Existing
Planned



Pennsylvania Turnpike Commission (PTC)

PTC Offices

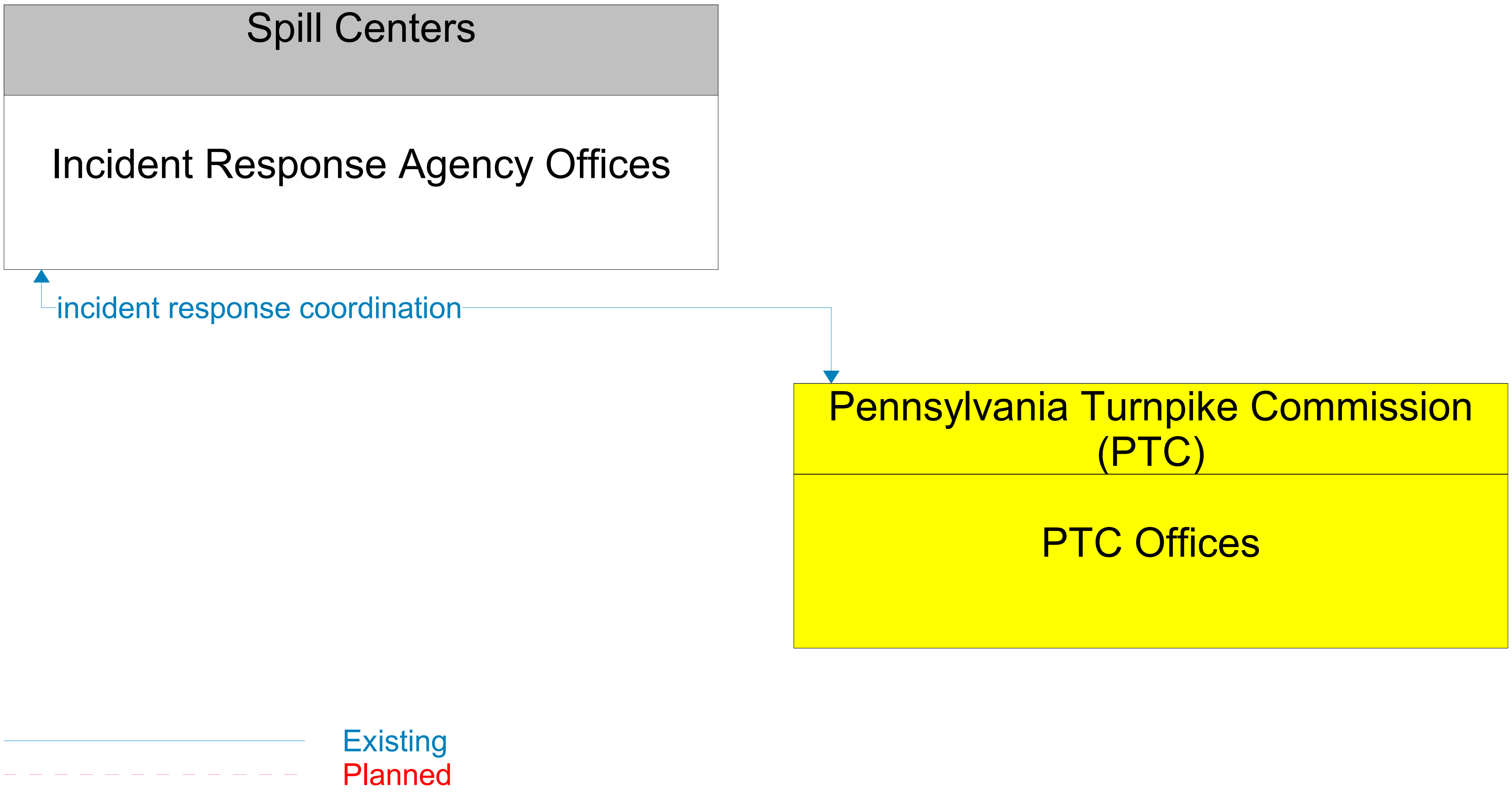
ISP coordination

TRANSCOM

TRANSCOM Center

Existing

Planned



Spill Centers

Incident Response Agency Offices

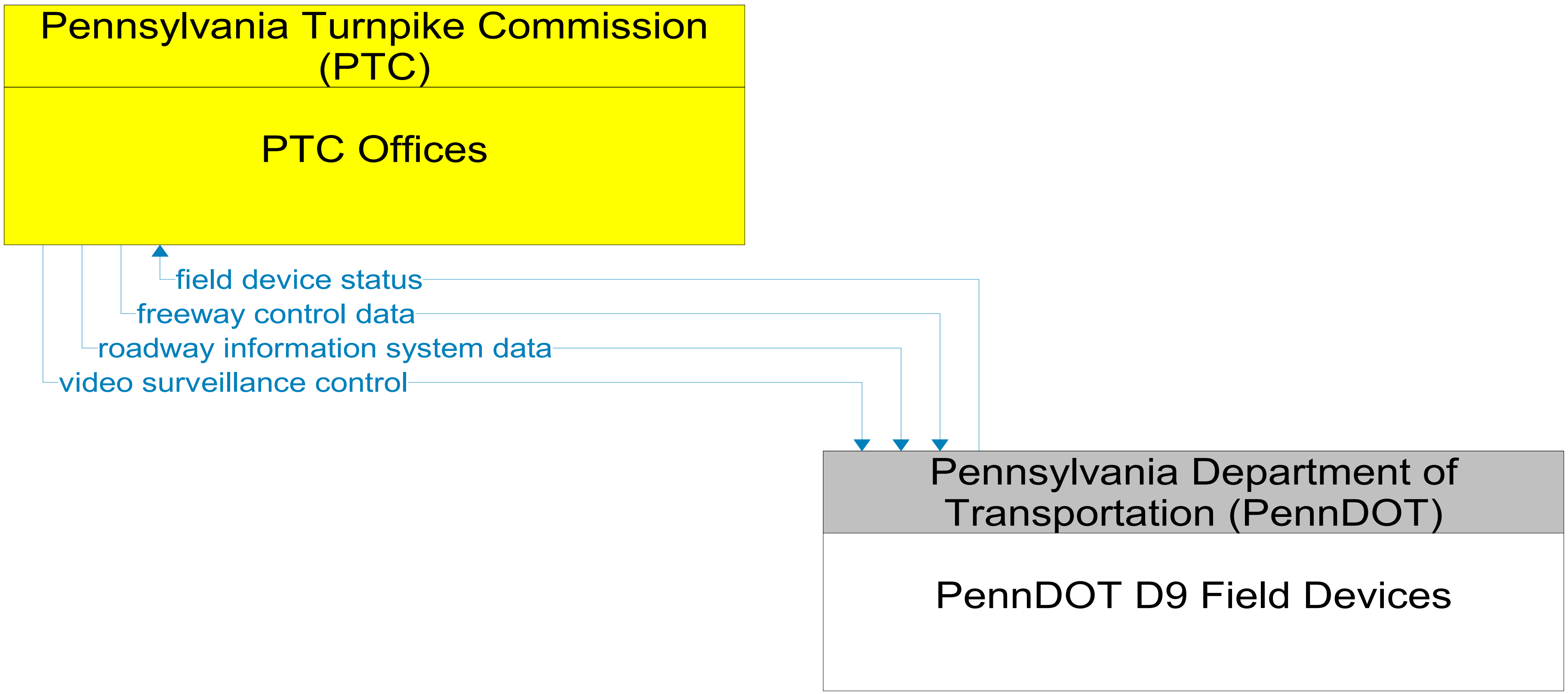
incident response coordination

Pennsylvania Turnpike Commission (PTC)

PTC Offices

Existing

Planned



Pennsylvania Turnpike Commission (PTC)

PTC Offices

field device status

freeway control data

roadway information system data

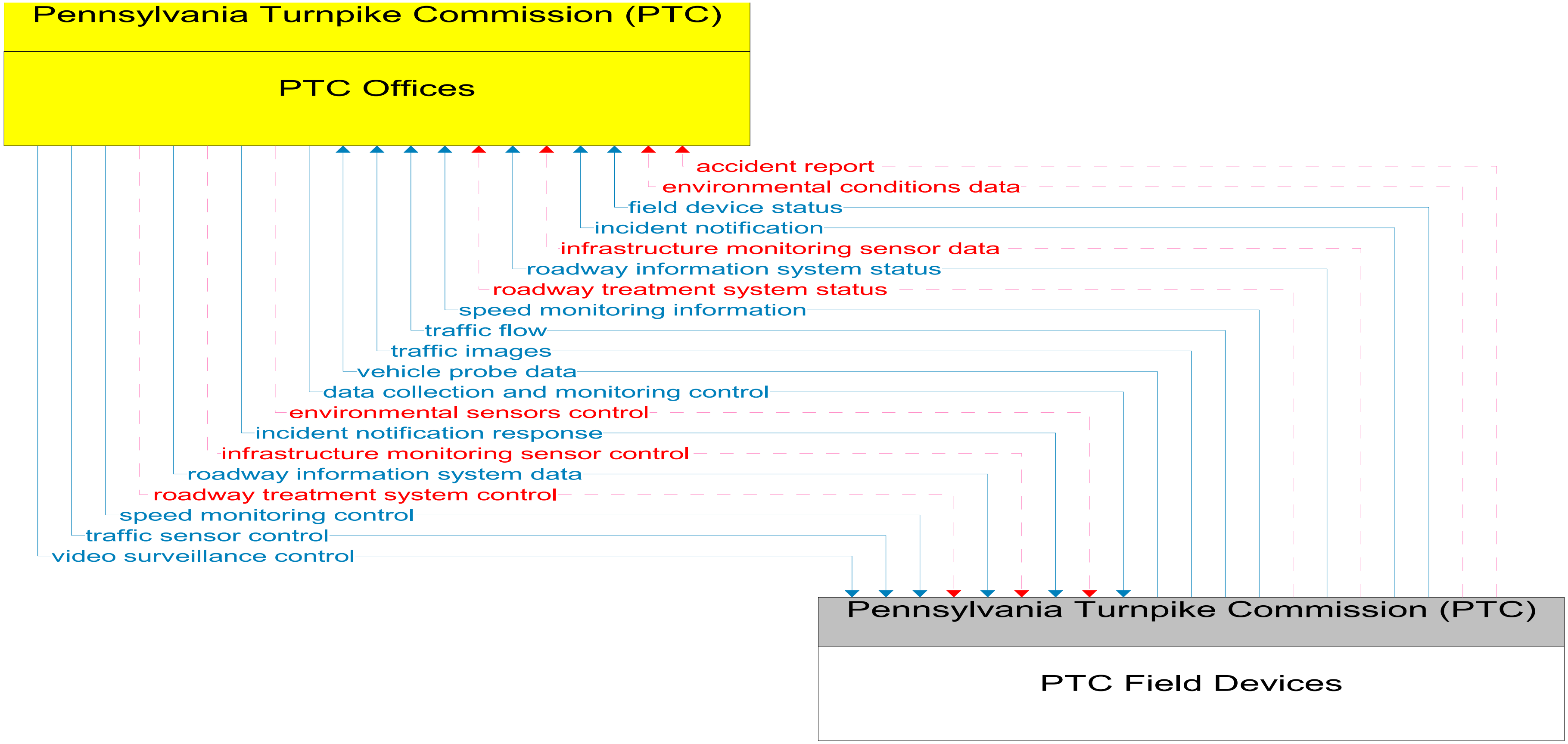
video surveillance control

Pennsylvania Department of Transportation (PennDOT)

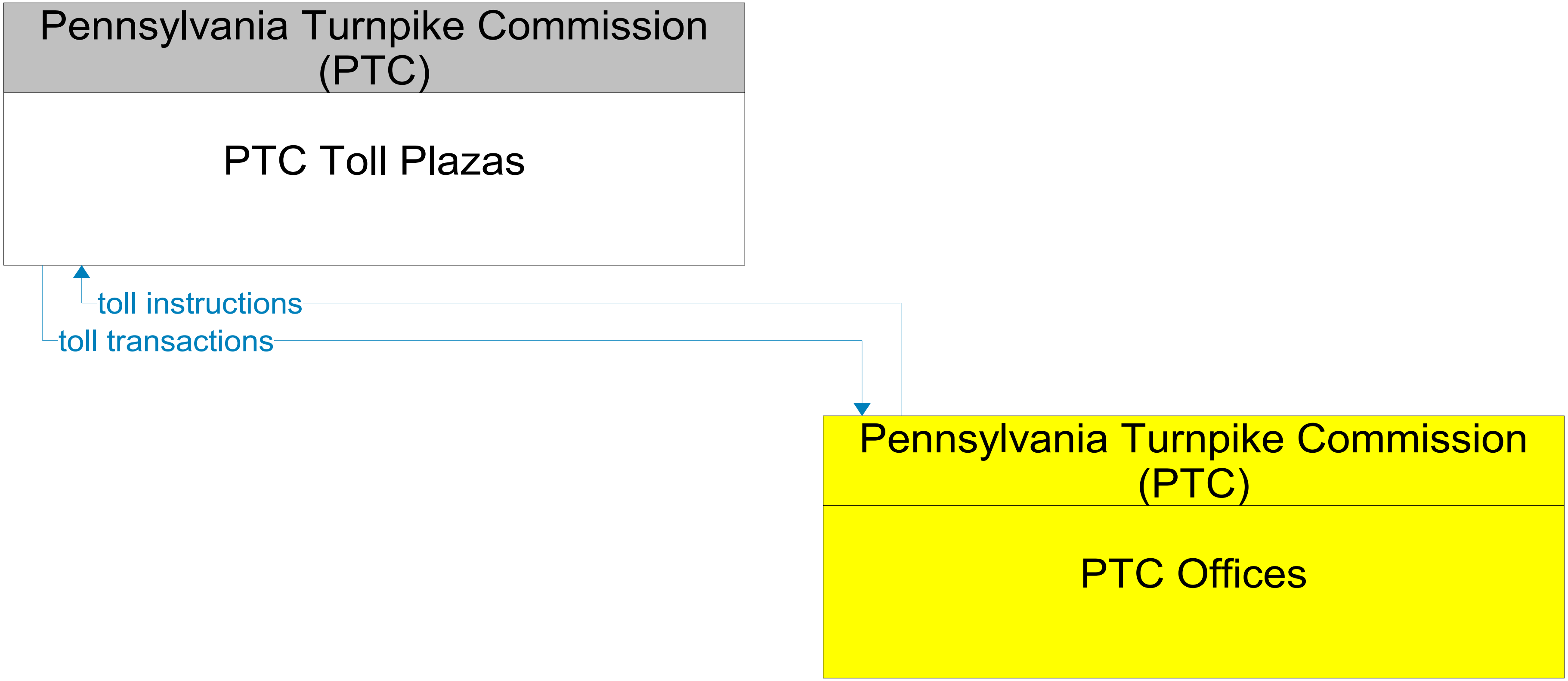
PennDOT D9 Field Devices

Existing

Planned


Pennsylvania Turnpike Commission (PTC)
PTC Offices
accident report
environmental conditions data
field device status
incident notification
infrastructure monitoring sensor data
roadway information system status
roadway treatment system status
speed monitoring information
traffic flow
traffic images
vehicle probe data
data collection and monitoring control
environmental sensors control
incident notification response
infrastructure monitoring sensor control
roadway information system data
roadway treatment system control
speed monitoring control
traffic sensor control
video surveillance control
Pennsylvania Turnpike Commission (PTC)
PTC Field Devices

Existing
Planned



Pennsylvania Turnpike Commission (PTC)

PTC Toll Plazas

toll instructions

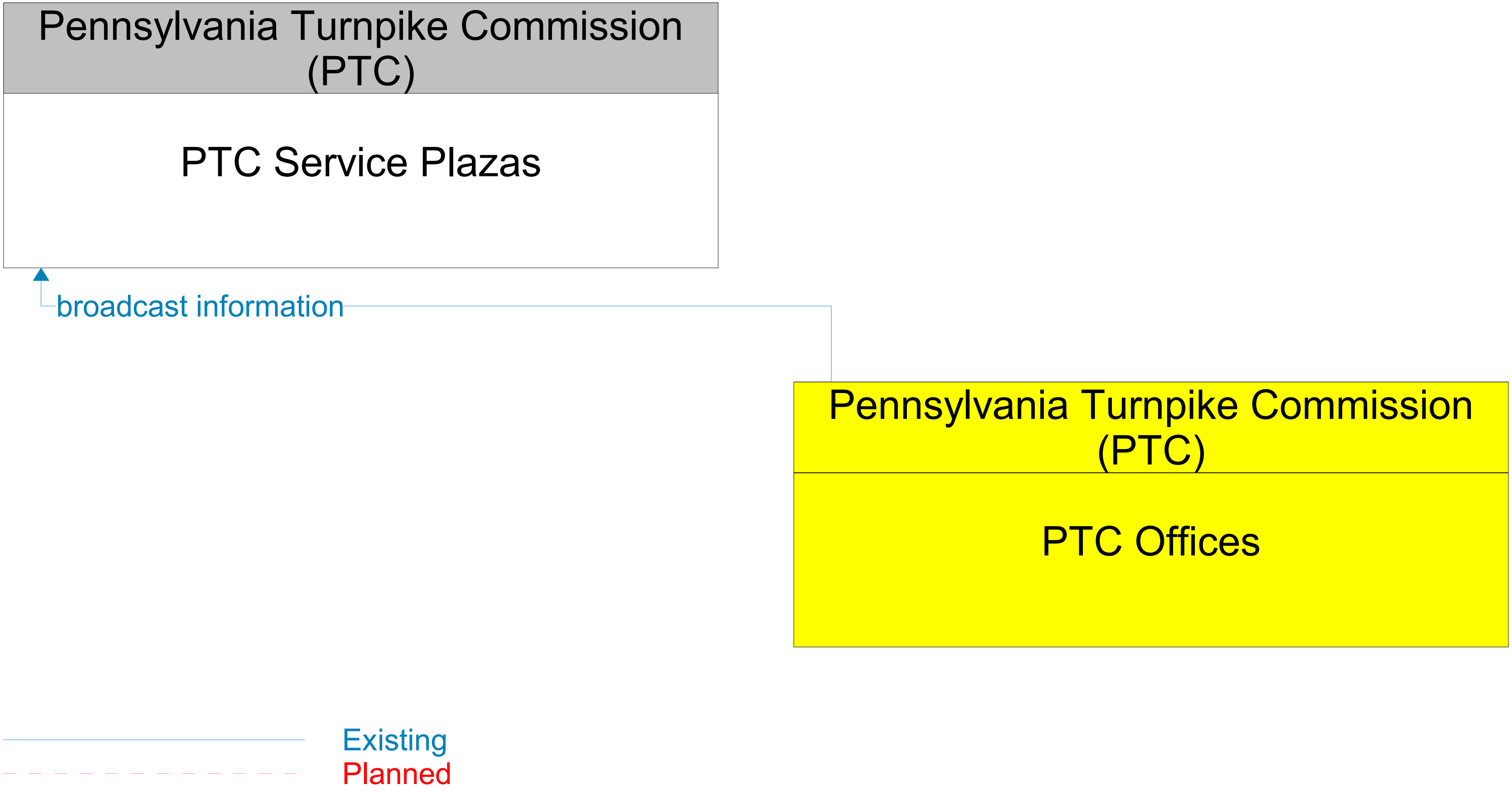
toll transactions

Pennsylvania Turnpike Commission (PTC)

PTC Offices

Existing

Planned



Pennsylvania Turnpike Commission (PTC)

PTC Service Plazas

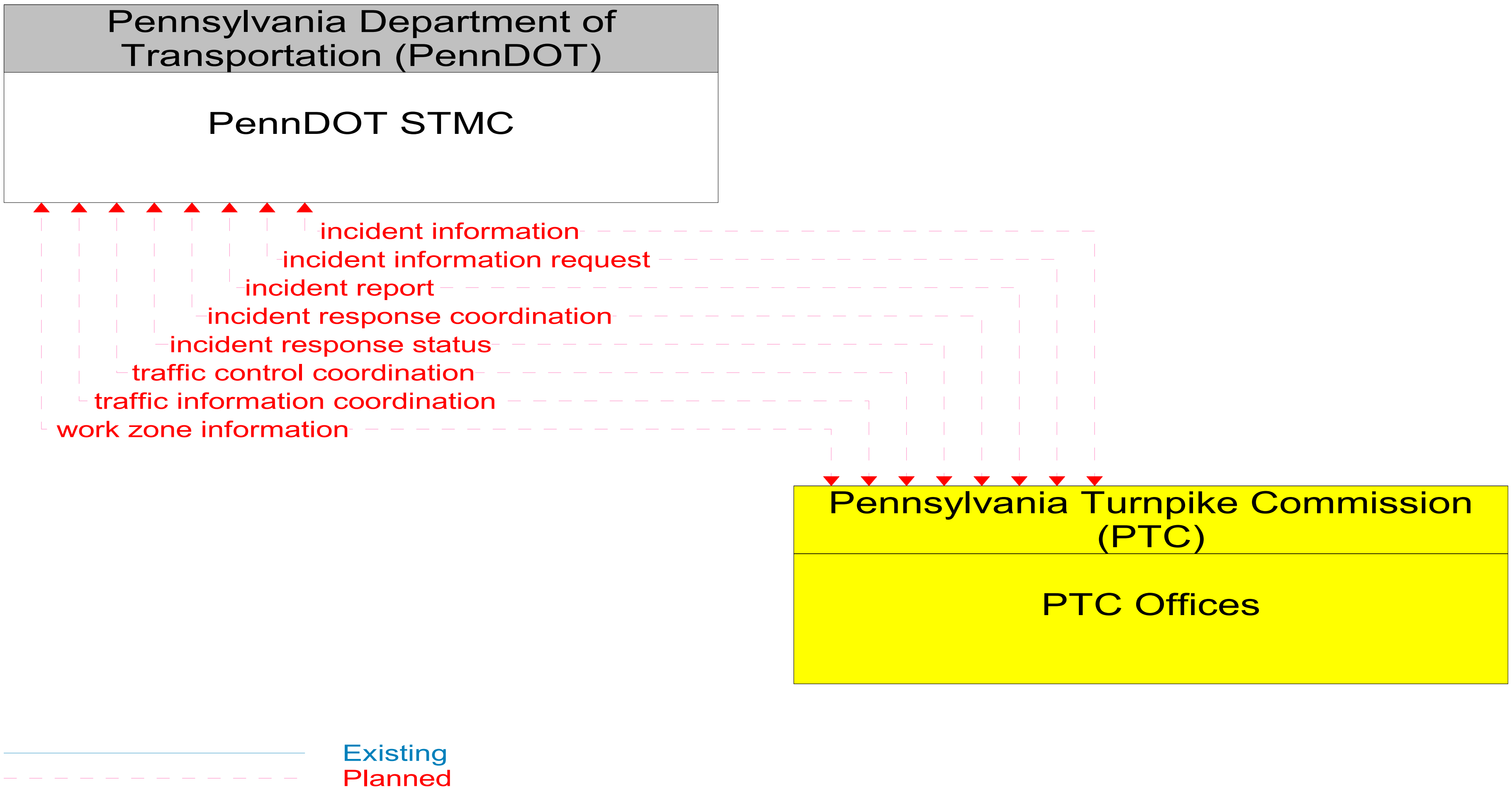
broadcast information

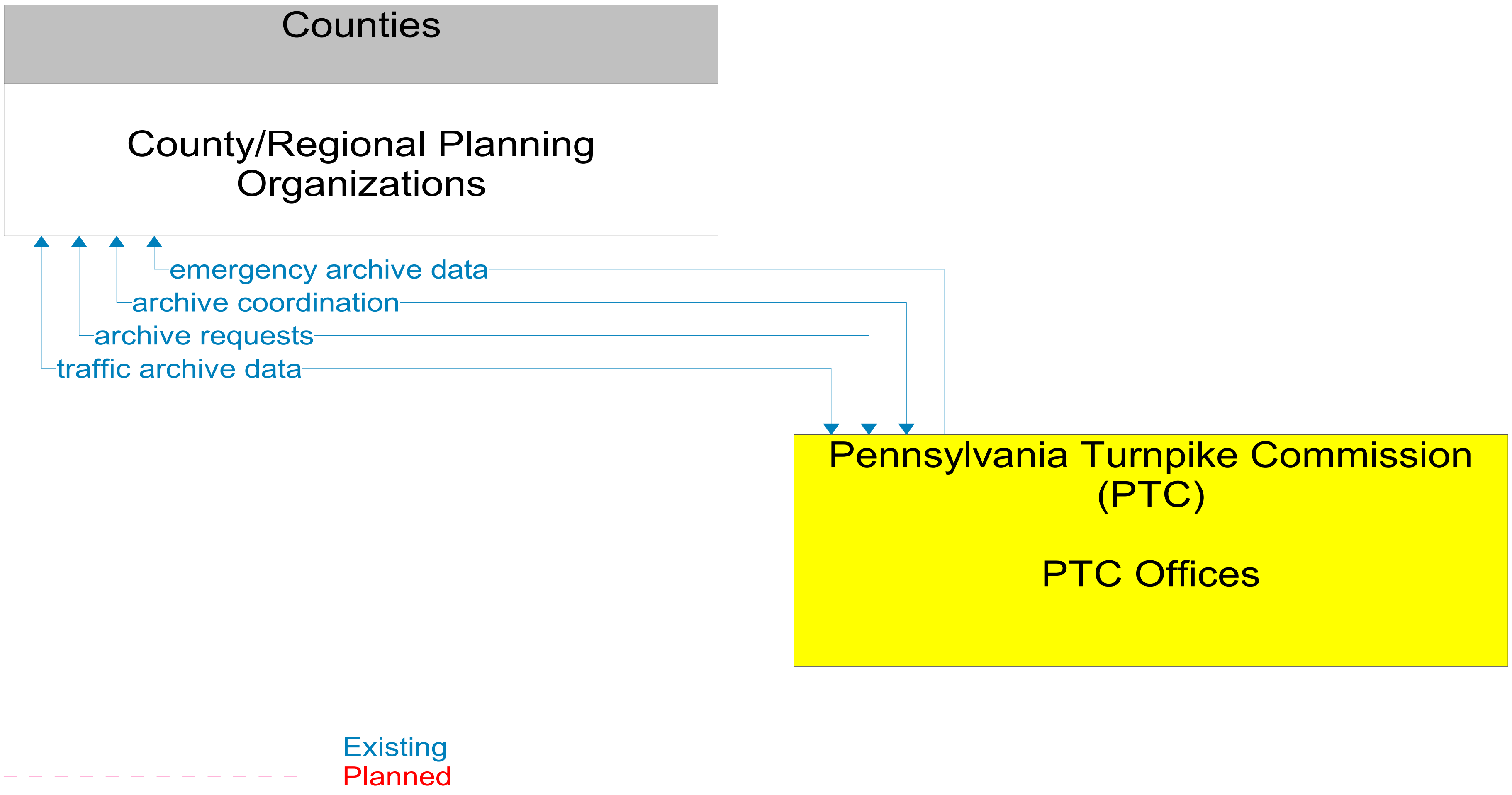
Pennsylvania Turnpike Commission (PTC)

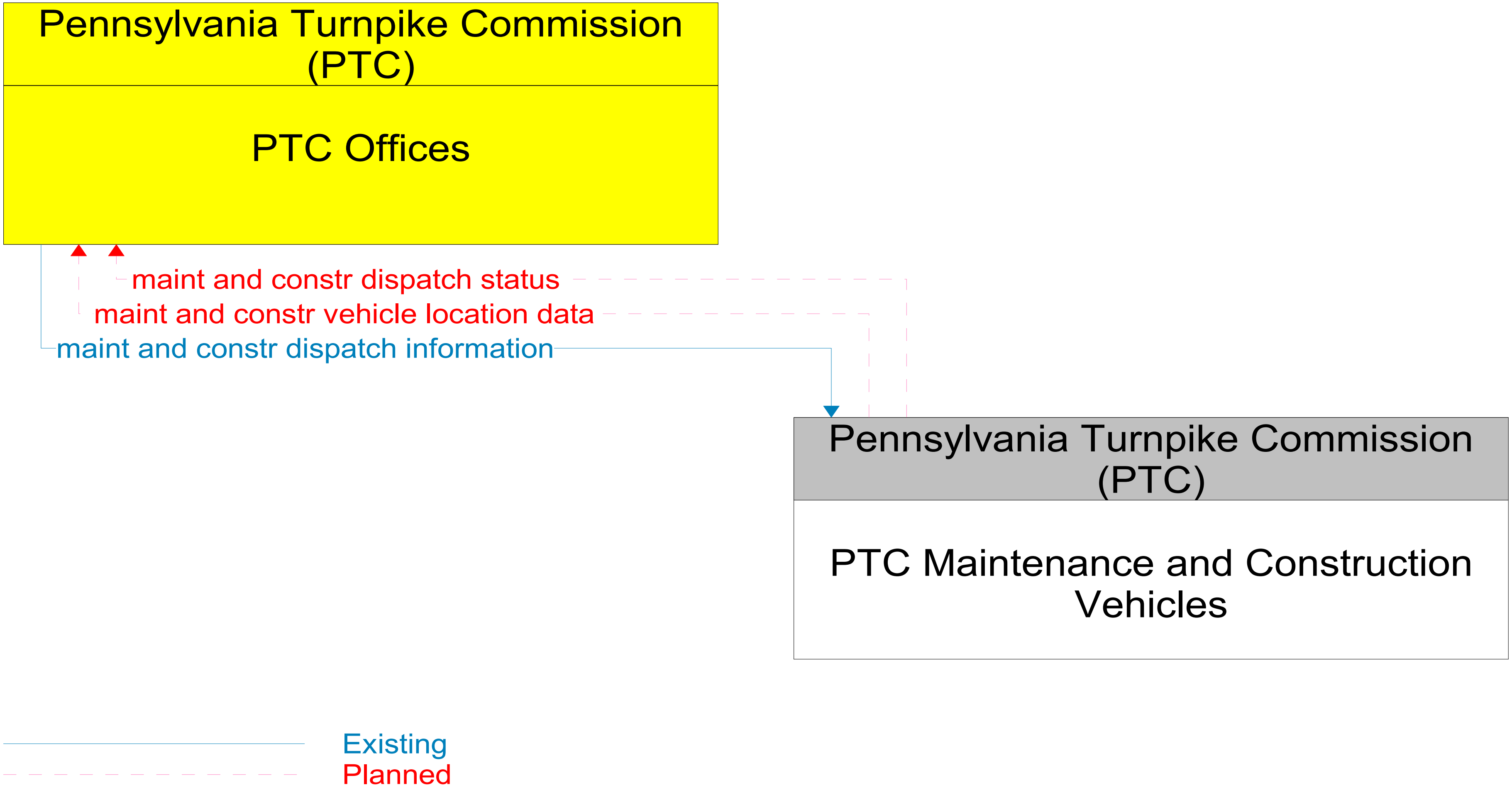
PTC Offices

Existing

Planned


Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC
incident information
incident information request
incident report
incident response coordination
incident response status
traffic control coordination
traffic information coordination
work zone information
Pennsylvania Turnpike Commission (PTC)
PTC Offices
Existing
Planned


Counties
County/Regional Planning Organizations
emergency archive data
archive coordination
archive requests
traffic archive data
Pennsylvania Turnpike Commission (PTC)
PTC Offices
Existing
Planned



Pennsylvania Turnpike Commission (PTC)

PTC Offices

maint and constr dispatch status

maint and constr vehicle location data

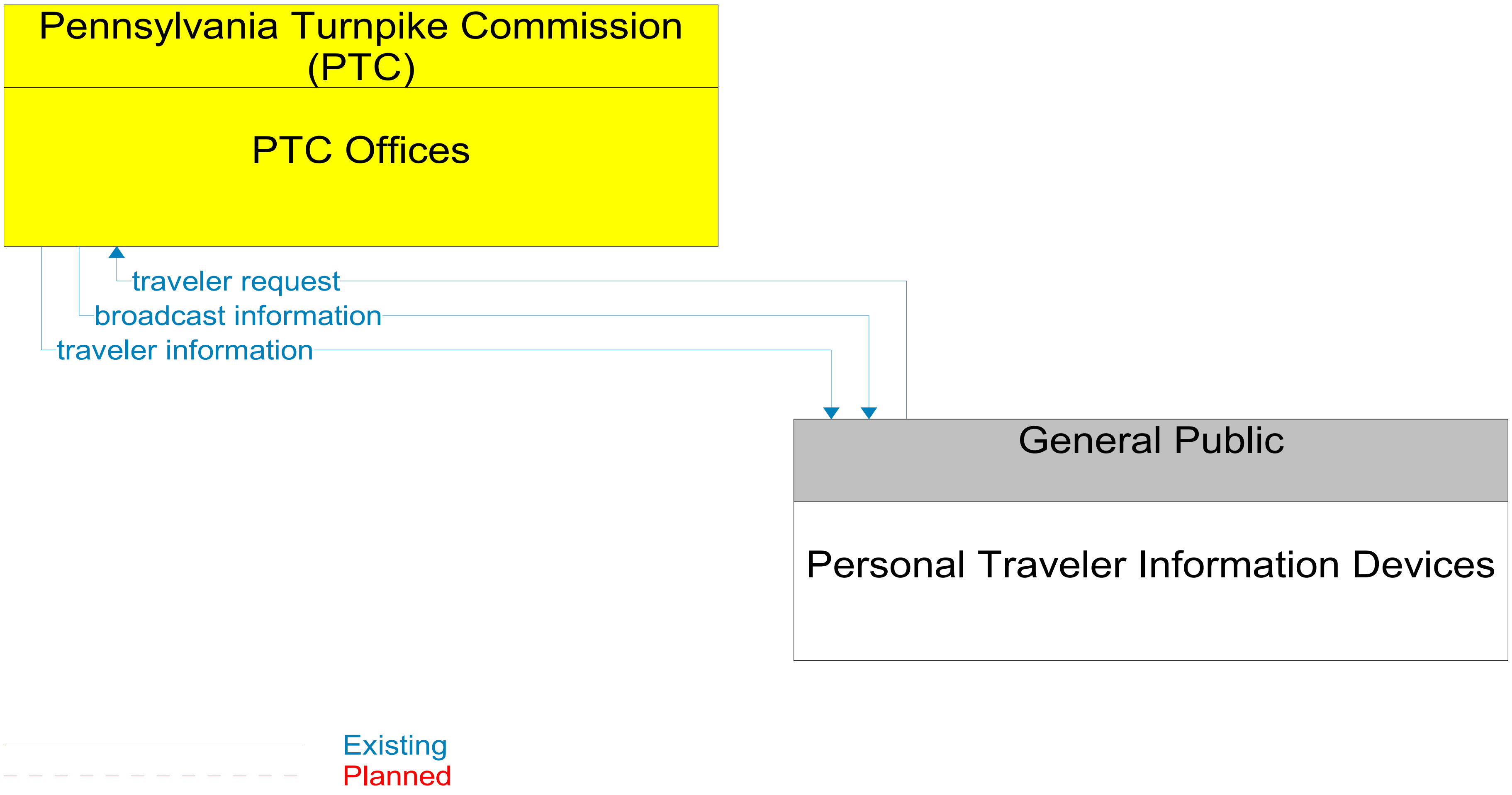
maint and constr dispatch information

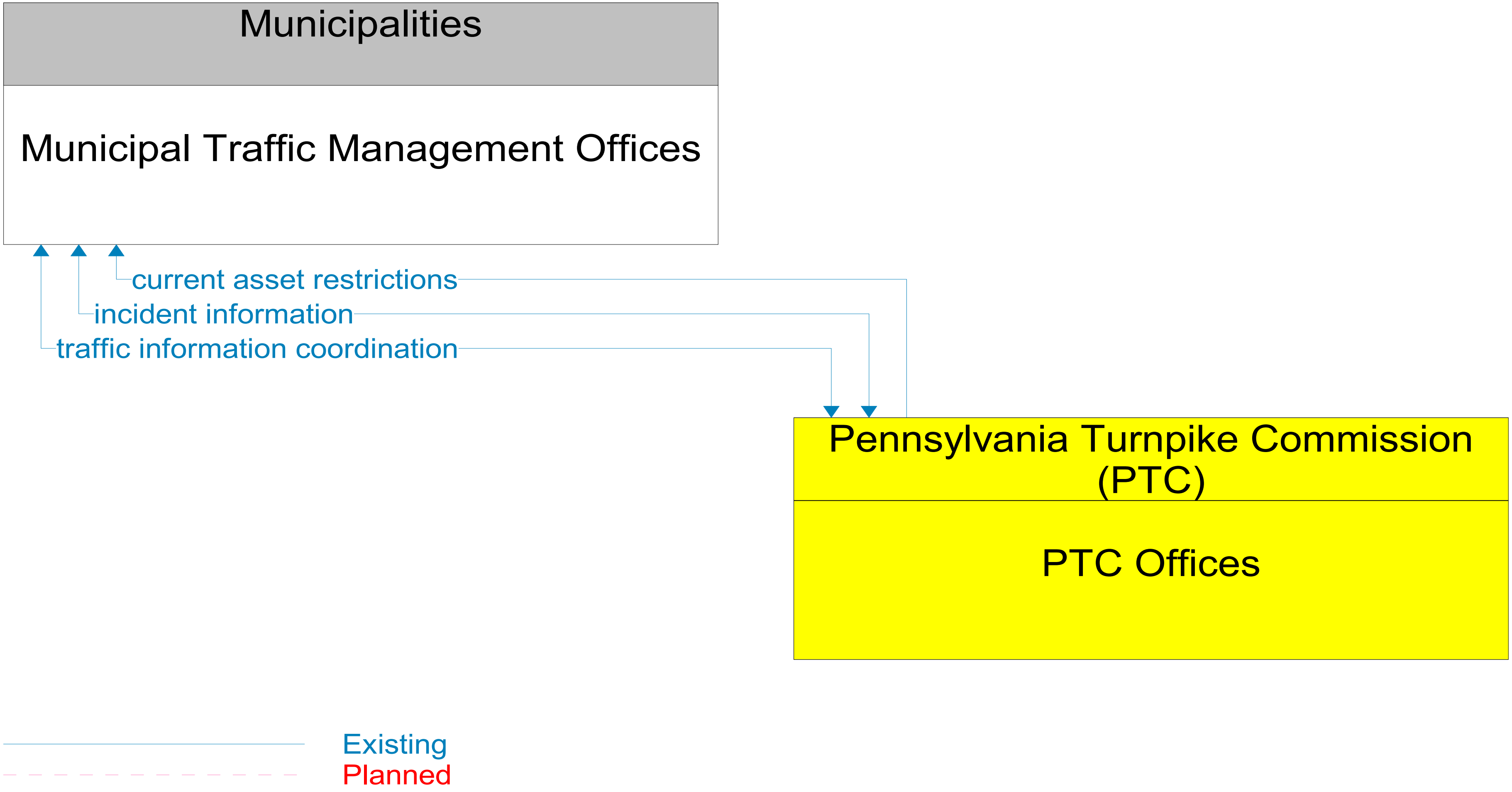
Pennsylvania Turnpike Commission (PTC)

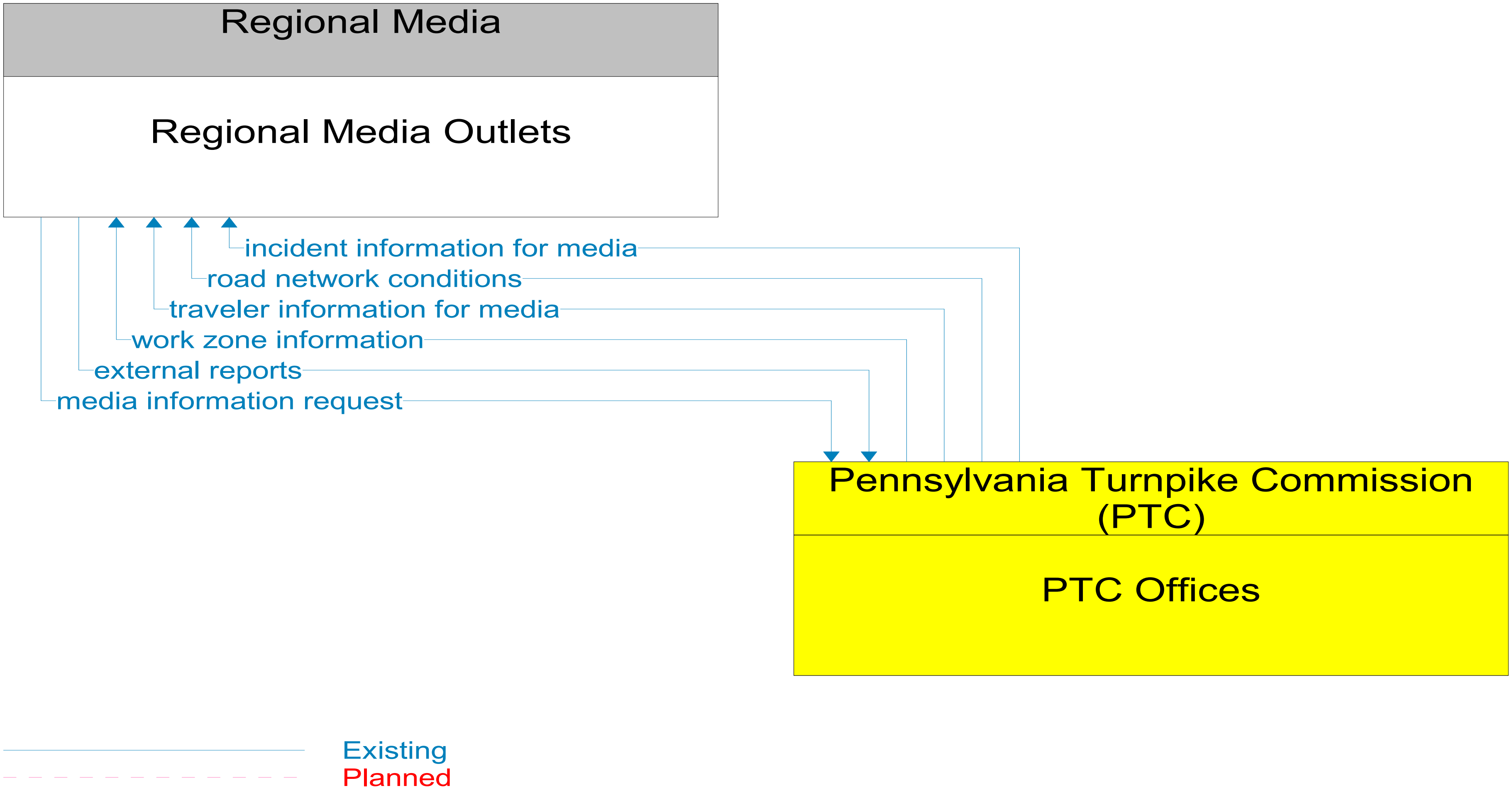
PTC Maintenance and Construction Vehicles

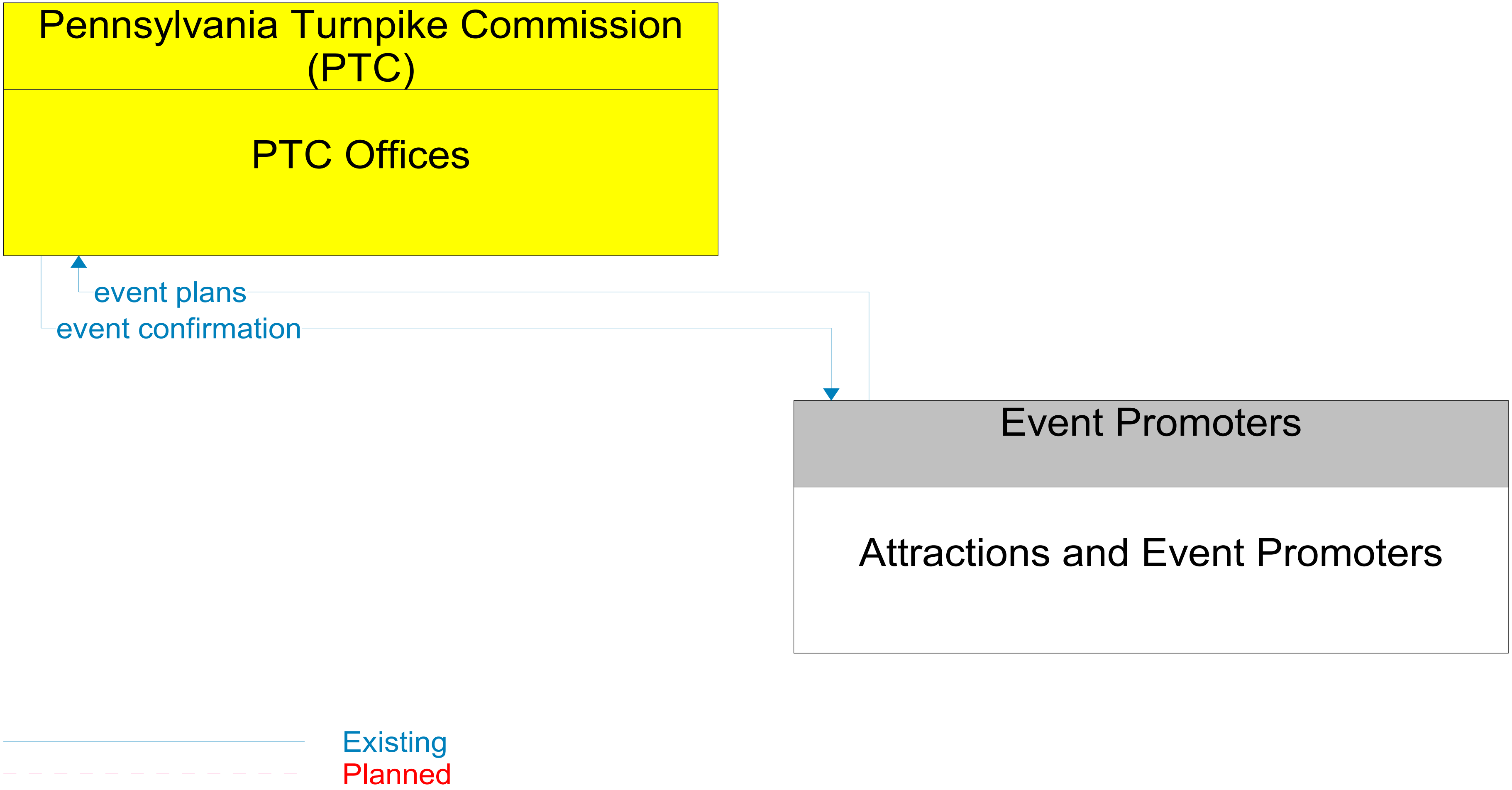
Existing

Planned


Pennsylvania Turnpike Commission (PTC)
PTC Offices
traveler request
broadcast information
traveler information
General Public
Personal Traveler Information Devices
Existing
Planned


Municipalities
Municipal Traffic Management Offices
current asset restrictions
incident information
traffic information coordination
Pennsylvania Turnpike Commission (PTC)
PTC Offices
Existing
Planned


Regional Media
Regional Media Outlets
incident information for media
road network conditions
traveler information for media
work zone information
external reports
media information request
Pennsylvania Turnpike Commission (PTC)
PTC Offices
Existing
Planned



Pennsylvania Turnpike Commission (PTC)

PTC Offices

event plans

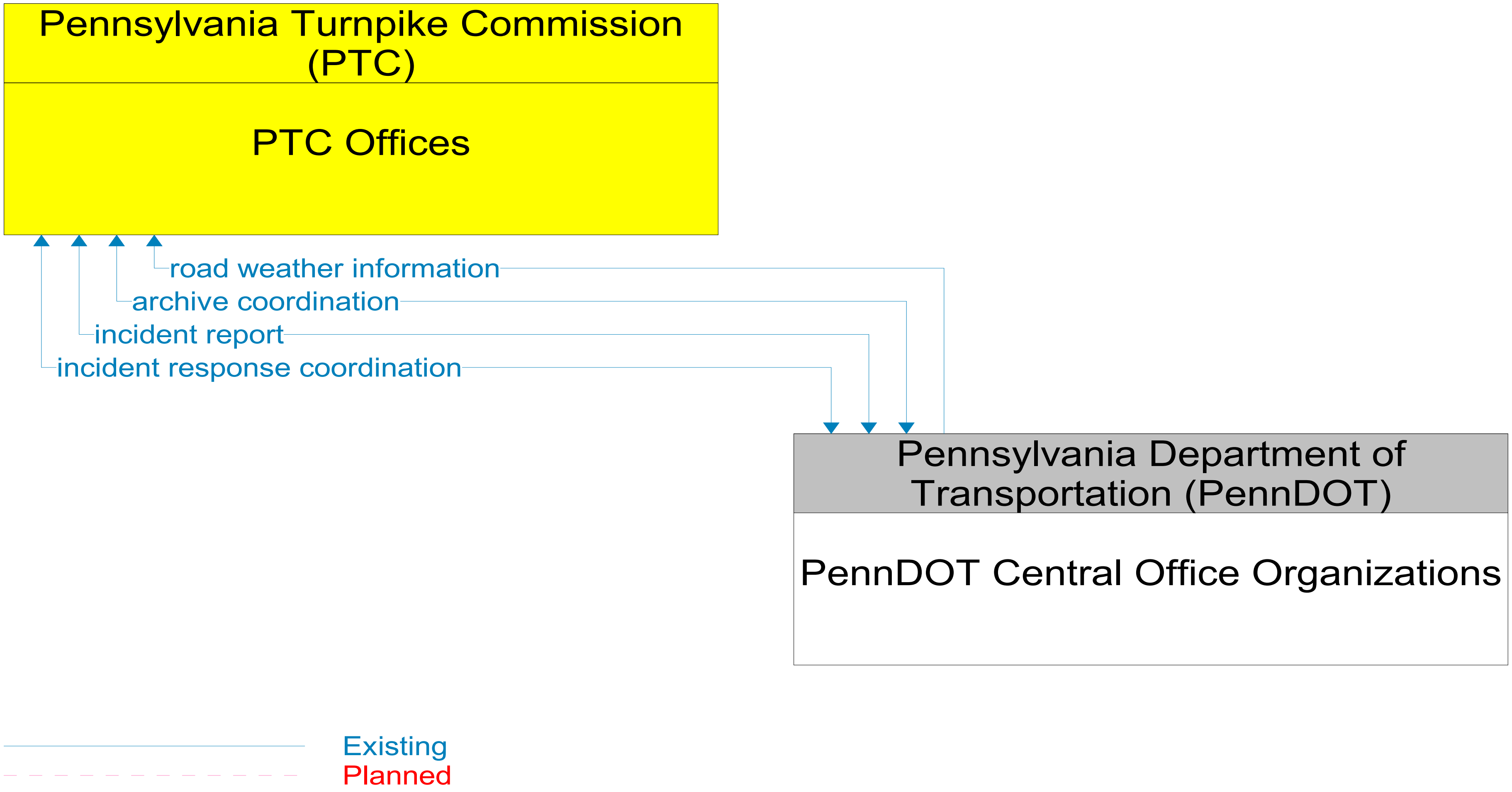
event confirmation

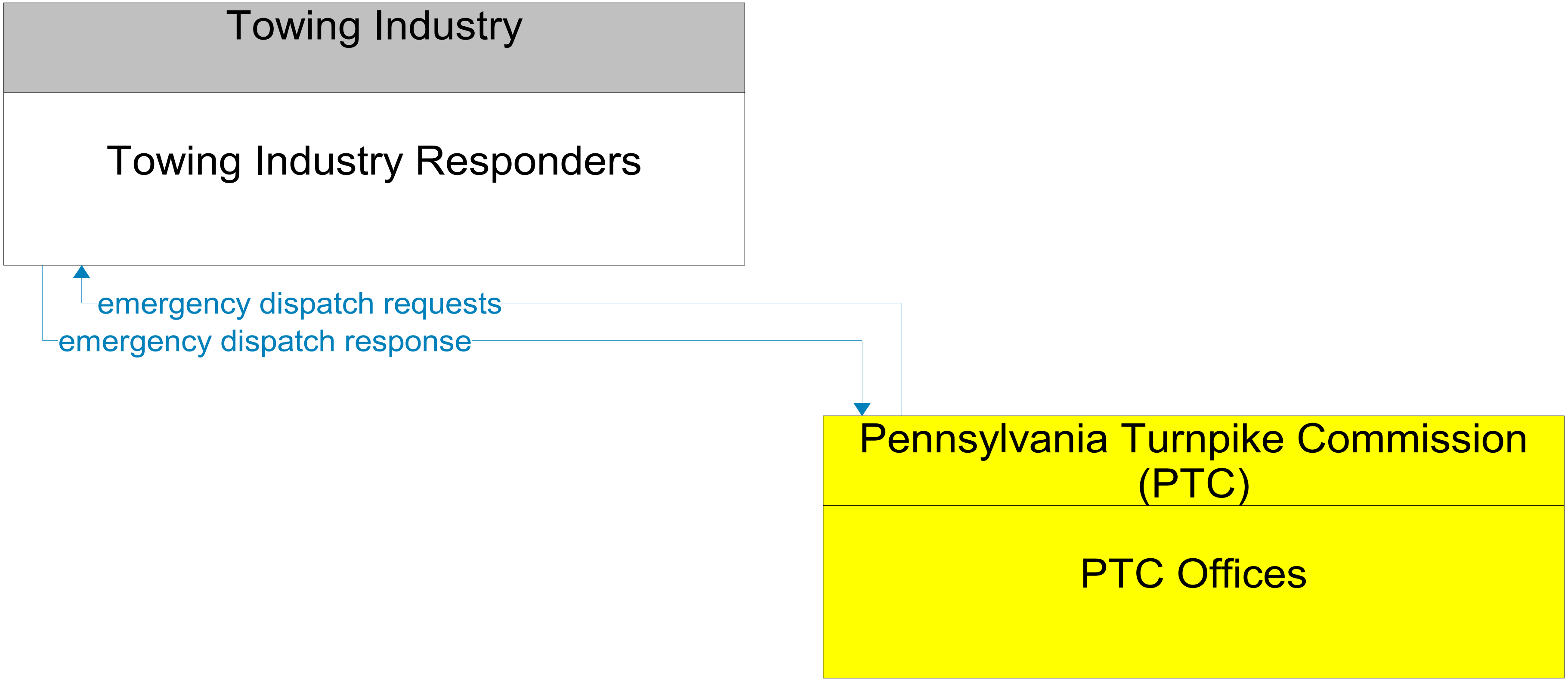
Event Promoters

Attractions and Event Promoters

Existing

Planned


Pennsylvania Turnpike Commission (PTC)
PTC Offices
road weather information
archive coordination
incident report
incident response coordination
Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Organizations
Existing
Planned



Towing Industry

Towing Industry Responders

emergency dispatch requests

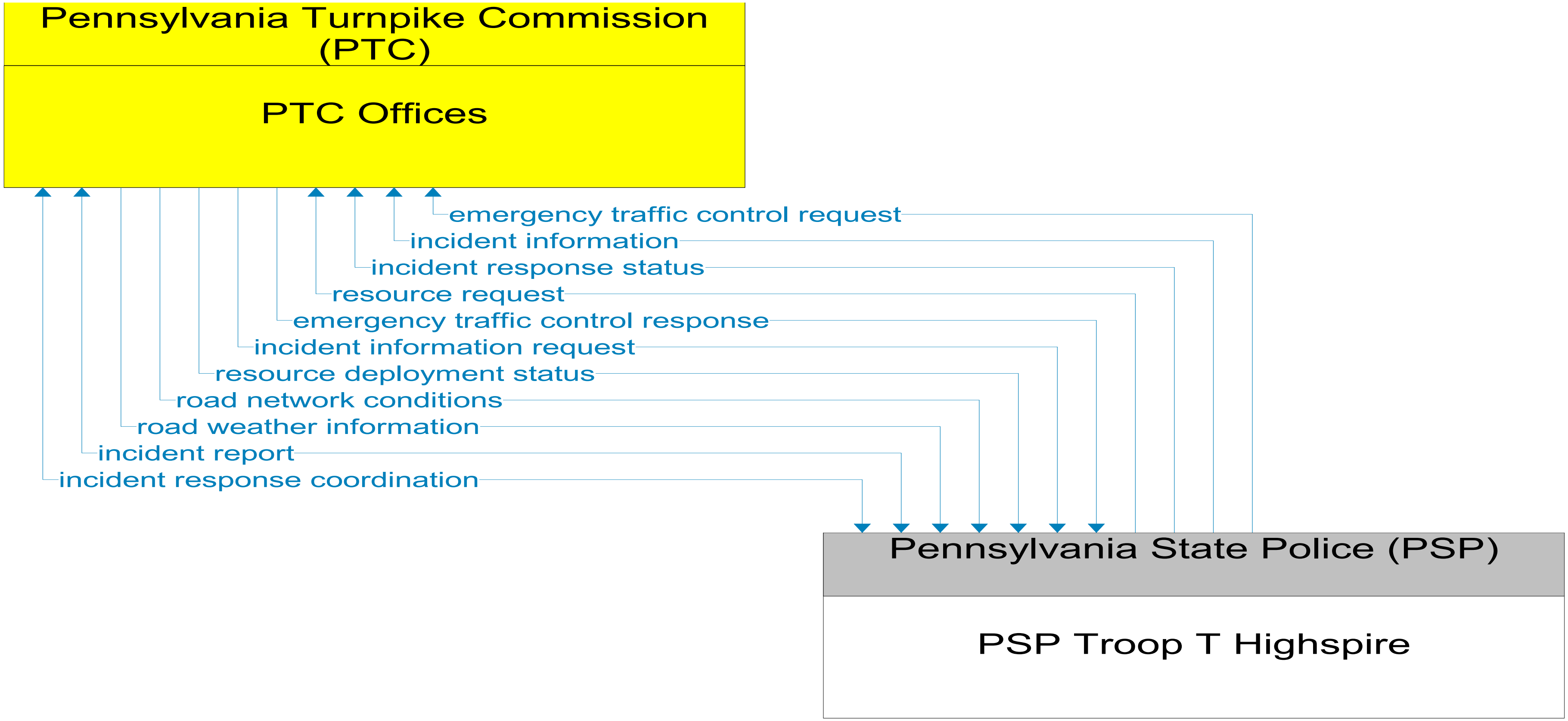
emergency dispatch response

Pennsylvania Turnpike Commission (PTC)

PTC Offices

Existing

Planned


Pennsylvania Turnpike Commission (PTC)

PTC Offices

emergency traffic control request

incident information

incident response status

resource request

emergency traffic control response

incident information request

resource deployment status

road network conditions

road weather information

incident report

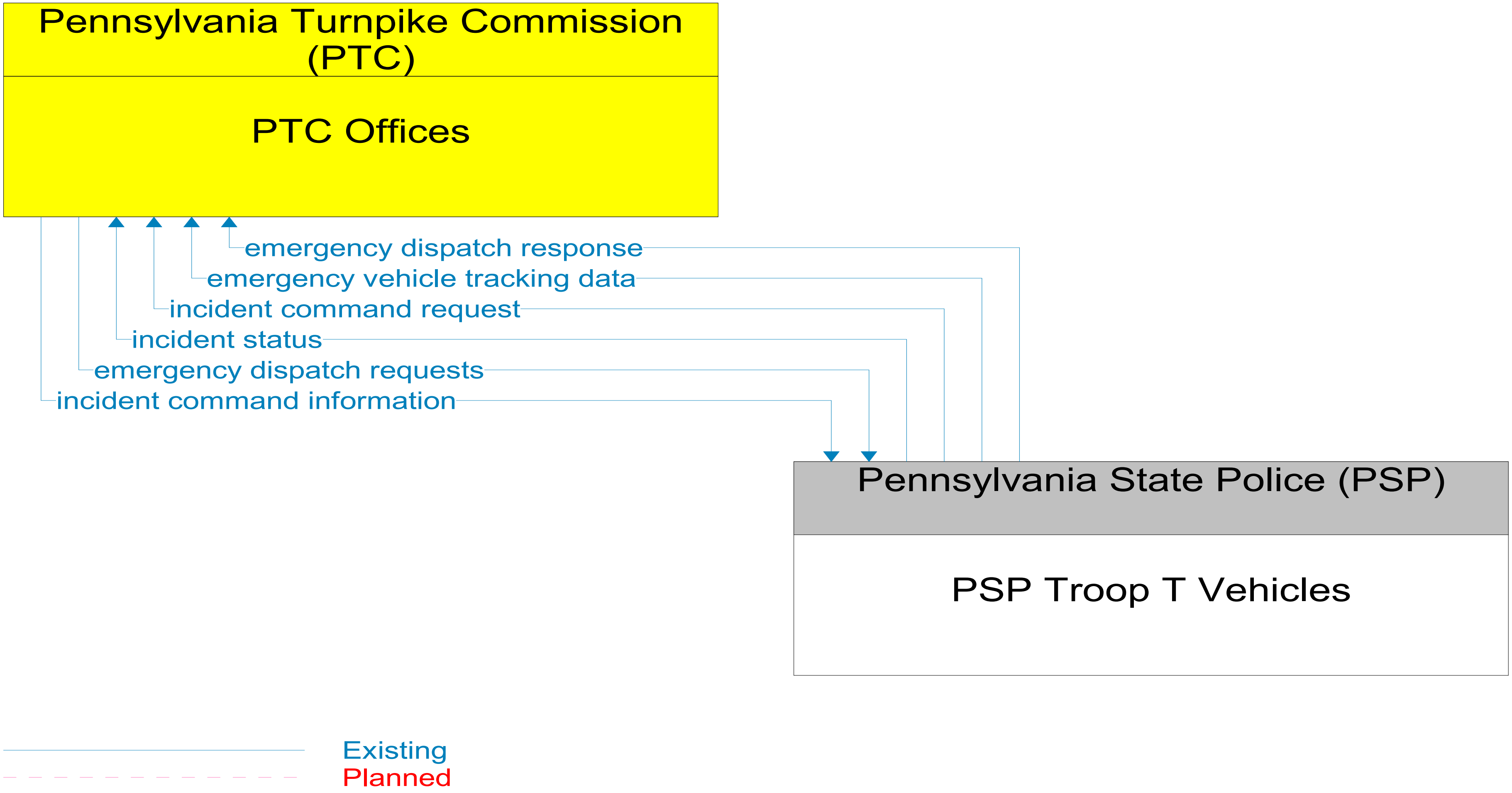
incident response coordination

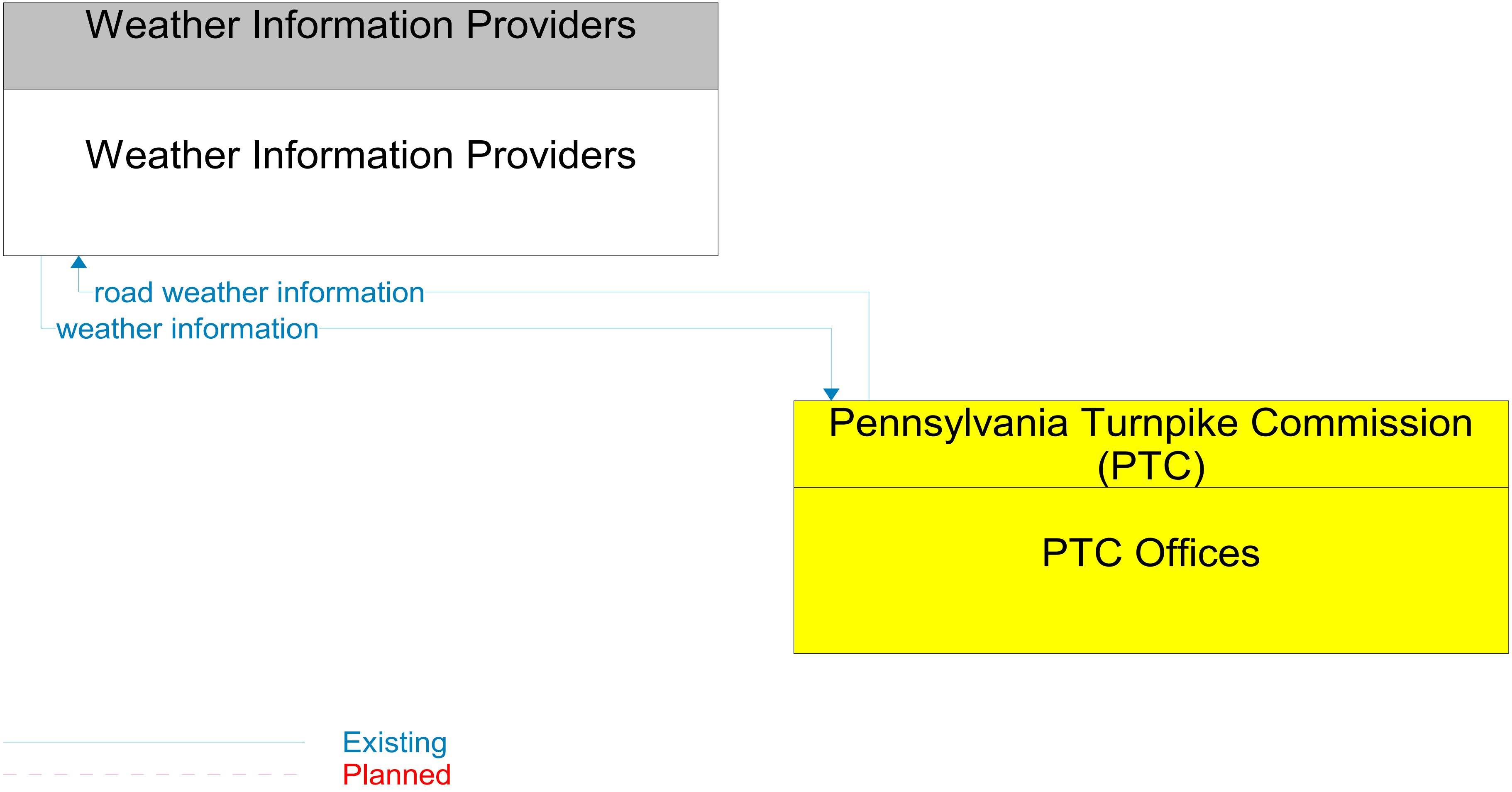
Pennsylvania State Police (PSP)

PSP Troop T Highspire

Existing

Planned


Pennsylvania Turnpike Commission (PTC)
PTC Offices
emergency dispatch response
emergency vehicle tracking data
incident command request
incident status
emergency dispatch requests
incident command information
Pennsylvania State Police (PSP)
PSP Troop T Vehicles
Existing
Planned



Weather Information Providers

Weather Information Providers

road weather information

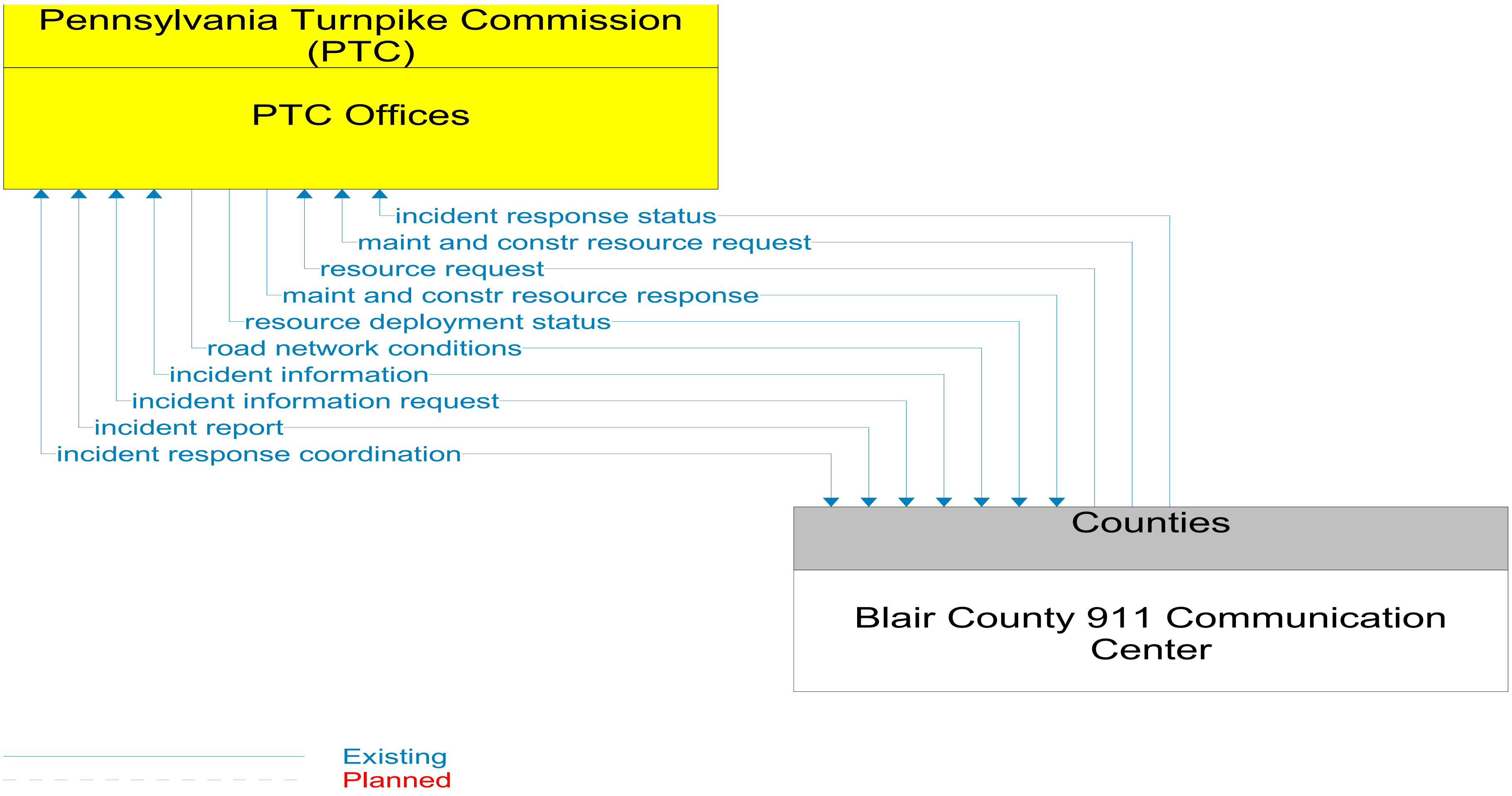
weather information

Pennsylvania Turnpike Commission (PTC)

