

**REQUEST FOR PROPOSALS FOR**

**NEXT GENERATION**

**ADVANCED TRAFFIC MANAGEMENT SYSTEM**

**ISSUING OFFICE**

**PENNSYLVANIA DEPARTMENT OF TRANSPORTATION**  
**BUREAU OF OFFICE SERVICES**  
**COMMONWEALTH KEYSTONE BUILDING**  
**400 NORTH STREET, 5<sup>TH</sup> FLOOR**  
**HARRISBURG, PENNSYLVANIA 17120-0041**

**RFP NUMBER**

**RFP 10R-01**

**DATE OF ISSUANCE**

**AUGUST 23, 2011**

**REQUEST FOR PROPOSALS FOR  
RFP 10R-01**

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All Appendices are incorporated by reference herein as part of this RFP, unless specific appendices are addressed in the Contract as having precedential weight above the RFP level (i.e. Appendices A through C).

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## CALENDAR OF EVENTS

The Commonwealth will make every effort to adhere to the following schedule:

Activity	Responsibility	Date
Deadline to submit Questions via email to dsellers@state.pa.us.	Potential Offerors	2:00 PM September 8, 2011
Pre-proposal Conference PUC Hearing Room One (1) Keystone Building – 2 <sup>nd</sup> Floor 400 North Street Harrisburg, PA 17120	Issuing Office/Potential Offerors	9:00 AM September 19, 2011
Answers to Potential Offeror questions posted to the DGS website at: <a href="http://www.dgsweb.state.pa.us/RTA/Search.aspx">http://www.dgsweb.state.pa.us/RTA/Search.aspx</a> no later than this date.	Issuing Office	September 26, 2011
Please monitor website for all communications regarding the RFP.	Potential Offerors	Continuous
Sealed proposal must be received by the Issuing Office* at: PennDOT Bureau of Office Services 400 North Street, 5 <sup>th</sup> Floor Harrisburg, PA 17120-0041	Offerors	2:00 PM October 13, 2011

\*Note: Due to increased security requirements in the Commonwealth's mail processing operations, all incoming mail to the Keystone Building is routed, scanned and sorted at an off-site location prior to delivery. This includes overnight deliveries. Be aware when submitting bid documents via overnight delivery services, there is no guarantee that the bid documents will be received in the Issuing office when required. Bids which are received late will be rejected regardless of the reason for late arrival. Bidders are advised to allow extra time to ensure timely delivery.

## PART I

### GENERAL INFORMATION

**I-1. Purpose.** Through this request for proposals (RFP) the Pennsylvania Department of Transportation (PennDOT) solicits proposals from interested parties (Offerors) to design and implement the Next Generation Advanced Traffic Management System (NEXT GEN ATMS). This will include services to design, develop, implement, test, maintain and support a single statewide Advanced Traffic Management System (ATMS) software that will allow shared control of all existing and future Intelligent Transportation System (ITS) devices and data throughout the Commonwealth of Pennsylvania. The ATMS will:

- facilitate consistent and planned responses to planned and unplanned events;
- provide a single statewide platform;
- collect, maintain, and display real-time data from field devices and external sources;
- be capable of continuing operation even after the failure of any single component;
- interface with PennDOT's existing software systems;
- provide PennDOT with the ability to administer and maintain the system;
- provide an asset management component;
- provide compatibility with all existing and future PennDOT ITS devices; and
- provide a maintenance and enhancement period following successful system deployment.

Additional detail is provided in **Part IV-1** of this RFP.

**I-2. Issuing Office.** The PennDOT Bureau of Office Services (BOS) ("Issuing Office") has issued this RFP on behalf of the Commonwealth. The sole point of contact in the Commonwealth for this RFP shall be:

Darlene Sellers, RFP Administrator  
PennDOT Bureau of Office Services  
400 North Street, 5<sup>th</sup> Floor  
Harrisburg, PA 17120-0041  
[dsellers@state.pa.us](mailto:dsellers@state.pa.us),

the Issuing Officer for this RFP. Please refer all inquiries to the Issuing Officer.

**I-3. Scope.** This RFP contains instructions governing the requested proposals, including the requirements for the information and material to be included; a description of the service to be provided; requirements which Offerors must meet to be eligible for consideration; general evaluation criteria; and other requirements specific to this RFP.

**I-4. Problem Statement.** PennDOT currently operates and maintains over 350 Dynamic Message Sign (DMS), over 80 Highway Advisory Radios (HAR), and over 500 Closed Circuit Television (CCTV) statewide, over 300 traffic detectors in District (D) in D 6-0 and D 11-0, travel time systems in D 6-0 and D 11-0, and various other subsystems statewide. Approximately 500 new devices are intended to be installed statewide over the next two years.

In many cases, these devices are operated by several independent and incompatible vendor-provided software and ATMS systems across the Commonwealth. This lack of a statewide, centrally controlled system creates inefficiencies in the operation, data management and reporting of traffic conditions for the motoring public and the Commonwealth.

**I-5. Type of Contract.** It is proposed that if the Issuing Office enters into a contract as a result of this RFP, it will be a Deliverable Based, Basic Established Price contract as shown in **Appendix A**. The Selected Offeror will be responsible for all tasks as identified in **Part IV** of this RFP. The Issuing Office, in its sole discretion, may undertake negotiations with Offerors whose proposals, in the judgment of the Issuing Office, show them to be qualified, responsible and capable of performing the Project.

**I-6. Rejection of Proposals.** The Issuing Office reserves the right, in its sole and complete discretion, to reject any proposal received as a result of this RFP.

**I-7. Incurring Costs.** The Issuing Office is not liable for any costs the Offeror incurs in preparation and submission of its proposal, in participating in the RFP process or in anticipation of award of the contract.

**I-8. Pre-proposal Conference.** The Issuing Office will hold a Pre-proposal conference as specified in the Calendar of Events. The purpose of this conference is to provide opportunity for clarification of the RFP. Offerors should forward all questions to the Issuing Office in accordance with **Part I, Section I-9** to ensure adequate time for analysis before the Issuing Office provides an answer. Offerors may also ask questions at the conference. In view of the limited facilities available for the conference, Offerors should limit their representation to two (2) individuals per Offeror. The Pre-proposal conference is for information only. Any answers furnished during the conference will not be official until they have been verified, in writing, by the Issuing Office. All questions and written answers will be posted on the Department of General Services' (DGS) website as an addendum to, and shall become part of, this RFP. Attendance at the Pre-proposal Conference is optional.

**I-9. Questions & Answers.** If an Offeror has any questions regarding this RFP, the Offeror must submit the questions by email (**with the subject line “RFP 10R-01 Question”**) to the Issuing Officer named in **Part I, Section I-2** of the RFP. If the Offeror has questions, they must be submitted via email **no later than** the date indicated on the Calendar of Events. The Offeror shall not attempt to contact the Issuing Officer by any other means. The Issuing Officer shall post the answers to the questions on the DGS website by the date stated on the Calendar of Events. An Offeror who submits a question *after* the deadline date for receipt of questions indicated on the Calendar of Events assumes the risk that its proposal will not be responsive or competitive because the Commonwealth is not able to respond before the proposal receipt date or in sufficient time for the Offeror to prepare a responsive or competitive proposal. When submitted after the deadline date for receipt of questions indicated on the Calendar of Events, the Issuing Officer *may* respond to questions of an administrative nature by directing the questioning Offeror to specific provisions in the RFP. To the extent that the Issuing Office decides to

respond to a non-administrative question *after* the deadline date for receipt of questions indicated on the Calendar of Events, the answer must be provided to all Offerors through an addendum.

All questions and responses as posted on the DGS website are considered as an addendum to, and part of, this RFP in accordance with RFP **Part I, Section I-10**. Each Offeror shall be responsible to monitor the DGS website for new or revised RFP information. The Issuing Office shall not be bound by any verbal information nor shall it be bound by any written information that is not either contained within the RFP or formally issued as an addendum by the Issuing Office. The Issuing Office does not consider questions to be a protest of the specifications or of the solicitation.

**I-10. Addenda to the RFP.** If the Issuing Office deems it necessary to revise any part of this RFP before the proposal response date, the Issuing Office will post an addendum to the DGS website at <http://www.dgsweb.state.pa.us/RTA/Search.aspx>. It is the Offeror's responsibility to periodically check the website for any new information or addenda to the RFP. Answers to the questions asked during the Questions & Answers period also will be posted to the website as an addendum to the RFP.

**I-11. Response Date.** To be considered for selection, hard copies of proposals must arrive at the Issuing Office on or before the time and date specified in the RFP Calendar of Events. The Issuing Office will **not** accept proposals via email or facsimile transmission. Offerors who send proposals by mail or other delivery service should allow sufficient delivery time to ensure timely receipt of their proposals. If, due to inclement weather, natural disaster, or any other cause, the Commonwealth office location to which proposals are to be returned is closed on the proposal response date, the deadline for submission will be automatically extended until the next Commonwealth business day on which the office is open, unless the Issuing Office otherwise notifies Offerors. The hour for submission of proposals shall remain the same. The Issuing Office will reject, unopened, any late proposals.

**I-12. Proposals.** To be considered, Offerors should submit a complete response to this RFP to the Issuing Office, using the format provided in **Part II**, providing **twenty (20) paper copies of the Technical Submittal and twenty (20) paper copy of the Cost Submittal**. In addition to the paper copies of the proposal, Offerors shall submit two **complete and exact** copies of the entire proposal (Technical and Cost, along with all requested documents) on separate CD-ROMs or Flash drives in Microsoft Office or Microsoft Office-compatible format. The electronic copy must be a mirror image of the paper copy and any spreadsheets must be in Microsoft Excel. The Offerors may not lock or protect any cells or tabs. **Offerors should ensure that there is no cost information in the technical submittal.** Offerors should not reiterate technical information in the cost submittal. The CD or Flash drive should clearly identify the Offeror and include the name and version number of the virus scanning software that was used to scan the CD or Flash drive before it was submitted. The Offeror shall make no other distribution of its proposal to any other Offeror or Commonwealth official or Commonwealth consultant. Each proposal page should be numbered for ease of reference. **An official authorized to bind the Offeror to its provisions must sign the proposal.** If the official signs the Proposal Cover Sheet (**Appendix K** to this RFP) and the Proposal Cover Sheet is attached to the Offeror's proposal, the requirement will be met. For this RFP, the proposal must remain valid for **180** days or until a contract is fully

executed. If the Issuing Office selects the Offeror's proposal for award, the contents of the selected Offeror's proposal will become, except to the extent the contents are changed through Best and Final Offers or negotiations, contractual obligations.

Each Offeror submitting a proposal specifically waives any right to withdraw or modify it, except that the Offeror may withdraw its proposal by written notice received at the Issuing Office's address for proposal delivery prior to the exact hour and date specified for proposal receipt. An Offeror or its authorized representative may withdraw its proposal in person prior to the exact hour and date set for proposal receipt, provided the withdrawing person provides appropriate identification and signs a receipt for the proposal. An Offeror may modify its submitted proposal prior to the exact hour and date set for proposal receipt only by submitting a new sealed proposal or sealed modification which complies with the RFP requirements.

**I-13. Disadvantaged Business Enterprise (DBE) Involvement.** The Commonwealth of Pennsylvania is committed to providing opportunities for Disadvantaged Business Enterprises to compete for work. To support this commitment, there is a goal of thirteen percent (13%) of the total contract dollar amount set for this RFP. Only those organizations certified by Pennsylvania DBE Unified Certification Program (PA UCP) before the response date of this RFP qualify as Disadvantaged Business Enterprises. The Offeror must comply with all terms of the Disadvantaged Business Enterprise requirement as stated in **Appendix F**, "Disadvantaged Business Enterprise Requirements."

**I-14. Economy of Preparation.** Offerors should prepare proposals simply and economically, providing a straightforward, concise description of the Offeror's ability to meet the requirements of the RFP. The proposal should not be more than **one hundred (100)** pages, excluding resumes, which should be limited to **two (2)** pages for each individual resume, Offeror's financial documents, Offeror's appendices of supportive information should be limited to 10 page maximum (10 page maximum does not include page count of **Appendix T**, Vendor Software Capabilities Matrix). Duplex printing is acceptable and suggested.

**I-15. Alternate Proposals.** The Issuing Office has identified the basic approach to meeting its requirements, allowing Offerors to be creative and propose their best solution to meeting these requirements. The Issuing Office will not accept alternate proposals.

**I-16. Discussions for Clarification.** Offerors may be required to make an oral or written clarification of their proposals to the Issuing Office to ensure thorough mutual understanding and Offeror responsiveness to the solicitation requirements. The Issuing Office will initiate requests for clarification.

**I-17. Prime Contractor Responsibilities.** The contract will require the selected Offeror to assume responsibility for all services offered in its proposal whether it produces them itself or by subcontract. The Issuing Office will consider the selected Offeror to be the sole point of contact with regard to contractual matters.



**I-18. Proposal Contents.**

- A. Confidential Information. The Commonwealth is not requesting, and does not require, confidential proprietary information or trade secrets to be included as part of Offerors' submissions in order to evaluate proposals submitted in response to this RFP. Accordingly, except as provided herein, Offerors should not label proposal submissions as confidential or proprietary or as a trade secret. Any Offeror who determines that it must divulge such information as part of its proposal must submit the signed written statement described in subsection c. below and must additionally provide a redacted version of its proposal, which removes only the confidential proprietary information and trade secrets, for required public disclosure purposes.
  
- B. Commonwealth Use. All material submitted with the proposal shall be considered the property of the Commonwealth of Pennsylvania and may be returned only at the Issuing Office's option. The Commonwealth has the right to use any or all ideas not protected by intellectual property rights that are presented in any proposal regardless of whether the proposal becomes part of a contract. Notwithstanding any Offeror copyright designations contained on proposals, the Commonwealth shall have the right to make copies and distribute proposals internally and to comply with public record or other disclosure requirements under the provisions of any Commonwealth or United States statute or regulation, or rule or order of any court of competent jurisdiction.
  
- C. Public Disclosure. After the award of a contract pursuant to this RFP, all proposal submissions are subject to disclosure in response to a request for public records made under the Pennsylvania Right-to-Know-Law, 65 P.S. § 67.101, et seq. If a proposal submission contains confidential proprietary information or trade secrets, a signed written statement to this effect must be provided with the submission in accordance with 65 P.S. § 67.707(b) for the information to be considered exempt under 65 P.S. § 67.708(b)(11) from public records requests. Financial capability information submitted in response to Part II, Section II-7 of this RFP is exempt from public records disclosure under 65 P.S. § 67.708(b)(26).

**I-19. Best and Final Offers**

A. While not required, the Issuing Office reserves the right to conduct discussions with Offerors for the purpose of obtaining "best and final offers." To obtain best and final offers from Offerors, the Issuing Office may do one or more of the following, in any combination and order:

- 1. Schedule oral presentations;
- 2. Request revised proposals;
- 3. Enter into pre-selection negotiations.

B. The following Offerors will **not** be invited by the Issuing Office to submit a Best and Final Offer:

1. Those Offerors, which the Issuing Office has determined to be not responsible or whose proposals the Issuing Office has determined to be not responsive.

2. Those Offerors, which the Issuing Office has determined in accordance with **Part III, Section III-5**, from the submitted and gathered financial and other information, do not possess the financial capability, experience or qualifications to assure good faith performance of the contract.

3. Those Offerors whose score for their technical submittal of the proposal is less than 70% of the total amount of technical points allotted to the technical criterion.

The issuing office may further limit participation in the best and final offers process to those remaining responsible Offerors which the Issuing Office has, within its discretion, determined to be within the top competitive range of responsive proposals.

**C.** The Evaluation Criteria found in **Part III, Section III-4**, shall also be used to evaluate the Best and Final offers.

**D.** Commitments to Disadvantaged Businesses Enterprise may not change.

**I-19. News Releases.** Offerors shall not issue news releases, Internet postings, advertisements or any other public communications pertaining to this Project without prior written approval of the Issuing Office, and then only in coordination with the Issuing Office.

**I-20. Restriction of Contact.** From the issue date of this RFP until the Issuing Office selects a proposal for award, the Issuing Officer is the sole point of contact concerning this RFP. Any violation of this condition may be cause for the Issuing Office to reject the offending Offeror's proposal. If the Issuing Office later discovers that the Offeror has engaged in any violations of this condition, the Issuing Office may reject the offending Offeror's proposal or rescind its contract award. Offerors must agree not to distribute any part of their proposals beyond the Issuing Office. An Offeror who shares information contained in its proposal with other Commonwealth personnel and/or competing Offeror personnel may be disqualified.

**I-21. Debriefing Conferences.** Offerors whose proposals are not selected will be notified of the name of the selected Offeror and given the opportunity to be debriefed. The Issuing Office will schedule the time and location of the debriefing. The debriefing will not compare the Offeror with other Offerors, other than the position of the Offeror's proposal in relation to all other Offeror proposals. An Offeror's exercise of the opportunity to be debriefed does not constitute the filing of a protest.

**I-22. Issuing Office Participation.** Offerors shall provide all services, supplies, facilities, and other support necessary to complete the identified work, except as otherwise provided in this **Part I, Section I-24**. PennDOT will provide up to ten (10) workstations at PennDOT facilities to accommodate the Selected Offeror's staff.

**I-23. Term of Contract.** The term of the contract will commence on the Effective Date and will end sixty (60) months after the Effective Date. The Commonwealth's Contracting Officer may renew this contract upon the same terms and conditions by annual increments or in one step, for a period of up to twenty-four (24) months by written notification provided to the Contractor by the Commonwealth's Contracting Officer. The Issuing Office will fix the Effective Date after the contract has been fully executed by the selected Offeror and by the Commonwealth and all approvals required by Commonwealth contracting procedures have been obtained. The selected Offeror shall not start the performance of any work prior to the Effective Date of the contract and the Commonwealth shall not be liable to pay the selected Offeror for any service or work performed or expenses incurred before the Effective Date of the contract.

