# *Quarterly Progress Report (QPR)*

# *Applications of Enterprise GIS in Transportation*

**Progress Report for Quarter 13 [Oct 1st, 2022 – Dec 30th, 2022]**

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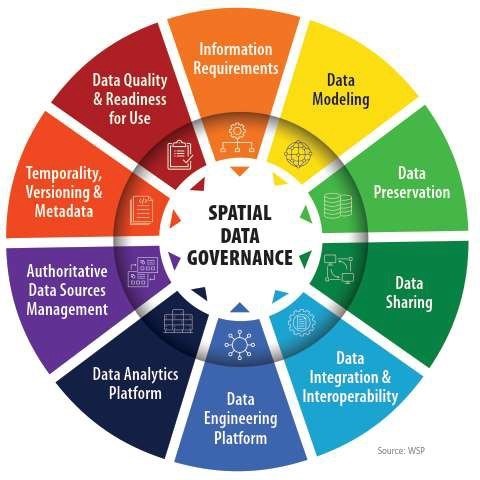
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Description automatically generatedWSP Technical Lead: Abhishek Bhargava (abhishek.bhargava@wsp.com)

Background

The Pooled Fund Study (PFS) on Applications of Enterprise GIS in Transportation (AEGIST) was initiated by FHWA in 2018. During Phase 1 of this study a guidebook was developed for transportation agencies in the United States, with the primary objective of documenting guidance on how spatial and linear referenced data should be managed by States. Phase 2 of this PFS was initiated in October 2019. This phase will span over 5 years (October 2019 – September 2024), during which the objectives outlined below would be accomplished.

Objectives

* Establish a standard for managing and governing data in spatial and linear referencing systems at transportation agencies, including but not limited to routes, intersections, interchanges, roundabouts, road segments, roadway characteristics, infrastructure assets, model inventory of roadway elements (MIRE), HPMS data items and ARNOLD road network.
* Develop guidance for States for modeling spatial transportation data, especially linear referencing system (LRS) data. Importing, exporting & conflating road network and roadway characteristics data across DOT LRS and Federal, State and Local data systems.
* Conduct a series of webinars, workshops, peer exchange meetings and provide consulting services to the States participating in the pooled fund to develop national standards in data modeling and management; enhance existing enterprise GIS systems at these agencies.
* Update the AEGIST Guidebook that was prepared in Phase 1 by documenting best practices, patterns and similarities across agencies in managing spatial data using enterprise data systems, including but not limited to Asset Management Systems, Traffic and Safety Systems, Project Planning and Programming Systems, Design and Construction Systems, and GIS and Linear Referencing Systems (LRS).
* Collaborate with States to enhance and develop spatial data management systems, processes, platforms to establish a structured and systematic approach for management of spatial data. This would involve establishing spatial data governance systems, business rules, applications, tools and platforms for:
  + Spatial Data Modeling
  + Spatial Data Integration and Engineering
  + Spatial Data Analytics

Completion Status and Summary

Time Frame: October 1, 2019 to September 30, 2024

Total Time, months: 60

Time Expended, months: 39

Percent Calendar Time Expended: 65%

Percent Complete for Tasks & Sub-Tasks:

|  |  |  |
| --- | --- | --- |
| **Base Period** | | |
| **Tasks** | **Sub-Tasks** | **Percent Complete** |
| Task 1: Project Management | 1.  Quarterly Meetings & Technical Tasks Planning | **100%** |
| 2.  Quarterly Status Reports |
| Task 2: Technical Services | 1.   Connecticut - **77%** | **68%** |
| 2.   Idaho - **80%** |
| 3.   Tennessee - **65%** |
| 4. California - 7**2%** |
| 5. Pennsylvania - **65%** |
| 6. Ohio - **54%** |
| Cross-Agency Activities: Guidebook Development - **67%** |
| Task 3: Workshops, Webinars, Presentations | 1. Webinar 1: Data Governance 2. Workshops: GIS-T 2019 and GIS-T 2021 3. Presentations 2020 and 2021 4. Flyers, Events Site Updates | **100%** |
| Task 4: Member State Meetings | 1.  Member State Meeting 1 – 2019  2. Member State Meeting 2 – 2020 | **100%** |
| Task 5: HPMS 9.0 Recommendations | Road Network Data Architecture  Data Modeling Standards, Use Cases, Topology | **100%** |

|  |  |  |
| --- | --- | --- |
| **Performance Period 1** | | |
| **Tasks** | **Sub-Tasks** | **Percent Complete** |
| Task 1: Project Management | 1.  Quarterly Meetings & Technical Tasks Planning | **55%** |
| 2.  Quarterly Status Reports |
| Task 2: Technical Services | 1.   New Mexico – **0%** | **5%** |
| 2.   Washington – **5%** |
| 3.   Florida – **0%** |
| 4. North Carolina **– 15%** |
| 5. Kansas **– 15%** |
| 6. Georgia **– 0%** |
| 7. Massachusetts **– 0%** |
| Cross-Agency Activities: Guidebook Development **- 0%** |
| Task 3: Workshops, Webinars, Presentations | 1. Workshops: GIS-T 2022 and GIS-T-2023 2. Presentations 2022 and 2023 3. Flyers, Events Site Updates | **22%** |
| Task 4: Member State Meetings | 1.  Member State Meeting 1 – 2022  2. Member State Meeting 2 – 2023 | **50%** |

Work Accomplished This Reporting Period: Oct – Dec, 2022

**Task 1: Project Management**

**Task Objective**: Perform project management activities, which include conducting monthly status meetings, developing quarterly status reports, creating project work plan, managing project resources, schedule, deliverables and communication with all stakeholders.