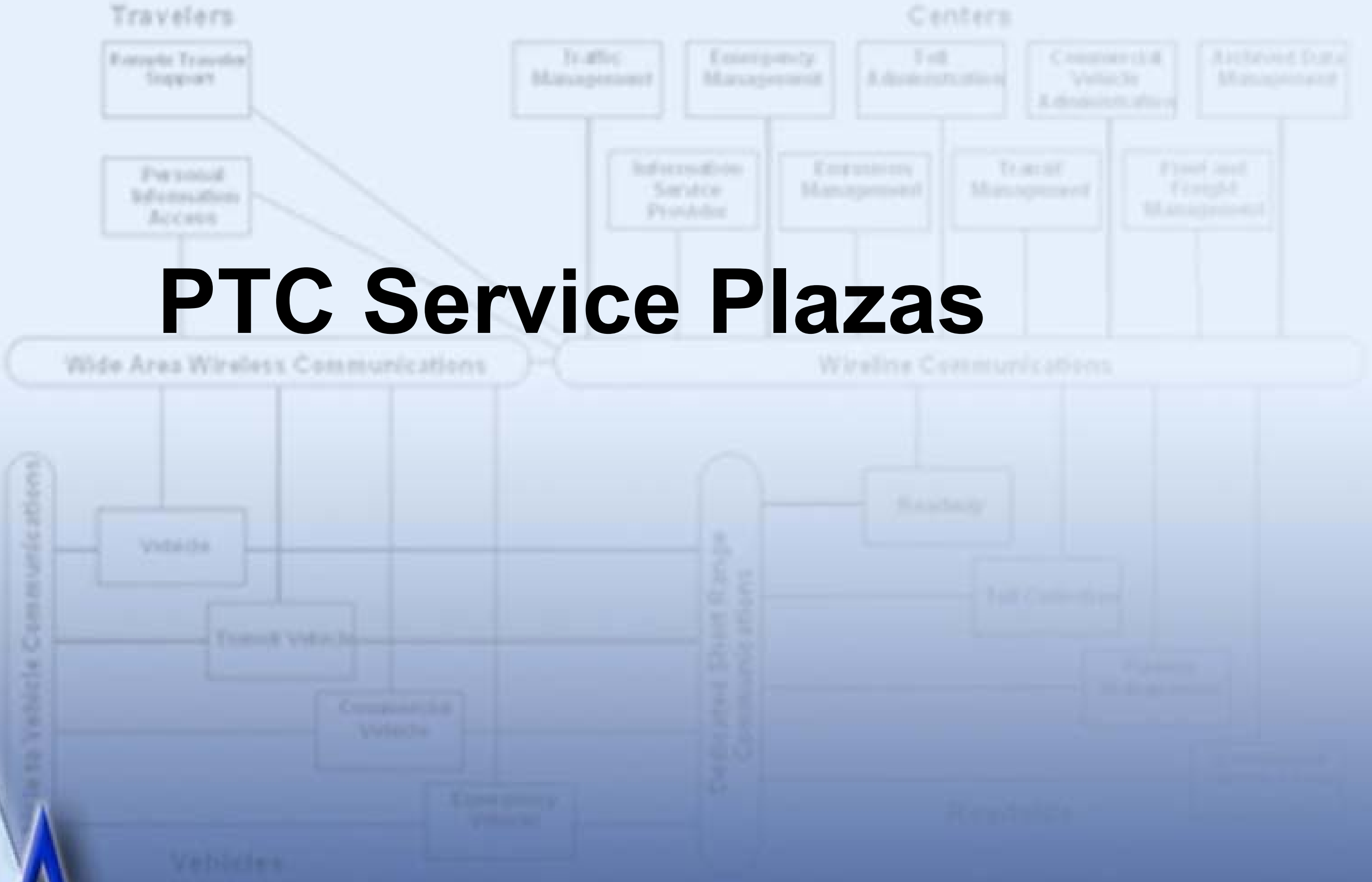
PTC Offices

Existing

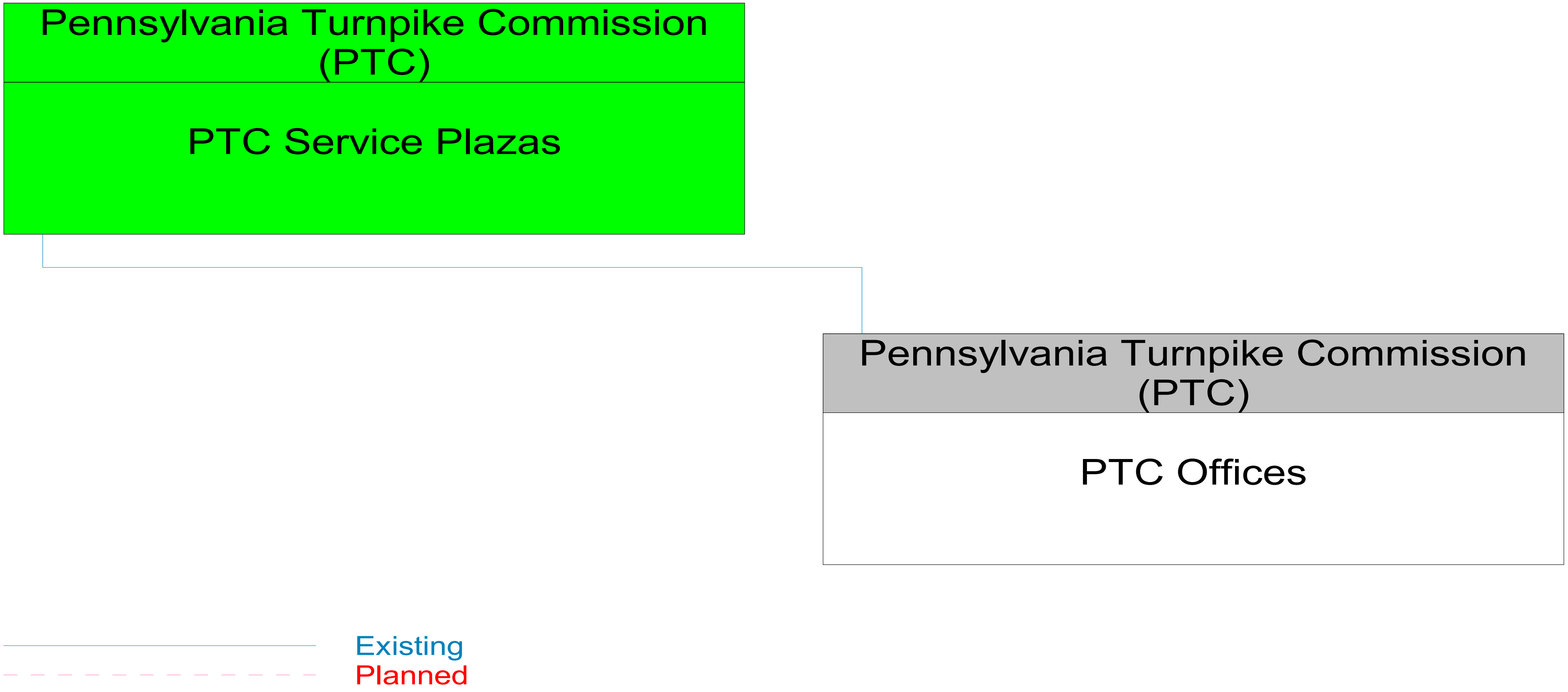
Planned


Pennsylvania Turnpike Commission (PTC)
PTC Offices
incident response status
maint and constr resource request
resource request
maint and constr resource response
resource deployment status
road network conditions
incident information
incident information request
incident report
incident response coordination
Counties
Blair County 911 Communication Center
Existing
Planned

PTC Service Plazas


Travelers
Centers
Wide Area Wireless Communications
Wireline Communications
Vehicles

PTC Service Plazas Interconnect Diagram



Pennsylvania Turnpike Commission (PTC)

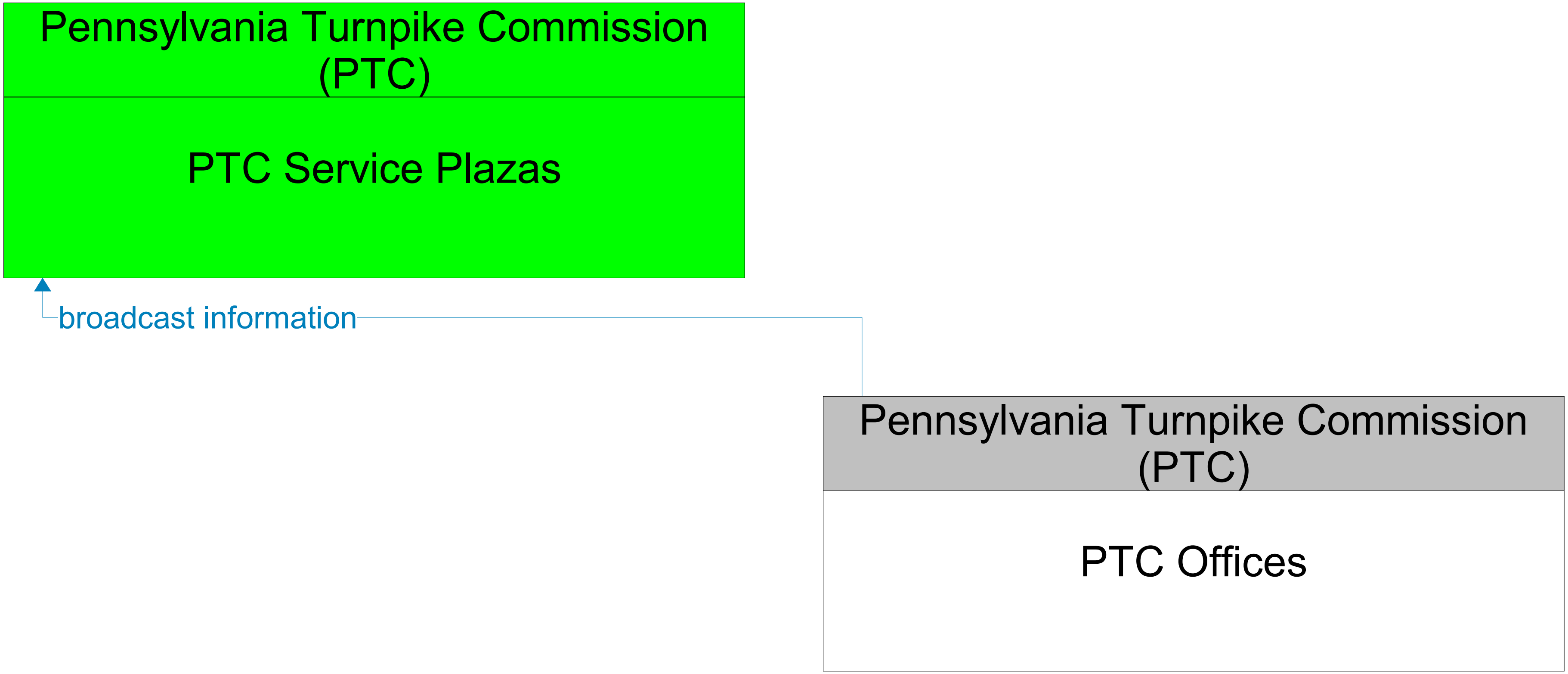
PTC Service Plazas

Pennsylvania Turnpike Commission (PTC)

PTC Offices

Existing

Planned



Pennsylvania Turnpike Commission (PTC)

PTC Service Plazas

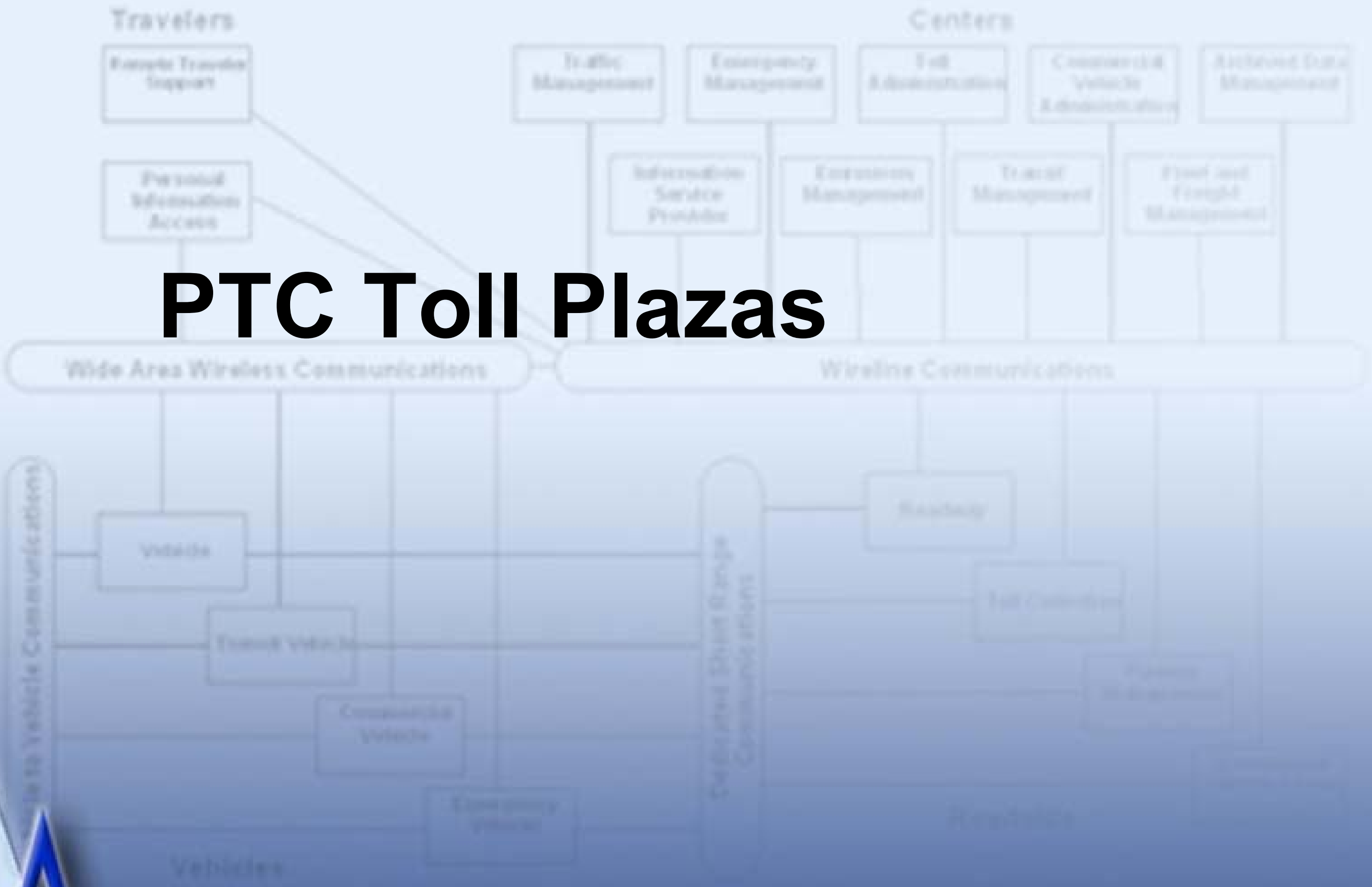
broadcast information

Pennsylvania Turnpike Commission (PTC)

PTC Offices

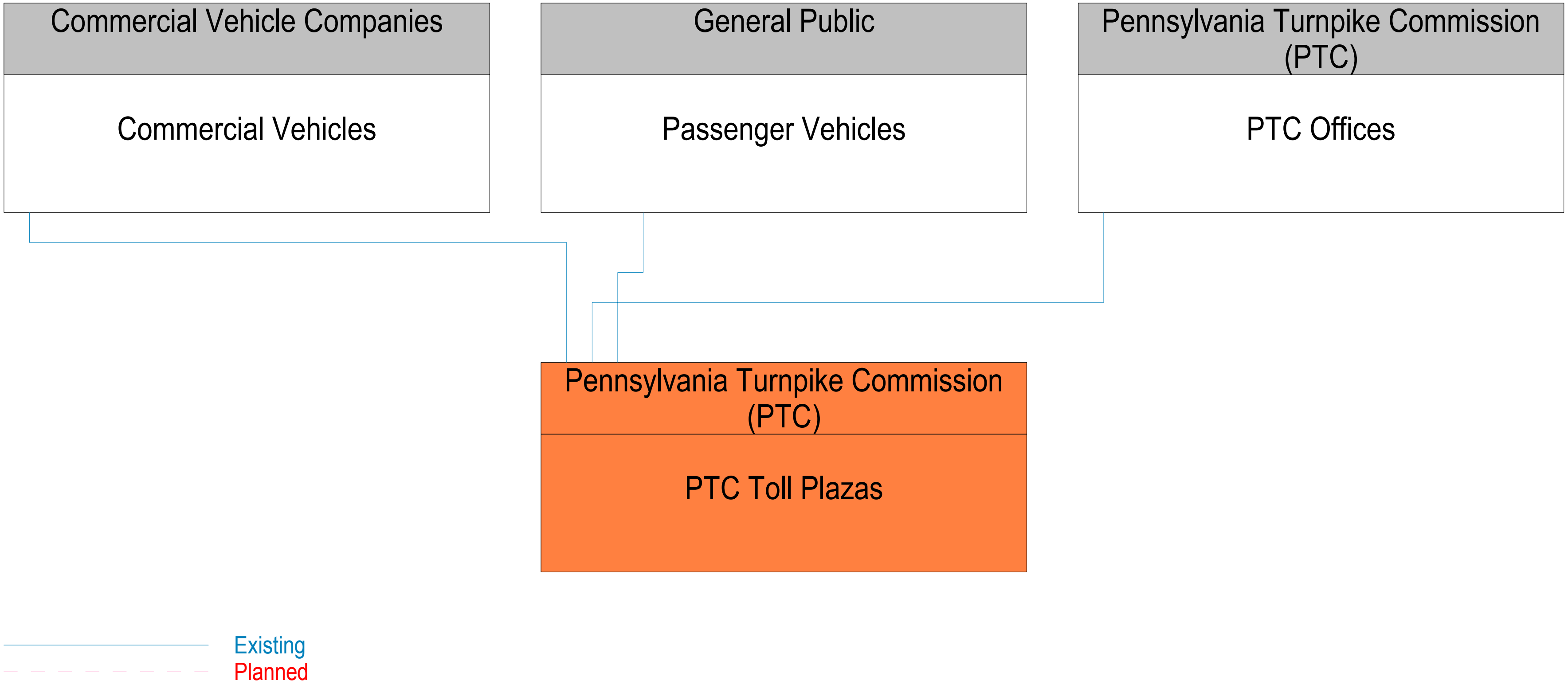
Existing

Planned

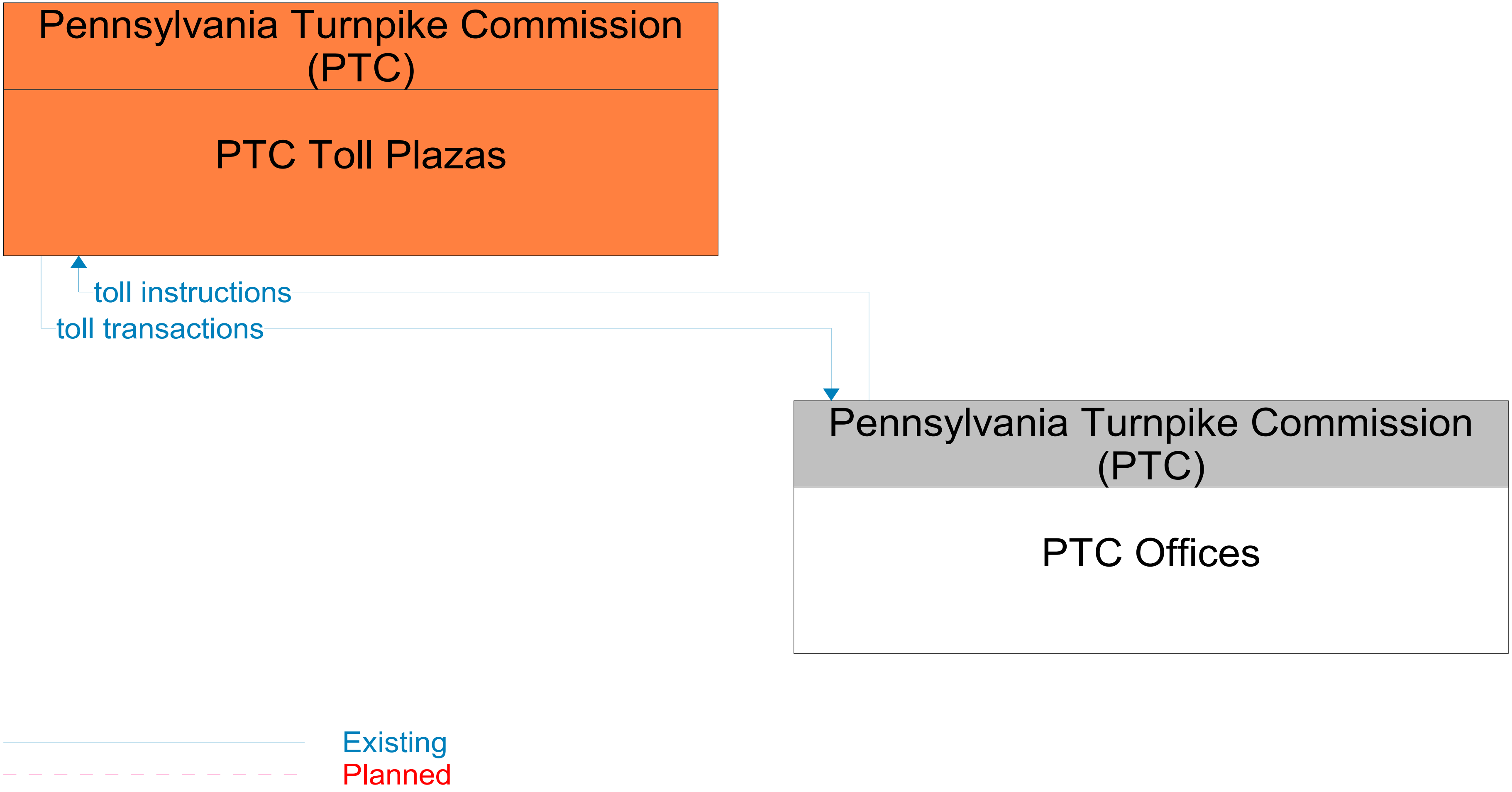

Travelers
Remote Traveler Support
Personal Information Access
Centers
Traffic Management
Emergency Management
Toll Administration
Commercial Vehicle Administration
Archived Data Management
Information Service Provider
Emissions Management
Transit Management
Fleet and Freight Management
Wide Area Wireless Communications
Wireline Communications
Vehicle to Vehicle Communications
Vehicle
Transit Vehicle
Commercial Vehicle
Emergency Vehicle
Vehicles
Dedicated Short Range Communications
Roadway
Toll Collection
Parking Management
Roadside

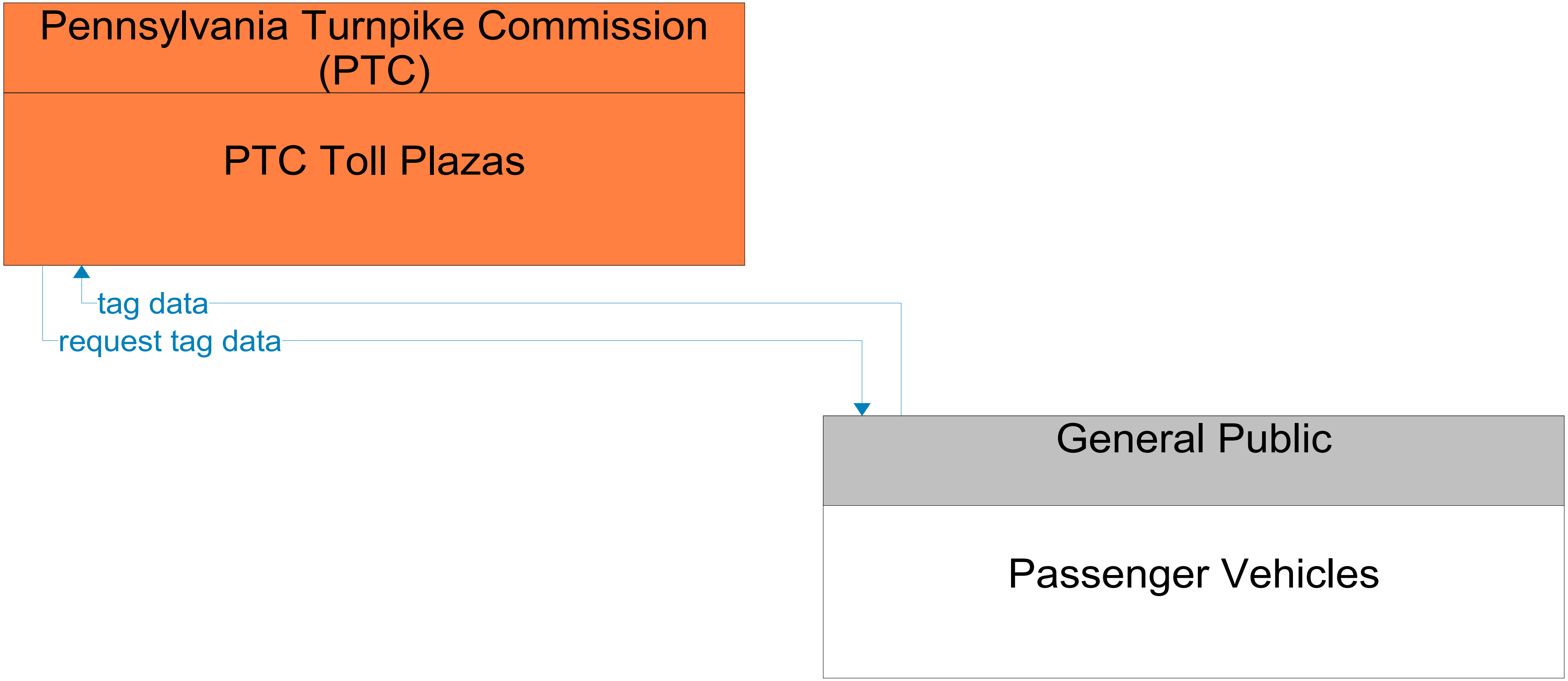
PTC Toll Plazas

PTC Toll Plazas Interconnect Diagram



Commercial Vehicle Companies
Commercial Vehicles
General Public
Passenger Vehicles
Pennsylvania Turnpike Commission (PTC)
PTC Offices
Pennsylvania Turnpike Commission (PTC)
PTC Toll Plazas
Existing
Planned


Pennsylvania Turnpike Commission (PTC)
PTC Toll Plazas
toll instructions
toll transactions
Pennsylvania Turnpike Commission (PTC)
PTC Offices
Existing
Planned



Pennsylvania Turnpike Commission (PTC)

PTC Toll Plazas

tag data

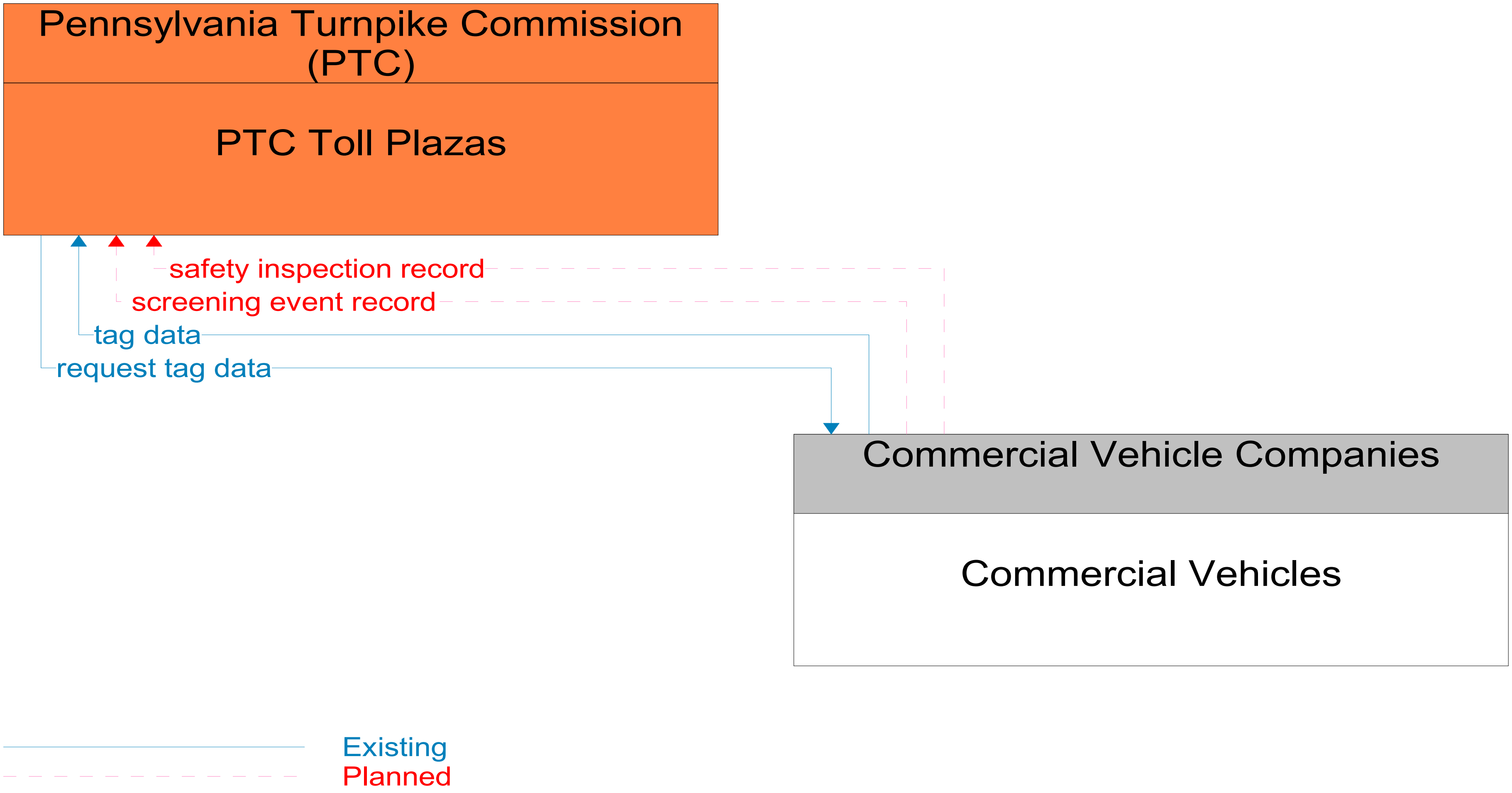
request tag data

General Public

Passenger Vehicles

Existing

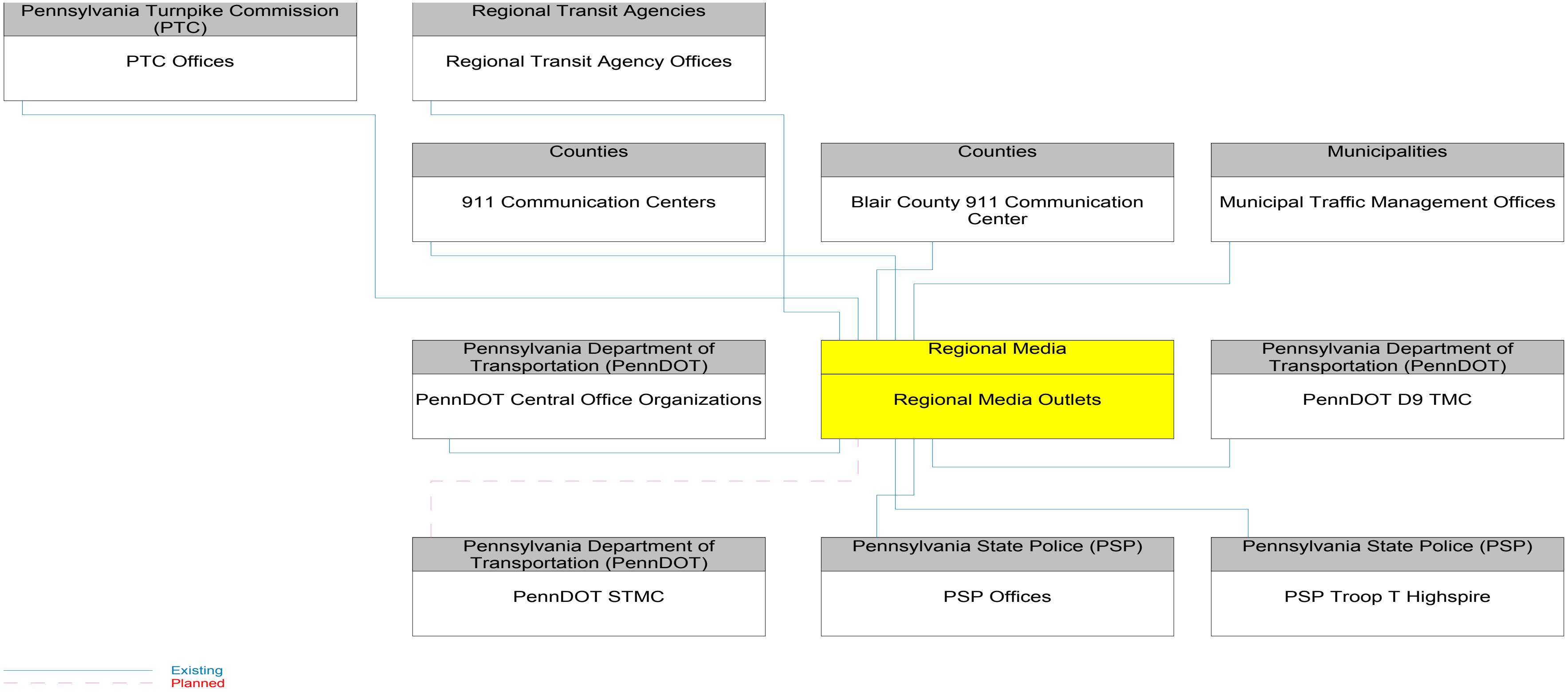
Planned


Pennsylvania Turnpike Commission (PTC)
PTC Toll Plazas
safety inspection record
screening event record
tag data
request tag data
Commercial Vehicle Companies
Commercial Vehicles
Existing
Planned

Travelers
Remote Traveler Support
Personal Information Access
Centers
Traffic Management
Emergency Management
Toll Administration
Commercial Vehicle Administration
Archived Data Management
Information Service Provider
Emissions Management
Transit Management
Fleet and Freight Management
Wide Area Wireless Communications
Wireline Communications
Vehicle to Vehicle Communications
Dedicated Short Range Communications
Vehicle
Transit Vehicle
Commercial Vehicle
Emergency Vehicle
Vehicles
Roadway
Toll Collection
Parking Management
Roadside

Regional Media Outlets

Regional Media Outlets Interconnect Diagram



Pennsylvania Turnpike Commission (PTC)
PTC Offices

Regional Transit Agencies
Regional Transit Agency Offices

Counties
911 Communication Centers

Counties
Blair County 911 Communication Center

Municipalities
Municipal Traffic Management Offices

Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Organizations

Regional Media
Regional Media Outlets

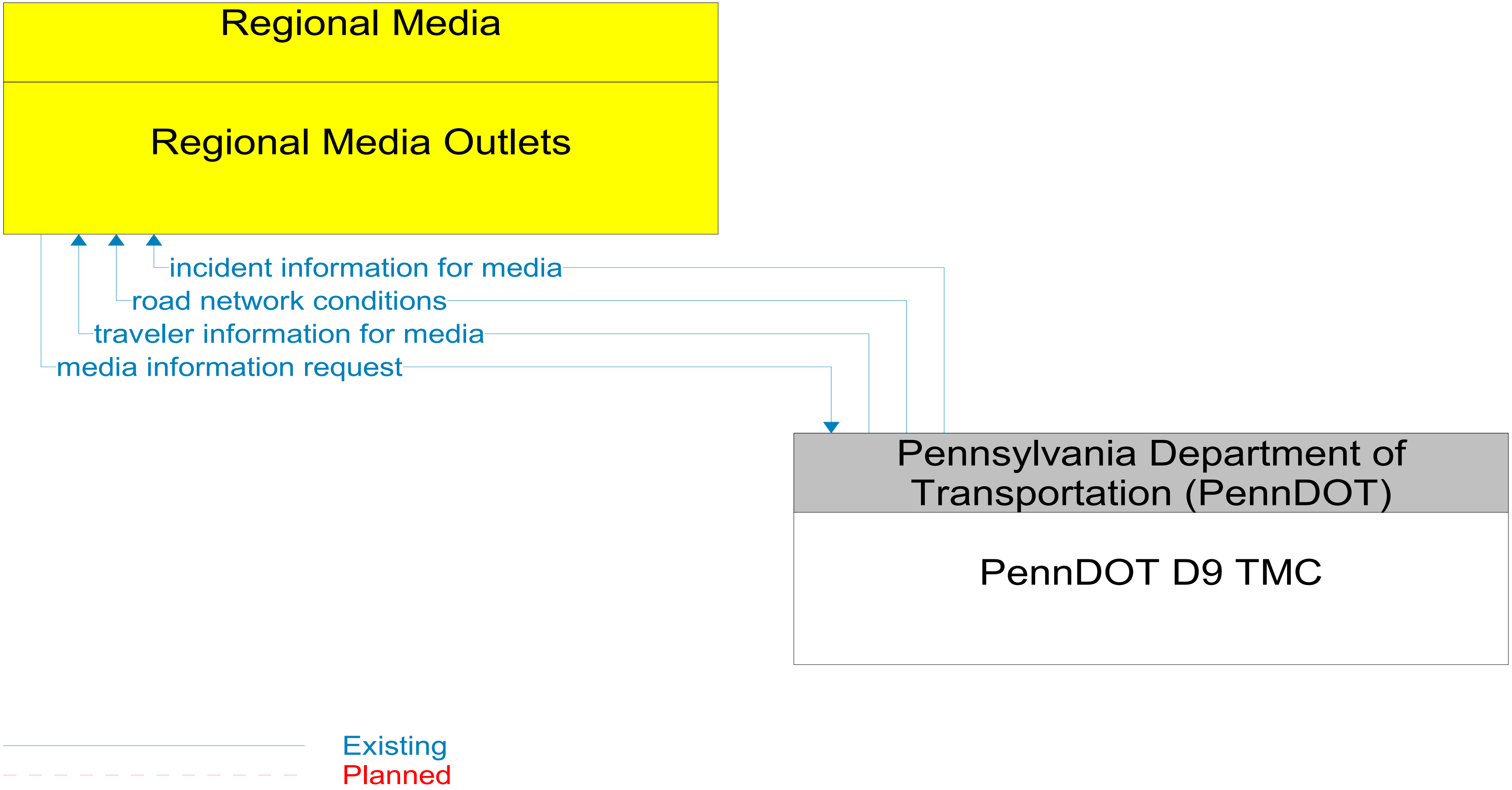
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC

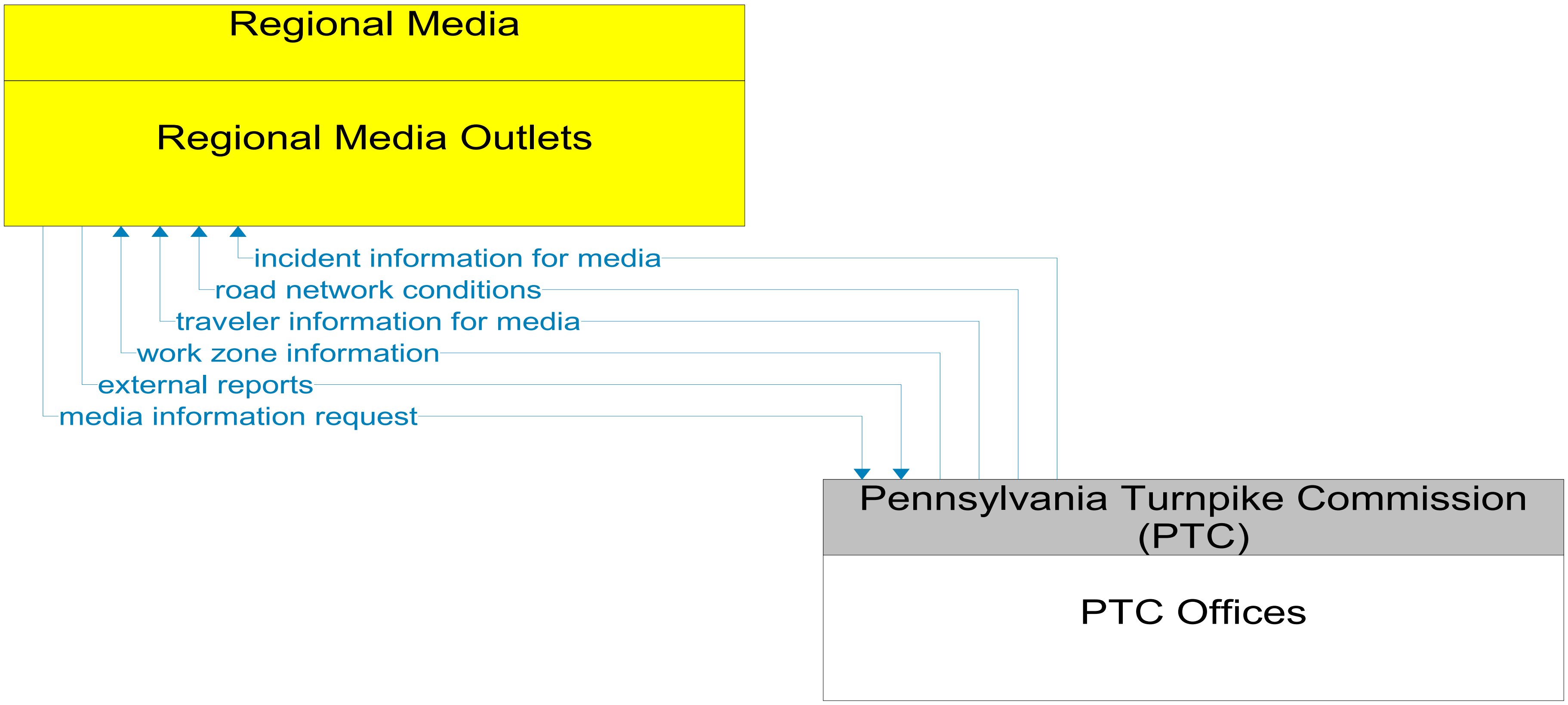
Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC

Pennsylvania State Police (PSP)
PSP Offices

Pennsylvania State Police (PSP)
PSP Troop T Highspire

Existing
Planned


Regional Media
Regional Media Outlets
incident information for media
road network conditions
traveler information for media
media information request
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
Existing
Planned



Regional Media

Regional Media Outlets

- incident information for media
- road network conditions
- traveler information for media
- work zone information
- external reports
- media information request

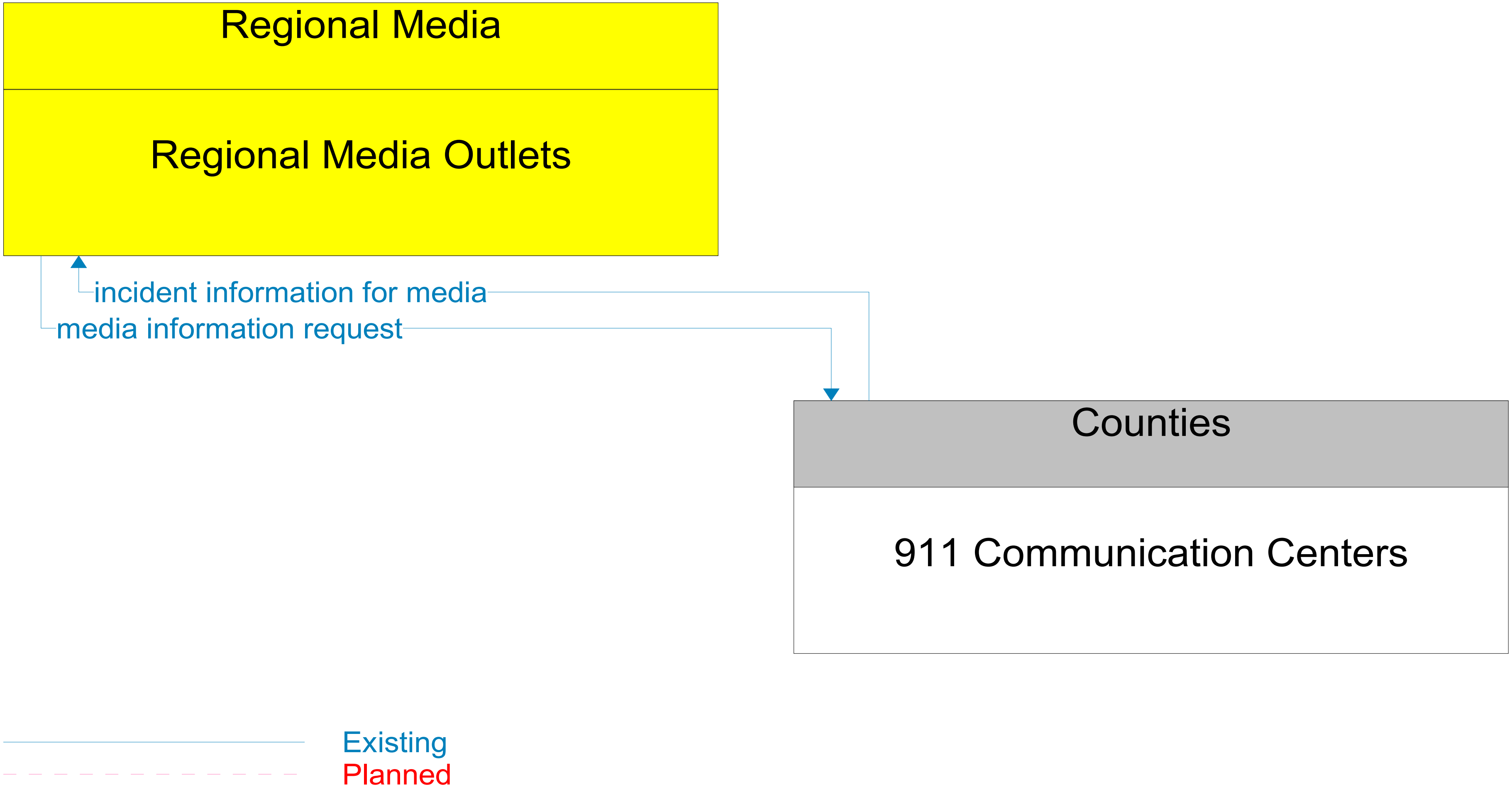
Pennsylvania Turnpike Commission (PTC)

PTC Offices

Existing

Planned

500



Regional Media

Regional Media Outlets

incident information for media

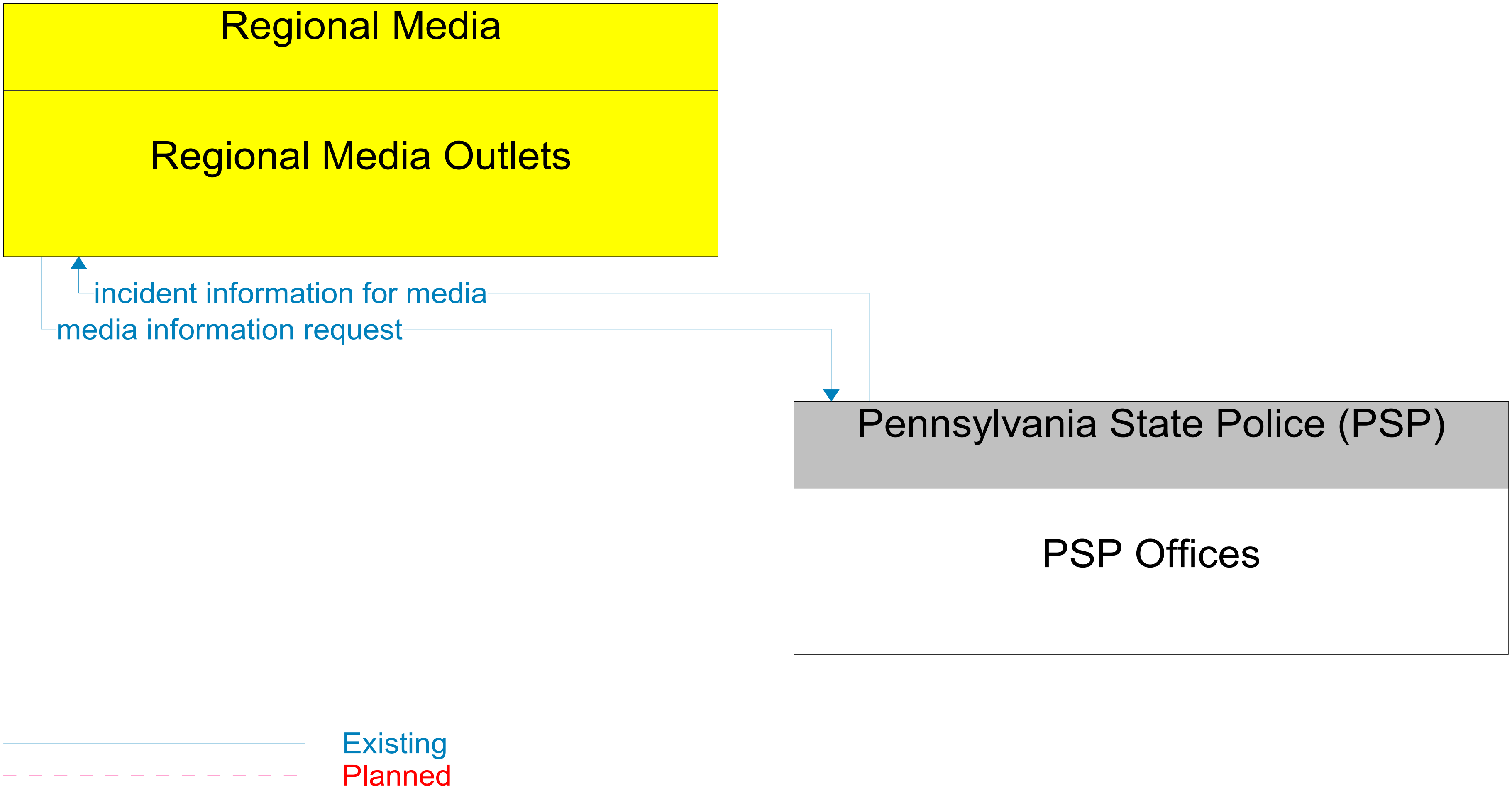
media information request

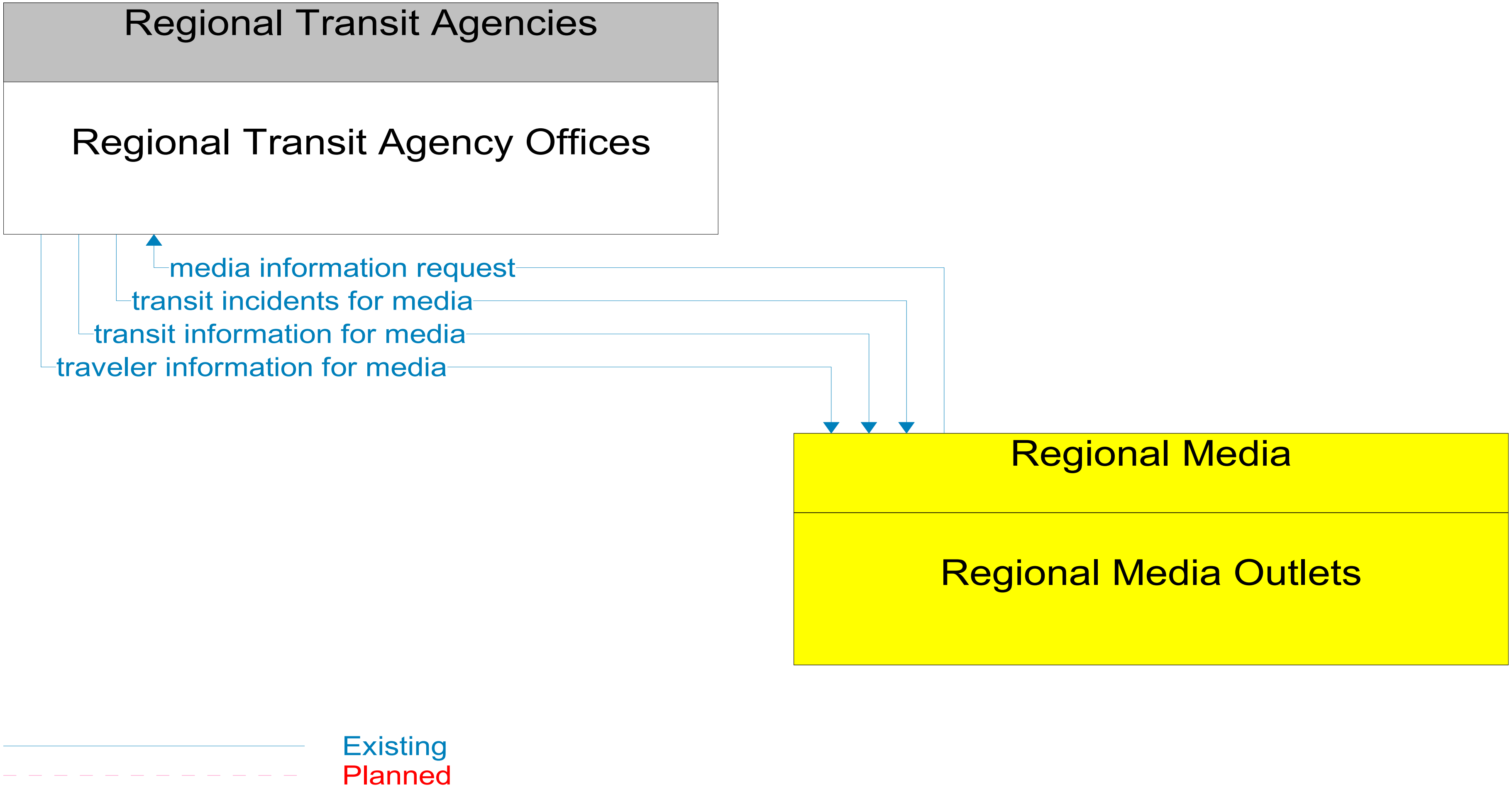
Counties

911 Communication Centers

Existing

Planned

Regional Media
Regional Media Outlets
incident information for media
media information request
Pennsylvania State Police (PSP)
PSP Offices
Existing
Planned



Regional Transit Agencies

Regional Transit Agency Offices

media information request

transit incidents for media

transit information for media

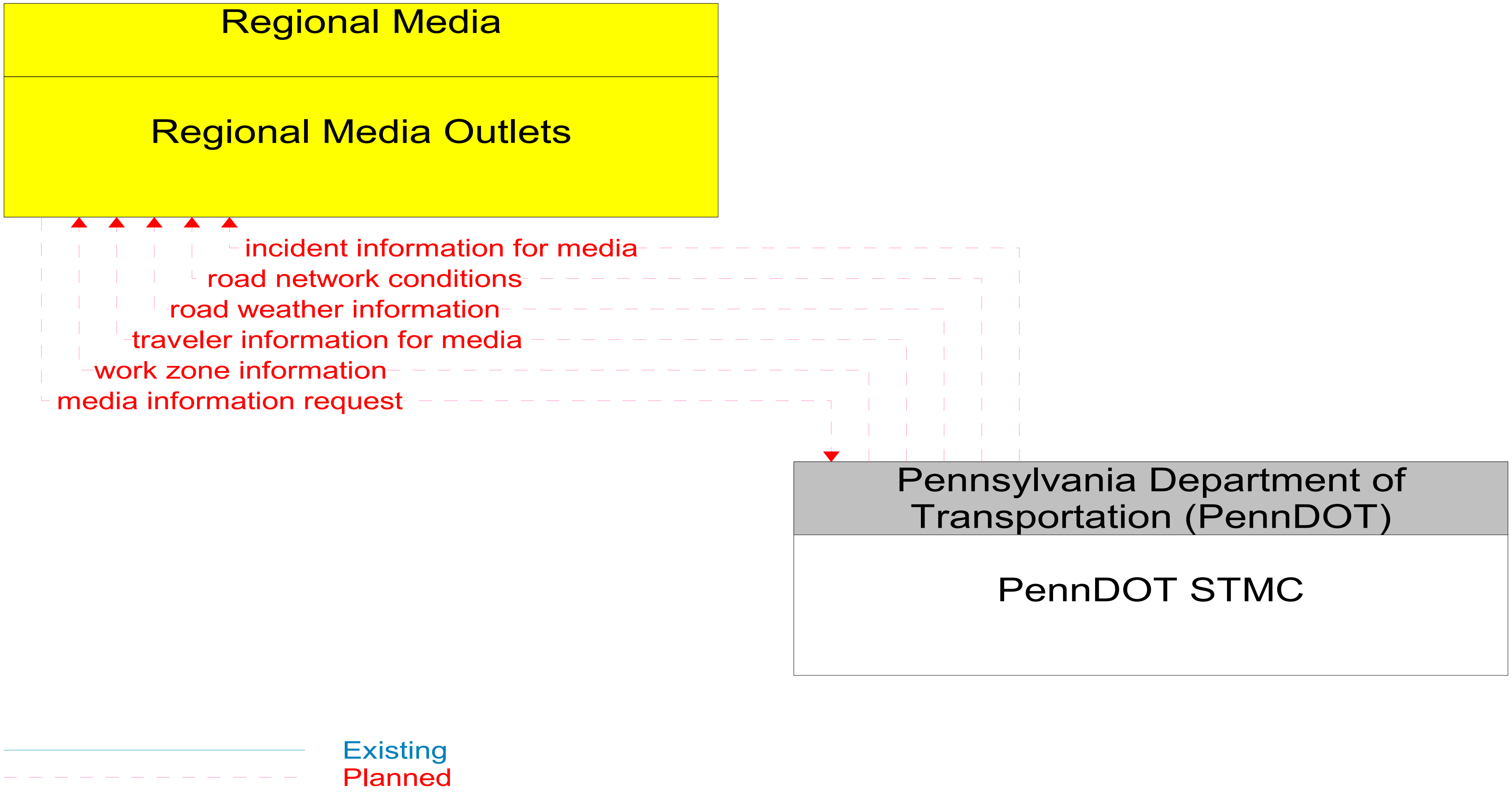
traveler information for media

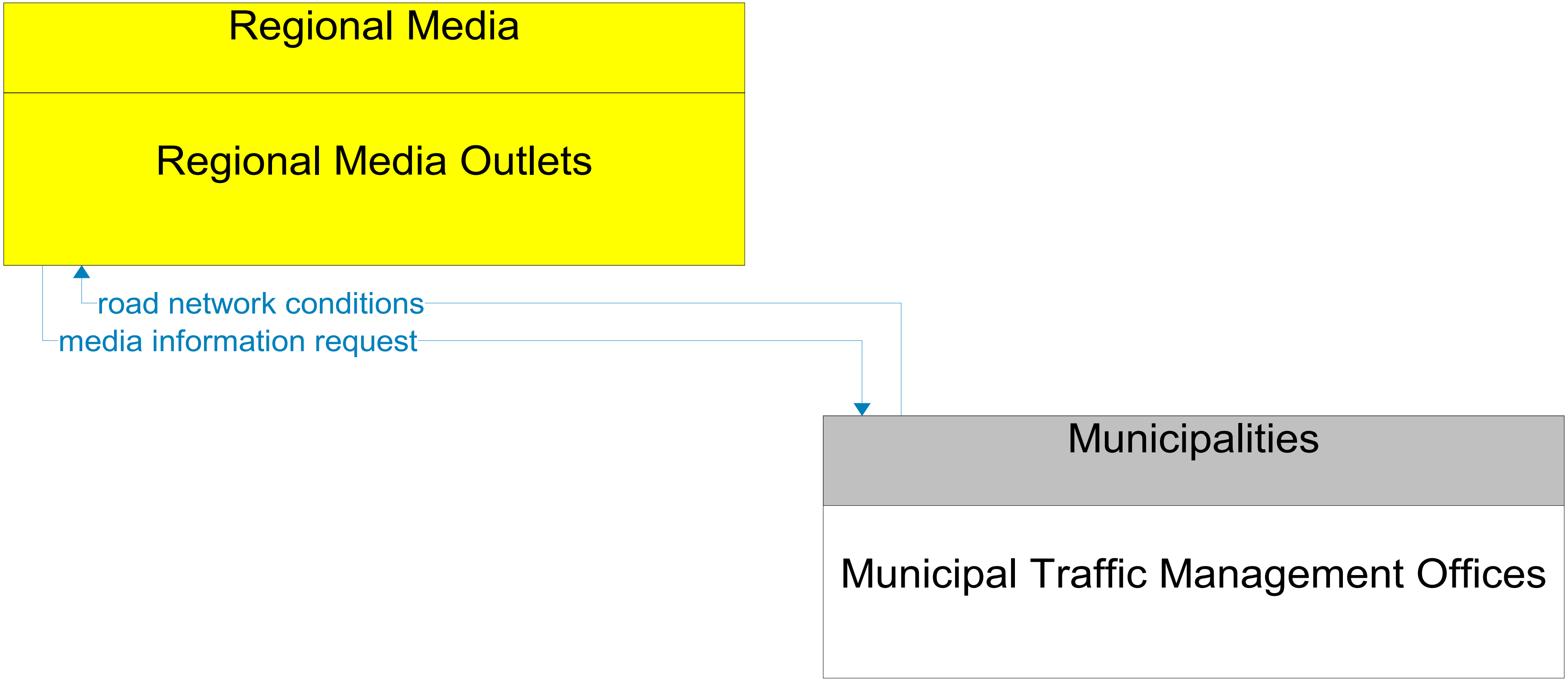
Regional Media

Regional Media Outlets

Existing

Planned


Regional Media
Regional Media Outlets
incident information for media
road network conditions
road weather information
traveler information for media
work zone information
media information request
Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC
Existing
Planned



Regional Media

Regional Media Outlets

road network conditions

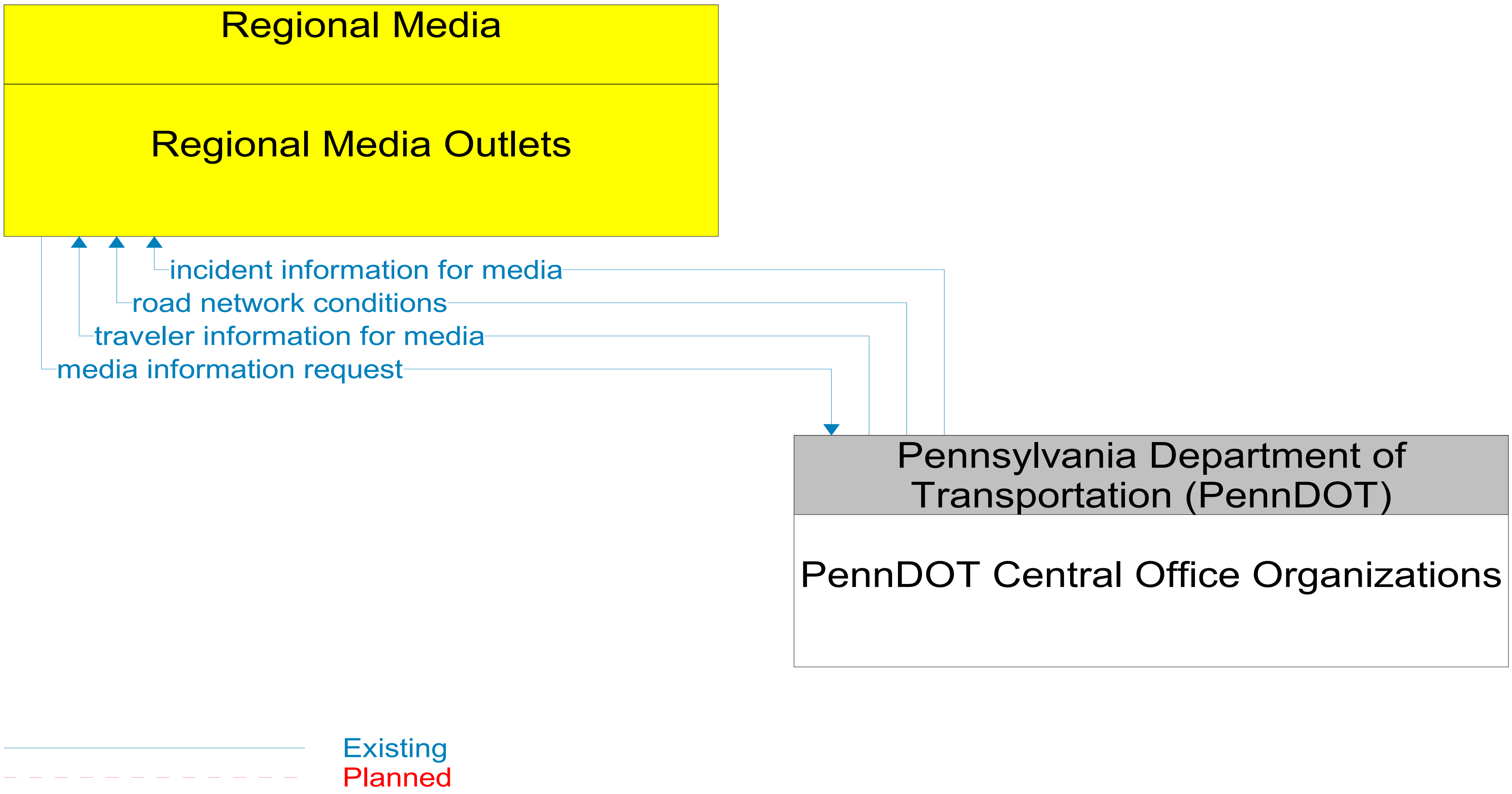
media information request

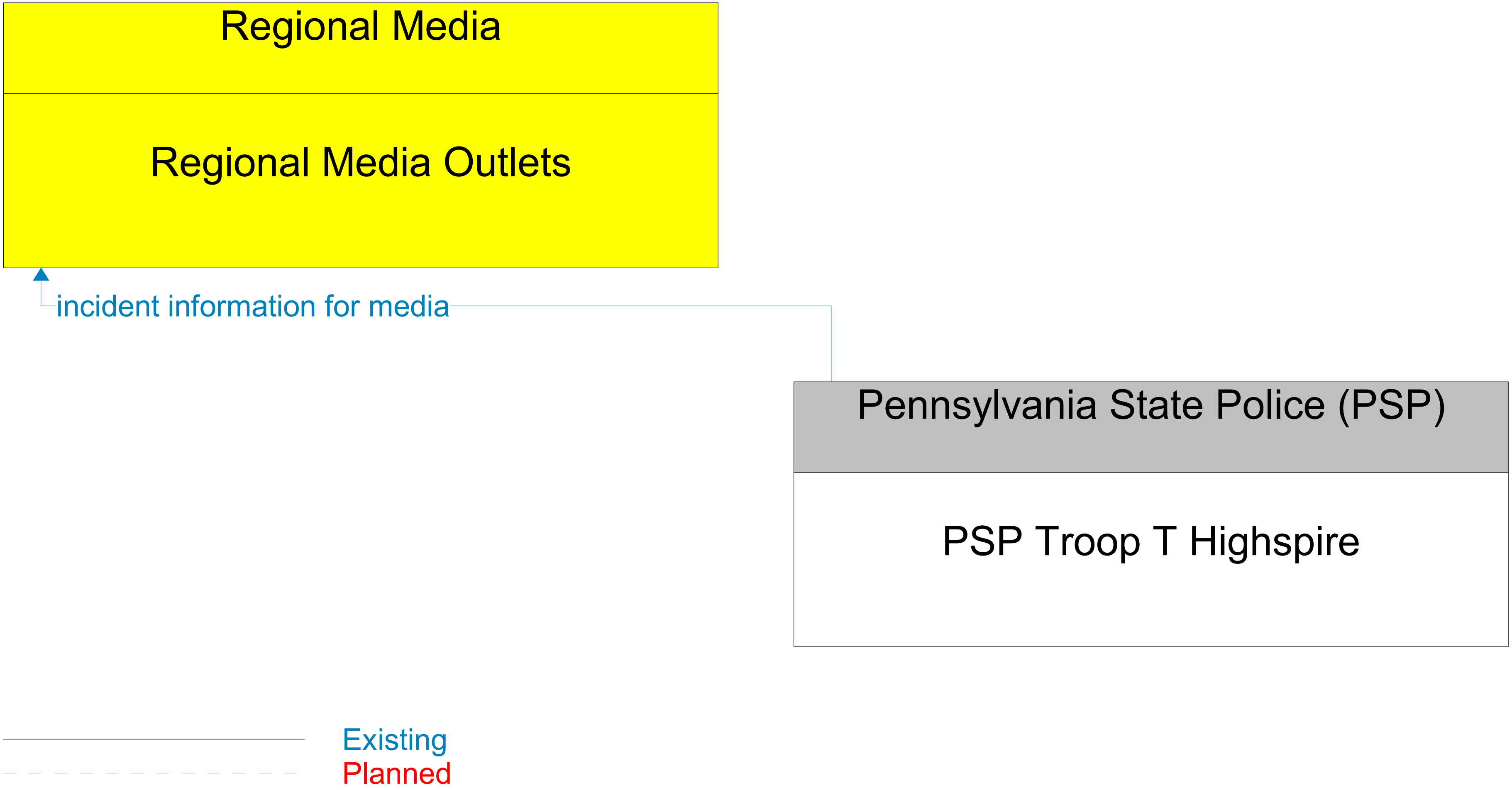
Municipalities

Municipal Traffic Management Offices

Existing

Planned


Regional Media
Regional Media Outlets
incident information for media
road network conditions
traveler information for media
media information request
Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Organizations
Existing
Planned



