

## PROJECT MANAGEMENT PLAN

Project Number MPD0053-17

July 19, 2017

**PREPARED FOR:**

**Arizona Department of Transportation  
Multimodal Planning Division (MPD)**

**PREPARED BY:**

**Ayres Associates  
Parsons  
United Civil Group Corporation**

**ADOT**



Project Number: MPD0053-17

[azdot.gov/planning/transportation-studies/arizona-statewide-its-architecture](http://azdot.gov/planning/transportation-studies/arizona-statewide-its-architecture)

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## 1.0 PROJECT SUMMARY

This Project Management Plan (PMP) defines how the Arizona Statewide Intelligent Transportation System Architecture will be executed, monitored, and controlled. This plan will assist the consultant team in managing the project and clearly defining the scope and services to meet Arizona Department of Transportation's expectations.

This project will update the 2011 Statewide Intelligent Transportation System (ITS) Architecture for the State of Arizona. The Statewide Architecture provides a common framework for planning, defining, and integrating intelligent transportation systems. Once complete, this Architecture will reflect the contributions of a broad cross section of the ITS community. The Arizona Statewide ITS Architecture defines the physical elements in the field, explains the functions that are required of the elements, and documents the information flow that connects the functions and the systems together to create a complete integrated system. The boundaries of geographic scope extend across Arizona as it borders California, Nevada, New Mexico, Utah, and Mexico.

The Arizona Statewide ITS Architecture includes all ITS elements, existing and planned, in the State of Arizona over the next 10 years. There are currently two existing regional architectures within Arizona: Maricopa Association of Governments (MAG) ITS Regional Architecture June 2010 covers the Phoenix area and its member agencies and Pima Association of Governments (PAG) Regional ITS Architecture July 2004 covers the Tucson Area and its member agencies. The 2018 Statewide ITS Architecture will interact with these architectures but focus on statewide ITS elements on the State system including the MAG and PAG regions. Some of the MAG and PAG regional architecture elements will be included as related architectures. ADOT will document ITS elements existing or planned throughout the State and provide a strategic approach to all future ITS investments. The intent of the Statewide ITS Architecture is to establish common communication and infrastructure protocols for all current and future ITS projects.

The objective of this project is to ensure that all ITS investments in the State will have established common communication protocols, avoid duplication of investment in infrastructure, provide the ability to share data sources between agencies, and update existing legacy ITS Architecture, bringing the State into compliance with the nationally established ITS standards and architecture.



This project will be conducted through tasks with multiple milestones and deliverables. The following sections of this Project Management Plan summarize the administrative aspects of the project and the scope of work. Ayres Associates, United Civil Group (UCG) and Parsons were selected by ADOT with a Notice to Proceed date of May 11, 2017.

## 2.0 PROJECT ORGANIZATION

Ayres Associates is the lead consultant with technical support from UCG and Parsons. The Consultant Team is dedicated to successfully completing the Arizona Statewide ITS Architecture project. The Team's skill set, knowledge of ADOT's infrastructure, outstanding communication skills, and previous proven partnerships with ADOT, are all assets for this assignment. UCG and Parsons assisted ADOT with the previous Statewide ITS Architecture project. Ayres Associates and UCG's local knowledge coupled with Parsons National Architecture expertise will provide ADOT with a thorough plan to guide ITS throughout the next 10 years.

### 2.1 Ayres Associates Role

**Dan Hartig, PE:** Dan has over 40 years of experience in transportation studies and design, traffic engineering, and planning. He has been project principal, project manager, or task leader for the preparation of DCR, environmental documents, ITS PS&E, traffic engineering PS&E, highway PS&E, arterial street design, corridor studies, traffic impact studies, and intersection improvement designs. He has facilitated public and stakeholder meetings to achieve consensus and has provided leadership to and fostered teamwork among traffic and transportation engineering staff. ITS projects Dan has been involved with include: Rural Road Fiber Optic Cable Installation for Signal Coordination, City of Tempe (2017); Elliot Road ITS Conduit, Cable, and Wireless Design, City of Tempe (2015); Town of Gilbert Transportation Master Plan (2014); Town of Queen Creek Transportation Master Plan (2016)