**Activities**:

1. Prepared and delivered AEGIST Quarterly Report #12 for the period July – Sept, 2022.
2. Technical services tasks managed for following PFS States: Idaho, Tennessee, California, Pennsylvania, Florida, North Carolina, Kansas, Georgia, Washington and Massachusetts. Details provided in the section below on Task 2.

**Task 2: Technical Services**

**Task Objective:** Provide technical services associated to PFS States by completing various agency-specific and cross-agency activities identified in the work plan.

**Activities**:

1. **Idaho**
   * Review of deliverable and plan for “Road Network Data Conflation & Governance: State DOT, FLMA and Local Agency Roads (NG911)”
   * Presentation of the Road Network Data Quality Framework: Rules, Robotic Process Automation Tools & Dashboards
   * Discussion on work that has been completed for Data Governance Framework, Systems, Data and Tools for Data Life Cycle Management
   * Development and delivery of a presentation on State DOT and Local Roads data integration for ITDs meeting with NG911 Deployment team
   * Demonstration of process, tools and techniques that can be used to extract road alignment and roadway characteristics data from design files into GIS-based LRS system
   * Planning of next steps that ITD can take on with NG911 deployment team and to discuss design-GIS data migration with stakeholders at the Data Summit
   * Discussion on ITD Roads data integration with FLMA roads
   * Presentation of recommendations on how ITD can contribute to development of the NG911 road centerline dataset using the DOTs LRS Routes data that is submitted for ARNOLD.
   * Planning of AEGIST presentation to NG911 team so that ITD data can be used to establish Statewide road network data model, and can be aligned with NG911 data.
   * Planning and discussion to schedule a presentation on Lidar Data Management and Use Work Session with ITD team
   * Discussion on scheduling a BIM-GIS data integration presentation for ITD Stakeholders
   * ITD was requested to provide Lidar data that was collected so that the data can be used in the presentation as an example to demonstrate how ITD can manage it and integrate with geospatial applications (i.e., integrate ArcGIS FGDB; Azure Storage Bucket, Cyclomedia Portal)
   * Requested ITD to provide the revised Data Modeling Standards Document so that it can be used in the meetings on BIM-GIS in integration and NG911 team.
   * Advised ITD to start thinking about providing access to the AEGIST Data Governance Tools to more users within the organization, particularly data stewards
   * Discussion on development of report on AEGIST ITD technical services in Base period of performance
   * Conducted work session to discuss the key messages, slides and demonstrations that will be done by ITD to NG911 team
   * Established that top priority during meeting with NG911 team will be to demonstrate ITD roads data and how it can be used to create road centerline
   * Established that the second priority during the meeting should be to present how ITD receives information from local agencies and integrates into roads
   * ITD identified the need to reach out to other agencies that are users of roads data in the State and would benefit from NG911 team adopting ITD roads data as starting point
   * Setup weekly meetings in November to prepare and update the presentation to NG911 team
   * Discussion on integrating roads data updates from local agencies into ITDs LRS using a structured workflow process
   * Review of action items related to presentation and discussion with NG911 team
   * Next Steps: Details of ITD steps on integrating Federal Lands roads data to be presented by ITD
   * Collaboration with Idaho to determine next meeting date-time for review of Data Management and Governance Roadmap
   * Shared updates through online working document that provides information about following roadmap activities and technical services being delivered to ITD corresponding to these activities

* A1: Federal Lands Roads Data Integration with DOT LRS & County Roads
* A2: Data Quality Rules, Robotic Process Automation ad Data
* A3: Data Governance Framework, Systems, Data and Tools for Data Life Cycle Management
* A4: Intersection Modeling
* A5. Enterprise Data Integration & Data Models Engineering for Provisioning Data to Stakeholders through Data Warehouse, Data Lake, Data Hub and Engineering Platform
* A6: BIM/CIM: Asset Data Extraction from Design for Pulling Data into Roadway Inventory and Asset Systems
* A7. Digital Twins Development for Traffic System, Asset Management System, Safety Analysis System and Project Planning System