**I-24. Offeror's Representations and Authorizations.** By submitting its proposal, each Offeror understands, represents, and acknowledges that:

- A.** All of the Offeror's information and representations in the proposal are material and important, and the Issuing Office may rely upon the contents of the proposal in awarding the contract(s). The Commonwealth shall treat any misstatement, omission or misrepresentation as fraudulent concealment of the true facts relating to the Proposal submission, punishable pursuant to 18 Pa. C.S. § 4904.
- B.** The Offeror has arrived at the price(s) and amounts in its proposal independently and without consultation, communication, or agreement with any other Offeror or potential offeror.
- C.** The Offeror has not disclosed the price(s), the amount of the proposal, nor the approximate price(s) or amount(s) of its proposal to any other firm or person who is an Offeror or potential offeror for this RFP, and the Offeror shall not disclose any of these items on or before the proposal submission deadline specified in the Calendar of Events of this RFP.
- D.** The Offeror has not attempted, nor will it attempt, to induce any firm or person to refrain from submitting a proposal on this contract, or to submit a proposal higher than this proposal, or to submit any intentionally high or noncompetitive proposal or other form of complementary proposal.
- E.** The Offeror makes its proposal in good faith and not pursuant to any agreement or discussion with, or inducement from, any firm or person to submit a complementary or other noncompetitive proposal.
- F.** To the best knowledge of the person signing the proposal for the Offeror, the Offeror, its affiliates, subsidiaries, officers, directors, and employees are not currently under investigation by any governmental agency and have not in the last **four** years been convicted or found liable for any act prohibited by State or Federal law in any jurisdiction, involving conspiracy or collusion with respect to bidding or proposing on any public contract, except as the Offeror has disclosed in its proposal.

- G.** To the best of the knowledge of the person signing the proposal for the Offeror and except as the Offeror has otherwise disclosed in its proposal, the Offeror has no outstanding, delinquent obligations to the Commonwealth including, but not limited to, any state tax liability not being contested on appeal or other obligation of the Offeror that is owed to the Commonwealth.
- H.** The Offeror is not currently under suspension or debarment by the Commonwealth, any other state or the federal government, and if the Offeror cannot so certify, then it shall submit along with its proposal a written explanation of why it cannot make such certification.
- I.** The Offeror has not made, under separate contract with the Issuing Office, any recommendations to the Issuing Office concerning the need for the services described in its proposal or the specifications for the services described in the proposal.
- J.** Each Offeror, by submitting its proposal, authorizes Commonwealth agencies to release to the Commonwealth information concerning the Offeror's Pennsylvania taxes, unemployment compensation and workers' compensation liabilities.
- K.** Until the selected Offeror receives a fully executed and approved written contract from the Issuing Office, there is no legal and valid contract, in law or in equity, and the Offeror shall not begin to perform.

**I-25. Notification of Selection.** The Issuing Office will notify the selected Offeror in writing of its selection for negotiation after the Issuing Office has determined, taking into consideration all of the evaluation factors, the proposal that is the most advantageous to the Issuing Office.

**I-26. RFP Protest Procedure.** Any protest arising from the award or non-award of a Contract by PennDOT as a result of this RFP must be filed in writing with the Secretary of the Department of Transportation and follow the procedures set forth in Section 1711.1 of the Procurement Code, 62 Pa.C.S. § 1711.1. A protest by a party not submitting a proposal must be filed within **seven** days after the protesting party knew or should have known of the facts giving rise to the protest, but no later than the proposal submission deadline specified in the Calendar of Events of the RFP. Offerors may file a protest within **seven (7)** days after the protesting Offeror knew or should have known of the facts giving rise to the protest, but in no event may an Offeror file a protest later than **seven (7)** days after the date the notice of award of the contract is posted on the DGS website. The date of filing is the date of receipt of the protest. A protest must be filed in writing with the Issuing Office.

**I-27. Use of Electronic Versions of this RFP.** This RFP is being made available by electronic means. If an Offeror electronically accepts the RFP, the Offeror acknowledges and accepts full responsibility to insure that no changes are made to the RFP. In the event of a conflict between a version of the RFP in the Offeror's possession and the Issuing Office's version of the RFP, the Issuing Office's version shall govern.

**I-28. Lobbying Certification and Disclosure of Lobbying Activities.** This project will be funded, in part, with federal monies. Public Law 101-121, Section 319, prohibits federal funds from being expended by the recipient or by any lower tier sub-recipients of a federal contract, grant, loan, or a cooperative agreement to pay any person for influencing, or attempting to influence a federal agency or Congress in connection with the awarding of any federal contract, the making of any federal grant or loan, or entering into any cooperative agreement. All parties who submit proposals in response to this RFP must sign the “Lobbying Certification Form” **Appendix G** and, if applicable, complete the “Disclosure of Lobbying Activities” form accessible through the hyperlink provided in **Appendix H**.

## PART II

### PROPOSAL REQUIREMENTS

Offerors must submit their proposals in the format, including heading descriptions, outlined below. To be considered, the proposal must respond to all requirements in this part of the RFP. Offerors should provide any other information thought to be relevant, but not applicable to the enumerated categories, as an appendix to the Proposal. All cost data relating to this proposal and all Disadvantaged Business Enterprise cost data should be kept separate from and not included in the Technical Submittal. Each Proposal shall consist of the following **two** separately sealed submittals:

- A. Technical Submittal, which shall be a response to RFP **Part II, Sections II-1 through II-9**;
- B. Cost Submittal, in response to RFP **Part II, Section II-10**.

The Issuing Office reserves the right to request additional information which, in the Issuing Office's opinion, is necessary to assure that the Offeror's competence, number of qualified employees, business organization, and financial resources are adequate to perform according to the RFP.

The Issuing Office may make investigations as deemed necessary to determine the ability of the Offeror to perform the Project, and the Offeror shall furnish to the Issuing Office all requested information and data. The Issuing Office reserves the right to reject any proposal if the evidence submitted by, or investigation of, such Offeror fails to satisfy the Issuing Office that such Offeror is properly qualified to carry out the obligations of the RFP and to complete the Project as specified.

**II-1. Statement of the Problem.** State in succinct terms your understanding of the problem presented or the service required by this RFP.

**II-2. Management Summary.** Include a narrative description of the proposed effort and a list of the items to be delivered or services to be provided.

**II-3. Work Plan.** Describe in narrative form your technical plan for accomplishing the work. Use the task descriptions in **Part IV** of this RFP as your reference point. Modifications of the task descriptions are permitted; however, reasons for changes should be fully explained. Indicate the number of person hours allocated to each task. Include a Program Evaluation and Review Technique (PERT) or similar type display, time related, showing each event. If more than one approach is apparent, comment on why you chose this approach.

**II-4. Prior Experience.** Include experience in Advanced Traffic Management Systems. Experience shown should be work done by individuals who will be assigned to this project as well as that of your company. Studies or projects referred to must be identified and the name of

the customer shown, including the name, address, and telephone number of the responsible official of the customer, company, or agency who may be contacted.

**II-5. Personnel.** Provide a separate project organizational chart showing all Key Personnel, including team leads, management personnel and numbers of proposed staff that will be required to implement your proposed approach. Provide resumes for all Key Personnel. Describe key roles and responsibilities for all proposed Key Personnel and for lead or management personnel for essential functions. Key Personnel positions shall remain identified as such until written approval from the PennDOT ATMS Project Manager provides approval to alter.

The selected Offeror will staff the project with individuals who possess a significant depth of experience within their functional area of expertise and with projects of similar size and scope as PennDOT's ATMS implementation. Proposed personnel should have experience in ATMS technical areas and/or project management areas to which they are assigned.

In addition, the Offeror must submit a Letter of Commitment for all Key Personnel that is signed by the individual stating his/her intention to work on the ATMS Project (if the contract is awarded to the Offeror). The Offeror shall define its proposed project organization in standard organization chart format showing, at a minimum, Key Management and lead positions.

Offerors must not make changes to Key Personnel without receiving written agreement of PennDOT's ATMS Project Manager. Changes to Key Personnel will come under the heading of a "substitution" or a "replacement". A "substitution" is defined as an individual temporarily filling-in for a permanent resource. A "replacement" is defined as an individual permanently replacing an already assigned resource. The Offeror must provide resumes for alternate resources and receive PennDOT approval prior to substitution or replacement. Any substitute or replacement staff for Key Personnel positions must have qualified background and qualified experience. To the extent possible, the replacement of Key Personnel shall be limited to personnel performance issues or circumstances beyond the Offeror's control including but not limited to death, long-term sickness, subcontract default or retirement. Any substitutions or replacements of Key Personnel for either Offeror or Subcontractor must be submitted to the Commonwealth ATMS Project Manager for approval 10 business days prior to new Key Personnel joining the ATMS project.

Substitutions of Key Personnel for either Offeror or Subcontractor must be submitted immediately to the Commonwealth ATMS Project Manager for approval when the Key Personnel position is suddenly vacated. All Key Personnel positions that are suddenly vacated without advanced notice must be filled with a substitute immediately. All Key Personnel positions are required to be filled with a replacement within eight (8) weeks.

**II-6. Training.** If appropriate, indicate recommended training of agency personnel. Include the agency personnel to be trained, the number to be trained, duration of the program, place of training, curricula, training materials to be used, number and frequency of sessions, and number and level of instructors.

**II-7. Financial Capability.** Describe your company's financial stability and economic capability to perform the contract requirements. Provide your company's financial statements

for the past three fiscal years. If your company is a publicly traded company, please provide a link to your financial records on your company website; otherwise, provide three (3) years of your company's financial documents such as audited financial statements or recent tax returns. Financial statements must include the company's Balance Sheet and Income Statement or Profit/Loss Statements. Also include a Dun & Bradstreet comprehensive report if available.

**II-8. Objections and Additions to Contract Terms and Conditions.** The Offeror will identify which, if any, of the terms and conditions contained in **Appendices B and C** it would like to negotiate and what additional terms and conditions the Offeror would like to add to the standard contract terms and conditions. The Offeror's failure to make a submission under this paragraph will result in its waiving its right to do so later, but the Issuing Office may consider late objections and requests for additions if to do so, in the Issuing Office's sole discretion, would be in the best interest of the Commonwealth. The Issuing Office may, in its sole discretion, accept or reject any requested changes to the standard contract terms and conditions. The Offeror shall not request changes to the other provisions of the RFP, nor shall the Offeror request to completely substitute its own terms and conditions for **Appendices B and C**. All terms and conditions must appear in one integrated contract. The Issuing Office will not accept references to the Offeror's, or any other, online guides or online terms and conditions contained in any proposal.

Regardless of any objections set out in its proposal, the Offeror must submit its proposal, including the cost proposal, on the basis of the terms and conditions set out in **Appendices B and C**. The Issuing Office will reject any proposal that is conditioned on the negotiation of the terms and conditions set out in **Appendices B and C or to other provisions of the RFP as specifically identified above**.

**II-9. Disadvantaged Business Enterprise.** Provide detailed information describing the Pennsylvania DBE Unified Certification Program (PA UCP) certified DBE(s). Include the business name of the DBE with the address, contact person, phone number, the Pennsylvania DBE Unified Certification Program (PA UCP) certification number, a detailed narrative of the services to be provided, and the percent of the proposal's total cost to be contractually allocated to the DBE. No cost information can be displayed in the technical proposal.

If no DBE is qualified, available, or willing to participate, the contractor must provide detailed, verifiable information describing the good faith effort made to locate a DBE. If the good faith effort is determined to be unacceptable, the proposal may be disqualified or other action taken as defined in **Appendix F**.

**II-10. Cost Submittal.** The information requested in this **Part II, Section II-10** shall constitute the Cost Submittal. The Cost Submittal shall be placed in a separate sealed envelope within the sealed proposal, separated from the technical submittal.

Offerors should **not** include any assumptions in their cost submittals; all questions should be addressed during the Questions and Answers period identified in the calendar of events. If the Offeror includes assumptions in its cost submittal, the Issuing Office may reject the proposal. Offerors should direct in writing to the Issuing Office pursuant to **Part I, Section I-9**, of this



RFP any questions about whether a cost or other component is included or applies. All Offerors will then have the benefit of the Issuing Office's written answer so that all proposals are submitted on the same basis.

The total proposed cost must be broken down into the components identified in **Appendix E, Cost Matrix**. Instructions for completion are provided in the **Appendix E**. Please complete **all** tabs in **Appendix E** accordingly.

**The Issuing Office will reimburse the selected Offeror for work satisfactorily performed after execution of a written contract and the start of the contract term, in accordance with contract requirements, and only after the Issuing Office has issued a notice to proceed.**

**II-11. Requests for Payments.** Payments will be based upon the successful completion and written acceptance of each deliverable identified in **Appendix E, Cost Matrix**, of this RFP. Each deliverable payment will be based on the agreed cost and acceptance date within the Offeror's proposal or as agreed to in the final contract. Offeror shall submit to the Project Manager Form OS-501 (**Appendix AA**) and substantiating documentation as notification of each deliverable completion. PennDOT Next Gen ATMS Project Manager will certify successful completion and acceptance of each deliverable. Invoices must be submitted after acceptance of each deliverable. All invoices against purchase orders must be sent to the following address:

COMMONWEALTH OF PENNSYLVANIA  
PO BOX 69180  
HARRISBURG, PA 17106

Payment to the Offeror will be based on timely completion and acceptance (in writing) of deliverables outlined within Part IV. The Commonwealth reserves the right, during negotiations with the selected Offeror, to allow for changes to the deliverables

**II-12. Domestic Workforce Utilization Certification.** Complete and sign the Domestic Workforce Utilization Certification contained in **Appendix D** of this RFP. Offerors who seek consideration for this criterion must submit in hardcopy the signed Domestic Workforce Utilization Certification Form in the same sealed envelope with the Technical Submittal.

## PART III

### CRITERIA FOR SELECTION

**III-1. Mandatory Responsiveness Requirements.** To be eligible for selection, a proposal must be:

- A. Timely received from an Offeror;
- B. Properly signed by the Offeror.
- C. Responsive, including completion and submission of the following appendices:
  - Appendix D
  - Appendix E
  - Appendix G
  - Appendix J
  - Appendix K
  - Appendix M
  - Appendix T
  - Appendix U

**III-2. Technical Nonconforming Proposals.** The Mandatory Responsiveness Requirements set forth in **Section III-1** above are the only RFP requirements that the Commonwealth will consider to be *non-waivable*. The Issuing Office reserves the right, in its sole discretion, to (1) waive any other technical or immaterial nonconformities in an Offeror's proposal, (2) allow the Offeror to cure the nonconformity, or (3) consider the nonconformity in the scoring of the Offeror's proposal.

**III-3. Evaluation.** The Issuing Office has selected a committee of qualified personnel to review and evaluate timely submitted proposals. The Issuing Office will notify in writing of its selection for negotiation the responsible Offeror whose proposal is determined to be the most advantageous to the Commonwealth as determined by the Issuing Office after taking into consideration all of the evaluation factors.

**III-4. Criteria for Selection.** The following criteria will be used, in order of relative importance from the highest to the lowest weighted factors, in evaluating each proposal:

- a. **Technical:** The Issuing Office has established the weight for the Technical criterion for this RFP as **70 %** of the total points. Evaluation will be based upon the following in order of importance:
  - i) **Soundness of Approach.** Emphasis here is on the techniques for collecting and analyzing data, sequence and relationship of major steps, and methods for managing the study/service.

- ii) **Personnel Qualifications.** This refers to the competence of professional personnel who would be assigned to the project by the Offeror. Qualifications of professional personnel will be measured by experience and education, with particular reference to experience on studies/services similar to that described in the RFP. Particular emphasis is placed on the qualifications of the Offeror's Project manager.
  - iii) **Offeror Qualifications.** This refers to the ability of the Offeror to meet the terms of the RFP, especially the time constraint and quality, relevancy, and recency of studies and projects completed by the Offeror. This also includes the Offeror's financial ability to undertake a project of this size.
  - iv) **Understanding the Problem.** This refers to the Offeror's understanding of PennDOT's needs that generated the RFP, of PennDOT's objectives in asking for the services or undertaking the study, and of the nature and scope of the work involved. This also includes the Offeror's responsiveness to the RFP, including quality criteria.
- b. **Cost.** The Issuing Office has established the weight for the Cost criterion for this RFP as **30 %** of the total points.

**III-5. Offeror Responsibility.** To be responsible, an Offeror must submit a responsive proposal and possess the capability to fully perform the contract requirements in all respects and the integrity and reliability to assure good faith performance of the contract.

In order for an Offeror to be considered responsible for this RFP and therefore eligible for selection for best and final offers or selection for contract negotiations:

- (1) The total score for the technical submittal of the Offeror's proposal must be greater than or equal to **70%** of the **available technical points; and**
- (2) The Offeror's financial information must demonstrate that the Offeror possesses the financial capability to assure good faith performance of the contract. An Offeror which fails to demonstrate sufficient financial capability to assure good faith performance of the contract may be considered by the Issuing Office, in its sole discretion, for best and final offers or contract negotiation contingent upon such Offeror providing contract performance security for the first contract year cost proposed by the Offeror in a form acceptable to the Issuing Office. Based on the financial condition of the Offeror, the Issuing Office may require a certified or bank (cashier's) check, letter of credit, or a performance bond conditioned upon the faithful performance of the contract by the Offeror. The required performance security must be issued or executed by a bank or surety company authorized to do business in the Commonwealth. The cost of the required performance security will be the sole responsibility of the Offeror and cannot increase the Offeror's cost proposal or the contract cost to the Commonwealth.

Further, the Issuing Office will award a contract only to an Offeror determined to be responsible in accordance with the most current version of Commonwealth Management Directive 215.9, Contractor Responsibility Program.

**III-6. Domestic Workforce Utilization.** Any points received for the Domestic Workforce Utilization criterion are bonus points in addition to the total points for this RFP. The maximum bonus points for this criterion is 3% of the total points for this RFP. To the extent permitted by the laws and treaties of the United States, each proposal will be scored for its commitment to use domestic workforce in the fulfillment of the contract. Maximum consideration will be given to those Offerors who will perform the contracted direct labor exclusively within the geographical boundaries of the United States or within the geographical boundaries of a country that is a party to the World Trade Organization Government Procurement Agreement. Those who propose to perform a portion of the direct labor outside of the United States and not within the geographical boundaries of a party to the World Trade Organization Government Procurement Agreement will receive a correspondingly smaller score for this criterion. Offerors who seek consideration for this criterion must submit in hardcopy the signed Domestic Workforce Utilization Certification Form in the same sealed envelope with the Technical Submittal. The certification will be included as a contractual obligation when the contract is executed.