### 2.2 United Civil Group Role

**Sarah Simpson, PhD, PE:** Sarah has 25 years of experience in traffic engineering and transportation planning, with 17 years specializing in ITS design and infrastructure. In 2011, Sarah attended the Quick Starting Your Regional ITS Architecture Update Workshop sponsored by Federal Highway Administration and presented by Iteris. Since that time, Sarah has kept current on National ITS Architecture changes and enhancements through sessions at the Transportation Research Board and ITS America conferences. Dr. Simpson's experience also includes research with a focus on innovative roadway enhancements to improve the safety of the motoring public. ITS projects Sarah has been involved with include: 2011 Arizona Statewide ITS Architecture, 2013 Ramp Metering Design Guide, South Mountain Design Build General



Engineering Consultant, FMS L202 Dobson to Ray, FMS L202 Ray to Broadway, FMS DMS Rural Installation I-17, FMS L303 I-17 to US60

**Keith Winney, PE:** Keith has fourteen years of experience in civil engineering within the Phoenix metropolitan area and the State of Arizona. Through higher education, on-the-job and in-field training, and design experience, he has gained expertise in traffic engineering, transportation planning, Intelligent Transportation Systems, traffic data collection, and construction inspection. ITS Projects Keith has been involved in include: ADOT FMS, L202 Phase 14B Design, AZ, (2014); ADOT FMS Loop 202 Phase 14a; I-10 to Dobson Road (2013); MAG Traffic Signal Optimization Project (2009/2017); ADOT FMS L303

### 2.3 Parsons Role

**Dan Lukasik, PE:** Dan has been an ITS engineer for 27 years, the majority of which has been focused on the design, development, deployment, and operations of ATMS on freeways. He is considered an expert in ICM and ATM strategies such as adaptive ramp metering, lane control systems, variable speed limits, queue warning, transit traveler information systems, advanced DSS, arterial signal priority systems, and multimodal information systems. In addition, Dan has an excellent knowledge of connected vehicles which comes through his involvement with the ITS-California Connected Vehicle Subcommittee and his work on four connected vehicle projects including the INFLO and IDTO DMA projects as well as the Federal Highway Administration Assessment of Emerging Opportunities for Real-Time Multimodal DSS. ITS projects Dan has been involved with include: Arizona ITS Architecture (2012); ADOT FMS, Phase 7A Design, AZ, (1998); ADOT FMS, L202 Phase 14B Design, AZ, (2014); Caltrans, District 7, Adaptive Ramp Metering, CA (2007)

**Rita L. Brohman, PMP:** Rita has 30 years' experience in program management. She has dedicated the past 26 years to Emergency Transportation Operations, Systems Engineering, and ITS Architecture projects. Rita is known to facilitate stakeholders; quickly identify issues; build consensus; and provide solutions for getting project results. Rita was a member of the National ITS Architecture Team in developing the National ITS Architecture for 10+ years and still reviews new concepts for the Team. She was the relevant expert and developed the Turbo Architecture Database for the 2011 Arizona Architecture. She has developed hundreds of regional ITS Architectures and at least 10 statewide ITS architectures. ITS projects Rita has been involved with include: Arizona ITS Architecture (2012); ITS Systems Engineering and Architecture—FHWA/RITA National ITS Architecture Team (2000–2010); Northern, Southern and Statewide Nevada Regional ITS Architecture (Regional SDP) (2002–2005/2007– 2008); Los Angeles Arterial Architecture (2003–2006)



**Teresa Malone:** Teresa has more than 30 years of experience in the systems integration field. She has been involved in system integration and installation, requirements engineering, and on-site and remote training and assistance. Teresa is a veteran of software integration projects, from contract signing to final acceptance testing. Her specialties are development of requirements, software build management, support and training on new products, as well as oversight and review of software documentation. ITS projects Teresa has been involved with include: SH 130 Segments 5 and 6 Network Communication System, TX; Caltrans District 4 Advanced Transportation Management System, CA; ODOT Corridor Ramp Metering System; WashDOT, Advanced Transportation Management System

## 2.4 ADOT's Role

Arizona Department of Transportation MPD is the contracting agency and client lead for this project. ADOT is ultimately responsible for the complete delivery of the Arizona Statewide ITS Architecture. Mark Hoffman is the project manager for ADOT. Reza Karimvand, PE, with ADOT TSMO will provide technical oversight.