Regional Media

Regional Media Outlets

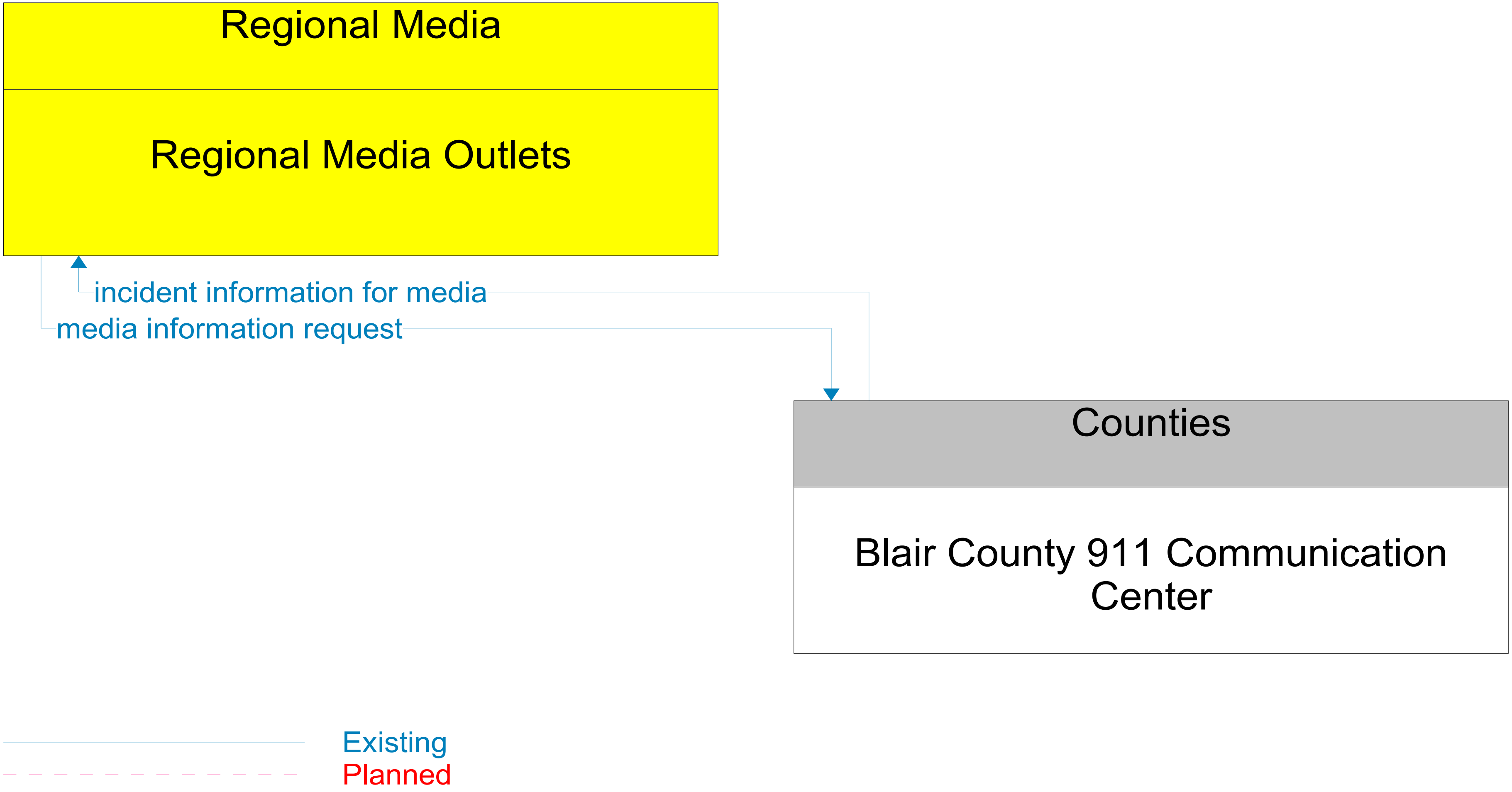
incident information for media

Pennsylvania State Police (PSP)

PSP Troop T Highspire

Existing

Planned



Regional Media

Regional Media Outlets

incident information for media

media information request

Counties

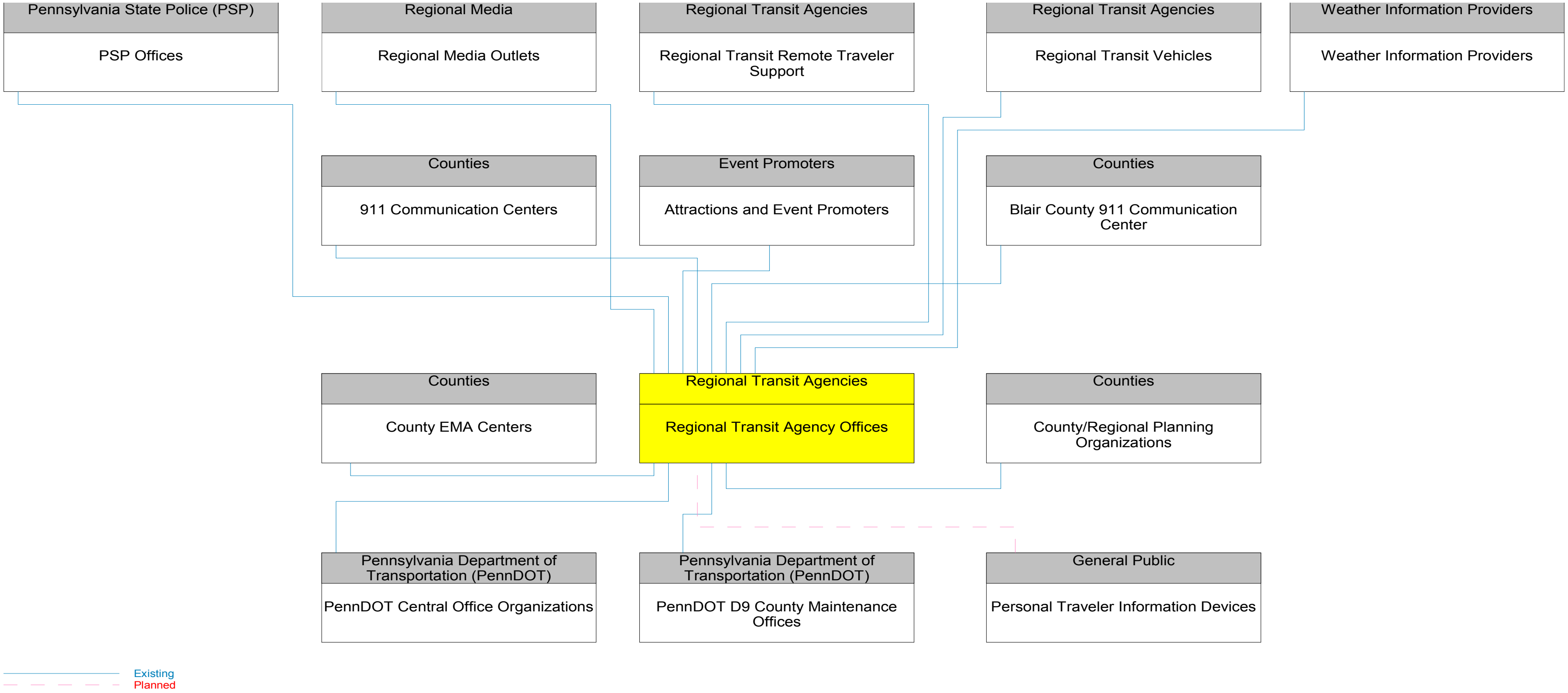
Blair County 911 Communication Center

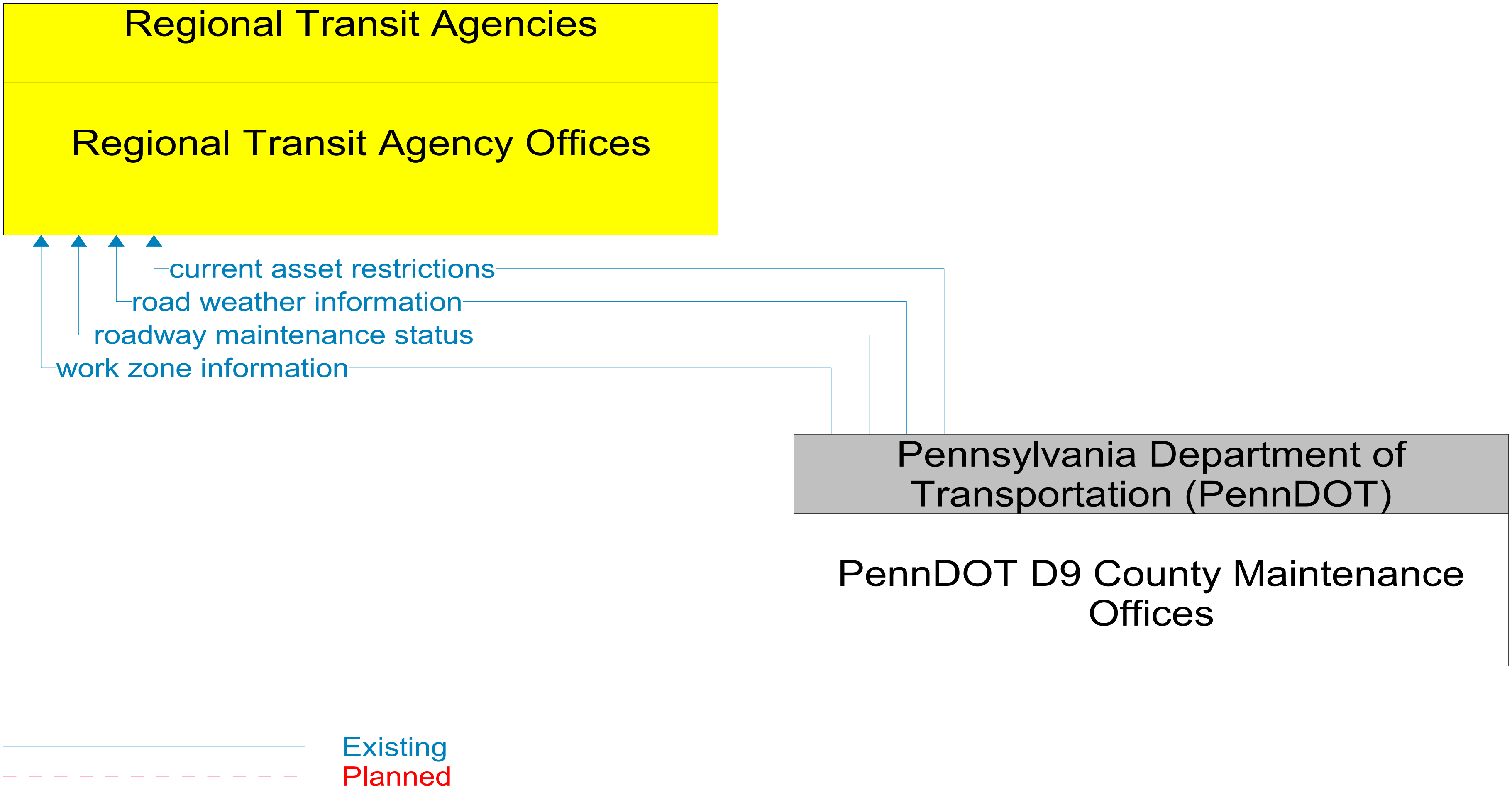
Existing

Planned

Regional Transit Agency Offices

Regional Transit Agency Offices Interconnect Diagram


Pennsylvania State Police (PSP)
PSP Offices
Regional Media
Regional Media Outlets
Regional Transit Agencies
Regional Transit Remote Traveler Support
Regional Transit Agencies
Regional Transit Vehicles
Weather Information Providers
Weather Information Providers
Counties
911 Communication Centers
Event Promoters
Attractions and Event Promoters
Counties
Blair County 911 Communication Center
Counties
County EMA Centers
Regional Transit Agencies
Regional Transit Agency Offices
Counties
County/Regional Planning Organizations
Pennsylvania Department of Transportation (PennDOT)
PennDOT Central Office Organizations
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 County Maintenance Offices
General Public
Personal Traveler Information Devices
Existing
Planned



Regional Transit Agencies

Regional Transit Agency Offices

current asset restrictions

road weather information

roadway maintenance status

work zone information

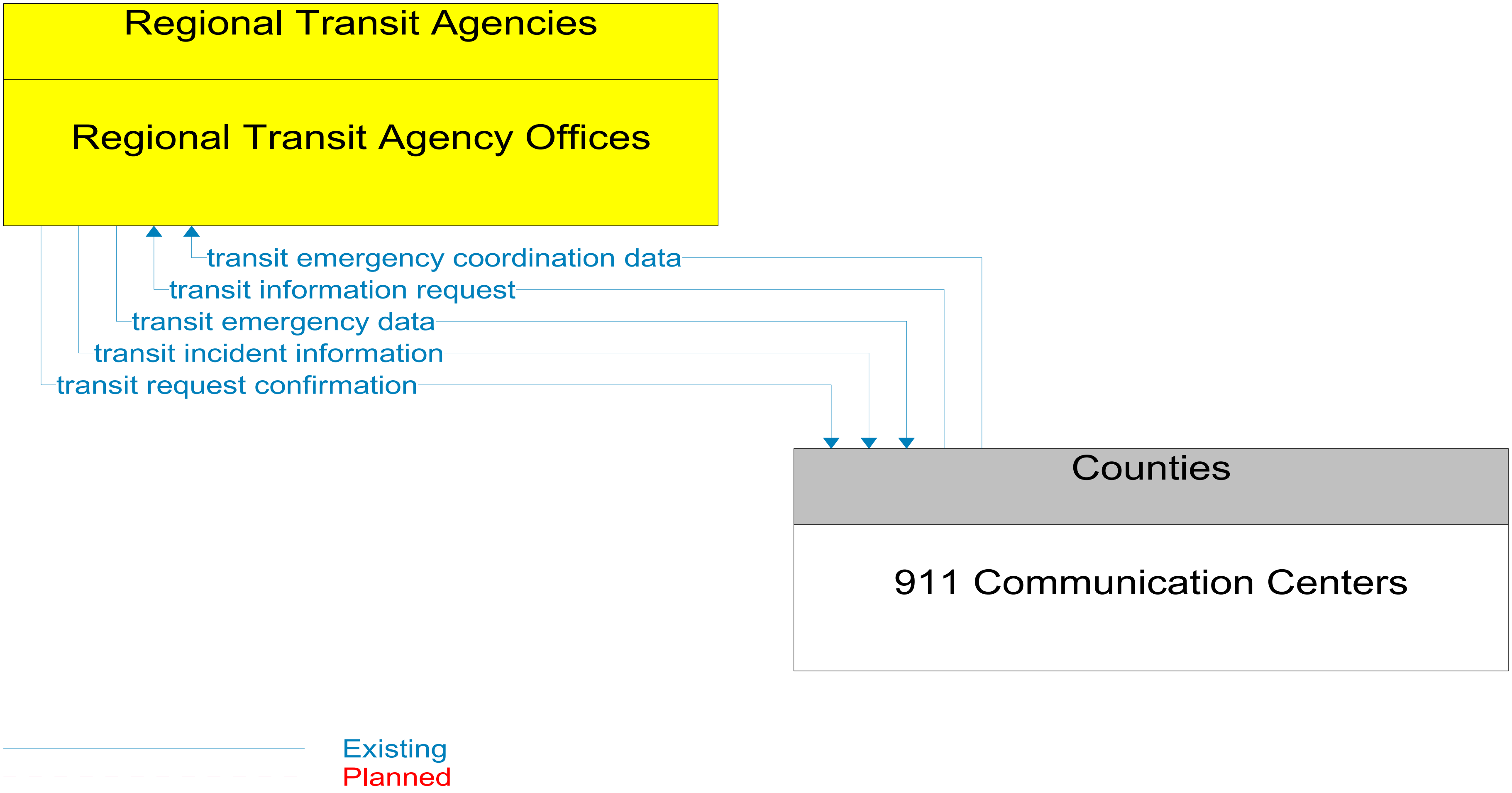
Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 County Maintenance Offices

Existing

Planned

511



Regional Transit Agencies

Regional Transit Agency Offices

transit emergency coordination data

transit information request

transit emergency data

transit incident information

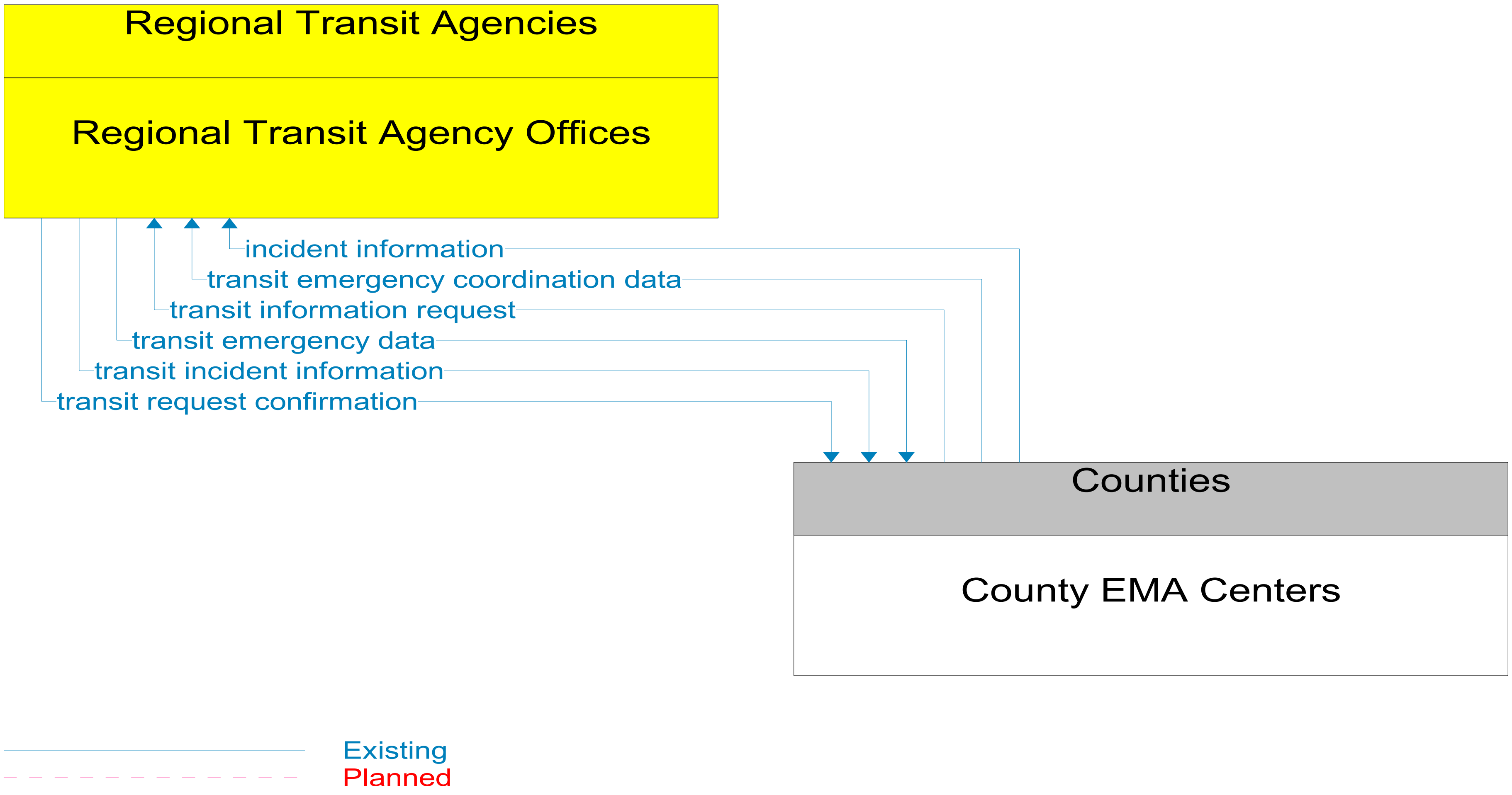
transit request confirmation

Counties

911 Communication Centers

Existing

Planned



Regional Transit Agencies

Regional Transit Agency Offices

incident information

transit emergency coordination data

transit information request

transit emergency data

transit incident information

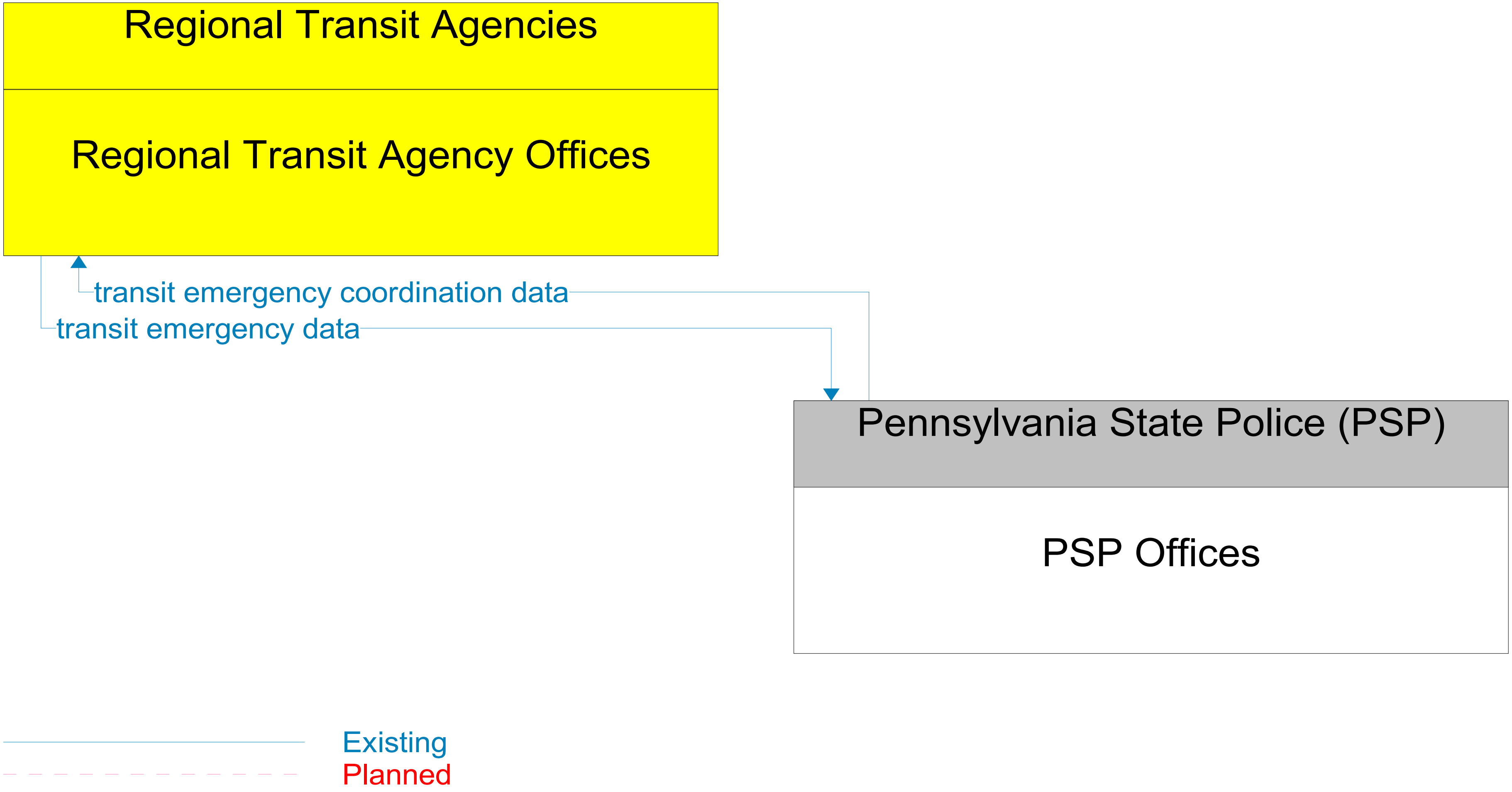
transit request confirmation

Counties

County EMA Centers

Existing

Planned



Regional Transit Agencies

Regional Transit Agency Offices

transit emergency coordination data

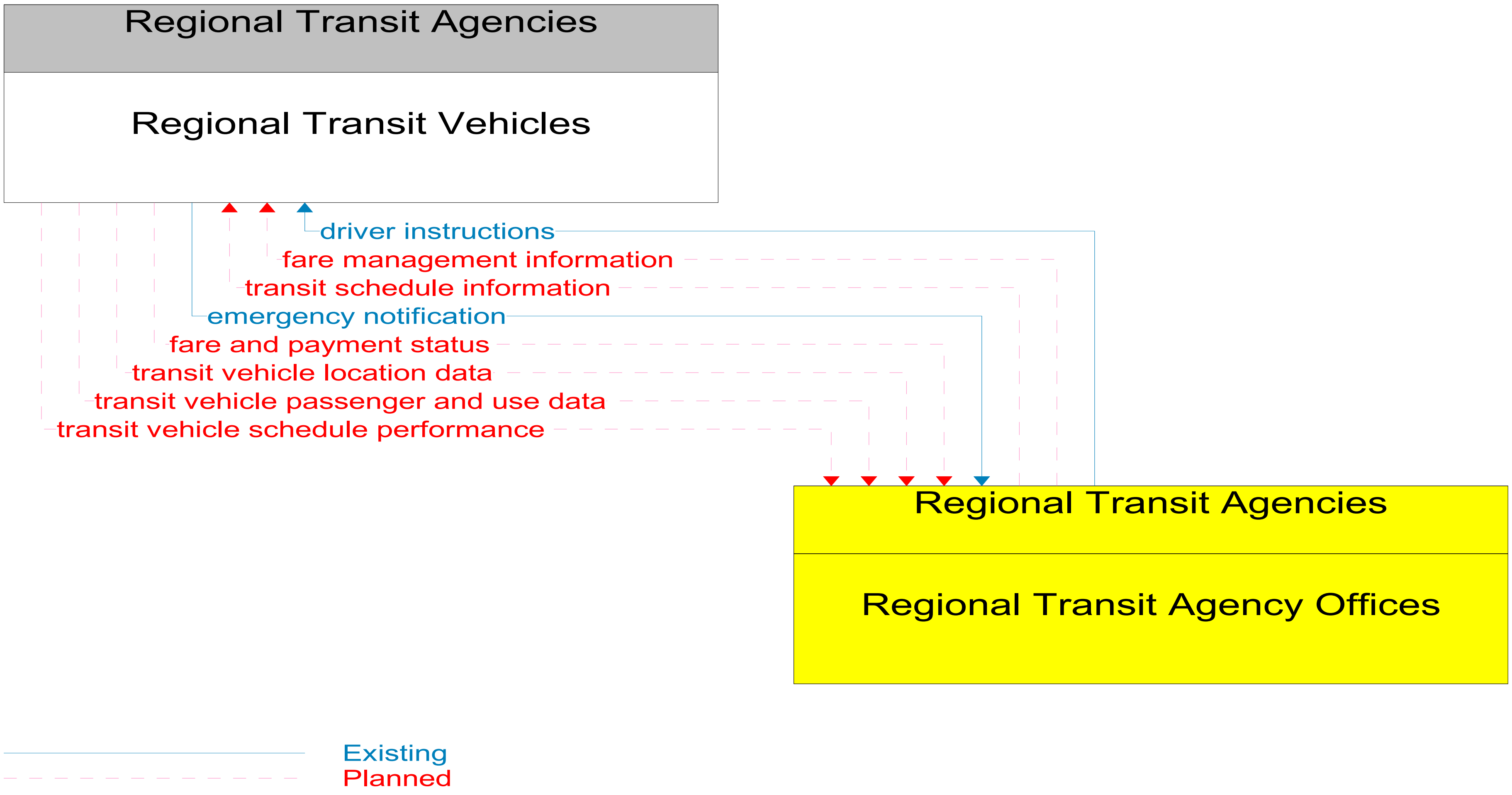
transit emergency data

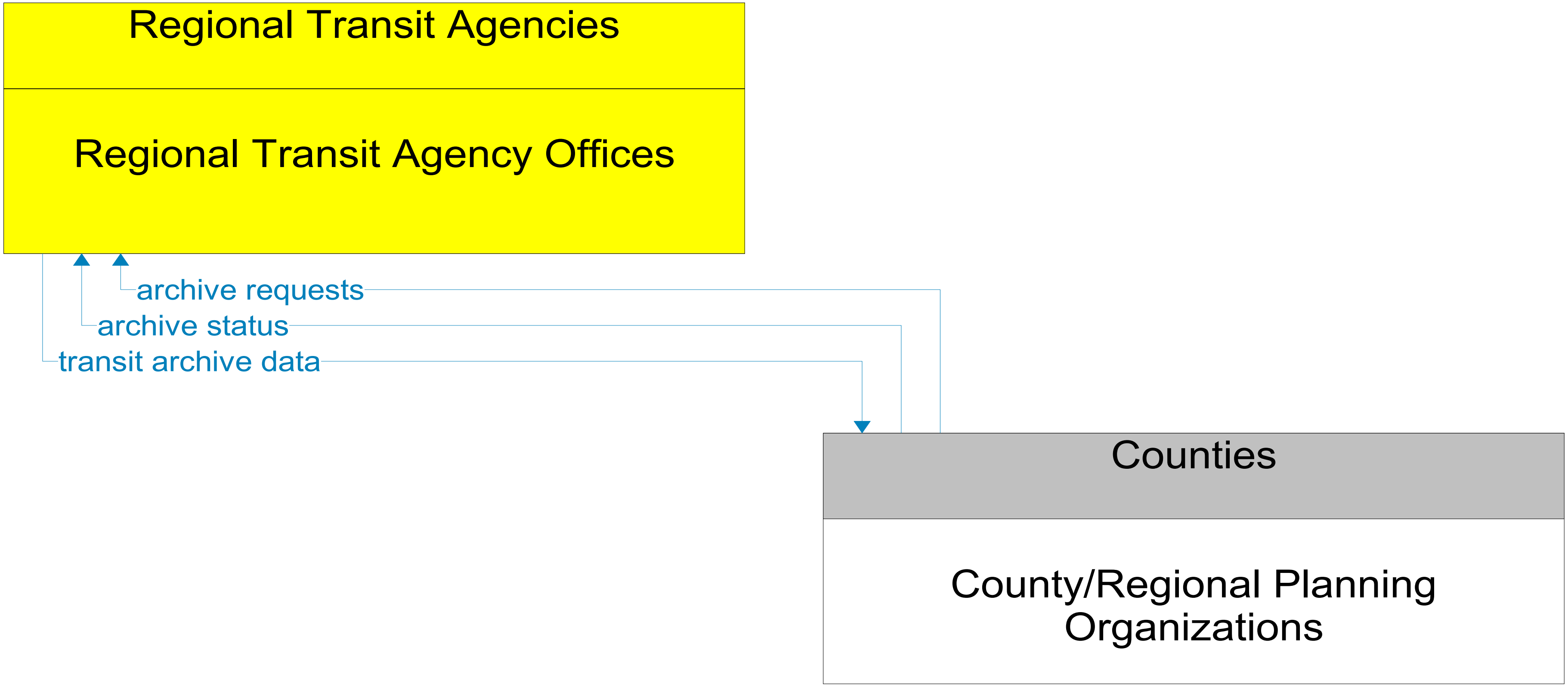
Pennsylvania State Police (PSP)

PSP Offices

Existing

Planned


Regional Transit Agencies
Regional Transit Vehicles
driver instructions
fare management information
transit schedule information
emergency notification
fare and payment status
transit vehicle location data
transit vehicle passenger and use data
transit vehicle schedule performance
Regional Transit Agencies
Regional Transit Agency Offices
Existing
Planned



Regional Transit Agencies

Regional Transit Agency Offices

archive requests

archive status

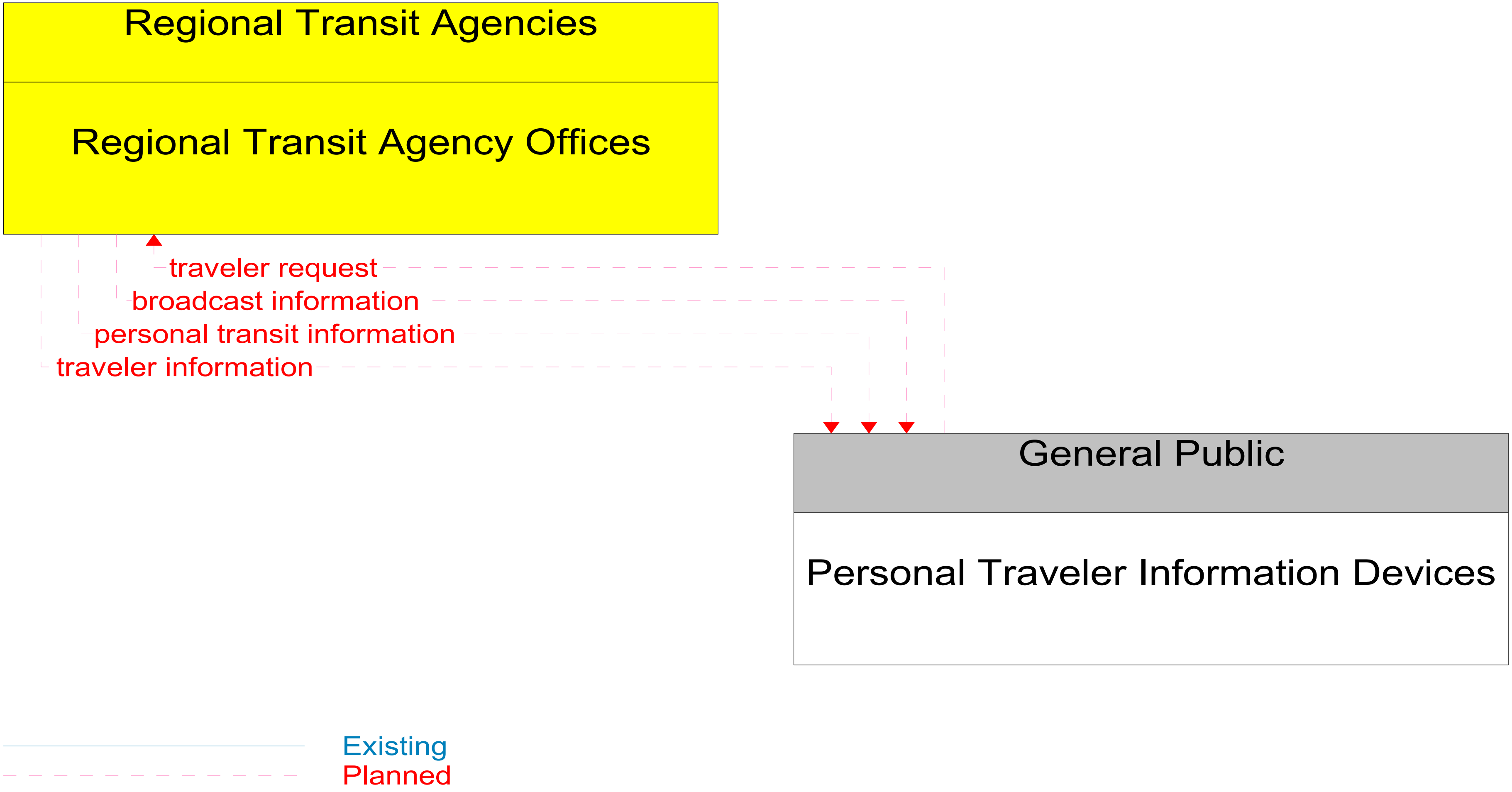
transit archive data

Counties

County/Regional Planning Organizations

Existing

Planned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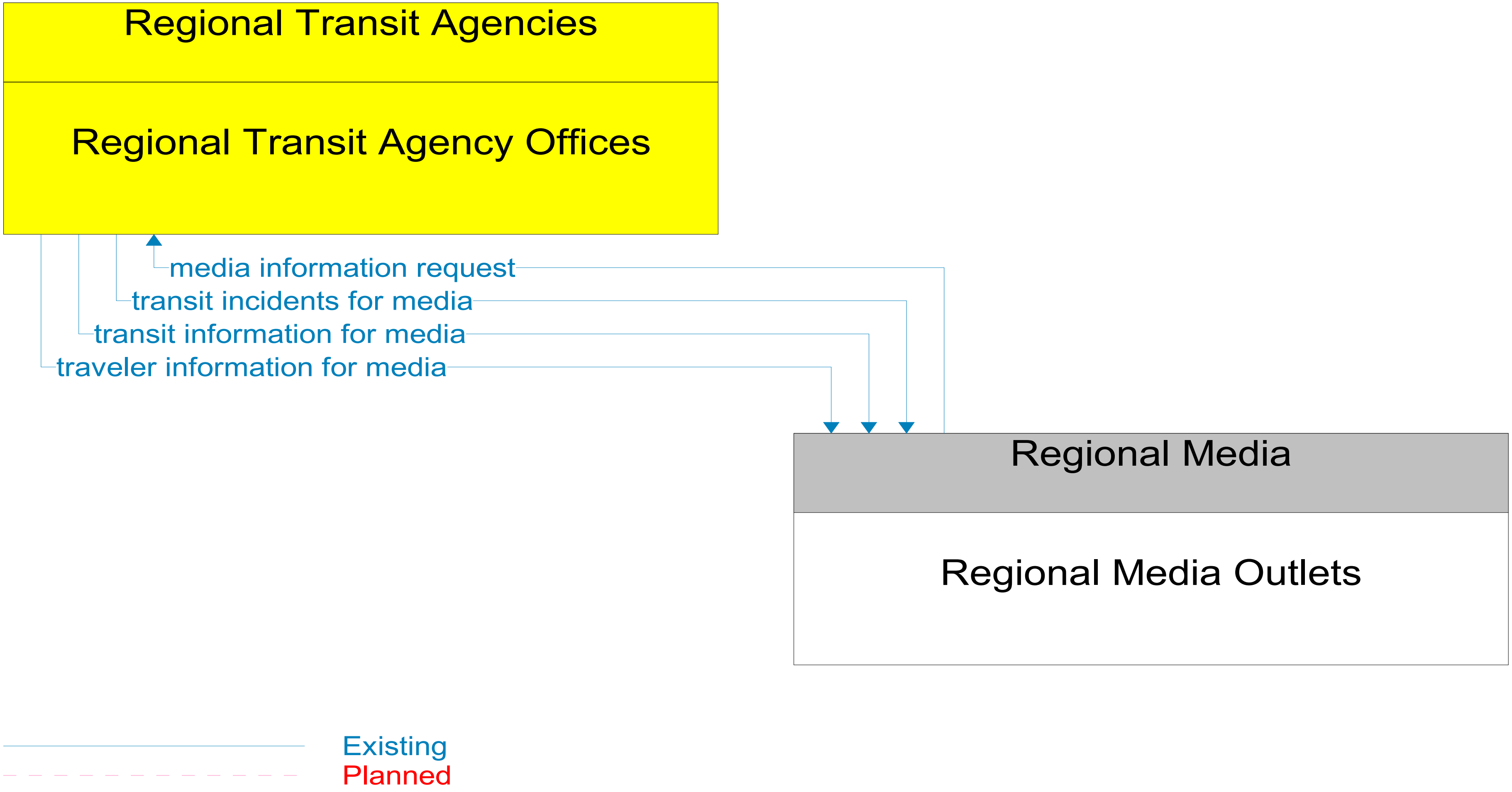
Regional Transit Agency Offices
traveler request
broadcast information
personal transit information
traveler information
General Public
Personal Traveler Information Devices
Existing
Planned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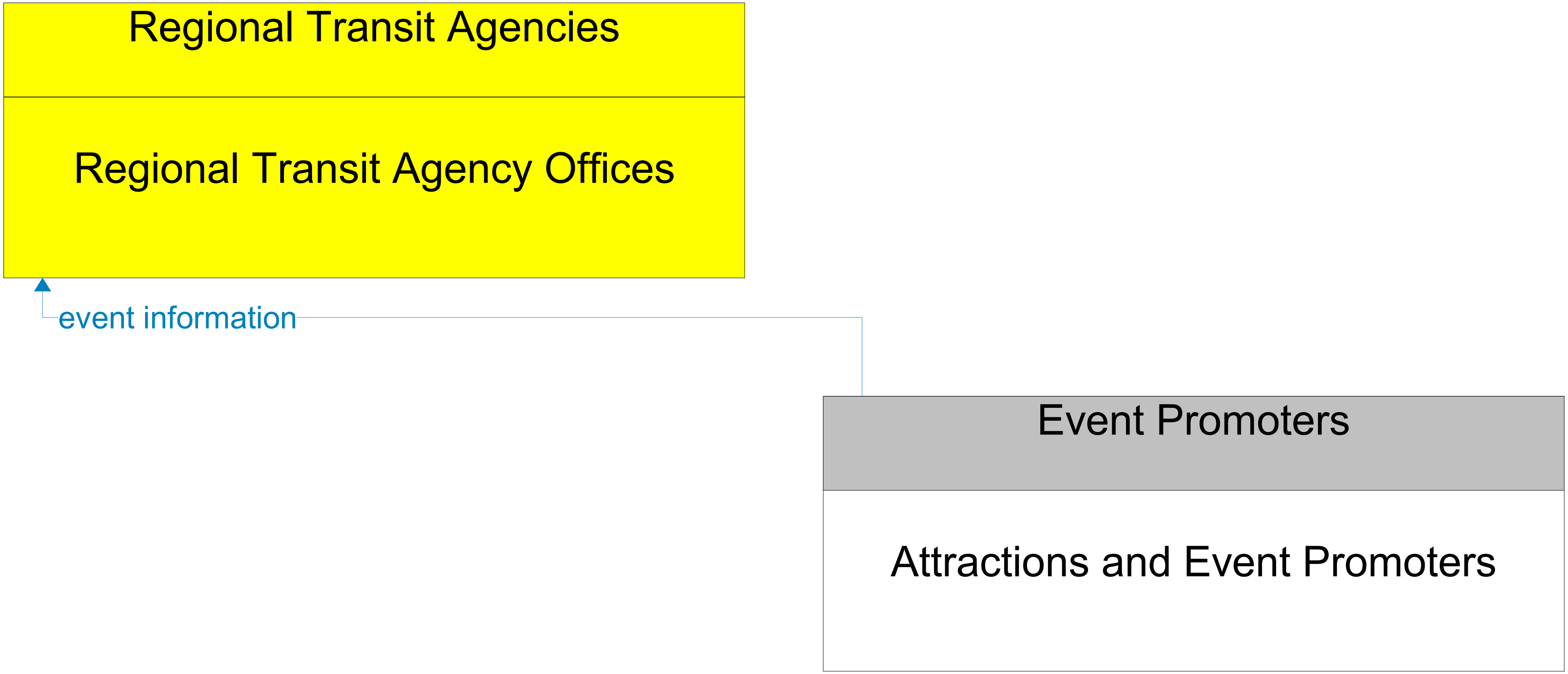
Regional Transit Agency Offices
media information request
transit incidents for media
transit information for media
traveler information for media
Regional Media
Regional Media Outlets
Existing
Planned



Regional Transit Agencies

Regional Transit Agency Offices

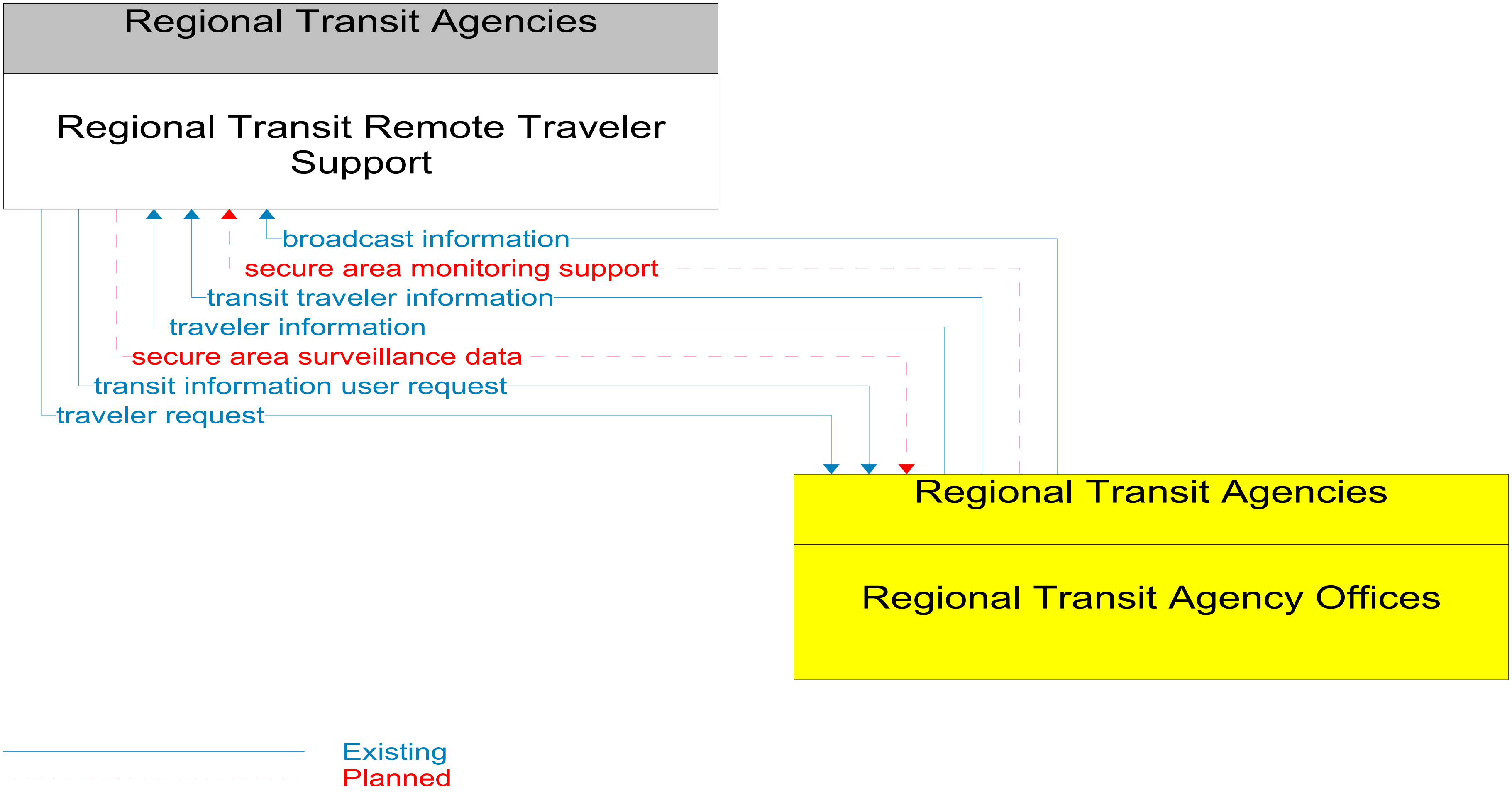
event information

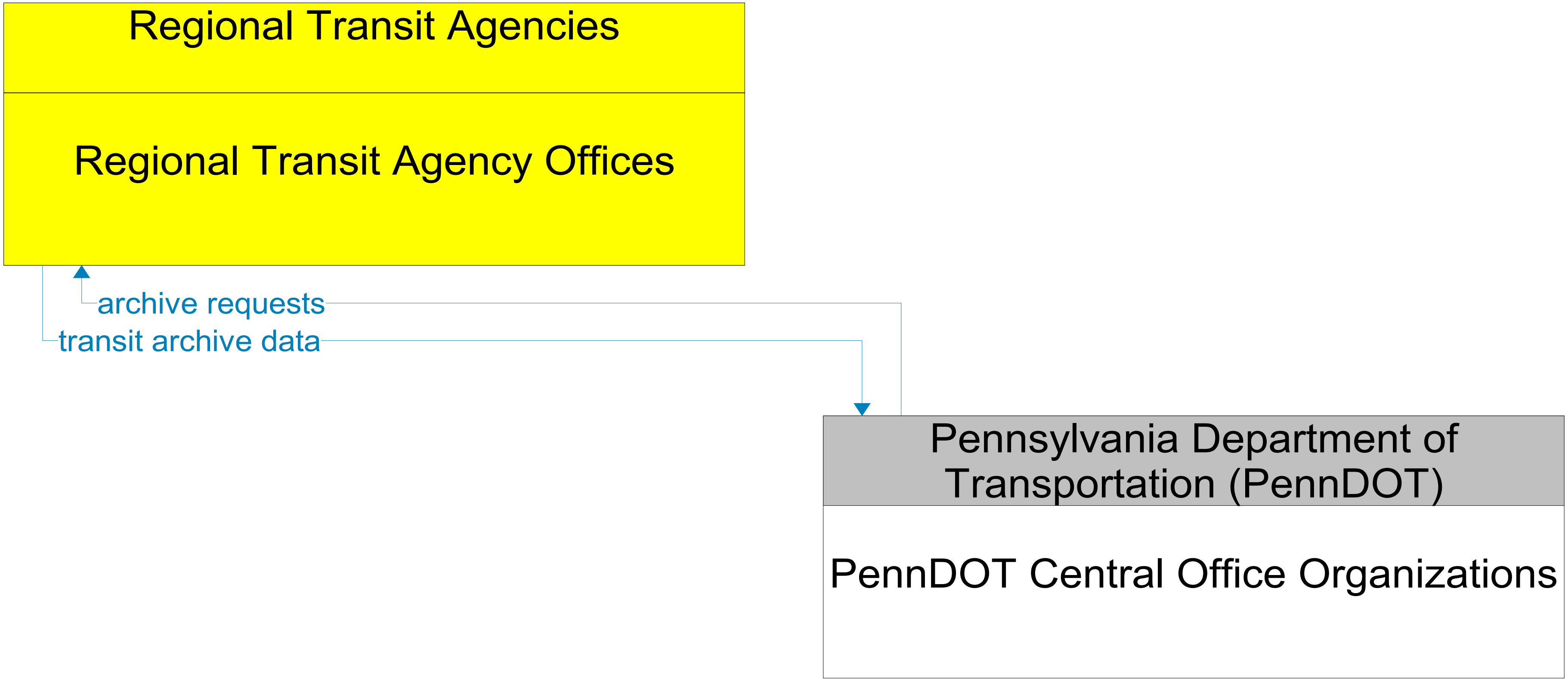
Event Promoters

Attractions and Event Promoters

Existing

Planned


Regional Transit Agencies
Regional Transit Remote Traveler Support
broadcast information
secure area monitoring support
transit traveler information
traveler information
secure area surveillance data
transit information user request
traveler request
Regional Transit Agencies
Regional Transit Agency Offices
Existing
Planned



Regional Transit Agencies

Regional Transit Agency Offices

archive requests

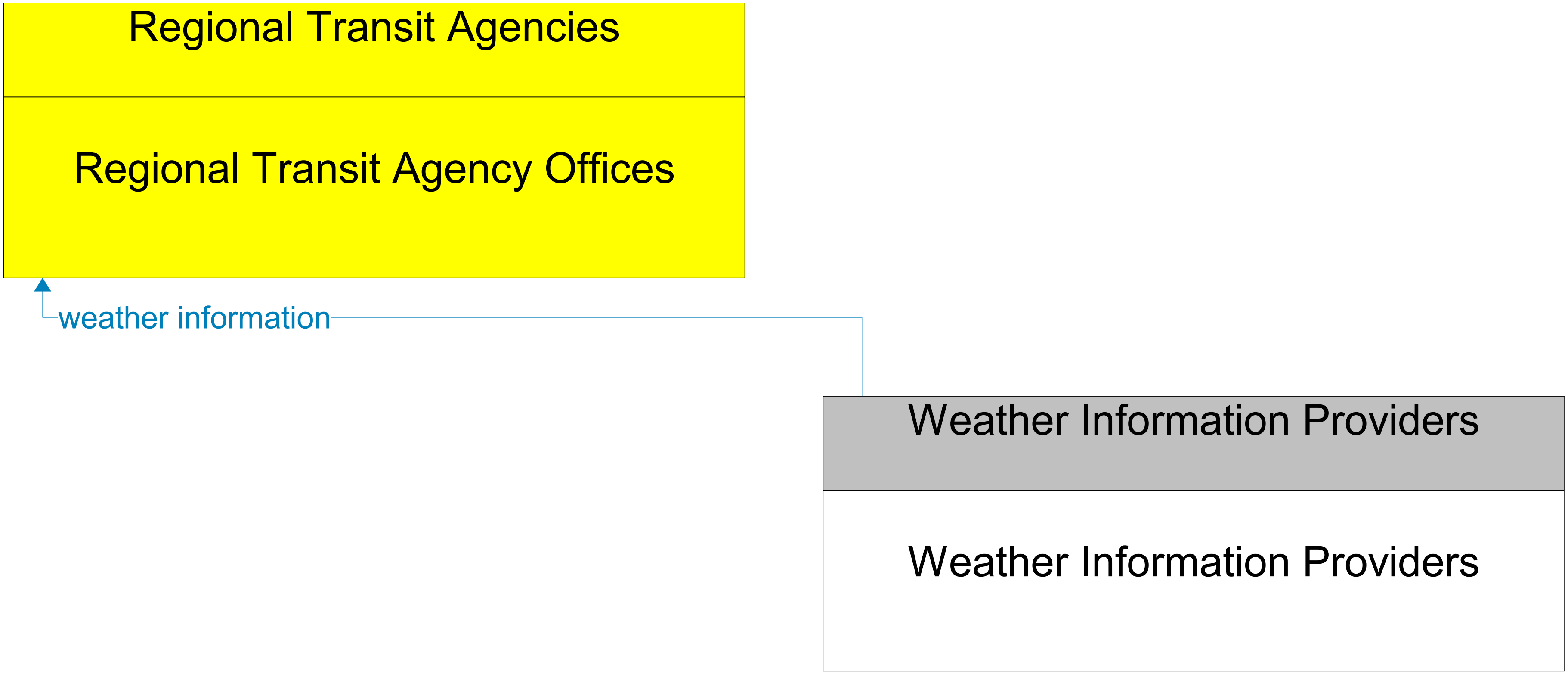
transit archive data

Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Organizations

Existing

Planned



Regional Transit Agencies

Regional Transit Agency Offices

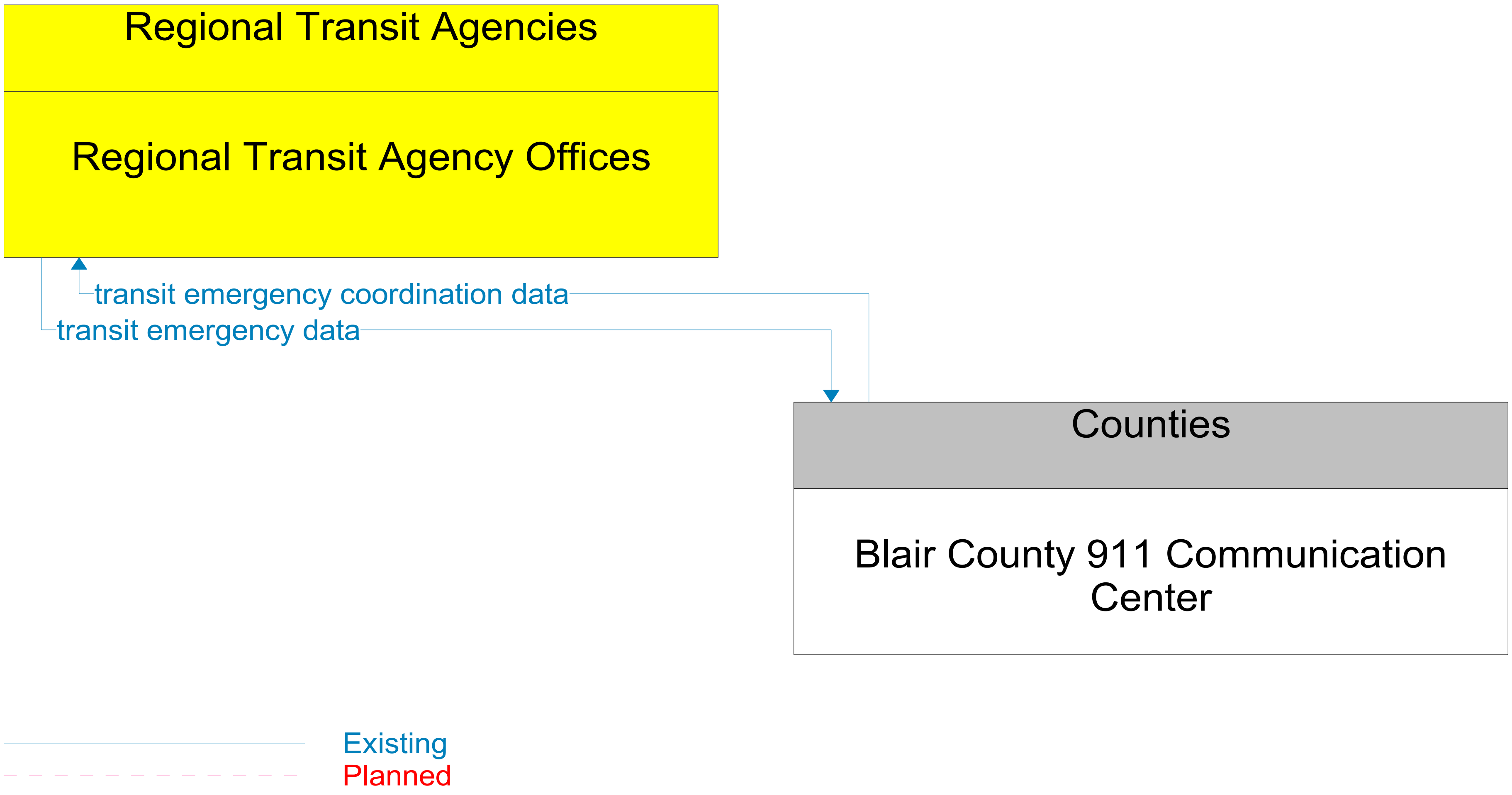
weather information

Weather Information Providers

Weather Information Providers

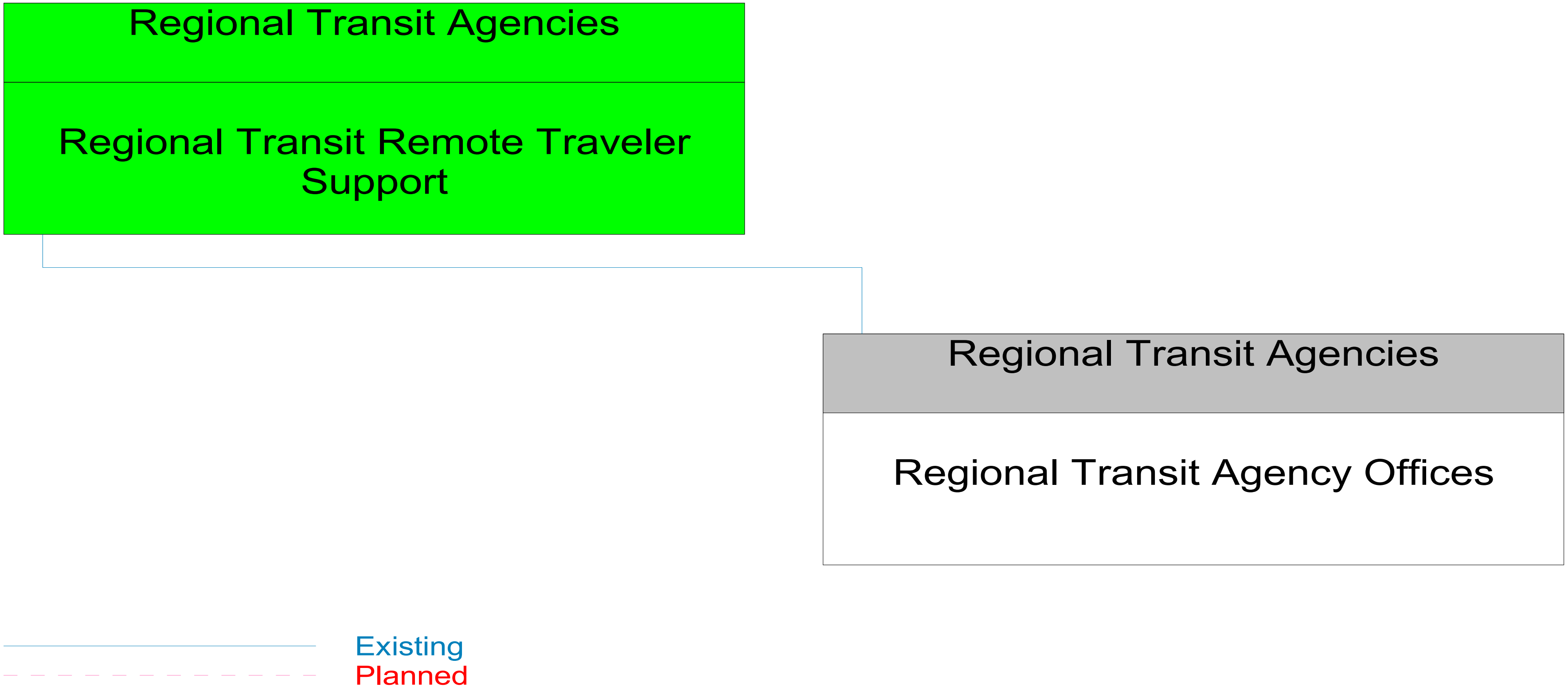
Existing

Planned


Regional Transit Agencies
Regional Transit Agency Offices
transit emergency coordination data
transit emergency data
Counties
Blair County 911 Communication Center
Existing
Planned

Regional Transit Remote Traveler Support

Regional Transit Remote Traveler Support Interconnect Diagram



Regional Transit Agencies

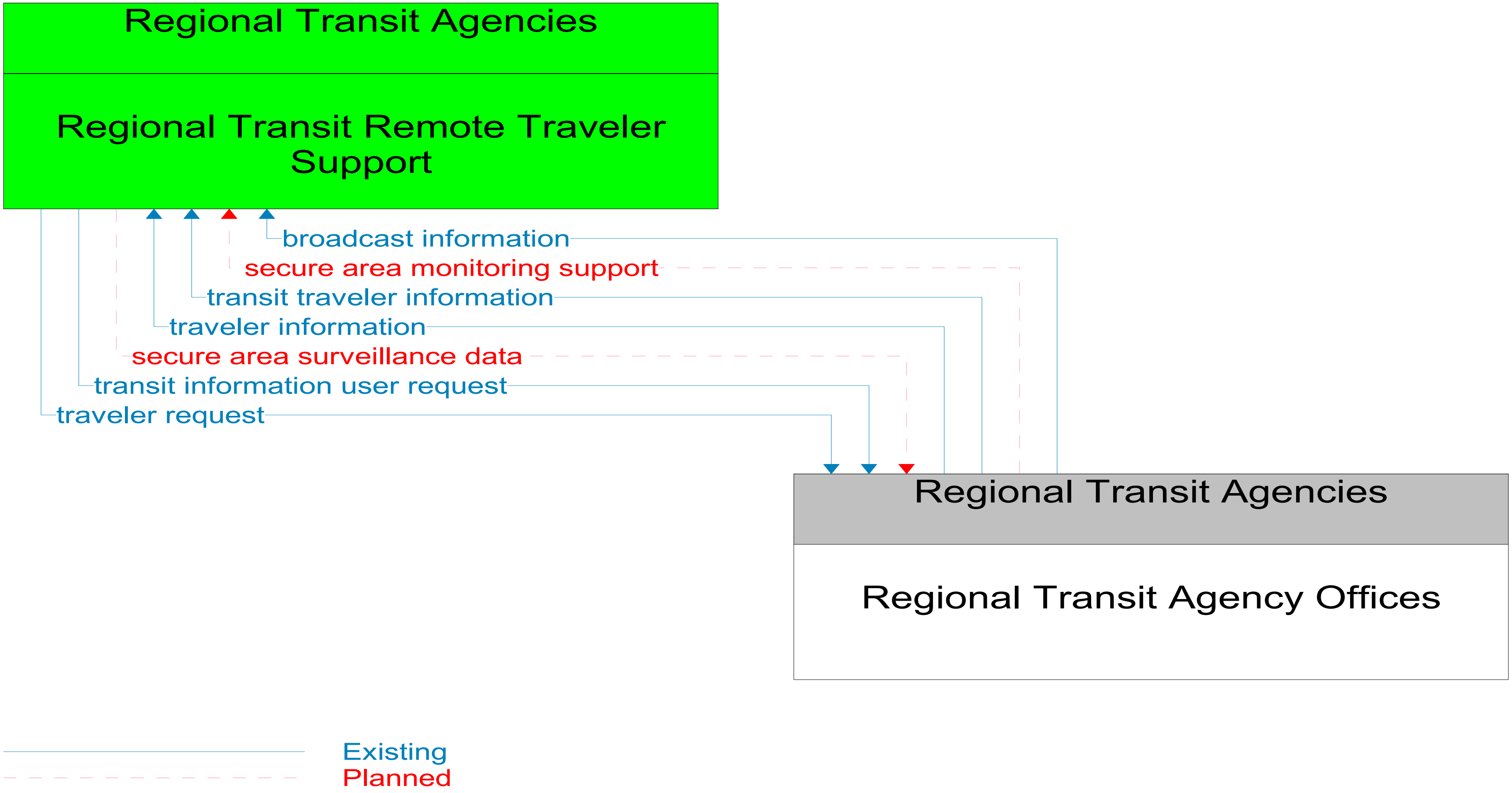
Regional Transit Remote Traveler Support

Regional Transit Agencies

Regional Transit Agency Offices

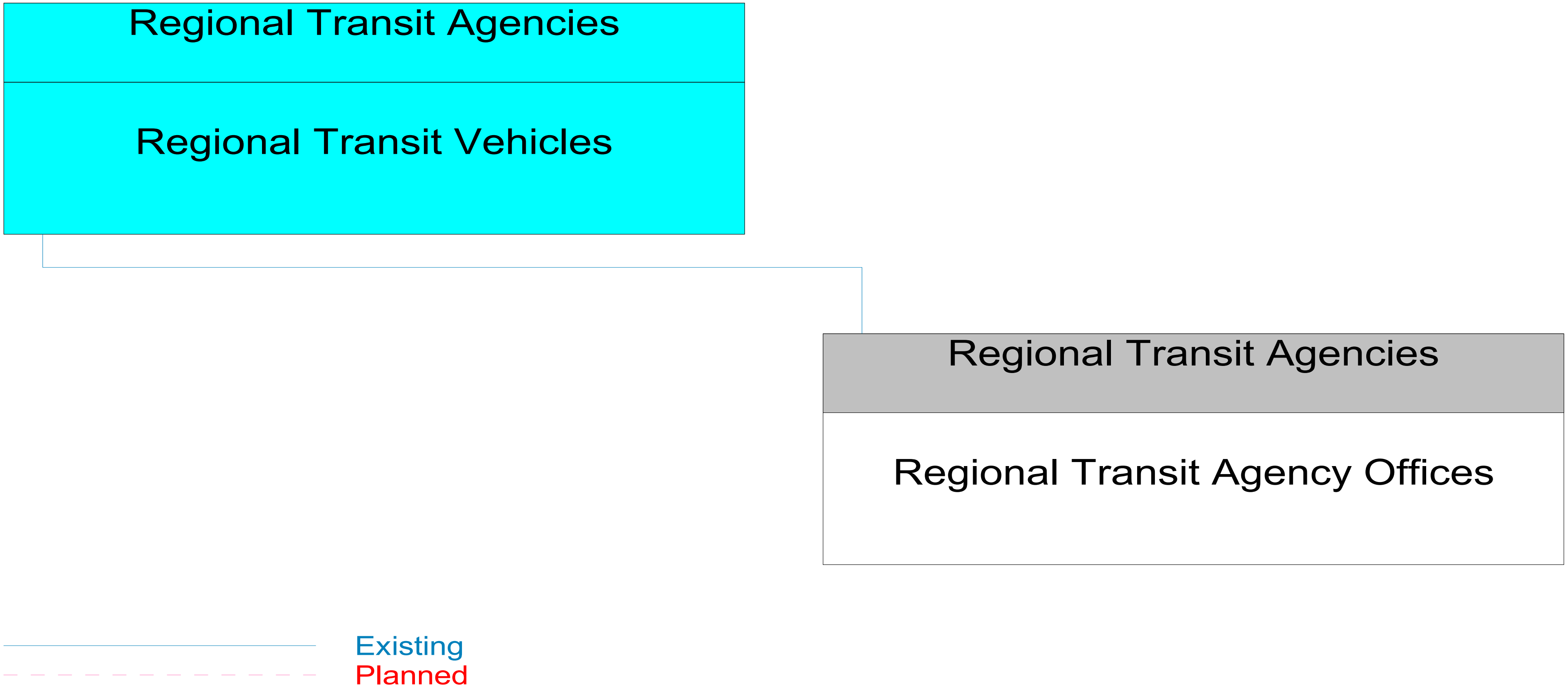
Existing

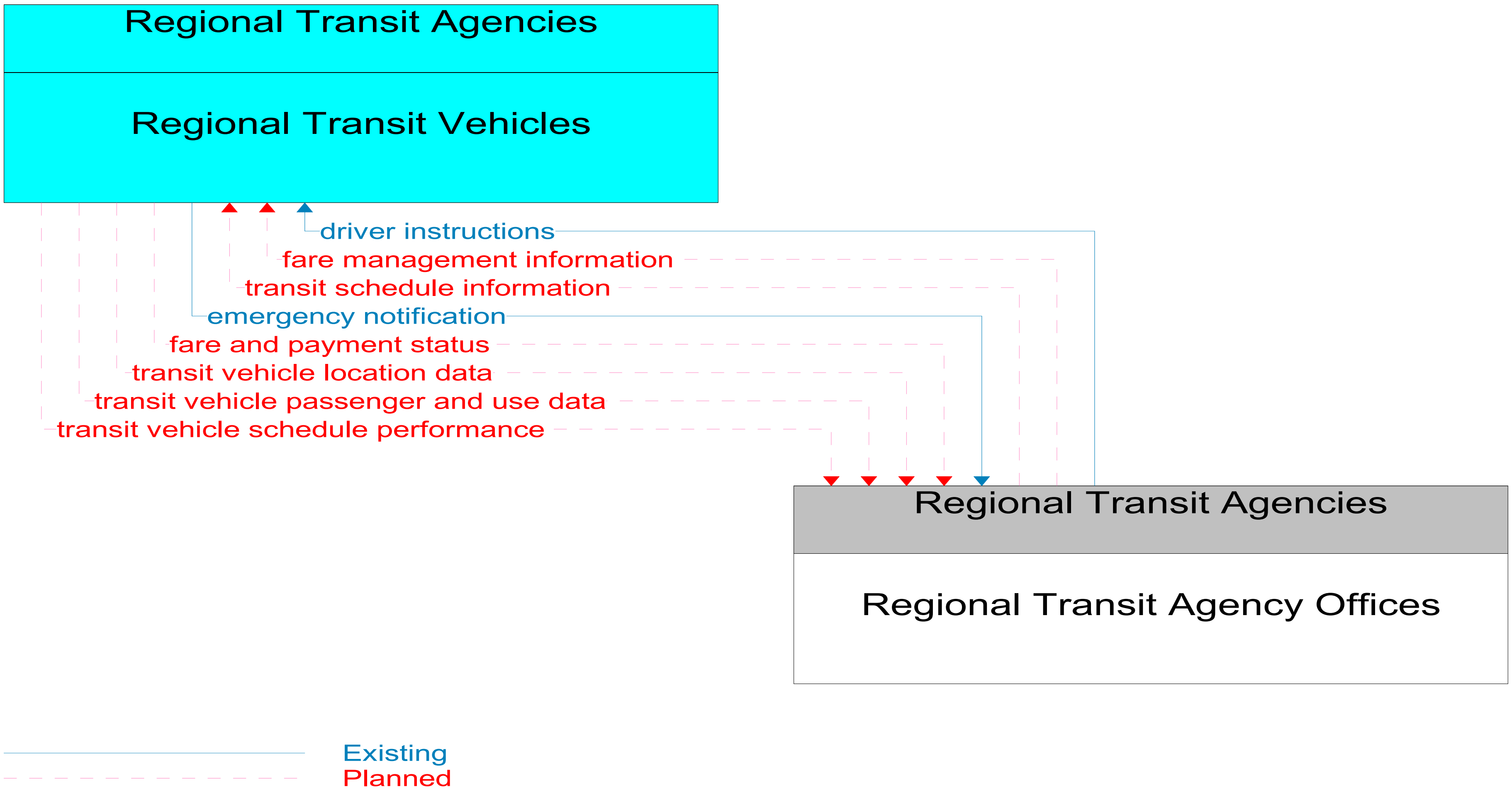
Planned


Regional Transit Agencies
Regional Transit Remote Traveler Support
broadcast information
secure area monitoring support
transit traveler information
traveler information
secure area surveillance data
transit information user request
traveler request
Regional Transit Agencies
Regional Transit Agency Offices
Existing
Planned