1. **Tennessee**
   * Task 2.TN.2:
     + Coordinated with TDOT on scheduling progress update meeting on “Design to LRS data migration pilot”
     + Scheduling of the next status meeting for demonstration of the design data migration tools and techniques being used for the pilot on linking design data with asset management (geospatial)
     + Discussion with Bentley and Esri on linking design and linear referencing system datasets.
2. **California**
   * Update the CaRS Data and Application Architecture report based on findings on practices in local agency roads data exchange at Georgia, Arizona and Massachusetts DOT
   * Coordinate with 1Spatial on conflating Merced roads and Caltrans All Roads using 1Integrate. Review the results of 1Integrate roads data quality assessment and comparison from 1Spatial for Merced County
   * Document findings on 1Integrate data quality checks and rules in the CaRS report. Incorporate 1Integrate results from Caltrans All Roads data comparison with Merced roads data.
3. **Pennsylvania**
   * Provided update to Pennsylvania DOT on progress in development of final reports on following tasks:
     + Task 2.PA.10: NG-911/e911 and PennDOT RMS Road Network Data Modeling Alignment & Maturity
     + Task 2.PA.15: Pavement Construction History
     + Task 2.PA.16: Trends with Integrating GIS and Roadway Management Systems
   * For Task 2.PA. 10, draft report outline was presented including how each section is being filled with information that has been developed and presented through 2022 at Pennsylvania GIS Conference and with PEMA to Pennsylvania NG911/GIS teams
   * For Task 2.PA.15, draft report was presented with examples of practices from California, Texas, Ohio, Arizona and North Carolina on Pavement Construction History information modeling using Roads/Linear Referencing System.
   * For Task Task 2.PA.16, information on trends in Integrating GIS (e.g. Design, Asset Management Systems) and Roadway Management Systems (LRS) will be presented in a chapter in the report on Pavement Construction History information modeling, so that pavement construction history data modeling and exchange can be used as a case study/example of why/how GIS and Roadway Management systems should be integrated.
4. **Ohio**
   * ODOT continued with conducting the internal review of the strategic roadmap recommendations to identify the stakeholders at ODOT who would conduct the work required to execute the recommended activities.
5. **Washington**
   * Task 2.WS.1: Technical Services work planning:
   * Task 2.WS.4: Best Practices for Managing Road Geometry in the LRS: All/State Roads.
   * Task 2.WS.5: Roads Inventory data modeling and data management (DB modernization) - Developed updated scope by adding following activities and deliverables
     + Activities:
       - Demonstrate Roads Alignment and Roadway Characteristics data flow from Bentley Open Roads Design to ArcGIS Pro 3.0 and Roads & Highways (IFC 4.3 and use of it in Bentley Open Roads 10.11, ArcGIS Pro 3.0)
       - Provide overview of how different states maintain the data, especially in regard to maintaining non-state highway roadways
       - Provide information about how processes, tools and techniques that can be used to integrate Federal Roads Datasets. Get a copy of the Federal Roads datasets from FLMA for the State of Washington and demonstrate
     + Deliverables
       - Report on Roads data conflation and integration tools and techniques from three sources (a) Design (b) Local Agency (c) Federal Lands Management Agency
       - Outline and Recommendation of BIM-GIS Data Integration Process Steps, Requirements and Data Standards
   * Next Steps:
     + WSP to share information about updated scope in a formal scope document along with timeline and budget (level-of-effort) estimate
     + Drafted October 15th as the tentative start date for Technical Services Activities at Washington
   * Discussion on getting started with technical work sessions on BIM-GIS integration to update road network data in Roads & Highways using data from design
   * Scheduling and prioritization of technical services activities. Development of sprint 1 (November) work plan.
   * Planning of the BIM-GIS Data Integration, Governance and Management meeting on Nov 17th
   * Presentation of the Interstate Bridge Replacement Project – Digital Twins, iModels, BIM design data models and IFC-based geospatial data models
   * Reviewed and updated agenda for Roads Data Management Modernization technical work session
   * Delivered the Roads Data Management session and demonstrate how data from design systems can be imported into LRS system using open standards like IFC
   * Discussed the activities that need to be carried out by WSDOT to establish the framework for migrating data from design to LRS
   * Established the need to have a follow-up discussion to show additional details about migrating roads data and attributes
   * Discussed the need to have DOT conversations on importing roads data from design into GIS-based LRS system
   * Confirmed the key messages and take-aways that WSDOT GIS team should have walked aways with from the Nov 17th meeting on BIM-GIS Integration
   * Discussed WSDOT concerns with Enterprise-wide roads data management modernization and governance. Talked about how those can be addressed incrementally, but need to be tabled for discussion (as is being done in other States), in order to implement a modern approach to road data modeling and management
   * Scheduled followup meeting on Roads Data Management Modernization on Dec 13th to discuss recommendations and next steps for BIM-GIS Integration
   * Presented the draft deliverables on BIM-GIS Integration for WSDOT and published them on Sharepoint for Review.
6. **Florida**
   * Communicated status of intersection modeling and divided highways modeling tasks
7. **North Carolina**
   * Task 2.NC.1: Closed Intersection Modeling task. Communicated follow-up plan on updating scope of intersection modeling work, which would involve adopting the modeled intersection data and rules from NCDOT’s Traffic and Safety teams’ project with VHB, and leveraging those to create an enterprise intersection data model with roots in GIS-based LRS system.
     + Discussion on Approach and Next Steps for Comparison and Unification of NCDOT AEGIST and NCDOT Safety Intersections data schema, modeling rules and data
     + Development of intersection data integration and management plan
       - Authoritative system(s) for intersection data modeling, data quality assessment
         * System for managing intersection data geometry
         * System for management of intersection data attributes
       - Plan for updating geometry of intersection features based on updates to ALRS routes
       - Plan for updating non-geometry intersection properties
     + Discussion on alignment of other NCDOT datasets associated with Intersections/Intersection Safety with the new Intersection Data Model
   * Task 2.NC.2: Coordinated with NCDOT on scheduling kickoff meeting to discuss “Task 2 – Roads Data Governance” – Scope, Available Budget and Technical Services activities that could be performed
8. **Kansas**
   * Demonstrated intersection data that was engineered by integrating data from Lidar Cyclomedia dataset, Safety Excel Spreadsheet and linear referencing system
   * Presented data governance and management plan for managing intersection data in the long-term
   * Presented step-by-step progress update on technical services activities associated with each task and sub-task in AEGIST scope
   * Established that a meeting with Esri and Rizing is needed to discuss the Intersection Modeling features coming in the software of each vendor and how they line up with the modeling rules and guidelines documented in AEGIST Guidebook v1 and Interim Report (Interim Guidebook v2)
   * Lidar data extracted in file geodatabase will be reviewed by Kansas DOT to identify whether the data exists in LRS and if it does, whether the LRS data will be updated/replaced with the data collected as part of the lidar survey
   * Delivered engineered Junctions, Intersection Points, Road Segments and Intersection Legs data to KDOT by AEGIST WSP team for review of the AEGIST Kansas Intersection Model
9. **Georgia**
   * Discussed Georgia’s process for Roads data management and integration across State and Local Agencies.
   * Stakeholders from Georgia DOT, University of Georgia and one of the Georgia Regional Commissions presented the work they do and their roles-responsibilities associated with helping build an integrated roads dataset using inputs from State DOT and local agencies (counties, cities, municipalities etc.)
   * Finalized plan for week of Nov 7th onsite visit for further discussion, presentation and information sharing on roads data management practices in Georgia with GDOT, UGA and Regional Commission.
   * Scheduling of onsite work sessions for the week of Nov 7th. A 3-day onsite visit is planned for documentation of Roads Data Management Process Steps that involves work done by GDOT, University of Georgia (UGA, ITOS) and Regional Commissions.
   * Preparation of agenda and work session goals, objectives, discussion questions for each of the sessions during the Nov 7th – 10th onsite visit.
   * Three-day (3-day) Onsite visit to meet with various teams working on Georgia Roads data collection and integration. Stakeholders with which meeting was held included: Regional Commissions (coordinating agency with cities, councils), University of Georgia technology office (the technical arm that facilitates data collection, validation, and aggregation across all local agencies) and Georgia DOT personnel involved in integrating the data received from local agencies
   * Documentation of processes, workflows, data flows, policies associated with Statewide roads data integration in Georgia
   * Review of memorandums of understanding, agreements, roles and responsibilities of all stakeholders and the operational activities that have enabled all stakeholders to stay coordinated and committed to achieving the goals of the statewide data integration program (REVAMP)
   * Discussion on next steps and approach for preparation of the report on Georgia’s approach and model to roads data management at statewide level by collaborating and coordinating personnel across all levels of government using a funded program
10. **Massachusetts**