## 2.5 Stakeholders' Role

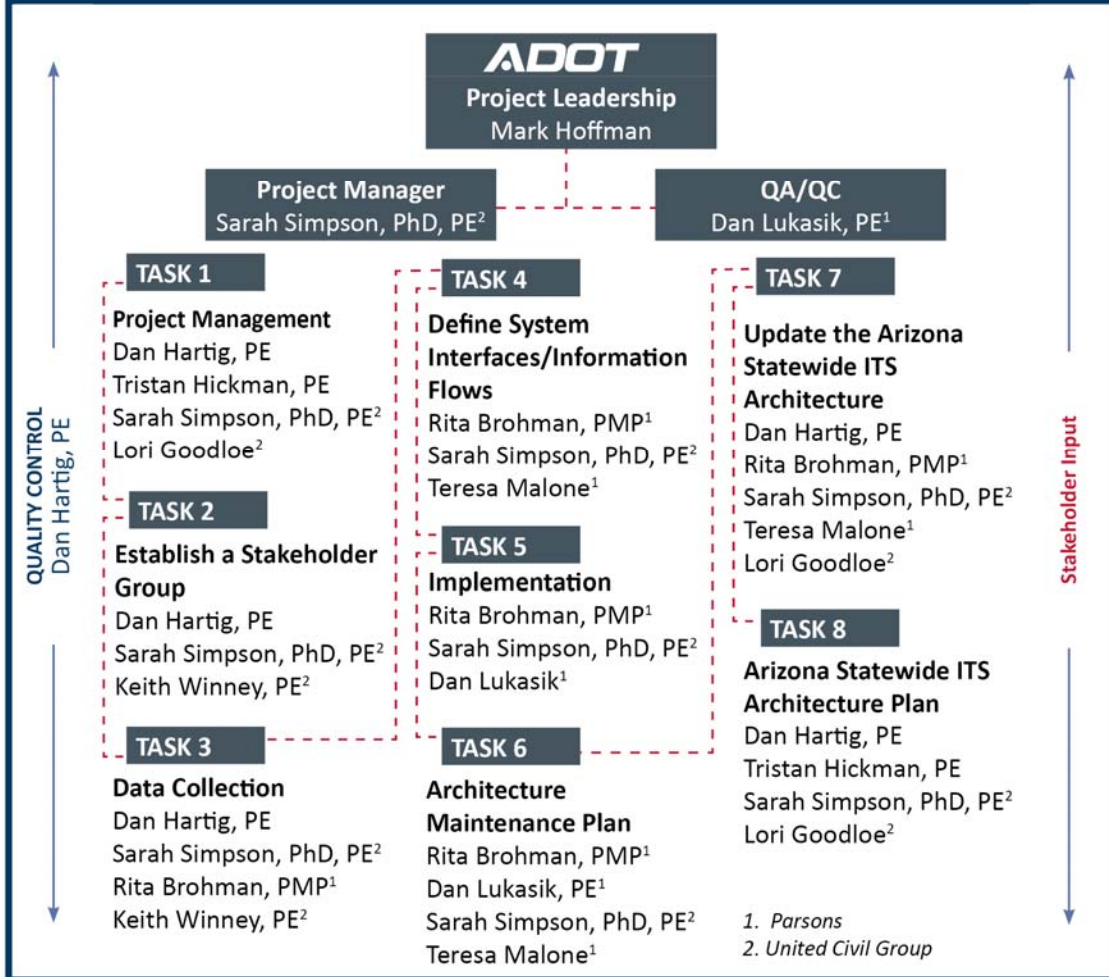
The Stakeholders will participate in the project oversight and were selected based on certain group characteristics and responsibilities (confirmed at the Project Kickoff Meeting) which include the following:

- Each stakeholder will continue their respective responsibilities towards their own transportation system in the State.
- The stakeholders will help guide the overall process, both written and verbal, through the review of deliverables, and attendance at all workshops and meetings.
- The stakeholders should be able to commit to review of deliverables in a timely manner.

*Figure 1: Project Organizational Chart* illustrates the team and consultant responsibilities by task.



## ORGANIZATIONAL CHART



## 3.0 SCOPE OF SERVICES

### 3.1 Task 1 – Project Initiation and Management

The objective of Task 1 is to identify the Project Management Team (PMT), prepare the PMP and provide all materials necessary for all PMT and stakeholder meetings. Our team will coordinate with the ADOT PM to establish the PMT. The PMT will meet monthly to discuss the progress, concerns, and milestones. Our team will prepare a PMP that establishes the final schedule, refines the work plan, provides contact information for PMT members, lists stakeholder groups, explains work plan assumptions, provides expectations of the team members, and presents deliverables and submittal dates.