## PART IV

### WORK STATEMENT

Part IV, along with the other material provided in this RFP, will provide Offerors with the information needed to understand the background, Commonwealth requirements, and the operational, business and technical objectives for this project.

#### Background

This section provides a high level overview of PennDOT and a brief description of the roles and responsibilities of the organizations that will receive the services as part of this RFP.

PennDOT provides services for the Commonwealth's multi-modal transportation network including:

- 39,843 miles of PennDOT-owned highways;
- 25,000 PennDOT-owned bridges;
- 1,758 miles of interstate highways and 749 miles of freeways and expressways which carry over 93 million daily vehicle miles of travel;
- 38 urban and rural fixed-route transit systems which carry over 400 million passengers each year;
- 65 operating railroads with more than 6,000 track miles;
- 15 commercial aviation facilities with over 24 million travelers each year.

PennDOT is headquartered at 400 North Street in Harrisburg, Pennsylvania. To better manage Pennsylvania's extensive transportation network, PennDOT also operates eleven regional Engineering Districts.

OFFICE	Abbreviation	LOCATION
Central Office	CO	Harrisburg, Pennsylvania
Engineering District 1-0	D 1-0	Oil City, Pennsylvania
Engineering District 2-0	D 2-0	Clearfield, Pennsylvania
Engineering District 3-0	D 3-0	Montoursville, Pennsylvania
Engineering District 4-0	D 4-0	Dunmore, Pennsylvania
Engineering District 5-0	D 5-0	Allentown, Pennsylvania
Engineering District 6-0	D 6-0	King of Prussia, Pennsylvania
Engineering District 8-0	D 8-0	Harrisburg, Pennsylvania
Engineering District 9-0	D 9-0	Hollidaysburg, Pennsylvania
Engineering District 10-0	D 10-0	Indiana, Pennsylvania
Engineering District 11-0	D 11-0	Bridgeville, Pennsylvania
Engineering District 12-0	D 12-0	Uniontown, Pennsylvania

#### PennDOT ITS Operations

PennDOT has been at the forefront of Intelligent Transportation Systems (ITS) deployments since 1990. During this time, there have been several installations of Advanced Traffic Management System (ATMS) software packages and vendor provided software for the

command and control of ITS field devices. ITS field devices primarily consist of Dynamic Message Signs (DMS), Highway Advisory Radio (HAR), Closed Circuit TV cameras (CCTV) and traffic detectors. Multiple stand-alone systems also fall into the realm of ITS, such as weather stations, bridge de-icing, advanced warning systems, and travel time systems.

PennDOT currently operates and maintains over 350 DMS, over 80 HARs, and over 500 CCTV statewide, over 300 traffic detectors in D 6-0 and D 11-0, travel time systems in D 6-0 and D 11-0, and various other subsystems statewide. Approximately 500 new devices are intended to be installed statewide over the next two years. Offerors are referred to the *ITS Equipment Inventory (Appendix Q)* and *List of Upcoming Integration Projects (Appendix R)* to become familiar with PennDOT's existing and proposed ITS field devices and systems, respectively.

In the past, PennDOT has used a variety of methods to procure ITS software to control field devices. PennDOT currently has several independent and incompatible vendor-provided software and ATMS systems across the Commonwealth. Offerors are referred to the *As-Is District Systems and Devices (Appendix S)* to become familiar with the current District systems.

Given the number and variety of current ITS devices and anticipated ITS deployments in the near future, PennDOT must deploy an integrated ATMS to ensure that devices may be controlled from one platform as accurately and efficiently as possible.

### **PennDOT Central Office**

In general, statewide planning is led by the Central Office while PennDOT Districts execute the ITS deployments to meet their regional and local needs.

Descriptions of the Central Office areas to be closely involved in the implementation of this project and their anticipated roles in this project are included below:

#### Bureau of Highway Safety and Traffic Engineering (BHSTE)

Within Central Office, the Bureau of Highway Safety and Traffic Engineering (BHSTE) is responsible for statewide coordination and management of crash reporting, highway safety, traffic engineering, and ITS operations. The ITS Division is responsible for the traveler information program, the ITS equipment inventory, Commonwealth funding for ITS maintenance, ITS software applications, and the coordination and procedures among the Traffic Management Centers (TMCs) located in the Districts.

For this project, the ITS Division will provide the business leadership to ensure that the ATMS software meets the needs of the traffic management community.

#### Bureau of Business Solutions and Services (BBSS)

The Bureau provides business application development and support services for existing and planned applications. In addition, this Bureau provides extended services in the areas of Data Administration, Quality Assurance Strategy/Processes, End to End Tracking, Enterprise Architecture and Systems Integration. The Bureau provides specialized services that support all application development teams, including Data Administration, Business Reporting Solutions, Quality Assurance, Enterprise Architecture, Framework Support and Imaging and Workflow.

For this project, the Bureau will provide technical oversight of and application maintenance support for any of the custom components that are not the responsibility of the vendor.

#### Bureau of Infrastructure and Operations (BIO)

The mission of the Bureau is to provide support for all components of an information technology network that are needed to support the business requirements of PennDOT. The Bureau ensures compliance with Commonwealth policies so interagency requirements can also be fulfilled.

The main responsibilities of the Bureau are:

- 1) Provide overall direction, support, and management of PennDOT's Server Farm and the client/server infrastructure located throughout PennDOT including server hardware and software; networking devices such as routers and switches; and Personal Computers.
- 2) Manage the enterprise server (Mainframe) operations provided through the Office of Administration's contract with the Data Powerhouse, and the high production data print center.
- 3) Coordinate customer service activities including help desk calls, problem management, service requests, change management, and asset management.

For this project, the Bureau will provide technical oversight and manage the systems supporting the ATMS software and work with the selected Offeror in managing the customer service activities as outlined above.

#### Project Management Office (PMO)

Project Management Office supports the PennDOT's efforts to successfully complete the numerous projects in its IT portfolio. The PennDOT PMO also promotes consistency, uniformity and continual improvement in project management within the PennDOT, supports communication to stakeholders, and assists with issue/change/risk management and capacity planning for PennDOT resources.

For this project, PennDOT will assign a PMO Project Manager to provide oversight, monitoring, and verification of all project activities.

#### **PennDOT Engineering Districts**

Central Office provides leadership and guidance for statewide coordination, but it is ultimately each District's responsibility to manage and operate the transportation system infrastructure within its boundaries. In general and in the context of this project, the Districts are responsible for:

- Incident and Event Management – PennDOT Districts manage both unplanned and planned events in an effort to minimize adverse impacts on the transportation network and to improve traveler safety. This is accomplished by utilizing various surveillance devices and coordinating with regional traffic and emergency management agencies during incidents/events.

PennDOT has developed a web-based Geographical Information System (GIS) application to improve road condition (lane restrictions, full closures and roadway surface conditions) information dissemination to the public and other stakeholders. This Road

Condition Reporting System (RCRS) is a standard statewide tool used by all PennDOT Engineering Districts to ensure consistency and accuracy when reporting road condition information on state highways.

- Traffic Information Dissemination – PennDOT Districts provide information to travelers using roadway equipment such as dynamic message signs (DMS) and highway advisory radio (HAR). A wide range of information is disseminated, including traffic and road conditions, closure and detour information, incident information, emergency alerts, driver advisories, and travel times (D 6-0 and D 11-0).

PennDOT Districts also share traffic information with other regional stakeholder agencies. PennDOT is currently sharing traffic information with 911 Communication Centers, attractions and event promoters, County Emergency Management Agencies (EMA), Information Service Providers, municipalities, the Pennsylvania State Police (PSP), the Pennsylvania Turnpike Commission (PTC), regional media outlets, regional transit agencies, and adjacent states.

- AMBER Alerts – PennDOT coordinates with PSP and other responsible agencies during AMBER Alerts.
- Traveler Information – Provides traveler information through its statewide network of Dynamic Message Signs (DMS) and Highway Advisory Radio (HAR) systems, as well as the 511PA service. DMS and HAR provide targeted information to motorists while en-route to their destination. 511PA provides telephone and internet-based information including traffic conditions, live traffic camera feeds, highway construction updates, winter road conditions, weather alerts, and transit/multi-modal services.
- Roadway Maintenance and Construction – PennDOT is responsible for scheduled and unscheduled maintenance and construction services on the roadway system. Maintenance services include hazard removal (e.g., roadway debris and dead animals), routine maintenance activities, and repair and maintenance of both ITS and non-ITS equipment.
- Winter Maintenance – PennDOT Districts support winter road maintenance, including snow plow operations, roadway treatments (e.g., salt spraying and other anti-icing material applications), and additional snow and ice control activities. Road weather information systems (RWIS) and other sources are used to monitor environmental conditions.
- Work Zone Management – PennDOT Districts manage work zones, controlling traffic in areas of the roadway where maintenance, construction, and utility work are underway. Work zone information is also coordinated with other agencies including the PSP, PTC, municipalities, and other traffic and emergency management agencies.

To perform these functions, PennDOT Districts work together with other transportation and emergency management agencies. Communications between agencies are typically conducted by



telephone and email. In general, agencies that coordinate with PennDOT Districts include, but are not limited to:

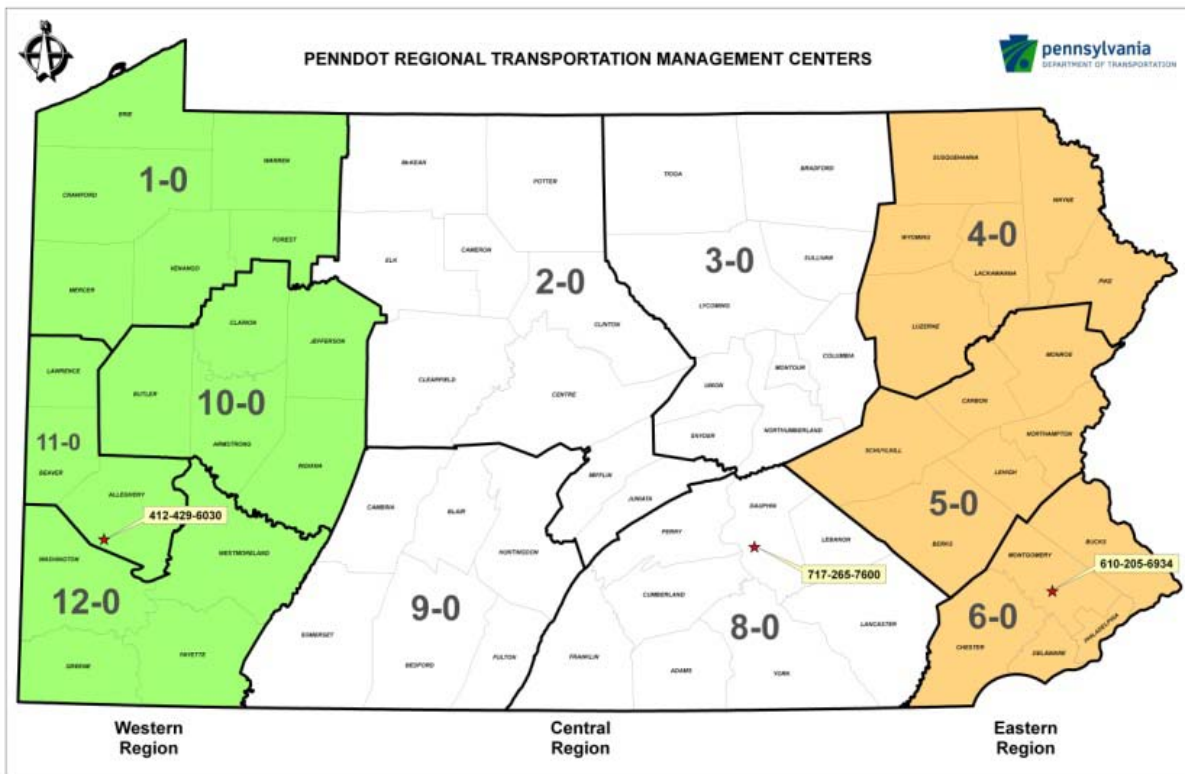
- 911 Communication Centers,
- Adjacent State Transportation Agencies,
- County EMA Centers,
- Information Service Providers,
- Local Police, Fire, and Emergency Management Services,
- Municipal Traffic Management Offices,
- Pennsylvania State Police,
- Pennsylvania Turnpike Commission,
- Regional Media Outlets,
- Regional Transit Agencies, and
- Towing Industry Responders.

#### Traffic Management Centers (TMCs)

The Traffic Management Center (TMC) is the centerpiece of ITS operations in the Districts. It serves as the hub of the transportation management system where information about PennDOT roadways is collected and combined with other operational and control data in order to manage the transportation network. Currently, each PennDOT District contains a TMC, except for Districts 3-0 and 12-0. PennDOT TMCs range in size and sophistication from a single workstation in a District office to an entire room or facility dedicated to operations. Urban, suburban, and rural environments each face different transportation problems. As a result, the Districts have developed customized TMCs to meet their individual needs.

PennDOT maintains three (3) 24/7 Regional Traffic Management Centers (RTMCs). The RTMC's reside in District's 6-0 (Eastern RTMC), 8-0 (Central RTMC), and 11-0 (Western RTMC). The RTMCs provide operational coverage for member TMCs, including ITS device operations and RCRS entry and management.

The map below shows the three traffic management regions established in the Commonwealth.



## IV-1 Objectives

- a. **General.** The primary objective of this RFP is to select an Offeror to provide services to design, develop, implement, test, maintain and support **a single** statewide Advanced Traffic Management System (ATMS) software that will allow shared control of all existing and future intelligent transportation system (ITS) devices throughout the Commonwealth. Once implemented, the ATMS software will result in increased ease and efficiency of traffic incident management; improved coordination among PennDOT Engineering Districts, PennDOT Central Office, adjacent states, and other stakeholders; improved dissemination of traffic information to the traveling public; and enhanced gathering, quality verification, and analysis of traffic data for decision making.

PennDOT requires that the Selected Offeror use a phased approach to the deployment of the ATMS software. A phased approach will follow the geographic division of the three established traffic management regions. Each phase shall include a few Engineering Districts at a time, thereby helping to reduce PennDOT's risk and overall impact to operations. The deployments shall occur in the following order:

1. Phase 1 - deployment in Eastern region (Districts 4-0, 5-0, 6-0, and PennDOT Central Office)
2. Phase 2 - deployment in Central region (Districts 2-0, 3-0, 8-0, and 9-0)
3. Phase 3 - deployment in Western region (Districts 1-0, 10-0, 11-0, and

12-0)

System functionality will be designed and developed to meet **statewide** requirements in Phase 1, before any deployment. The phases may be implemented sequentially or overlapped. The Selected Offeror must provide their proposed approach and outline its delivery schedule in Appendix U, Project Deliverables Schedule.

For the regional deployments (Phases 1-3) the ATMS software will meet the objectives outlined below:

- The ATMS system will **facilitate consistent and planned responses to planned and unplanned events** and will enable traffic management center (TMC) operators to manage incident activities from detection through resolution. The system will automatically alert operators via detection technologies and allow them to quickly and efficiently verify potential traffic problems using closed circuit television (CCTV) cameras. Traffic and equipment conditions will be viewable and controllable via a graphical user interface (GUI) that is displayed as an interactive map.
- The system will improve statewide coordination by providing a **single statewide platform** to enable the information flow to and from all PennDOT Engineering Districts and Central Office. A single statewide platform will improve data consistency and provide statewide reporting capabilities.
- The ATMS system will **collect, maintain, and display real-time data from field devices and external sources**. PennDOT will disseminate traffic information to the traveling public via 511, highway advisory radio (HAR), and dynamic message signs (DMS). The system will also enable PennDOT to provide partners with accurate real-time information to improve incident response and coordination. All collected, stored and archived traffic data will be easily accessible for traffic planning purposes and generation of performance metrics and reports.
- The ATMS system must be robust, **capable of continuing operation even after the failure of any single component**. If a critical component fails, the backup component will kick-in to continue operations. Data will be stored redundantly so that if one of the drives fails, operations will continue and data will not be lost. The solution shall be reliable, available 24/7/365, scalable, redundant, flexible, and easy to maintain. It will be compliant with all of PennDOT's IT Standards and OA/OIT's Information Technology Bulletins (ITB) and guidelines. The solution will also enable

the transfer of equipment control between Districts and provide secure access for all approved users and stakeholders.

- To maximize the use of existing PennDOT software, the **ATMS system will interface with PennDOT's existing software systems** such as the Road Condition Reporting System (RCRS) and the Transmit software in D6 for travel times. The ATMS software solution shall also be capable of presenting video available through PennDOT's planned video sharing solution.
- **PennDOT will be able to administer and maintain the system;** this includes adding new devices, troubleshooting the system, system backups, data archiving, and user and user group maintenance. It is anticipated that functionality can be tailored to the needs of different user groups. The system will interface with CA SiteMinder tool suite to leverage CWOPA credentials for user authentication, authorization and user administration.
- **The system will provide an asset management component** and enable PennDOT to view current and historical status of all field devices (CCTV, HAR, DMS, etc.). In addition, the ATMS system will contain a trouble ticket system, maintenance log, preventative maintenance component and a component for tracking maintenance contracts.
- **It is critical that the ATMS software works with PennDOT's existing field equipment.** The Selected Offeror shall research and test compatibility with any and all ITS devices intended to be integrated into the ATMS software to assure dependable consistent operation.
- **The Maintenance and Enhancement Period** will begin immediately following the post implementation support period after the first successful system deployment into the production environment.

PennDOT has also identified Phase 4 and Phase 5 for this project. Phase 4 will focus on incorporating additional functionality and providing system maintenance and Phase 5 is reserved for deploying the software at: the Pennsylvania Turnpike Commission (PTC); or such other Commonwealth executive and independent agency or entity authorized to collect tolls on roadways and highways in the Commonwealth of Pennsylvania, as agreed to by the parties.

For Phase 4, the ATMS software will meet the objectives outlined below:

Continue to maintain, enhance and support the ATMS software.