Regional Transit Vehicles

Regional Transit Vehicles Interconnect Diagram

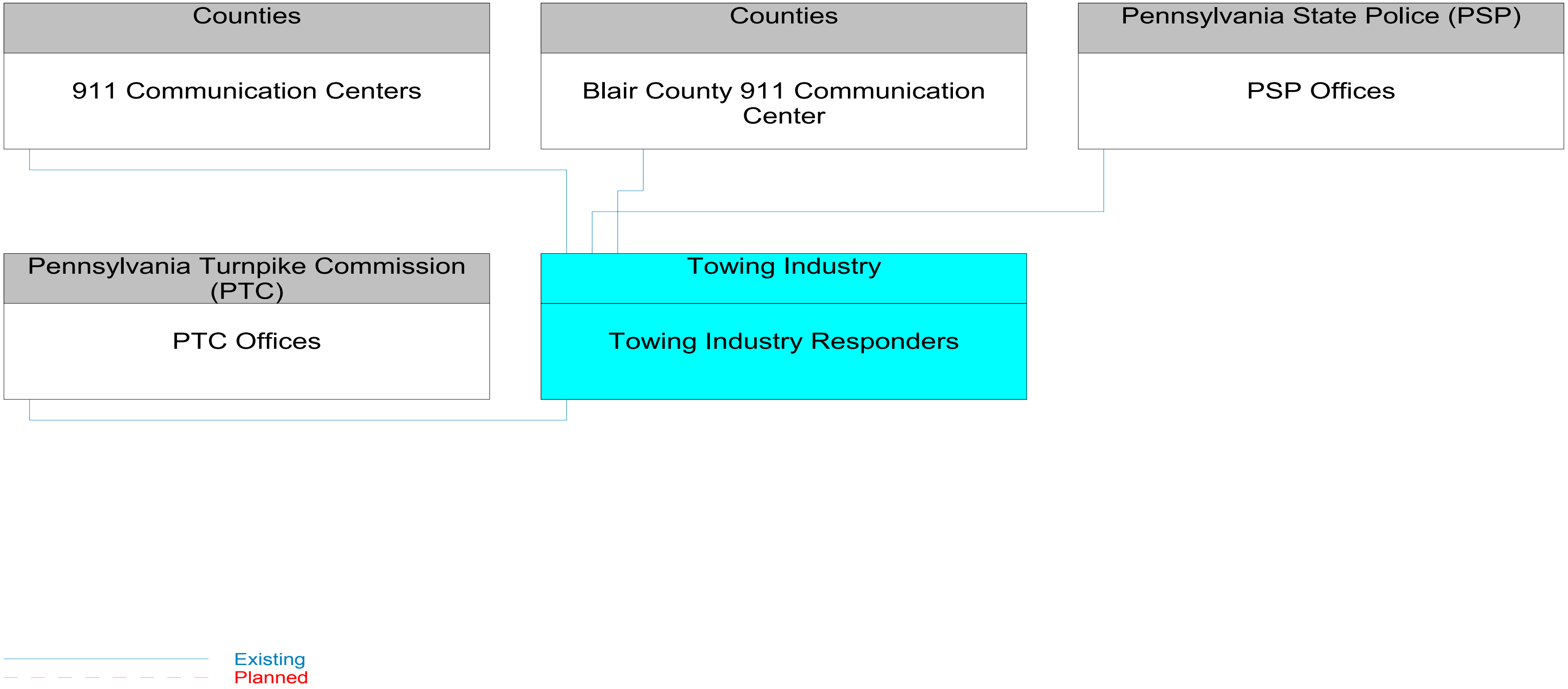

Regional Transit Agencies
Regional Transit Vehicles
Regional Transit Agencies
Regional Transit Agency Offices
Existing
Planned



Regional Transit Agencies
Regional Transit Vehicles
driver instructions
fare management information
transit schedule information
emergency notification
fare and payment status
transit vehicle location data
transit vehicle passenger and use data
transit vehicle schedule performance
Regional Transit Agencies
Regional Transit Agency Offices
Existing
Planned

Towing Industry Responders

Towing Industry Responders Interconnect Diagram



Counties

911 Communication Centers

Counties

Blair County 911 Communication Center

Pennsylvania State Police (PSP)

PSP Offices

Pennsylvania Turnpike Commission (PTC)

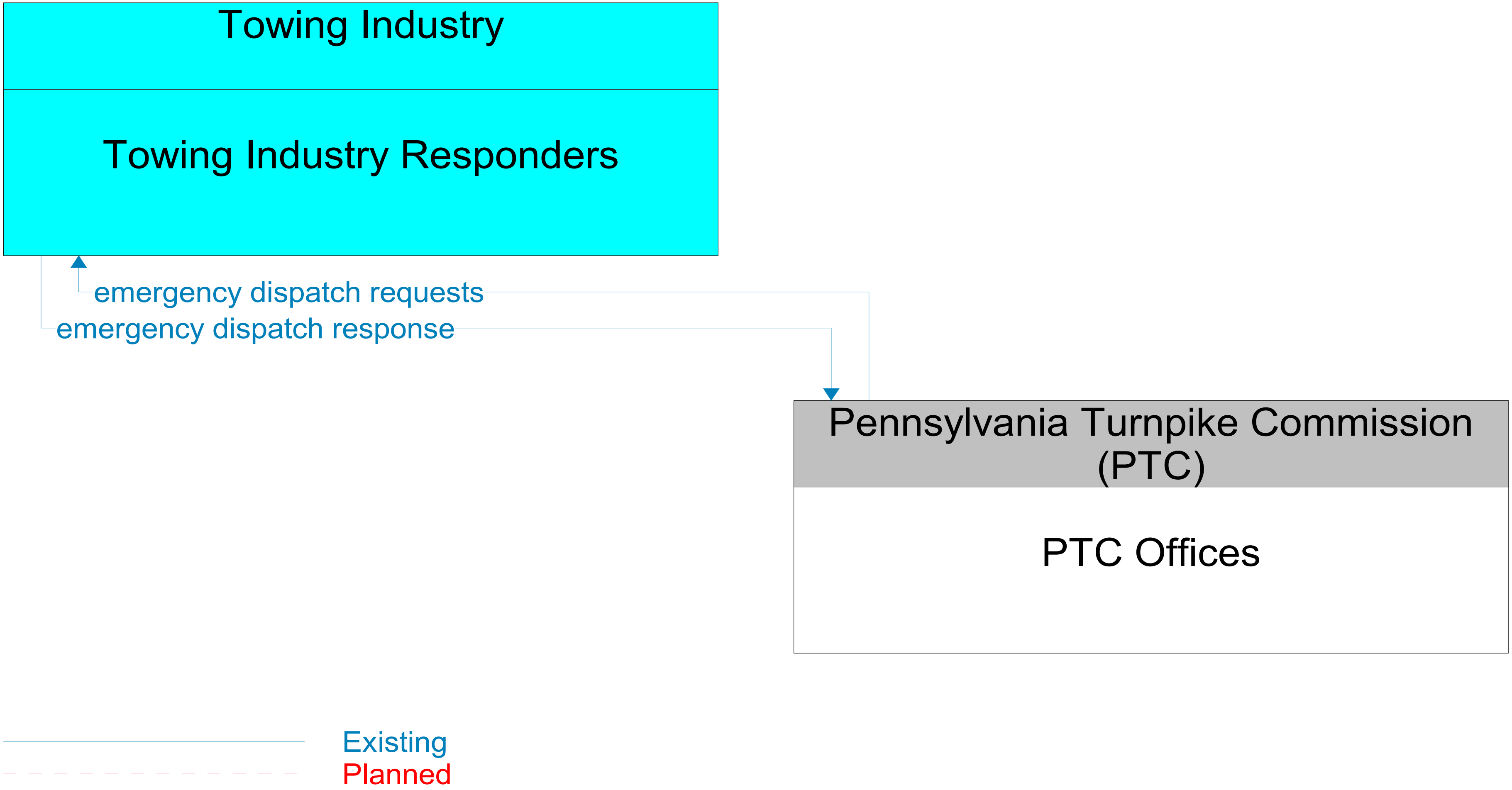
PTC Offices

Towing Industry

Towing Industry Responders

Existing

Planned



Towing Industry

Towing Industry Responders

emergency dispatch requests

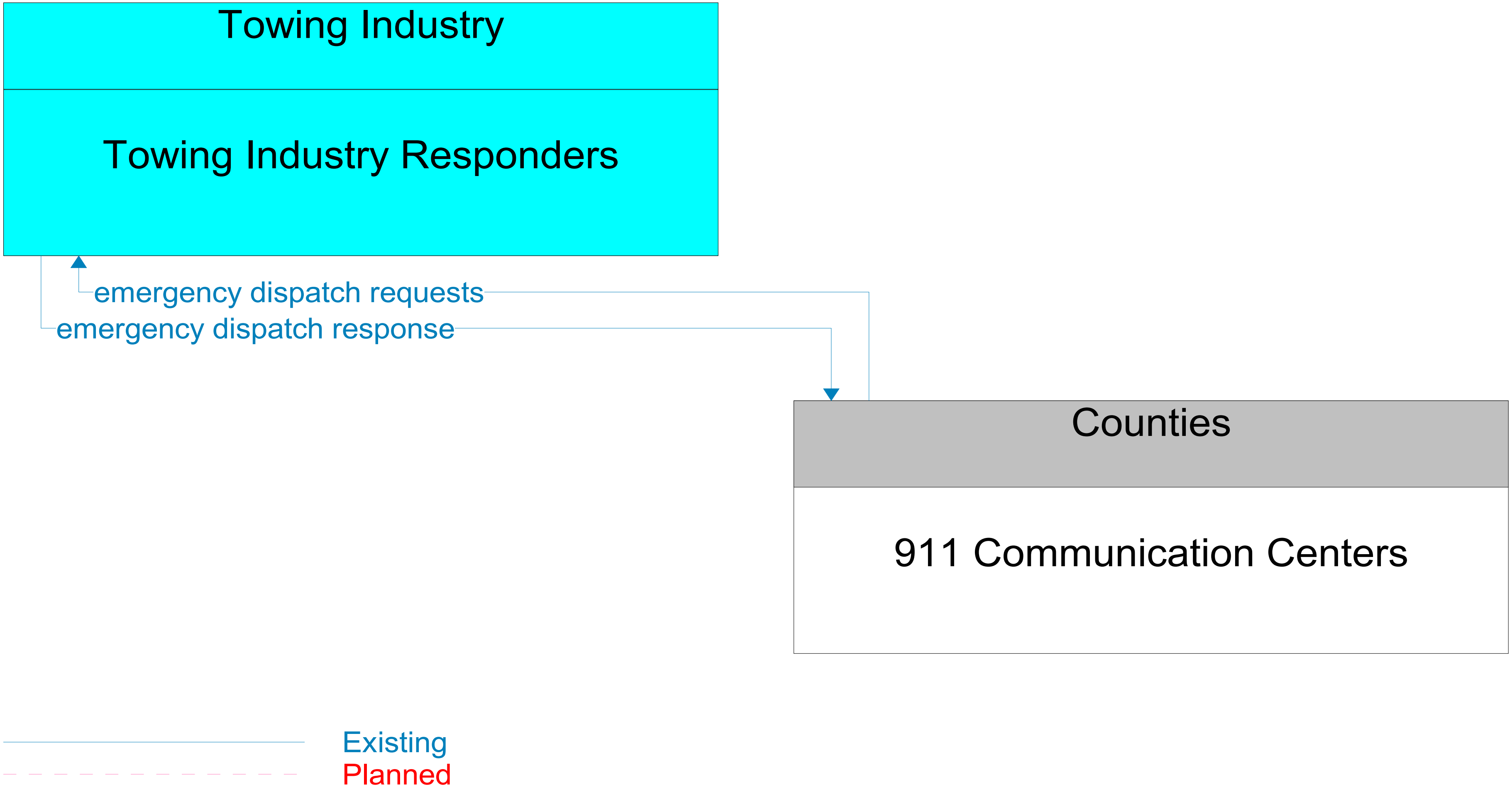
emergency dispatch response

Pennsylvania Turnpike Commission (PTC)

PTC Offices

Existing

Planned



Towing Industry

Towing Industry Responders

emergency dispatch requests

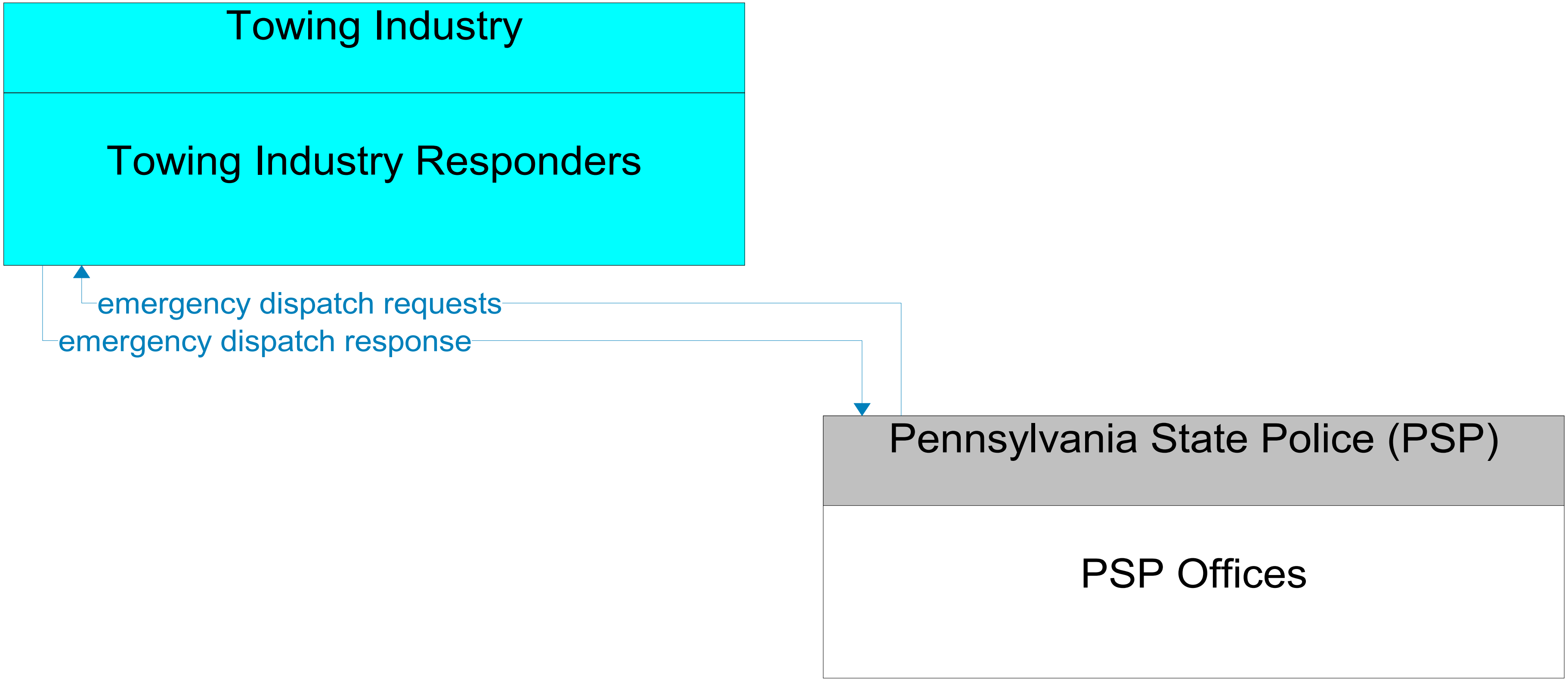
emergency dispatch response

Counties

911 Communication Centers

Existing

Planned



Towing Industry

Towing Industry Responders

emergency dispatch requests

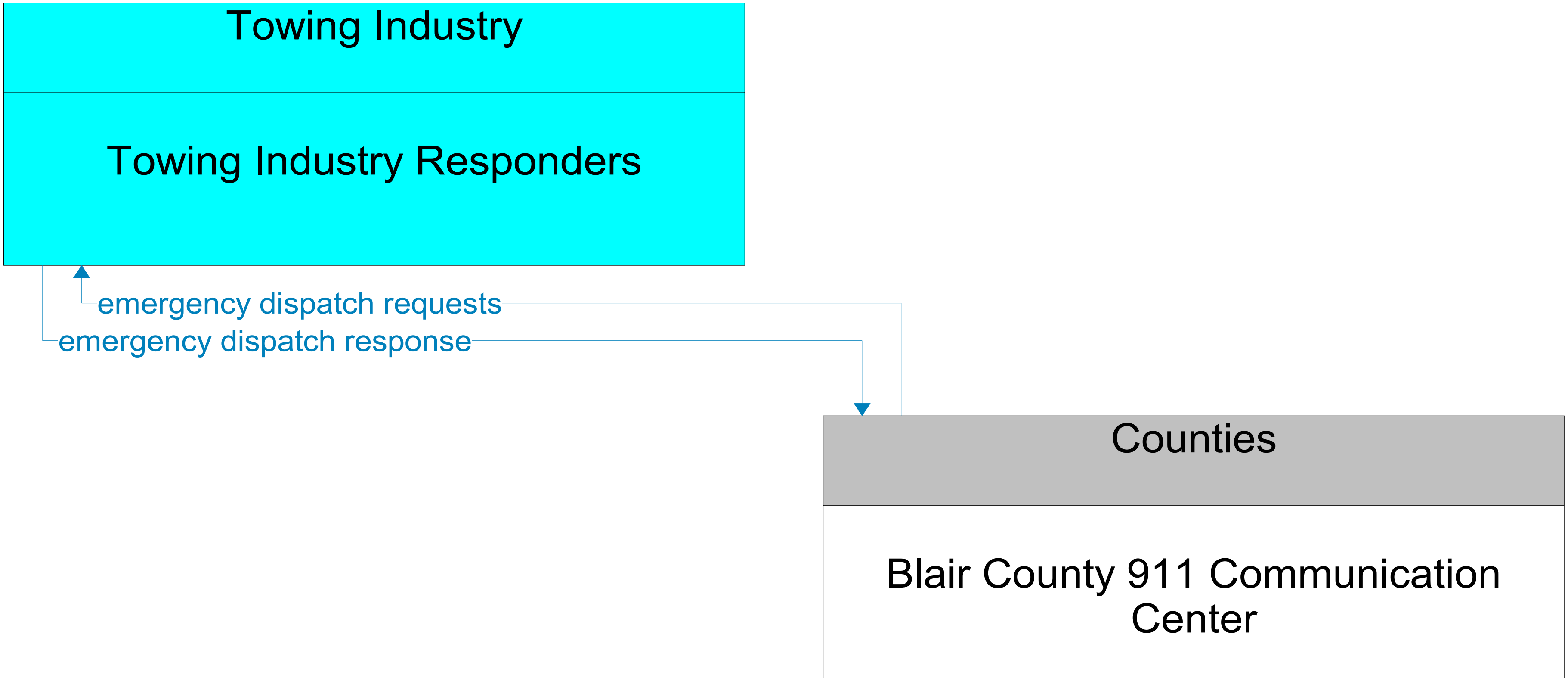
emergency dispatch response

Pennsylvania State Police (PSP)

PSP Offices

Existing

Planned



Towing Industry

Towing Industry Responders

emergency dispatch requests

emergency dispatch response

Counties

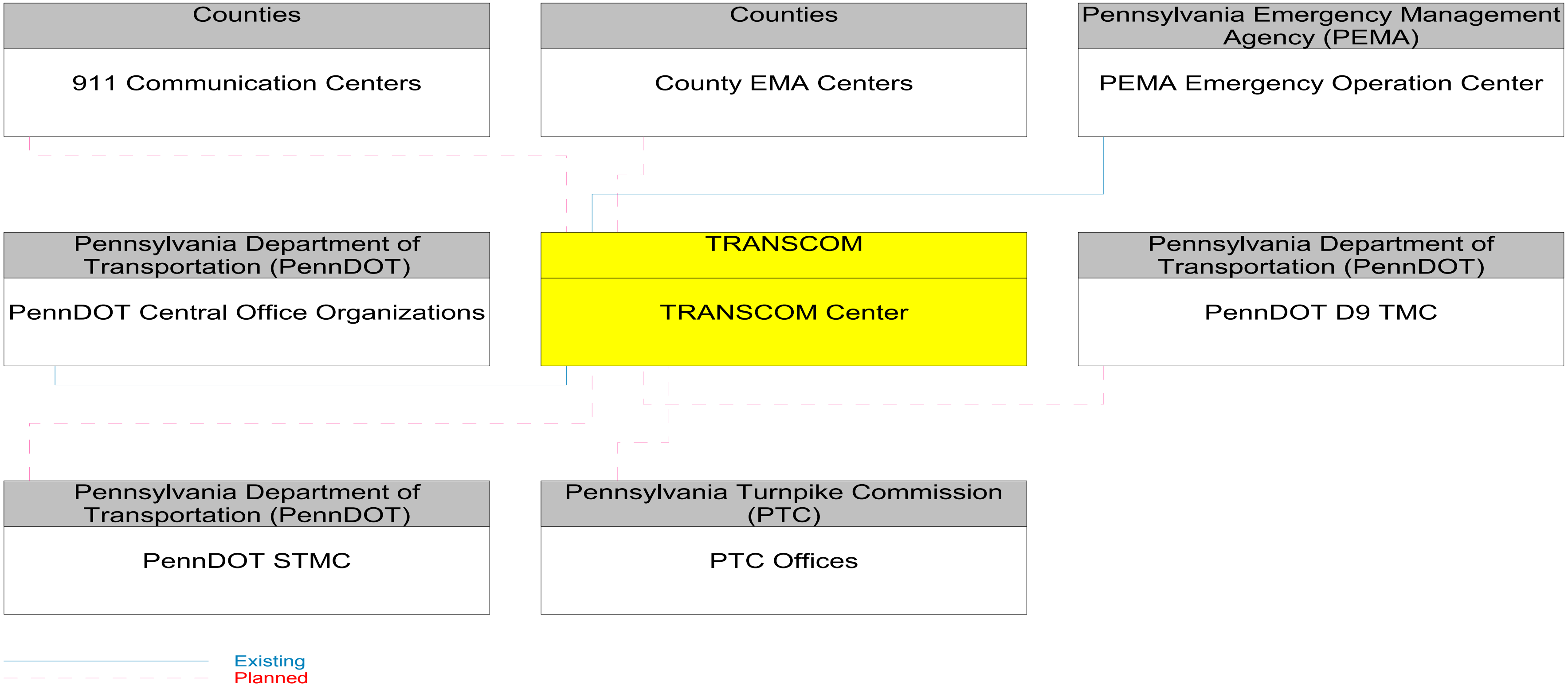
Blair County 911 Communication Center

Existing

Planned

TRANSCOM Center

TRANSCOM Center Interconnect Diagram



Counties

911 Communication Centers

Counties

County EMA Centers

Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Organizations

TRANSCOM

TRANSCOM Center

Pennsylvania Department of Transportation (PennDOT)

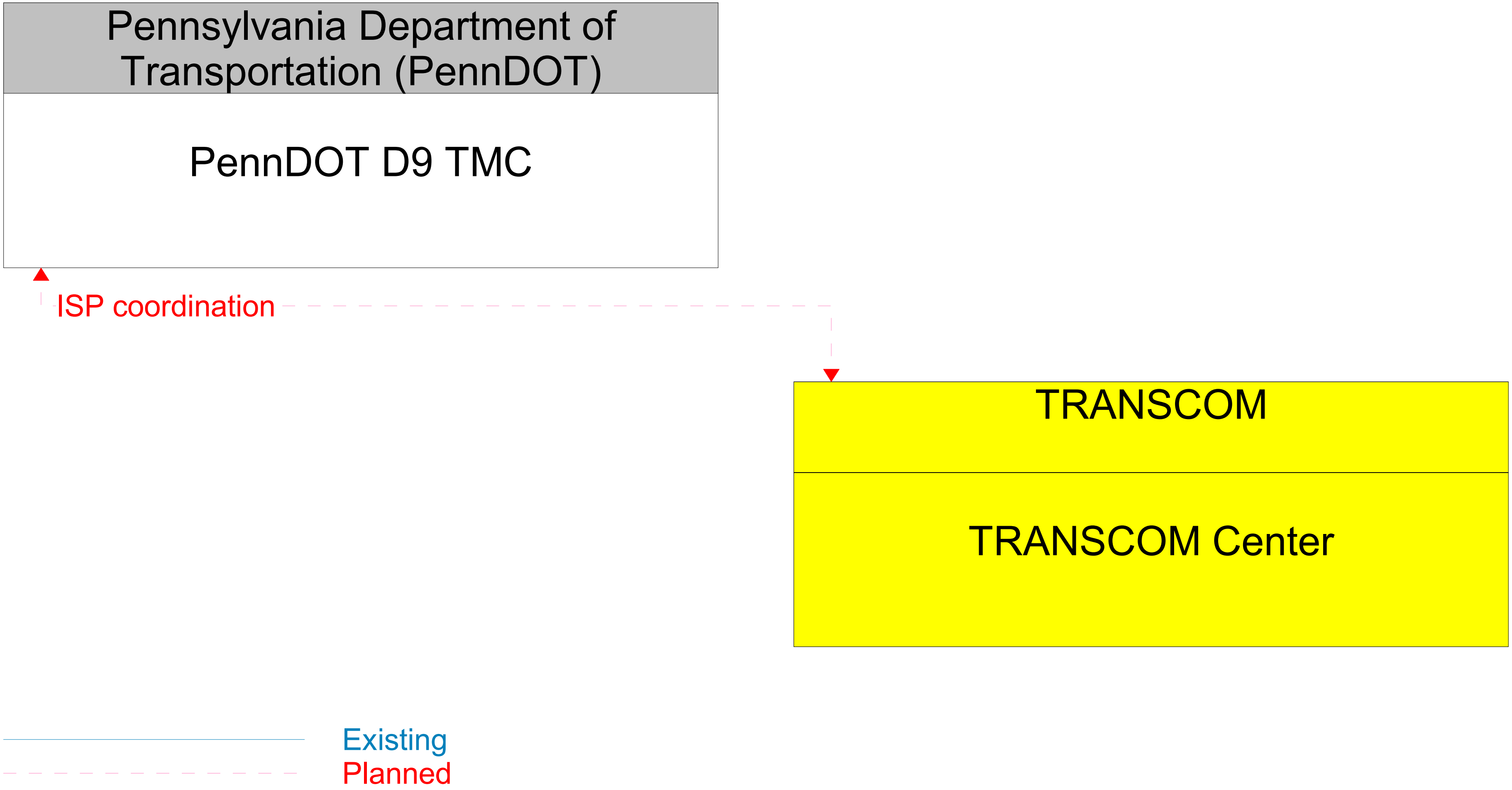
PennDOT D9 TMC

Pennsylvania Department of Transportation (PennDOT)

PennDOT STMC

Pennsylvania Turnpike Commission (PTC)

PTC Offices



Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 TMC

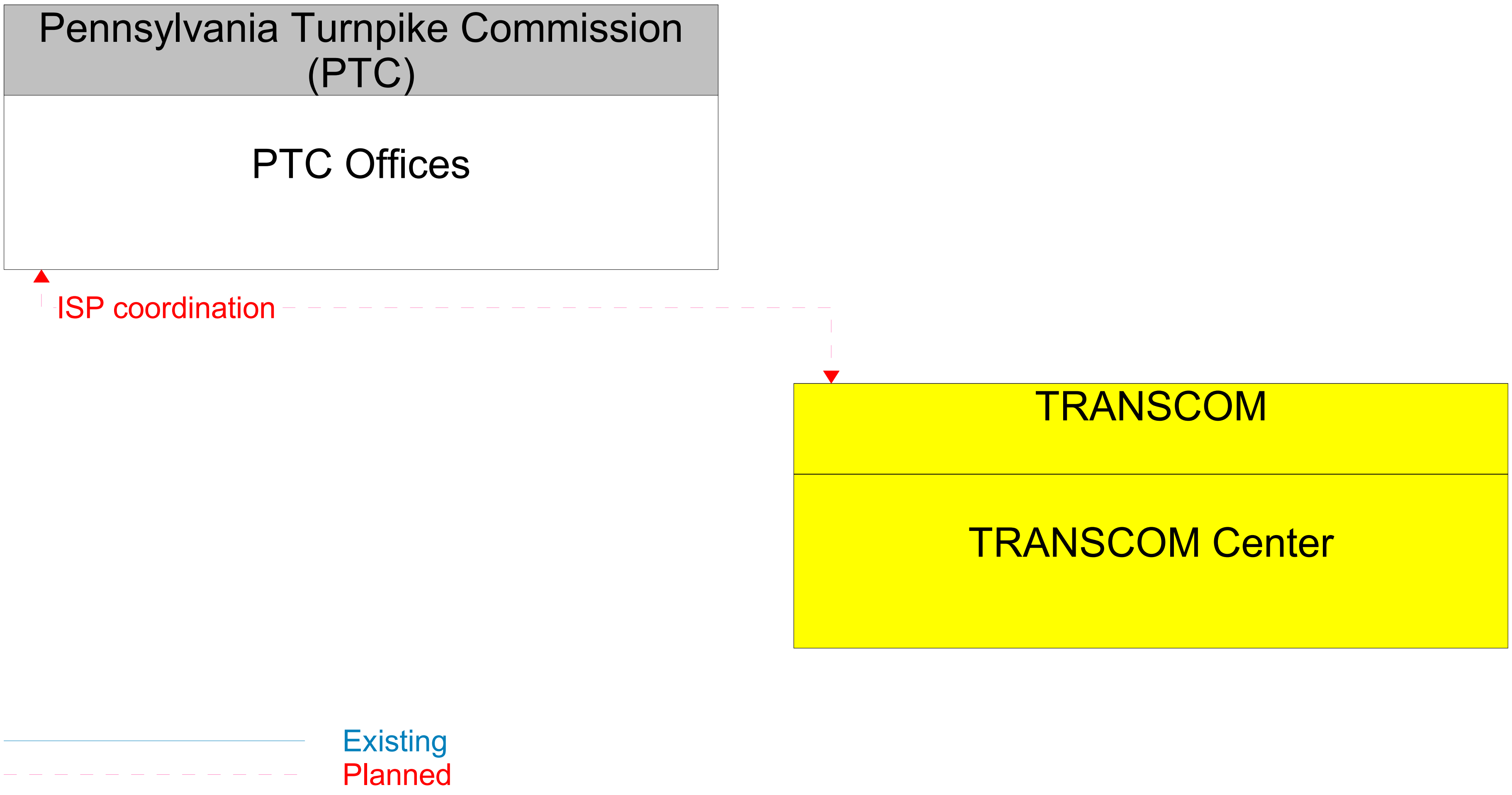
ISP coordination

TRANSCOM

TRANSCOM Center

Existing

Planned



Pennsylvania Turnpike Commission (PTC)

PTC Offices

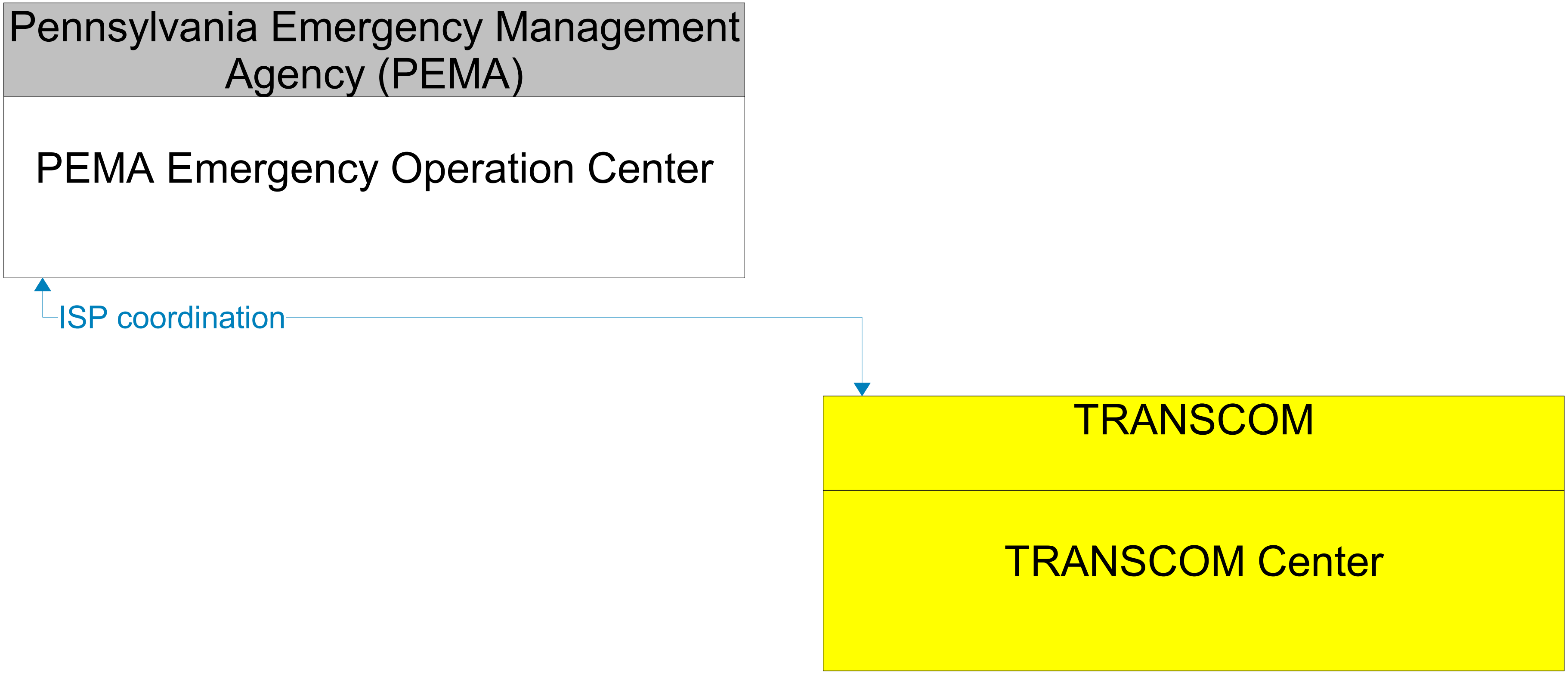
ISP coordination

TRANSCOM

TRANSCOM Center

Existing

Planned



Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

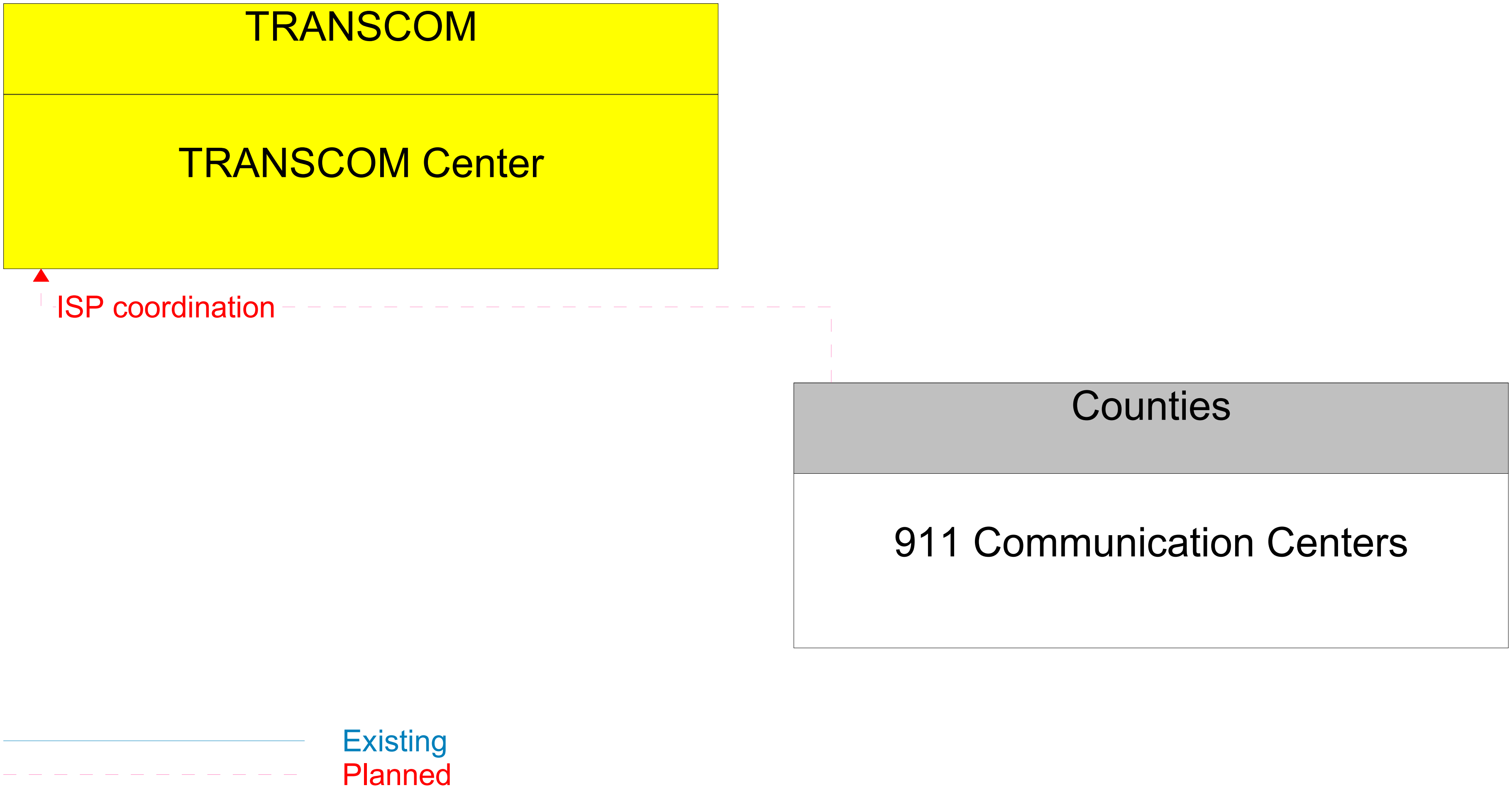
ISP coordination

TRANSCOM

TRANSCOM Center

Existing

Planned



TRANSCOM

TRANSCOM Center

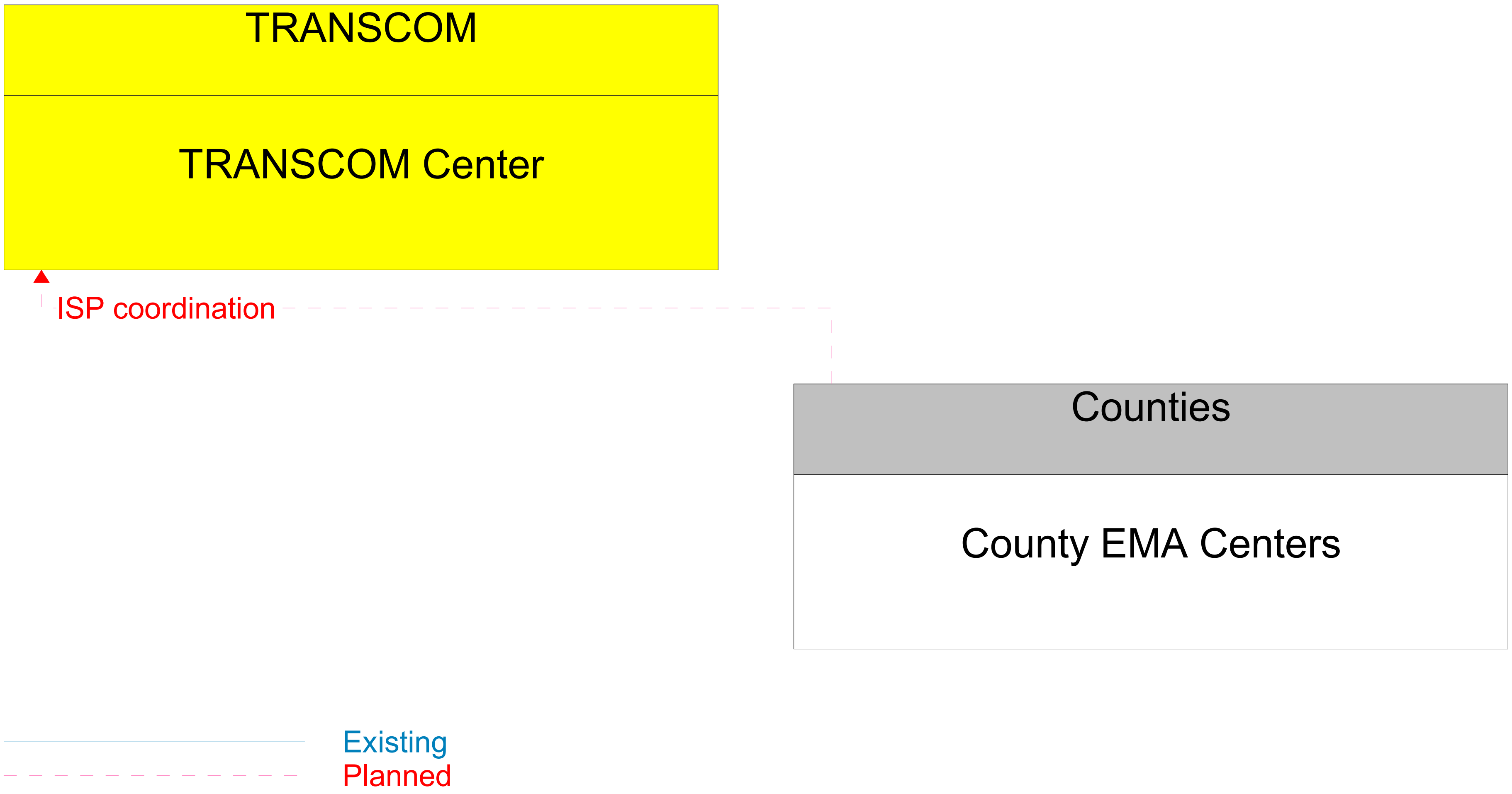
ISP coordination

Counties

911 Communication Centers

Existing

Planned



TRANSCOM

TRANSCOM Center

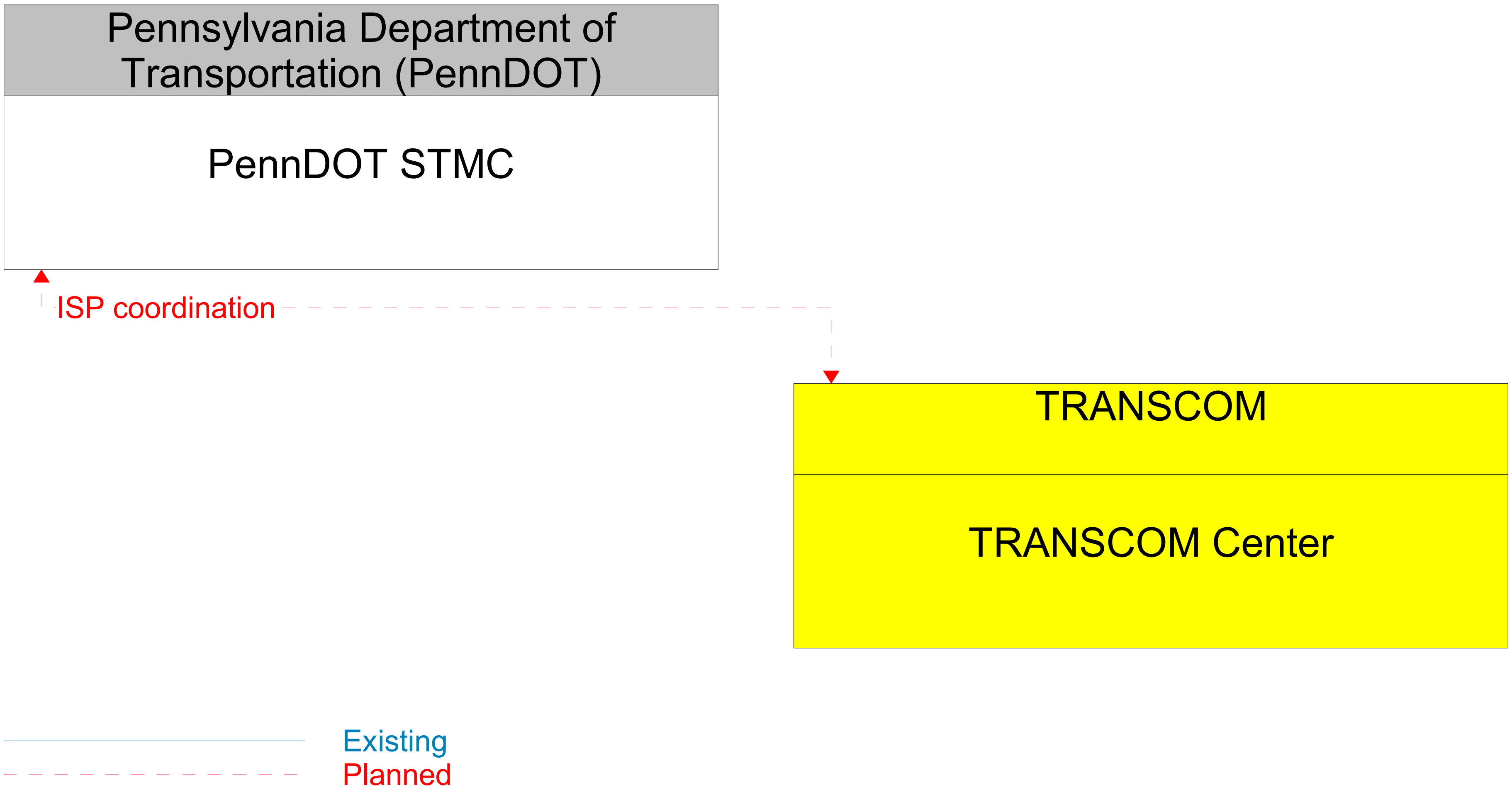
ISP coordination

Counties

County EMA Centers

Existing

Planned



Pennsylvania Department of Transportation (PennDOT)

PennDOT STMC

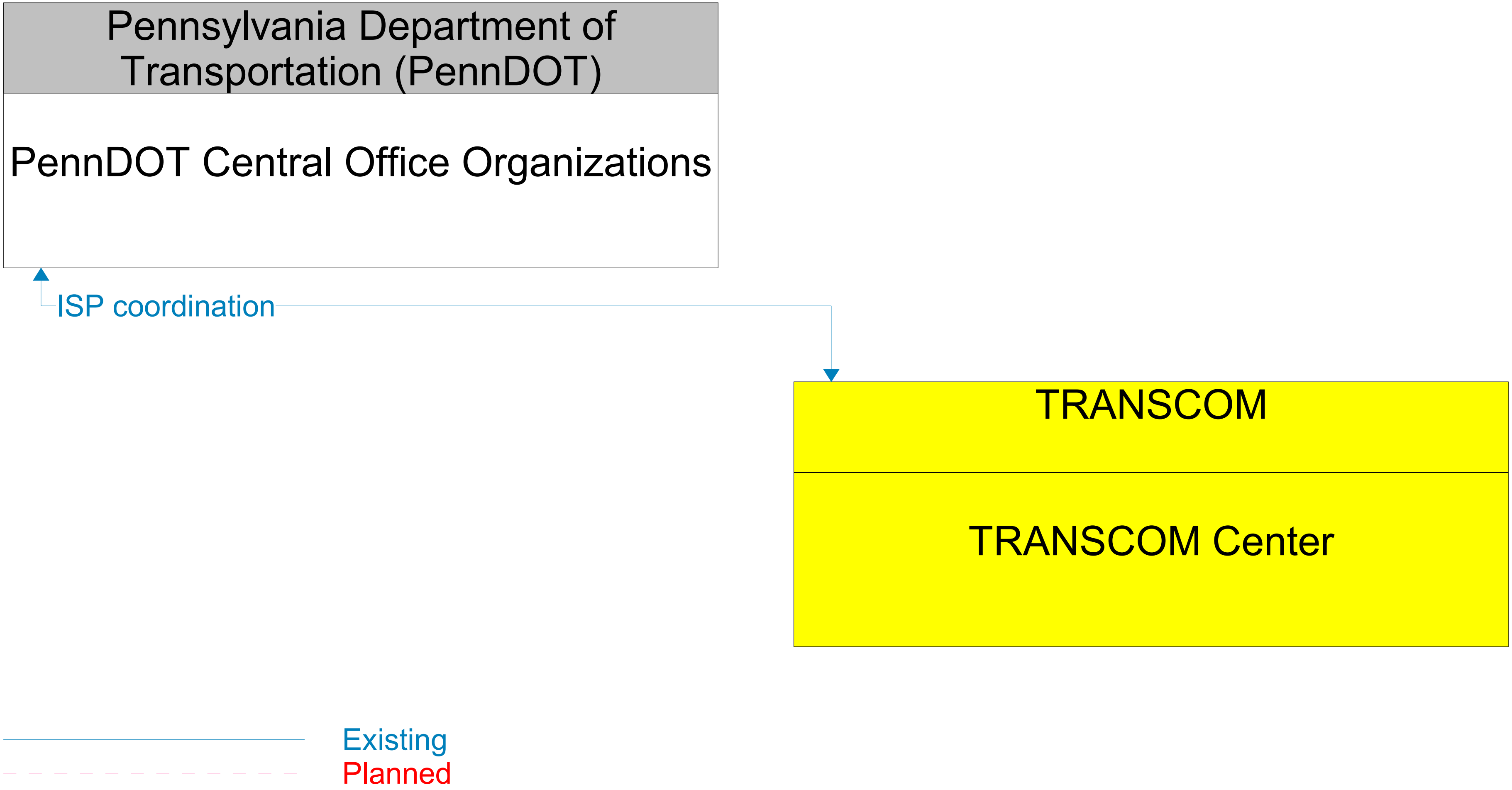
ISP coordination

TRANSCOM

TRANSCOM Center

Existing

Planned



Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Organizations

ISP coordination

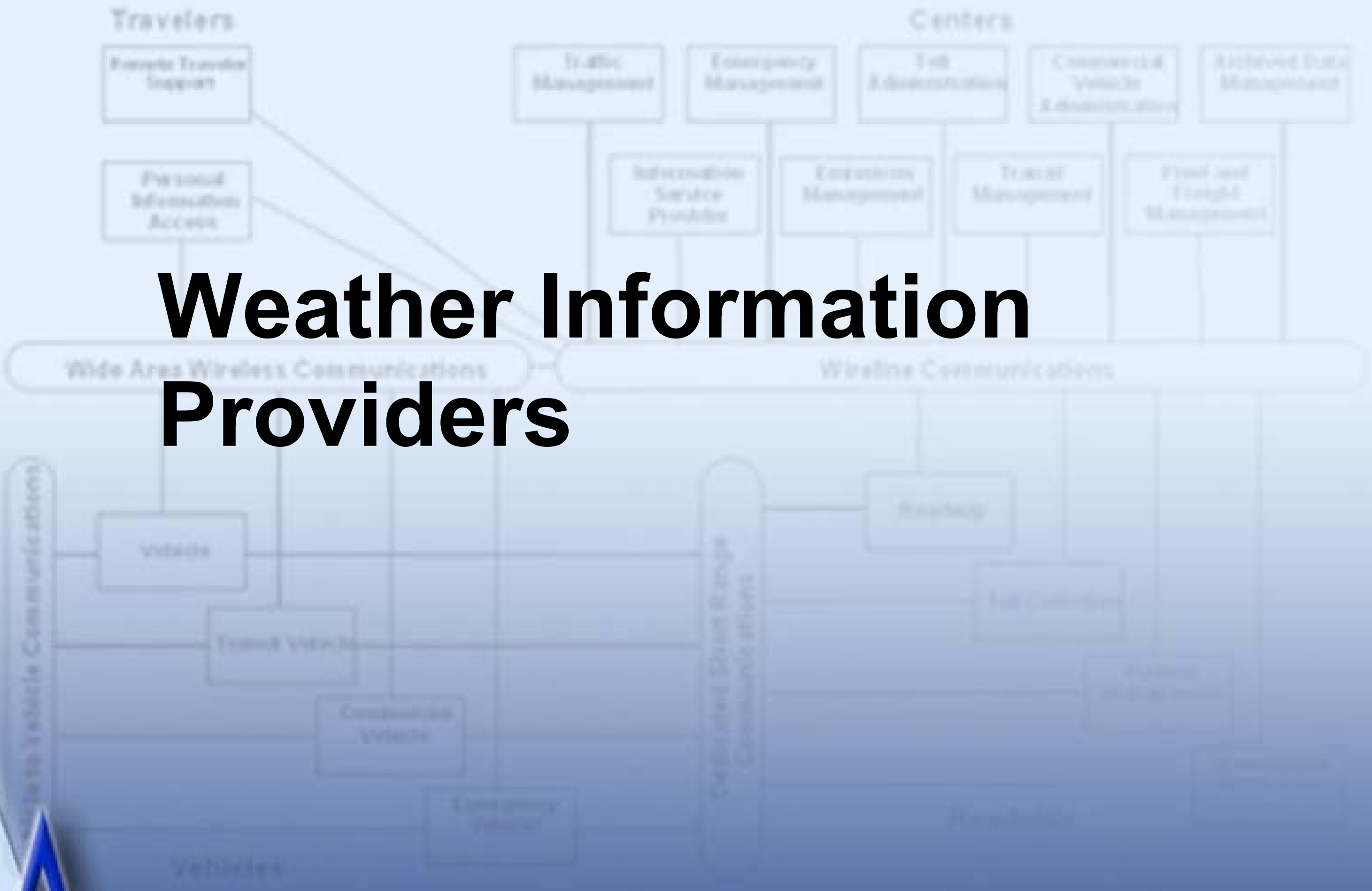
TRANSCOM

TRANSCOM Center

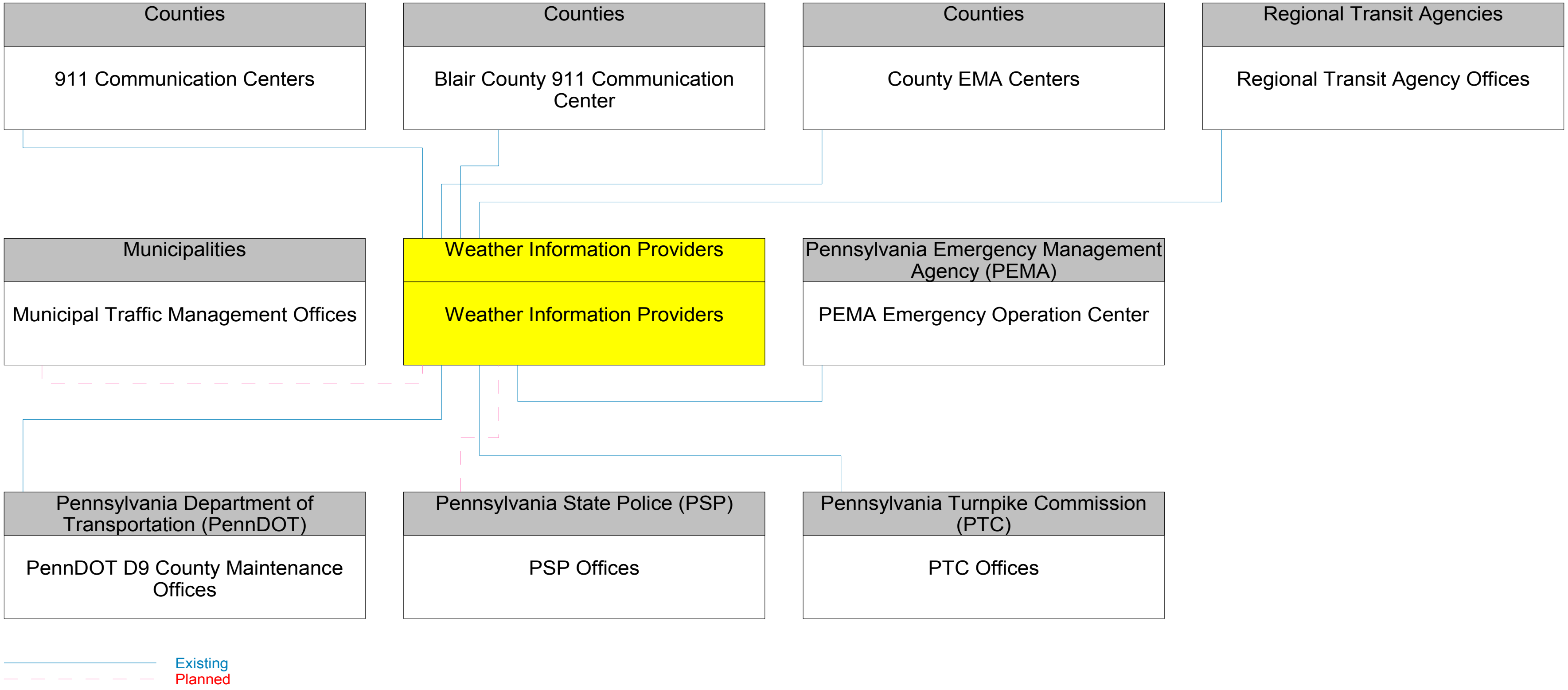
Existing

Planned

Weather Information Providers



Weather Information Providers Interconnect Diagram



Counties

911 Communication Centers

Counties

Blair County 911 Communication Center

Counties

County EMA Centers

Regional Transit Agencies

Regional Transit Agency Offices

Municipalities

Municipal Traffic Management Offices

Weather Information Providers

Weather Information Providers

Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 County Maintenance Offices

Pennsylvania State Police (PSP)

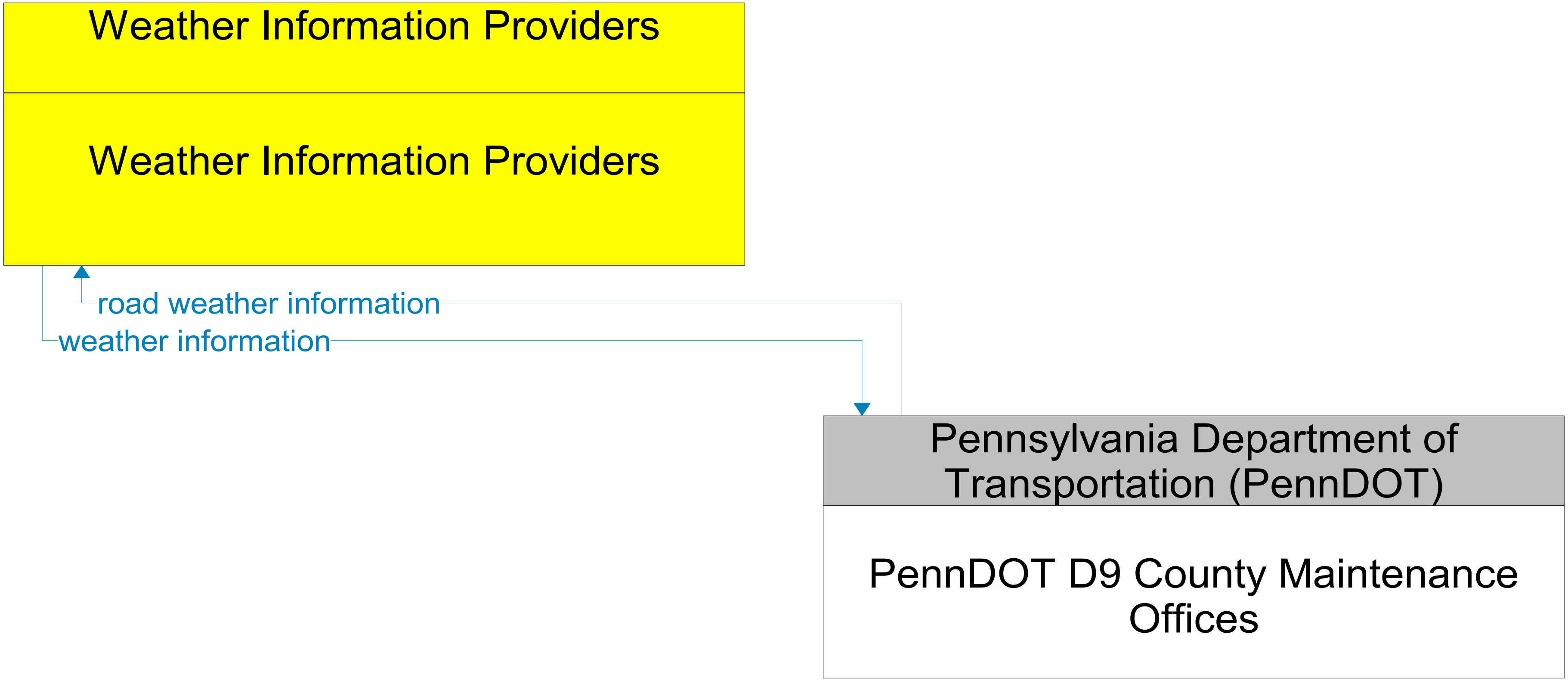
PSP Offices

Pennsylvania Turnpike Commission (PTC)

PTC Offices

Existing

Planned



Weather Information Providers

Weather Information Providers

road weather information

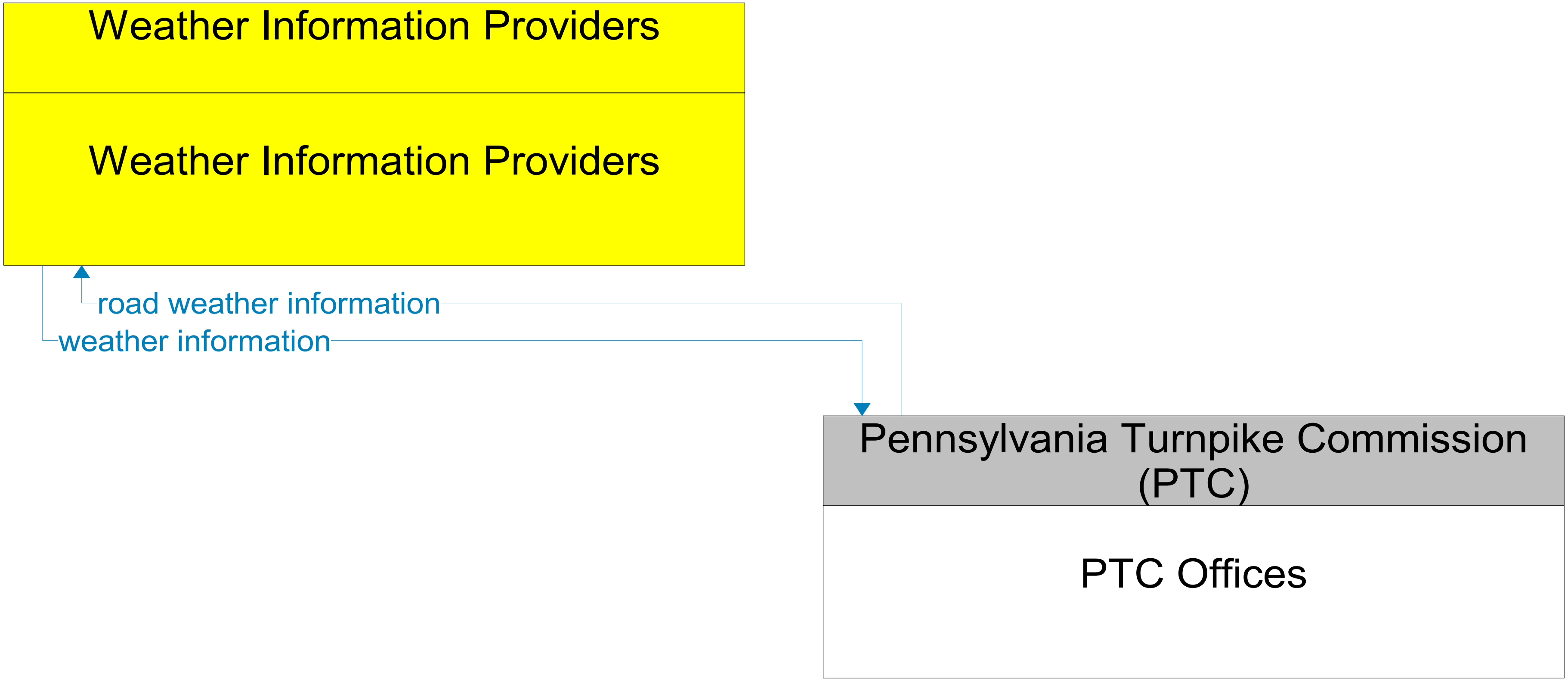
weather information

Pennsylvania Department of Transportation (PennDOT)

PennDOT D9 County Maintenance Offices

Existing

Planned



Weather Information Providers

Weather Information Providers

road weather information

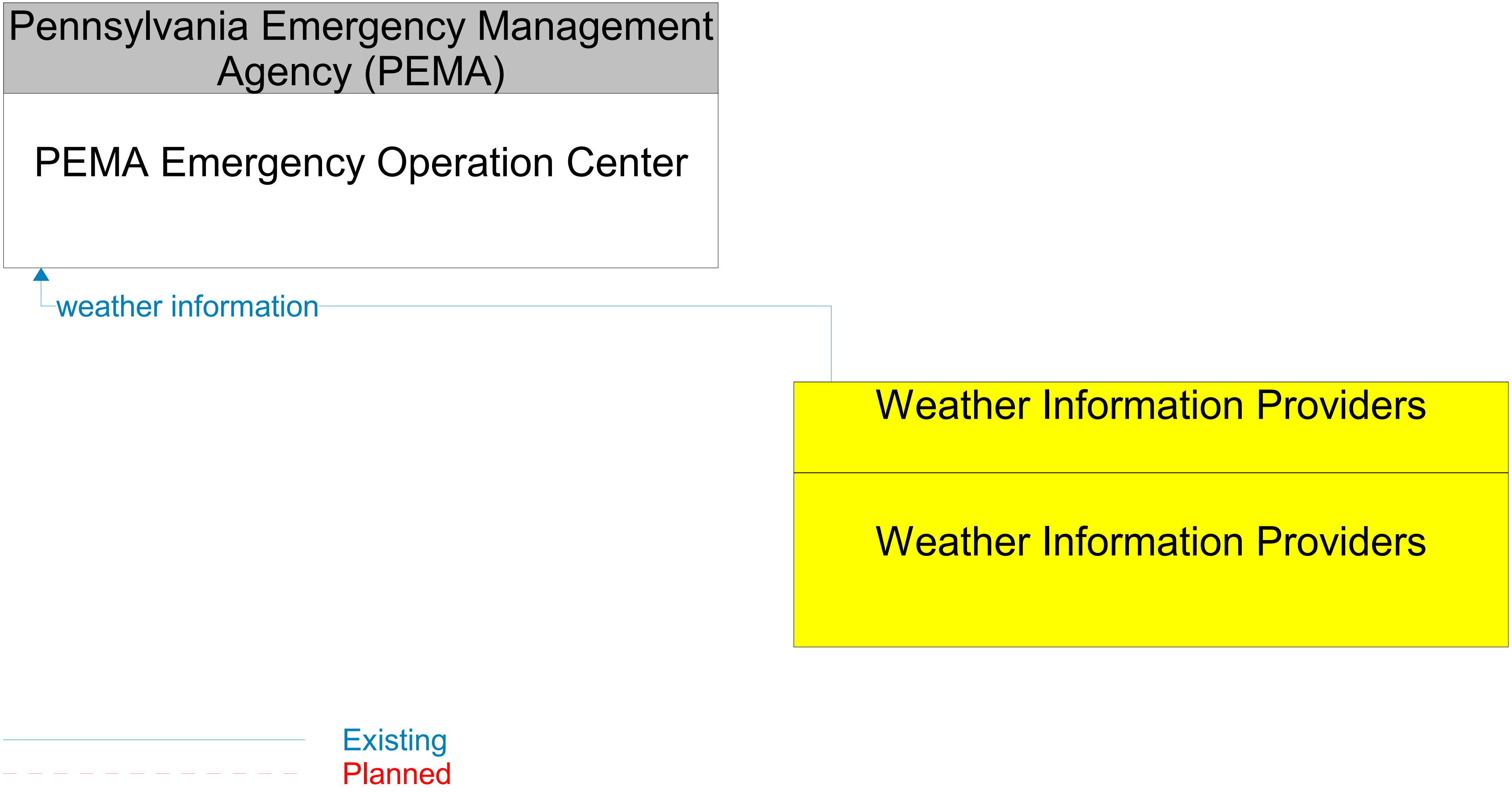
weather information

Pennsylvania Turnpike Commission (PTC)