#### Activities

- Conduct the Project Kick-Off Meeting and establish PMT
- Prepare draft PMP with the ADOT PM
- Address comments from the PMT
- Lead monthly PMT meetings

#### Deliverables

- Draft and Final PMP, Agendas, Meeting Notes

### 3.2 Task 2 – ITS Architecture: Establishing a Stakeholder Group and Defining the Regional Boundary (Technical Memorandum #1)

Based on the information exchanged in the kick-off meeting in Task 1, the Team will identify existing and new stakeholders. We will review the 2011 Turbo Architecture files to identify stakeholders that participated in the previous update. New stakeholders will be identified at the kickoff meeting, through communications with past stakeholders and based on current positions held in governmental agencies and interest groups. The stakeholder list will include a broad range of transportation-related organizations.

It will be important for our Team to keep stakeholders involved with this ITS Architecture update. Therefore, our team will follow the same process developed by the National ITS Architecture Team in 2000 when Rita Brohman, our ITS Strategic Advisor, served as a member. This process is a tried and proven six-step process for developing architectures and is still effective today. The key concept is to develop the Architecture as an interactive process and allow stakeholders the opportunity to provide input throughout the study effort.





Once the stakeholder group is established, Rita Brohman and Sarah Simpson will give an ITS Architecture Training Workshop. The workshop will introduce ITS technology and traffic operations, and its relevance to transportation planning. In addition, our Team will prepare a document that gives an introduction of ITS technology and traffic operations and its relevance to transportation planning. The roles, responsibilities, and necessary partnerships along with the project boundary will be presented. Participants will discuss and define goals, objectives, needs, services, level of detail for statewide architecture, statewide ITS plans, and planning timeframes for the Architecture.

The Arizona Statewide ITS Architecture will include all ITS elements existing and planned in Arizona. Because there are two existing regional architectures, MAG and PAG, both will be included as related Regional Architectures. The 2018 Statewide ITS Architecture will interact with these architectures but focus on statewide ITS elements on the State system, including the MAG and PAG regions. ADOT's ITS elements will be documented within the Arizona Statewide ITS Architecture including interconnects and ITS elements that connect to those elements within the MAG and PAG Regional Architectures.

#### Activities

- Identify internal and external stakeholders
- Establish a contact list of all stakeholders
- Prepare the ITS introductory briefing document
- Identify the Geographic Scope Boundary
- Prepare materials and ITS project examples for use at the ITS Architecture Stakeholder Training Workshop
- Conduct an update training for changes to the ITS Architecture

#### Deliverables

- Draft and Final Technical Memorandum #1
- Draft and Final ITS Introductory Briefing Document
- ITS Architecture Training Workshop Notebook

### 3.3 Task 3 – Data Collection

In order to accurately perform the activities required to update the existing Arizona Statewide ITS Architecture, institutional, functional, and operational data must be gathered. There will be a series of meetings to confirm stakeholder inventory, objectives, and services.



We will review planning documents, 1998 Architecture, 2004, 2007 ITS Concepts for Rural Corridor Management, State TIP and SIP, MAG RTP, PAG SDP, and 2011 ITS Architecture. We will prepare a list of existing goals, objectives and performance measures defined from existing plans. For example, 3 of the 8 goals as defined in Arizona’s LRTP, *What Moves You Arizona 2035* could be realized through ITS infrastructure: improved mobility and accessibility, enhanced safety and security, and strengthened partnerships.