* Discussed potential technical services activities:
  + Intersection Modeling: MassDOT Current Efforts, AEGIST Efforts, Next Steps
  + NG911 and MassDOT Roads Data Conflation
  + Data quality assessment rules and configuration: 1Spatial, FME, Python/SQL, Other?
* Discussed findings from MassDOT LRS Roads Data review
* Reviewed following action items and Next Steps
  + MassDOT to provide access to e911/NG911/Local Agency Roads Data
  + MassDOT to provide access to 1Integrate tool for review of Roads Data Quality Check and Change Detection process
* Development environment created and MassDOT ALRS FGDB dataset loaded
* Review of MassDOT Intersections, Routes, Road Segments and Bridge Datasets for assessment of detailed technical scope and work on Intersection modeling (including identification of at-grade and grade-separated intersections)
* Discussion with MassDOT on how ALRS FGDB data will be leveraged for Intersection modeling, geoprocessing tools that will be created and how ArCGIS Pro 3.1 features related to intersection modeling may help with deployment. Development of project task schedule and discussion on project task dependencies (e.g. ALRS ArcGIS Pro 3.0 data updates and Pro 3.1 intersection modeling features). Review of updates to backlog and technical scope document
* Discussion on approach used in various States for modeling and inventorying of interchange (including ramps, road segments, junctions)
* Follow-up on action items and next steps
  + 1Integrate Access via Citrix
  + NG911 data and rules
  + MassDOT Rules Document for modeling of Roads
* Review of work done by Massachusetts on modeling Interchanges using automated tools and techniques
* Discussion on building an interchange data model with (a) ramp lines (b) junction points at mainline and ramp (c) mainline road segments and (d) Interchange point that rests on the LRS Routes
* Discussion on need to investigate approaches (automated) associated with generating the interchange point using the junction point features and the mainline route features
* Planned meeting with MassGIS to discuss conflation approaches with MassDOT and local/NG911 roads data integration
* Architected approach for Interchange data modeling using linear referencing system road network data
* Acquired and testing of access to 1Integrate via Citrix and for examination of Roads data modeling checks performed for local roads data.

**AEGIST Guidebook:**

**North Dakota**

1. AEGIST received North Dakota’s data and engineering scripts for creating a segment-based linear referencing system. Data loaded in AEGIST development environment.

**Arizona**

* Discussion on building a Combined Geospatial Database for analyzing ADOTs WorkZone safety
* Discussion on need to integrate data from construction database, planning database for workzone
* Discussion on using GMNS standard to model road network data for work zone safety
* Review of approaches that can be used to align standards used for travel demand modeling, safety analysis
* Scheduled meeting to discuss the key messages that will be presented at the AEGIST Quarterly meeting on AZDOTs data supply chain
* Ascertained Arizona DOTs availability for meeting with Caltrans to present Arizona’s approach to integrating local agency roads data
* Established Arizona’s availability to participate in a 5-state group on Data Supply Chain Practices in the country. Other states to be approached: Georgia, Massachusetts, North Carolina and California

**Task 3: Marketing and Communication**

**Task Objective:** Webinars and Workshops will be held, and Articles will be presented in conferences and other industry forums to communicate information about the activities of the project, especially the technical work products developed as part of the project.