PTC Offices

Existing

Planned



Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

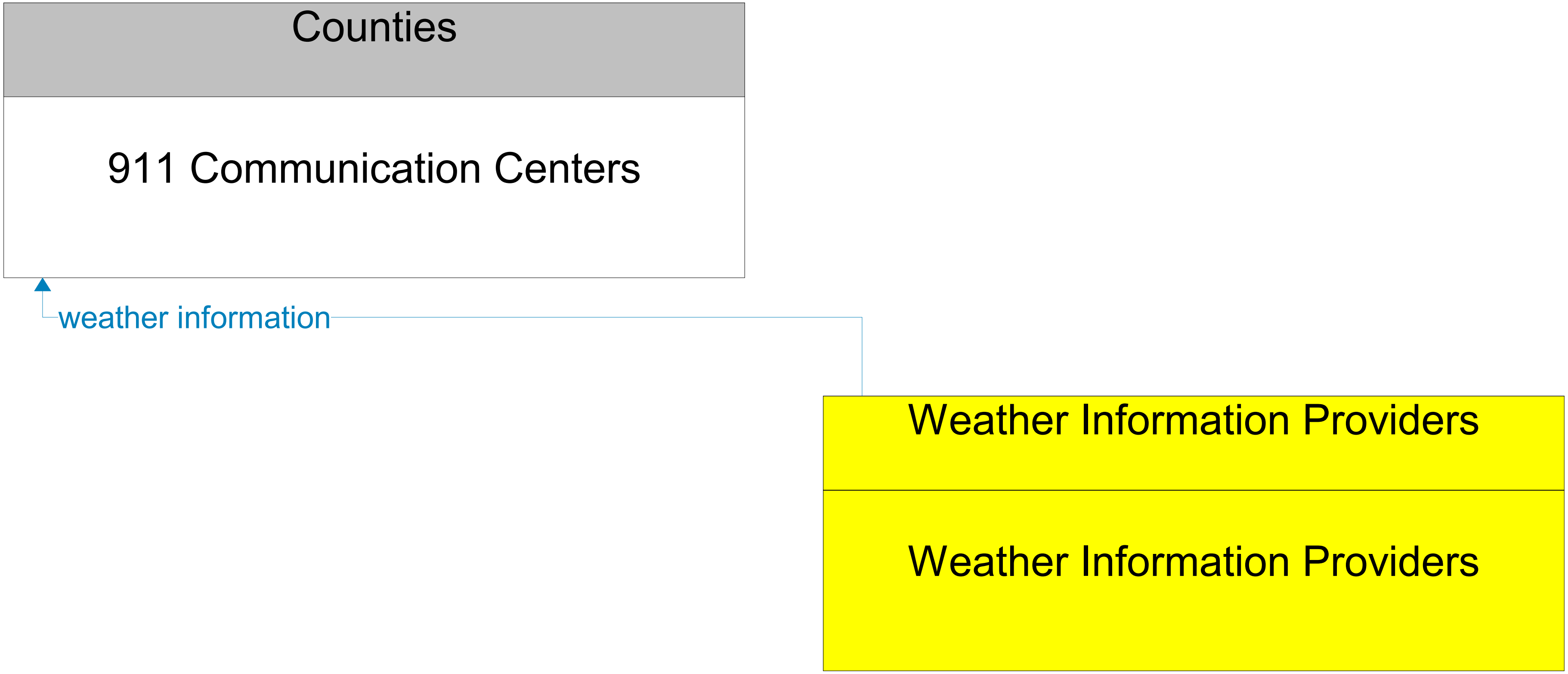
weather information

Weather Information Providers

Weather Information Providers

Existing

Planned



Counties

911 Communication Centers

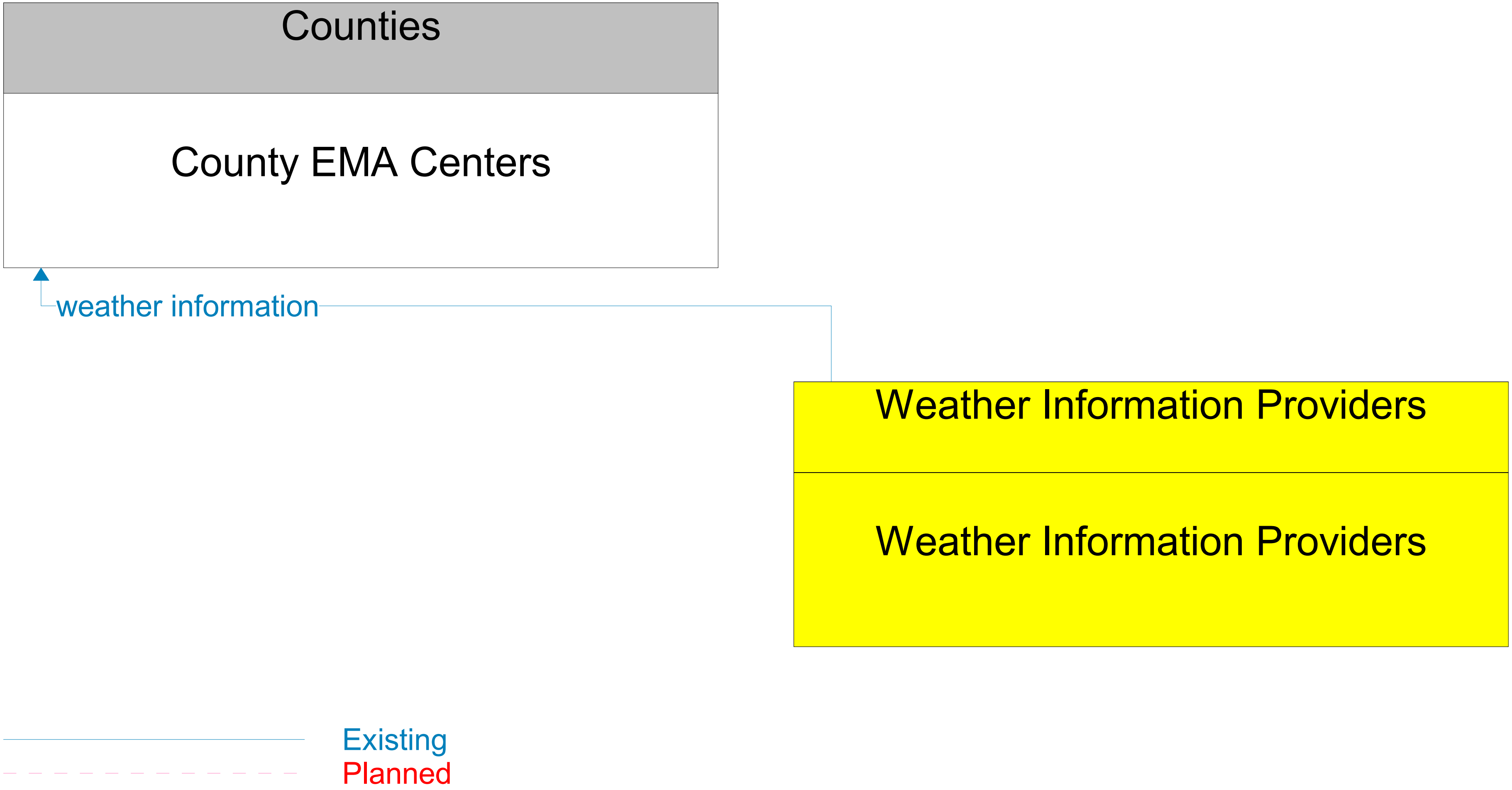
weather information

Weather Information Providers

Weather Information Providers

Existing

Planned



Counties

County EMA Centers

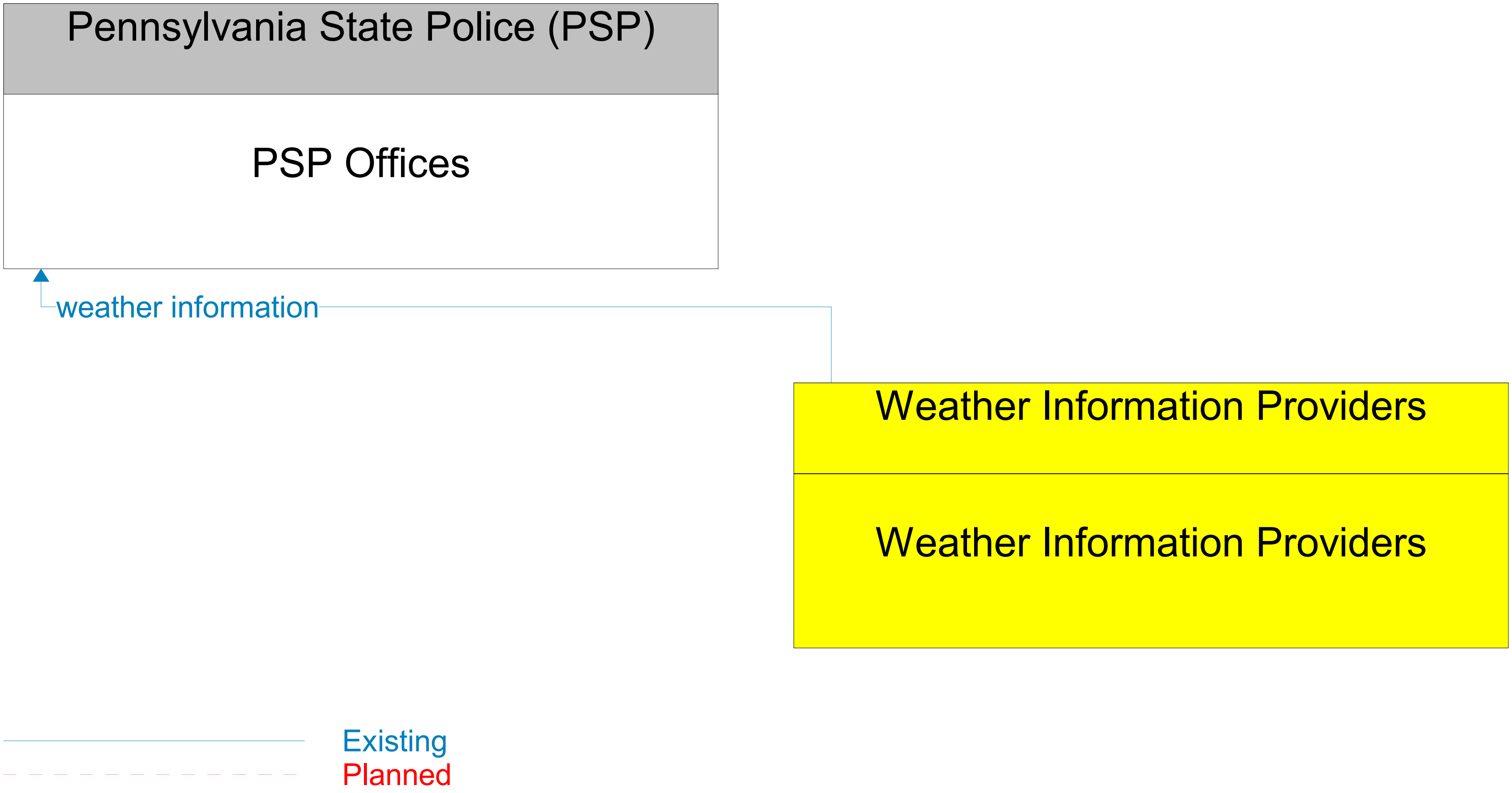
weather information

Weather Information Providers

Weather Information Providers

Existing

Planned



Pennsylvania State Police (PSP)

PSP Offices

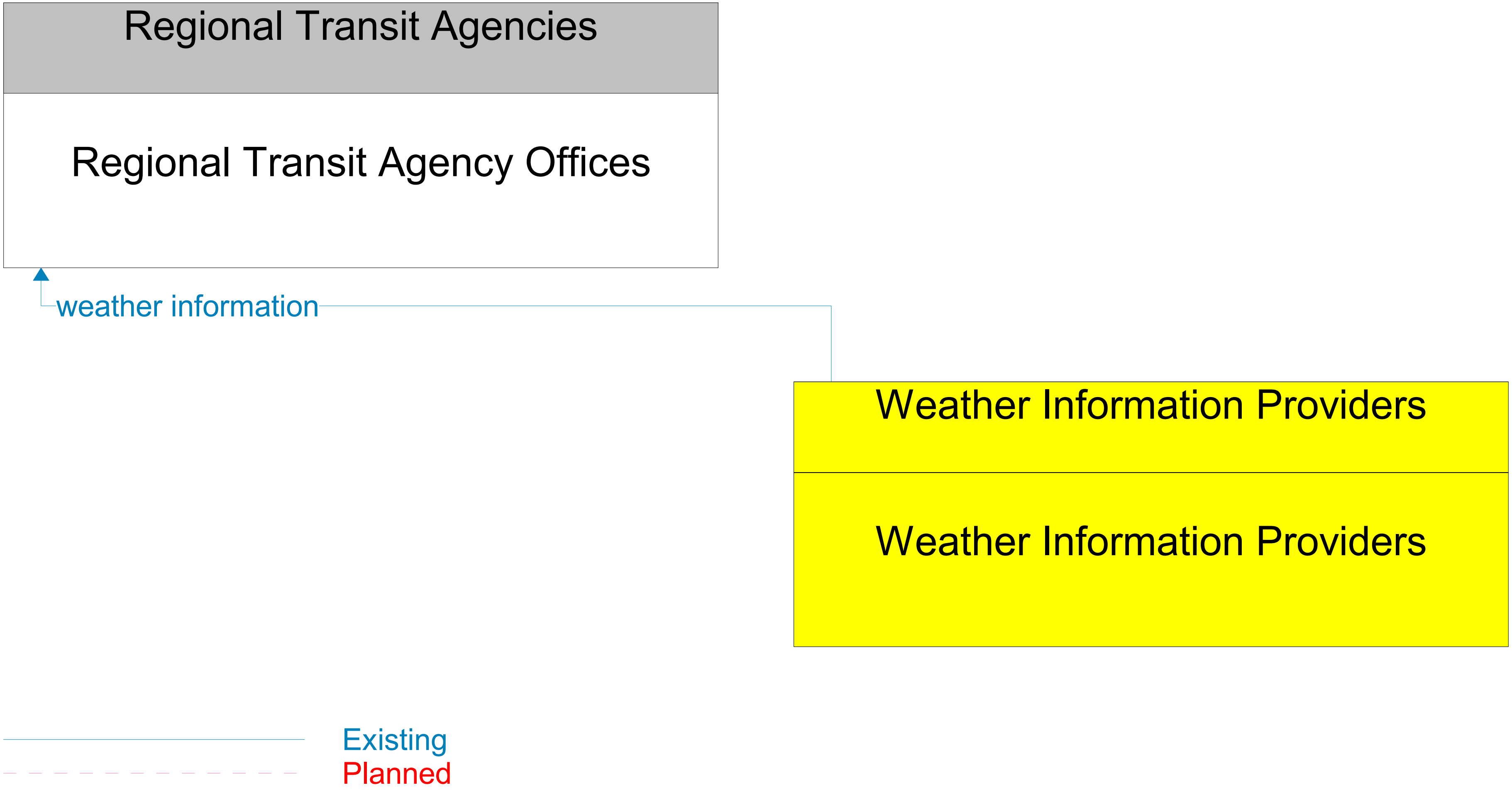
weather information

Weather Information Providers

Weather Information Providers

Existing

Planned



Regional Transit Agencies

Regional Transit Agency Offices

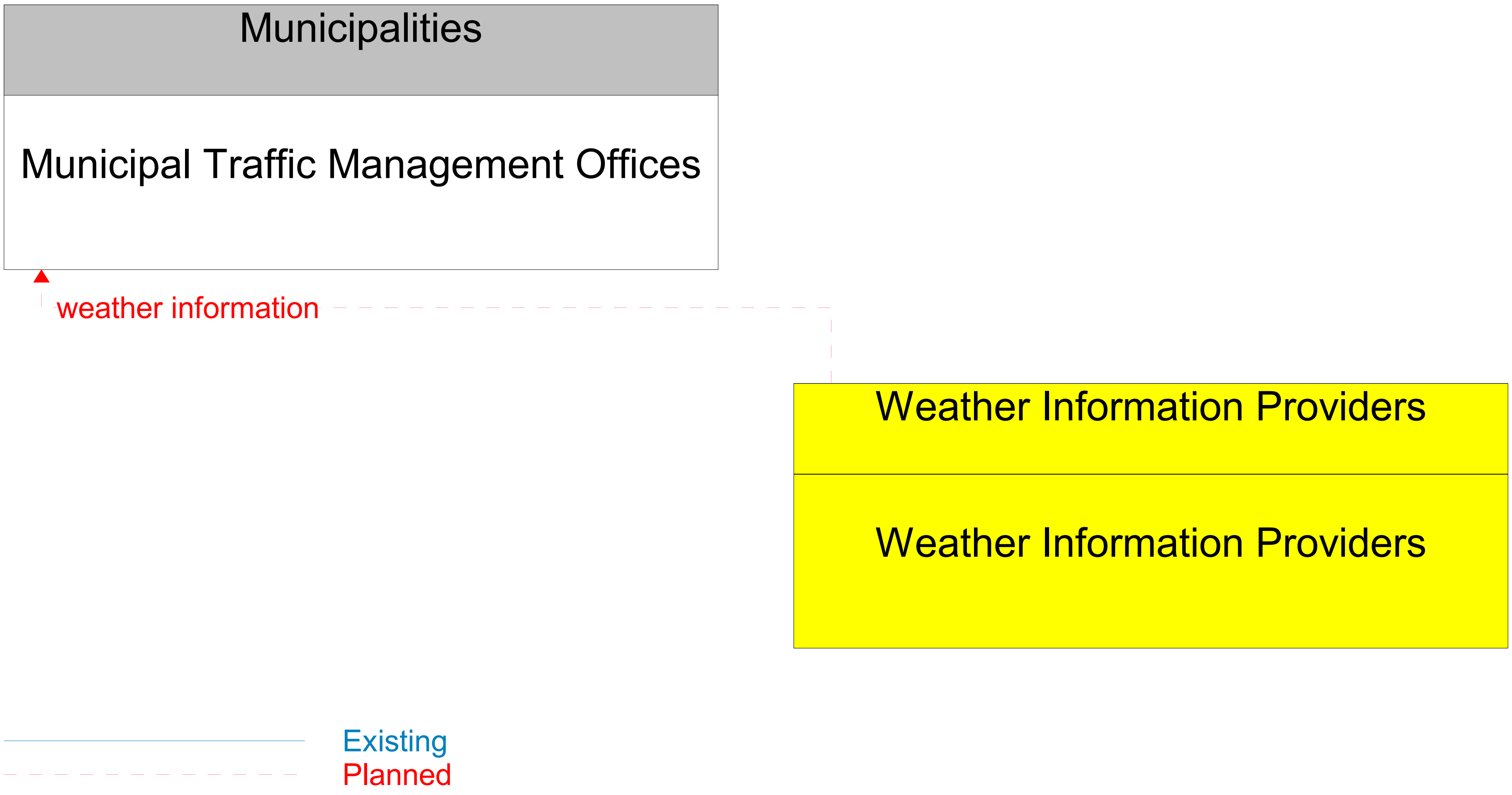
weather information

Weather Information Providers

Weather Information Providers

Existing

Planned



Municipalities

Municipal Traffic Management Offices

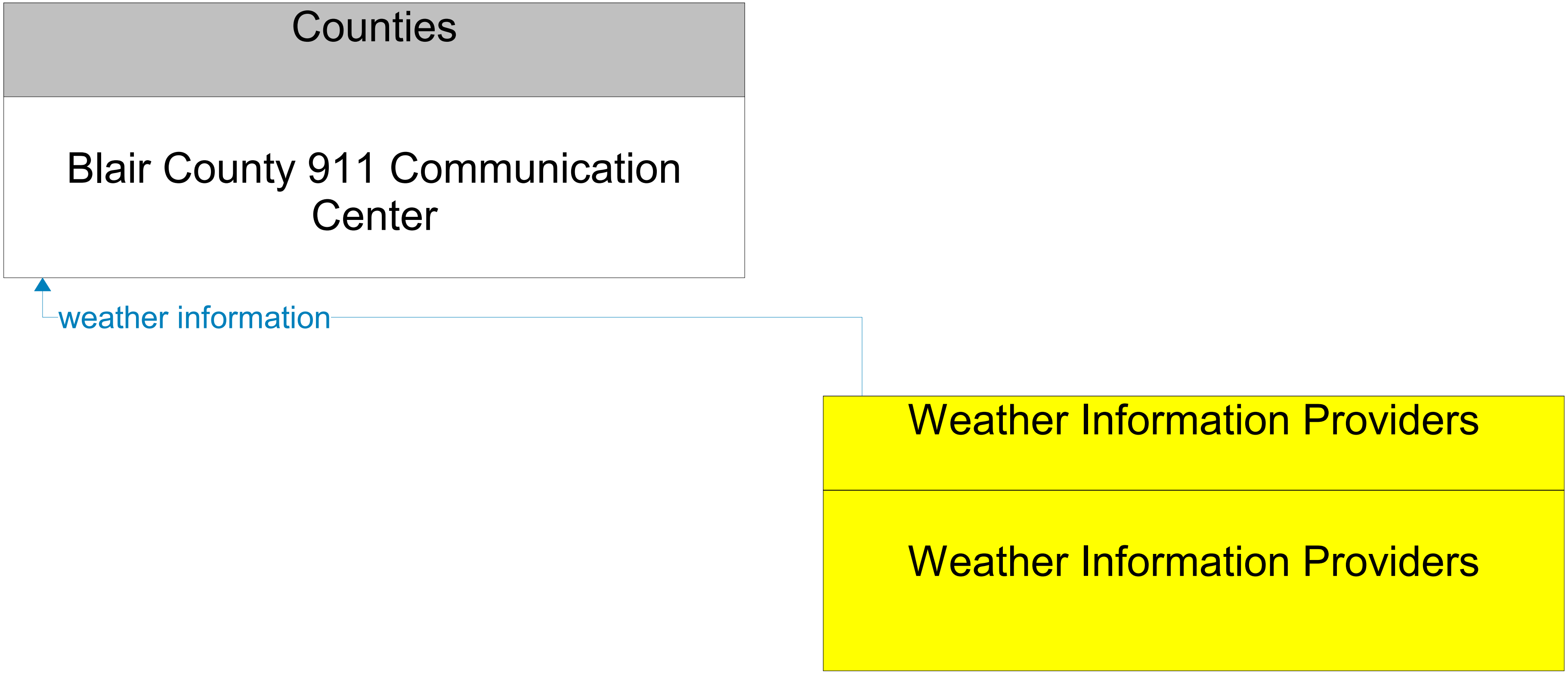
weather information

Weather Information Providers

Weather Information Providers

Existing

Planned



Counties

Blair County 911 Communication Center

weather information

Weather Information Providers

Weather Information Providers

Existing

Planned

References

The following references were utilized in the development of the Southern Alleghenies Regional ITS Architecture:

- *PennDOT Bureau of Planning and Research – 2002 Highway Statistics*. http://www.dot.state.pa.us Last viewed, April 2004.
- *DVRPC Regional ITS Architecture – Version 1.0*. Delaware Valley Regional Planning Commission. Philadelphia, PA. March 2001.
- *National ITS Architecture – Version 4.0*. http://itsarch.iteris.com/itsarch Last viewed, April 2004.
- *United States Census Bureau*. http://www.census.gov Last viewed, April 2004.
- *P*ennsylvania ITS Architecture Phase I – Final Report, PennDOT, February 2003

Appendix A: Acronyms

24x7	Twenty Four Hours of Operation, Seven Days a Week
AAA	American Automobile Association
AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
AHS	Automated Highway System
AMTRAN	Altoona Metro Transit
ANSI	American National Standards Institute
ARMS	Automatic Real-Time Messaging
ASTM	American Society of Testing and Materials
ATIS	Advanced Traveler Information System
ATR	Automatic Traffic Recorders
AVL	Automatic Vehicle Location
BHSTE	Bureau of Highway Safety and Traffic Engineering
BOMO	Bureau of Maintenance and Operations
BPR	Bureau of Planning and Research
BRT	Bus Rapid Transit
CamTRAN	Cambria County Transit Authority
CCTV	Closed Circuit Television
CDC	Consolidated Dispatch Centers
CDL	Commercial Drivers License
CVC	Commercial Vehicle Check
CVISN	Commercial Vehicle Information Systems and Networks
CVO	Commercial Vehicle Operations
DARC	Data Radio Channel
DMS	Dynamic Message Signs
DMV	Department of Motor Vehicles
DOT	Department of Transportation
DSRC	Designated Short Range Communication
EMA	Emergency Management Agency
EMS	Emergency Medical Services
ESP	Emergency Service Patrol
ETC	Electronic Toll Collection
E-Z Pass	Electronic toll collection system used by a consortium of toll authorities in northeast United States
FCC	Federal Communication Commission
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GIS	Geographic Information System
GPS	Global Positioning System
HAR	Highway Advisory Radio
HAT	Highway Advisory Telephone System
HAZMAT	Hazardous Materials
HIA	Harrisburg International Airport

HOV	High Occupancy Vehicle
HRI	Highway Rail Intersection
IEEE	Institute of Electrical and Electronics Engineers
IEN	Information Exchange Network
IM	Incident Management
IIMS	Incident Information Management System
IMMS	Incident Management Message Sets
ISP	Information Service Provider
ITS	Intelligent Transportation System
MCSAP	Motor Carrier Safety Assistance Program
MDSHA	Maryland State Highway Administration
MEMA	Maryland Emergency Management Agency
MOE	Measures of Effectiveness
MOU	Memorandum of Understanding
m.p.	Milepost
NEMA	National Electrical Manufacturers Association
NHI	National Highway Institute
NTCIP	National Transportation Communications for ITS Protocols
NWS	National Weather Service
OB	Onboard
OER	Octet Encoding Rules
O&M	Operations and Maintenance
OEM	Office of Emergency Management
PDA	Personal Digital Assistant
PEIRS	Pennsylvania Emergency Information Reporting System
PEMA	Pennsylvania Emergency Management Agency
PennDOT	Pennsylvania Department of Transportation
PRISM	Performance and Registration Information Systems Management
PSP	Pennsylvania State Police
PSAP	Public Safety Answering Point
PTC	Pennsylvania Turnpike Commission
RAP	Regional Advisory Panel
RAPID	Regional Agile Port Intermodal Distribution System
RPO	Rural Planning Organization
RTMC	Regional Transportation Management Center
RWIS	Road Weather Information System
SAFER	Safety and Fitness Electronic Record
SATIN	Service Area Travelers Interactive Network
SCADA	Supervisory Control and Data Acquisition
SCH	Scheduling/Run Cutting
SFA	Strategic Focus Area
STMC	Statewide Transportation Management Center
STMF	Simple Transportation Management Framework
T-1	High Bandwidth Telephone Line
TIP	Transportation Improvement Plan
TMC	Transportation Management Center
WIM	Weigh in Motion

Appendix B: ITS Definitions

(Source: DVRPC Regional ITS Architecture)

The following definitions for ITS terms may or may not apply specifically to the Region. They are provided as reference material to support ITS terminology found in and outside of this report.

Automatic Vehicle Location: This technology is used by various agencies, including transit and emergency management agencies, to constantly monitor the location of their vehicles. Transit agencies utilize AVL as a management tool to track the progress of buses and to determine when remedial action is required if buses are not adhering to schedule. Emergency dispatchers rely upon AVL to help guide their selection of which vehicle to dispatch to a call. AVL technology relies upon GPS or triangulation as the mechanism for locating vehicles.

Cellular Phone Number for Incident Reporting: Several toll authorities have reserved cellular phone numbers, such as *11 for the Pennsylvania Turnpike, for use by motorists to report disabled vehicles or incidents while en-route. The numbers are usually toll-free and go directly to the agency's operations center. Several highway departments have posted signs directing motorists to dial cellular 911 to report incidents.

Closed Circuit Television: CCTV is real-time video surveillance equipment, monitored and manipulated by operations personnel. For highways, CCTV's are installed at locations where accident rates and/or congestion levels are known to be high. The cameras dispatch real-time video images to the traffic operation centers so that in emergency situations a quicker response can be provided. Transit agencies deploy CCTV cameras to observe transit passengers for transit management (crowding levels), fare collection, and security purposes.

Closed Loop Traffic Signal System: For this system, traffic signals are interconnected along specified corridors to provide for ease in traffic flow. The signals may be monitored by detectors and adjusted according to current traffic conditions, or preprogrammed with a number of signal timing plans that vary by time of day and day of week.

Commercial Vehicle Electronic Administration Processes: This process allows commercial vehicle operators to obtain necessary permits via computer and supports the exchange of safety and credentials data among multiple jurisdictions and between agencies within a single jurisdiction.

Dynamic Message Sign: The purpose of the DMS's is to provide real-time en-route travel advisories to travelers. For highways, the DMS signs are either centered over travel lanes or placed alongside the roadway. Messages on permanent DMS signs typically originate from a traffic control center. For transit systems, DMS's take the form of dynamic message boards located in waiting areas and/or platforms to provide information on train arrivals, departures, and platform locations.

Emergency Call Boxes: Emergency call boxes permit travelers who do not have cellular phones a mechanism to report accidents and other emergency situations. They are used by both highway and transit travelers. Call boxes are typically located along the side of an expressway at mile or half mile intervals. Transit agencies place them in waiting areas and on platforms to improve the security of passengers.

E-Z Pass: E-Z Pass is an electronic toll collection system developed by a consortium of toll agencies located in the northeast United States. When a vehicle passes through an E-Z Pass designated toll lane, an electronic tag, in the form of a small box mounted on a vehicle windshield, is detected by an antenna and the appropriate toll is deducted from the customer's prepaid E-Z Pass account. Because of the alliance, E-Z Pass will eventually be employed on all toll bridges and roads in the region.

Highway Advisory Radio: HAR provides travelers with real-time roadway information, including weather information, agency hotline numbers, incident information, and roadway construction advisories, directly over their car radio. The FCC reserves certain AM and FM frequencies specific to whatever jurisdiction in which they are located for public agencies to broadcast these special travel advisories.

Kiosks: A number of organizations have plans to install travel information kiosks at tourist centers, government buildings, and highway service areas.
Travelers will be able to obtain current traffic and transit information, information about places to visit, route planning information, and hotel reservations. Generally kiosks will be more interactive and offer more choices than the static traveler information services currently available.

Management Center: Management centers are the focal point and communications hub of an agency’s operation. Almost all transit, highway and bridge agencies in the region have their own control centers. These facilities monitor and control an agency’s highway or transit network and are responsible for incident management. While the equipment in each operating center varies by agency, the typical control center consists of any number of computer workstations, radio scanners, TV monitors, audio text recording booths to record HAR messages, and fax machines for broadcasting information to other agencies. Depending on agency needs, a highway control center can include capabilities to operate computerized traffic signal systems, Dynamic message signs and highway advisory radios, monitor CCTV’s, manage emergency service patrols, and coordinate incident management response teams. Composition of transit operation centers vary based upon whether rail or bus operations are involved.

Ramp Metering: Ramp metering is designed to control the rate of traffic entering a freeway. The objective is to maintain a predetermined level of service on the freeway by adjusting the on-ramp traffic volume with a traffic control signal. Typical waiting times at ramp metering signals are between 5 to 6 seconds per vehicle.

Road Weather Information System: RWIS are typically installed at locations that experience a higher-than-average number of accidents attributable to fog, snow or icy conditions. Sensor information can be used to more effectively deploy road maintenance resources, issue weather-specific warnings to drivers and general advisories to motorists. Weather sensors are connected to remote processing units located in the field which measure, collect, and pre-process environmental data and then transmit the information to an operations center where staff can act on the information.

Signal Priority: This technology allows transit vehicles to send direct control requests to signalized intersections. These messages result in preemption of the current signal control plan and grants right-of-way to the requesting transit and emergency vehicles.

Service Patrols: The Service Patrol program is designed to improve the efficiency of the highway system through the quick resolution of minor incidents, including disabled vehicles, vehicles out of gas, and minor accidents that impact traffic flow. Service Patrol vans patrol along highways and provide assistance to disabled vehicles. Service Patrol operators are equipped to perform minor repairs such as changing a flat tire or providing gasoline. When major repairs are needed, Service Patrol operators can assist the motorist in contacting a towing company to remove the disabled vehicle. Service Patrol's also reduce the risk of secondary accidents by deploying appropriate warning devices.

Traveler Cards: This technology provides the capability for the traveler to use a common fare instrument for all surface transportation services (i.e., multiple transit agencies, parking facilities, toll roads), to pay without stopping, and have the payment media automatically identified as invalid or its eligibility verified. In addition, smart cards have the capability to provide expansion into other uses as payment for retail purchases, telephone services and for off-line billing for fares paid to agencies.

Traveler Information Website: This type of website is used to access traveler information prior to starting a trip. Currently, most of the existing travel websites in the region offer only construction or special event information. Eventually, real- time, route-specific travel reports will be found on the websites. SmartRoute, under contract to PennDOT, provides real-time travel information on selected highways and transit facilities in the region.

Weigh-In-Motion Station: Weight measuring equipment, including fixed sensors embedded in the pavement, can ascertain the weight of a commercial vehicle at highway speeds to ensure the vehicle is operating within legal weight limits. Ultimately, WIM stations will be utilized to assess motor vehicle taxes on commercial carriers.

Appendix C: Subsystem and Terminator Definitions

(Source: National ITS Architecture)

Appendix C contains the subsystems and terminators from the National ITS Architecture exclusive to the Regional ITS Architecture:

Archived Data Management: The Archived Data Management Subsystem collects, archives, manages, and distributes data generated from ITS sources for use in transportation administration, policy evaluation, safety, planning, performance monitoring, program assessment, operations, and research applications. The data received is formatted, tagged with attributes that define the data source, conditions under which it was collected, data transformations, and other information (i.e. meta data) necessary to interpret the data. The subsystem can fuse ITS generated data with data from non-ITS sources and other archives to generate information products utilizing data from multiple functional areas, modes, and jurisdictions. The subsystem prepares data products that can serve as inputs to Federal, State, and local data reporting systems. This subsystem may be implemented in many different ways. It may reside within an operational center and provide focused access to a particular agency's data archives. Alternatively, it may operate as a distinct center that collects data from multiple agencies and sources and provides a general data warehouse service for a region.

Archived Data User Systems: This terminator represents the systems users employ to access archived data. The general interface provided from this terminator allows a broad range of users (e.g. planners, researchers, analysts, operators) and their systems (e.g. databases, models, analytical tools, user interface devices) to acquire data and analyses results from the archive.

Commercial Vehicle Administration: The Commercial Vehicle Administration Subsystem will operate at one or more fixed locations within a region. This subsystem performs administrative functions supporting credentials, tax, and safety regulations. It issues credentials, collects fees and taxes, and supports enforcement of credential requirements. This subsystem communicates with the Fleet Management Subsystems associated with the motor carriers to process credentials applications and collect fuel taxes, weight/distance taxes, and other taxes and fees associated with commercial vehicle operations. The subsystem also receives applications for, and issues special Oversize/Overweight and HAZMAT permits in coordination with other cognizant authorities. The subsystem coordinates with other Commercial Vehicle Administration Subsystems (in other states/regions) to support nationwide access to credentials and safety information for administration and enforcement functions. This subsystem supports communications with Commercial Vehicle Check Subsystems operating at the roadside to enable credential checking and safety information collection. The collected safety information is processed, stored, and made available to qualified stakeholders to identify carriers and drivers that operate unsafely.

Commercial Vehicle Check: The Commercial Vehicle Check Subsystem supports automated vehicle identification at mainline speeds for credential checking, roadside safety inspections, and weigh-in-motion using two-way data exchange. These capabilities include providing warnings to the commercial vehicle drivers, their fleet managers, and proper authorities of any safety problems that have been identified, accessing and examining historical safety data, and automatically deciding whether to allow the vehicle to pass or require it to stop with operator manual override. The Commercial Vehicle Check Subsystem also provides supplemental inspection services to current capabilities by supporting expedited brake inspections, the use of operator hand-held devices, on-board safety database access, and the enrollment of vehicles and carriers in electronic clearance.

Commercial Vehicle Subsystem: This subsystem resides in a commercial vehicle and provides the sensory, processing, storage, and communications functions necessary to support safe and efficient commercial vehicle operations. The Commercial Vehicle Subsystem provides two-way communications between the commercial vehicle drivers, their fleet managers, and roadside officials, and provides HAZMAT response teams with timely and accurate cargo contents information after a vehicle incident. This subsystem provides the capability to collect and process vehicle, cargo, and driver safety data and status and alert the driver whenever there is a potential safety problem. Basic identification and safety status data are supplied to inspection facilities at mainline speeds.

Emergency Management: The Emergency Management Subsystem represents public safety and other allied agency systems that support coordinated traffic incident management and emergency response. The subsystem includes the functions associated with fixed and mobile public safety communications centers includes various public safety call taker and dispatch centers operated by police, fire, and emergency medical services. This subsystem also represents other allied systems including centers associated with towing and recovery, freeway service patrols, HAZMAT response teams, mayday service providers, and security/surveillance services that improve traveler security in public areas. This subsystem interfaces with other Emergency Management Subsystems to support coordinated emergency response involving multiple agencies. The subsystem creates, stores, and utilizes emergency response plans to facilitate coordinated response. The subsystem tracks and manages emergency vehicle fleets using automated vehicle location technology and two way communications with the vehicle fleet. Real-time traffic information received from the other center subsystems is used to further aide the emergency dispatcher in selecting the emergency vehicle(s) and routes that will provide the timeliest response. Interface with the Traffic Management Subsystem allows strategic coordination in tailoring traffic control to support en-route emergency vehicles. Interface with the Transit Management Subsystem allows coordinated use of transit vehicles to facilitate response to major emergencies.

Emergency Telecommunications System: This terminator represents the telecommunications systems that connect a caller with a Public Safety Answering Point (PSAP). These systems transparently support priority wireline and wireless caller access to the PSAP through 9-1-1 and other access mechanisms like 7 digit local access numbers, and motorist aid call boxes. The calls are routed to the appropriate PSAP, based on caller location when this information is available.

Emergency Vehicle: This subsystem resides in an emergency vehicle and provides the sensory, processing, storage, and communications functions necessary to support safe and efficient incident response. The subsystem represents a range of vehicles including those operated by police, fire, and emergency medical services. In addition, this subsystem represents other incident response vehicles including towing and recovery vehicles and freeway service patrols. The Emergency Vehicle Subsystem includes two-way communications to support coordinated response to emergencies in accordance with an associated Emergency Management Subsystem. Emergency vehicles are equipped with automated vehicle location capability for monitoring by vehicle tracking and fleet management functions in the Emergency Management Subsystem. Using these capabilities, the appropriate emergency vehicle to respond to each emergency is determined. Route guidance capabilities within the vehicle enable safe and efficient routing to the emergency. In addition, the emergency vehicle may be equipped to support signal preemption through communications with the Roadway Subsystem.

Fleet and Freight Management: The Fleet and Freight Management Subsystem provides the capability for commercial drivers and dispatchers to receive real-time routing information and access databases containing vehicle and cargo locations as well as carrier, vehicle, cargo and driver information. In addition, the capability to purchase credentials electronically shall also be provided, with automated and efficient connections to financial institutions and regulatory agencies, along with post-trip automated mileage and fuel usage reporting. The Fleet Management Subsystem also provides the capability for fleet managers to monitor the safety of their commercial vehicle drivers and fleet. The subsystem also supports application for hazmat credentials and makes information about hazmat cargo available to agencies as required. Within this subsystem lies all the functionality associated with subsystems and components necessary to enroll and participate in international goods movement programs aimed at enhancing trade and transportation safety.

Information Service Provider: This subsystem collects, processes, stores, and disseminates transportation information to system operators and the traveling public. The subsystem can play several different roles in an integrated ITS. In one role, the ISP provides a general data warehousing function, collecting information from transportation system operators and redistributing this information to other system operators in the region and other ISPs. In this information redistribution role, the ISP provides a bridge between the various transportation systems that produce the information and the other ISPs and their subscribers that use the information. The second role of an ISP is focused on delivery of traveler information to subscribers and the public at large. Information provided includes basic advisories, traffic and road conditions, transit schedule information, yellow pages information, ride matching information, and parking information. The subsystem also provides the capability to provide specific directions to travelers by receiving origin and destination requests from travelers, generating route plans, and returning the calculated plans to the users. In addition to general route planning for travelers, the ISP also supports specialized route planning for vehicle fleets. In this third role, the ISP function may be dedicated to, or even embedded within, the dispatch system. Reservation services are also provided in advanced implementations. The information is provided to the traveler through the Personal Information Access Subsystem, Remote Traveler Support Subsystem, and various Vehicle Subsystems through available communications links. Both basic one-way (broadcast) and personalized two-way information provision is supported. The subsystem provides the capability for an informational infrastructure to connect providers and consumers, and gather that market information needed to assist in the planning of service improvements and in maintenance of operations.

Maintenance and Construction Management: The Maintenance and Construction Management Subsystem monitors and manages roadway infrastructure construction and maintenance activities. Representing both public agencies and private contractors that provide these functions, this subsystem manages fleets of maintenance, construction, or special service vehicles (e.g., snow and ice control equipment). The subsystem receives a wide range of status information from these vehicles and performs vehicle dispatch, routing, and resource management for the vehicle fleets and associated equipment. The subsystem participates in incident response by deploying maintenance and construction resources to an incident scene, in coordination with other center subsystems. The subsystem manages equipment at the roadside, including environmental sensors and automated systems that monitor and mitigate adverse road and surface weather conditions. The subsystem manages the repair and maintenance of both non-ITS and ITS equipment including the traffic controllers, detectors, dynamic message signs, signals, and other equipment associated with the roadway infrastructure. Additional interfaces to weather information providers (the weather service and surface transportation weather service providers) provide current and forecast weather information that can be fused with other data sources and used to support advanced decision support systems that increase the efficiency and effectiveness of maintenance and construction operations.

The subsystem remotely monitors and manages ITS capabilities in work zones, gathering, storing, and disseminating work zone information to other systems. It manages traffic in the vicinity of the work zone and advises drivers of work zone status (either directly at the roadside or through an interface with the Information Service Provider or Traffic Management subsystems.) It schedules and manages the location and usage of maintenance assets (such as portable dynamic message signs). Construction and maintenance activities are tracked and coordinated with other systems, improving the quality and accuracy of information available regarding closures and other roadway construction and maintenance activities.

Maintenance and Construction Vehicle: This subsystem resides in a maintenance, construction, or other specialized service vehicles or equipment and provides the sensory, processing, storage, and communications functions necessary to support highway maintenance and construction. All types of maintenance and construction vehicles are covered, including heavy equipment and supervisory vehicles. The subsystem provides two-way communications between drivers/operators and dispatchers and maintains and communicates current location and status information. A wide range of operational status is monitored, measured, and made available, depending on the specific type of vehicle or equipment. For example, for a snow plow, the information would include whether the plow is up or down and material usage information. The subsystem may also contain capabilities to monitor vehicle systems to support maintenance of the vehicle itself and other sensors that monitor environmental conditions including the road condition and surface weather information. This subsystem can represent a diverse set of mobile environmental sensing platforms, including wheeled vehicles and any other vehicle that collects and reports environmental information.

Media: This terminator represents the information systems that provide traffic reports, travel conditions, and other transportation-related news services to the traveling public through radio, TV, and other media. Traffic and travel advisory information that are collected by ITS are provided to this terminator. It is also a source for traffic flow information, incident and special event information, and other events which may have implications for the transportation system.

Parking Management: The Parking Management Subsystem provides electronic monitoring and management of parking facilities. It supports a DSRC communications link to the Vehicle Subsystem that allows electronic collection of parking fees. It also includes the instrumentation, signs, and other infrastructure that monitors parking lot usage and provides local information about parking availability and other general parking information. This portion of the subsystem functionality must be located in the parking facility where it can monitor, classify, and share information with customers and their vehicles. The subsystem also interfaces with the financial infrastructure and broadly disseminates parking information to other operational centers in the region. Note that the latter functionality may be located in a back office, remote from the parking facility.

Personal Information Access: This subsystem provides the capability for travelers to receive formatted traffic advisories from their homes, place of work, major trip generation sites, personal portable devices, and over multiple types of electronic media. These capabilities shall also provide basic routing information and allow users to select those transportation modes that allow them to avoid congestion, or more advanced capabilities to allow users to specify those transportation parameters that are unique to their individual needs and receive travel information. This subsystem shall provide capabilities to receive route planning from the infrastructure at fixed locations such as in their homes, their place of work, and at mobile locations such as from personal portable devices and in the vehicle or perform the route planning process at a mobile information access location. In addition to end user devices, this subsystem may also represent a device that is used by a merchant or other service provider to receive traveler information and relay important information to their customers. This subsystem shall also provide the capability to initiate a distress signal and cancel a prior issued manual request for help.

Remote Traveler Support: This subsystem provides access to traveler information at transit stations, transit stops, other fixed sites along travel routes (e.g., rest stops, merchant locations), and at major trip generation locations such as special event centers, hotels, office complexes, amusement parks, and theaters. Traveler information access points include kiosks and informational displays supporting varied levels of interaction and information access. At transit stops, simple displays providing schedule information and imminent arrival signals can be provided. This basic information may be extended to include multi-modal information including traffic conditions and transit schedules along with yellow pages information to support mode and route selection at major trip generation sites. Personalized route planning and route guidance information can also be provided based on criteria supplied by the traveler. In addition to traveler information provision, this subsystem also supports public safety monitoring using CCTV cameras or other surveillance equipment and emergency notification within these public areas. Fare card maintenance, and other features which enhance traveler convenience may also be provided at the discretion of the deploying agency.

Roadway: This subsystem includes the equipment distributed on and along the roadway which monitors and controls traffic and monitors and manages the roadway itself. Equipment includes traffic detectors, environmental sensors, traffic signals, highway advisory radios, dynamic message signs, CCTV cameras and video image processing systems, grade crossing warning systems, and freeway ramp metering systems. HOV lane management and reversible lane management functions are also available. This subsystem also provides the capability for environmental monitoring including sensors that measure road conditions, surface weather, and vehicle emissions. In adverse conditions, automated systems can be used to apply anti-icing materials, disperse fog, etc. Work zone systems including work zone surveillance, traffic control, driver warning, and work crew safety systems are also included. In advanced implementations, this subsystem supports automated vehicle safety systems by safely controlling access to and egress from an Automated Highway System through monitoring of, and communications with, AHS vehicles. Intersection collision avoidance functions are provided by determining the probability of a collision in the intersection and sending appropriate warnings and/or control actions to the approaching vehicles.

Toll Administration: The Toll Administration Subsystem provides general payment administration capabilities and supports the electronic transfer of authenticated funds from the customer to the transportation system operator. This subsystem supports traveler enrollment and collection of both pre-payment and post-payment transportation fees in coordination with the existing, and evolving financial infrastructure supporting electronic payment transactions. The system may establish and administer escrow accounts depending on the clearinghouse scheme and the type of payments involved. This subsystem posts a transaction to the customer account and generates a bill (for post-payment accounts), debits an escrow account, or interfaces to the financial infrastructure to debit a customer designated account. It supports communications with the Toll Collection Subsystem to support fee collection operations. The subsystem also sets and administers the pricing structures and includes the capability to implement road pricing policies in coordination with the Traffic Management Subsystem. The electronic financial transactions in which this subsystem is an intermediary between the customer and the financial infrastructure shall be cryptographically protected and authenticated to preserve privacy and ensure authenticity and auditability.

Toll Collection: The Toll Collection Subsystem provides the capability for vehicle operators to pay tolls without stopping their vehicles using locally determined pricing structures and including the capability to implement various variable road pricing policies. Each transaction is accompanied by feedback to the customer who indicates the general status of the customer account. A record of the transactions is provided to the Toll Administration subsystem for reconciliation.

Traffic Management: The Traffic Management Subsystem operates within a traffic management center or other fixed location. This subsystem communicates with the Roadway Subsystem to monitor and manage traffic flow. Incidents are detected and verified and incident information is provided to the Emergency Management Subsystem, travelers (through Roadway Subsystem Highway Advisory Radio and Dynamic Message Signs), and to third party providers. The subsystem supports HOV lane management and coordination, road pricing, and other demand management policies that can alleviate congestion and influence mode selection. The subsystem monitors and manages maintenance work and disseminates maintenance work schedules and road closures. The subsystem also manages reversible lane facilities, and processes probe vehicle information. The subsystem communicates with other Traffic Management Subsystems to coordinate traffic information and control strategies neighboring jurisdictions. It also coordinates with rail operations to support safer and more efficient highway traffic management at highway-rail intersections. Finally, the Traffic Management Subsystem provides the capabilities to exercise control over those devices utilized for AHS traffic and vehicle control.

Transit Management: The transit management subsystem manages transit vehicle fleets and coordinates with other modes and transportation services. It provides operations, maintenance, customer information, planning, and management functions for the transit property. It spans distinct central dispatch and garage management systems and supports the spectrum of fixed route, flexible route, paratransit services, and bus rapid transit (BRT) service. The subsystem's interfaces allow for communication between transit departments and with other operating entities such as emergency response services and traffic management systems. This subsystem receives special event and real-time incident data from the traffic management subsystem. It provides current transit operations data to other center subsystems. The Transit Management Subsystem collects and stores accurate ridership levels and implements corresponding fare structures. It collects operational and maintenance data from transit vehicles, manages vehicle service histories, and assigns drivers and maintenance personnel to vehicles and routes. The Transit Management Subsystem also provides the capability for automated planning and scheduling of public transit operations. It furnishes travelers with real-time travel information, continuously updated schedules, schedule adherence information, transfer options, and transit routes and fares. In addition, the monitoring of key transit locations with both video and audio systems is provided with automatic alerting of operators and police of potential incidents including support for traveler activated alarms.

Transit Vehicle: This subsystem resides in a transit vehicle and provides the sensory, processing, storage, and communications functions necessary to support safe and efficient movement of passengers. The Transit Vehicle Subsystem collects accurate ridership levels and supports electronic fare collection. An optional traffic signal prioritization function communicates with the roadside subsystem to improve on-schedule performance. Automated vehicle location functions enhance the information available to the Transit Management Subsystem enabling more efficient operations. On-board sensors support transit vehicle maintenance. The Transit Vehicle Subsystem also furnishes travelers with real-time travel information, continuously updated schedules, transfer options, routes, and fares.

Traveler Card: This terminator represents the entity that enables the actual transfer of electronic information from the user of a service (I.e. a traveler) to the provider of the service. This may include the transfer of funds through means of an electronic payment instrument. The device, like a smart card, may also hold and update the traveler's information such as personal profiles or trip histories.

Vehicle: This subsystem provides the sensory, processing, storage, and communications functions necessary to support efficient, safe, and convenient travel. These functions reside in general vehicles including personal automobiles, commercial vehicles, emergency vehicles, transit vehicles, or other vehicle types. Information services provide the driver with current travel conditions and the availability of services along the route and at the destination. Both one-way and two-way communications options support a spectrum of information services from low-cost broadcast services to advanced, pay for use personalized information services. Route guidance capabilities assist in formulation of an optimal route and step by step guidance along the travel route. Advanced sensors, processors, enhanced driver interfaces, and actuators complement the driver information services so that, in addition to making informed mode and route selections, the driver travels these routes in a safer and more consistent manner. Initial collision avoidance functions provide “vigilant co-pilot” driver warning capabilities. More advanced functions assume limited control of the vehicle to maintain safe headway. Ultimately, this subsystem supports completely automated vehicle operation through advanced communications with other vehicles in the vicinity and in coordination with supporting infrastructure subsystems. Pre-crash safety systems are deployed and emergency notification messages are issued when unavoidable collisions do occur.

Appendix D: Architecture Flow Definitions

(Source: National ITS Architecture)

Appendix D contains the architecture flow definitions from the National ITS Architecture exclusive to the Regional ITS Architecture:

accident report: Report of commercial vehicle safety accident. The information may be provided as a response to a real-time query or proactively by the source. The query flow is not explicitly shown.

archive coordination: Catalog data, meta data, published data, and other information exchanged between archives to support data synchronization and satisfy user data requests.

archive requests: A request to a data source for information on available data (i.e. "catalog") or a request that defines the data to be archived. The request can be a general subscription intended to initiate a continuous or regular data stream or a specific request.

archive status: Notification that data provided to an archive contains erroneous, missing, or suspicious data or verification that the data provided appears valid. If an error has been detected, the offending data and the nature of the potential problem are identified.

audit data: Information to support a tax audit.

broadcast information: General broadcast information that contains link travel times, incidents, advisories, transit services and a myriad of other traveler information.

commercial vehicle archive data: Information describing commercial vehicle travel and commodity flow characteristics. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.

compliance review report: Report containing results of carrier compliance review, including concomitant out-of-service notifications, carrier warnings/notifications. The information may be provided as a response to a real-time query of proactively by the source.

credential application: Application for commercial vehicle credentials. Authorization for payment is included.

credentials information: Response containing full credentials information. "Response" may be provided in reaction to a real-time query or a standing request for updated information. The query flow is not explicitly shown.

credentials status information: Credentials information such as registration, licensing, insurance, check flags, and electronic screening enrollment data. A unique identifier is included. Corresponds to the credentials portion of CVISN "snapshots."

current asset restrictions: Restrictions levied on transportation asset usage based on infrastructure design, surveys, tests, or analyses. This includes standard facility design height, width, and weight restrictions, special restrictions such as spring weight restrictions.

daily site activity data: Record of daily activities at commercial vehicle check stations including summaries of screening events and inspections.

data collection and monitoring control: Information used to configure and control data collection and monitoring systems.

driver instructions: Transit service instructions, traffic information, road conditions, and other information for both transit and paratransit drivers.

driver to fleet request: Requests from the driver and vehicle for routing, payment, and enrollment information.

emergency archive data: Logged incident information that characterizes the identified incidents and provides a record of the corresponding incident response. Content may include a catalog of available information, the actual information to be archived, and associated meta data.

emergency dispatch requests: Emergency vehicle dispatch instructions including incident location and available information concerning the incident.

emergency dispatch response: Request for additional emergency dispatch information (e.g., a suggested route) and provision of en route status.

emergency notification: An emergency request for assistance originated by a traveler using an in-vehicle, public access, or personal device.

emergency traffic control request: Special request to preempt the current traffic control strategy in effect at one or more signalized intersections or highway segments. For example, this flow can request all signals to red-flash, request a progression of traffic control preemptions.

emergency traffic control response: Status of the special traffic signal control strategy implemented in response to the emergency traffic control request.

emergency vehicle tracking data: The current location and operating status of the emergency vehicle.

environmental conditions data: Current road conditions (e.g., surface temperature, subsurface temperature, moisture, icing, treatment status) and surface weather conditions (e.g., air temperature, wind speed, precipitation, visibility) as measured and reported by environmental sensors.

environmental sensors control: Data used to configure and control environmental sensors.

equipment maintenance status: Current status of field equipment maintenance actions.

event confirmation: Confirmation that special event details have been received and processed.

event information: Special event information for travelers. This would include a broader array of information than the similar "event plans" that conveys only information necessary to support traffic management for the event.

event plans: Plans for major events possibly impacting traffic.

external reports: Traffic and incident information that is collected by the media through a variety of mechanisms (e.g., radio station call-in programs, air surveillance).

fare and payment status: Current fare collection information including the operational status of the fare collection equipment and financial payment transaction data.

fare management information: Transit fare information and transaction data used to manage transit fare processing on the transit vehicle.

field device status: Reports from field equipment (sensors, signals, signs, controllers, etc.) which indicate current operational status.

fleet to driver update: Updated instructions to the driver including dispatch, routing, and special instructions.

freeway control data: Control commands and operating parameters for ramp meters, mainline metering/lane controls and other systems associated with freeway operations.

freeway control status: Current operational status and operating parameters for ramp meters, mainline metering/lane controls and other control equipment associated with freeway operations.

hazmat information: Information about a particular hazmat load including nature of the load and unloading instructions. May also include hazmat vehicle route and route update information.

hazmat information request: Request for information about a particular hazmat load.

high threat facility incident information: Threats regarding transportation infrastructure, facilities, or systems detected by a variety of methods (sensors, surveillance, threat analysis of advisories from outside agencies, etc.

incident command information: Information that supports local management of an incident. It includes resource deployment status, hazardous material information, traffic, road, and weather conditions, evacuation advice, and other information.

incident command request: Request for resources, commands for relay to other allied response agencies, and other requests that reflect local command of an evolving incident response.

incident information: Notification of existence of incident and expected severity, location, time and nature of incident.

incident information for media: Report of current desensitized incident information prepared for public dissemination through the media.

incident information request: Request for incident information, clearing time, severity. The request can be a subscription that initiates as-needed information updates as well as a one-time request for information.

incident notification: The notification of an incident including its nature, severity, and location.

incident notification response: Interactive acknowledgement and verification of the incident information received, requests for additional information, and general information on incident response status.

incident report: Report of an identified incident including incident location, type, severity and other information necessary to initiate an appropriate incident response.

incident response coordination: Incident response procedures, resource coordination, and current incident response status that are shared between allied response agencies to support a coordinated response to incidents.

incident response status: Status of the current incident response including traffic management strategies implemented at the site (e.g., closures, diversions, traffic signal control overrides).

incident status: Information gathered at the incident site that more completely characterizes the incident and provides current incident response status.

infrastructure monitoring sensor control: Data used to configure and control infrastructure monitoring sensors.

infrastructure monitoring sensor data: Data read from infrastructure-based sensors that monitor the condition of pavement, bridges, culverts, signs, and other roadway infrastructure.

ISP coordination: Coordination and exchange of transportation information between centers. This flow allows a broad range of transportation information collected by one ISP to be redistributed to many other ISPs and their clients.

maint and constr dispatch information: Information used to dispatch maintenance and construction vehicles, equipment, and crews. This information includes routing information, traffic information, road restrictions, incident information, environmental information, and decision support information.

maint and constr dispatch status: Current maintenance and construction status including work data, operator status, crew status, and equipment status.

maint and constr resource coordination: Request for road maintenance and construction resources that can be used in the diversion of traffic (cones, portable signs), clearance of a road hazard, repair of ancillary damage, or any other incident response.

maint and constr resource request: Request for road maintenance and construction resources that can be used in the diversion of traffic (cones, portable signs), clearance of a road hazard, repair of ancillary damage, or any other incident response.

maint and constr resource response: Current status of maintenance and construction resources including availability and deployment status.

maint and constr vehicle conditions: Vehicle diagnostics information that is collected, filtered, and selectively reported by a maintenance and construction vehicle. The information includes engine temperature, mileage, tire wear, brake wear, belt wear, and any warnings or alarms.

maint and constr vehicle location data: The current location and related status (e.g., direction and speed) of the maintenance/construction vehicle.

maint and constr vehicle operational data: Data that describes the maintenance and construction activity performed by the vehicle. Operational data includes materials usage (amount stored and current application rate), operational state of the maintenance equipment (e.g., blade up/down, etc.).

maint and constr vehicle system control: Configure and control data that supports remote control of on-board maintenance and construction vehicle systems and field equipment that is remotely controlled by the vehicle. For example, the data can be used to adjust material application rates.

maint and constr work plans: Future construction and maintenance work schedules and activities including anticipated closures with anticipated impact to the roadway, alternate routes, anticipated delays, closure times, and durations.

media information request: Request from the media for current transportation information.

on-board safety data: Safety data measured by on-board sensors. Includes information about the vehicle, vehicle components, cargo, and driver.

on-board safety request: Request for on-board vehicle safety data by the roadside equipment.

on-board vehicle data: Information about the commercial vehicle stored on-board (for maintenance purposes, gate access, cargo status, lock status, etc.).

on-board vehicle request: Request for on-board vehicle data.

personal transit information: General and personalized transit information for a particular fixed route, flexible route, or paratransit system.

remote surveillance control: The control commands used to remotely operate another center's sensors or surveillance equipment so that roadside surveillance assets can be shared by more than one agency.

request for right-of-way: Forwarded request from signal prioritization, signal preemption, pedestrian call, multi-modal crossing activation, or other source for right-of-way.

request for road network conditions: Request for traffic information, road conditions, surface weather conditions, incident information, and other road network status. The request specifies the region/route of interest, the desired effective time period, and other parameters.

request tag data: Request for tag information including credit identity, stored value card cash, etc.

resource deployment status: Status of traffic management center resource deployment identifying the resources available and their current deployment status.

resource request: A request for traffic management resources to implement special traffic control measures, assist in clean up, verify an incident, etc.

road network conditions: Current and forecasted traffic information, road and weather conditions, incident information, and other road network status. Either raw data, processed data, or some combination of both may be provided by this architecture flow.

road weather information: Road conditions and weather information that are made available by road maintenance operations to other transportation system operators.

roadway information system data: Information used to initialize, configure, and control roadside systems that provide driver information (e.g., dynamic message signs, highway advisory radio, and beacon systems). This flow can provide message content and delivery attributes.

roadway information system status: Current operating status of dynamic message signs, highway advisory radios, beacon systems, or other configurable field equipment that provides dynamic information to the driver.

roadway maintenance status: Summary of maintenance fleet operations affecting the road network. This includes the status of winter maintenance (snow plow schedule and current status).

roadway treatment system control: Control data for remotely located, automated devices that affect the roadway surface (e.g. de-icing applications).

roadway treatment system status: Current operational status of automated roadway treatment devices (e.g., anti-icing systems).

safety inspection record: Record containing results of commercial vehicle safety inspection.

safety inspection report: Report containing results of commercial vehicle safety inspection. The information may be provided as a response to a real-time query or proactively by the source. The query flow is not explicitly shown.

safety status information: Safety information such as safety ratings, inspection summaries, and violation summaries. A unique identifier is included. Corresponds to the safety portion of CVISN "snapshots." The status information may be provided as a response to a real-time query screening event record Results of CVO electronic screening activity.

secure area monitoring support: Commands that control surveillance equipment and security sensors that monitor secure public transportation areas. Also includes information for general advisories and alerts intended for general dissemination in these same public areas.

secure area surveillance data: Data collected from surveillance systems used to monitor secure areas. Includes video, audio, and other security sensor outputs.

signal control data: Information used to configure and control traffic signal systems.

signal control status: Status of surface street signal controls.

speed monitoring control: Information used to configure and control automated speed monitoring, speed warning, and speed enforcement systems.

speed monitoring information: System status including current operational state and logged information including measured speeds, warning messages displayed, and violation records.

suggested route: Suggested route for a dispatched emergency or maintenance vehicle that may reflect current network conditions and the additional routing options available to en route emergency or maintenance vehicles that are not available to the general public.

tag data: Unique tag ID and related vehicle information.

tax filing: Commercial vehicle tax filing data. Authorization for payment is included.

threat information coordination: Sensor, surveillance, and threat data including raw and processed data that is collected by sensor and surveillance equipment located in secure areas.

toll instructions: Demand management toll pricing information based on current congestion.

toll transactions: Detailed list of transactions from a toll station.

traffic archive data: Information describing the use and vehicle composition on transportation facilities and the traffic control strategies employed. Content may include a catalog of available information, the actual information to be archived, and associated meta data.

traffic control coordination: Information transfers that enable remote monitoring and control of traffic management devices. This flow is intended to allow cooperative access to, and control of, field equipment during incidents and special events and during day-to-day operations.

traffic flow: Raw and/or processed traffic detector data which allows derivation of traffic flow variables (e.g., speed, volume, and density measures) and associated information (e.g., congestion, potential incidents).

traffic images: High fidelity, real-time traffic images suitable for surveillance monitoring by the operator or for use in machine vision applications. This flow includes the images and the operational status of the surveillance system.

traffic information coordination: Traffic information exchanged between TMC's. Normally would include incidents, congestion data, traffic data, signal timing plans, and real-time signal control information.

transit archive data: Data used to describe and monitor transit demand, fares, operations, and system performance. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.

transit emergency coordination data: Data exchanged between centers dealing with a transit-related incident.

transit emergency data: Initial notification of transit emergency at a transit stop or on transit vehicles and further coordination as additional details become available and the response is coordinated.

transit incident information: Information on transit incidents that impact transit services for public dissemination.

transit incidents for media: Report of an incident impacting transit operations for public dissemination through the media.

transit information for media: Report of transit schedule deviations for public dissemination through the media.

transit information request: Request for transit operations information including schedule and fare information. The request can be a subscription that initiates as-needed information updates as well as a one-time request for information.

transit information user request: Request for special transit routing, real-time schedule information, and availability information.

transit request confirmation: Confirmation of a request for transit information or service.

transit schedule information: Current and projected transit schedule adherence.

transit traveler information: Transit information prepared to support transit users and other travelers. It contains transit schedules, real-time arrival information, fare schedules, and general transit service information.

transit vehicle location data: Current transit vehicle location and related operational conditions data provided by a transit vehicle.

transit vehicle passenger and use data: Data collected on board the transit vehicle pertaining to availability and/or passenger count.

transit vehicle schedule performance: Estimated times of arrival and anticipated schedule deviations reported by a transit vehicle.

traveler information: Traveler information comprised of traffic status, advisories, incidents, payment information and many other travel-related data updates and confirmations.

traveler information for media: General traveler information regarding incidents, unusual traffic conditions, transit issues, or other advisory information that has been desensitized and provided to the media.

traveler request: Request by a traveler to summon assistance, request information, make a reservation, or initiate any other traveler service.

trip identification number: The unique trip load number for a specific cross-border shipment.

trip log: Driver's daily log, vehicle location, mileage, and trip activity (includes screening, inspection and border clearance event data as well as fare payments).

trip log request: Request for trip log.

vehicle probe data: Vehicle probe data indicating identity, route segment identity, link time and location.

video surveillance control: Information used to configure and control video surveillance systems.

violation notification: Notification to enforcement agency of a violation. The violation notification flow describes the statute or regulation that was violated and how it was violated.

weather information: Accumulated forecasted and current weather data (e.g., temperature, pressure, wind speed, wind direction, humidity, precipitation, visibility, light conditions, etc.).

work plan coordination: Coordination of work plan schedules and activities between maintenance and construction organizations or systems. This information includes the work plan schedules and comments and suggested changes that are exchanged as work plans are coordinated.

work plan feedback: Comments and suggested changes to proposed construction and maintenance work schedules and activities. This information influences work plan schedules so that they minimize impact to other system operations and the overall transportation system.

work zone information: Summary of maintenance and construction work zone activities affecting the road network including the nature of the maintenance or construction activity, location, impact to the roadway, expected time(s) and duration of impact, anticipated delays.

work zone status: Current work zone status including current location (and future locations for moving work zones), impact to the roadway, required lane shifts, expected time(s) and duration of impact, anticipated delays, alternate routes, and suggested speed limits.

work zone warning status: Status of a work zone safety monitoring and warning devices. This flow documents system activations and includes additional supporting information (e.g., an image) that allows verification of the alarm.

Appendix E: Operations Coverage

The following table summarizes the operations on key highway facilities within the Region. Operations centers, whether they are a personal computer or an entire building, accommodate the intelligence for the majority of ITS applications. The location and operation of the TMC's within the Commonwealth of Pennsylvania are currently being explored through other statewide efforts. This section takes roadways of regional significance developed by the RAP in each work plan (prior project working document) and assigns ITS operations coverage for the primary and secondary role. This section although useful for other Statewide ITS effort, was not needed for the creation of the Regional ITS Architecture.