Offer expandability to incorporate additional functionality. Anticipated enhancements are listed in Phase 4 of the *Phasing Plan (Appendix N)*. They include, but are not limited to the interfaces with traffic signal systems, Bureau of Planning and Research (BPR) traffic count system (i.e. automated traffic recorder (ATR)), Geospatial Analysis of Threats and Incident Reports (GATIR) or current automatic vehicle location (AVL) solution, Maintenance Decision Support System (MDSS), and Roadway Weather Information System (RWIS). Other examples of enhancements include, but are not limited to:

- New interfaces;
- New reports;
- Data feeds (e.g. XML, RSS, etc.);
- Replacement of obsolete technologies;
- Technology upgrades;
- Incorporation of new technologies; and
- Predictive modeling

PennDOT reserves the right to request enhancements, currently identified as Phase 4 or otherwise, to be completed in accordance with and as part of earlier releases identified in RFP Task I-4, Release Management, or concurrently with other phases of this project. In the event that enhancements do not fit into a release, the enhancement may be done in accordance with **Appendix B**, Special Terms and Conditions, Paragraph 7, Additional Work.

Phase 5 is reserved for the Pennsylvania Turnpike Commission (PTC) to deploy the PennDOT Next Gen ATMS software at a PTC facility or facilities; or such other Commonwealth executive and independent agency or entity authorized to collect tolls on roadways and highways in the Commonwealth of Pennsylvania to deploy the PennDOT Next Gen ATMS software, as agreed to by the parties. Phase 5 may include, but is not limited to the software design, development, implementation, testing, maintenance, and enhancement deliverables. While PennDOT reserves the right to request Phase 5 to be initiated concurrently with other phases of this project, it is not likely to occur until after successful deployment in one, if not all, PennDOT regions. PennDOT and the Selected Offeror reserve the right to mutually agree upon the scope, specific tasks, and schedule for completion of Phase 5 as provided for in **Appendix B**, Special Terms and Conditions, Paragraph 7, Additional Work in consultation with the Selected Offeror.

- b. **Specific.** The anticipated services and project deliverables to be provided by the Offeror are included in **Part IV-4 Tasks**.

## **IV-2 Nature and Scope of the Project**

The Selected Offeror will design, develop, implement, test, maintain and support statewide ATMS software. Offerors may propose COTS solutions for all or some of the proposed functionality. The Contractor shall indicate in the technical proposal how many licenses will be provided as part of the base system and whether the license agreement is site-based or user-based. The Contractor shall document the cost of all subsequent license(s) and renewal(s) that is not provided as part of the initial system in the cost submittal (**Appendix E**).

Any Offeror whose proposal indicates a COTS solution must complete and submit **Appendix T**, Vendor Software Capabilities Matrix. The completed document must be included as an appendix to the RFP proposal. Failure to complete and submit **Appendix T** may result in a proposal being considered non-responsive.

The list below identifies the tasks that contain deliverables for this project:

- Task A: Project Management
- Task B: High Level Design
- Task C: Detailed Design
- Task D: Implementation Planning
- Task E: Phase 1 – Deployment in Eastern Region
- Task F: Phase 2 – Deployment in Central Region
- Task G: Phase 3 – Deployment in Western Region
- Task H: Planned ITS Deployment Integration
- Task I: Maintenance and Support

Tasks are outlined in detail in section IV-4 of this RFP.

For better understanding of the nature and scope of the project, Offerors are also referred to additional documentation contained in the appendices:

- Network Diagrams (**Appendix L**) contain information on PennDOT’s current TMC network architecture, consisting of ITS devices, communication technologies, and servers. Offerors wishing to receive the information provided in **Appendix L** “Network Diagrams” for the sole purpose of submitting a proposal in response to RFP 10R-01 “Next Gen ATMS” must execute page 3 of the **Appendix I**, Non-disclosure Authorization. The original signed Non-disclosure Authorization must be submitted to the Issuing Officer indicated in Paragraph I-2 of this RFP. Upon receipt and approval, the Issuing Officer will provide the address of a secure ftp site where **Appendix L** Network Diagrams may be obtained.
- Phasing Plan (**Appendix N**) outlines the established deployment approach. PennDOT requires that the Selected Offeror use a phased approach to the deployment of the ATMS software. The phased approach to the integration will include a few Engineering Districts at a time; thereby helping to reduce PennDOT’s risk and overall impact to operations. For Districts with large quantities of equipment, such as Districts 6-0 and 11-0, the Selected Offeror may need to divide the District implementation further. While Appendix N outlines the established deployment approach, the phases may be implemented sequentially or overlapped. The Selected Offeror shall provide their

proposed approach and outline its delivery schedule in Appendix U, Project Deliverables Schedule.

- Statewide ATMS Software Concept of Operations (**Appendix O**) contains information on how the system will be used from the operator's, maintainer's and manager's perspectives in both normal and emergency modes.
- Statewide ATMS Software System Requirements (**Appendix P**) details particular behaviors that the ATMS software shall perform, and includes system requirements related to performance, human machine interface (HMI), interfaces with other systems, data and enabling requirements. The Offerors shall consider the requirements listed in this System Requirements document to be core functional requirements and other ancillary requirements may be implied.
- ITS Equipment Inventory (**Appendix Q**) contains the listing of the ITS devices currently installed throughout the Commonwealth of Pennsylvania.
- List of Upcoming Integration Projects (**Appendix R**) contains information about the device installation projects planned to begin in each District through June of 2013.
- As-Is District Systems and Devices (**Appendix S**) provides a high level overview of the ITS software and devices (by manufacturer) currently used in each of the Engineering Districts. The Selected Offeror is expected to provide a software solution that will integrate all PennDOT ITS devices into a **single** ATMS system.
- Traceability Matrix (**Appendix X**) - the Selected Offeror will be required to demonstrate, document, and track how the ATMS software will meet the business requirements and trace back to the scenarios developed in the *Statewide ATMS Software Concept of Operations*.
- Interface Descriptions (**Appendix Y**) contains brief descriptions of the existing systems that will require interfaces to be built into the ATMS.
- ATMS RCRS System Requirements Document (**Appendix Z**) provides further detail on the anticipated interface between RCRS and ATMS.
- Department Specific Standards, Tools and Existing Technical Environment (**Appendix CC**) contains information about the PennDOT technical environment.

### IV-3 Requirements

- a. **Appendix J**, ATMS Device Driver Matrix provides a list of PennDOT's existing devices. Offerors must complete the form to indicate the Offeror's need to develop a new device driver. Additional opportunity is provided to identify Offeror's existing developed device drivers that are not listed. The completed **Appendix J** must be included as an appendix to the Offeror's RFP proposal (and will not be included in the 10 page limit of Offeror's Appendices).
- b. **Appendix M** form is a list of technical summary questions regarding the Offerors' proposal. A brief answer to each item as it relates to the Offeror's proposed ATMS solution should be provided. The completed **Appendix M** must be included as an appendix to the Offeror's RFP proposal (and will not be included in the 10 page count of the Offeror's Appendix).

- c. **Project Staffing.** The Selected Offeror shall identify the name and qualifications of all professional personnel that will be directly involved in the completion of all specified tasks/work orders, including a Project Manager (PM). For all key personnel proposed, including the Project Manager, the Selected Offeror will include all employee names and through a resume or similar document, indicate the assigned responsibilities each individual will have in this project and how long each has been with the company. The Selected Offeror shall also identify by name any subcontractors intended to be used and the services they will perform.

All project staffing changes must be approved by PennDOT Project Manager.

PennDOT expects to have frequent interactions with key project personnel throughout the project. The Selected Offeror will illustrate where all personnel will be physically located during the time they will be engaged in the project. The Selected Offeror shall describe how frequently the personnel are expected to be working at PennDOT facilities and how personnel will handle work assignments and attend meetings. At Selected Offeror's request, PennDOT will provide 5-10 workstations at PennDOT facilities to accommodate Selected Offeror's staff.

- d. **Background Checks.** The Selected Offeror must, at its expense, arrange for a background check for each of its employees, as well as the employees of any subcontractors, who will have access to Commonwealth Information Technology (IT) facilities, either through on-site access or through remote access. Background checks are to be conducted via the Request for Criminal Record Check form and procedure found at <https://epatch.state.pa.us/Home.jsp>. The background check must be conducted prior to initial access and on an annual basis thereafter. Before the Commonwealth will permit access to the Selected Offeror, the Selected Offeror must provide written confirmation that the background checks have been conducted. If, at any time, it is discovered that the Selected Offeror's employee has a criminal record that includes a felony or misdemeanor involving terrorist behavior, violence, use of a lethal weapon, or breach of trust/fiduciary responsibility or which raises concern about building, system or personal security or is otherwise job-related, the Selected Offeror shall not assign that employee to any Commonwealth facilities, shall remove any access privileges already given to the employee and shall not permit that employee remote access unless the agency consents to the access, in writing, prior to access. The agency may withhold its consent in its complete discretion. Failure of the Selected Offeror to comply with the terms of this paragraph may result in default of the Selected Offeror under its contract.
- e. **Emergency Preparedness.** To support continuity of operations during an emergency, including a pandemic, the Commonwealth needs a strategy for maintaining operations for an extended period of time. One part of this strategy is to ensure that essential contractors who provide critical business services to the Commonwealth have planned for such an emergency and put contingencies in place to provide needed goods and services.



1. Describe how you anticipate such a crisis will impact your operations.
  2. Describe your emergency response continuity of operations plan. Please attach a copy of your plan, or at a minimum, summarize how your plan addresses the following aspects of pandemic preparedness:
    - employee training (describe your organization’s training plan, and how frequently your plan will be shared with employees)
    - identified essential business functions and key employees (within your organization) necessary to carry them out
    - contingency plans for:
      - How your organization will handle staffing issues when a portion of key employees are incapacitated due to illness.
      - How employees in your organization will carry out the essential functions if contagion control measures prevent them from coming to the primary workplace.
    - How your organization will communicate with staff and suppliers when primary communications systems are overloaded or otherwise fail, including key contacts, chain of communications (including suppliers), etc.
    - How and when your emergency plan will be tested, and if the plan will be tested by a third-party.
- f. **Federal Highway Administration (FHWA) guidelines.** The ATMS software services shall be consistent with the FHWA guidelines including, but not limited to:
- “Systems Engineering Guidebook for ITS” found at <http://www.fhwa.dot.gov/cadiv/segb/>
  - National ITS Architecture found at <http://www.its.dot.gov/arch/index.htm>
  - National Transportation Communications for ITS (NTCIP) family of protocols found at <http://www.ntcip.org>. Additional guidance may be found in the NTCIP Guide (9001 Version 04) document.
- g. **PennDOT policies, procedures, and standards.** Prior to and during the execution of any design or development tasks involving PennDOT’s existing system environments (for example, RCRS, 511, GIS, MDSS, RWIS, AVL) the Offeror’s design/development team must comply with the policies, procedures, and standards provided by the PennDOT bureau responsible for the support of the system environment. This includes but is not limited to participation in a requirements phase, design phase, development phase, testing phase, and implementation phase as documented in the prevailing organization’s software and application development standards.
- h. **Industry Best Practices.** The Selected Offeror shall utilize System Development Life Cycle methodology (SDLC) as representing industry best practices.

- i. **Compatibility with Existing PennDOT Technical Environment.** To the extent possible, the ATMS shall be built upon the hardware and software products already in use by PennDOT. The Offerors may propose COTS solutions for all or some of the proposed functionality. All COTS products will be required to be compatible with PennDOT's existing technical environment (**Appendix CC**). Any deviation to this requirement shall be explained in detail and should identify what additional infrastructure and costs are necessary to sustain the alternate approach.
- j. **Server / Workstation Information.** Please refer to Office of Administration ITBs regarding current operating system standards, which can be found at [http://www.portal.state.pa.us/portal/server.pt/community/policies\\_and\\_procedures/416/information\\_technology\\_bulletins/210791](http://www.portal.state.pa.us/portal/server.pt/community/policies_and_procedures/416/information_technology_bulletins/210791).
- k. **PennDOT Security.** PennDOT uses SiteMinder for role-based security administration, which relies upon the Microsoft Windows Active Directory (LDAP) that has been established for the Commonwealth of Pennsylvania (CWOPA) domain. PennDOT also uses Identity Manager for user provisioning, which relies upon the Microsoft Windows Active Directory (LDAP) that has been established for the CWOPA domain. Both of these products also rely upon an LDAP that has been established between PennDOT, Department of Labor and Industry, and Department of Welfare for business partner administration. The selected Offeror will be responsible for creating well-defined user roles and profiles and integrating them within the application to control user access. The Offeror shall also develop user administration roles in order to provide administrative capabilities to create and manage user authentication and authorization for the ATMS applications. PennDOT prefers that the ATMS be built upon SiteMinder products already in use by PennDOT, and any deviation to this requirement shall be explained in detail and should identify what additional infrastructure and costs are necessary to sustain the alternate approach.
- l. **Documentation Format.** The Selected Offeror shall provide electronic versions of all documentation, and employ change control processes and version control to ensure that it is kept current for the duration of the contract resulting from this RFP. Where appropriate, a table of contents, an index, and keywords shall be available for information searching. PennDOT, at its discretion, may request or accept printed documentation on a case by case basis.

All diagrams provided by the vendor shall be in an easy to update, PennDOT approved format (e.g., Microsoft Visio).

- m. **Quality and Service.** The Selected Offeror will demonstrate a high level of quality control standards and service. The Selected Offeror is required to describe its quality standards and guarantees of service, background check processes and other quality assurance processes, and its response to resources which are not performing to PennDOT's quality expectations. PennDOT reserves the right to

request that the Selected Offeror remove staff that are not performing to the standard of quality.

PennDOT has set a high standard of quality expectations. PennDOT expects high quality service and products—i.e., products that are professionally edited and responsive to both the intent and the specific requirements of the contract. It is expected that products will be error free and that commitments made by the Selected Offeror will be met.

- n. **Service Level Agreements.** PennDOT has developed a Service Level Agreement (SLA) process that will be utilized throughout the life of this contract to ensure that the Selected Offeror is providing the best possible service. The SLA can be found in **Appendix B** Paragraph 6 and will be strictly enforced.

A monthly meeting will take place with the selected Offeror's Service Manager to review the quality of service provided to PennDOT. The selected Offeror shall provide monthly performance reports to allow PennDOT to evaluate the selected Offeror on a variety of performance criteria, including, but not limited to, the Service Level Agreements (SLA) established

The Selected Offeror will have the opportunity to provide PennDOT with suggestions on how to improve its own processes relating to Contract services. If any service deficiencies are identified across the entire contract, the Selected Offeror and PennDOT representatives will determine a plan of action to ensure that the level of service improves.

- o. **Interruptions to Normal Operations.** Any work that affects operations (such as live system testing, system transitions and software upgrades) must be planned and the Selected Offeror must receive written approval from PennDOT to conduct such work. The work that affects operations must be performed during non-peak traffic times. Generally non-peak traffic times are considered to be Monday through Friday from 9:00 PM to 5:00 AM and weekends; however, these times are subject to holiday and other restrictions (such as weather, unplanned traffic events, planned special events). PennDOT reserves the right to cancel any planned and approved work due to any unforeseen circumstances that may include, but are not limited to, weather and unplanned traffic events.

#### **IV-4 Tasks**

This section of the statement of work describes the tasks and deliverables which shall be required to complete the ATMS implementation.

Some tasks below are described as critical milestones or checkpoints. If a deliverable is identified as a critical milestone and impacts other tasks, then the Selected Offeror must wait for PennDOT approval before proceeding to the next task. For all other deliverables, the Selected Offeror can continue work while PennDOT is reviewing the previous deliverables.

PennDOT has developed a standard review and approval process that will be utilized throughout this project; please refer to the *Deliverable Review and Approval Process (Appendix V)* for further details. PennDOT reserves 15 working days to review each submittal.

**Task A: Project Management**

Project management involves planning, organizing and managing resources to bring about the successful completion of specific project goals and objectives. Project Management is composed of several different types of activities such as:

- a. Planning the work (tasks, subtasks, activities, milestones) needed to meet the project objectives, schedule and budget, and tracking to the baseline.
- b. Executing a change control management plan.
- c. Assessing/controlling issues and risks.
- d. Estimating, allocating and monitoring activity of project resources.
- e. Directing activity and controlling project execution.
- f. Facilitating deliverable review and approval process.
- g. Reporting status and tracking progress against the project plan.
- h. Executing a communication plan.
- i. Participating in After Action Reviews (AAR).

PennDOT will assign a PennDOT Project Manager who will coordinate PennDOT's responsibilities and provide oversight, monitoring, and verification of all project activities. The Selected Offeror shall be responsible to complete all work and meet all requirements identified in the executed contract. The Selected Offeror shall be responsible to complete the work to conditions of satisfaction for quality, accuracy, and completeness to be approved by PennDOT.

A-1 Develop and Execute ATMS Project Management Plan

The Selected Offeror shall develop and maintain the ATMS Project Management Plan by incorporating input from all parties as deemed necessary to establish the overall direction and goals of the ATMS Project. At a minimum, the following documents shall be incorporated into the ATMS Project Management Plan:

- a. Project Charter/Scope Document
- b. Stakeholder expectations
- c. ATMS Project expectations, goals, and benefits
- d. ATMS Project Work Plan to include activities/tasks for:
  - i. Issue Management
  - ii. Risk Management
  - iii. Change Control Management
  - iv. Communication Management
  - v. Project Execution (following the Software Development Life Cycle),
  - vi. Project close out

The Selected Offeror shall update the work plan as changes occur to the Project Work Plan activities to reflect project progress, to manage schedule and resource variances, and to take appropriate corrective action. Tasks, sub-tasks, activities or sub-activities should be measured in person-hours of effort and may have to be tracked through the PennDOT standard scheduling tool - Clarity.

The Selected Offeror shall prepare a complete Critical Path Method (CPM) schedule that adheres to and incorporates all contract requirements, shows work being completed on or before the Completion Dates, and meets any specified Milestone Date(s). The Selected Offeror shall incorporate in the schedule coordination with all entities (subcontractors, etc.) and contracts that could impact the project schedule. It is critical that the master schedule includes coordination with the planned construction activities that will require device integration as indicated in the *List of Upcoming Integration Projects (Appendix R)*. The schedule shall also indicate when any special materials and equipment are needed to allow for procurement planning, and will indicate restraints (i.e., dependency relationships) between activities.