**Activities**:

1. **Task 3.1.x – AEGIST Articles**
   * **Task 3.1.5 – Article 4:** Document Data Supply Chain practices in Arizona, Massachusetts and Georgia in the white paper and present the key messages in the white paper at the AEGIST Quarterly meeting in December,
   * **Task 3.1.5 - Article 5:** Update AEGIST Article 5 on **“***LRS Administration Levels and Maturity Model”*. Incorporate key take-aways from the Santa-Fe Peer exchange meeting
     + Identify business use cases that require different levels of information or levels of development in the road network data model
     + Review list of 180+ use cases gathered by NCDOT at the enterprise level and determine data modeling requirements identified for the use cases.

Work Planned for Next Reporting Period: Jan – Mar 2023

**Task 1: Project Management**

**Task Objective**: Perform project management activities, which include conducting monthly status meetings, developing quarterly status reports, creating project work plan, managing project resources, schedule, deliverables and communication with all stakeholders.

**Activities**:

1. Prepare and deliver quarterly report #13 for the period Oct – Dec, 2022.
2. Prepare and deliver invoices for the year 2022.
3. Conduct AEGIST Quarterly meeting in March 2022

**Task 2: Technical Services**

**Task Objective:** Provide technical services associated to PFS States by completing various agency-specific and cross-agency activities identified in the work plan.

**Activities**:

1. **Idaho**
   * ..
2. **Tennessee**
   * Task 2.TN.1: Update TDOT Strategic Plan document. Add BIM implementation and BIM-GIS data integration activities to roadmap based on recommendations in following FHWA reports:
     + National Strategic Roadmap for Advancing BIM for Infrastructure
     + Deploying BIM Workflows for Bridges and Structures; and, Implementing National BIM Transportation Library
     + Integrating data from digital design and construction data models into asset management
     + Global benchmarking of BIM practices in the US
3. **California**
   * ..
4. **Pennsylvania**
   * ..
5. **Ohio**
   * ..
6. **Washington**
   * Task 2.WS.1: Technical Services work planning: Finalize scope for following technical services tasks.
   * Task 2.WS.4: Best Practices for Managing Road Geometry in the LRS:
   * Task 2.WS.5: Roads Inventory data modeling and data management (DB modernization).
7. **Florida**
   * ..
8. **North Carolina**
   * Task 2.NC.2: ..
9. **Kansas**
   * ..
10. **Georgia** 
    * Plan and conduct onsite workshop with GDOT, GDOT Regional Commissions and University of Georgia.
11. **Massachusetts**
    * ..

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     + Identify business use cases that require different levels of information or levels of development in the road network data model
     + Review list of 180+ use cases gathered by NCDOT at the enterprise level and determine data modeling requirements identified for the use cases.