County	Highway Corridors	Primary Operations		Secondary Operations	
		ITS Devices	Signals	ITS Devices	Signals
Blair	I-99	D9/RTMC		911/CMO/RTMC	
	US-22	D9		911/CMO/RTMC	
	US-220	D9		911/CMO/RTMC	
	PA 764	D9		911/CMO/RTMC	
	PA 36	D9		911/CMO/RTMC	
	17th Street Corridor	D9	D9	911/CMO/RTMC	RTMC
	East 6th Avenue Corridor	CMO	D9	PSP	RTMC
	12th/13th Ave-Downtown	CMO	D9	PSP	RTMC
	Juniata Gap Road	CMO	D9	PSP	RTMC
	Chesnut Ave Corridor	D9	D9	911/CMO/RTMC	RTMC
	6th Avenue @ Lloyd St	CMO	D9	PSP	RTMC
	Union Avenue Corridor	CMO	D9	PSP	RTMC
	Broad/Beale Ave	CMO	D9	PSP	RTMC
Bedford	I-70	D9/RTMC		PTC/RTMC	
	I-76	PTC		D9/RTMC	
	I-99	D9		RTMC	
	PA-26	CMO		PSP	
	PA-31	D9		RTMC	
	PA-56	D9		RTMC	
	PA-913	CMO		PSP	
	PA-96	CMO		PSP	
	US-220	D9		RTMC	
	US-30	D9	D9	RTMC	RTMC
	N. Richard/Penn Streets	CMO	D9	PSP	RTMC
	Bus 220 @ PA Turnpike	CMO	D9	PSP	RTMC
Cambria	PA-160	CMO		PSP	
	PA-271	CMO		PSP	

County	Highway Corridors	Primary Operations		Secondary Operations	
		ITS Devices	Signals	ITS Devices	Signals
	PA-53	CMO		PSP	
	PA-56	CMO		PSP	
	US-219	CMO	D9	PSP	RTMC
	US-22	D9		911/CMO/RTMC	
	US-422	CMO		PSP	
	Broad Street Corridor	CMO	D9	PSP	RTMC
	Roosevelt Blvd Corridor	CMO	D9	PSP	RTMC
	Johnstown CBD	CMO	D9	PSP	RTMC
	Franklin Street Corridor	CMO	D9	PSP	RTMC
	Central Avenue Corridor	CMO	D9	PSP	RTMC
	Scalp Avenue Corridor	CMO	D9	PSP	RTMC
	Galleria Drive Corridor	CMO	D9	PSP	RTMC
	Elton Road Corridor	CMO	D9	PSP	RTMC
Fulton	I-70	D9/RTMC		RTMC	
	PA-26	CMO		PSP	
	PA-913	CMO		PSP	
	US-30	D9		RTMC	
	US-522	D9		RTMC	
	McConnellsburg	CMO	D9	PSP	RTMC
Huntingdon	PA-26	D9		RTMC	
	PA-305	CMO		PSP	
	PA-45	CMO		PSP	
	PA-550	CMO		PSP	
	PA-913	CMO		PSP	
	PA-994	CMO		PSP	
	Water St	D9	D9	RTMC	RTMC
	US-522	D9		RTMC	
	Penn/Washington Streets	CMO	D9	PSP	RTMC

County	Highway Corridors	Primary Operations		Secondary Operations	
		ITS Devices	Signals	ITS Devices	Signals
Somerset	I-70/76	CMO		PSP	
	PA-160	CMO		PSP	
	PA-271	CMO		PSP	
	PA-281	CMO		PSP	
	PA-31	CMO		PSP	
	PA-56	CMO		PSP	
	PA-653	CMO		PSP	
	US-219	D9		RTMC	
	US-30	CMO		PSP	
	US-40	CMO		PSP	
	N. Central Ave Corridor	CMO	D9	PSP	RTMC
	Somerset CBD	CMO		PSP	

Appendix F: Bookend I Meeting Minutes

Date: Thursday, September 16, 2004

Meeting of: PennDOT District 9-0 Stakeholders' Meeting – First Regional Meeting

Location: Days Inn – Altoona, PA

Presentation

- Roger Dodson, PennDOT District 9-0 Engineer, began the presentation with a welcome. He identified some of the agencies involved in the process, planning offices, townships, partnership organizations, enforcement community, transit, counties, emergency management agencies, and economic development agencies. Roger described the "Southern Alleghenies" Region which consists of a six county Region with two MPO's and one RPO. He explained the regional significance of the ITS architecture in planning documents and its impact on transportation of goods and people. He went on the discuss challenges in the Region and how they will be able to operate safe roads and how they will be able to accommodate increased roadway congestion. The need for regional ITS Planning is vital because the public expects reliable transportation. Roger pointed out particular corridors in the Region, such as I-76, I-99 US 219, US 22, and US 30 as corridors that require particular attention. He said that the stakeholders are here at the meeting because of their involvement with aspects of transportation such as planning, operation, and policy. Roger stressed the importance of their knowledge required to validate the critical baseline information. He urged everyone to continue participation in future meetings, telling others about ITS, and continuing the regional dialog beyond this effort.

- Michael Harris from PB Farradyne continued the presentation with a few slides defining ITS and ITS architecture. ITS is "simply technology being used in the transportation environment." It is used to improve safety, maximize mobility, fulfill traveler needs, support enhanced security, and manage capacity. Types of ITS include CCTV, freeway service patrol, advanced signal systems, automated transit dispatching, incident management, and electronic payment. ITS architecture is "the plan for design and construction." Mike showed two diagrams placing ITS architecture in the context of the planning process and the systems engineering process. Furthermore, the federal mandate states, "Regional ITS Architectures must be completed in partnership with the State and regional planning partners by April 8, 2005 for use of Federal funds for ITS." The expectation for this process is that the mandates' conditions are made and a process is put in place for initial architecture development and for revisiting and updating the Regional Architecture as necessary. Regional benefits include interoperability enhancement, implementation for planning ITS integration, ensuring institutional agreement among ITS stakeholder agencies, establishing a common framework for future ITS operations across the region and state, and allowing integration options to be considered before investments are made.

- Dan Leonard from PennDOT Bureau of Highway Safety and Traffic Engineering presented a statewide vision of ITS Architecture. He talked about the history of transportation, the current transportation problem, and how ITS Architecture will be part of the solution. The region cannot afford to build out of congestion. However, efficiency in the transportation system is required for economic vitality. Transportation operation challenges for today and the foreseeable future consist of safety, security, and mobility. Congestion solution includes building capacity, better managing capacity, and reducing demand. Regional ITS architecture is a tool to use for the purposes of forming the building blocks of transportation operations and for supporting a balanced look at congestion improvement investments. The statewide vision includes building TMC's in each region, incident management software and programs on all interstate highways, ITS integration, and PA mobility (congestion management operations) strategy with 24X7 operations. The statewide vision through transportation operations and ITS will provide the Region with a safe, secure, and efficient system which will enhance the economic vitality of the state and improve the quality of life for all Pennsylvanians.

- Dennis Lebo from PennDOT Central Office – Center for Program Development and Management, gave an overview of statewide planning. He talked about using the mandate as a planning opportunity for creating a framework for regional and statewide integration, establishing a basis sound investments, creating a regional forum for stakeholders to address ITS/Operational issues, and advancing the issue of ITS to better manage the transportation system. Maps were presented to show that the Regional Architecture boundaries will closely follow the PennDOT district map while taking the planning organizations into consideration. He also discussed important corridors, such as I-76, I-99, and US 219 and again emphasized the need for ITS planning at a regional level. Subsequent slides identified the objectives and scope of the ITS Architecture program. The project objective is to "complete Regional ITS Architectures in partnership with planning organizations throughout the state to meet the federal mandate by April 8, 2005 for use of Federal funds for ITS operations. The scope of work will include aspects of operations and planning". Also, Dennis Lebo helped to answer questions such as "How will this be used?" and "What will we need to do?" in the slides. Dennis talked about how ITS Architecture will help determine what investments would be made in transportation. PennDOT will need to produce a statewide ITS strategic plan and regional ITS implementation plan.

- Mike Pastore from PennDOT D9-0 talked about Regional ITS operations. He gave an overview of the current Regional operations and ITS and the S(-) key staff. Mike talked about Blair County areas of concern and ITS technologies in existence today, such as dynamic message signs, closed circuit television camera, highway advisory signs, radio, portable message boards, and nighthawk receiver just to name a few. He also discussed the TMC and how vital it was. Mike talked about some of the challenges faced such as how to operate the system outside normal working hours, One of the solutions would be to recruit the 911 center as co-operators of the system, since it is staffed 24-

7. The agreement was executed between the District and the Blair county Commissioners. An operations manual was developed and protocol measures are set. Quarterly meeting are conducted with the PTC, PSP, County Planning, County Emergency, FHWA, and BHSTE to review the performance. The system benefits for PennDOT have been improved response time to incidents, no need for increase staffing, better information to travelers, and a safer highway system. The benefits for Blair County 911 and the citizens have also been tremendous. However, it is important to continue the expansion north on I-99 in cooperation with District 2-0. In closing, Mike stressed the importance of sharing responsibilities where possible.

- Lieutenant John Bey of the Pennsylvania State Police spoke on incident management and ITS. He began talking about highway incident management and the various tools the police use. He talked about detection of various incidents, verification when it is critical, importance of response, scene management and detours, and clearance of the incident. Cell phones are 99.9 % of how they get their calls. Once verified, the precise location of the incident and the nature of the incident are determined. Furthermore, they decide which resource agencies are needed, such as fire, EMS, or towing. Safety is their biggest concern during incident scene management and they try to ensure safety for responders, the public, and the injured. This may include clearing the lanes of debris and removal of responders from lanes. They also need to be aware of secondary crashes and traffic control. The unified command training and highway incident scene safety and traffic control training helps them to do this. The five functional sections of the ICS consists of command, operations, planning, logistics, and finance/administration. Information is disseminated to the motorists through DMS, the district TMC, upstream traffic diversion, and local media traffic reporting. One example of this was a crash on I-80 when DMS was particularly useful; motorists tuned into a radio station and were able to avoid problems. Pre-planning and coordination for special events includes going to incident management meetings and establishing detour routes for major highways. Pennsylvania State Police have coordinated events with Altoona PD, and as the population in the area continue to grow, this coordination becomes more critical.

- Finally, Mike Waisley from PB Farradyne talked about the validation outreach. He discussed the ITS Strawman architecture process step by step and talked about the characteristics of the document. He told the stakeholders that they were there because their knowledge is needed to validate information that they have begun to compile. The regional perspective is valued, and the stakeholders are involved in setting transportation policy in the Region. Larry went on to describe what were in the validation packets. He described what the diagrams were and how they fit into the bigger picture. Larry also talked about the validation effort, which consisted of two large stakeholder meetings and then small validation meetings by functional area. The validation meeting schedule was posted on a slide. He gave examples of what will happen at the validation meetings and discussed some diagrams briefly. The planned regional actions include input to support adoption, to continue to advance ITS element of regional long range plans, to continue ITS regional dialogue beyond this effort, and to develop the Regional ITS Implementation Plan.

Questions and Answers

Someone from the audience asked if the PowerPoint presentation would be available on the website.

- Mike Waisley said that they would make sure it was on the site (www.paits.org).

Hank Parke commented that high speed internet to rural areas is non-existent. Is there discussion on coordinated high fiber trunk lines to bring high speed internet to these areas?

- PennDOT said that currently it is expensive and nothing is specifically been identified. However, they will be looking into other technology like TI since PennDOT is limited on how much they can do with fiber optics. Mike from PB, noted that ITS encompasses a lot of agencies and it is difficult to coordinate but sometimes possible to share state-wide fiber optics with other agencies.

List of Attendees

Last Name	First Name	Agency	Email	Phone
Barker	Rian	Richland Township		(814) 266-2922
Bey	Lt. John	Pennsylvania State Police (PSP)	jbey@state.pa.us	(814) 696-6116
Burket	Wes	Blair County Planning Commission	wlbbcpc@atlanticbbn.net	(814) 940-5980
Callahan	Tara	PennDOT District 9-0 Community Relations Coordinator	tacallahan@state.pa.us	(814) 696-7101
Crider	Scott	Delgrosso's Park		(814) 684-3538
Crider	Carl	Delgrosso's Park		(814) 684-3538
Davis	Kathy	Bedford County Development Association		
Diedrich	Dave	City of Altoona	ddiedrich@altoonapa.gov	(814) 949-2446
Dodson	Roger	PennDOT District 9-0 Traffic	rdodson@state.pa.us	(814) 696-7321
Eichelberger	John	Blair County Commissioner	jeichelberger@blairco.org	(814) 693-3030
Gardella	Peter	Delgrosso's Park	gardella@delgrossos.com	(814) 684-3538

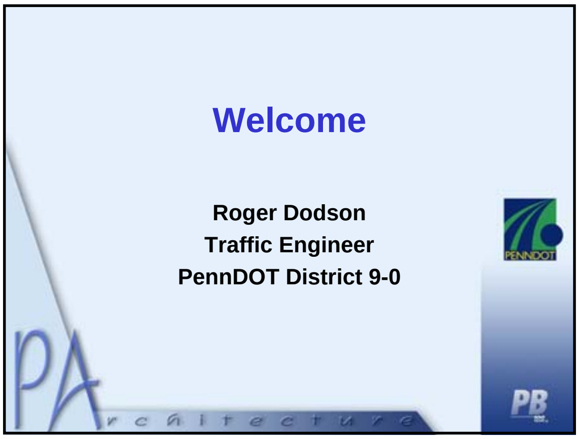
Last Name	First Name	Agency	Email	Phone
Greenland	Vince	PennDOT District 9-0 Design (ITS)	vgreenland@state.pa.us	(814) 696-7179
Haines	Richard	Blair County Planning Commission Director	rthbcpc@atlanticbbn.net	(814) 940-5978
Herring	Pat	Pennsylvania Towing Agency (PTA)		(814) 445-4577
Hershberger	Boye	PennDOT District 9-0 Traffic	bhershberg@state.pa.us	(814) 696-7230
Hofer	Thomas	PennDOT District 9-2 Maintenance Manager	thofer@state.pa.us	(814) 696-7271
Johnson	Terry	Pennsylvania Towing Agency (PTA)	patowing@yahoo.com	(717) 564-0360
Klevan	Tom	AMTRAN	tom.klevan@amtran.org	(814) 944-4074
Kloss	Jeff	Bedford County Planning Commission	jwkloss@earthlink.net	(814) 623-4827
LaSalle	Dion	Pennsylvania Towing Agency (PTA)	towmow38@pennswoods.net	(814) 652-2459
Lebo	Dennis	PennDOT Central Office		
Leonard	Dan	PennDOT Central Office	danleonard@state.pa.us	(717) 705-1448
McCreadie	Bernard	Planning Coordinator/Cambria County EMA	bmccreadie@co.cambria.pa.us	(814) 472-2050

Last Name	First Name	Agency	Email	Phone
Murphy	Brenda	PennDOT Central Office	bremurphy@state.pa.us	(412) 429-6038
Nedimyer	Vince	Altoona School District	vnedimyer@aasdcat.com	(814) 946-8292
Parke	Hank	Somerset County Chamber of Commerce	hparke@somersetcountychamber.com	(814) 445-6431
Parks	James	Cambria County Transit Authority (CamTRAN)		
Pastore	Mike	PennDOT District 9-0 Traffic	mipastore@state.pa.us	(814) 696-7238
Pillar	Charles	Altoona-Blair County Airport	cpillaraoo@earthlink.net	(814) 793-2027
Potts	Tim	R.J. Corman Railroad Group		
Prestash	Dennis	PennDOT District 2-0 Traffic	dprestash@state.pa.us	(814) 765-0402
Rourke	Warren	PennDOT District 9-1 Maintenance	wrourke@state.pa.us	(814) 643-0150
Seville	Mary	Fulton County Planning Commission	planning@fultoncntypa.org	(717) 485-3717
Seymore	Karen	Cambria County Transit Authority (CamTRAN)		
Shinholt	Richard	Somerset County Department of Emergency Services	shinholtr@co.somerset.pa.us	(814) 445-1515

Last Name	First Name	Agency	Email	Phone
Stacey	Kevin	PennDOT District 9-0 Safety		
Stern	Kevin	PennDOT District 9-0 Construction (ITS)	kstern@state.pa.us	(814) 696-7139
Stolz	Greg	PennDOT District 9-2 Maintenance	gstolz@state.pa.us	(814) 696-7288
Tanzi	Tony	PennDOT District 9-0 Traffic	ttanzi@state.pa.us	(814) 696-6855
Tennis	Cathy	Pennsylvania Towing Agency (PTA)	ctennisblue@aol.com	(814) 234-9700
Weisman	Milt	Fullington Bus Company	milt@fullingtontours.com	(814) 765-7871
Weyandt	Carl	City of Altoona		(814) 949-2446

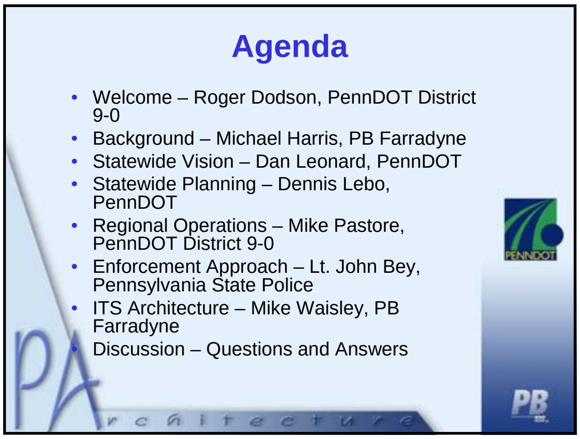
Pennsylvania Intelligent Transportation Systems (ITS) Architecture

Southern Alleghenies Region
Stakeholders' Meeting
September 16, 2004



Welcome

Roger Dodson
Traffic Engineer
PennDOT District 9-0

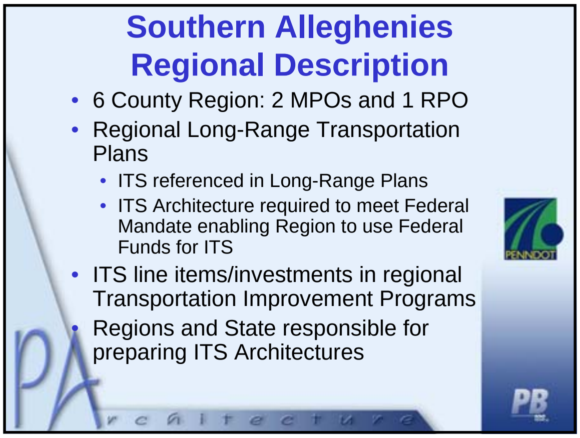


Agenda

- Welcome – Roger Dodson, PennDOT District 9-0
- Background – Michael Harris, PB Farradyne
- Statewide Vision – Dan Leonard, PennDOT
- Statewide Planning – Dennis Lebo, PennDOT
- Regional Operations – Mike Pastore, PennDOT District 9-0
- Enforcement Approach – Lt. John Bey, Pennsylvania State Police
- ITS Architecture – Mike Waisley, PB Farradyne
- Discussion – Questions and Answers

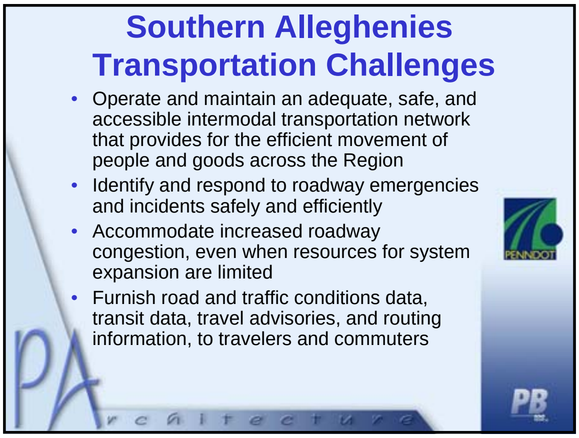
Welcome

- PennDOT
- PSP
- Transit Agencies
- Planning Agencies
- Counties
- Cities
- Boroughs
- Townships
- Policy Agencies
- Emergency Management Agencies
- Economic Development Agencies
- Enforcement Community
- Tourism and Event Destinations



Southern Alleghenies Regional Description

- 6 County Region: 2 MPOs and 1 RPO
- Regional Long-Range Transportation Plans
  - ITS referenced in Long-Range Plans
  - ITS Architecture required to meet Federal Mandate enabling Region to use Federal Funds for ITS
- ITS line items/investments in regional Transportation Improvement Programs
- Regions and State responsible for preparing ITS Architectures



Southern Alleghenies Transportation Challenges

- Operate and maintain an adequate, safe, and accessible intermodal transportation network that provides for the efficient movement of people and goods across the Region
- Identify and respond to roadway emergencies and incidents safely and efficiently
- Accommodate increased roadway congestion, even when resources for system expansion are limited
- Furnish road and traffic conditions data, transit data, travel advisories, and routing information, to travelers and commuters

The Need for Regional ITS Planning

- Public expects reliable transportation
- Need to make existing transportation system more efficient
- Important corridors: I-76, I-99, US 219, US 22, and US 30
- Better communication between those who operate and rely on transportation systems
- Plan efficient use of limited Funding
- Mandate to receive Federal funds for ITS projects in future

We need your help because…

- **Your knowledge is required to validate critical baseline information**
- Your insights and perspectives on regional conditions and activities are needed
- Some of you operate a piece of the transportation system
- Some of you are involved in planning and programming for regional transportation
- Some of you help set transportation policy in the Region
- **All of you have a stake in transportation conditions and performance in the Region**

What we need from you…

- Attend meetings on this effort
- Validate the work presented to you
- Champion ITS
- Outreach to other stakeholders and organizations about ITS
- Continue the ITS regional dialogue beyond this effort

Background

Michael Harris

PB Farradyne

ITS?

Intelligent Transportation Systems (ITS) is simply technology being used in the transportation environment

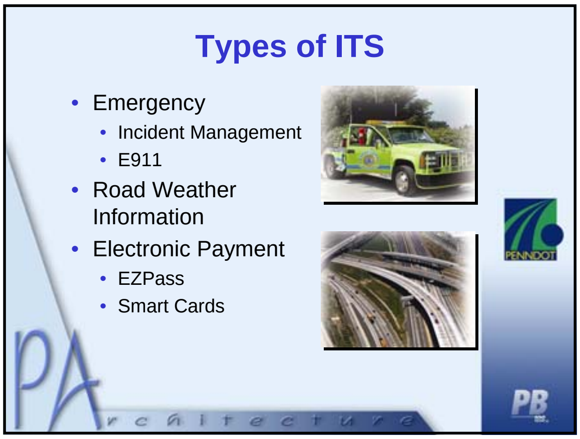
ITS:

- Improve Safety
- Maximize Mobility
- Fulfill Traveler Needs
- Support Enhanced Security
- Manage Capacity

Types of ITS

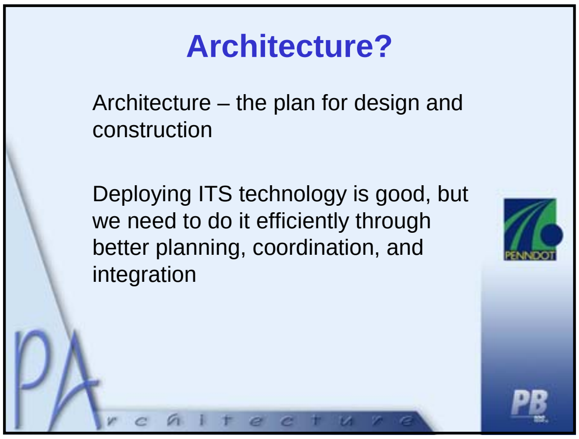
- Freeway
  - Highway Advisory Radio
  - Dynamic Message Signs
  - 511
  - CCTV
  - HOV
  - Freeway Service Patrol
- Arterial
  - Advanced Signal Systems
- Transit
  - Advanced Vehicle Location
  - Automated Dispatching

TRAFFIC CLEAR
NEXT 5 MILES
ALL LANES CLEAR



Types of ITS

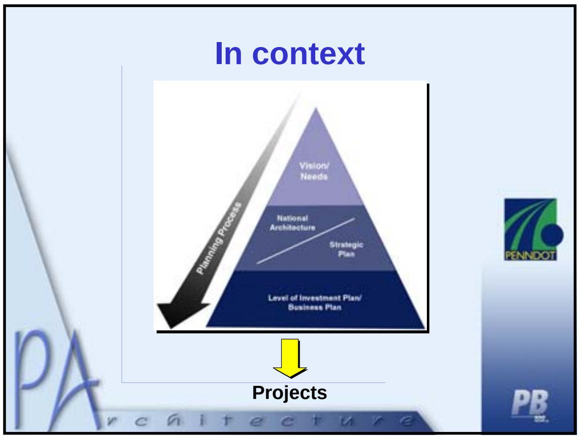
- Emergency
  - Incident Management
  - E911
- Road Weather Information
- Electronic Payment
  - EZPass
  - Smart Cards



Architecture?

Architecture – the plan for design and construction

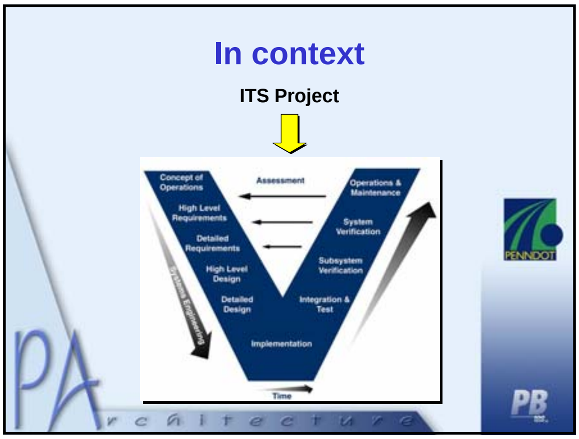
Deploying ITS technology is good, but we need to do it efficiently through better planning, coordination, and integration



In context

Vision/ Needs
National Architecture
Strategic Plan
Level of Investment Plan/ Business Plan
Planning Process

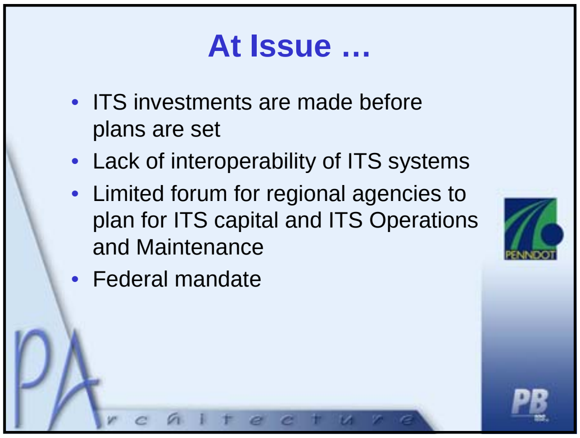
Projects



In context

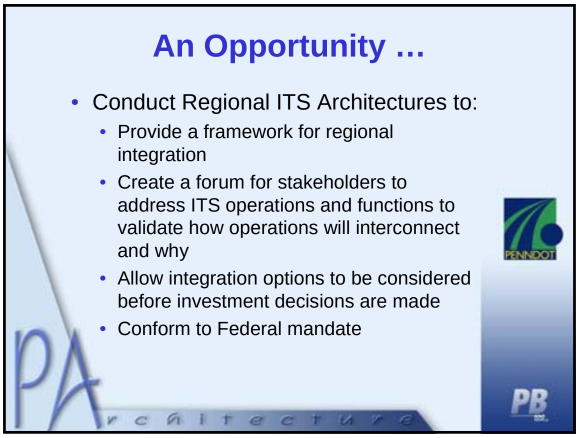
ITS Project

Concept of Operations
High Level Requirements
Detailed Requirements
High Level Design
Detailed Design
Implementation
Integration & Test
Subsystem Verification
System Verification
Operations & Maintenance
Assessment
Systems Engineering
Time



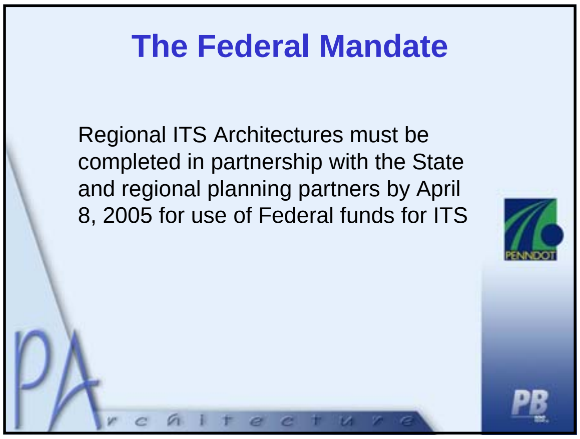
At Issue …

- ITS investments are made before plans are set
- Lack of interoperability of ITS systems
- Limited forum for regional agencies to plan for ITS capital and ITS Operations and Maintenance
- Federal mandate



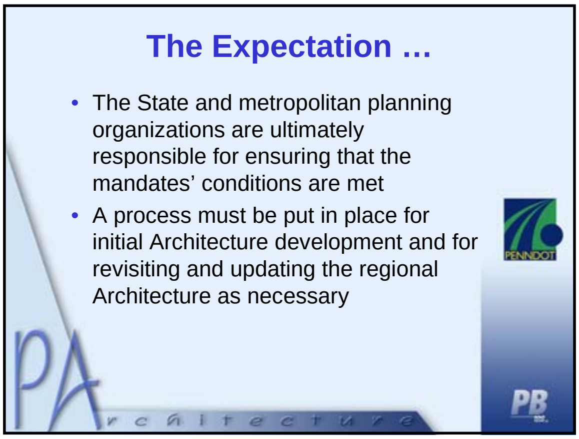
An Opportunity …

- Conduct Regional ITS Architectures to:
  - Provide a framework for regional integration
  - Create a forum for stakeholders to address ITS operations and functions to validate how operations will interconnect and why
  - Allow integration options to be considered before investment decisions are made
  - Conform to Federal mandate



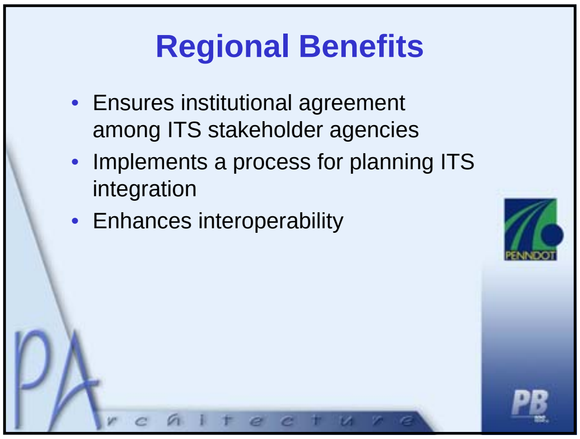
The Federal Mandate

Regional ITS Architectures must be completed in partnership with the State and regional planning partners by April 8, 2005 for use of Federal funds for ITS



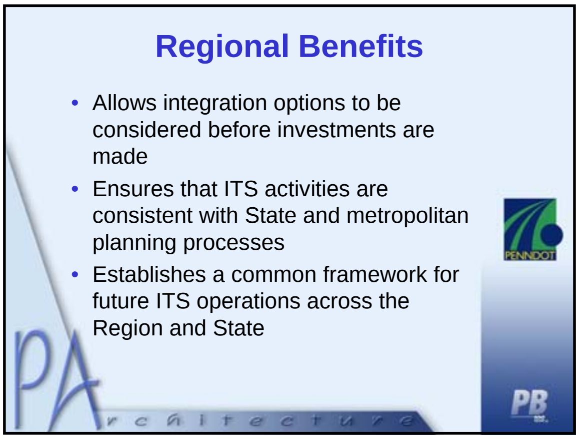
The Expectation …

- The State and metropolitan planning organizations are ultimately responsible for ensuring that the mandates' conditions are met
- A process must be put in place for initial Architecture development and for revisiting and updating the regional Architecture as necessary



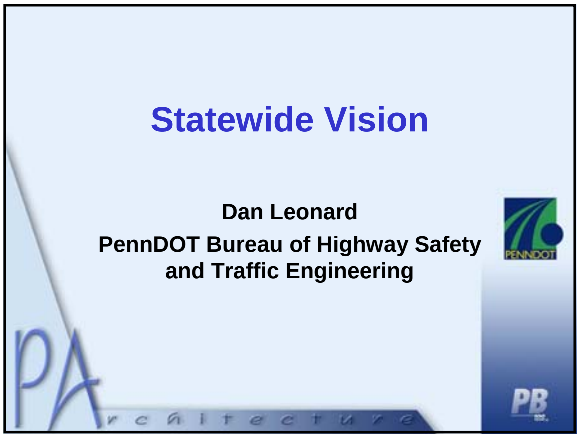
Regional Benefits

- Ensures institutional agreement among ITS stakeholder agencies
- Implements a process for planning ITS integration
- Enhances interoperability



Regional Benefits

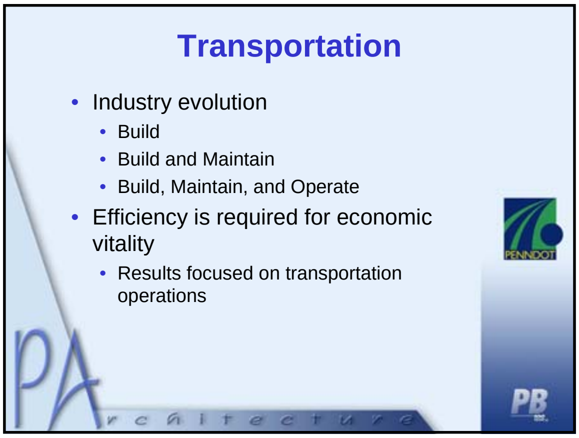
- Allows integration options to be considered before investments are made
- Ensures that ITS activities are consistent with State and metropolitan planning processes
- Establishes a common framework for future ITS operations across the Region and State



Statewide Vision

Dan Leonard

PennDOT Bureau of Highway Safety and Traffic Engineering



Transportation

- Industry evolution
  - Build
  - Build and Maintain
  - Build, Maintain, and Operate
- Efficiency is required for economic vitality
  - Results focused on transportation operations

Transportation Operations

- Safety
- Security
- Mobility (Congestion)

All are challenges for today and the foreseeable future

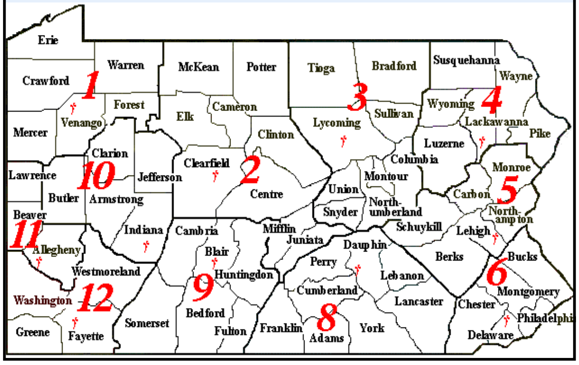
Congestion Solution

- Comprehensive, coordinated, and long-term commitment to balanced investment in:
  - Building Capacity
  - Better Managing Capacity
  - Reducing Demand, through modal alternatives and changes in land-use patterns

Regional Tool

- Regional ITS Architectures
  - Form the building blocks of transportation operations
  - ITS supports managing capacity and improves safety and security
  - Supports a balanced look at congestion improvement investments

PennDOT District Map

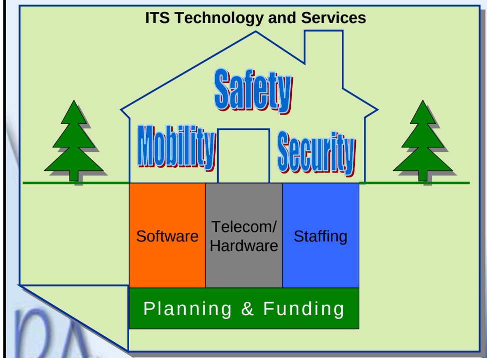

Erie
Crawford
Warren
McKean
Potter
Tioga
Bradford
Susquehanna
Wayne
1
Forest
Venango
Mercer
Elk
Cameron
Clinton
3
Lycoming
Sullivan
Wyoming
4
Lackawanna
Pike
Luzerne
Clarion
Lawrence
10
Jefferson
Clearfield
2
Centre
Columbia
Montour
Monroe
Union
Snyder
North-umberland
Carbon
5
North-ampton
Butler
Armstrong
Beaver
11
Indiana
Cambria
Mifflin
Juniata
Schuylkill
Lehigh
Allegheny
Blair
Dauphin
Perry
Berks
Bucks
6
Westmoreland
Huntingdon
9
Lebanon
Cumberland
Montgomery
Washington
12
Bedford
Lancaster
Chester
Somerset
8
Philadelphi
Greene
Fayette
Fulton
Franklin
Adams
York
Delaware

Statewide Vision

- Transportation Management Centers in each Region
- Incident Management and Reporting Software
- Incident Management Program for All Interstate Highways
- ITS Data Integration and Information Sharing
  - Voice
  - Data
  - Video
- PA Mobility (Congestion Management) Strategy
- 24 X 7 Operations

Statewide Vision

- Transportation Operations
  - Safety
  - Security
  - Mobility
    - Economic Vitality
    - Quality of Life
- ITS
  - Tools, Techniques, and Technology


ITS Technology and Services
Safety
Mobility
Security
Software
Telecom/ Hardware
Staffing
Planning & Funding

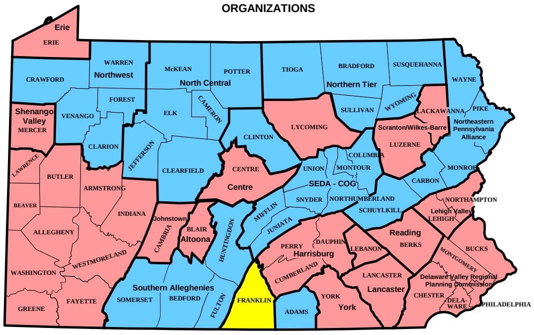
Statewide Planning

Dennis Lebo
PennDOT Center for Program Development and Management

Statewide Planning Opportunity

- Create a framework for regional and statewide integration
- Establish a basis for sound investments
- Create a regional forum for stakeholders to address ITS/Operational issues
- Advance the use of ITS to better manage our transportation system

PENNSYLVANIA'S TRANSPORTATION PLANNING ORGANIZATIONS


Erie
ERIE
CRAWFORD
WARREN
Northwest
McKEAN
POTTER
North Central
TIOGA
BRADFORD
SUSQUEHANNA
Northern Tier
WAYNE
Shenango Valley
MERCER
VENANGO
FOREST
ELK
CAMERON
CLARION
JEFFERSON
CLEARFIELD
CLINTON
LYCOMING
SULLIVAN
WYOMING
LACKAWANNA
PIKE
Scranton/Wilkes-Barre
Northeastern Pennsylvania Alliance
LUZERNE
COLUMBIA
MONTOUR
UNION
SEDA - COG
CENTRE
Centre
MONROE
CARBON
LAWRENCE
BUTLER
ARMSTRONG
BEAVER
INDIANA
SNYDER
NORTHUMBERLAND
SCHUYLKILL
NORTHAMPTON
Lehigh Valley
LEHIGH
ALLEGHENY
Johnstown
CAMBRIA
BLAIR
Altoona
HUNTINGDON
MIFFLIN
JUNIATA
PERRY
DAUPHIN
Harrisburg
LEBANON
Reading
BERKS
BUCKS
MONTGOMERY
WASHINGTON
WESTMORELAND
CUMBERLAND
LANCASTER
Lancaster
Delaware Valley Regional Planning Commission
Southern Alleghenies
SOMERSET
BEDFORD
FULTON
FRANKLIN
ADAMS
YORK
York
CHESTER
DELA-WARE
PHILADELPHIA
GREENE
FAYETTE

🟥 METROPOLITAN PLANNING ORGANIZATION (MPO)
🟦 RURAL PLANNING ORGANIZATION (RPO)
🟨 INDEPENDENT COUNTY

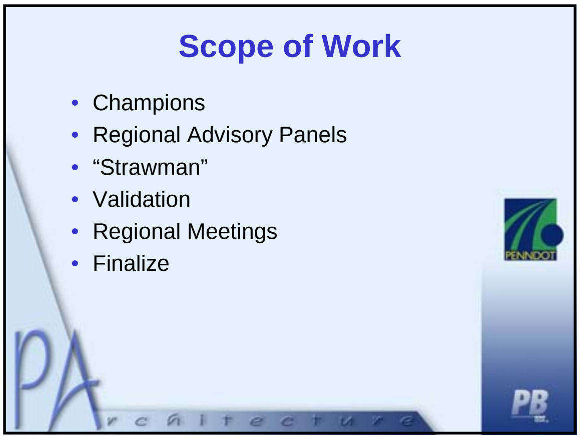
MPO / RPO Involvement

Need for ITS Planning at regional (MPO/RPO) level:

- Public expects reliable transportation
- Need to make existing transportation system more efficient
- Important corridors: I-76, I-99, US 219
- Better communication between those who operate and rely on transportation systems
- Decisions on use of limited funding
- Mandate to receive Federal funds for ITS projects in future

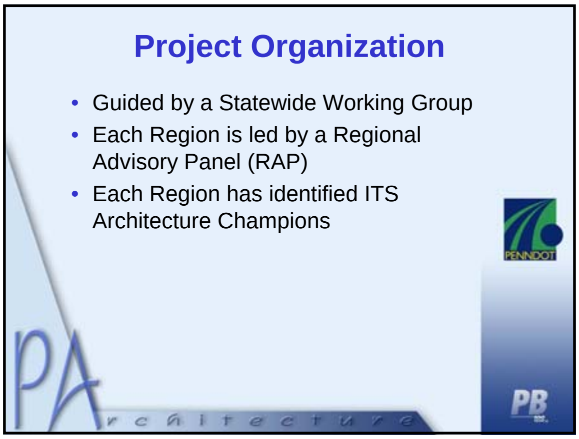
Project Objective

Complete Regional ITS Architectures in partnership with planning organizations throughout the State to meet the Federal mandate by April 8, 2005 for use of Federal funds for ITS operations



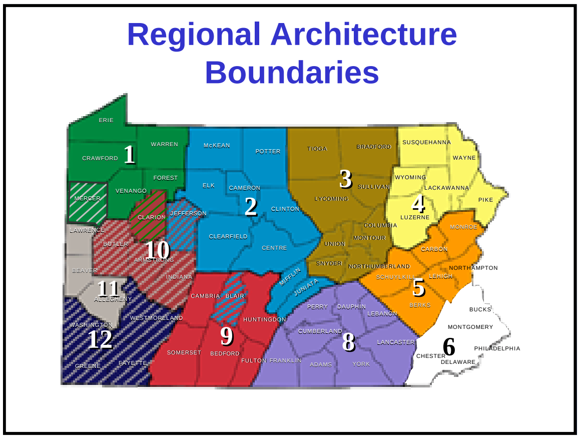
Scope of Work

- Champions
- Regional Advisory Panels
- “Strawman”
- Validation
- Regional Meetings
- Finalize



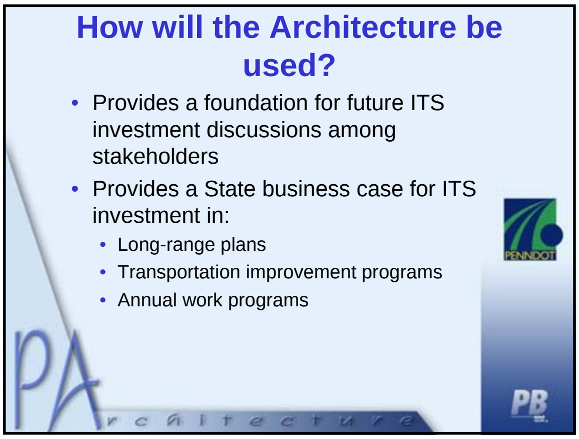
Project Organization

- Guided by a Statewide Working Group
- Each Region is led by a Regional Advisory Panel (RAP)
- Each Region has identified ITS Architecture Champions



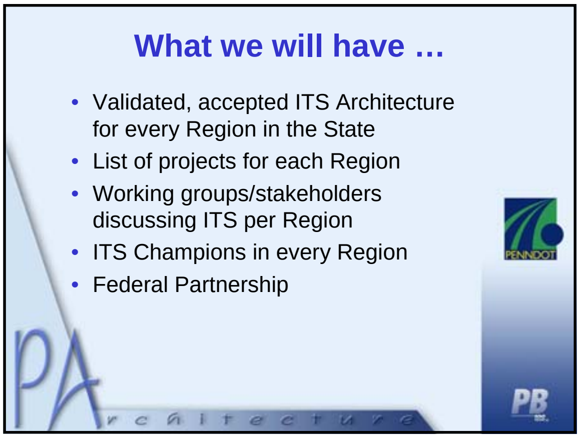
Regional Architecture Boundaries

ERIE
WARREN
CRAWFORD
1
McKEAN
POTTER
TIOGA
BRADFORD
SUSQUEHANNA
WAYNE
FOREST
MERCER
VENANGO
ELK
CAMERON
3
SULLIVAN
WYOMING
LACKAWANNA
PIKE
LYCOMING
2
CLARION
JEFFERSON
CLINTON
4
LUZERNE
COLUMBIA
MONROE
LAWRENCE
BUTLER
10
CLEARFIELD
CENTRE
UNION
MONTOUR
CARBON
BEAVER
ARMSTRONG
SNYDER
NORTHUMBERLAND
NORTHAMPTON
INDIANA
MIFFLIN
SCHUYLKILL
LEHIGH
11
ALLEGHENY
JUNIATA
5
CAMBRIA
BLAIR
PERRY
DAUPHIN
BERKS
WASHINGTON
WESTMORELAND
HUNTINGDON
LEBANON
BUCKS
MONTGOMERY
12
9
CUMBERLAND
8
LANCASTER
6
PHILADELPHIA
SOMERSET
BEDFORD
CHESTER
DELAWARE
GREENE
FAYETTE
FULTON
FRANKLIN
ADAMS
YORK



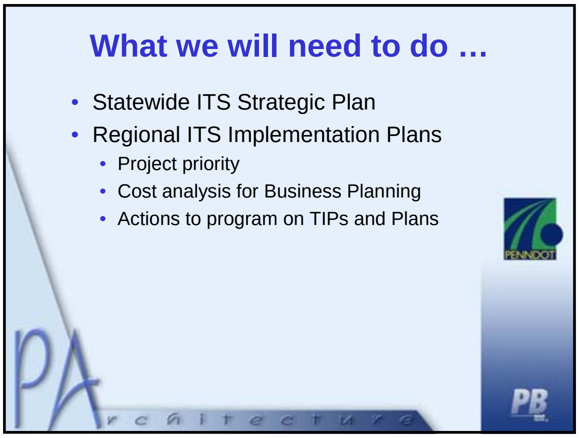
How will the Architecture be used?

- Provides a foundation for future ITS investment discussions among stakeholders
- Provides a State business case for ITS investment in:
  - Long-range plans
  - Transportation improvement programs
  - Annual work programs



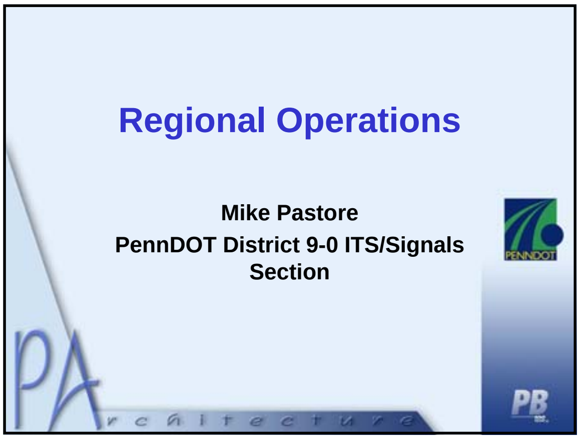
What we will have …

- Validated, accepted ITS Architecture for every Region in the State
- List of projects for each Region
- Working groups/stakeholders discussing ITS per Region
- ITS Champions in every Region
- Federal Partnership



What we will need to do …

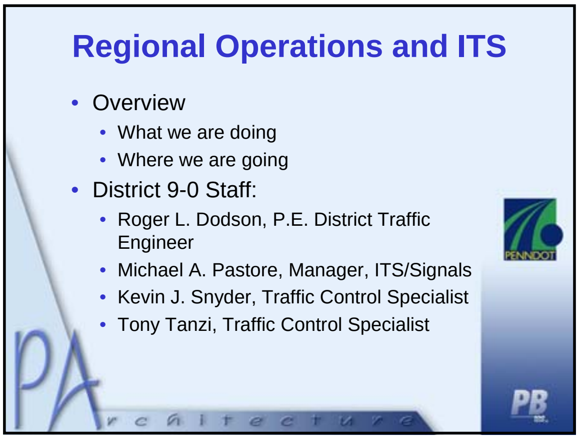
- Statewide ITS Strategic Plan
- Regional ITS Implementation Plans
  - Project priority
  - Cost analysis for Business Planning
  - Actions to program on TIPs and Plans



Regional Operations

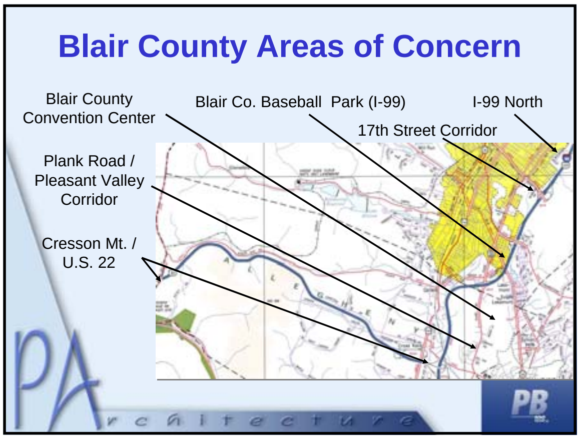
Mike Pastore

PennDOT District 9-0 ITS/Signals Section



Regional Operations and ITS

- Overview
  - What we are doing
  - Where we are going
- District 9-0 Staff:
  - Roger L. Dodson, P.E. District Traffic Engineer
  - Michael A. Pastore, Manager, ITS/Signals
  - Kevin J. Snyder, Traffic Control Specialist
  - Tony Tanzi, Traffic Control Specialist



Blair County Areas of Concern

Blair County Convention Center

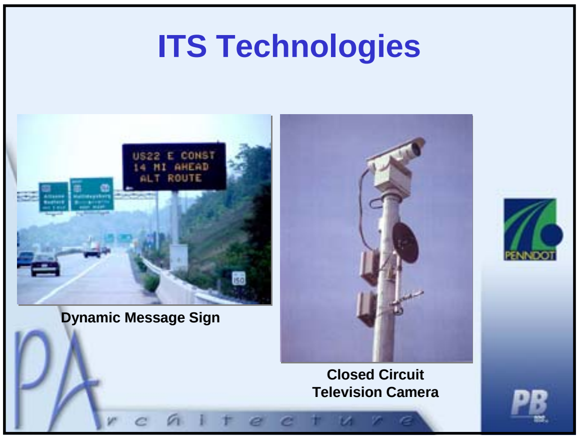
Blair Co. Baseball Park (I-99)

I-99 North

17th Street Corridor

Plank Road / Pleasant Valley Corridor

Cresson Mt. / U.S. 22



ITS Technologies

Dynamic Message Sign

Closed Circuit Television Camera

ITS Technologies

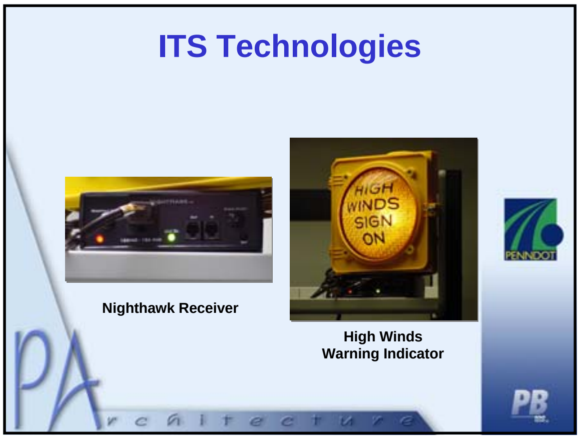
Highway Advisory Radio – Flashing Beacon Sign

Highway Advisory Radio – Station

ITS Technologies

Portable Message Boards

Fiber Optic Trunk Line



ITS Technologies

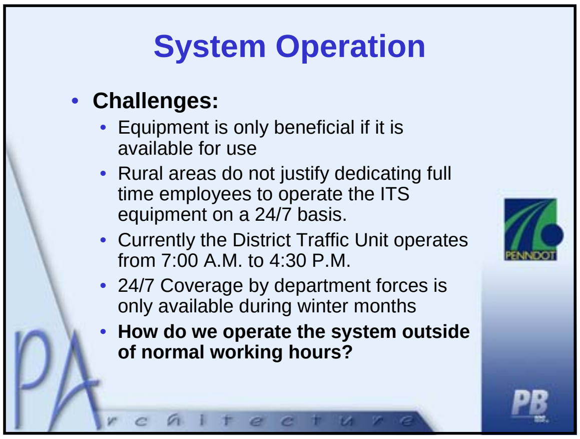
Nighthawk Receiver

High Winds
Warning Indicator

Traffic Management Center

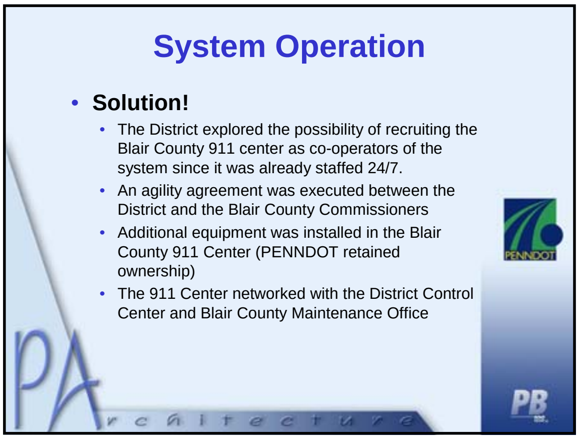
Console

Video Wall



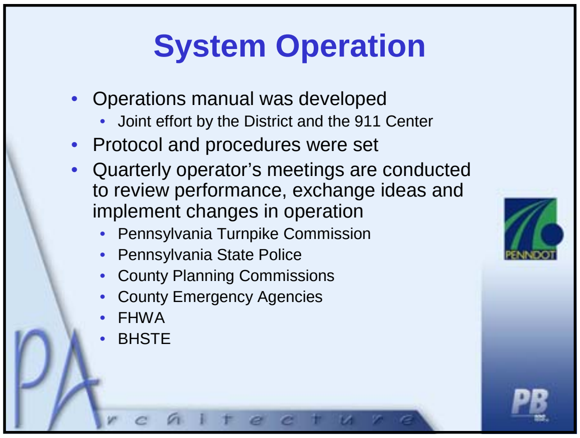
System Operation

- **Challenges:**
  - Equipment is only beneficial if it is available for use
  - Rural areas do not justify dedicating full time employees to operate the ITS equipment on a 24/7 basis.
  - Currently the District Traffic Unit operates from 7:00 A.M. to 4:30 P.M.
  - 24/7 Coverage by department forces is only available during winter months
  - **How do we operate the system outside of normal working hours?**



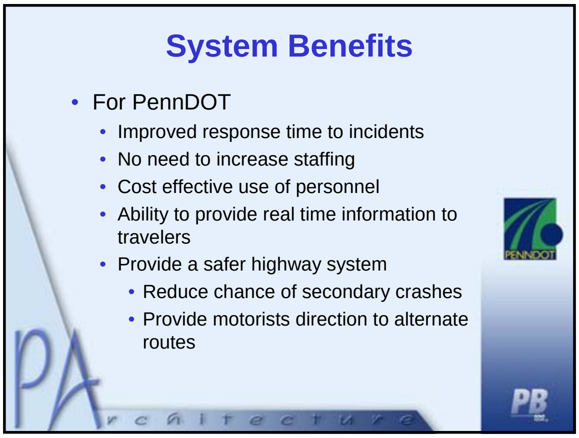
System Operation

- **Solution!**
  - The District explored the possibility of recruiting the Blair County 911 center as co-operators of the system since it was already staffed 24/7.
  - An agility agreement was executed between the District and the Blair County Commissioners
  - Additional equipment was installed in the Blair County 911 Center (PENNDOT retained ownership)
  - The 911 Center networked with the District Control Center and Blair County Maintenance Office



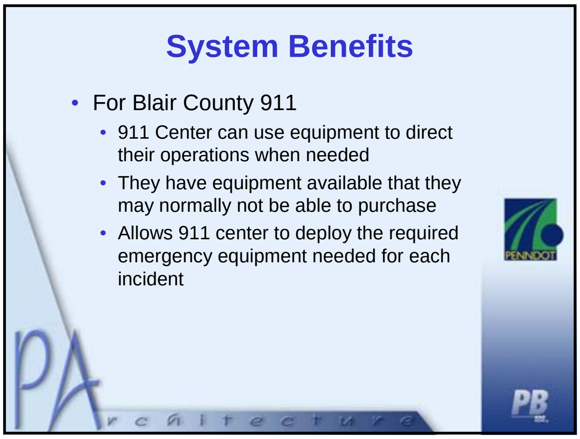
System Operation

- Operations manual was developed
  - Joint effort by the District and the 911 Center
- Protocol and procedures were set
- Quarterly operator’s meetings are conducted to review performance, exchange ideas and implement changes in operation
  - Pennsylvania Turnpike Commission
  - Pennsylvania State Police
  - County Planning Commissions
  - County Emergency Agencies
  - FHWA
  - BHSTE



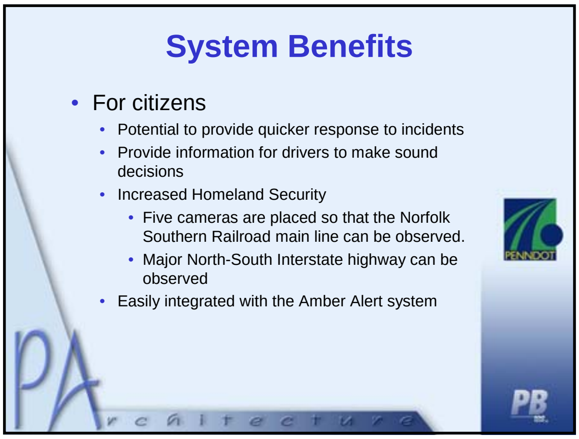
System Benefits

- For PennDOT
  - Improved response time to incidents
  - No need to increase staffing
  - Cost effective use of personnel
  - Ability to provide real time information to travelers
  - Provide a safer highway system
    - Reduce chance of secondary crashes
    - Provide motorists direction to alternate routes



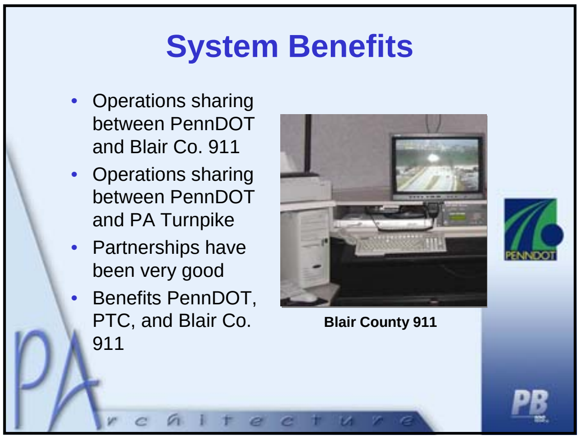
System Benefits

- For Blair County 911
  - 911 Center can use equipment to direct their operations when needed
  - They have equipment available that they may normally not be able to purchase
  - Allows 911 center to deploy the required emergency equipment needed for each incident



System Benefits

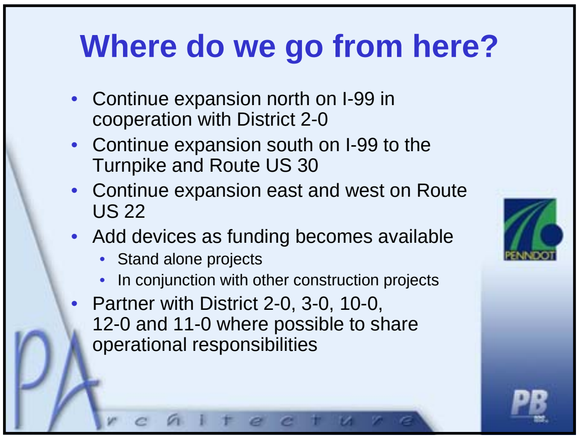
- For citizens
  - Potential to provide quicker response to incidents
  - Provide information for drivers to make sound decisions
  - Increased Homeland Security
    - Five cameras are placed so that the Norfolk Southern Railroad main line can be observed.
    - Major North-South Interstate highway can be observed
  - Easily integrated with the Amber Alert system



System Benefits

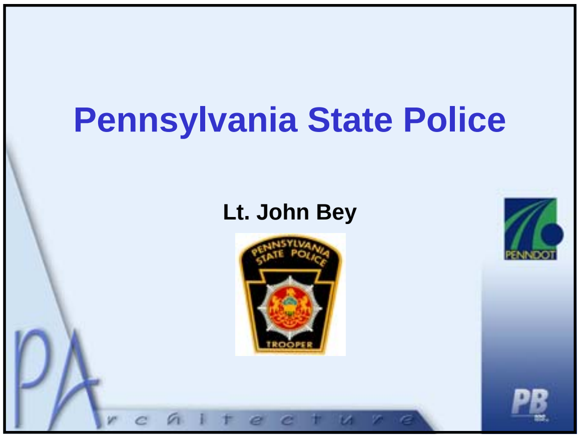
- Operations sharing between PennDOT and Blair Co. 911
- Operations sharing between PennDOT and PA Turnpike
- Partnerships have been very good
- Benefits PennDOT, PTC, and Blair Co. 911

Blair County 911



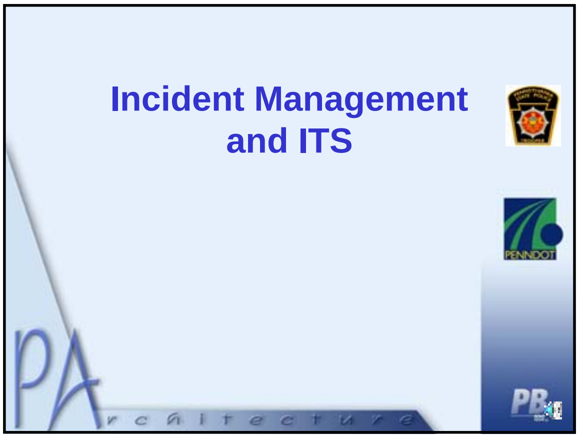
Where do we go from here?

- Continue expansion north on I-99 in cooperation with District 2-0
- Continue expansion south on I-99 to the Turnpike and Route US 30
- Continue expansion east and west on Route US 22
- Add devices as funding becomes available
  - Stand alone projects
  - In conjunction with other construction projects
- Partner with District 2-0, 3-0, 10-0, 12-0 and 11-0 where possible to share operational responsibilities

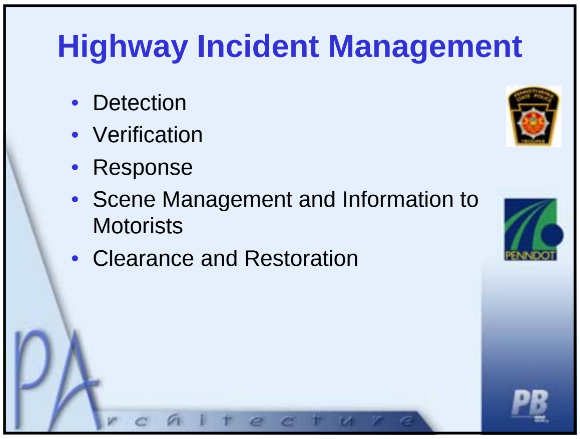


Pennsylvania State Police

Lt. John Bey

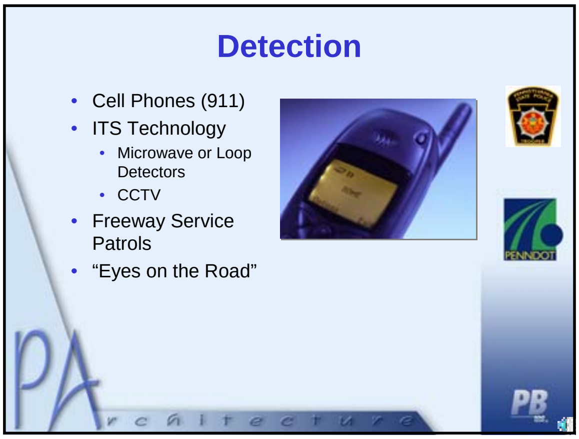


Incident Management and ITS



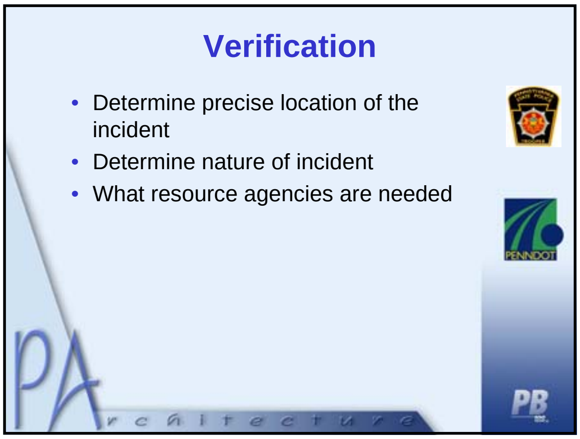
Highway Incident Management

- Detection
- Verification
- Response
- Scene Management and Information to Motorists
- Clearance and Restoration



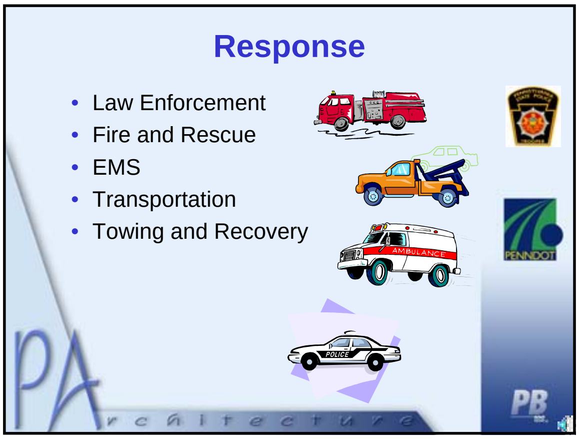
Detection

- Cell Phones (911)
- ITS Technology
  - Microwave or Loop Detectors
  - CCTV
- Freeway Service Patrols
- “Eyes on the Road”



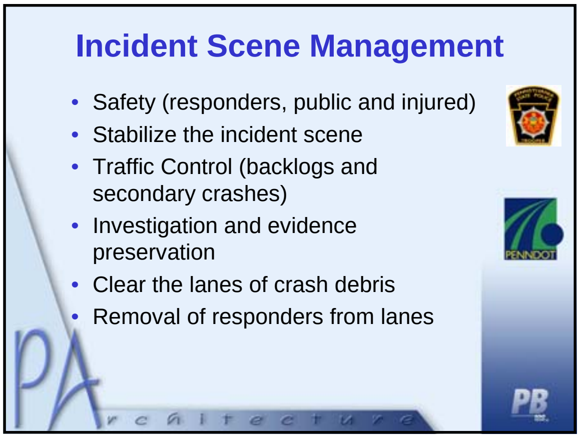
Verification

- Determine precise location of the incident
- Determine nature of incident
- What resource agencies are needed



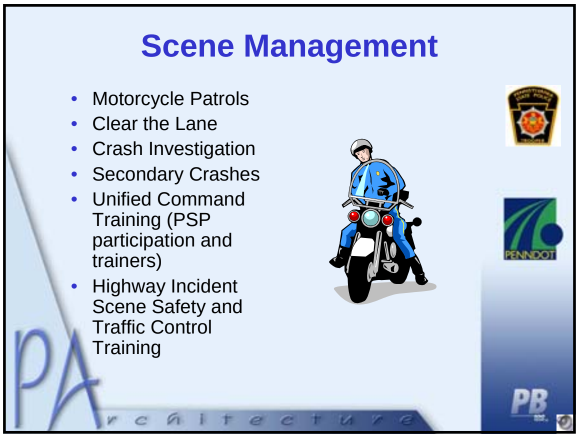
Response

- Law Enforcement
- Fire and Rescue
- EMS
- Transportation
- Towing and Recovery



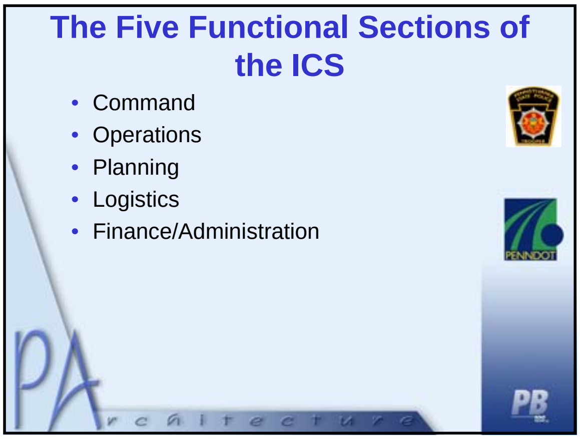
Incident Scene Management

- Safety (responders, public and injured)
- Stabilize the incident scene
- Traffic Control (backlogs and secondary crashes)
- Investigation and evidence preservation
- Clear the lanes of crash debris
- Removal of responders from lanes



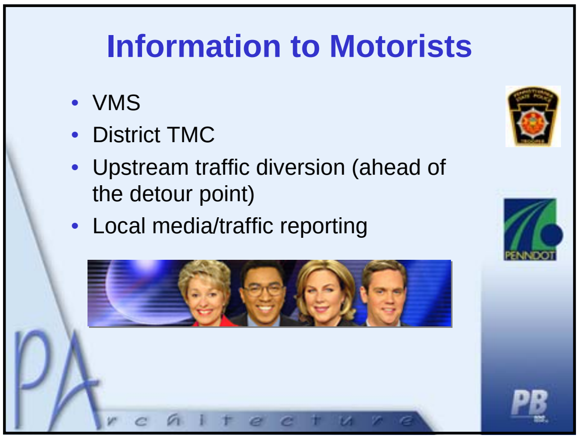
Scene Management

- Motorcycle Patrols
- Clear the Lane
- Crash Investigation
- Secondary Crashes
- Unified Command Training (PSP participation and trainers)
- Highway Incident Scene Safety and Traffic Control Training



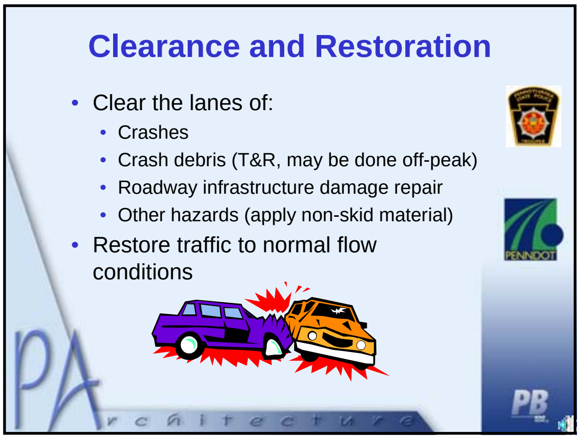
The Five Functional Sections of the ICS

- Command
- Operations
- Planning
- Logistics
- Finance/Administration



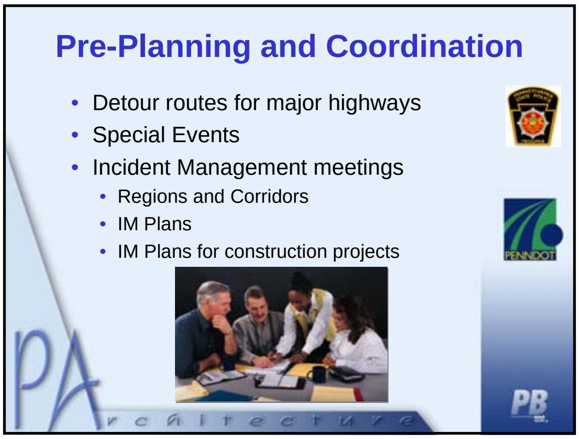
Information to Motorists

- VMS
- District TMC
- Upstream traffic diversion (ahead of the detour point)
- Local media/traffic reporting



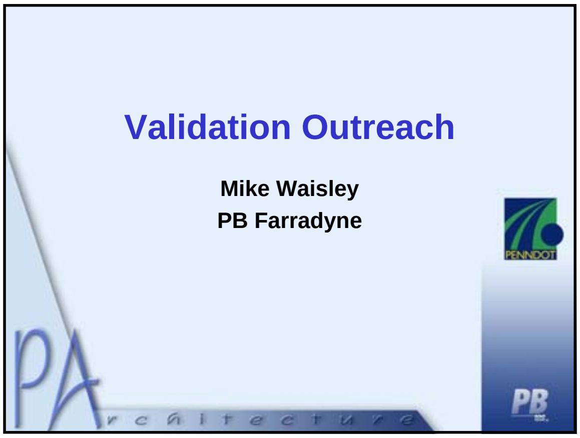
Clearance and Restoration

- Clear the lanes of:
  - Crashes
  - Crash debris (T&R, may be done off-peak)
  - Roadway infrastructure damage repair
  - Other hazards (apply non-skid material)
- Restore traffic to normal flow conditions



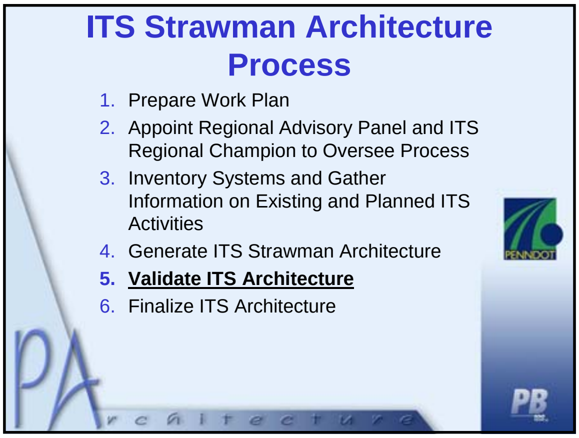
Pre-Planning and Coordination

- Detour routes for major highways
- Special Events
- Incident Management meetings
  - Regions and Corridors
  - IM Plans
  - IM Plans for construction projects



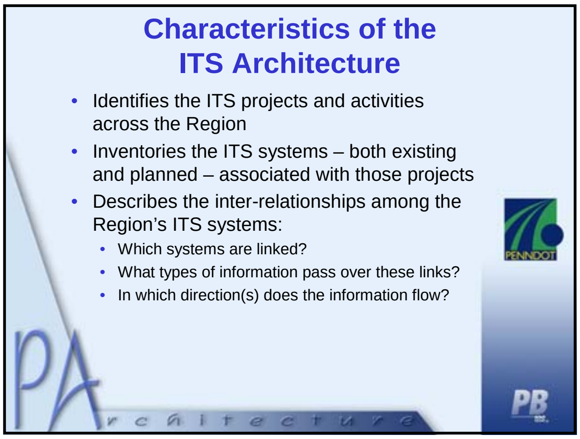
Validation Outreach

Mike Waisley
PB Farradyne



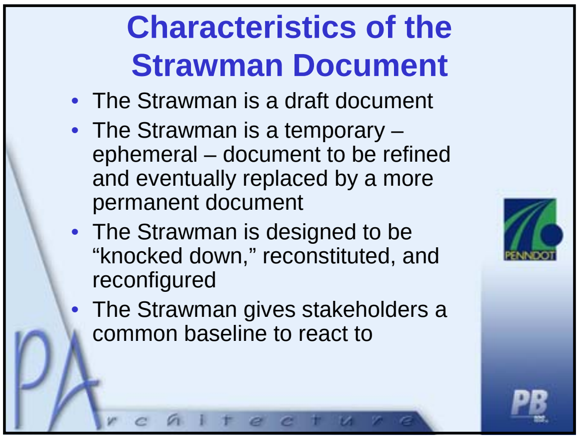
ITS Strawman Architecture Process

1. Prepare Work Plan
2. Appoint Regional Advisory Panel and ITS Regional Champion to Oversee Process
3. Inventory Systems and Gather Information on Existing and Planned ITS Activities
4. Generate ITS Strawman Architecture
5. **Validate ITS Architecture**
6. Finalize ITS Architecture



Characteristics of the ITS Architecture

- Identifies the ITS projects and activities across the Region
- Inventories the ITS systems – both existing and planned – associated with those projects
- Describes the inter-relationships among the Region's ITS systems:
  - Which systems are linked?
  - What types of information pass over these links?
  - In which direction(s) does the information flow?