Deliverables in the Statewide ITS Architecture must be compatible with regional agency goals. Therefore, the Team will develop specific questions for use in gathering data that will accommodate our need to update the ITS Architecture. The questions will identify and capture stakeholder:

1. ITS elements
2. Needs and services
3. Operational concepts
4. Functional requirements
5. Interconnects
6. Information flows
7. Operational agreements
8. Appropriate ITS standards

**Inventory Systems:** review of the existing ITS Architecture, determination of the necessary geographic scale of the State facilities to be included, inventory of existing and planned ITS deployments by organization including, but not limited to:

- a. Traffic Management Systems (covering freeway management in ADOT Districts as well as arterial traffic management outside of the MAG and PAG regions),
- b. Traveler Information
- c. Maintenance and Construction Operations (including weigh in motion, safety inspection stations, international border crossings and/or ports of entry),
- d. Arizona DOT transportation data archives
- e. Commercial Vehicle Operations
- f. Connected Vehicle Pilot Projects
- g. Information Systems
- h. Other

Through the Regional Architecture Development for Intelligent Transportation (RAD-IT), elements will be mapped to subsystems and terminators. A detailed and well organized inventory of systems throughout the State will allow the Team to identify additional inventory gaps and items required to develop a complete system.



**Needs and Services:** identify the needs and services for the State of Arizona. This includes the ITS capabilities to meet operational goals and objectives. Our Team will review the 2011 listed needs and services and update them in Turbo Architecture. During stakeholder meetings, the 2011 needs will be revisited and discussed with stakeholders.

Based on discussions with stakeholders, the ITS plans, transportation studies, ITS project documentation, and needs and services will be documented to meet the current and future planned conditions over the next 10 years.

**Operational Concept:** document each stakeholder's current and future roles and responsibilities in the operation of the Statewide ITS Architecture. Our Team will review the 2011 Statewide ITS Operational Concepts and update it as required. We will add any new Operational Concepts and identify stakeholders along with their role and responsibility.

**Functional Requirements:** Using the Architecture Reference of Cooperative and Intelligent Transportation (ARC-IT), our team will review the 2011 Functional Requirements and add any new requirements that are discovered. The ITS elements will be mapped to one or more Functional Areas.

#### Activities

- Provide stakeholders with their 2011 stakeholder description, ITS systems and inventory, and needs and services (planned or existing)
- Interview stakeholders to update their existing information and obtain new information/updates
- Review ITS documents for new projects, systems, operational concepts and functional requirements
- Update RAD-IT

#### Deliverables

- Draft and Final Technical Memorandum #2



### 3.4 Task 4 – Define System Interfaces/Information Flows

In this task, our Team will identify interconnects, defining which systems will share information. Based on information input into the 2011 Turbo Architecture, we will update the identification of interconnects which are based on the inventory, services, operational concept and functional requirements. We will evaluate if existing person-to-person connections may evolve into automated interfaces between ITS systems. We will also define information flows, describing what information will be shared. The interfaces will be represented as existing or planned depending upon the interface.

#### Activities

- Prepare graphics in RAD-IT that show all connections and the information to be exchanged between ITS systems and the State.

#### Deliverables

- Draft and Final Technical Memorandum #3 – System Interfaces/Information Flows

### 3.5 Task 5 – Implementation

The Statewide ITS Architecture provides an overall framework that shows how anticipated projects will integrate with each other and with the existing systems. Implementation is a significant component within the ITS Architecture. Preliminary operational needs and deficiencies of State facilities will be discussed and defined in the Architecture. Planned projects funded and unfunded will be considered for inclusion into the Statewide ITS Architecture.

Our team will review planning documents to gather data on planned FMS projects. We will review projects previously entered in Turbo and bring the 2011 project list up to date. All planned projects will be evaluated based on costs, benefits, feasibility, institutional constraints, and readiness. The projects will be prioritized based on evaluation criteria and funding. A matrix will be developed showing all proposed projects. The prioritized projects will satisfy ADOT requirements for further review and be categorized into short (1-2 years), mid (3-6 years) and long (7-10 years) term projects that take feasibility, benefits and dependencies of each project into account.

Institutional agreements within 2011 Turbo Architecture will be reviewed and updated. Our team will communicate with the ADOT PM and stakeholders to determine if any new agreements were formed or are planned over the next 10 years. In 2011, it was difficult to obtain a thorough list of ITS agreements. Our team will discuss agreement opportunities with each stakeholder. We will evaluate which kinds of agreements are needed and prepare a matrix with the acquired information.



Standards are an important tool that will allow efficient implementation of the Statewide ITS Architecture. Our team will review the standards included in the 2011 Architecture and add any new standards or standards that have been updated after 2011.