**Complete List of AEGIST Deliverables**

**Note:** Deliverables on which work is complete (in green) and work is in progress (in light yellow).

| Task | D# | Deliverable Name | Due Date | Status |
| --- | --- | --- | --- | --- |
| Task 1\* | 1.1.0 | Kick-off Meeting | 10/30/19 | Completed. |
| Task 1\* | 1.2.0 | Work Plan Version 1: Cross-Agency Tasks, Deliverables & Schedule | 4/30/20 | Completed. Submitted to FHWA and PFS States. |
| Task 1\* | 1.3.1 | Quarterly Progress Report - 1 (incl. 3 monthly reports and quarterly meetings) | 12/31/19 | Completed. Submitted to FHWA. Email sent to PFS States. |
| Task 1\* | 1.3.2 | Quarterly Progress Report - 2 (incl. 3 monthly reports and quarterly meetings) | 3/31/20 | Completed. Submitted to FHWA.  Email sent to PFS States. |
| Task 1\* | 1.3.3 | Quarterly Progress Report - 3 (incl. 3 monthly reports and quarterly meetings) | 6/30/20 | MPR for April, May, June published.  QPR-3 (April-June) published. |
| Task 1\* | 1.3.4 | Quarterly Progress Report - 4 (incl. 3 monthly reports and quarterly meetings) | 9/30/20 | MPR for July and August prepared. QPR-4 Prepared. |
| Task 1\* | 1.3.5 | Quarterly Progress Report - 5 (incl. quarterly meetings) | 12/31/20 | QPR-5 report prepared. QTR meeting held in Dec 2020 |
| Task 1\* | 1.3.6 | Quarterly Progress Report - 6: Jan-Apr 2021 (incl. quarterly meet) | 4/31/21 | QPR-6 prepared. QTR Meeting (Mar 2021) |
| Task 1\* | 1.3.7 | Quarterly Progress Report - 7: May-July 2021 (incl. quarterly meet) | 7/30/21 | QPR-7 Completed and Submitted.  Quarterly meeting held. |
| Task 1\*\* | 1.3.8 | Quarterly Progress Report - 8: Aug-Sept 2021 (incl. quarterly meet) | 9/30/21 | QPR-8 Completed and Submitted.  Quarterly meeting held. |
| Task 1\*\* | 1.3.9 | Quarterly Progress Report - 9: Oct-Dec 2021 (incl. quarterly meet) | 12/30/21 | QPR-9 Completed and Submitted.  Quarterly meeting held. |
| Task 1\*\* | 1.3.10 | Quarterly Progress Report - 10: Jan-Mar 2022 (incl. quarterly meet) | 3/31/22 | QPR-10 Completed and Submitted.  Quarterly meeting held. |
| Task 1\*\* | 1.3.11 | Quarterly Progress Report - 11: Apr-Jun 2022 (incl. quarterly meet) | 6/30/22 | QPR-11 Completed and Submitted.  Quarterly meeting to be held in July 2022. |
| Task 2\* | 2.1 | TASK 2 Technical Services (incl. Work Plan v1.1 with State Tasks) - MONTH 8 - MAY 2020 | 5/30/20 | Work Plan v1.1 has Caltrans Tasks.  May 29th PFS States Presentation. |
| Task 2\* | 2.2 | TASK 2 Technical Services (incl. Work Plan v1.2 with State Tasks) - MONTH 9 - JUN 2020 | 6/30/20 | Work Plan v1.2 has CA, GA, ID Tasks.  June 16th PFS States Presentation. |
| Task 2\* | 2.3 | TASK 2 Base Period Technical Services (incl. Work Plan v1.3 with State Tasks) - MONTH 10 - JUL 2020 | 7/30/20 | Work Plan v1.3 with ID Task updates. Weekly work planning with Idaho. |
| Task 2\* | 2.4 | TASK 2 Technical Services (incl. Work Plan v1.4 with State Tasks) - MONTH 11 - AUG 2020 | 8/30/20 | Work Plan v1.4. Tasks 2.1, 2.2, 2.ID.1 |
| Task 2\* | 2.5 | TASK 2 Technical Services (incl. Work Plan v1.5 with State Tasks) - MONTH 12 - SEP 2020 | 9/30/20 | Work Plan v1.5 with ID Task updates.  Tasks 2.1, 2.2, 2.ID.2 and 2.ID.3 |
| Task 2\* | 2.6 | TASK 2 Technical Services - MONTH 13 - OCT 2020 | 10/30/20 | Work plan activities at ID, TN, CA and Tasks 2.1 and 2.2. |
| Task 2\* | 2.7 | TASK 2 Technical Services - MONTH 14 - NOV 2020 | 11/30/20 | Work plan activities at ID, TN, CA and Tasks 2.1 and 2.2. |
| Task 2\* | 2.8 | TASK 2 Technical Services (incl. Work Plan v1.6 with State Tasks) - MONTH 15 - DEC 2020 | 12/30/20 | Work Plan v1.6 with updates for ID, CT, TN and CA. Continued Tasks 2.1 and 2.2 |
| Task 2\* | 2.9 | TASK 2 Technical Services - MONTH 16 - JAN 2021 | 1/20/21 | Technical Services to ID, TN, CA, PA, CT, OH and Cross-agency Tasks 2.1 & 2.2. |
| Task 2\* | 2.10 | TASK 2 Technical Services - MONTH 17 - FEB 2021 | 2/28/21 | Technical Services to ID, TN, CA, PA, CT, OH and Cross-agency Tasks 2.1 & 2.2. |
| Task 2\* | 2.11 | TASK 2 Technical Services - MONTH 18 - MAR 2021 | 3/20/21 | Technical Services to ID, TN, CA, PA, CT, OH and Cross-agency Tasks 2.1 & 2.2. |
| Task 2\* | 2.12 | TASK 2 Technical Services - MONTH 19 - APR 2021 | 4/30/21 | Technical Services to ID, TN, CA, PA, CT, OH and Cross-agency Tasks 2.1 & 2.2. |
| Task 2\* | 2.13 | TASK 2 Technical Services - MONTH 20 - MAY 2021 | 5/30/21 | Technical services to PFS States and for Cross-agency Tasks 2.1 & 2.2. |
| Task 2\* | 2.14 | TASK 2 Technical Services - MONTH 21 - JUN 2021 | 6/30/21 | Technical services to PFS States and for Cross-agency Tasks 2.1 & 2.2. |