The Selected Offeror shall be responsible for managing the day-to-day operation of the project. This includes, but is not limited to the development, maintenance and execution for the following activities:

- The Selected Offeror shall create, validate, maintain, manage and execute a detailed ATMS project plan which incorporates Selected Offeror and PennDOT activities, sub-activities, milestones and assigned resources for the project

#### Issue Management

Issue management is the systematic process of identifying and resolving project issues that may arise from any project activity. Action items may become issues if they are not resolved timely or effectively. Issues can affect the project work plans if not addressed properly and timely.

Issue Management Process includes:

- a. Identify/define/document the issue
- b. Log the issue for tracking
- c. Identify severity/priority of the issue
- d. Evaluate/document potential impact to project
- e. Identify/document/present options for resolution
- f. Identify pros/cons of proposed options for resolution
- g. Identify a recommended option for resolution
- h. Determine level of escalation required for resolution
- i. Determine appropriate communication scope and strategy
- j. Implement and document the resolution of the issue

The Selected Offeror shall document and manage all project issues across all project activities.

#### Risk Management

A risk is an event or action that has a chance of occurring which may result in a negative effect on the project. Risk Management is the systematic process of identifying, analyzing, and

responding to project risk. Once an identified risk has occurred, it becomes an issue and is handled through the issue management process described earlier.

The objectives of Risk Management activity are to:

- a. Develop an effective Risk Management strategy to identify, categorize, quantify, prioritize, and respond to project risks with mitigation strategies.
- b. Select and execute risk responses.
- c. Determine whether the implemented risk responses are achieving the desired objective and provide corrective action if necessary.

The Selected Offeror is responsible for developing and implementing a risk management strategy and managing risks for the ATMS project.

All risks and issues that have been encountered shall be included in the documentation provided for the weekly status meetings and the monthly Governance Committee meetings.

#### Change Control Management

Proactively managing scope is a critical element of effective project management. Scope creep (the gradual and incremental expansion of scope) is a common cause of project failure. The objectives of this activity are:

- a. To define and manage the scope of project work so that it complies with the project requirements and budget
- b. To establish the plan/process for change request evaluation with respect to impact on schedule, budget and resources, and project objectives
- c. To develop, implement, manage, and monitor the processes for managing project issues and change requests
- d. To provide a description of proposed change control tools
- e. To establish an approach to change request implementation.

Scope management, in addition to monitoring the scope of work of a project, also includes the maintenance and validation of contract terms and conditions. Changes to the project scope may in turn impact the project schedule, cost, quality, and approved work products.

The Selected Offeror is responsible for adhering to change control standards, policies, and procedures and effectively managing and coordinating project changes. All change requests will be reviewed, prioritized and approved by PennDOT in accordance with Appendix C Paragraph 30 Changes.

#### Communications Management

The purpose of Communication Management is to create and implement a communications strategy and plan for the ATMS project. An effective Communication Management strategy involves the following:

- a. Supporting communications principles and objectives
- b. Conducting internal and external stakeholder analysis
- c. Developing and delivering targeted project communications

- d. Collecting, analyzing, and responding to feedback on Communication Management activities

The Selected Offeror is responsible for developing and implementing a communications management strategy and managing communications within the scope of the ATMS project.

<b>Task A Deliverables Summary</b>	
<b>Task</b>	<b>Deliverable</b>
A-1	ATMS Project Management Plan

The deliverable for this section is the ATMS project management plan. All project management products shall adhere to the Selected Offeror’s quality of service standards and guarantees provided in response to this RFP.

All Plans, including the CPM schedule, shall be in accordance with the most recently approved version of Appendix U, Project Deliverables Schedule, which will take precedence in the case of any conflicts.

**Task B: High Level Design**

**B-1 Existing Conditions Reports**

Offerors are referred to the *As-Is District Systems and Devices (Appendix S)*, *ITS Equipment Inventory (Appendix Q)*, and *List of Upcoming Integration Projects (Appendix R)* to become familiar with PennDOT’s existing and planned ITS field devices and systems. The Selected Offeror shall verify all ITS system components, center to field communications, and center to center communications. The purpose of the existing conditions report is to obtain a detailed understanding of the protocols and equipment used by PennDOT, so that the Selected Offeror can efficiently develop software for a fully functional ATMS system.

The Selected Offeror is expected to begin scheduling TMC/District visits and coordinating the Existing Conditions documentation tasks immediately following NTP. PennDOT will provide the Selected Offeror with contact information for each TMC/District to schedule visits to each site.

PennDOT will provide existing documentation, answer questions, and provide contact information needed to schedule meetings. The Offeror is advised that limited as-built documentation exists, so full inspections are required.

*B-1.1. Existing System and Facility Inventory Report*

The Selected Offeror shall perform a thorough review of all ATMS related system components that exist at the PennDOT Central Office and each of the PennDOT Engineering Districts. System components include, but are not limited to, various computers, software, control hardware, communications equipment and field devices. PennDOT will provide the Selected Offeror with existing documentation in various forms and media to support this task. The

Selected Offeror shall verify and amend the existing documentation as needed, including any missing elements, to complete the existing system inventory.

*B-1.2. Center to Field Protocol Inventory Report*

The Selected Offeror shall develop a complete inventory and document the communication and control methods and protocols to the various devices that are of mixed generation and manufacturer. The Selected Offeror is fully responsible for generating software that uses the correct transmission speed, communication medium and protocol to each and every device. If protocol is not in the public domain, the Selected Offeror shall be responsible for coordinating and executing, in a timely manner, any Non-Disclosure agreements (NDA) required by the equipment manufacturers to obtain available protocol documentation. If protocol documentation is not available, the Selected Offeror shall intercept and decode one-way and two-way communications using protocol analyzers and “break-out boxes” by tapping into cables, fibers or terminal cabinets and blocks as needed.

As part of the Center to Field Protocol Inventory Report, the Selected Offeror shall provide a listing of all device types and indicate which, if any, of the devices require development of custom drivers.

*B-1.3. Center to Center Communication Report*

The Selected Offeror, in coordination with PennDOT personnel, shall verify the existing center to center communications. PennDOT will provide the Selected Offeror with detailed network drawings that describe the communication infrastructure available between Districts. This information will be used to identify any network elements which could affect the ATMS software operation. The Selected Offeror is required to make initial recommendations for potential changes, and to attend coordination meetings with PennDOT to identify the optimum changes. The Center to Center communication backbone is the responsibility of PennDOT. As such, the Selected Offeror is only required to prepare a report with recommendations, and will not procure or configure any network devices that are part of the Center to Center communication backbone.

***All three reports shall be presented to PennDOT within sixty (60) calendar days of Notice to Proceed (NTP). Deliverable B-1, Existing Conditions Reports will be paid only after all three reports are submitted and accepted by PennDOT.***

## **B-2 Business Requirements**

Any existing requirements work products shall be reviewed and validated to ensure that the Offeror fully understands the business and system requirements. The Offeror shall validate the business and system requirements based on their previous implementation experience and with respect to industry best practices. The Selected Offeror shall also develop/enhance requirements documentation in order to configure, enhance and/or develop the ATMS proposed solution. This will be accomplished by holding detailed requirements gathering sessions with PennDOT business and technical personnel, and business partners where appropriate.



### B-2.1. Validation of Existing Concept of Operations (ConOps) Document

The Selected Offeror shall review and deliver a final version of the *Statewide ATMS Software Concept of Operations* (**Appendix O**). The Selected Offeror will work with the business and technical personnel, and business partners where appropriate, to clarify and update the ConOps document. During the validation of the ConOps, the Selected Offeror will be provided the opportunity to demonstrate the as-is capabilities of the Offeror's existing or proposed software and, to the extent possible, demonstrate how each scenario in the ConOps will be accomplished using the proposed software. The Selected Offeror shall also have an opportunity to propose minor modifications to the ConOps document; however, any proposed modifications will have to be approved by PennDOT before inclusion into the final document. The updated ConOps submitted by the Selected Offeror and approved by PennDOT will be considered final.

### B-2.2. Validation of Existing System Requirements Document

The Selected Offeror shall review and deliver a final version of the *Statewide ATMS Software System Requirements* (**Appendix P**). Any changes made to the *ConOps* document (task B-2.1) that impact system requirements shall be incorporated into the final *System Requirements* document accordingly. The Selected Offeror will work with the business and technical personnel, and business partners where appropriate, to clarify and update the current System Requirements document. The updated Requirements submitted by the Selected Offeror and approved by PennDOT will be considered final.

### B-2.3. Detailed Business Requirements Document

The Offeror shall be responsible for a document that defines all business requirements and system requirements for implementing the ATMS. The Detailed Business and System Requirements Document will build on the validated *System Requirements* document (task B-2.2) and will contain a list of functional and nonfunctional requirements that will be used as the basis for the system design, development/configuration and testing tasks. The document will also include Business Process Flows in a form of diagrams and descriptions to be used for the design and development/configuration tasks.

The detailed requirements development task includes, but is not limited to, the following activities:

- Meet with business program/technical experts to define and document detailed business, functional and technical requirements for each of the system components.
- Perform requirements management, traceability, and source code management (if applicable).
- Obtain formal approval of requirements specifications from the business program area. When necessary, schedule, conduct and document requirements review sessions with appropriate business area managers to obtain the approval.

These requirements will become the basis for system design, configuration/ development, and testing.

The Selected Offeror shall be responsible for maintaining system requirements documentation for the duration of the contract. The completed system requirements document and subsequent updates shall be provided to PennDOT in an electronic format that can be imported into IBM Rational RequisitePro for use by PennDOT.

## **B-3 Detailed Business System Design**

### **B-3.1 Detailed Business System Design Document**

Building on the completed requirements documents, the Selected Offeror shall develop a detailed business system design document. This document shall include a description of the primary components of the system, along with block diagrams and illustrations. This document shall clearly present the details and facts of the proposed design and the Selected Offeror's plan to meet the functional requirements.

The Selected Offeror shall meet with PennDOT business and technical subject matter experts (SMEs) to create a high-level design of the new application. To the extent possible, screens and screen flows, interface specifications, and system business rules will be developed collaboratively with PennDOT SMEs. The Business System Design Document shall also include all aspects of the user interface including navigation rules, exception handling, reports and business rules. Any business requirements not previously identified shall be documented and incorporated into the design, as appropriate.

The Business System Design shall include, but not be limited to:

- User Interface Specifications and Business Rules
  - i. User Interface Scenarios (Screen layouts, flows, functionality and navigation)
  - ii. Business rules by screen
  - iii. Validation rules for data
  - iv. Preliminary user group identification for role mapping
  - v. Identification of associated business process changes for future training development
- Output General Specifications
  - i. Report requirements, specifications and mockups
  - ii. System Notification rules, requirements, specifications and mockups
- Data processing and Interface General Specifications
  - i. Data processing – business functionality, data involved and frequency
  - ii. Interface – business functionality, data exchanged, direction, frequency and systems involved

The Offeror will provide sample screens and a draft user manual to demonstrate how the ATMS software will look and function.

### **B-3.2 Requirements Traceability Matrix**

The Selected Offeror shall develop and validate a requirements traceability matrix that will map all requirements to the detailed design document. This includes all requirements developed by PennDOT for this RFP and those developed by the Selected Offeror as part of this contract.

The Traceability Matrix shall show the traceability of the detailed requirements contained in the detailed business system design deliverable. The Traceability Matrix will be used to verify that all business system requirements are mapped to system component designs. It will also be used to identify the source of requirements from a design perspective.

The Selected Offeror is responsible for the development, delivery and maintenance of the Traceability Matrix. The Selected Offeror shall validate the Traceability Matrix to confirm that business/system requirements are complete. The Selected Offeror shall confirm that requirements are mapped all the way to design elements.

The Selected Offeror shall also be responsible for updating the Traceability Matrix as required under subsequent system design and testing deliverables.

<b>Task B Deliverables Summary</b>	
<b>Task</b>	<b>Deliverable</b>
B-1	Existing Conditions Reports <ul style="list-style-type: none"> <li>• <i>Existing System and Facility Inventory Report</i></li> <li>• <i>Center to Field Protocol Inventory Report</i></li> <li>• <i>Center to Center Communication Report</i></li> </ul>
B-2	Business Requirements <ul style="list-style-type: none"> <li>• <i>Statewide ATMS Software Concept of Operations (Final)</i></li> <li>• <i>Statewide ATMS Software System Requirements (Final)</i></li> <li>• <i>Detailed Business Requirements Document</i></li> </ul>
B-3	Detailed Business System Design <ul style="list-style-type: none"> <li>• <i>Detailed Business System Design Document</i></li> <li>• <i>Requirements Traceability Matrix</i></li> </ul>

**Task C: Detailed Design**

**C-1 User Interface Design**

C-1.1 User Interface Design Demonstrations

The Selected Offeror will provide user interface demonstrations to allow operators to visualize how the various sections of software will work together. These demonstrations will provide PennDOT with an additional opportunity to comment on how the system will function. As part of the initial User Interface Demonstration, the Selected Offeror shall walk through the final Concept of Operations document and fully demonstrate how the ATMS software addresses each function. It is understood that the demonstrations will generate ideas, suggestions and potential changes. As a result, the Offeror should plan on hosting at least three (3) iterative demonstration sessions.

Five (5) business days prior to each User Interface Demonstration, the Selected Offeror shall provide draft user interface design documents. Following each demonstration, the Selected Offeror shall provide meeting minutes that capture comments provided at the demonstrations.

### C-1.2 User Interface Design Document

Upon acceptance of the demonstrated user interface, the Selected Offeror shall submit a detailed design document describing how the software will function. This document shall be developed to the level that each graphical user interface (GUI) element (i.e. fields, buttons, etc) are described with detailed text that identifies the functionality of each element. The text should describe not only how each element works, but also the expected behavior. It shall be considered a draft user manual and provide PennDOT a final opportunity to comment on the proposed user interface.

## **C-2 Detailed Software Design Document**

The software system detailed design deliverable document will consist of several items. This document, including block diagrams, inputs, outputs, illustrations, and fold-outs, shall present the details and facts of the proposed design. It shall provide details of the system described in the Selected Offeror's proposal. As part of this task, the Selected Offeror shall determine, design and document detailed system specifications for all coding components including, but not limited to:

- Architectural Design (Top Level Design)
- Module Design (High Level Functionality of each module)
- Key Function Design (Brief description of major functions in each module in sufficient detail for a programmer to develop)
- Database Design
- Data elements and data models
- Message layouts and data exchange
- Application programs
- Transactions
- System security
- Middleware configurations
- External interfaces

The Offeror may have proprietary intellectual property that will have to be licensed to PennDOT via a non-exclusive, perpetual license agreement. Additional information regarding intellectual property rights are found in the terms and conditions, **Appendices B and C**. While the Selected Offeror is not expected to provide a detailed design for previously developed software, the Selected Offeror must fully disclose interface documentation and provide the full Application Programming Interface (API). Documentation of interfaces and API's will also include sample code, which demonstrates how the interfaces could be utilized.

Software developed under this contract is subject to intellectual property rights outlined in the terms and conditions, Appendices B and C. Detailed software design documentation must be provided for all code developed for PennDOT under this Contract.

***The software development cannot proceed until the concepts presented in the Design Document are approved by PennDOT in writing.***

### C-3 Network Topology Report

The Selected Offeror shall submit a network topology diagram and an associated explanation document illustrating anticipated network connectivity, bandwidth requirements, firewall rule requirements, and hardware placement. The network topology diagram and associated explanation document will be provided to PennDOT for approval.

Task C Deliverables Summary	
Task	Deliverable
C-1	User Interface Design <ul style="list-style-type: none"><li>• <i>User Interface Design Demonstrations</i></li><li>• <i>User Interface Design Document</i></li></ul>
C-2	Detailed Software Design Document
C-3	Network Topology Report

### Task D: Implementation Planning

#### D-1 Procurement Plan

##### D-1.1. Hardware and Software Recommendation Report

The Selected Offeror shall identify and present recommended hardware and software to support the ATMS software installation. All hardware and software products will be required to be compatible with PennDOT's existing technical environment (**Appendix CC**). Any deviation from this requirement shall be explained in detail and shall identify what additional infrastructure and costs are necessary to sustain the proposed solution.

The Selected Offeror will develop an overview report with drawings, descriptions, and cost estimates for all material to be procured. This report shall include a description of the primary components of the system, including make and models along with block diagrams and illustrations. It shall clearly present the details and facts of the proposed design. The Selected Offeror recommended hardware shall work with the existing communications equipment and ITS field devices.

The Selected Offeror shall be prepared to provide up to two (2) formal presentations explaining their recommendations. Each presentation shall be followed by discussions, questions and clarifications. A written summary of the discussions and clarifications shall be submitted to PennDOT's Project Manager. The deliverable of this task will be a final report submission based on the presentations and discussions with acceptance by PennDOT.

##### D-1.2. Procurement Plan

Based on the *Hardware and Software Recommendation Report*, the Selected Offeror will compile a list of items that were determined to be supplied by PennDOT and will incorporate the list into the CPM schedule. PennDOT will procure the materials to be installed on PennDOT property for PennDOT use. While PennDOT will procure the items, it is the Selected Offeror's responsibility to ensure that all recommended items include detailed specifications to identify the correct materials and that enough notice is given to PennDOT to procure these materials in accordance with the Selected Offeror's CPM schedule. To ensure the timely completion of this project, the Selected Offeror should assume that it will take sixty (60) calendar days to purchase items.

The deliverable for this task is a *Procurement Plan*. Upon approval of the plan, the Selected Offeror shall work with PennDOT to implement the plan and will provide detailed specifications to PennDOT for approval.

## **D-2 Statewide Implementation Plan**

The Selected Offeror shall develop a statewide implementation plan, which will describe the overall approach to the statewide ATMS software deployment. At a high level the plan will describe the method and timing of the installation and cutover on a District by District level. For Districts with larger equipment counts, the Selected Offeror shall plan to divide the installation into sub-phases within the Districts. Installation sub-phases may be grouped by module or corridor, depending on the District specifics. The intent is to minimize disruptions to operations in each District.