#### Activities

- Develop prioritization criteria for ITS projects
- Develop a matrix of proposed statewide ITS projects
- Prioritize ITS projects based on approved criteria within the short, mid and long term time frame
- Include all projects in RAD-IT
- Develop a list of ITS agreements
- Update ITS Standards that may apply to the Statewide ITS Architecture

#### Deliverables

- Draft and Final Technical Memorandum #4 – 10-Year Implementation Plan
- Stakeholder Workshop to present the Draft Implementation Plan

### 3.6 Task 6 – ITS Architecture Maintenance Plan

Our Team will provide ADOT with an ITS Architecture Maintenance Plan that provides information about the process of maintaining the Statewide Architecture. The Statewide ITS Architecture should be modified as plans and priorities change, ITS projects are implemented, and the ITS needs and services evolve in the State. This maintenance plan will address who is responsible for the ITS Architecture, what must be maintained, what is the maintenance level, and how changes are identified.

#### Activities

- Prepare the Arizona Statewide ITS Architecture Maintenance Plan

#### Deliverables

- Draft and Final Technical Memorandum #5 –Maintenance Plan

### 3.7 Task 7 – Update the Arizona Statewide ITS Architecture in RAD-IT

During this project, our Team will assist the ADOT PM by providing the software file for posting on the ADOT website so it can be used for communications with stakeholders and future maintenance of the Statewide Architecture. This task includes providing the RAD-IT database. The database file will contain:

1. Planning – connecting planned ITS infrastructure on State facilities to ARC-IT
2. Stakeholders



3. Inventory Elements
4. Operational Concept (roles and responsibilities)
5. System Functional Requirements
6. Interconnects and Information Flows
7. Standards Identification

**Activities**

- Confirm all information is satisfactorily entered
- Generate the web version of the ITS Architecture from RAD-IT

**Deliverables**

- RAD-IT database file

**3.8 Task 8 – Arizona Statewide ITS Architecture Plan**

The Statewide ITS Architecture shall include the necessary components needed to demonstrate conformity to federal regulations in 23 CFR Part 940 including, but not limited to: operational concept, list of agreements, system functional requirements, standards identification and a maintenance plan.

**Activities**

- Prepare the 2017 Arizona Statewide ITS Architecture
- Address comments from the PMT and stakeholders
- Incorporate appropriate comments

**Deliverables**

- Draft and Final Statewide ITS Architecture Update
- Stakeholder presentation of the Statewide Architecture

**4.0 PROJECT CONTROL SYSTEM**

Project control is that element of a project that keeps it on-track, on-time and within budget. Project control begins early in the project with planning and ends late in the project with post-review. It is important to have thorough involvement in each step of the process and to assess the appropriate level of control needed.