Characteristics of the Strawman Document

- The Strawman is a draft document
- The Strawman is a temporary – ephemeral – document to be refined and eventually replaced by a more permanent document
- The Strawman is designed to be "knocked down," reconstituted, and reconfigured
- The Strawman gives stakeholders a common baseline to react to

We Need Your Help Because…

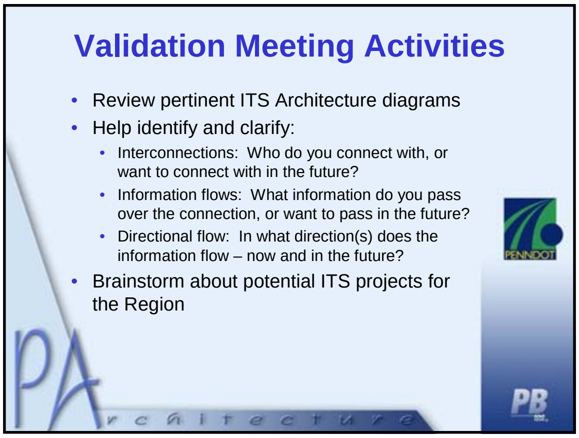
- **Your knowledge is required to validate the contents of the Strawman Architecture**
- Your insights and perspectives on regional conditions and activities are needed
- Some of you operate a piece of the transportation system
- Some of you are involved in planning and programming for regional transportation
- Some of you help set transportation policy in the Region
- **All of you have a stake in transportation conditions and performance in the Region**

Regional Validation Sessions

- Large-Group Stakeholder Meetings (2)
  - September 2004 and January 2005
- Small-Group Validation Meetings (4)
  - October 2004

Validation Meeting Schedule

- Traffic Management – PennDOT Internal
  Wednesday, October 20, 1:00-3:30PM
- Traffic Management – All
  Thursday, October 21, 9:00-11:30AM
- Incident and Emergency Management
  Thursday, October 21, 1:00-3:30PM
- Traveler Information and Tourism
  Wednesday, October 27, 9:00-11:30AM
- ITS Planning and Transit Management
  Wednesday, October 27, 1:00-3:30PM



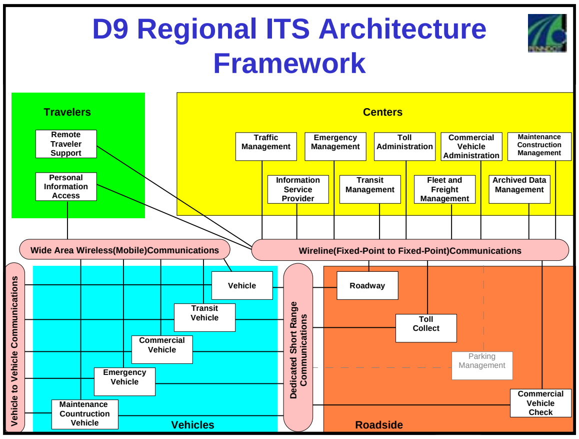
Validation Meeting Activities

- Review pertinent ITS Architecture diagrams
- Help identify and clarify:
  - Interconnections: Who do you connect with, or want to connect with in the future?
  - Information flows: What information do you pass over the connection, or want to pass in the future?
  - Directional flow: In what direction(s) does the information flow – now and in the future?
- Brainstorm about potential ITS projects for the Region

Strawman Architecture Validation Example:

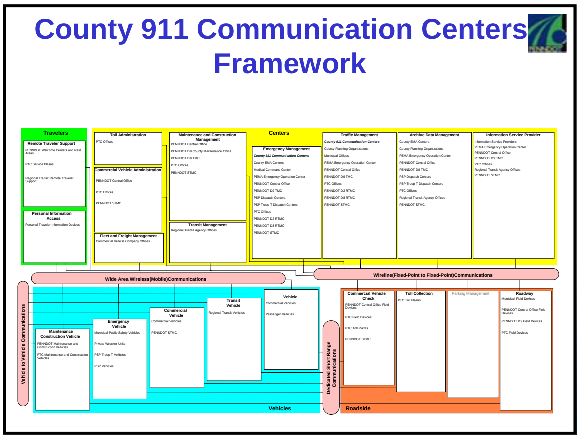
County 911 Communication Centers

PA rchitecture
PENNDOT
PB

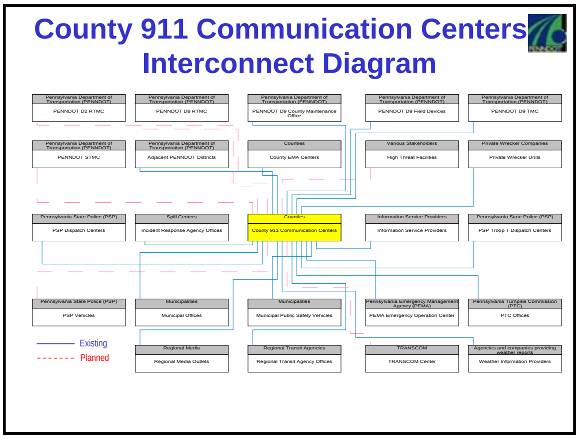


D9 Regional ITS Architecture Framework

Travelers
Remote Traveler Support
Personal Information Access
Centers
Traffic Management
Emergency Management
Toll Administration
Commercial Vehicle Administration
Maintenance Construction Management
Information Service Provider
Transit Management
Fleet and Freight Management
Archived Data Management
Wide Area Wireless(Mobile)Communications
Wireline(Fixed-Point to Fixed-Point)Communications
Vehicle to Vehicle Communications
Vehicle
Transit Vehicle
Commercial Vehicle
Emergency Vehicle
Maintenance Countruction Vehicle
Vehicles
Dedicated Short Range Communications
Roadway
Toll Collect
Parking Management
Commercial Vehicle Check
Roadside

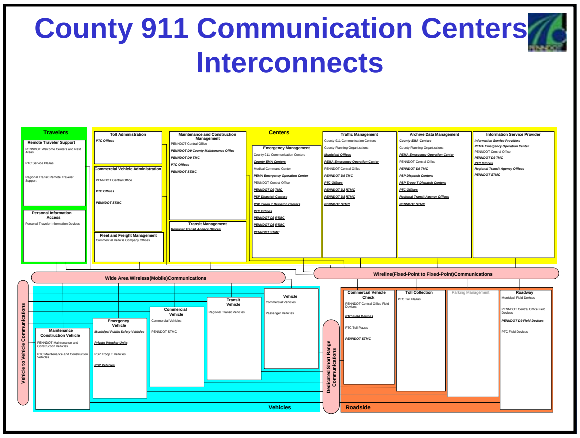


County 911 Communication Centers Framework

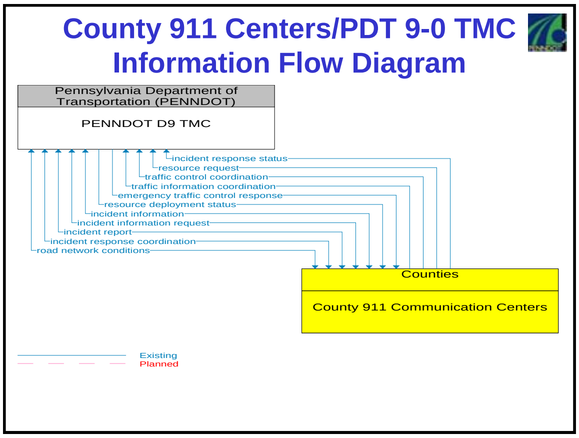


County 911 Communication Centers Interconnect Diagram

Pennsylvania Department of Transportation (PENNDOT)
PENNDOT D2 RTMC
Pennsylvania Department of Transportation (PENNDOT)
PENNDOT D8 RTMC
Pennsylvania Department of Transportation (PENNDOT)
PENNDOT D9 County Maintenance Office
Pennsylvania Department of Transportation (PENNDOT)
PENNDOT D9 Field Devices
Pennsylvania Department of Transportation (PENNDOT)
PENNDOT D9 TMC
Pennsylvania Department of Transportation (PENNDOT)
PENNDOT STMC
Pennsylvania Department of Transportation (PENNDOT)
Adjacent PENNDOT Districts
Counties
County EMA Centers
Various Stakeholders
High Threat Facilities
Private Wrecker Companies
Private Wrecker Units
Pennsylvania State Police (PSP)
PSP Dispatch Centers
Spill Centers
Incident Response Agency Offices
Counties
County 911 Communication Centers
Information Service Providers
Information Service Providers
Pennsylvania State Police (PSP)
PSP Troop T Dispatch Centers
Pennsylvania State Police (PSP)
PSP Vehicles
Municipalities
Municipal Offices
Municipalities
Municipal Public Safety Vehicles
Pennsylvania Emergency Management Agency (PEMA)
PEMA Emergency Operation Center
Pennsylvania Turnpike Commission (PTC)
PTC Offices
Existing
Planned
Regional Media
Regional Media Outlets
Regional Transit Agencies
Regional Transit Agency Offices
TRANSCOM
TRANSCOM Center
Agencies and companies providing weather reports
Weather Information Providers

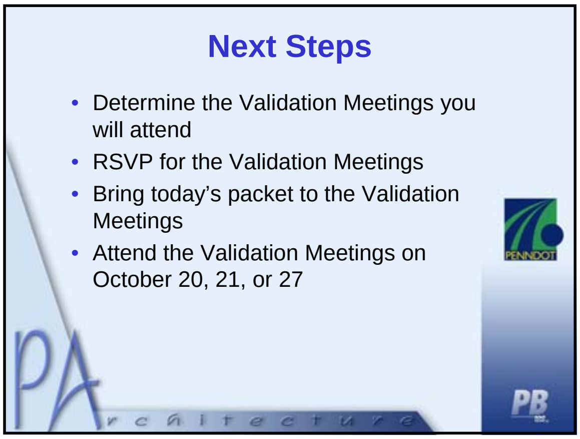


County 911 Communication Centers Interconnects



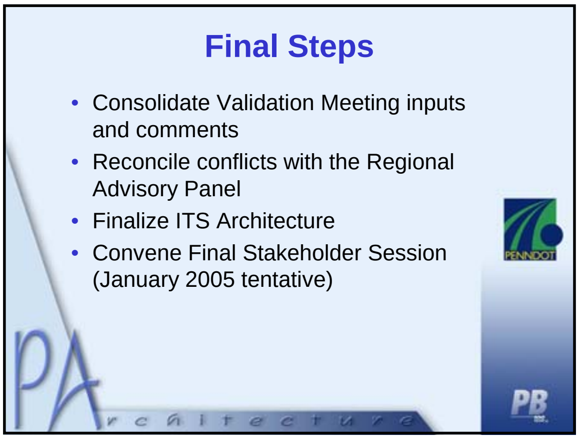
County 911 Centers/PDT 9-0 TMC Information Flow Diagram

Pennsylvania Department of Transportation (PENNDOT)
PENNDOT D9 TMC
incident response status
resource request
traffic control coordination
traffic information coordination
emergency traffic control response
resource deployment status
incident information
incident information request
incident report
incident response coordination
road network conditions
Counties
County 911 Communication Centers
Existing
Planned



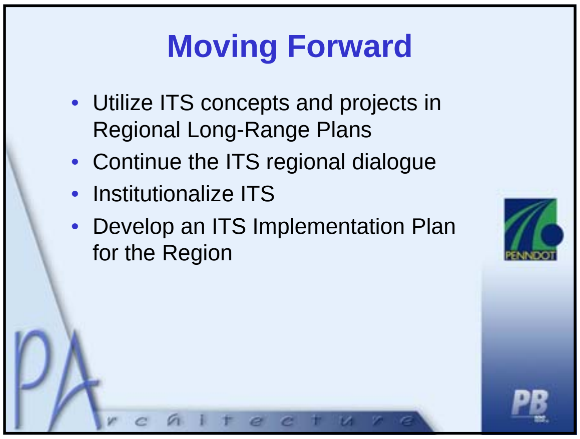
Next Steps

- Determine the Validation Meetings you will attend
- RSVP for the Validation Meetings
- Bring today's packet to the Validation Meetings
- Attend the Validation Meetings on October 20, 21, or 27



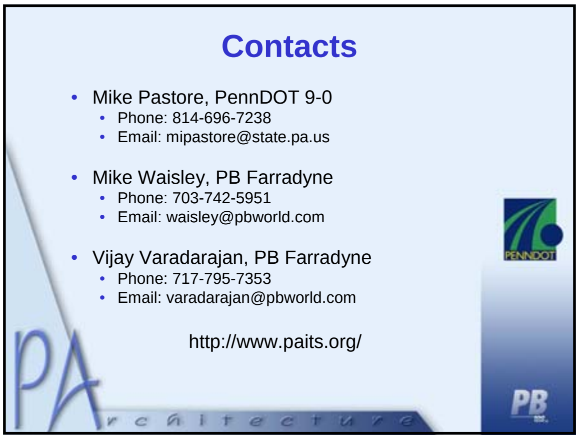
Final Steps

- Consolidate Validation Meeting inputs and comments
- Reconcile conflicts with the Regional Advisory Panel
- Finalize ITS Architecture
- Convene Final Stakeholder Session (January 2005 tentative)



Moving Forward

- Utilize ITS concepts and projects in Regional Long-Range Plans
- Continue the ITS regional dialogue
- Institutionalize ITS
- Develop an ITS Implementation Plan for the Region



Contacts

- Mike Pastore, PennDOT 9-0
  - Phone: 814-696-7238
  - Email: mipastore@state.pa.us

- Mike Waisley, PB Farradyne
  - Phone: 703-742-5951
  - Email: waisley@pbworld.com

- Vijay Varadarajan, PB Farradyne
  - Phone: 717-795-7353
  - Email: varadarajan@pbworld.com

http://www.paits.org/

Discussion

Appendix G: Validation Meeting Minutes

Date: October 20th, 2004

Location: Room 1MA, PennDOT District 9-0 Office; Hollidaysburg, PA

Attendees:
Wally Tomassetti, PennDOT District 9-0
Mike Pastore, PennDOT District 9-0
Boye Hersberger, PennDOT District 9-0
Kevin Snyder, PennDOT District 9-0
Craig Yohn, PennDOT District 9-0
Tony Tanzi, PennDOT District 9-0
Kevin Stern, PennDOT District 9-0
Vijay Varadarajan, PB Farradyne
Mike Waisley, PB Farradyne

Minutes Prepared By: Vijay Varadarajan, PB Farradyne

A meeting was held on October 20th, 2004 between 1:00 PM and 3:30 PM at the Room 1MA, PennDOT District 9-0 Office, Hollidaysburg, PA. The meeting was conducted to validate the **Traffic and Travel Management (PennDOT District 9-0)** elements of the PennDOT District 9-0 Regional ITS Architecture. The following was the meeting agenda:

- I. Introductions
- II. Background
- III. Validation
    - i. Elements Description
    - ii. Interconnects
    - iii. Information Flows
- IV. Potential Projects
- V. Wrap-up/Next Steps

The validation component of the agenda included the validation of the following elements in the PennDOT District 9-0 Regional ITS Architecture:

- PennDOT D9 TMC
- PennDOT D9 County Maintenance Offices

- PennDOT D9 Field Devices
- PennDOT Maintenance and Construction Vehicles
- *PennDOT Central Office*
- *PennDOT Central Office Field Devices*
- *PennDOT STMC*
- *PennDOT Welcome Centers and Rest Areas*
- *Pennsylvania Office of Homeland Security*
- *High Threat Facilities*

(Note: The *italicized elements* were validated as part of other Regions' validation meetings).

A "package" was developed for each of the above elements in order to portray how an element (i.e., the "subject" element) fits into the regional architecture. The packages were then combined into a MS PowerPoint presentation and reviewed with the stakeholders in attendance. These packages were distributed to the stakeholders during the PennDOT District 9-0 first book end meeting. Additionally, copies were handed out during the validation meetings to the stakeholders who did not have the package. Copies of each element package are attached with these minutes. Specifically, the element packages consisted of:

- PennDOT District 9-0 Regional ITS Architecture Framework – a copy of the National ITS Architecture "Sausage Diagram".
- Element Cover Sheets – The name, description and stakeholder of the subject element as defined in the DRAFT Regional ITS Architecture.
- "Sausage Diagrams" showing the context of the subject element and the relationship between other elements in the DRAFT Regional ITS Architecture – the subject element was shown alone within the "Sausage Diagram" framework to provide a sense of context as to where that particular element fits within the National ITS Architecture framework. In addition, a second drawing was provided to show the relationship (i.e., interconnects) between the subject element and other elements in the PennDOT D9 Regional ITS Architecture.
- Interconnect Diagram – An Interconnect Diagram showing existing and planned interconnects between the subject element and other elements in the regional architecture were provided.
- Information Flow Diagrams – Existing and planned information flows by direction were shown on drawings for the subject element and each of the elements it interconnects with.

- Appendices – Definitions for the elements and architecture flows were provided.

In addition to the package, a meeting agenda and a list of elements and terminators in the PennDOT District 9-0 Regional ITS Architecture.

The following is a list of comments that were provided at the meeting. For the elements, comments are organized around additions and deletions by element, as well as general discussion items.

I. Introductions:

Mr. Waisley opened the meeting with an overview of the agenda for the meeting. Then, the meeting participants introduced themselves.

II. Background:

Mr. Waisley presented the project background. He briefly explained the project purpose and the importance of the project to the PennDOT District 9 region.

III. Validation:

The following comments were received as part of the validation process:

I PennDOT D9 TMC

a. **Definition**:

- Change the last sentence to read " PennDOT District 9-0 TMC operates traffic signal systems in the District.
- Include the PennDOT District Maintenance (role of emergency coordinator) and Communication Relations Coordinator (CRC) to the definition.

b. **Interconnects**

- Delete the following interconnects:
    - With Medical Command Center
    - With Incident Response Agency Offices
    - MDSHA Offices
    - Municipal Offices
    - Weather Information Providers
    - PEMA Emergency Operation Centers

- Additions
    - PTC Field Devices

c. Information Flows

i With PennDOT D9 County Maintenance Offices

1. Additions
    - None
2. Deletions
    - Road network condition
3. Changes
    - Road weather information – one way to PennDOT D9 TMC
    - Both the County Maintenance Offices and PennDOT District 9-0 TMC get the Road Weather Information (RWIS data) from a central server located at the PennDOT District 9-0. The field device data comes directly to the central services. For the architecture, the road weather information is shown as a direct connection.
    - Blair County 911 Communications Center and County Maintenance Offices have access to both the District 9-0 CCTV's and DMS's.
    - Exchanges detour, construction, and work zone information

ii With PTC Offices

1. Additions:
    - DMS Control
2. Deletions:
    - Road weather information
3. Changes:
    - None
    - PTC sends Plan X information to the counties

- PennDOT notifies road closures by telephone
- Include a connection with PennDOT District 9-0 Field Devices
- Include a connection between PTC Field Devices and PennDOT District 9-0 TMC

iii With PEMA Emergency Operation Center

- No connection
- PennDOT D9 TMC deals with PEMA only during emergency operations. PennDOT helps with DMS signs during amber alert and other emergency situations. Road closures along major highways are notified to PEMA through PennDOT Central Office.

iv County 911 Communications Centers

1. Additions
    - None
2. Deletions
    - Traffic control coordination
    - Incident report
3. Changes
    - None
    - Consider splitting 911 Communication centers element into Blair County 911 Communication center and Other County 911 Communication Centers because of unique operations of the Blair County 911 Communication Center. Blair County 911 Communication Center acts as a satellite to PennDOT D9 TMC. It has access to both DMS and CCTV in Blair County. Once the Blair County changes the messages, it notifies County Maintenance Offices and District TMC
    - Blair County 911 Communication Center and County Maintenance Offices have capabilities to operate both DMS and CCTV
    - During construction, District TMC changes traffic signal timings
    - Traffic signal coordination during incidents are through fire police

- In the future, other County 911 Communication Centers may have access to CCTV based on an as-on-need-basis.

v County EMA Centers

- Consider combining County 911 Communications Center and County EMA Centers.

vi With Medical Command Center

- No Connection

vii With PSP Dispatch Centers

1. Additions
    - Planned CCTV image
2. Deletions
    - Incident report
    - current asset restriction
3. Changes
    - None
    - No real time information flows
    - Coordinates during amber alert situation
    - All the information flows happen through County 911 Communications Center
    - PennDOT CMO notifies major road closures to PSP.

viii With Regional Transit Agency Offices

- No real time connection
- PennDOT TMC notifies Regional Transit Agency Offices about planned construction activities

ix With TRANSCOM Center

1. Additions
    - None

2. Deletions
   - None
3. Changes
   - ISP coordination – both ways - Planned

x With Adjacent PennDOT Districts

1. Additions
   - None
2. Deletions
   - None
3. Changes
   - None
   - Consider splitting the Adjacent PennDOT Districts element into PennDOT adjacent District TMC and PennDOT Adjacent County Maintenance Offices. PennDOT District 9-0 TMC coordinates with Adjacent District TMC/RTMC and PennDOT District 9-0 County Maintenance Offices coordinates with Adjacent District County Maintenance Offices.

xi With Incident Response Agency Offices

- No Connection.
- All information flows happen through County 911 Communications Center

xii With MDSHA Offices

- No Connection
- Information flows may occur through PennDOT Central Office
- PennDOT District 9 County Maintenance Offices bordering adjacent Maryland coordinates with MDSHA offices during incidents and other construction related coordination.

xiii With PennDOT D9 Field Devices

1. Additions

- None

2. Deletions

- Speed monitoring information
- Speed monitoring control

3. Changes

- None

xiv With STMC

- Not validated as part of this meeting.

xv With County Planning Organizations

1. Additions

- None

2. Deletions

- None

3. Changes

- Archived coordination – both ways
- County Planning Organizations receive traffic volume, closed looped systems data and incident location (planned) from PennDOT D9 TMC

xvi With Municipal Offices

- No connection
- All information flows happen through County 911 Communications Centers

xvii With Regional Media Outlets

1. Additions

- None

2. Deletions

- None

3. Changes

- None
- All information flows happen through PennDOT District 9-0 CRC (definition included in PennDOT District 9-0 TMC)

xviii With Event Promoters

1. Additions

- None

2. Deletions

- None

3. Changes

- None

xix With Information Service Providers

- Consider deleting the element

xx With D2 RTMC

- Not validated as part of this meeting.

xxi With D8 RTMC

- Not validated as part of this meeting.

xxii With Weather Information Providers

- No Connection
- All flows happen through County Maintenance Offices

II PennDOT D9 County Maintenance Offices

a. **Definition**:

- Include traffic permits as part of the definition

b. **Interconnects**

- Delete the following interconnects:
    - Regional Media Outlets
    - Information Service Providers

c. **Information Flows**

i With D9 RTMC

- Validation as part of PennDOT D9 TMC element

ii With PTC Offices

1. Additions
    - Road network conditions – one way to PTC Offices
2. Deletions
    - None
3. Changes
    - None

iii With 911 Communication Centers

1. Additions
    - None
2. Deletions
    - None
3. Changes
    - Incident response status – both ways

iv With County EMA Centers

- Consider combining 911 Communications Center and County EMA Centers

v With PSP Dispatch Centers

- Road closures

- All information flow happens through 911 Communications Center

vi With Regional Transit Agency Offices

1. Additions
    - None
2. Deletions
    - maint and constr archive data
3. Changes
    - None
    - PennDOT CMO notifies bridge closures, road closures and flooding information

vii With Adjacent PennDOT Districts

- Change the element name to Adjacent PennDOT Districts County Maintenance Offices

viii With MDSHA Offices

1. Additions
    - None
2. Deletions
    - Road weather information
    - Roadway maintenance status
3. Changes
    - None

ix With PennDOT D9 Field Devices

1. Additions
    - DMS control
    - CCTV image
2. Deletions

- Environmental sensors control
- Environmental conditions data

3. Changes
   - None
   - PennDOT D9 District maintenance maintains the PennDOT D9 field devices
   - PennDOT CMO has access/control to CCTV and DMS

x With PennDOT Maintenance and Construction Vehicles

1. Additions
   - Road weather information
2. Deletions
   - None
3. Changes
   - Maint and constr vehicle location data – planned (through AVL/GPS)

xi With Municipal Offices

1. Additions
   - Road network conditions (detour/road closures)
2. Deletions
   - All flows
3. Changes
   - None
   - PennDOT TMC deals with signal issues

xii With Regional Media Outlets

- No connection.
- All information flows are handled through PennDOT TMC (CRC)

xiii With Information Service Providers

- No connection

xiv With PennDOT Central Office Organizations

- Not validated as part of this meeting.

xv With D2 RTMC

- Not validated as part of this meeting.

xvi With D8 RTMC

- Not validated as part of this meeting.

xvii With Weather Information Providers

1. Additions
    - None
2. Deletions
    - None
3. Changes
    - All flows - existing

III PennDOT D9 Field Devices

a. **Definition**:

- None

b. **Interconnects**

- Additions
    - With PTC Offices

c. **Information Flows**

i With D9 RTMC

- Validation as part of PennDOT D9 TMC element

ii With PennDOT D9 County Maintenance Office

- Validation as part of PennDOT D9 County Maintenance Offices element

iii With 911 Communication Centers

1. Additions
    - DMS control
2. Deletions
    - Freeway control data and status
3. Changes
    - None

iv With STMC

- Not validated as part of this meeting.

v With D2 RTMC

- Not validated as part of this meeting.

vi With D8 RTMC

- Not validated as part of this meeting.

IV PennDOT Maintenance and Construction Vehicles

a. Definition:

- Change the element name to PennDOT D9 Maintenance and Construction Vehicles

b. Interconnects

- None

c. Information Flows

i With PennDOT D9 County Maintenance Offices

- Validation as part of PennDOT D9 TMC element

IV. Potential Projects

- Coordinate with PTC to improve the Plan X deployment coordination with the Counties
- Deploy a central system software
- Improve the maintenance of RWIS devices
- Deploy more CCTV's
- Extend fiber optics communication along US 22
- Deploy automated de-icing for bridges

V. Next Steps

Mr. Waisley identified the following next steps:

- Conduct and complete other validation meetings
- Identify conflicting comments
- Convene a Regional Advisory Panel (RAP) members to resolve the conflicting comments
- Incorporate the comments into draft Strawman Architecture
- Finalize the architecture
- Conduct the second Bookend meeting

Attachments: Meeting Agenda, List of District 9--0 Elements & Terminators, and Travel and Traffic Management Internal group Validation Elements Package.

Date: October 21st, 2004

Location: Room 1MA, PennDOT District 9-0 Office; Hollidaysburg, PA

Attendees:
Bill Rankin, PennDOT District 10-0
Cassandra Schmick, Logan Township
Carl Weyandt, PennDOT District 9-0
Warren W. Rourke, Huntingdon County, PennDOT
Dave Diedrich, City of Altoona
Kevin Snyder, PennDOT District 9-0
Tony Tanzi, PennDOT District 9-0
Mike Pastore, PennDOT District 9-0
Vijay Varadarajan, PB Farradyne
Mike Waisley, PB Farradyne

Minutes Prepared By: Vijay Varadarajan, PB Farradyne

A meeting was held on October 21st, 2004 between 9:00 AM and 11:30 AM at the Room 1MA, PennDOT District 9-0 Office, Hollidaysburg, PA. The meeting was conducted to validate the **Traffic Management (External)** elements of the PennDOT District 9-0 Regional ITS Architecture. The following was the meeting agenda:

I. Introductions
II. Background
III. Validation
    i. Elements Description
    ii. Interconnects
    iii. Information Flows
IV. Potential Projects
V. Wrap-up/Next Steps

The validation component of the agenda included the validation of the following elements in the PennDOT District 9-0 Regional ITS Architecture:

- Adjacent PennDOT Districts
- *MDSHA Offices*
- Municipal Offices
- Municipal Field Devices
- Weather Information Providers

- *PennDOT D2 RTMC*
- *PennDOT D8 RTMC*
- *MEMA Emergency Operations Center*
- *TRANSCOM*

(Note: The *italicized elements* were validated as part of other Regions' validation meetings).

A "package" was developed for each of the above elements in order to portray how an element (i.e., the "subject" element) fits into the regional architecture. The packages were then combined into a MS PowerPoint presentation and reviewed with the stakeholders in attendance. These packages were distributed to the stakeholders during the PennDOT District 9-0 first book end meeting. Additionally, copies were handed out during the validation meetings to the stakeholders who did not have the package. Copies of each element package are attached with these minutes. Specifically, the element packages consisted of:

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II. Background:

Mr. Waisley presented the project background. He briefly explained the project purpose and the importance of the project to the PennDOT D9-0 region.

III. Validation:

The following comments were received as part of the validation process:

I Adjacent PennDOT Districts

a. **Definition**:

- No changes

b. **Interconnects**

- No changes

c. **Information Flows**

i With PennDOT D9 TMC

1. Additions
   - Work zone information
   - Work plan coordination
2. Deletions
   - None
3. Changes
   - None

ii With PennDOT D9 County Maintenance Offices

- No connection

- Shows a connection between Adjacent PennDOT Districts' County Maintenance Offices and PennDOT County Maintenance Offices with the flows identified in this interconnect. Include incident response coordination and traffic information flows. Delete work plan coordination and work zone information flows.

iii With PTC Offices

1. Additions:
    - Road network information
2. Deletions:
    - None
3. Changes:
    - None

iv With 911 Communication Centers

- Verify this interconnect during the Incident and Emergency validation group meeting.

v With PennDOT STMC

- Not validated as part of this meeting.

vi With PennDOT Central Office Organizations

- Not validated as part of this meeting.

vii With PennDOT D2 RTMC

- Not validated as part of this meeting.

viii With PennDOT D8 RTMC

- Not validated as part of this meeting.

II MDSHA Offices

a. **Definition**:

- Include CHART in the definition

b. **Interconnects**

- Include the following interconnects:
    - PTC Offices
        - Incident response coordination
    - PennDOT Central Office Organizations
        - Incident response coordination
- Delete the following interconnects:
    - PennDOT D9 TMC

c. **Information Flows**

i With PennDOT D9 TMC

- No connections.
- All information flows happens through PennDOT Central Office Organizations.

ii With PennDOT D9 County Maintenance Offices

1. Additions
    - None
2. Deletions
    - None
3. Changes
    - All flows – both ways

iii With PEMA Emergency Operation Center

- Not validated as part of this meeting.

iv With PennDOT STMC

- Not validated as part of this meeting.

v With D2 RTMC

- Not validated as part of this meeting.

vi With D8 RTMC

- Not validated as part of this meeting.

III Municipal Offices

a. **Definition**:

- Delete the following sentence from the definition: "Include systems personnel from police, fire, and EMS agencies.

b. **Interconnects**

- Delete the following interconnects:
  - Weather information providers
  - Information Service Providers
- Include the following interconnects:
  - Regional Outlet Media

c. **Information Flows**

i With PennDOT D9 TMC

1. Additions
   - Work zone information
   - Work plan coordination
2. Deletions
   - Current asset restrictions
3. Changes
   - All flows – both ways
   - School districts are responsible for taking decisions to close the schools. Sometimes, school districts contact counties to learn about the roadway conditions.

ii With PennDOT D9 County Maintenance Offices

1. Additions
    - Maintenance and construction resource request
2. Deletions
    - Current asset restrictions
3. Changes
    - incident information – both ways

iii With PTC Offices

1. Additions
    - None
2. Deletions
    - None
3. Changes
    - Traffic control coordination – existing
    - Current asset restrictions - planned

iv With 911 Communication Centers

1. Additions
    - None
2. Deletions
    - None
3. Changes
    - None

v With County EMA Centers

1. Additions
    - None
2. Deletions

- None

3. Changes

- None

vi With Municipal Field Devices

1. Additions

- None

2. Deletions

- video surveillance control

3. Changes

- None

vii With County Planning Organizations

1. Additions

- None

2. Deletions

- None

3. Changes

- None

viiiWith Event Promoters

1. Additions

- None

2. Deletions

- None

3. Changes

- None
- All events are coordinated through local police.

ix With Information Service providers

- No connection

x With PennDOT D2 RTMC

- Not validated as part of this meeting.

xi With PennDOT D8 RTMC

- Not validated as part of this meeting.

xii With Information Service providers

- No connection

IV Municipal Field Devices

a. **Definition**:

- Change the definition to read: Municipality owned and maintained traffic management devices. Include vehicle priority systems planned for the future.

b. **Interconnects**

- Additions
  - PennDOT D9 TMC

c. **Information Flows**

i Municipal Offices

1. Please refer to C.III.c.vi for comments.
   - None
2. Deletions
   - Video surveillance control
3. Changes
   - None

V Weather Information Providers

a. **Definition**:

- Mention NOAA weather media in the definition.

b. **Interconnects**

- No changes

c. **Information Flows**

i **With PennDOT D9 TMC**

1. Additions
    - None
2. Deletions
    - Environmental conditions data
    - Weather information
3. Changes
    - All flows - existing

ii **With PennDOT D9 County Maintenance Offices**

1. Additions
    - None
2. Deletions
    - Environmental conditions data
    - Weather information
3. Changes
    - All flows - existing

iii **With PTC Offices**

- Not validated as part of this meeting.

iv **With PEMA Emergency Operation Center**

- Not validated as part of this meeting.
- However, delete archive requests and archive status flows.

v With 911 Communication Centers

1. Additions
   - None
2. Deletions
   - None
3. Changes
   - None

vi With County EMA Centers

1. Additions
   - None
2. Deletions
   - None
3. Changes
   - None

vii With PSP Dispatch Centers

1. Additions
   - None
2. Deletions
   - None
3. Changes
   - Weather information - existing

viii With Regional Transit Agency Offices

1. Additions
   - None
2. Deletions

- None

3. Changes

- Weather information – existing

ix With PTC Field Devices

- Not validated as part of this meeting.

x With PennDOT STMC

- Not validated as part of this meeting.

xi With Municipal Offices

1. Additions

- None

2. Deletions

- Environmental conditions data

3. Changes

- Weather information - existing

xii With Information Service Providers

- Delete the elements

xiii With PennDOT D2 RTMC

- Not validated as part of this meeting.

xivWith PennDOT D8 RTMC

- Not validated as part of this meeting.

IV. Potential Projects

- Deploy more ITS devices (DMS, HAR) along I-80.
- Deploy more DMS in the region.
- Consider providing the CCTV images to the cities.

- Develop an agreement between the City of Altoona and Logan Township for the maintenance of the traffic signal systems.

V. Next Steps

Mr. Waisley identified the following next steps:

- Conduct and complete other validation meetings
- Identify conflicting comments
- Convene a Regional Advisory Panel (RAP) members to resolve the conflicting comments
- Incorporate the comments into draft Strawman Architecture
- Finalize the architecture
- Conduct the second Bookend meeting

Attachments: Meeting Agenda, List of District 9--0 Elements & Terminators, and Traffic Management (External) group Validation Elements Package.

Date: October 21st, 2004

Location: Room 1MA, PennDOT District 9-0 Office; Hollidaysburg, PA

Attendees:
Dan Datesman, Bedford EMA
Lisa Sherman, Fulton EMA
Rod Bohner, Blair EMA/911
Graham Hess, PennDOT BHSTE
Bernard McCreadie, Cambria EMA
Kevin Snyder, PennDOT District 9-0
Tony Tanzi, PennDOT District 9-0
Mike Pastore, PennDOT District 9-0
Vijay Varadarajan, PB Farradyne
Mike Waisley, PB Farradyne

Minutes Prepared By: Vijay Varadarajan, PB Farradyne

A meeting was held on October 21st, 2004 between 9:00 AM and 11:30 AM at the Room 1MA, PennDOT District 9-0 Office, Hollidaysburg, PA. The meeting was conducted to validate the **Incident and Emergency Management** elements of the PennDOT District 9-0 Regional ITS Architecture. The following was the meeting agenda:

I. Introductions
II. Background
III. Validation
    i. Elements Description
    ii. Interconnects
    iii. Information Flows
IV. Potential Projects
V. Wrap-up/Next Steps

The validation component of the agenda included the validation of the following elements in the PennDOT District 9-0 Regional ITS Architecture:

- 911 Communication Centers
- County EMA Centers
- Incident Response Agency Offices
- Medical Command Center
- Municipal Public Safety Vehicles

- *Private Wrecker Units*
- *PSP Dispatch Centers*
- *PSP Vehicles*

(Note: The *italicized elements* were validated as part of other Regions' validation meetings).

A "package" was developed for each of the above elements in order to portray how an element (i.e., the "subject" element) fits into the regional architecture. The packages were then combined into a MS PowerPoint presentation and reviewed with the stakeholders in attendance. These packages were distributed to the stakeholders during the PennDOT District 9-0 first book end meeting. Additionally, copies were handed out during the validation meetings to the stakeholders who did not have the package. Copies of each element package are attached with these minutes. Specifically, the element packages consisted of:

- PennDOT District 9-0 Regional ITS Architecture Framework – a copy of the National ITS Architecture "Sausage Diagram".
- Element Cover Sheets – The name, description and stakeholder of the subject element as defined in the DRAFT Regional ITS Architecture.
- "Sausage Diagrams" showing the context of the subject element and the relationship between other elements in the DRAFT Regional ITS Architecture – the subject element was shown alone within the "Sausage Diagram" framework to provide a sense of context as to where that particular element fits within the National ITS Architecture framework. In addition, a second drawing was provided to show the relationship (i.e., interconnects) between the subject element and other elements in the PennDOT D9 Regional ITS Architecture.
- Interconnect Diagram – An Interconnect Diagram showing existing and planned interconnects between the subject element and other elements in the regional architecture were provided.
- Information Flow Diagrams – Existing and planned information flows by direction were shown on drawings for the subject element and each of the elements it interconnects with.
- Appendices – Definitions for the elements and architecture flows were provided.

In addition to the package, a meeting agenda and a list of elements and terminators in the PennDOT District 9-0 Regional ITS Architecture.

The following is a list of comments that were provided at the meeting. For the elements, comments are organized around additions and deletions by element, as well as general discussion items.

I. Introductions:

Mr. Waisley opened the meeting with an overview of the agenda for the meeting. Then, the meeting participants introduced themselves.

II. Background:

Mr. Waisley presented the project background. He briefly explained the project purpose and the importance of the project to the PennDOT D9-0 region.

III. Validation:

The following comments were received as part of the validation process:

I 911 Communication Centers

a. **Definition**:

- Include County EMS/fire/police

b. **Interconnects**

- Delete the following interconnects:
    - Adjacent PennDOT Districts

c. **Information Flows**

i With PennDOT D9 TMC

1. Additions
    - DMS control
    - CCTV control
2. Deletions
    - None
3. Changes
    - Traffic control coordination – both ways
    - Traffic information coordination – both ways

- County 911 Communication Centers/EMA other that Blair County talks to County Maintenance Offices. Show future connection between County 911 Communication Centers/EMA with PennDOT D9 TMC.
- PennDOT D9 TMC is planning to provide DMS control to all the PennDOT D9 counties.
- Fulton County contracts the 911 service to Cumberland County 911 Center

ii With PennDOT D9 County Maintenance Offices

1. Additions:
    - None
2. Deletions:
    - None
3. Changes:
    - Incident response status – both ways
    - Road weather information – both ways

iii With PTC Offices

1. Additions:
    - None
2. Deletions:
    - None
3. Changes:
    - None
    - County 911 Communication Centers receive Turnpike incidents through PEMA.

iv With PEMA Emergency Operation Center

1. Additions
    - None

2. Deletions
   - None
3. Changes
   - None
   - All the information flows are through PEMA's PIERS systems.
   - PennDOT CO acts as liaison between PennDOT and TRANSCOM, PSP, PEMA etc.

v County EMA Centers

- Consider combining County 911 Communications Center and County EMA Centers.

vi With PSP Dispatch Centers

1. Additions
   - None
2. Deletions
   - None
3. Changes
   - All information flows – both ways

vii With Regional Transit Agency Offices

1. Additions
   - None
2. Deletions
   - None
3. Changes
   - None

viiiWith TRANSCOM Center

1. Additions

- None

2. Deletions

- None

3. Changes

- None

ix With Adjacent PennDOT Districts

- No connection

x With Incident Response Agency Offices

1. Additions

- None

2. Deletions

- None

3. Changes

- None

xi With MDSHA Offices

- No Connection
- Information flows may occur through PennDOT Central Office
- PennDOT District 9 County Maintenance Offices bordering adjacent Maryland coordinates with MDSHA offices during incidents and other construction related coordination.

xii With PennDOT D9 Field Devices

1. Additions

- DMS control

2. Deletions

- None

3. Changes

- None
- All the flows are currently applicable to Blair County 911 Communication centers. However, all the flows are planned for all the other County 911 Communication centers.

xiii With Municipal Public Safety vehicles

1. Additions
    - None
2. Deletions
    - None
3. Changes
    - None
    - Consider changing the Municipal Public Safety vehicles element name to Emergency Response Vehicles.
    - Cambria County dispatches helicopter. Other counties dispatch helicopter through One Call.

xivWith PennDOT STMC

- Not validated as part of this meeting.

xv With Municipal Offices

1. Additions
    - None
2. Deletions
    - None
3. Changes
    - None

xvi With PSP Vehicles

1. Additions
    - None

2. Deletions
    - None
3. Changes
    - All flows – existing and both ways

xvii With Regional Media Outlets

1. Additions
    - None
2. Deletions
    - None
3. Changes
    - None

xviii With Information Service Providers

- Consider deleting the element

xix With Private Wrecker Units

1. Additions
    - Incident information - planned
2. Deletions
    - Incident command information
    - Incident command request
    - Incident status
3. Changes
    - None

xx With High Threat Facilities

1. Additions
    - None

2. Deletions
   - None
3. Changes
   - None

xxi With D2 RTMC

- Not validated as part of this meeting.

xxii With D8 RTMC

- Not validated as part of this meeting.

xxiii With PSP Troop T Highspire

- No Connection
- All flows happen through PTC TOC

xxiv With Weather Information Providers

1. Additions
   - None
2. Deletions
   - None
3. Changes
   - None

II County EMA Centers

a. **Definition**:

- Include hazmat response in the definition

b. **Interconnects**

- Delete the following interconnects:
  - PSP Troop T Highspire
  - Regional Media Outlets

- o Medical Command Center
- o Municipal Public Safety Vehicles

c. **Information Flows**

i With PennDOT D9 TMC

1. Additions
    - None
2. Deletions
    - None
3. Changes
    - None

ii With PennDOT D9 County Maintenance Offices

1. Additions
    - None
2. Deletions
    - None
3. Changes
    - None

iii With PTC Offices

- Not validated as part of this meeting.

iv With PEMA Emergency Operation Center

1. Additions
    - None
2. Deletions
    - None
3. Changes

- None

v With 911 Communication Centers

1. Additions
    - None
2. Deletions
    - None
3. Changes
    - All flows – both ways

vi With Medical Command Center

- No Connection

vii With PSP Dispatch Centers

1. Additions
    - None
2. Deletions
    - None
3. Changes
    - All flows – both ways

viii With Regional Transit Agency Offices

1. Additions
    - None
2. Deletions
    - None
3. Changes
    - Transit information request - existing

ix With TRANSCOM

1. Additions
    - None
2. Deletions
    - None
3. Changes
    - None

x With Incident Response Agency Offices

1. Additions
    - None
2. Deletions
    - None
3. Changes
    - None

xi With Municipal Public Safety Vehicles

- No connection. Dispatch of emergency vehicles happens through 911 Communication center.

xii With STMC

- Not validated as part of this meeting.

xiii With Municipal Offices

1. Additions
    - None
2. Deletions
    - None
3. Changes
    - None

- All the information flows happens during flooding situation.

xiv With Regional Media Outlets

- No connection

xv With Information Service Providers

- No connection

xvi With High Threat Facilities

1. Additions
    - None
2. Deletions
    - None
3. Changes
    - None

xvii With D2 RTMC

- Not validated as part of this meeting.

xviii With D8 RTMC

- Not validated as part of this meeting.

xix With PSP Troop T Highspire

- No connection

xx With Weather Information Providers

1. Additions
    - None
2. Deletions
    - None
3. Changes
    - None

III Incident Response Agency Offices

a. **Definition**:

- Include DEP

b. **Interconnects**

- No changes

c. **Information Flows**

i With PennDOT D9 TMC

1. Additions
   - None
2. Deletions
   - None
3. Changes
   - None

ii With PTC Offices

1. Additions
   - None
2. Deletions
   - None
3. Changes
   - None

iii With PEMA Emergency Operation Center

1. Additions
   - None
2. Deletions
   - None

3. Changes
    - None

iv With PennDOT 911 Communication Centers

1. Additions
    - None
2. Deletions
    - None
3. Changes
    - None

v With County EMA Centers

1. Additions
    - None
2. Deletions
    - None
3. Changes
    - None

vi With PSP Dispatch Centers

1. Additions
    - None
2. Deletions
    - None
3. Changes
    - None

vii With PennDOT STMC

- Not validated as part of this meeting

viii With PennDOT Central Office Organizations

1. Additions
   - None
2. Deletions
   - None
3. Changes
   - None

ix With PennDOT D2 RTMC

- Not validated as part of this meeting.

x With PennDOT D8 RTMC

- Not validated as part of this meeting.

IV Medical Command Center

- Consider deleting this element. Include the definition of EMS vehicles in the Emergency response vehicles

V Municipal Public Safety Vehicles

a. **Definition**:

- No changes

b. **Interconnects**

- No changes

c. **Information Flows**

i With 911 Communication Centers

- Please refer to section III.I.C.xiii

ii With County EMA Centers

- Please refer to section III.II.C.xi

iii With PSP Dispatch Centers

1. Additions
    - None
2. Deletions
    - None
3. Changes
    - None

IV. Potential Projects

- Improve incident response coordination between Blair County 911 Communication Center and Blair County Maintenance Offices.
- Provide the incident information on the website for the use of general public.
- Develop a common website for information exchange.

V. Next Steps

Mr. Waisley identified the following next steps:

- Conduct and complete other validation meetings
- Identify conflicting comments
- Convene a Regional Advisory Panel (RAP) members to resolve the conflicting comments
- Incorporate the comments into draft Strawman Architecture
- Finalize the architecture
- Conduct the second Bookend meeting

Attachments: Meeting Agenda, List of District 9--0 Elements & Terminators, and **Incident and Emergency Management** group Validation Elements Package.

Date: October 27th, 2004

Location: Room 1MA, PennDOT District 9-0 Office; Hollidaysburg, PA

Attendees:
Tony Tanzi, PennDOT District 9-0
Mike Pastore, PennDOT District 9-0
Kevin Snyder, PennDOT District 9-0
Peter Gardella, Del Grosso's Amusement Park
Steve Seltzer, Blair County Chamber of Commerce
Noah Goodall, PB Farradyne
Mike Waisley, PB Farradyne

Minutes Prepared By: Noah Goodall, PB Farradyne

A meeting was held on October 27th, 2004 between 9:00 AM and 11:30 PM at the Room 1MA, PennDOT District 9-0 Office, Hollidaysburg, PA. The meeting was conducted to validate the **Traveler Information and Tourism (PennDOT District 9-0)** elements of the PennDOT District 9-0 Regional ITS Architecture. The following was the meeting agenda:

I. Introductions
II. Background
III. Validation
    i. Elements Description
    i. Interconnects
    ii. Information Flows
IV. Potential Projects
V. Wrap-up/Next Steps

The validation component of the agenda including the validation of the following elements in the PennDOT District 9-0 Regional ITS Architecture:

- Event Promoters
- Information Service Providers
- Personal Traveler Information Devices
- Regional Media Outlets
- *Commercial Vehicle Company Offices*
- *Commercial Vehicles*

(I*talicized* bulleted items are not validated as part of this meeting.)

A “package” was developed for each of the above elements in order to portray how an element (i.e., the “subject” element) fits into the regional architecture. The packages were then combined into a MS PowerPoint presentation and reviewed with the stakeholders in attendance. These packages were distributed to the stakeholders during the PennDOT District 9-0 first book end meeting. Additionally, copies were handed out during the validation meetings to the stakeholders who did not have the package. Copies of each element package are attached with these minutes. Specifically, the element packages consisted of:

- PennDOT District 9-0 Regional ITS Architecture Framework – a copy of the National ITS Architecture “Sausage Diagram”.
- Element Cover Sheets – The name, description and stakeholder of the subject element as defined in the DRAFT Regional ITS Architecture.
- “Sausage Diagrams” showing the context of the subject element and the relationship between other elements in the DRAFT Regional ITS Architecture – the subject element was shown alone within the “Sausage Diagram” framework to provide a sense of context as to where that particular element fits within the National ITS Architecture framework. In addition, a second drawing was provided to show the relationship (i.e., interconnects) between the subject element and other elements in the PennDOT D9 Regional ITS Architecture.
- Interconnect Diagram – An Interconnect Diagram showing existing and planned interconnects between the subject element and other elements in the regional architecture were provided.
- Information Flow Diagrams – Existing and planned information flows by direction were shown on drawings for the subject element and each of the elements it interconnects with.
- Appendices – Definitions for the elements and architecture flows were provided.

In addition to the package, a meeting agenda and a list of elements and terminators in the PennDOT District 9-0 Regional ITS Architecture.

The following is a list of comments that were provided at the meeting. For the elements, comments are organized around additions and deletions by element, as well as general discussion items.

I. Introductions:

Mr. Waisley opened the meeting with an overview of the agenda for the meeting. Then, the meeting participants introduced themselves.

II. Background:

Mr. Waisley presented the project background. He briefly explained the project purpose and the importance of the project to the PennDOT D9 region.

III. Validation:

The following comments were received as part of the validation process:

I Event Promoters

a. **Definition**

- Include relation to local media outlets as part of the definition

b. **Interconnects**

- Add the following interconnect:
  - Regional Media Outlets

c. **Information Flows**

i With Regional Media Outlets

1. Additions
   - Event information – one way to Regional Media Outlets
   - Event information request – one way to Event Promoters
2. Deletions
   - None
3. Changes
   - None

II Information Service Providers

a. **Definition**:

- Include connection to Regional Media Outlets

b. **Interconnects**

- None
- Steve Seltzer explained the role of the Blair County Chamber of Commerce in transportation planning.

c. **Information Flows**

- None

III Personal Traveler Information Devices

a. **Definition**:

- Include Onstar, XM Radio, and Sirius Satellite Radio.

b. **Interconnects**

- None

c. **Information Flows**

- None

IV. Regional Media Outlets

a. **Definition**

- Include public access channel as part of the definition.

a. **Interconnects**

- Add the following interconnect:
    - Event Promoters

b. **Information flows**

- **With Event Promoters**

1. Additions
    - Event information – one way to Regional Media Outlets
    - Event information request – one way to Event Promoters
2. Deletions
    - None
3. Changes
    - None

V. Potential Projects

- Camera image sharing with regional media

VI. Next Steps

Mr. Waisley identified the following next steps:

- Conduct and complete other validation meetings
- Identify conflicting comments
- Convene a Regional Advisory Panel (RAP) members to resolve the conflicting comments
- Incorporate the comments into draft Strawman Architecture
- Finalize the architecture
- Conduct the second Bookend meeting

Attachments: Meeting Agenda, List of District 9--0 Elements & Terminators, and **Traveler Information and Tourism** group Validation Elements Package.

Date: October 27th, 2004

Location: Room 1MA, PennDOT District 9-0 Office; Hollidaysburg, PA

Attendees:
Randy Hillegass, PennDOT District 9-0
Tony Tanzi, PennDOT District 9-0
Mike Pastore, PennDOT District 9-0
Kevin Snyder, PennDOT District 9-0
Tom Klevan, AMTRAN
Eric Wolf, AMTRAN
Wes Burket, Blair County Planning Commission
Jessie Yung, FHWA
Karen Seymore, Cambria County Transit
James Parks, Cambria County Transit
Frank Burggraf, Bedford County Planning Commission
David Belz, Cambria County Planning Commission
Noah Goodall, PB Farradyne
Mike Waisley, PB Farradyne

Minutes Prepared By: Noah Goodall, PB Farradyne

A meeting was held on October 27th, 2004 between 1:00 PM and 3:30 PM at the Room 1MA, PennDOT District 9-0 Office, Hollidaysburg, PA. The meeting was conducted to validate the **ITS Planning and Transit Management** elements of the PennDOT District 9-0 Regional ITS Architecture. The following was the meeting agenda:

I. Introductions
II. Background
III. Validation
    i. Elements Description
    ii. Interconnects
    iii. Information Flows
IV. Potential Projects
V. Wrap-up/Next Steps

The validation component of the agenda including the validation of the following elements in the PennDOT District 9-0 Regional ITS Architecture:

- County Planning Organizations
- Regional Transit Agency Offices
- Regional Transit Remote Traveler Support

- Regional Transit Vehicles

A "package" was developed for each of the above elements in order to portray how an element (i.e., the "subject" element) fits into the regional architecture. The packages were then combined into a MS PowerPoint presentation and reviewed with the stakeholders in attendance. These packages were distributed to the stakeholders during the PennDOT District 9-0 first book end meeting. Additionally, copies were handed out during the validation meetings to the stakeholders who did not have the package. Copies of each element package are attached with these minutes. Specifically, the element packages consisted of:

- PennDOT District 9-0 Regional ITS Architecture Framework – a copy of the National ITS Architecture "Sausage Diagram".

- Element Cover Sheets – The name, description and stakeholder of the subject element as defined in the DRAFT Regional ITS Architecture.

- "Sausage Diagrams" showing the context of the subject element and the relationship between other elements in the DRAFT Regional ITS Architecture – the subject element was shown alone within the "Sausage Diagram" framework to provide a sense of context as to where that particular element fits within the National ITS Architecture framework. In addition, a second drawing was provided to show the relationship (i.e., interconnects) between the subject element and other elements in the PennDOT D8 Regional ITS Architecture.

- Interconnect Diagram – An Interconnect Diagram showing existing and planned interconnects between the subject element and other elements in the regional architecture were provided.

- Information Flow Diagrams – Existing and planned information flows by direction were shown on drawings for the subject element and each of the elements it interconnects with.

- Appendices – Definitions for the elements and architecture flows were provided.

In addition to the package, a meeting agenda and a list of elements and terminators in the PennDOT District 9-0 Regional ITS Architecture.

The following is a list of comments that were provided at the meeting. For the elements, comments are organized around additions and deletions by element, as well as general discussion items.

I. Introductions:

Mr. Waisley opened the meeting with an overview of the agenda for the meeting. Then, the meeting participants introduced themselves.

II. Background:

Mr. Waisley presented the project background. He briefly explained the project purpose and the importance of the project to the PennDOT D9 region.

III. Validation:

The following comments were received as part of the validation process:

I County Planning Organizations

a. **Definition**

- Change the first sentence to read "County and/or regional agencies responsible for long-range planning for the future of transportation system and the short-range programming of funds for upcoming projects."

b. **Interconnects**

- Add the following interconnect:
    - Municipal Field Devices

c. **Information Flows**

i With Municipal Field Devices

1. Additions
    - Traffic control priority request – one way to Municipal Field Devices, planned
2. Deletions
    - None
3. Changes
    - None

ii With Regional Transit Agency Offices

1. Additions:
    - None
2. Deletions:
    - Request transit information

3. Changes:

   - None

iii With PennDOT STMC

- All flows should instead go through the PennDOT Central Office effort

iv PennDOT Central Office Organizations

1. Additions

   - Archived traffic accident information as it relates to safety – existing, to County Planning Organizations

2. Deletions

   - None

3. Changes

   - Change “traffic archive data” to flow in both directions

II Regional Transit Agency Offices

a. Definition

- Consider changing “paratransit” to “Shared Ride Program” or “PA Class 5”
- Include evacuation partners and 911 frequency monitoring in the description

b. Interconnects

- None

c. Information Flows

i With PennDOT D9 County Maintenance Offices

- The District Maintenance Office has some of the same communications as the County Maintenance Offices, and should be reflected in the County element or in a new District element.

ii With 911 Communication Centers

1. Additions

- Flows related to video surveillance information at bus stops, planned

2. Deletions

- None

3. Changes

- None

iii With County EMA Centers

1. Additions

- Flows related to video surveillance information at bus stops, planned

2. Deletions

- None

3. Changes

- None

iv With PSP Dispatch Centers

- Note a radio patch concerning transit emergency coordination data

v With Regional Transit Vehicles

1. Additions

- None

2. Deletions

- None

3. Changes

- Fare management information is planned
- Transit schedule information is planned
- Emergency notification is via radio

- Fare and payment status is planned
- Transit vehicle schedule performance has real-time scheduling and is planned

vi With Personal Traveler Information Devices

- Real time information exchange is planned

vii With Regional Media Outlets

- Only exchanges transit incidents and transit information if transit schedule is disrupted by weather

viiiWith Information Service Providers

1. Additions
   - None
2. Deletions
   - None
3. Changes
   - Transit information request and transit incident information are planned

ix With Regional Transit Remote Traveler Support

1. Additions
   - Flows related to video surveillance information at bus stops, planned

1. Deletions
   - None

2. Changes
   - Uses Traveler Information System (TIS) to monitor bus arrival times, similar to NextBus
   - Monitored by radio now, video in the future

III Regional Transit Remote Traveler Support

a. **Definition**

- Altoona Transit (AMTRAN) has received a federal ITS earmark for a potential project for bus tracking (AVL) and schedule adherence, similar in scope to a NextBus type system.
- Include surveillance cameras

b. **Interconnects**

- None

c. **Information Flows**

i With Regional Transit Agency Offices

1. Additions
    - Flows related to video surveillance information at bus stops, planned
2. Deletions
    - None
3. Changes
    - None

IV Regional Transit Vehicles

a. **Definition**

- None

b. **Interconnects**

- Add the following interconnect:
    - Municipal Field Devices

c. **Information Flows**

i With Municipal Field Devices

1. Additions
    - Traffic control priority request – one way to Municipal Field Devices, planned

2. Deletions
    - None
3. Changes
    - None

IV. Potential Projects

- Automatic Vehicle Location (AVL) for transit
- Bus schedule adherence system, similar to NextBus
- Security monitoring via video at bus terminals
- Transit signal preemption

V. Next Steps

Mr. Waisley identified the following next steps:

- Conduct and complete other validation meetings
- Identify conflicting comments
- Convene a Regional Advisory Panel (RAP) members to resolve the conflicting comments
- Incorporate the comments into draft Strawman Architecture
- Finalize the architecture
- Conduct the second Bookend meeting

Attachments: Meeting Agenda, List of District 9--0 Elements & Terminators, and Travel and Traffic Management Internal group Validation Elements Package.

Appendix H: Bookend II Meeting Minutes

Date: Thursday, December 16, 2004

Meeting of: PennDOT Southern Alleghenies Region – Second Meeting

Location: Days Inn -- Altoona, PA

Presentation

- Thomas Prestash from PennDOT 9-0 welcomed everyone to the meeting. He presented a slide showing some of the groups that were present. This included planners, elected officials, operators, transit, towing providers, enforcement community, and tourism organizations. Thomas explained that this meeting is the final regional stakeholder meeting of the ITS Architecture effort. The first regional meeting was held in September 2004; it was followed by a series of smaller working meetings in November 2004. Material from the first regional meeting is available upon request or via the web at www.paits.org. The purposes of the meeting today include concluding the ITS Architecture effort, meeting the federal mandate for architecture conformity, discussing next steps, and discussing continuing regional operations dialogue. Thomas quickly listed the agenda for the meeting. First, Mike Waisley from PB would give an overview of the ITS Architecture. Then, Noah Goodall, also from PB, would describe the website and how users would access information and provide input for updating the architecture. Next, Dennis Lebo from PennDOT would talk about next steps. John Dubnansky, from SAPDC, would explain the role of the regional planning bodies. Brenda Murphy from PennDOT would facilitate discussion at the end.

- Mike Waisley from PB began his section on ITS Architecture by showing an outline of some of the questions that he would be answering during his part of the presentation. The mandate for conformity is reflected in this statement “The Intelligent Transportation System Architecture and Standards final rule issued by the Federal Highway Administration (FHWA), USDOT, Section: 940.5 (and 49 CFR Part 613 and 621) has been met for this region in Pennsylvania”. This means that federal rules from FTA and FHWA have been met. The federal funds can continue to be used for ITS projects in the Southern Alleghenies Region because the regional ITS Architecture has been successfully completed. Then, Mike explained the process for creating the ITS Architecture. He started by showing the regional architecture boundaries for the entire state of Pennsylvania. The Southern Alleghenies region includes the following counties: Cambria, Blair, Huntingdon, Somerset, Bedford, and Fulton. Mike showed a diagram which detailed the different steps in the process of generating the ITS Architecture. The pre-planning stage includes developing the process for generating this ITS Architecture and identifying the champions and the regional advisory panel. In the information gathering stage, stakeholders are identified and information on regional projects are gathered. In the analysis stage, interconnects and flows are identified. The strawman architecture results from the analysis. In the outreach stage, stakeholders are invited to regional meetings and validation meetings. Afterwards, the information gathering stage is revisited. The architecture is rebuilt and is used to populate the website. A second regional meeting is held, and finally, the ITS Architecture is presented.

- Mike continued by summarizing each of the chapters in the Southern Alleghenies Regional ITS Architecture Document. The new sections include using the architecture document, ITS Standards, utility of the architecture, maintenance of the architecture, and mainstreaming ITS. Mike showed a slide on “Using the ITS Architecture”. This included the architecture scope section, which summarizes the scope and magnitude of the architecture, defines the stakeholders, and lists projects. Furthermore, ITS Standards are industry consensus standards that define the operations of the system components within a consistent framework. Interoperability is promoted, and participating standards development organizations include AASHTO, ANSI, ASTM, IEEE, ITE, NEMA, and SAE. More than 50 standards exists for Pennsylvania Regional ITS Architecture. The ITS architecture provides structure for ITS planning and deployments. Also, an instititional mechanism that promote development and deployment of ITS is established. ITS Architecture helps to promote interoperability, encourages efficient investment, and satisfies the federal mandate. In the following slide, Mike talked about how the ITS Architecture is to be maintained. The ITS Architecture is to be updated every four years, and the next update should be Fall 2008. In order to maintain statewide consistency, the ITS Architecture updates will most likely be led by PennDOT Central office. Elements that will be maintained include the following: a description of the region, stakeholders, ITS architecture elements, system inventory, needs and services, interconnect diagrams, architecture flows, and applicable ITS standards. To move forward and mainstream ITS, the regional stakeholders and PennDOT Central Office ITS Partnership will work together. They will work to get transportation technology issues in front of decision makers, incorporate ITS in long range plans, modify TIP project selection criteria to more fairly evaluate technology and ITS, give regular updates to elected officials, and set up regional ITS/Operations Coordination Committees. Furthermore, educational training courses may be provided to introduce practitioners to systems engineering, ITS procurement, and managing traffic incidents for roadway emergencies. A helpful website for the training is www.nhi.fhwa.dot.gov. Educational scanning tours may also be provided to county commissioners, executive boards, managers, operations staff, and public safety officials.

- Noah Goodall gave a demonstration for using the website to update the ITS Architecture. The website will become the historical library and also will provide forms for filling out new information on stakeholder and project updates. Noah used a sample scenario to demonstrate the use of the website. He used the deployment of Automated Vehicle Location Project by Altoona Metro Transit to explain how this agency can use the Architecture website to identify the stakeholders who might be interested in the project, identify the information flows among the interested stakeholders, and identify the ITS standards applicable to the information flows. He also explained the process of updating the architecture website using the "Architecture Update Form".

- Dennis Lebo from the PennDOT Central Office, Center for Program Development and Management talked about next steps. He began with a picture identifying the various planning bodies within Pennsylvania. Then, he explained the role of ITS Architecture in the context of planning. The regional architecture sits between the vision and the long range plans / transportation improvement plans. For regional next steps, he suggested that each MPO/RPO in the region needs to formally adopt the ITS Architecture. The region needs to prioritize projects documented in the architecture, and incorporate projects into regional long range plans and the transportation improvement program. For PennDOT, the next step is to develop a Statewide Mobility Plan (SMP). The SMP will focus mainly on mobility. Developing a Transportation System Operations Plan (TSOP) is one of the components of the SMP. Prioritized statewide PennDOT projects are focused in incident management, telecommunications, ITS and operations. The draft of the TSOP may be available as early as May 2005. A regional outreach on this plan is proposed to identify the Statewide priorities.

- John Dubnansky from the Southern Alleghenies Planning and Development Commission continued the discussion about the Role of the Regional Planning Bodies. To move forward, the region must adopt the ITS architecture and incorporate it into its long range plan. The region needs to support the ITS/Operations project in the TIP and the PennDOT statewide TSOP. Furthermore, ITS elements needs to be mainstreamed into other transportation projects. The region should continue the RAP meetings and evolve to address ITS, operations, and mobility at the regional level. A meeting is scheduled for April 2005, and all the stakeholders are invited. They are to contact Mike Pastore if they want more information. *District 9-0 ITS Operators' Group* covers both planning and operations. The semiannual meeting will consist of two parts. In the planning discussion, current and future ITS/operations needs are identified. The group will also identify and prioritize potential ITS projects. Funding will be examined. In the second part, the operations disucssion which happens after the action review, there will be a review of procedures. Similar to the planning discussion, current and future ITS/operations needs will be identified. In his final slide, John showed the ITS Planning Framework for the Southern Alleghenies Region. District 9-0 ITS Operators' Group, stakeholder need, and public needs will be combined with the ITS elements defined in architecture to propose projects to the planning organizations. In this region, the Blair MPO, SAPDC RPO, and Johnstown MPO will review the ITS projects that are proposed and approve it with the coordinating committee. A Southern Alleghenies Regional ITS Plan will be produced in the context of LRP, TIP, STIP, and TYP. ITS projects and projects with ITS will be coordinated by the Southern Alleghenies Regional ITS Architecture.