At a minimum, the implementation plan shall describe an approach to:

- Code migrations, deployment, and production check out tasks.
- System Rollback Plan. The Selected Offeror shall describe procedures to remove software, a patch or software update if required. This plan will contain a detailed description of the steps that would be necessary should this be required. The rollback plan shall also address data preservation including the method of restoring database backups if required.
- Transition Plan. The Selected Offeror shall describe how they plan to transition each TMC to the new hardware and software with minimal interruptions to normal operations.
- Decommissioning existing software and equipment. The Selected Offeror shall describe the timing and procedure that will be used to remove unneeded equipment and software. While the Selected Offeror is required to identify unneeded equipment, it is PennDOT's responsibility to remove the devices.
- Implementation planning coordination with appropriate PennDOT support teams.
- Post implementation support.

The Selected Offeror will include descriptions of approaches to any other relevant implementation activities, based on industry standards, best practices, and Offeror experience.

The Statewide Implementation plan will describe an overall approach to installation and then will be updated with District level specifics in preparation for each regional deployment. These updates are described in tasks E, F, and G.

### **D-3 Statewide Test Plan**

The Selected Offeror shall develop a statewide plan that will describe an approach to Statewide ATMS software testing. At a high level the plan will describe the methods and timing of software testing at all appropriate system development and deployment stages based on industry standards, best practices and Offeror experience.

At a minimum, the test plan shall address the following requirements:

- The Contractor shall develop detailed test plans and test procedures for each scenario and requirement.
  - Each test procedure shall list the testing objective for the requirement(s) that are being verified along with pass/fail criteria for each.
  - Each test procedure shall list the specific steps that should be followed to test the requirement(s).
  - Each test procedure shall list the expected results for each step of the test.
- All ATMS software, enhancements and upgrades shall be tested in a development environment provided by the Selected Offeror prior to being tested in the PennDOT staging environment.
- All ATMS software, enhancements and upgrades shall be tested in a PennDOT staging environment prior to being deployed in the production environment. PennDOT staging environment will mirror the production environment.
- The ATMS software shall be provided with a system acceptance test to ensure that system functions as designed and agreed upon by PennDOT.
- The Selected Offeror shall complete an ATMS performance test to determine average and peak system loads based on the sizing and volume information gathered from stakeholders.
  - Test scripts/load simulations will be developed to test the ATMS infrastructure at the estimated speed and transaction rate.
  - The ATMS performance statistics related to network and server utilization will be collected and documented during test runs to determine the overall level of system performance. These statistics will be used to size and tune the ATMS system, or infrastructure components, to meet estimated ATMS usage.
- The test plan should also address the testing of devices that have communications directly to the TMCs.
  - If any testing is required for devices in production, the Selected Offeror will have to coordinate the testing with the PennDOT BIO and TMC's to minimize downtime and disruptions to normal operations. This may involve configuring additional equipment to isolated devices for testing.
  - The Selected Offeror is responsible for returning the devices/ system to complete operation after testing.

#### **D-4 Statewide Training Plan**

The Selected Offeror will be required to provide training and training materials to the anticipated ATMS users. Due to travel restrictions for the Commonwealth employees, the training will be held locally in the Districts or regionally in the RTMCs. PennDOT anticipates that training will be needed for each RTMC region, and for Central Office business and IT users.

PennDOT also anticipates that a select group of ATMS users will need to be trained to become the PennDOT trainers for future user groups. The Selected Offeror shall consider incorporating “Train the trainer” sessions in the training plan to meet this need.

PennDOT estimated ATMS user group sizes are:

- RTMC/TMC operators – Up to 60 operators statewide
- TMC supervisors – Up to 30 Supervisors statewide
- TMC management staff – Up to 30 Managers statewide
- Central Office staff – Up to 50 users
- IT – Up to 25 users
- Train-the-trainer – Up to 25 users

At a minimum, the Selected Offeror shall plan to provide detailed user manuals for training materials.

Taking into consideration the user groups and system requirements identified by PennDOT, the Selected Offeror will develop a statewide training plan. The Selected Offeror shall incorporate industry standards, best practices, and Offeror experience when developing the training plan.

This plan shall serve as the basis for developing site specific training plans described under tasks E, F, and G.

#### **D-5 Knowledge Transfer Plan**

Based in part on the solution that is offered as part of this RFP, PennDOT may choose to maintain the non-proprietary components of the system. PennDOT needs to be able to use, support, maintain, and enhance any custom developed functionality that is turned over to PennDOT. Utilizing a complete system component inventory that will result from the system design deliverables, PennDOT will work with the Selected Offeror to make a determination regarding who is responsible for maintaining each of the system components. The knowledge transfer plan will outline the Selected Offeror’s approach to transferring the knowledge required to effectively maintain each of the components that are turned over to PennDOT. Knowledge areas shall include, but not be limited to, system administration, testing, enhancements, support, or maintenance of the solution in its entirety.

The Selected Offeror shall incorporate industry standards, best practices and Offeror experience, when developing a knowledge transfer plan for PennDOT review and approval. Where



appropriate, PennDOT expects the Selected Offeror to incorporate the following knowledge transfer formats:

- a. Face to face, via:
  - i. training sessions on systems functionality and inner-workings;
  - ii. on-site technical support;
  - iii. job shadowing (some number of hours/regularly throughout the project)
  - iv. periodic checkpoints to demonstrate target audiences' knowledge received
- b. Via detailed system documentation (developed under other tasks)

**D-6 ATMS COTS Software Licenses**

If the Offeror proposed a third party proprietary software (COTS) as a key component of the functionality for the ATMS system, they shall provide to PennDOT all software licenses and media needed to deliver a complete application solution in accordance with Section 2 of Appendix B.

The Offeror shall indicate in the technical proposal how many licenses will be provided as part of the base system and whether the license agreement is site-based or user-based. The Offeror shall document the cost for the initial license(s) and all subsequent license(s) and renewal(s) that are not provided as part of the initial system in the cost submittal (**Appendix E**).

<b>Task D Deliverables Summary</b>	
<b>Task</b>	<b>Deliverable</b>
D-1	Procurement Plan <ul style="list-style-type: none"> <li>• <i>Hardware and Software Recommendation Report</i></li> <li>• <i>Procurement Plan</i></li> </ul>
D-2	Statewide Implementation Plan
D-3	Statewide Test Plan
D-4	Statewide Training Plan
D-5	Knowledge Transfer Plan
D-6	ATMS COTS Software Licenses

**Task E: Eastern Region Deployment**

The Eastern Region Deployment consists of the PennDOT Central Office and Engineering Districts 4-0, 5-0, and 6-0.

PennDOT requires that the Eastern Region deployment begins with a full system deployment in District 5-0. The Selected Offeror shall begin implementation in Districts 4-0 and 6-0 only after successful system implementation and acceptance in District 5-0. The Selected Offeror will also need to train District 6-0 staff to use the ATMS system concurrently with the District 5-0 deployment to assure continuity of regional traffic operations.

PennDOT Central Office deployment shall include all required hardware and software installations needed to perform all functions within ATMS for all TMCs in PA, ultimately serving as a “back-up” to all TMCs. The Central Office deployment must be completed concurrent with the first ATMS implementation in District 5-0.

PennDOT District 6-0 RTMC has fully integrated ATMS software that needs to be considered during the pre-implementation and implementation stages of this region. The integrated ATMS software includes modules for DMS/Travel Time, CCTV cameras, and incident detection. At no time shall the existing operations be interrupted, except for instances explicitly approved by the District.

In addition, District 6-0 has numerous ITS projects that are in the design, construction, and operational support stage. Close coordination with these ITS projects is required by the Selected Offeror.

Modules/Items to be implemented in the Eastern Region include, but are not limited, to:

- DMS/Travel Time
- CCTV Cameras
- HAR
- Incident Detection/Alarm/Vehicle Detectors
- Incident Response Plan
- Queue Detection
- Administration
- Asset Management
- Data Warehouse
- Performance Measures
- RCRS Interface (Statewide)
- 511/Current Data Provider Interface (Statewide)
- HMI-Regional Operations Interface (Statewide)

## **E-1 Eastern Region Pre-Implementation Planning**

### *E-1.1 Site Specific Implementation Plans*

Building on the statewide implementation plan developed under **Task D**, the Selected Offeror will develop a site specific implementation plan for each installation site in the region. The site specific plan will include District level details that will align with all components of the statewide implementation plan.

***The Site Specific implementation plan is due to PennDOT at least three (3) weeks in advance of installation into the staging environment. No work shall be conducted prior to PennDOT written approval of the Site Specific Implementation Plan.***

### *E-1.2. Site Specific Equipment Installation Plan*

As equipment required under this contract is installed, it is likely that modifications to the existing TMC infrastructure (i.e. racks, power, communication, etc) will be required. The

Selected Offeror shall use information gathered in the *Existing System and Facility Inventory Report* to develop the *Equipment Installation Plan* for each installation site, as needed. While the Selected Offeror is not required to procure any materials under this task, there is a requirement to assemble detailed drawings and installation instructions (specifications) for use by PennDOT or a designated installation contractor.

Upon review and acceptance of the plan the Selected Offeror will be required to work with each TMC to make sure everything will fit in the existing equipment rooms.

#### E-1.3. Site Specific Test Plans and Documentation

Building on the statewide test plan, the user interface and technical design documentation, the Selected Offeror will develop site specific test plans and test scripts for each installation site in the region. Some test conditions may vary by location, therefore the selected offeror must tailor the test documents to address the specific needs of each installation site. PennDOT expects that the test plans shall include, but not be limited to test conditions, test scripts, test data, expected results (including outputs), resource requirements and schedule.

As part of this task, the Selected Offeror shall also update the *Requirements Traceability Matrix*. The Selected Offeror shall confirm that test scripts are mapped all the way to design elements and system requirements.

#### E-1.4. Site Specific Training Plan and Materials

Building on the statewide training plan, the Selected Offeror will develop training materials and site specific training plans and schedules.

## **E-2 Eastern Region Implementation**

#### E- 2.1. Site Specific Equipment Installation Support

The Selected Offeror is required to validate the installation work performed as a result of **Task E-1.2**. Upon the completion of the work, the Selected Offeror shall assemble as-built documentation, which shall include but not be limited to all configurations and detailed installation instructions.

#### E-2.2. Coding and Testing in the Development Environment

The Software Deployment process requires a phased installation of software through a minimum of three environments: development, staging and production.

- All ATMS software, enhancements and upgrades shall be tested in a development environment provided by the Selected Offeror prior to being tested in the PennDOT staging environment.
  - PennDOT is not responsible for any aspect of the purchase, installation, configuration, support or maintenance of the Selected Offeror development environment.

- All ATMS software, enhancements and upgrades shall be tested in a PennDOT staging environment prior to being deployed in the production environment. PennDOT staging environment will mirror the production environment.

While developing the ATMS software, the Selected Offeror shall, at a minimum:

- Develop and code all programs and logic according to the specifications contained within the technical design documents;
- Configure any COTS solutions to meet PennDOT specific requirements that PennDOT personnel deem appropriate;
- Create all designed components of the user interface based on the screen mock-ups and descriptions presented in the User Interface Design document approved by PennDOT;
- Work with internal PennDOT staff to establish database sizing and space estimates for all tables and supplementary data sources;
- Setup and configure middleware, application security, and database tables;
- Define and execute all appropriate tests;
- Document and maintain all test plans and logs;
- Develop and maintain detailed system documentation; and
- Implement a source management model for source code control.

To the extent possible, pre-deployment testing will be conducted at the Selected Offeror's location, followed by testing in the Staging Environment at PennDOT. PennDOT reserves the right to witness and participate in any testing sessions.

While performing testing the Selected Offeror shall, at a minimum:

- Use a consistent, representative test data set;
- Ensure that all functionality of each of the components and the remaining functionality of the system processes correctly after the implementation of each new component;
- Ensure that each component meets the desired performance level based on anticipated and peak number of users utilizing the system;
- Ensure that all security measures within the system release components are functioning properly. This includes user authentication and user authorizations;
- Perform system testing, including but not limited to, execution of the test plan, loading and maintaining test data, verification of expected results, and tracking pass/fail metrics for test scripts;
- Track defects that are found during all phases of testing, assess severity, priority, corrective action, level of effort, and impact on schedule;
- Provide a weekly system test status report including pass/fail rate, number of defects by severity code, status of re-work and re-test, and compliance with planned schedule; and
- The Selected Offeror shall perform regression testing to ensure that previously identified deficiencies are not re-introduced into the system as new features are added;

The Selected Offeror must complete a system test which meets the established exit criteria in order to proceed to user acceptance testing (UAT).

If any testing is required against devices in production, the Selected Offeror will have to coordinate the testing with the PennDOT BIO and TMC's to minimize downtime and disruptions to normal operations. This may involve configuring additional equipment to isolated devices for testing. The Selected Offeror is responsible for returning the devices/system to complete operation after testing.

The Selected Offeror shall be required to monitor and document any changes to the ATMS software throughout the duration of the project. The Selected Offeror is required to employ a Software Version Control process and identify the versions provided to PennDOT to ensure that all systems running the ATMS software are running at the same development iteration. This includes, but is not limited to, applying version control process to configuration files and settings.

PennDOT reserves the right to audit the selected Offeror's work to ensure that the documentation and software are being managed as described.

#### E-2.3. Installation Instructions

When providing a version of software for PennDOT to install into any PennDOT environment, the Selected Offeror shall provide Software Installation instructions. Software installation instructions shall include, but not be limited to step by step installation instructions, SQL scripts, release notes, prerequisite software and any other information required for successful installation and operation of the software.

The Selected Offeror shall also provide instructions needed to install hardware as purchased based on the *Hardware and COTS Recommendation Report*.

#### E-2.4. Software Installation into the Staging Environment

The Selected Offeror must supply a complete, compiled version of the ATMS software to be deployed in the staging environment in the form of an executable program with all associated files and/or data. Suggested mechanisms to furnish the latest version of the software include Compact Disk (CD), FTP upload to the PennDOT FTP server or download from the Selected Offeror FTP server.

PennDOT BIO is responsible to install, configure and support the network, servers and associated operating systems directly related to the ATMS software as purchased based on the *Hardware and COTS Recommendation Report* and as directed by the *Installation Instructions* in the staging and production environments.

While PennDOT generally performs the installation, the selected Offeror shall be available on site to provide support.

#### E-2.5. User Acceptance Testing

Utilizing the approved test scripts developed under the *Site Specific Test Plans and Documentation* task, the Selected Offeror shall coordinate and document formal User Acceptance Testing (UAT). At a minimum, UAT will include:

- Assist PennDOT's business program areas with the planning and preparation (including training) for UAT.
- Oversee and support the execution of the UAT plan, including loading and maintaining test data, executing batch streams, assisting with the verification of expected results, and the tracking of defects/incidents discovered during the UAT.
- Track defects that are found during all phases of testing, assess severity, priority, corrective action, level of effort, and impact on schedule.
- Correct, retest, and migrate defects through the normal development environments, prior to redeploying them in the UAT environment.
- Provide a regular UAT status report including pass/fail metrics, number of defects by severity code, status of rework and re-test, and compliance with planned schedule.
- Facilitate completion of the UAT to meet the established exit criteria in order to proceed to production deployment.
- Obtain sign-off authorization from the business program area and the PennDOT Project Manager prior to deploying to production.

In addition to using testing scripts, PennDOT intends to perform *ad hoc* testing to verify system functionality.

#### E-2.6. Software Installation into Production Environment

Following the success of User Acceptance Testing in the staging environment and approval from PennDOT, the Selected Offeror will assist PennDOT BIO in installing the latest version of the ATMS software in the production environment.

PennDOT BIO will install the latest version of the ATMS software as directed by the *Installation Instructions* into production environment.

The latest version installed in the production environment will be tested as prescribed in the *Site Specific Implementation Plan* and *Site Specific Test Plan*.

#### E-2.7. Training

The Selected Offeror shall conduct the training in accordance with the approved *Site Specific Training Plan and Materials* task.

#### E-2.8. Regional Acceptance Testing

When all sites in the region are implemented, the Selected Offeror shall utilize the approved test scripts developed under the *Site Specific Test Plans and Documentation* task to demonstrate full regional functionality as described in the ConOps and System Requirements. This shall include, but not be limited to, sharing control of all ITS devices and distributing complete state-wide traffic incident information. The Selected Offeror shall oversee and support the execution of the Regional Acceptance Test plan. At a minimum, Regional Acceptance will include:

- Assist PennDOT's business program areas with the planning and preparation (including training) for Regional Acceptance Testing.

- Oversee and support the execution of the Regional Acceptance Testing plan, including assisting with the verification of expected results, and the tracking of defects/incidents discovered during the testing.
- Track defects that are found during all phases of testing, assess severity, priority, corrective action, level of effort, and impact on schedule.
- Correct, retest, and migrate defects through the normal development environments. Obtain sign-off authorization from the business program area and the PennDOT Project Manager prior to redeploying the corrected code.
- Provide a regular testing status report including pass/fail metrics, number of defects by severity code, status of rework and re-test, and compliance with planned schedule.
- Facilitate completion of the Regional Acceptance Test to meet the established criteria.

#### E- 2.9. Site Specific Post-Implementation Status Report

After implementation at each site, the Selected Offeror shall develop and submit a Site Specific Post-Implementation Status Report. At a minimum, this report will accomplish the following objectives:

- Document, log and categorize post-implementation defects.
- Post-implementation status report will be provided within the timeframe defined in the implementation plan.
- An after action review (AAR) will be performed following selected implementations. When an AAR is conducted, a formal evaluation report will need to be completed. AARs will be scheduled for implementations which are particularly complex, or for which significant issues arise impacting the original implementation plan.
- A brief lessons-learned document will be prepared after each implementation and any beneficial changes will be incorporated into the implementation plan for the next implementation.

#### E- 2.10. Post- Implementation On-Site Support

- The Selected Offeror must provide at least one (1) week of on-site support at each implementation site immediately following the ATMS deployment. The on-site support is intended to address system troubleshooting needs and general questions about software functionality that may arise during the first week of PennDOT staff working with the new system.