| Task 2\* | 2.15 | TASK 2 Technical Services - MONTH 22 - JUL 2021 | 7/30/21 | Technical services to PFS States and for Cross-agency Tasks 2.1 & 2.2. |
| Task 2\* | 2.16.1 | TASK 2 Technical Services - MONTH 23 - AUG 2021 | 8/30/21 | Technical Services to 8 States as listed in the quarterly report. |
| Task 2\*\* | 2.16.2 | TASK 2 Technical Services - MONTH 23 - AUG 2021 | 8/30/21 | Technical Services to NC and KS, with FL, NM requirements considered as well. |
| Task 2\* | 2.17.1 | TASK 2 Technical Services - MONTH 24 - SEP 2021 | 9/30/21 | Technical Services to 6 Base Period States as listed in the quarterly report. |
| Task 2\*\* | 2.17.2 | TASK 2 Technical Services - MONTH 24 - SEP 2021 | 9/30/21 | Technical Services to NC and KS, with FL, NM requirements considered as well. |
| Task 2\* | 2.18.1 | TASK 2 Technical Services - MONTH 25 - OCT 2021 | 10/30/21 | Technical Services to ID, PA, CA and OH. |
| Task 2\*\* | 2.18.2 | TASK 2 Technical Services - MONTH 25 - OCT 2021 | 10/30/21 | Technical Services to NC and KS, with FL, NM requirements considered as well. |
| Task 2\* | 2.19.1 | TASK 2 Technical Services - MONTH 26 - NOV 2021 | 11/30/21 | Technical Services to ID, PA, CA, NC, KS and OH, as summarized in this report. |
| Task 2\*\* | 2.19.2 | TASK 2 Technical Services - MONTH 26 - NOV 2021 | 11/30/21 | Technical Services to NC and KS, with FL, NM requirements considered as well. |
| Task 2\* | 2.20.1 | TASK 2 Technical Services - MONTH 27 - DEC2021 | 12/30/21 | Technical Services to ID, PA, CA, NC, KS and OH, as summarized in this report. |
| Task 2\*\* | 2.20.2 | TASK 2 Technical Services - MONTH 27 - DEC2021 | 12/30/21 | Technical Services to NC and KS, with FL, NM requirements considered as well. |
| Task 2 | 2.21.1 | TASK 2 Technical Services - MONTH 28 - JAN2022 | 1/30/22 | Technical Services to PFS States in Base Period as listed in QTR Report #10. |
| Task 2\*\* | 2.21.2 | TASK 2 Technical Services - MONTH 28 - JAN2022 | 1/30/22 | Technical Services to NC and KS, with FL, NM requirements considered as well. |
| Task 2 | 2.22.1 | TASK 2 Technical Services - MONTH 29 - FEB2022 | 2/30/22 | Technical Services to PFS States in Base Period as listed in QTR Report #10. |
| Task 2\*\* | 2.22.2 | TASK 2 Technical Services - MONTH 29 - FEB2022 | 2/30/22 | Technical Services to NC and KS, with FL, NM requirements considered as well. |
| Task 2 | 2.23.1 | TASK 2 Technical Services - MONTH 30 - MAR 2022 | 3/30/22 | Technical Services to PFS States in Base Period as listed in QTR Report #10. |
| Task 2\*\* | 2.23.2 | TASK 2 Technical Services - MONTH 30 - MAR 2022 | 3/30/22 | Technical Services to NC and KS, with FL, NM requirements considered as well. |
| Task 2 | 2.24.1 | TASK 2 Technical Services - MONTH 31 - APR 2022 | 4/30/22 | Technical Services to PFS States in Base Period as listed in QTR Report #11. |
| Task 2\*\* | 2.24.2 | TASK 2 Technical Services - MONTH 31 - APR 2022 | 4/30/22 | Technical Services to NC and KS, with FL, NM requirements considered as well. |
| Task 2 | 2.25.1 | TASK 2 Technical Services - MONTH 32 - MAY 2022 | 5/30/22 | Technical Services to PFS States in Base Period as listed in QTR Report #11. |
| Task 2\*\* | 2.25.2 | TASK 2 Technical Services - MONTH 32 - MAY 2022 | 5/30/22 | Technical Services to NC and KS, with FL, NM requirements considered as well. |
| Task 2 | 2.26.1 | TASK 2 Technical Services - MONTH 33 - JUN 2022 | 6/30/22 | Technical Services to ID, TN, CA, PA |
| Task 2\*\* | 2.26.2 | TASK 2 Technical Services - MONTH 33 - JUN 2022 | 6/30/22 | Technical Services to NC, KS, GA, WA, NM, MA |
| Task 2 | 2.27.1 | TASK 2 Technical Services - MONTH 34 – JUL 2022 | 7/30/22 | Technical Services to ID, TN, CA, PA |
| Task 2\*\* | 2.27.2 | TASK 2 Technical Services - MONTH 34 – JUL 2022 | 7/30/22 | Technical Services to NC, KS, GA, WA, NM, MA |
| Task 2 | 2.28.1 | TASK 2 Technical Services - MONTH 35 – AUG 2022 | 8/30/22 | Technical Services to ID, TN, CA, PA |
| Task 2\*\* | 2.28.2 | TASK 2 Technical Services - MONTH 35 – AUG 2022 | 8/30/22 | Technical Services to NC, KS, GA, WA, NM, MA |
| Task 2 | 2.29.1 | TASK 2 Technical Services - MONTH 36 - SEPT 2022 | 9/30/22 | Technical Services to ID, TN, CA, PA |
| Task 2\*\* | 2.29.2 | TASK 2 Technical Services - MONTH 35 – AUG 2022 | 8/30/22 | Technical Services to NC, KS, GA, WA, NM, MA |
| Task 2 | 2.30 | TASK 2 Technical Services - MONTH 37 - OCT 2022 | 10/30/22 | Technical Services to ID, TN, CA, PA |
| Task 2\*\* | 2.30 | TASK 2 Technical Services - MONTH 37 - OCT 2022 | 10/30/22 | Technical Services to NC, KS, GA, WA, MA |