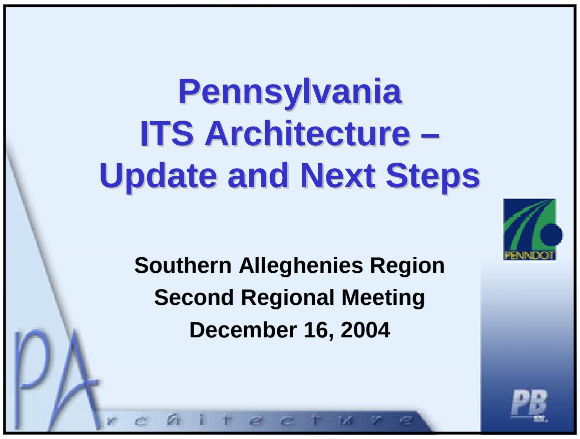
- Brenda Murphy facilitated the open discussion. Lt. John Bey of the Pennsylvania State Police asked Brenda Murphy from PennDOT Central Office if the PSP's role in the overall ITS program will continue to evolve after the architecture is adopted. Her answer was yes, that it would continue to evolve and proof of that is the recent agreement to co-locate the call and response centers for PSP and PennDOT in the Harrisburg area.

List of Attendees

Last Name	First Name	Agency	Email	Phone
Ambrosini	John	PennDOT, District 9-0 Traffic Engineer		
Bey	Lt. John	Pennsylvania State Police (PSP)	jbey@state.pa.us	(814) 696-6116
Burket	Wes	Blair County Planning Commission	wlbbcpc@atlanticbbn.net	(814) 940-5980
Callahan	Tara	PennDOT District 9-0 Community Relations Coordinator	tacallahan@state.pa.us	(814) 696-7101
Diedrich	Dave	City of Altoona	ddiedrich@altoonapa.gov	(814) 949-2446
Dubnansky	John	Southern Alleghenies Regional Planning Commission	dubnansky@sapdc.org	(814) 949-6232
Eichelberger	John	Blair County Commissioner	jeichelberger@blairco.org	(814) 693-3030
Harris	Bill	Cambria County Board of Commissioners		(814) 472-1600
Hofer	Thomas	PennDOT District 9-2 Maintenance Manager	thofer@state.pa.us	(814) 696-7271
Klevan	Tom	Altoona Metro Transit (AMTRAN)	tom.klevan@amtran.org	(814) 944-4074
Lebo	Dennis	PennDOT Central Office	dlebo@state.pa.us	(717) 787-5246

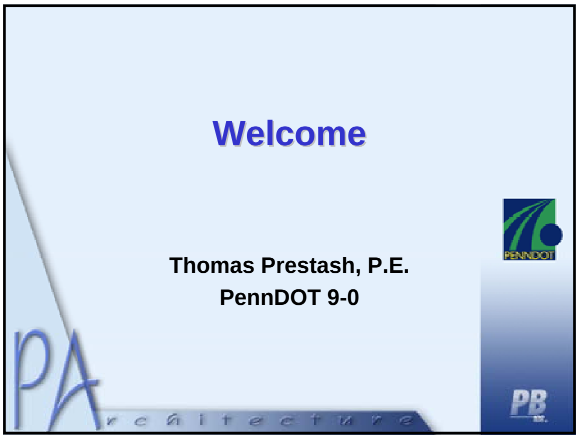
Last Name	First Name	Agency	Email	Phone
Lucey-Noll	Rose	Cambria County Transit Authority (CamTRAN)		
Masterson	Jeff	Tableland Services, Inc.		
McCreadie	Bernard	Cambria County Department of Emergency Services	bmccreadie@co.cambria.pa.us	(814) 472-2050
Murphy	Brenda	PennDOT Central Office	bremurphy@state.pa.us	(412) 429-6038
Pastore	Mike	PennDOT District 9-0 Traffic	mipastore@state.pa.us	(814) 696-7238
Prestash	Thomas	PennDOT District 9-0 DE	tprestash@state.pa.us	(814) 696-7104
Schmick	Cassandra	Logan Township		
Seville	Mary	Fulton County Planning Commission	planning@fultoncntypa.org	(717) 485-3717
Snyder	Kevin	PennDOT District 9-0 Traffic	scotsnyder@state.pa.us	(724) 357-2844
Speck	Jeff	Huntingdon Borough		
Stern	Kevin	PennDOT District 9-0 Construction (ITS)	kstern@state.pa.us	(814) 696-7139
Stolz	Greg	PennDOT District 9-2 Maintenance	gstolz@state.pa.us	(814) 696-7288

Last Name	**First Name**	**Agency**	**Email**	**Phone**
Suder	Rick	Bedford County Planning Commission		
Tanzi	Tony	PennDOT District 9-0 Traffic	ttanzi@state.pa.us	(814) 696-6855
Walker	Jeffrey	PennDOT District 2-0 Engineering		
Weyandt	Carl	City of Altoona		(814) 949-2446
Yohn	Craig	PennDOT District 9-2 Maintenance	cryohn@state.pa.us	(814) 696-6838



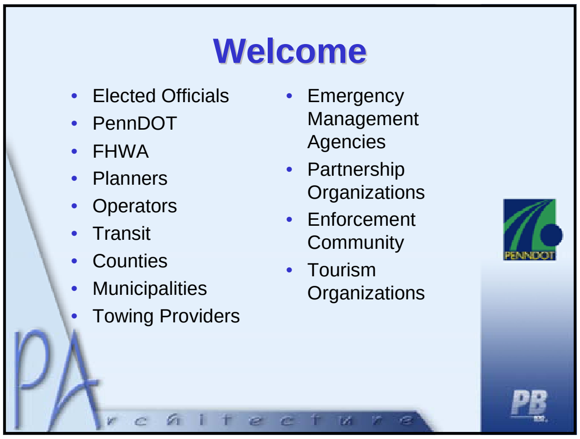
Pennsylvania ITS Architecture – Update and Next Steps

Southern Alleghenies Region
Second Regional Meeting
December 16, 2004



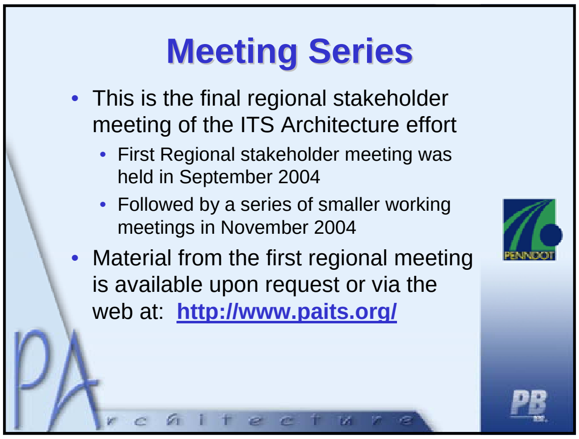
Welcome

Thomas Prestash, P.E.
PennDOT 9-0



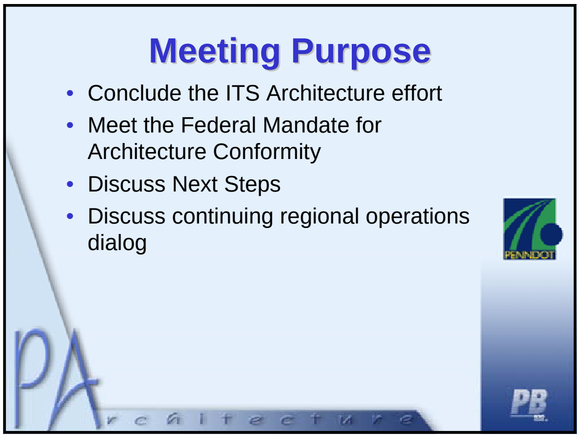
Welcome

- Elected Officials
- PennDOT
- FHWA
- Planners
- Operators
- Transit
- Counties
- Municipalities
- Towing Providers
- Emergency Management Agencies
- Partnership Organizations
- Enforcement Community
- Tourism Organizations



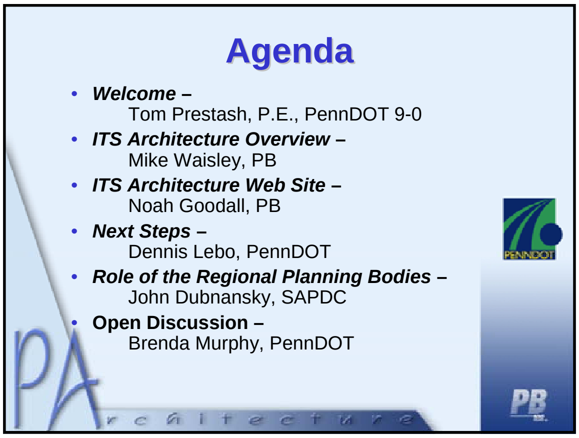
Meeting Series

- This is the final regional stakeholder meeting of the ITS Architecture effort
  - First Regional stakeholder meeting was held in September 2004
  - Followed by a series of smaller working meetings in November 2004
- Material from the first regional meeting is available upon request or via the web at: http://www.paits.org/



Meeting Purpose

- Conclude the ITS Architecture effort
- Meet the Federal Mandate for Architecture Conformity
- Discuss Next Steps
- Discuss continuing regional operations dialog



Agenda

- ***Welcome –***
  Tom Prestash, P.E., PennDOT 9-0
- ***ITS Architecture Overview –***
  Mike Waisley, PB
- ***ITS Architecture Web Site –***
  Noah Goodall, PB
- ***Next Steps –***
  Dennis Lebo, PennDOT
- ***Role of the Regional Planning Bodies –***
  John Dubnansky, SAPDC
- **Open Discussion –**
  Brenda Murphy, PennDOT

ITS Architecture Overview

Mike Waisley
Parsons Brinckerhoff

Mandate Conformity

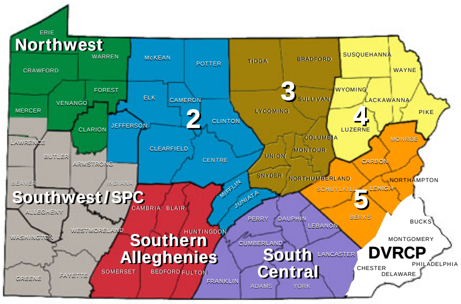
Conformity Statement

The Intelligent Transportation System Architecture and Standards final rule issued by the United States Department of Transportation, USDOT, Section: 940.5 (and 49 CFR Part 613 and 621) has been met for this region in Pennsylvania.

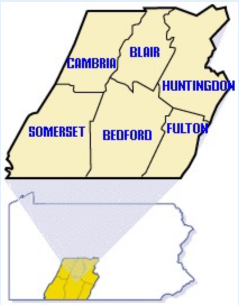
Meaning

- Federal rule from FHWA and policy from FTA have been met
- Federal funds can continue to be used for ITS projects in this region
- The region has been successful

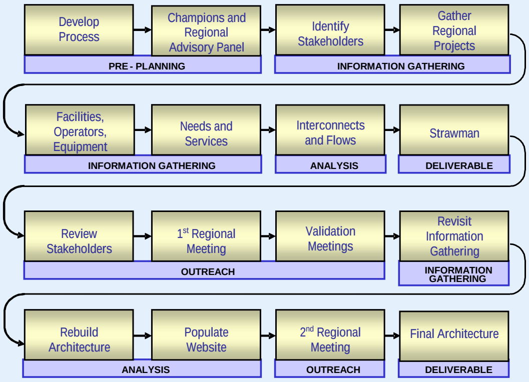
Regional Architecture Boundaries


Northwest
ERIE
WARREN
CRAWFORD
FOREST
VENANGO
MERCER
CLARION
McKEAN
POTTER
ELK
CAMERON
2
CLINTON
JEFFERSON
CLEARFIELD
CENTRE
TIOGA
BRADFORD
3
SULLIVAN
LYCOMING
COLUMBIA
MONTOUR
UNION
SNYDER
NORTHUMBERLAND
SUSQUEHANNA
WAYNE
WYOMING
LACKAWANNA
4
PIKE
LUZERNE
MONROE
CARBON
NORTHAMPTON
SCHUYLKILL
LEHIGH
5
BERKS
LAWRENCE
BUTLER
ARMSTRONG
BEAVER
INDIANA
Southwest / SPC
ALLEGHENY
WASHINGTON
WESTMORELAND
GREENE
FAYETTE
CAMBRIA
BLAIR
MIFFLIN
JUNIATA
HUNTINGDON
Southern Allegheniеs
SOMERSET
BEDFORD
FULTON
PERRY
DAUPHIN
LEBANON
CUMBERLAND
South Central
LANCASTER
FRANKLIN
ADAMS
YORK
BUCKS
MONTGOMERY
DVRCP
CHESTER
PHILADELPHIA
DELAWARE

Regional Map


CAMBRIA
BLAIR
HUNTINGDON
SOMERSET
BEDFORD
FULTON

Process



Develop Process → Champions and Regional Advisory Panel → Identify Stakeholders → Gather Regional Projects

PRE - PLANNING | INFORMATION GATHERING

Facilities, Operators, Equipment → Needs and Services → Interconnects and Flows → Strawman

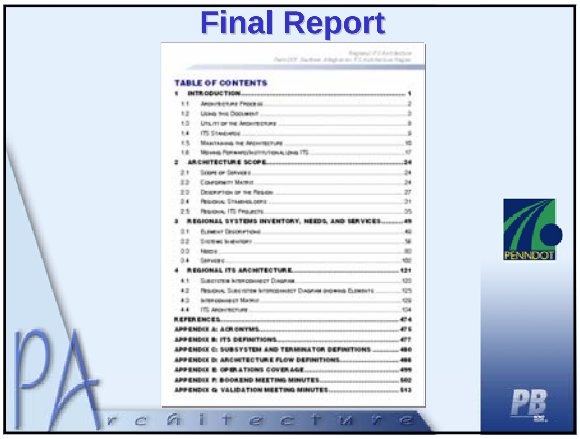
INFORMATION GATHERING | ANALYSIS | DELIVERABLE

Review Stakeholders → 1st Regional Meeting → Validation Meetings → Revisit Information Gathering

OUTREACH | INFORMATION GATHERING

Rebuild Architecture → Populate Website → 2nd Regional Meeting → Final Architecture

ANALYSIS | OUTREACH | DELIVERABLE



Final Report

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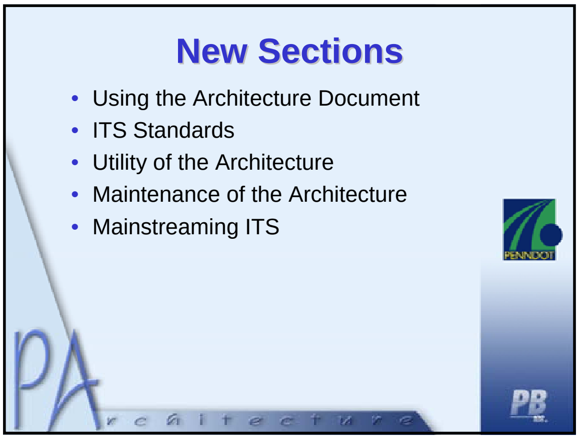
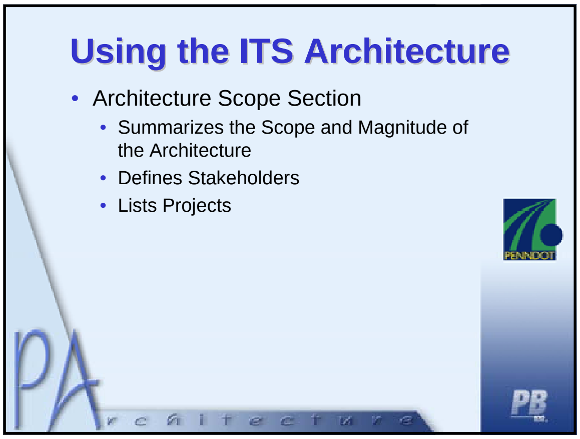


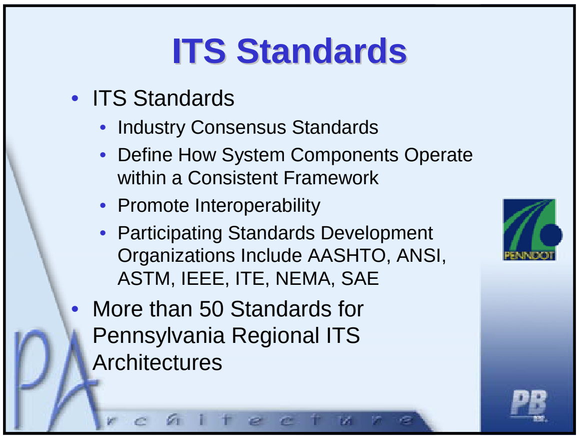
New Sections

- Using the Architecture Document
- ITS Standards
- Utility of the Architecture
- Maintenance of the Architecture
- Mainstreaming ITS



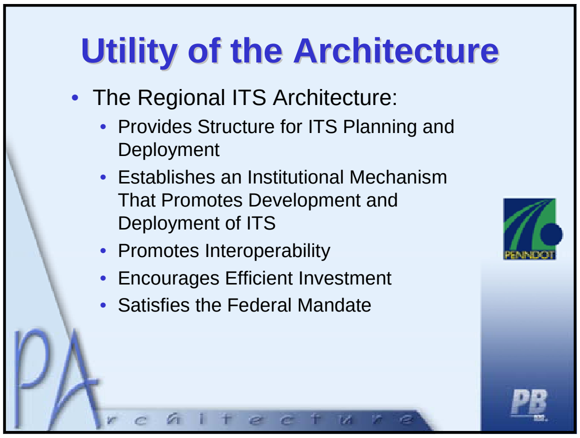
Using the ITS Architecture

- Architecture Scope Section
  - Summarizes the Scope and Magnitude of the Architecture
  - Defines Stakeholders
  - Lists Projects



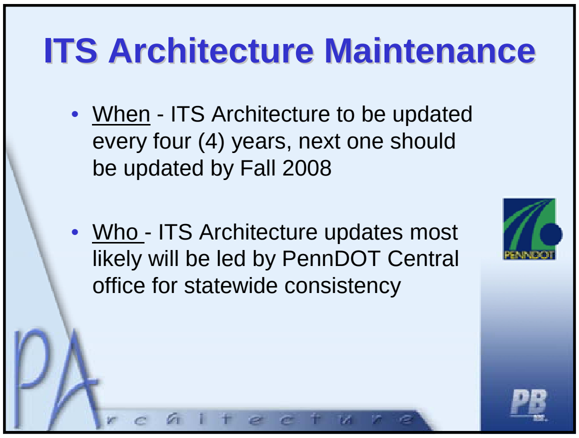
ITS Standards

- ITS Standards
  - Industry Consensus Standards
  - Define How System Components Operate within a Consistent Framework
  - Promote Interoperability
  - Participating Standards Development Organizations Include AASHTO, ANSI, ASTM, IEEE, ITE, NEMA, SAE
- More than 50 Standards for Pennsylvania Regional ITS Architectures



Utility of the Architecture

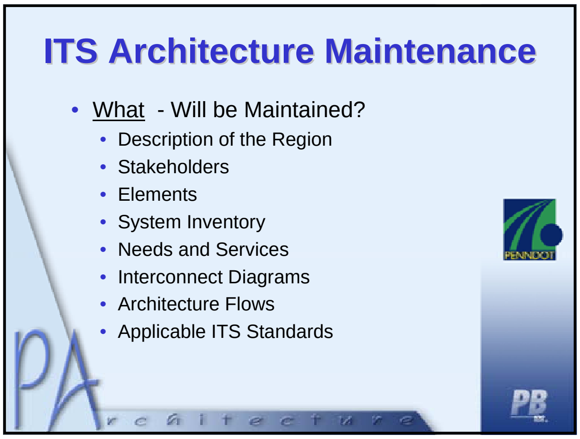
- The Regional ITS Architecture:
  - Provides Structure for ITS Planning and Deployment
  - Establishes an Institutional Mechanism That Promotes Development and Deployment of ITS
  - Promotes Interoperability
  - Encourages Efficient Investment
  - Satisfies the Federal Mandate



ITS Architecture Maintenance

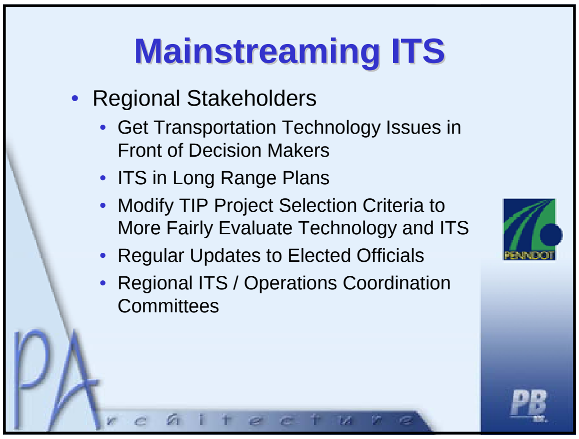
- When - ITS Architecture to be updated every four (4) years, next one should be updated by Fall 2008

- Who - ITS Architecture updates most likely will be led by PennDOT Central office for statewide consistency



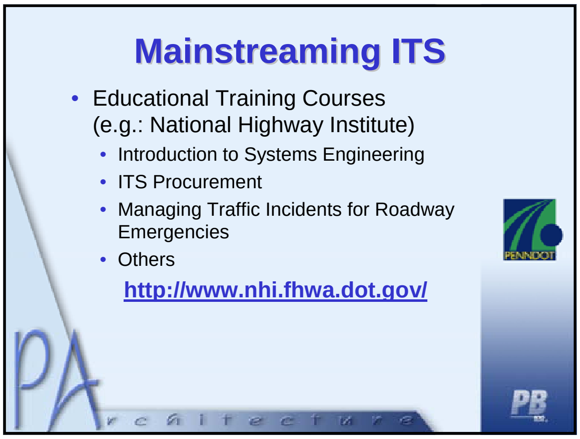
ITS Architecture Maintenance

- What - Will be Maintained?
  - Description of the Region
  - Stakeholders
  - Elements
  - System Inventory
  - Needs and Services
  - Interconnect Diagrams
  - Architecture Flows
  - Applicable ITS Standards



Mainstreaming ITS

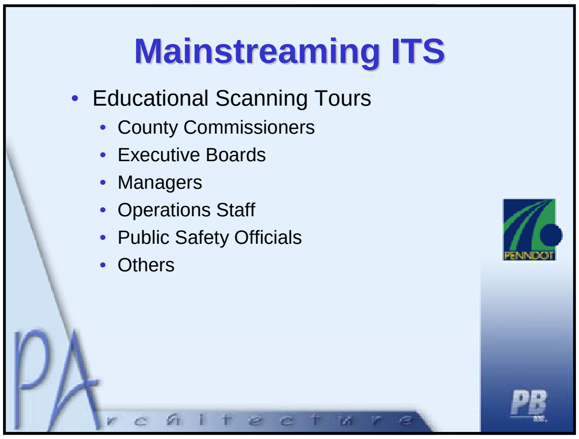
- Regional Stakeholders
  - Get Transportation Technology Issues in Front of Decision Makers
  - ITS in Long Range Plans
  - Modify TIP Project Selection Criteria to More Fairly Evaluate Technology and ITS
  - Regular Updates to Elected Officials
  - Regional ITS / Operations Coordination Committees



Mainstreaming ITS

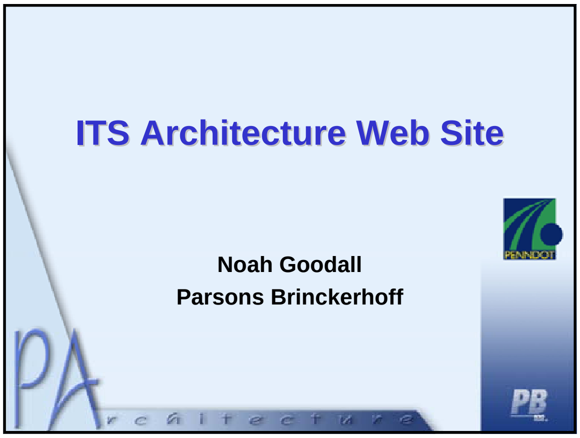
- Educational Training Courses (e.g.: National Highway Institute)
  - Introduction to Systems Engineering
  - ITS Procurement
  - Managing Traffic Incidents for Roadway Emergencies
  - Others

http://www.nhi.fhwa.dot.gov/



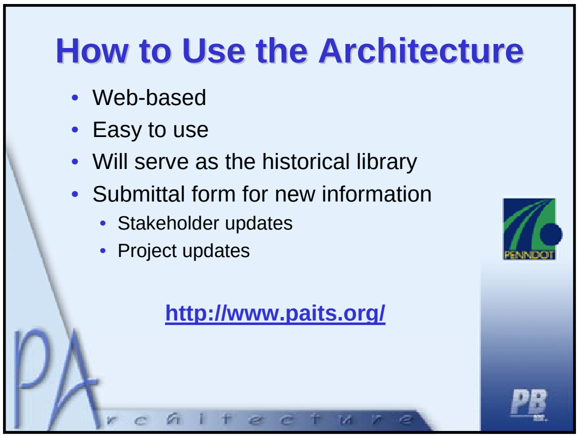
Mainstreaming ITS

- Educational Scanning Tours
  - County Commissioners
  - Executive Boards
  - Managers
  - Operations Staff
  - Public Safety Officials
  - Others



ITS Architecture Web Site

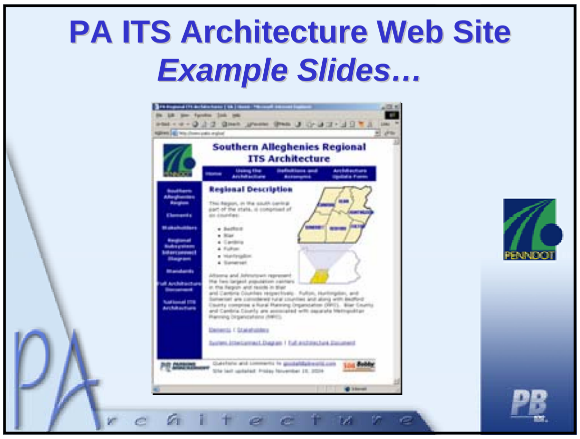
Noah Goodall
Parsons Brinckerhoff



How to Use the Architecture

- Web-based
- Easy to use
- Will serve as the historical library
- Submittal form for new information
  - Stakeholder updates
  - Project updates

http://www.paits.org/



PA ITS Architecture Web Site
Example Slides…

PENNDOT
PA
rchitecture
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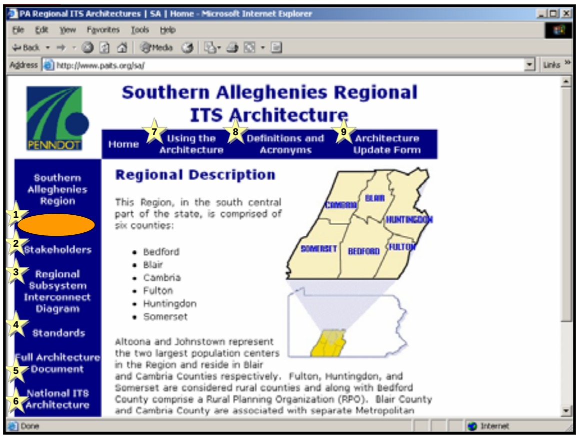

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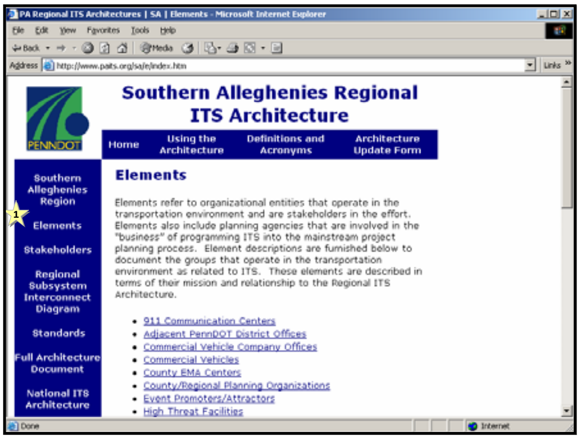
Regional Description

This Region, in the south central part of the state, is comprised of six counties:

- Bedford
- Blair
- Cambria
- Fulton
- Huntingdon
- Somerset

Altoona and Johnstown represent the two largest population centers in the Region and reside in Blair and Cambria Counties respectively. Fulton, Huntingdon, and Somerset are considered rural counties and along with Bedford County comprise a Rural Planning Organization (RPO). Blair County and Cambria County are associated with separate Metropolitan



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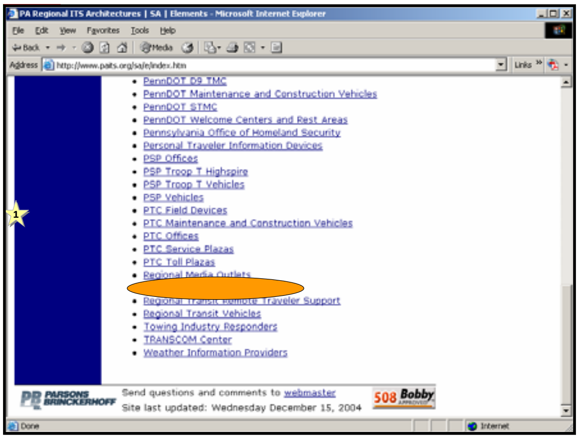
Elements

Elements refer to organizational entities that operate in the transportation environment and are stakeholders in the effort. Elements also include planning agencies that are involved in the "business" of programming ITS into the mainstream project planning process. Element descriptions are furnished below to document the groups that operate in the transportation environment as related to ITS. These elements are described in terms of their mission and relationship to the Regional ITS Architecture.

- 911 Communication Centers
- Adjacent PennDOT District Offices
- Commercial Vehicle Company Offices
- Commercial Vehicles
- County EMA Centers
- County/Regional Planning Organizations
- Event Promoters/Attractors
- High Threat Facilities



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- PennDOT D9 TMC
- PennDOT Maintenance and Construction Vehicles
- PennDOT STMC
- PennDOT Welcome Centers and Rest Areas
- Pennsylvania Office of Homeland Security
- Personal Traveler Information Devices
- PSP Offices
- PSP Troop T Highspire
- PSP Troop T Vehicles
- PSP Vehicles
- PTC Field Devices
- PTC Maintenance and Construction Vehicles
- PTC Offices
- PTC Service Plazas
- PTC Toll Plazas
- Regional Media Outlets
- Regional Transit Remote Traveler Support
- Regional Transit Vehicles
- Towing Industry Responders
- TRANSCOM Center
- Weather Information Providers

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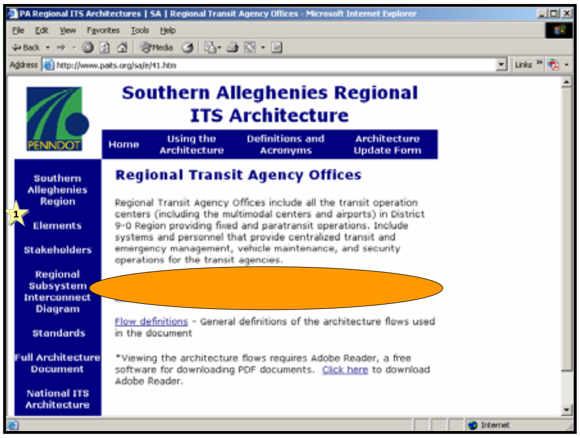

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Regional Transit Agency Offices

Regional Transit Agency Offices include all the transit operation centers (including the multimodal centers and airports) in District 9-0 Region providing fixed and paratransit operations. Include systems and personnel that provide centralized transit and emergency management, vehicle maintenance, and security operations for the transit agencies.

Flow definitions - General definitions of the architecture flows used in the document

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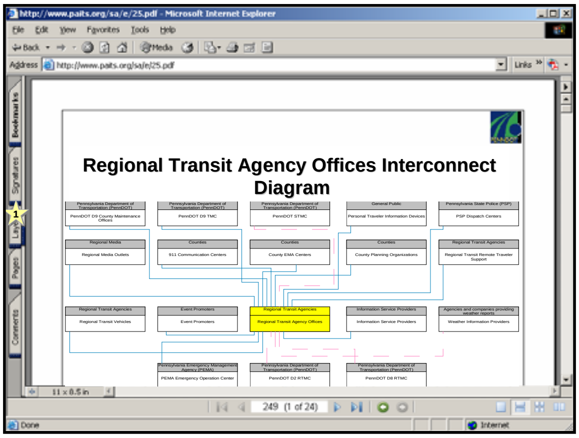

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PennDOT D9 County Maintenance Offices
Pennsylvania Department of Transportation (PennDOT)
PennDOT D9 TMC
Pennsylvania Department of Transportation (PennDOT)
PennDOT STMC
General Public
Personal Traveler Information Devices
Pennsylvania State Police (PSP)
PSP Dispatch Centers
Regional Media
Regional Media Outlets
Counties
911 Communication Centers
Counties
County EMA Centers
Counties
County Planning Organizations
Regional Transit Agencies
Regional Transit Remote Traveler Support
Regional Transit Agencies
Regional Transit Vehicles
Event Promoters
Event Promoters
Regional Transit Agencies
Regional Transit Agency Offices
Information Service Providers
Information Service Providers
Agencies and companies providing weather reports
Weather Information Providers
Pennsylvania Emergency Management Agency (PEMA)
PEMA Emergency Operation Center
Pennsylvania Department of Transportation (PennDOT)
PennDOT D2 RTMC
Pennsylvania Department of Transportation (PennDOT)
PennDOT D8 RTMC
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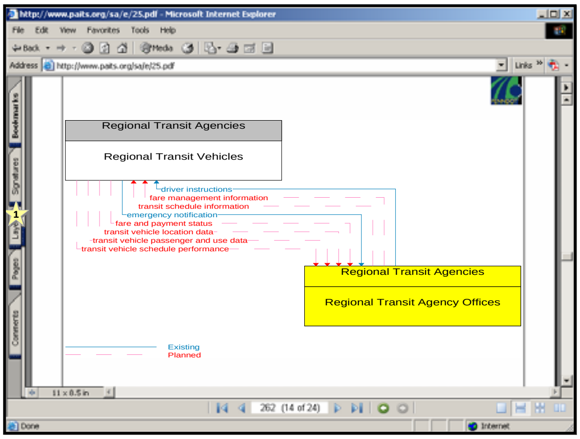
Regional Transit Agency Offices Interconnect Diagram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Regional Transit Vehicles
driver instructions
fare management information
transit schedule information
emergency notification
fare and payment status
transit vehicle location data
transit vehicle passenger and use data
transit vehicle schedule performance
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Regional Transit Agency Offices
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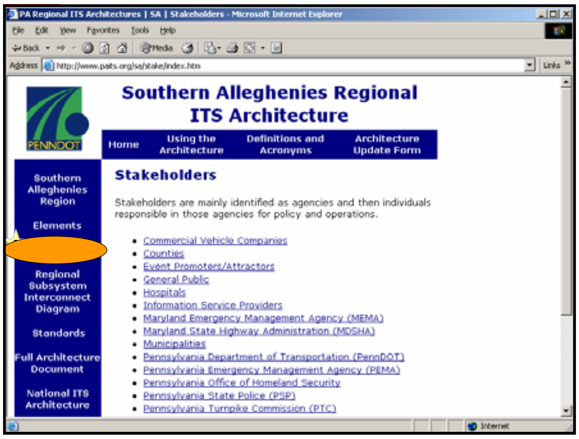
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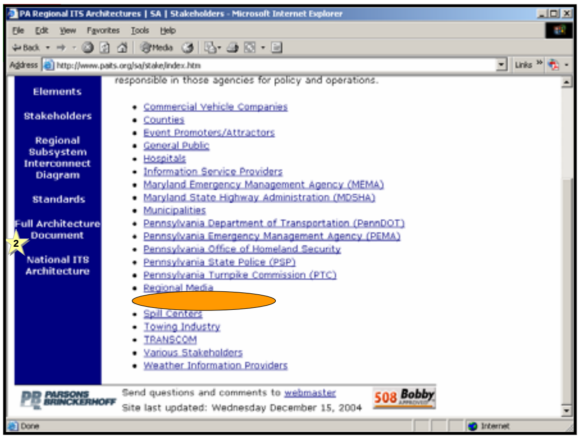
Stakeholders

Stakeholders are mainly identified as agencies and then individuals responsible in those agencies for policy and operations.

- Commercial Vehicle Companies
- Counties
- Event Promoters/Attractors
- General Public
- Hospitals
- Information Service Providers
- Maryland Emergency Management Agency (MEMA)
- Maryland State Highway Administration (MDSHA)
- Municipalities
- Pennsylvania Department of Transportation (PennDOT)
- Pennsylvania Emergency Management Agency (PEMA)
- Pennsylvania Office of Homeland Security
- Pennsylvania State Police (PSP)
- Pennsylvania Turnpike Commission (PTC)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responsible in those agencies for policy and operations.

- Commercial Vehicle Companies
- Counties
- Event Promoters/Attractors
- General Public
- Hospitals
- Information Service Providers
- Maryland Emergency Management Agency (MEMA)
- Maryland State Highway Administration (MDSHA)
- Municipalities
- Pennsylvania Department of Transportation (PennDOT)
- Pennsylvania Emergency Management Agency (PEMA)
- Pennsylvania Office of Homeland Security
- Pennsylvania State Police (PSP)
- Pennsylvania Turnpike Commission (PTC)
- Regional Media
- Spill Centers
- Towing Industry
- TRANSCOM
- Various Stakeholders
- Weather Information Providers

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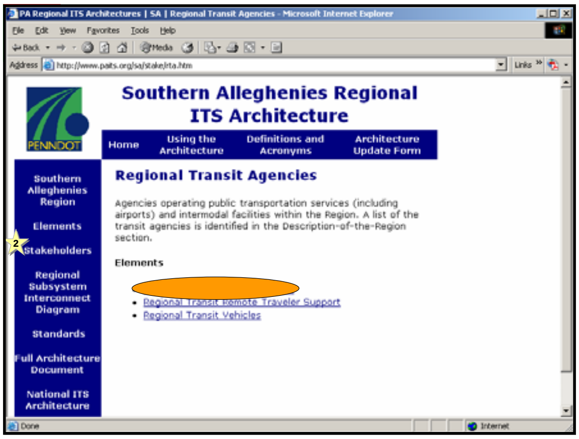
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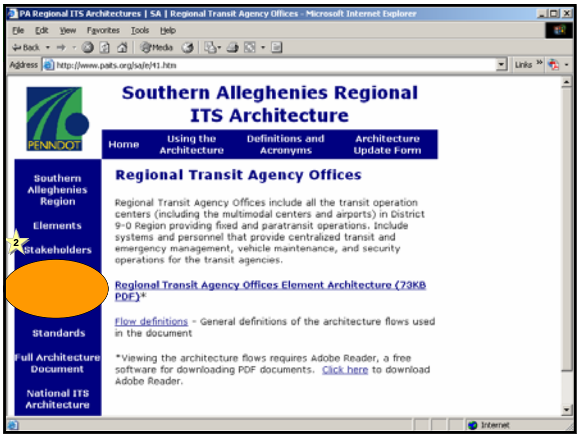
Regional Transit Agencies

Agencies operating public transportation services (including airports) and intermodal facilities within the Region. A list of the transit agencies is identified in the Description-of-the-Region section.

Elements

- Regional Transit Remote Traveler Support
- Regional Transit Vehicles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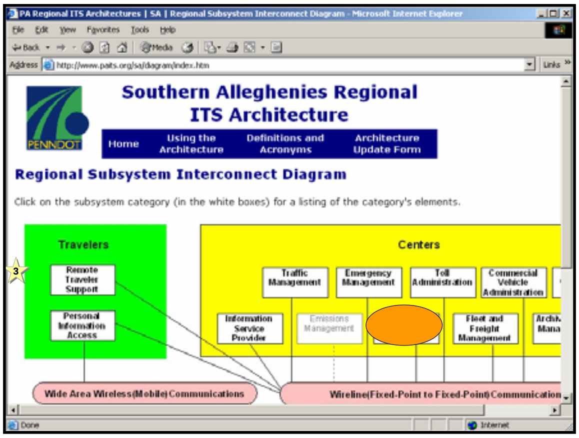
Regional Transit Agency Offices

Regional Transit Agency Offices include all the transit operation centers (including the multimodal centers and airports) in District 9-0 Region providing fixed and paratransit operations. Include systems and personnel that provide centralized transit and emergency management, vehicle maintenance, and security operations for the transit agencies.

Regional Transit Agency Offices Element Architecture (73KB PDF)*

Flow definitions - General definitions of the architecture flows used in the document

*Viewing the architecture flows requires Adobe Reader, a free software for downloading PDF documents. Click here to download Adobe Reader.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Remote Traveler Support
Personal Information Access
Centers
Traffic Management
Emergency Management
Toll Administration
Commercial Vehicle Administration
Information Service Provider
Emissions Management
Fleet and Freight Management
Wide Area Wireless(Mobile) Communications
Wireline(Fixed-Point to Fixed-Point) Communication
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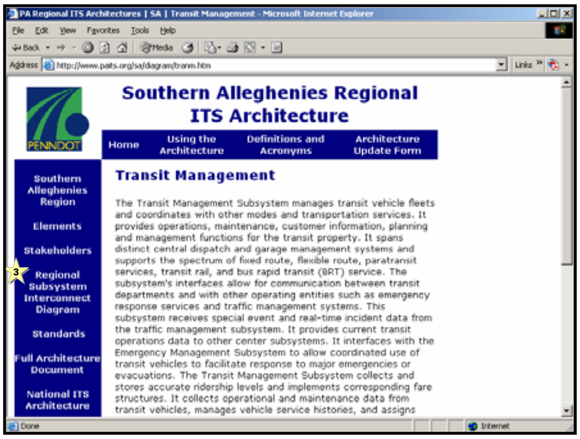
Regional Subsystem Interconnect Diagram

Click on the subsystem category (in the white boxes) for a listing of the category's elements.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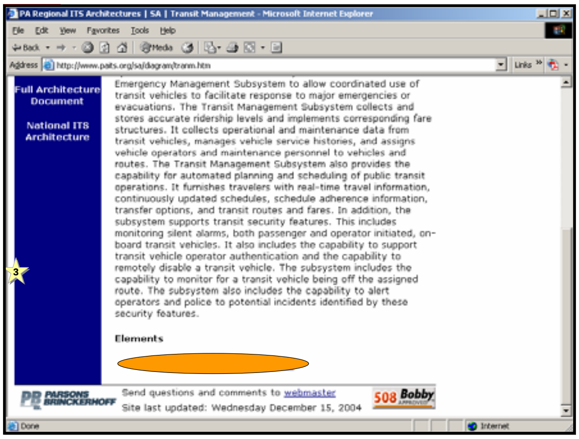
Transit Management

The Transit Management Subsystem manages transit vehicle fleets and coordinates with other modes and transportation services. It provides operations, maintenance, customer information, planning and management functions for the transit property. It spans distinct central dispatch and garage management systems and supports the spectrum of fixed route, flexible route, paratransit services, transit rail, and bus rapid transit (BRT) service. The subsystem's interfaces allow for communication between transit departments and with other operating entities such as emergency response services and traffic management systems. This subsystem receives special event and real-time incident data from the traffic management subsystem. It provides current transit operations data to other center subsystems. It interfaces with the Emergency Management Subsystem to allow coordinated use of transit vehicles to facilitate response to major emergencies or evacuations. The Transit Management Subsystem collects and stores accurate ridership levels and implements corresponding fare structures. It collects operational and maintenance data from transit vehicles, manages vehicle service histories, and assigns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Emergency Management Subsystem to allow coordinated use of transit vehicles to facilitate response to major emergencies or evacuations. The Transit Management Subsystem collects and stores accurate ridership levels and implements corresponding fare structures. It collects operational and maintenance data from transit vehicles, manages vehicle service histories, and assigns vehicle operators and maintenance personnel to vehicles and routes. The Transit Management Subsystem also provides the capability for automated planning and scheduling of public transit operations. It furnishes travelers with real-time travel information, continuously updated schedules, schedule adherence information, transfer options, and transit routes and fares. In addition, the subsystem supports transit security features. This includes monitoring silent alarms, both passenger and operator initiated, on-board transit vehicles. It also includes the capability to support transit vehicle operator authentication and the capability to remotely disable a transit vehicle. The subsystem includes the capability to monitor for a transit vehicle being off the assigned route. The subsystem also includes the capability to alert operators and police to potential incidents identified by these security features.

Elements

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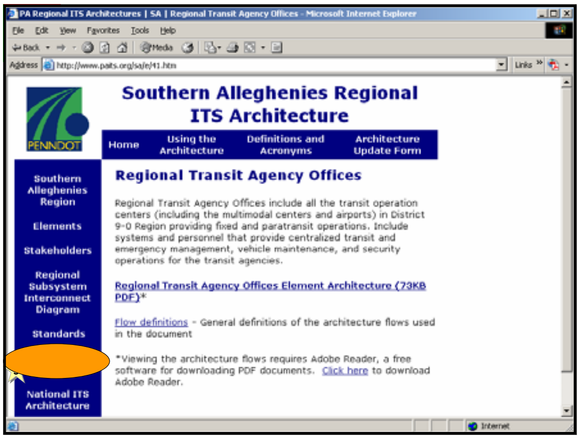
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Regional Transit Agency Offices Element Architecture (73KB PDF)*

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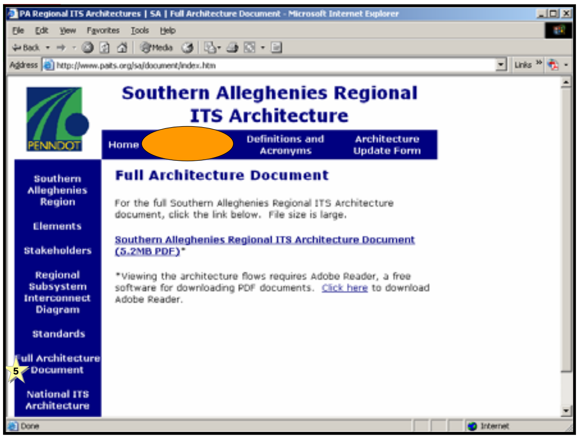
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Southern Alleghenies Regional ITS Architecture

Full Architecture Document

For the full Southern Alleghenies Regional ITS Architecture document, click the link below. File size is large.

Southern Alleghenies Regional ITS Architecture Document (5.2MB PDF)*

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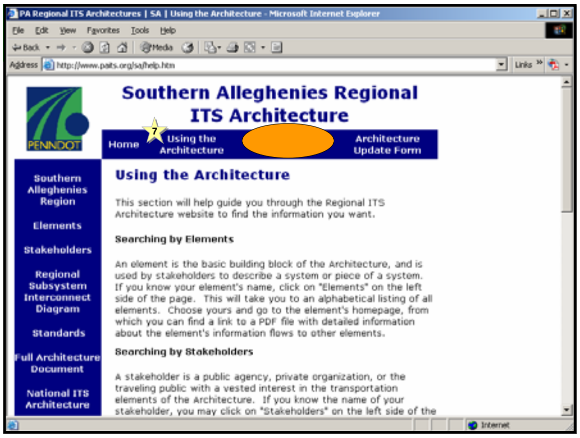
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Using the Architecture

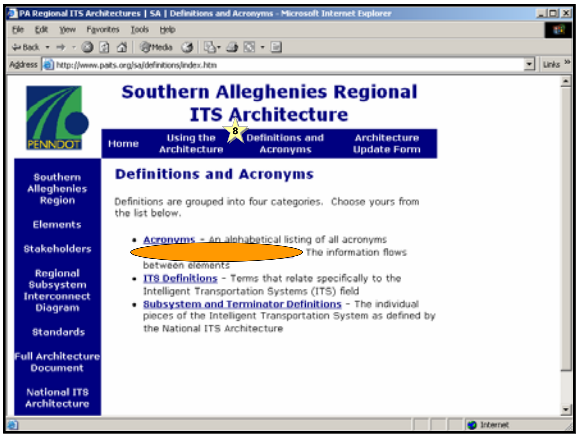
This section will help guide you through the Regional ITS Architecture website to find the information you want.

Searching by Elements

An element is the basic building block of the Architecture, and is used by stakeholders to describe a system or piece of a system. If you know your element's name, click on "Elements" on the left side of the page. This will take you to an alphabetical listing of all elements. Choose yours and go to the element's homepage, from which you can find a link to a PDF file with detailed information about the element's information flows to other elements.

Searching by Stakeholders

A stakeholder is a public agency, private organization, or the traveling public with a vested interest in the transportation elements of the Architecture. If you know the name of your stakeholder, you may click on "Stakeholders" on the left side of the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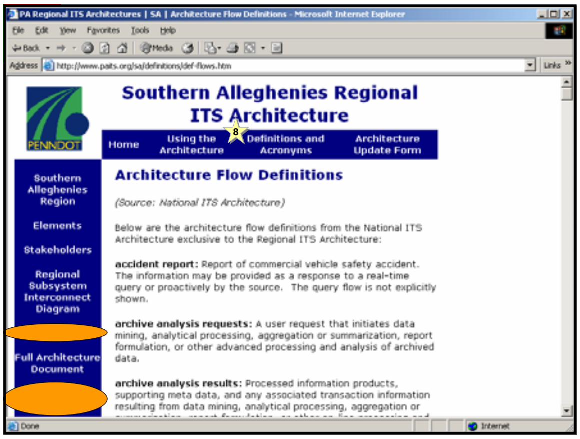
Definitions and Acronyms

Definitions are grouped into four categories. Choose yours from the list below.

- Acronyms - An alphabetical listing of all acronyms
- The information flows between elements
- ITS Definitions - Terms that relate specifically to the Intelligent Transportation Systems (ITS) field
- Subsystem and Terminator Definitions - The individual pieces of the Intelligent Transportation System as defined by the National ITS Architecture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Architecture Flow Definitions

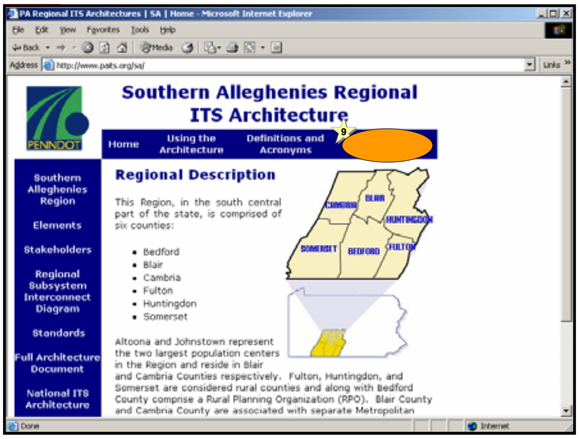
(Source: National ITS Architecture)

Below are the architecture flow definitions from the National ITS Architecture exclusive to the Regional ITS Architecture:

accident report: Report of commercial vehicle safety accident. The information may be provided as a response to a real-time query or proactively by the source. The query flow is not explicitly shown.

archive analysis requests: A user request that initiates data mining, analytical processing, aggregation or summarization, report formulation, or other advanced processing and analysis of archived data.

archive analysis results: Processed information products, supporting meta data, and any associated transaction information resulting from data mining, analytical processing, aggregation or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Southern Alleghenies Regional ITS Architecture

Regional Description

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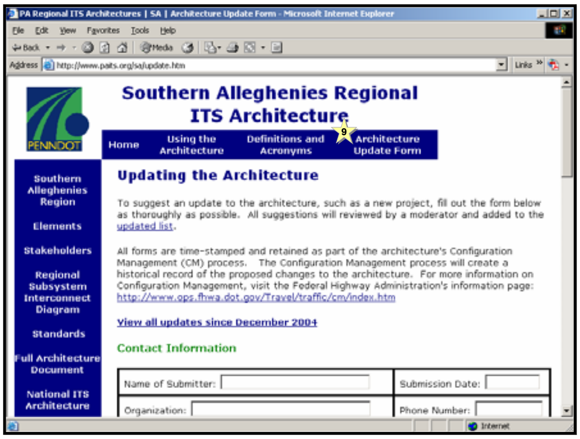
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Updating the Architecture

To suggest an update to the architecture, such as a new project, fill out the form below as thoroughly as possible. All suggestions will reviewed by a moderator and added to the updated list.

All forms are time-stamped and retained as part of the architecture's Configuration Management (CM) process. The Configuration Management process will create a historical record of the proposed changes to the architecture. For more information on Configuration Management, visit the Federal Highway Administration's information page: http://www.ops.fhwa.dot.gov/Travel/traffic/cm/index.htm

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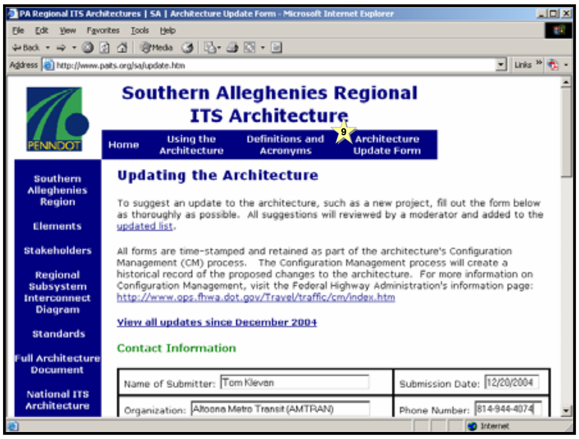
Contact Information

Name of Submitter:
Submission Date:
Organization:
Phone Number: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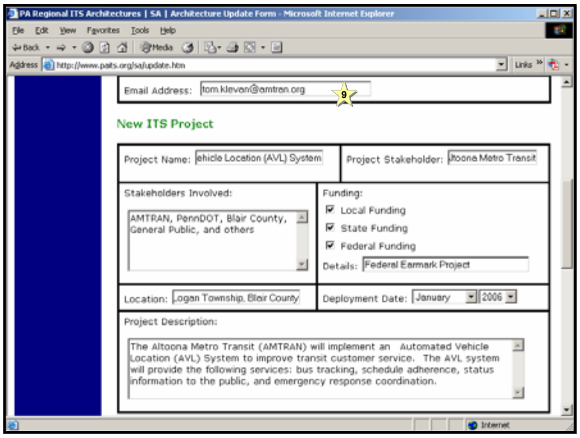
Contact Information

Name of Submitter: Tom Kleven
Submission Date: 12/20/2004
Organization: Altoona Metro Transit (AMTRAN)
Phone Number: 814-944-4074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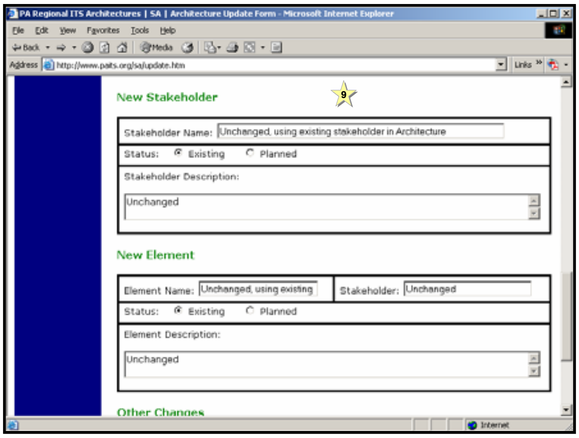
Email Address: tom.kleven@amtran.org

New ITS Project

Project Name: ehicle Location (AVL) System
Project Stakeholder: ltoona Metro Transit
Stakeholders Involved: AMTRAN, PennDOT, Blair County, General Public, and others
Funding:
☑ Local Funding
☑ State Funding
☑ Federal Funding
Details: Federal Earmark Project
Location: Logan Township, Blair County
Deployment Date: January 2006
Project Description:
The Altoona Metro Transit (AMTRAN) will implement an Automated Vehicle Location (AVL) System to improve transit customer service. The AVL system will provide the following services: bus tracking, schedule adherence, status information to the public, and emergency response coordination.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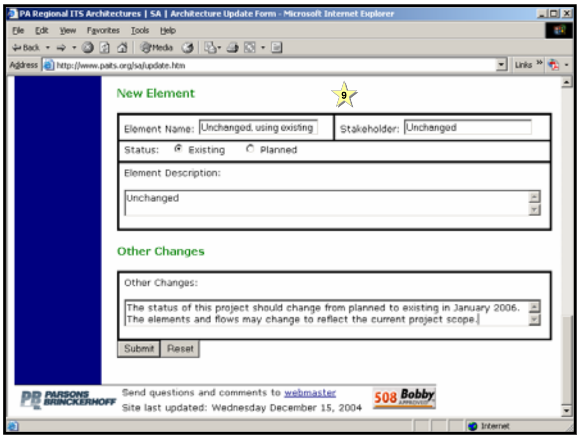
New Stakeholder

Stakeholder Name: Unchanged, using existing stakeholder in Architecture
Status: ● Existing ○ Planned
Stakeholder Description:
Unchanged

New Element

Element Name: Unchanged, using existing
Stakeholder: Unchanged
Status: ● Existing ○ Planned
Element Description:
Unchanged

Other Changes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Reset
PARSONS BRINCKERHOFF
508 Bobby Approved
Internet

New Element

Element Name: Unchanged, using existing

Stakeholder: Unchanged

Status: ● Existing ○ Planned

Element Description:

Unchanged

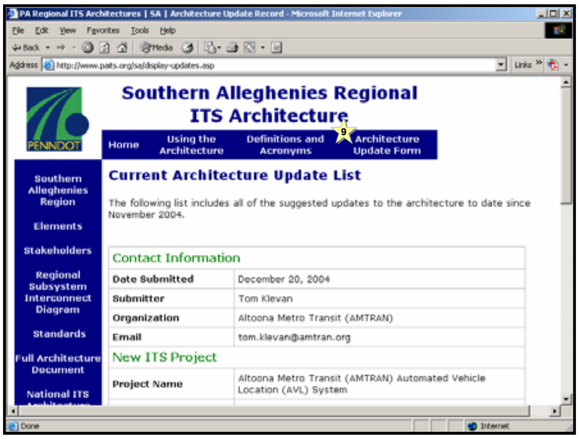
Other Changes

Other Changes:

The status of this project should change from planned to existing in January 2006. The elements and flows may change to reflect the current project scope.

Send questions and comments to webmaster

Site last updated: Wednesday December 15, 2004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Standards
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National ITS Architecture
Done
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Southern Alleghenies Regional ITS Architecture

Current Architecture Update List

The following list includes all of the suggested updates to the architecture to date since November 2004.

Contact Information	
Date Submitted	December 20, 2004
Submitter	Tom Klevan
Organization	Altoona Metro Transit (AMTRAN)
Email	tom.klevan@amtran.org
New ITS Project	
Project Name	Altoona Metro Transit (AMTRAN) Automated Vehicle Location (AVL) System

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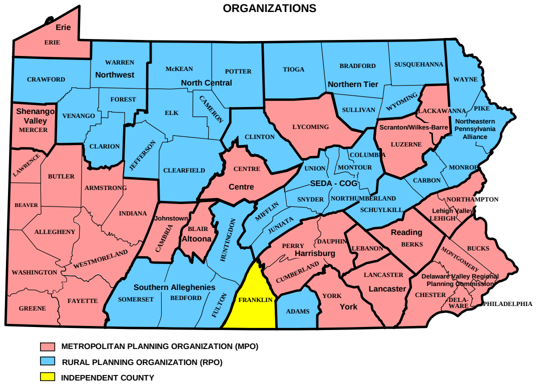
Moving Forward – Next Steps

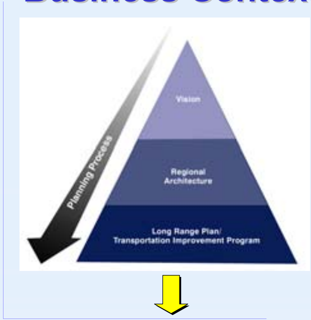
Dennis Lebo
PennDOT Center for Program Development and Management

PENNSYLVANIA'S TRANSPORTATION PLANNING ORGANIZATIONS


Erie
ERIE
WARREN
Northwest
CRAWFORD
McKEAN
POTTER
North Central
TIOGA
BRADFORD
SUSQUEHANNA
Northern Tier
WAYNE
FOREST
Shenango Valley
MERCER
VENANGO
ELK
CAMERON
SULLIVAN
WYOMING
LACKAWANNA
PIKE
LYCOMING
Scranton/Wilkes-Barre
Northeastern Pennsylvania Alliance
CLINTON
LUZERNE
CLARION
JEFFERSON
COLUMBIA
LAWRENCE
BUTLER
CLEARFIELD
CENTRE
UNION
MONTOUR
MONROE
Centre
SEDA - COG
CARBON
ARMSTRONG
SNYDER
NORTHUMBERLAND
NORTHAMPTON
BEAVER
INDIANA
SCHUYLKILL
Lehigh Valley
LEHIGH
Johnstown
MIFFLIN
BLAIR
JUNIATA
ALLEGHENY
CAMBRIA
Altoona
HUNTINGDON
DAUPHIN
Reading
PERRY
BERKS
Harrisburg
LEBANON
BUCKS
WESTMORELAND
MONTGOMERY
WASHINGTON
CUMBERLAND
LANCASTER
Delaware Valley Regional Planning Commission
Southern Alleghenies
Lancaster
GREENE
FAYETTE
SOMERSET
BEDFORD
FULTON
FRANKLIN
YORK
CHESTER
York
DELA-WARE
PHILADELPHIA
ADAMS

🟥 METROPOLITAN PLANNING ORGANIZATION (MPO)
🟦 RURAL PLANNING ORGANIZATION (RPO)
🟨 INDEPENDENT COUNTY

Business Context


Vision
Regional Architecture
Long Range Plan/ Transportation Improvement Program
Planning Process
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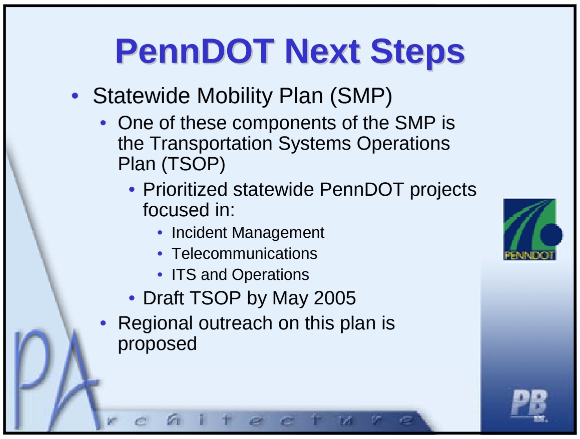
Projects

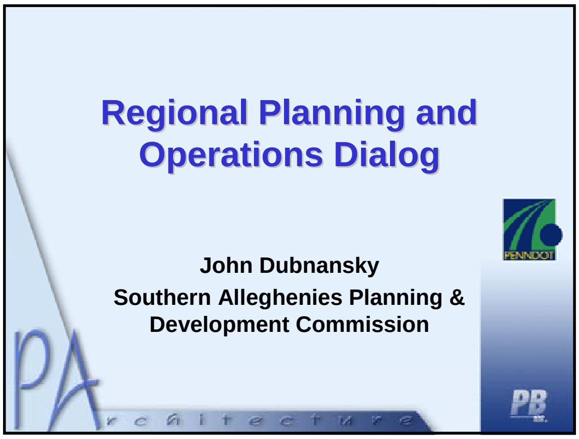
Regional Next Steps

- Adopt Architectures at Each MPO/RPO
- Regionally prioritize projects documented in Architecture
- Incorporate into regional long range plans
- Incorporate into regional transportation improvement programs (TIP)



PennDOT Next Steps

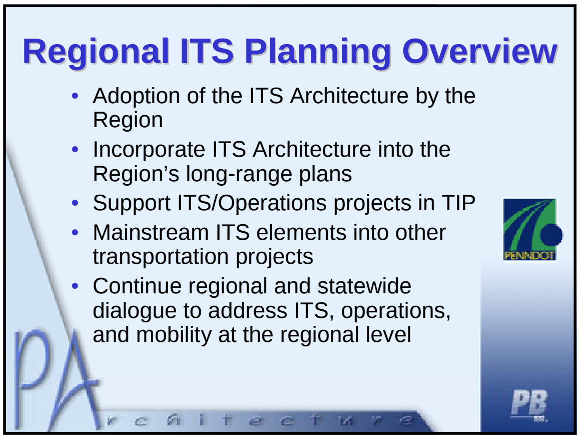
- Statewide Mobility Plan (SMP)
  - One of these components of the SMP is the Transportation Systems Operations Plan (TSOP)
    - Prioritized statewide PennDOT projects focused in:
      - Incident Management
      - Telecommunications
      - ITS and Operations
    - Draft TSOP by May 2005
  - Regional outreach on this plan is proposed



Regional Planning and Operations Dialog

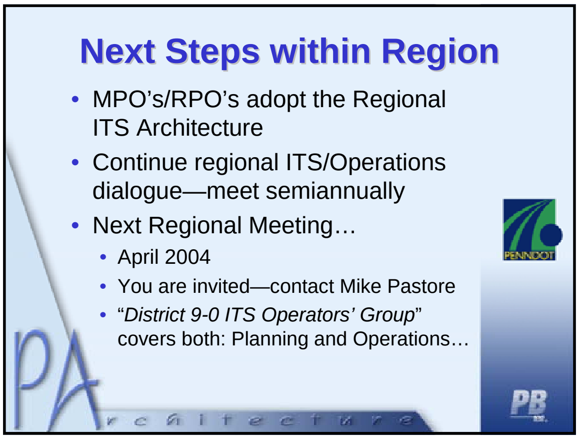
John Dubnansky

Southern Alleghenies Planning & Development Commission



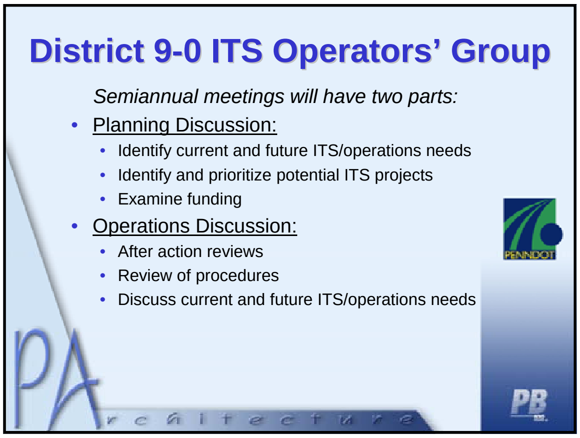
Regional ITS Planning Overview

- Adoption of the ITS Architecture by the Region
- Incorporate ITS Architecture into the Region’s long-range plans
- Support ITS/Operations projects in TIP
- Mainstream ITS elements into other transportation projects
- Continue regional and statewide dialogue to address ITS, operations, and mobility at the regional level



Next Steps within Region

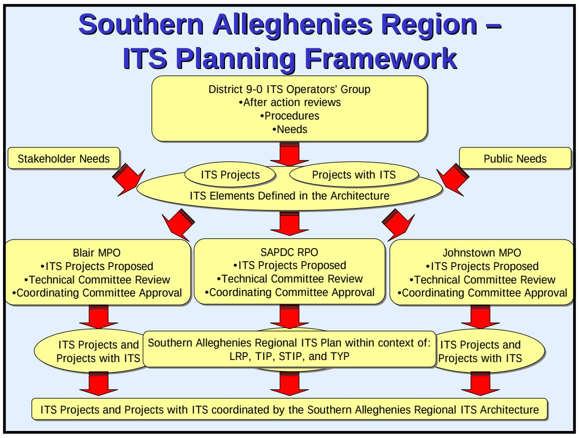
- MPO’s/RPO’s adopt the Regional ITS Architecture
- Continue regional ITS/Operations dialogue—meet semiannually
- Next Regional Meeting…
  - April 2004
  - You are invited—contact Mike Pastore
  - “*District 9-0 ITS Operators’ Group*” covers both: Planning and Operations…



District 9-0 ITS Operators’ Group

Semiannual meetings will have two parts:

- Planning Discussion:
  - Identify current and future ITS/operations needs
  - Identify and prioritize potential ITS projects
  - Examine funding
- Operations Discussion:
  - After action reviews
  - Review of procedures
  - Discuss current and future ITS/operations needs



Southern Alleghenies Region – ITS Planning Framework

District 9-0 ITS Operators’ Group
•After action reviews
•Procedures
•Needs

Stakeholder Needs

Public Needs

ITS Projects

Projects with ITS

ITS Elements Defined in the Architecture

Blair MPO
•ITS Projects Proposed
•Technical Committee Review
•Coordinating Committee Approval

SAPDC RPO
•ITS Projects Proposed
•Technical Committee Review
•Coordinating Committee Approval

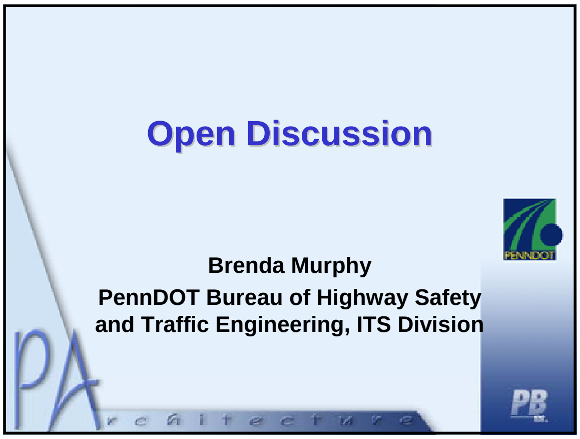
Johnstown MPO
•ITS Projects Proposed
•Technical Committee Review
•Coordinating Committee Approval

ITS Projects and Projects with ITS

Southern Alleghenies Regional ITS Plan within context of: LRP, TIP, STIP, and TYP

ITS Projects and Projects with ITS

ITS Projects and Projects with ITS coordinated by the Southern Alleghenies Regional ITS Architecture



Open Discussion

Brenda Murphy

PennDOT Bureau of Highway Safety and Traffic Engineering, ITS Division

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