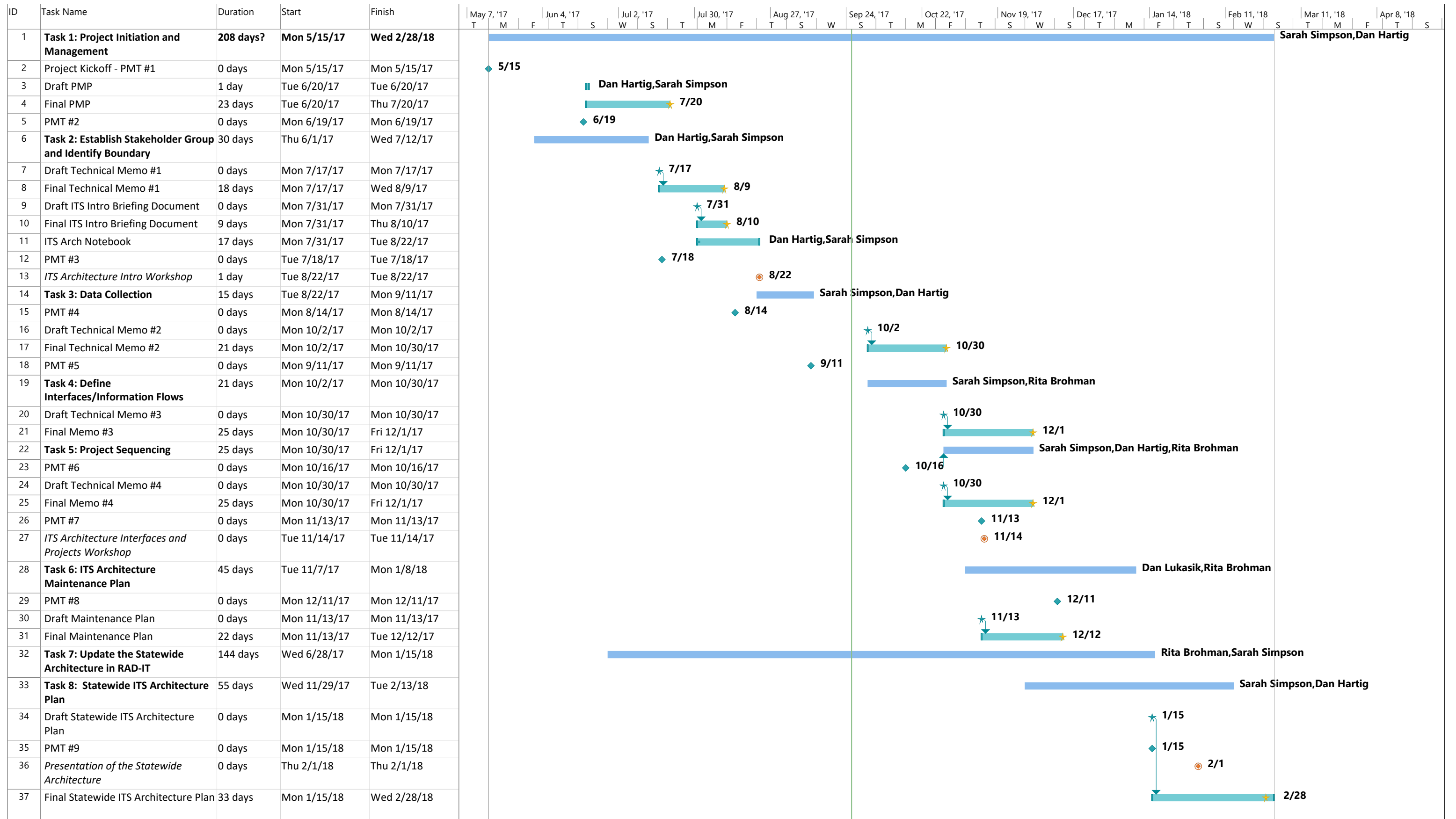
Control systems are needed for schedule, cost control, quality, invoicing, and responsibilities. Controls for this project are explained in the following sections.



#### 4.1 Project Schedule

The project is being implemented in a single phase with eight (8) formal tasks. *Task 1: Project Management* will continue throughout the life of the project. The remaining tasks have specific begin and end dates. Some tasks rely on completion of other tasks prior to commencing. The Project Schedule represents the tasks and deliverables and illustrates the relationships between the tasks. Additionally, deliverables are presented as stars in the Project Schedule. Based on our project schedule, final deliverables and close out of the Arizona Statewide ITS Architecture should be by February 28, 2018.





Project: ITS Architecture 09261 Date: Tue 9/26/17	Task	Summary	Inactive Milestone	Duration-only	Start-only	External Milestone	Manual Progress
Split	Project Summary	Inactive Summary	Manual Summary Rollup	Finish-only	Deadline		
Milestone	Inactive Task	Manual Task	Manual Summary	External Tasks	Progress		



#### 4.2 Cost Control

The cost control attributes of this project include allocation of budget by task and billing by percent complete invoicing details. The contract stipulates the following terms for progress payments:

- Progress payments are made to the Ayres Associates for percent complete on each of the deliverables and for performance of the contract requirements.
- Subcontractors, UCG and Parsons will submit monthly progress reports and accompanying invoices to Ayres Associates. Ayres Associates will submit monthly progress reports and accompanying invoices to Arizona Department of Transportation.

#### 4.3 Document Control

Electronic versions of documents produced under this project will be stored on the Ayres Associates, UCG, and Parsons project server. Any documents that are not in electronic form will be stored in the Ayres Associates office.

#### 4.4 Action Item System

Action items for this project will be maintained in a format which includes the following:

- Item Number
- Date Originated
- Description
- Assigned To
- Date Due
- Date Closed
- Comments

#### 4.5 Quality Control Plan

The production of top quality products and deliverables by the Consultant Team is our number one goal. All documents produced by the Team, whether for transmittal to a client, prospective client, another consulting firm, or for public distribution, are reviewed by someone other than the author to ensure that they are understandable and well written. A second opinion is also invaluable in identifying alternative approaches to the analysis.