#### E- 2.11 Sixty (60) Day Test Period

Following the successful *Regional Acceptance Testing* for the region, PennDOT will have sixty (60) calendar days to identify any ATMS software errors and deficiencies that materially impact the operation of the system, as defined in the system requirements and design documentation delivered to and approved by PennDOT (Tasks B and C). Errors reported by PennDOT and/or proactively identified by the Selected Offeror during this period shall be corrected by the Selected Offeror at **no cost to PennDOT**. At PennDOT's sole discretion, depending on the frequency and the level of severity of the error or deficiency, the Sixty (60) Day Test Period may be suspended pending a resolution of the issue. The Test Period will remain in suspension until the issue that prompted a suspension has been resolved. Upon successful resolution of such issue, the system will be monitored for a period of 72 hours to verify the system is stable and is

performing as defined in the system requirements and design documentation delivered to and approved by PennDOT. After demonstrating that the system is operating properly, the Sixty (60) Day Test Period will resume.

PennDOT will issue a formal letter notifying the Selected Offeror of System Acceptance at the later date of either: a) the end of the sixty (60) calendar days or b) when all reported errors and deficiencies have been corrected. Any time during which the Sixty (60) Day Test Period is suspended shall not count toward the sixty (60) calendar day period.

**E-3 Knowledge Transfer**

The Selected Offeror shall conduct the knowledge transfer in accordance with the approved *Knowledge Transfer Plan*.

<b>Task E Deliverables Summary</b>	
<b>Task</b>	<b>Deliverable</b>
E-1	Eastern Region Pre-Implementation Planning <ul style="list-style-type: none"> <li>• <i>Eastern Region Site Specific Implementation Plans</i></li> <li>• <i>Eastern Region Site Specific Equipment Installation Plans</i></li> <li>• <i>Eastern Region Site Specific Test Plans and Documentation</i></li> <li>• <i>Eastern Region Site Specific Training Plans and Materials</i></li> </ul>
E-2	Eastern Region Implementation <ul style="list-style-type: none"> <li>• <i>Eastern Region Site Specific Equipment Installation Support</i></li> <li>• <i>Eastern Region Coding and Testing in the Development Environment</i></li> <li>• <i>Eastern Region Installation Instructions</i></li> <li>• <i>Eastern Region Software Installation into the Staging Environment</i></li> <li>• <i>Eastern Region User Acceptance Testing</i></li> <li>• <i>Eastern Region Software Installation into Production Environment</i></li> <li>• <i>Eastern Region Training</i></li> <li>• <i>Eastern Region Regional Acceptance Testing</i></li> <li>• <i>Eastern Region Post-Implementation Status Report</i></li> <li>• <i>Eastern Region Post-Implementation On-Site Support</i></li> <li>• <i>Eastern Region Sixty (60) Day Test Period</i></li> </ul>
E-3	Eastern Region Knowledge Transfer

**Task F: Central Region Deployment**

The Central Region Deployment consists of the PennDOT Engineering Districts 2-0, 3-0, 8-0, and 9-0.

Modules/Items to be implemented in the Central Region include, but are not limited, to:



- DMS/Travel Time
- CCTV Cameras
- HAR
- Incident Detection/Alarm/Vehicle Detectors
- Incident Response Plan
- Administration
- Asset Management
- Data Warehouse
- Performance Measures
- RIMIS Interface (District 6-0)

### **F-1 Central Region Specific Element Design**

While the majority of the software will be developed and tested in Phase 1, Eastern Region deployment, it is anticipated that some software development will be required for the Central Region Districts. Following the approved change management and version control procedures, the Selected Offeror shall design added functionality in preparation for the Central Region deployment. It is anticipated that the following documents will be updated as a result of this task:

- *Existing conditions reports* (completed under Task B)
- *Hardware and Software Recommendations Report*
- *Procurement Plan*
- *Detailed Requirements*
- *Detailed Business System Design*
- *Requirements Traceability Matrix*
- *User Interface Design Documents*
- *Detailed Software Design Documents*

The Selected Offeror shall update all relevant documentation as needed to successfully complete the Central Region design task.

### **F-2 Central Region Pre-Implementation**

See **Task E-1** for a description of the following activities to be performed under this task:

- *Site Specific Implementation Plans*
- *Site Specific Equipment Installation Plans*
- *Site Specific Test Plans and Documentation*
- *Site Specific Training Plans and Materials*

### **F-3 Central Region Implementation**

See **Task E-2** for a description of the following activities to be performed under this task:

- *Site Specific Equipment Installation Support*
- *Coding and Testing in the Development Environment*
- *Installation Instructions*
- *Software Installation into the Staging Environment*
- *User Acceptance Testing*
- *Software Installation into Production Environment*
- *Training*
- *Regional Acceptance Testing* (testing shall be conducted for all implemented sites, including sites implemented in previous phases)
- *Eastern Region Post-Implementation Status Report*
- *Eastern Region Post-Implementation On-Site Support*
- *Sixty (60) Day Test Period*

**F-4 Knowledge Transfer**

See **Task E-3** for a description of the following activities to be performed under this task.

<b>Task F Deliverables Summary</b>	
<b>Task</b>	<b>Deliverable</b>
F-1	Central Region Specific Element Design
F-2	Central Region Pre-Implementation Planning <ul style="list-style-type: none"> <li>• <i>Central Region Site Specific Implementation Plans</i></li> <li>• <i>Central Region Site Specific Equipment Installation Plans</i></li> <li>• <i>Central Region Site Specific Test Plans and Documentation</i></li> <li>• <i>Central Region Site Specific Training Plans and Materials</i></li> </ul>
F-3	Central Region Implementation <ul style="list-style-type: none"> <li>• <i>Central Region Site Specific Equipment Installation Support</i></li> <li>• <i>Central Region Coding and Testing in the Development Environment</i></li> <li>• <i>Central Region Installation Instructions</i></li> <li>• <i>Central Region Software Installation into the Staging Environment</i></li> <li>• <i>Central Region User Acceptance Testing</i></li> <li>• <i>Central Region Software Installation into Production Environment</i></li> <li>• <i>Central Region Training</i></li> <li>• <i>Central Region Regional Acceptance Testing</i></li> <li>• <i>Central Region Post-Implementation Status Report</i></li> <li>• <i>Central Region Post-Implementation On-site Support</i></li> <li>• <i>Central Region Sixty (60) Day Test Period</i></li> </ul>
F-4	Central Region Knowledge Transfer

**Task G: Western Region Deployment**

The Western Region Deployment consists of the PennDOT Engineering Districts 1-0, 10-0, 11-0, and 12-0.

PennDOT District 11-0 RTMC also has a fully integrated ATMS software that needs to be considered during the pre-implementation and implementation stages of this region. The integrated ATMS software includes modules for DMS, HAR, CCTV cameras, HOV, and incident detection.

Modules/Items to be implemented in the Western Region include, but are not limited, to:

- DMS/Travel Time
- CCTV Cameras
- HAR
- Incident Detection/Alarm/Vehicle Detectors
- HOV
- Incident Response Plan
- Administration
- Asset Management
- Data Warehouse
- Performance Measures

The Selected Offeror shall update all relevant documentation as needed to successfully complete the Central Region design task.

### **G-1 Western Region Specific Element Design**

While the majority of the software will be developed and tested in Phase 1, Eastern Region deployment, it is anticipated that some software development will be required for the Western Region Districts. Following the approved change management and version control procedures, the Selected Offeror shall design added functionality in preparation for the Western Region deployment. It is anticipated that the following documents will be updated as a result of this task:

- *Existing conditions reports* (completed in Task B)
- *Hardware and Software Recommendations Report*
- *Procurement Plan*
- *Detailed Requirements*
- *Detailed Business System Design*
- *Requirements Traceability Matrix*
- *User Interface Design Documents*
- *Detailed Software Design Documents*

The Selected Offeror shall update all relevant documentation as needed to successfully complete the Western Region design task.

### **G-2 Western Region Pre-Implementation**

See **Task E-1** for a description of the following activities to be performed under this task:

- *Site Specific Implementation Plans*
- *Site Specific Equipment Installation Plans*
- *Site Specific Test Plans and Documentation*
- *Site Specific Training Plans and Materials*

**G-3 Western Region Implementation**

See **Task E-2** for a description of the following activities to be performed under this task:

- *Site Specific Equipment Installation Support*
- *Coding and Testing in the Development Environment*
- *Installation Instructions*
- *Software Installation into the Staging Environment*
- *User Acceptance Testing*
- *Software Installation into Production Environment*
- *Training*
- *Regional Acceptance Testing* (testing shall be conducted for all implemented sites, including sites implemented in previous phases)
- *Eastern Region Post-Implementation Status Report*
- *Eastern Region Post-Implementation On-Site Support*
- *Sixty (60) Day Test Period*

**At the completion of implementation in this region, the Offeror is required to deposit the final accepted version of the software code into the escrow account consistent with the requirements described under Task I-5.**

**G-4 Knowledge Transfer**

See **Task E-3** for a description of the following activities to be performed under this task.

<b>Task G Deliverables Summary</b>	
<b>Task</b>	<b>Deliverable</b>
G-1	Western Region Specific Element Design
G-2	Western Region Pre-Implementation Planning <ul style="list-style-type: none"> <li>• <i>Western Region Site Specific Implementation Plans</i></li> <li>• <i>Western Region Site Specific Equipment Installation Plans</i></li> <li>• <i>Western Region Site Specific Test Plans and Documentation</i></li> <li>• <i>Western Region Site Specific Training Plans and Materials</i></li> </ul>

G-3	Western Region Implementation <ul style="list-style-type: none"> <li>• <i>Western Region Site Specific Equipment Installation Support</i></li> <li>• <i>Western Region Coding and Testing in the Development Environment</i></li> <li>• <i>Western Region Installation Instructions</i></li> <li>• <i>Western Region Software Installation into the Staging Environment</i></li> <li>• <i>Western Region User Acceptance Testing</i></li> <li>• <i>Western Region Software Installation into Production Environment</i></li> <li>• <i>Western Region Training</i></li> <li>• <i>Western Region Regional Acceptance Testing</i></li> <li>• <i>Western Region Post-Implementation Status Report</i></li> <li>• <i>Western Region Post- Implementation On-site Support</i></li> <li>• <i>Western Region Sixty (60) Day Test Period</i></li> </ul>
G-4	Western Region Knowledge Transfer

**Task H: Planned ITS Deployment Integration**

There are numerous programmed and planned projects for the integration of ITS field devices that will be in design and/or construction stages through the duration of this Contract. It is anticipated that all new ITS devices will be integrated directly into the new ATMS software; therefore, the Selected Offeror must ensure that the ATMS software planning, design, implementation, maintenance and support efforts will be coordinated with the ITS integration projects within every Engineering District (described in **Appendix R**).

A new statewide video sharing solution is also expected to come online during the ATMS project, which must be coordinated with and integrated into the ATMS software. This project and any others that PennDOT deems necessary to integrate into ATMS shall require the Selected Offeror to ensure that the ATMS software planning, design, implementation, maintenance and support efforts are closely coordinated for successful results.

**H-1 Standard Statewide Integration Specification Documents**

Prior to integrating any ITS devices, the Selected Offeror must develop a Statewide ATMS integration specification as well as a design guideline report. The specification will be inserted into construction contracts and used by contractors while integrating new devices on future projects. The design guidelines will provide design criteria to other consultants so that future ITS design contracts can easily be integrated into the Selected Offeror’s system. This document will minimize the risk of other consultants designing a system that is difficult or impossible to integrate with the new software. The documents will describe all key activities associated with the new device integration and identify the responsibilities of all key parties involved.

The ITS project workflow outlined below describes the approach currently used by PennDOT on **typical** ITS construction / integration projects and identifies anticipated Selected Offeror’s roles and responsibilities in this process. The Selected Offeror will have the opportunity to propose changes to the existing PennDOT process as part of the ATMS software design effort. The

intent of providing this “typical” workflow is to provide the selected offeror guidance for understanding task H-1 expectations.

Note that “ITS construction Contractor” referenced below is the entity who is awarded the overall ITS construction project. This will typically be a General Contractor or Electrical Contractor, depending upon the nature of the work.

The anticipated workflow is:

- Procurement and field installation of ITS equipment is part of the construction contract and is the responsibility of the ITS construction Contractor
- Shop drawings and catalog cuts for ITS integration projects will be provided to PennDOT to identify any new devices as early as possible.
- The ITS construction Contractor is responsible to ensure that new ITS devices can be integrated into the existing ATMS software. The Selected Offeror must then work with the ITS construction Contractor(s) to ensure that as new ITS devices are turned over to PennDOT, they can be integrated into the ATMS software. While the ITS construction Contractor is responsible for the supply and installation of all hardware, the Selected Offeror must provide any required software changes to fully integrate the ITS devices into the ATMS software platform.
- The following testing for ITS devices is required for each of the ITS integration projects:
  - **Factory Demonstration Test (FDT):** FDT for all ITS devices and components other than the ATMS software is the responsibility of the ITS construction Contractor. The ITS construction Contractor performs FDT to demonstrate that the new devices and associated equipment can communicate and control the proposed ITS devices. The FDT is completed prior to bringing the devices online. The Selected Offeror is not required to participate in the FDT, but will receive a copy of the completed test report.
  - **On-Site Test (OST):** All ITS devices in the Field and the TMC/RTMC will be installed and tested by the ITS construction contractor. The Selected Offeror is not anticipated to be involved during the OST phase.
  - **Final System Acceptance Test (FSAT):** ITS construction Contractor coordinates with PennDOT’s representative to perform this test. It is the ITS construction Contractor’s responsibility to provide support to ensure that the field devices and other ITS elements that are essential to perform this test are in working condition and maintained. The ITS construction Contractor will typically demonstrate that the equipment is functioning through the use of the standard equipment software. The Selected Offeror shall then integrate the new devices and demonstrate that they work with the ATMS software. If the test is not successful, PennDOT, after consulting with both the ITS construction Contractor and the Selected Offeror, determines if the cause is software (ATMS) or hardware (non-ATMS) related. Depending on what the cause is, the responsible party is notified and assumes responsibility for correcting the error.
  - **30-Day Test.** The intent of the 30-day test is to make sure that all systems, subsystems and equipment furnished under this contract operate continuously with full capability as specified for a total duration of 30 calendar days.

- **Operational Test Period (OTP):** The ITS construction Contractor and the Selected Offeror shall provide OTP support that typically ranges from sixty to one hundred and eighty days.

The Selected Offeror will begin the task of creating the *Standard Statewide Integration Specification Documents* by reviewing the PennDOT's current ITS device standards documentation.

***This deliverable shall be coordinated and completed concurrently with the design deliverables under tasks B and C.***

## **Deliverables H-2 through H-9**

**Estimated** quantities for the tasks below are represented in the *List of Upcoming Integration Projects (Appendix R)*. The costs quoted for tasks H-2 through H-9 shall include the necessary integration to meet the previously validated *Statewide ATMS Software Concept of Operations (Appendix O)* and *Statewide ATMS Software System Requirements (Appendix P)*.

The Offeror(s) shall note that the costs quoted for the tasks below will include the work of:

- Providing a schedule for each District integration project based on a number and type of devices that need to be integrated.
  - The schedule needs to account for all activities outlined in the standard integration specification document (deliverable H-1).
- Providing a cost summary for each District integration project based on a number and type of devices that need to be integrated.
  - The Offeror shall utilize the applicable integration costs identified for deliverables H-2 through H-9 to produce the cost summary.

### **H-2 Planned DMS Integration**

The Offeror shall perform the required development, testing, integration, and other applicable support activities to integrate new standard (i.e. non-travel time) DMS by either utilizing an existing communication driver or developing a new driver, as needed.

Deliverable cost quoted on Appendix E shall be individual unit price of integration based on the estimated quantities. Estimated quantities may be changed based on the actual number of devices to be integrated over the life of the contract.

### **H-3 Planned DMS Integration with Travel Time**

The Offeror shall perform the required development, testing, integration, and other applicable support activities to integrate new travel time DMS by either utilizing an existing communication driver or developing a new driver, as needed. The integration activities shall include the coordination and/or interface with the travel time system, as well as vehicle detectors systems where appropriate for speed feedback.

Deliverable cost quoted on Appendix E shall be individual unit price of integration based on the estimated quantities. Estimated quantities may be changed based on the actual number of devices to be integrated over the life of the contract.

#### **H-4 Planned CCTV Camera Integration**

The Offeror shall perform the required development, testing, integration, and other applicable support activities to integrate new CCTV camera by either utilizing an existing communication driver or developing a new driver, as needed.

Deliverable cost quoted on Appendix E shall be individual unit price of integration based on the estimated quantities. Estimated quantities may be changed based on the actual number of devices to be integrated over the life of the contract.

#### **H-5 Planned HAR Integration**

The Offeror shall perform the required development, testing, integration, and other applicable support activities to integrate new HAR by either utilizing an existing communication driver or developing a new driver, as needed.

Deliverable cost quoted on Appendix E shall be individual unit price of integration based on the estimated quantities. Estimated quantities may be changed based on the actual number of devices to be integrated over the life of the contract.

#### **H-6 Planned Radar / Microwave Vehicle Detector Integration**

The Offeror shall perform the required development, testing, integration, and other applicable support activities to integrate new Radar / Microwave Vehicle Detector by either utilizing an existing communication driver or developing a new driver, as needed. Each detector may be used for either incident detection purposes and / or calculating travel times depending upon its location and PennDOT's ITS plans. As such, the integration activities shall include the complete functionality of the Radar / Microwave Vehicle Detectors including coordination and/or making detector data available for the incident management module and/or the travel time module.

Deliverable cost quoted on Appendix E shall be individual unit price of integration based on the estimated quantities. Estimated quantities may be changed based on the actual number of devices to be integrated over the life of the contract.

#### **H-7 Planned Integration of Bluetooth Vehicle Detector Travel Time Links**

The ATMS shall integrate with Bluetooth Servers to make Bluetooth data available on the map and in the travel time module. As new devices are added to the Bluetooth system, provide



support for adding new travel time link. The integration activities shall include the coordination and/or interface with the new Travel Time Tag Readers / Lane Kits and DMS.

Deliverable cost quoted on Appendix E shall be individual unit price of integration based on the estimated quantities. Estimated quantities may be changed based on the actual number of devices to be integrated over the life of the contract.

**H-8 Planned Integration of TRANSMIT Travel Time Links**

The ATMS shall integrate with TRANSMIT Travel Time Servers to make TRANSMIT data available on the map and the travel time module. As new devices are added to the TRANSMIT system, provide support for adding new travel time link. The integration activities shall include the coordination and/or interface with the new Travel Time Tag Readers / Lane Kits and DMS.