| Task 2 | 2.31 | TASK 2 Technical Services - MONTH 38 - NOV 2022 | 11/30/22 | Technical Services to ID, TN, CA, PA |
| Task 2\*\* | 2.31 | TASK 2 Technical Services - MONTH 38 - NOV 2022 | 11/30/22 | Technical Services to NC, KS, GA, WA, MA |
| Task 2 | 2.32 | TASK 2 Technical Services - MONTH 39 - DEC 2022 | 12/30/22 | Technical Services to ID, TN, CA, PA |
| Task 2\*\* | 2.32 | TASK 2 Technical Services - MONTH 39 - DEC 2022 | 12/30/22 | Technical Services to NC, KS, GA, WA, MA |
| Task 2 | 2.33 | TASK 2 Technical Services - MONTH 40 - JAN 2023 | 1/30/23 | Not Started |
| Task 2\*\* | 2.33 | TASK 2 Technical Services - MONTH 40 - JAN 2023 | 1/30/23 | Not Started |
| Task 2 | 2.34 | TASK 2 Technical Services - MONTH 41 - FEB 2023 | 2/30/23 | Not Started |
| Task 2\*\* | 2.34 | TASK 2 Technical Services - MONTH 41 - FEB 2023 | 2/30/23 | Not Started |
| Task 2 | 2.35 | TASK 2 Technical Services - MONTH 42 - MAR 2023 | 3/30/23 | Not Started |
| Task 2\*\* | 2.35 | TASK 2 Technical Services - MONTH 42 - MAR 2023 | 3/30/23 | Not Started |
| Task 2 | 2.36 | TASK 2 Technical Services - MONTH 43 - APR 2023 | 4/30/23 | Not Started |
| Task 2\*\* | 2.36 | TASK 2 Technical Services - MONTH 43 - APR 2023 | 4/30/23 | Not Started |
| Task 2 | 2.37 | TASK 2 Technical Services - MONTH 44 - MAY 2023 | 5/30/23 | Not Started |
| Task 2\*\* | 2.37 | TASK 2 Technical Services - MONTH 44 - MAY 2023 | 5/30/23 | Not Started |
| Task 3\*\* | 3.1.1 | **Article 1**: Road Network Publication Data Model with Topology, Temporality, Routable Network Rule | 5/30/21 | In-Progress |
| Task 3\*\* | 3.1.2 | **Article 2:** Enterprise GIS Application for Spatial Safety Performance Functions Calibration and HSM-based Safety Analysis | 5/30/22 | In-Progress |
| Task 3\*\* | 3.1.3 | **Article 3:** Engineering, processing and integrating spatial Traffic and Safety Data using Cloud | 12/30/22 | In-Progress |
| Task 3\*\* | 3.1.4 | **Article 4:** Enterprise GIS Application forModeling and Conflating Federal Lands Management Agency, DOT LRS and Local Agency Roads data | 12/30/23 | In-Progress |
| Task 3\*\* | 3.1.5 | **Article 5:** LRS Administration Levels and Maturity Mode | 9/30/24 | In-Progress |
| Task 3 | 3.2.1 | Workshop 1 - GIS-T 2021 | 4/30/21 | GIS-T Workshop 2021 Delivered |
| Task 3\* | 3.2.2 | AEGIST Presentations (2020) | 12/30/20 | **Following Presentations Delivered:**  NY (Apr); TRF (Aug); KS (Jun); National Roads Symposium (Sep); Esri RHUG (Oct), AEGIST Modeling & Standards (Dec). |
| Task 3\*\* | 3.2.3 | Workshop 2 – GIS-T 2022 | 5/30/22 | Delivered Workshop in April 2022. |
| Task 3\* | 3.2.4 | AEGIST Presentations (2021) | 12/30/21 | Completed delivery of following 2021 Presentations:   1. USDOT Presentation on April 2nd. 2. Presentations to new PFS States: WV, DC 3. Provided AEGIST Overview to Colorado.Presentation at NaTMEC on Jun 23rd. FHWA NRN Presentation on Aug 31st. 4. Presentation Slides for FHWA Safety Group on AEGIST-MIRE activities. 5. FLMA Presentation on Nov 9th. |
| Task 3\*\* | 3.2.5 | AEGIST Presentations (2022) | 12/30/22 | Following presentations have been delivered in 2022, as of this quarter:   1. TRB AEGIST Update at AED40 Committee Meetings 2. USDOT Mobility Plan Business Group Update (Feb 1st) 3. AASHTO GIS-T Conference – AEGIST Updates (April 21st) 4. Presentation for Gloria Shepherd 5. Spatial Data Governance presentation to NC, TN, ID, PA (April 1st, 2022) 6. RDIP Conference in Rhode Island (April. 2022) 7. NaTMEC 2022 in June, 2022 8. CTPP Conference in June, 2022 9. RDIP Conference in West Virginia (June 2022) 10. IHEEP Conference Presentation Preparation (Sept 2022) |
| Task 3 | 3.3.1 | Webinar 1: Data Governance | 2/11/21 | Webinar delivered on Feb 11th, 2021 |
| Task 3 | 3.3.2 | Webinar 2: AEGIST Activities associated with Spatial Data Modeling, Integration and Analysis | TBD | TBD |
| Task 4 | 4.1.0 | Peer-Exchange 1 - 2019 | 12/30/19 | Completed. |
| Task 4 | 4.2.0 | Peer-Exchange 2 - 2020 | 12/30/20 | Aug 25th-26th Peer Exchange Conducted. |
| Task 4 | 4.3.0 | Peer-Exchange 3 – 2022 | 08/30/22 | Conducted Santa Fe Peer Exchange Meeting |
| Task 5 | 5.0 | HPMS 9.0 Remodeling Report/Article Database Design | 5/30/21 | Delivered report on Road Network Publication Data Model for FHWA and PFS States Review completed between July-Sept. Comments Addressed.  Coordinate with FHWA to determine next Steps on publication to be determined. |

\* Tasks in Base/Original Period (CLIN 0001)

\*\*Tasks in Performance Period 1 (CLIN 0002)