Deliverable cost quoted on Appendix E shall be individual unit price of integration based on the estimated quantities. Estimated quantities may be changed based on the actual number of devices to be integrated over the life of the contract.

**H-9 Planned Video Detector Integration**

The Offeror shall perform the required development, testing, integration, and other applicable support activities to integrate Video Detector by either utilizing an existing communication driver or developing a new driver, as needed.

Deliverable cost quoted on Appendix E shall be individual unit price of integration based on the estimated quantities. Estimated quantities may be changed based on the actual number of devices to be integrated over the life of the contract.

<b>Task H Deliverables Summary</b>	
<b>Task</b>	<b>Deliverable</b>
H-1	Standard Statewide ATMS Integration Specification documents
H-2	Planned DMS Integration
H-3	Planned DMS Integration with Travel Time
H-4	Planned CCTV Camera Integration
H-5	Planned HAR Integration
H-6	Planned Radar / Microwave Vehicle Detector Integration
H-7	Planned Integration of Bluetooth Vehicle Detector Travel Time Links
H-8	Planned Integration of TRANSMIT Travel Time Links
H-9	Planned Video Detector Integration

**Task I: Maintenance and Support**

Maintenance and Support activities shall begin upon the first completion of Post-Implementation On-site Support (Task E-5.2.). As additional Regions are added they will also be subject to Maintenance and Support activities.

The Selected Offeror shall provide pricing for maintenance and support activities for the years remaining on the Contract. At PennDOT's sole discretion, the Contract may or may not be extended annually for maintenance and support activities for the years remaining on the Contract.

***Upon task beginning, this deliverable will be billed monthly and is subject to credits under the Service Level Agreement.***

## **I-1 User and Support Documentation**

### **I-1.1. User Documentation**

The Selected Offeror shall produce comprehensive user documentation for ATMS. User documentation shall include but not be limited to:

- User manual
- System operations and maintenance manual
  - Operations manual document shall include all installation, support and configuration documentation for any and all necessary input and/or output interfaces required to collect and/or send data and/or control commands to and/or from any ITS device currently operating within any given TMC in the Commonwealth.
- System administration manual

Documentation shall be available electronically (rather than in binders) to users and support staff, with the ability to print all or selected sections as needed. User documentation shall be available in the document repository, which is created and administered by PennDOT, and from the ATMS application.

Documentation shall include but not be limited to the below elements:

- A table of contents, an index, and keywords for information searching;
- Data dictionary;
- Glossary of terms;
- List of reports, description, sample layout, and input parameters; and
- An online help facility providing:
  - Help at the data element level;
  - Help at the process or topic level;
  - Search capability at the data element, process or topic level; and
  - Print capability at the data element, process or topic level.

The Selected Offeror shall turn the documentation over for ongoing updates by PennDOT staff, as indicated in the Turnover Plan (Task I-6).

### I-1.2. Troubleshooting Guide

The Selected Offeror shall produce a troubleshooting guide with recommendations for resolving potential problems that may occur with the software. This matrix should include step-by-step recommendations, preferably depicted in a process flow diagram that allows basic users the ability to resolve problems as quickly as possible. The recommendations will also indicate what steps the PennDOT staff is expected to take before contacting the Selected Offeror for support. The Selected Offeror will assist PennDOT in documenting the issue escalation procedures within PennDOT, based on the user group privileges defined during system design and with consideration of skill sets needed to provide support.

It is expected that draft documents for *User and Support Documentation* (task I-1) shall be produced under the system design, development and training tasks in Phase 1. The deliverable for task I-1 shall be comprehensive, final documentation that shall be provided following Phase 1 system implementation.

Updates to the *User and Support Documentation* shall then be provided as needed under the *Routine Maintenance and Support* and *Release Management* tasks

## **I-2 Software Deficiency (Bug) Tracking**

The Selected Offeror will use a PennDOT intranet based server to host a bug tracking website. The purpose of this website will be to allow operators from various Districts to log software bugs for repair. The website will allow PennDOT to review open issues and see the scheduled corrective action. It is anticipated that the website will be utilized during the implementation phases and for tracking issues and enhancements as part of ongoing system maintenance and support tasks.

PennDOT uses Remedy solution to track system issues and ClearQuest solution to track system enhancement requests. The Selected Offerors shall propose how these existing systems can be leveraged to meet the requirements of this task or may propose alternate COTS solutions. All COTS products will be required to be compatible with PennDOT's existing technical environment. Any deviation to this requirement shall be explained in detail and should identify what additional infrastructure and costs are necessary to sustain the alternate approach.

## **I-3 Routine Maintenance and Support**

Routine maintenance will address system issues that prevent the system from functioning as designed and routine service requests. Examples include, but are not limited to:

- Service failures;
- Bug fixes;
- Data fixes;
- Screen element malfunctions,
- Spelling mistake corrections,

- Special reports and data extracts,
- User and technical documentation updates,
- Proactive identification and mediation of potential issues that may result from system changes due to required technology upgrades (patches, version upgrades, etc.)
- Answering general questions about system functionality
- Providing system administration assistance to PennDOT for the ATMS software and associated equipment
- Assisting PennDOT in troubleshooting COTS and custom ATMS software issues including instances where the software issues may be related to the network and the field devices
- Coordinating emergency changes/releases with PennDOT project manager
- Implementing emergency changes/releases

Starting with the first successful system installation into the production environment, the Selected Offeror shall provide the routine maintenance and support activities to support the ATMS system, consistent with the requirements described under this task. Selected Offeror will be responsible to support the ATMS application and associated software running on the workstations and servers. PennDOT's BIO is responsible for all aspects of the support and maintenance contributing to the network, hardware and operating system functionality of the PennDOT staging and production environments. The Selected Offeror shall note that they will not have physical access to the staging or production environments. Remote administration access is available and will be initiated by PennDOT network engineers based on the vendor request.

As ITS systems are closely tied with the networking infrastructure, detailed troubleshooting of the entire system may be required by the Selected Offeror as well. Ultimately, it will be the Selected Offeror's responsibility to ensure that the ATMS software system remains in operation. The Selected Offeror will establish an 800 number and provide 24/7/365 support for the system and provide service in accordance with the Service Level Agreement (Appendix B Paragraph 6). At a minimum, PennDOT expects the Selected Offeror to complete the following steps when resolving service failures:

- Respond to all service failure events within SLA guidelines (refer to severity level matrix contained in **Appendix B**).
- Communicate periodic status updates during service failure response.
- Maintain detailed service failure records.
- Provide a quick assessment of criticality, impact to business, risks and options.
- Restore application service.
- At the request of PennDOT, provide a root cause analysis report within two (2) business days of service failure. The report will include:
  - Chronology analysis in support of problem resolution
  - Documentation of all emergency changes
  - Description and schedule for any follow-up changes
  - Identification of the root cause of the service failure

- At the request of PennDOT, document additional corrective action necessary to prevent future reoccurrence of the problem within five (5) business days of service failure.
- At the request of PennDOT, implement and document changes in supporting environments within two (2) business days of the conclusion of corrective maintenance activities.
- At the request of PennDOT, complete an After Action Review (AAR). Provide an after action report within ten (10) business days of the conclusion of corrective maintenance activities. The report should include:
  - Chronology analysis in support of problem resolution
  - Documentation of all emergency changes
  - Description and schedule for any follow-up changes
  - Identification of the root cause of the service failure

The Selected Offeror shall recommend and complete any additional steps required to successfully resolve service failures, based on industry standards, best practices and Offeror experience.

The Selected Offeror shall provide monthly performance reports to demonstrate compliance with the SLA. PennDOT will work with the Selected Offeror to identify the report format.

Routine Maintenance task is an ongoing task that shall continue throughout the duration of the Contract or until PennDOT determines the routine maintenance services are no longer needed, whichever occurs first.

#### **I-4 Release Management**

Release management will address small to mid size system enhancements to meet PennDOT's specific needs for system changes and improvements. Examples include, but are not limited to:

- New interfaces;
- New reports;
- Data feeds (e.g. XML, RSS, etc.);
- Replacement of obsolete technologies;
- Technology upgrades;
- Incorporation of new technologies; and
- Predictive modeling

PennDOT will work with the Selected Offeror to determine which items will fit in the scope of each release based on the prioritized list of enhancements. The deliverables for each release will be based on the release management plan that is established at the start of the release effort. The Selected Offeror will prepare and execute a release management plan for each release. These plans shall respond to the following requirements:

- Requests submitted by business units/users will be used to prioritize and determine scope for a release;
- The Offeror may be required to use PennDOT approved planning processes and track the release plan using PennDOT's Clarity tool;

- Forecast resource demands for both Offeror and PennDOT resources.
- Leverage and employ application development best practices used with similar systems and processes in industry;
- Release management practices appropriate to ITILv3. (The Information Technology Infrastructure Library (ITIL) is a customizable framework of good practices designed to promote quality computing services in the information technology (IT) sector.);
- Provide accurate level of effort and resource estimates;
- Ensure testing and implementation support activities are clearly defined; and
- Prepare, maintain and report on a baseline work breakdown structure for each release.

The Offeror shall provide detailed release documentation with each ATMS software enhancement and upgrade. The Offeror shall assume that all the deliverables listed below will be required for each release. The size and complexity of the requested enhancements will determine the level of detail required for the deliverables listed below. If approved by the PennDOT Project Manager, some deliverables may be waived for a specific release depending on the scope of the release.

- Release Management Plan
- Detailed Requirements
- Detailed Business Systems Design
- Detailed Technical Design
- Unit Test Plan & Testing
- System Test Plan & Testing
- User Acceptance Test Plan and Testing. (Obtain sign-off authorization from the affected business program area and the PennDOT Project Manager prior to deploying to production.)
- User Training Plan, materials and training
- User Documentation Update
- Implementation Plan
- Post-implementation status report
- Technical support training plan and training
- Knowledge transfer

At PennDOT's discretion, the estimated enhancement work will include:

- Two (2) initial enhancement releases will coincide with the Phase 2 and Phase 3 deployment schedule, respectively. Each release is estimated to take 350 hours of work.
  - These initial releases will be subject to the Sixty (60) Day Test Periods as defined under tasks F and G, respectively
- Then, starting after full system deployment at the end of Phase 3, there will be 4 releases per year with estimated 350 hours of work per release.
  - These releases will be subject to the Thirty (30) Day Test Periods as defined below.

### **Thirty (30) Day Test Period**

Following each successful enhancement release implementation, PennDOT will have thirty (30) calendar days to identify any ATMS software errors and deficiencies that materially impact the operation of the system, as defined in the system requirements and design documentation delivered to and approved by PennDOT. Errors reported by PennDOT and/or proactively identified by the Selected Offeror during this period shall be corrected by the Selected Offeror at **no cost to PennDOT**. At PennDOT's sole discretion, depending on the frequency and the level of severity of the error or deficiency, the Thirty (30) Day Test Period may be suspended pending a resolution of the issue. The Thirty (30) Day Test Period will remain in suspension until the issue that prompted a suspension has been resolved. Upon successful resolution of such issue, the system will be monitored for a period of 72 hours to verify the system is stable and is performing as defined in the system requirements and design documentation delivered to and approved by PennDOT. After demonstrating that the system is operating properly, the Thirty (30) Day Test Period will resume.

PennDOT will issue a formal letter notifying the Selected Offeror of System Acceptance at the later date of either: a) the end of the thirty (30) calendar days or b) when all reported errors and deficiencies have been corrected. Any time during which the Thirty (30) Day Test Period is suspended shall not count toward the thirty (30) calendar day period.

### **I-5 Escrow Agreement**

If the Offeror proposed a COTS solution as a key component of the functionality for the ATMS system, they shall establish an escrow account and deposit the ATMS system source code into the escrow account. The Offeror shall propose an Escrow Agent and shall enter into a three party escrow agreement with PennDOT and a mutually agreed upon Escrow Agent.

The escrow agreement shall be executed in time for the final system acceptance of the final deployment. The Offeror will be required to deposit the final accepted version of the software code into the escrow account and have a validation test performed by the escrow agent to prove usability of the deposited software code (in a production setting or similar environment) before payment for the final regional deployment is released.

The Offeror shall keep the validated version of the software code in an escrow account and shall deposit any updated versions of the software code into the account as updated versions become available. The escrow account shall be maintained for the duration of the contract. At PennDOT's discretion, a validation test shall be performed by the escrow agent to prove usability of the deposited software code at least once a year.

The Offeror shall indicate in the technical proposal the approach to establishing and maintaining an escrow agreement. Minimally, the escrow agreement shall:

- 1) contain a provision under which the Offeror and escrow agent will indemnify and hold harmless the Commonwealth of Pennsylvania and PennDOT at all times;
- 2) be interpreted in accordance with and fully comply with Pennsylvania law;
- 3) provide adequate protections to permit the Commonwealth to access the escrowed source code under all circumstances, during regular business hours; and,
- 4) fully comply with the Commonwealth of Pennsylvania's contracting procedures and protocol, which includes but it not limited to standard contract provisions, such as the Contractor Responsibility Provisions; Contractor Integrity Provisions; Commonwealth Nondiscrimination/Sexual Harassment Clause; offset provision; Provisions Concerning the Americans with Disabilities Act; and the Right-to-Know Law Provisions.

The escrow agreement shall not:

- 1) require PennDOT to indemnify any party;
- 2) require PennDOT to agree to pay any attorneys' fees, late fees, interest or similar charges; or
- 3) conflict with applicable Commonwealth of Pennsylvania laws and policies.

The Offeror shall document the cost to establish the escrow agreement and all subsequent renewals in the cost submittal (**Appendix E**). This deliverable is not required for Offeror(s) who do not propose a COTS solution(s). All software developed by the Offeror and/or its subcontractors as a result of this contract shall be considered Developed Works Materials.

## **I-6 Turnover**

The Selected Offeror shall produce a complete system component inventory. Depending on the solution that is proposed in response to this RFP, PennDOT may choose to maintain some of the system components (e.g. custom developed components). PennDOT will work with the Selected Offeror to determine who is responsible for maintaining each of the system components.

PennDOT must be able to use, support, maintain, and enhance any custom developed functionality that is turned over to PennDOT. The selected Offeror shall complete turnover services when PennDOT is intended to take over a component and/or when PennDOT initiates steps to rebid all or part of the tasks included in this contract. The Offeror will first develop a turnover plan and follow the steps described in the plan at the predefined triggers during the turnover process.

### I-6.1 Turnover Plan



Turnover may occur at the identified milestones agreed upon the Selected Offeror and PennDOT and/or at the end of the contract. The turnover plan must identify the critical tasks that need to occur to provide a smooth and orderly turnover of functions to PennDOT. or to another PennDOT specified entity.

The work activities associated with this task include, but are not limited to, the following:

- Activities necessary to turn over the business application functions in an orderly manner
- Specialized technical transition of application(s)
- Knowledge transfer activities
- System turnover objectives and work plan activities on a chart, including activity time frames and responsibilities
- Resources required, including those from PennDOT, the Offeror, and any new contractor
  - For each component that is turned over to PennDOT for maintenance, the Selected Offeror shall complete a comprehensive component maintenance assessment. The assessment must include the component name, technology, a level of effort (LOE) estimate and a skill set description needed to maintain the component.

This turnover plan must be submitted to PennDOT for final review and approval.

#### I-6.2 Service Turnover

Once the service turnover is initiated, the selected Offeror is responsible for delivery of the following:

- Services to ensure a smooth and orderly transition of functions, programs, responsibilities, services and systems to PennDOT or to another entity specified by the Commonwealth.
- Transitioning the business applications, providing the updated versions of system documentation, and completing knowledge transfer activities according to the approved turnover plan.
- Turning over the following documents/information:
  - Production program documentation and any updated procedures
  - All non-proprietary source code
  - Final user and system documentation
  - All assets and artifacts in a neatly organized, easily navigable and normalized taxonomy
  - References and operational instructions to technology assets
  - General procedures for updating computer programs, data and reference files, all other documentation
  - Any information that is currently in use to support the application(s)

During the turnover activities, the Offeror must submit weekly Turnover Progress Reports and at the end of the turnover period, the Offeror must prepare a report that documents the completion of turnover activities, and provides status of each high-level task and activity that took place during the full service period.

The deliverable for this task shall be Weekly Turnover Progress Reports and a Final Turnover Report.

<b>Task I Deliverables Summary</b>	
<b>Task</b>	<b>Deliverable</b>
I-1	User and Support Documentation <ul style="list-style-type: none"> <li>• <i>User Documentation</i></li> <li>• <i>Troubleshooting Guide</i></li> </ul>
I-2	Software Deficiency (Bug) Tracking
I-3	Routine Maintenance and Support
I-4	Release Management
I-5	Escrow Agreement
I-6	Turnover Plan
	Service Turnover

#### **IV-5 Reports and Project Control**

The Selected Offeror must provide reports including but not limited to, the following:

##### Weekly ATMS Status Meetings and Reports

The Selected Offeror shall schedule and attend weekly ATMS Status meetings and submit a Status Report to PennDOT Project Manager at least one business day in advance of the Status Meeting. All reports shall be delivered on time and shall contain accurate information.

##### Regular Status Reports

The Selected Offeror shall submit regular Status Reports that shall be integrated into the weekly ATMS Status Reports and Monthly Chief Information Officer (CIO) Reports. The Status Reports shall include, but will not be limited to, the following:

- a. Project dashboard that shows current status of all project activities, tasks, milestones
- b. Updated ATMS Project Work Plan
- c. Review/update action items from last meeting
- d. Planned tasks/activities to be completed during the next week
- e. Review of project budget
- f. Issues, risks, and proposed changes

##### Governance Committee Status Reporting

The Selected Offeror shall prepare the status, accomplishments, issues/risks/mitigation strategies, budget status, and planned activities to the PennDOT ATMS Project Governance Committee. The Governance Committee will meet monthly or at intervals deemed appropriate by the Committee. The Governance Committee will make decisions which have a significant impact on the planned goals/resources of the project. When necessary the Selected Offeror will prepare and present materials to the Governance Committee. Materials shall be submitted at least two

business days in advance to the meeting or sooner, if Governance Committee review is required prior to the meeting. All reports shall be delivered on time and shall contain accurate information.