

City of San Antonio ATMS

Statement of Work

Prepared by:

Kimley-Horn and Associates, Inc.

For Review by:

City of San Antonio

Version 1.3

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PROJECT SCOPE

The following scope of services describes the deployment and integration of KITS for the City of San Antonio based on RFCSP 14-035, 6100004287 May 2, 2014.

SCOPE OF SERVICES

Task 1: Project Management and Bill of Materials

KHA's Project Manager shall act as the principal contact for the City and other involved agencies. KHA's Project Manager will be responsible for completing activities associated with the performance of this project. Additional responsibilities include managing project planning activities, adherence to project task budgets and tracking resources associated with each aspect of the project.

Prepare Project Status Reports

KHA shall prepare and submit written monthly project status reports. The reports shall include the following information including a schedule outlining target dates for completion of items:

- Period covered by the report.
- Overview of the reporting period.
- Tasks, subtasks, deliverables, goods, services, and other work scheduled for the reporting period that were completed.
- Action Items.
- Updated deliverables chart and completion schedule, if necessary.

KHA shall also prepare invoices, billings, and other financial information for review and approval by the City, as required by this agreement.

Payments to KHA will be on a per task/sub-task basis and made after the completion of a defined milestone and associated deliverables included within a given task/sub-task. Project management and expenses will be invoiced in equal monthly amounts for one year.

KHA will meet with City staff to further understand existing City software licenses and planned virtual environment for the project. The City has indicated a desire to leverage existing workstations along with a virtualized server environment for this project. Based on the information gathered during meetings with the TCI and ITSD staff, KHA shall deliver a complete equipment list ("Bill of Materials") for full system deployment and submit to the City for review. KHA will review options and provide input on reusing the City's existing hardware and software licenses to fulfill the needs of the project. Upon the City's and KHA's approval of the equipment list, the City will procure system components, including supporting third-party software, system hardware, network equipment, and peripherals. The equipment will remain at the City. The City will assist with the configuration of remote access into the network to enable authorized KHA staff to remotely diagnose the system. Using funds outside of this agreement, the City will purchase third-party software and any additional hardware and licenses for the VM environment or network that is required for the deployment of KITS. Anticipated software includes:

- SQL Server 2008 or 2012
- MS Excel 2013 or 2010
- MapDotNet

The workstations will be deployed on Windows 7 and the servers on Windows Server 2012. The Integrated System will utilize SQL Server 2012 Standard as its central database. The specific versions of the tools will be determined in conjunction with City's ITSD preference. KHA and the City will conduct up to 3 meetings to finalize the equipment identified in Task 1.1.

Deliverables:

1. Project and Configuration Management – invoiced monthly for 12 months
2. Bill of Materials for System Equipment

Task 2: ATMS Software

Integration of KITS shall be performed in stages. The following sequence of events details the staged implementation of the KITS system.

1. The City will procure designated equipment as defined in Deliverable 1.1.
2. KHA will collaborate with the City to determine a subset of five initial intersections that will be used to test the migration and import of existing NextPhase timing data. All intersections will have a consistent version of NextPhase firmware.
3. The source code, reports, registry, and database to support the functionality of the City's modules will be placed under Kimley-Horn's internal configuration management and version control processes.
4. A lab configuration will be created and maintained in KHA's facility to simulate the deployment environment.
5. An installation procedure will be generated by KHA for the City of San Antonio that will be highly correlated to the KITS central software currently installed in Austin, TX. This will be a functional self-contained installation and automate many of the procedures used to install the KITS user interface in the City. This automated installation will include most of the required third-party tools and may reference other supporting third-party documentation.
6. The City will be responsible for providing reliable communication with the field devices and upgrading the firmware to a consistent version. The basis of communication with the NextPhase firmware will be NTCIP 1201, 1202, and 1203 to support the City's functional requirements. Integrated KITS analysis tools will support up to 4 rings, 4 barriers, and 32 phases.
7. KHA will come to the City TMC facilities for the installation and configuration of the equipment and required third-party software. City staff will have the option to observe all installation processes.
8. KHA will fully configure and integrate the first ten intersections.
9. KHA will develop automated database scripts to assist with the import of common fields from the existing Siemens i2 ATMS central database or existing spreadsheets into KITS. The City will be responsible for ensuring the integrity of the data in advance of the automated import.

Deliverables:

1. System Installation of Base System. Payable upon successful integration of KITS User interface connecting to SQL Database and KITS Communication server with new City hardware on City network.
2. System Configuration of KITS servers and workstations. Payable upon completion of task 2.1 and successful communication with the first 10 controllers on City network.
3. Unlimited non-expiring KITS licenses for City of San Antonio. Payable upon completion of task 2.2. End user license agreement for the KITS software is located in Appendix B.

Task 3: System Implementation

1. KHA will assist City personnel with the integration of 15 additional pilot intersections by leading the effort to create the intersection graphics, place intersections on the main map, and configure these intersections within KITS. The City will provide communication parameters and configuration data parameters.
2. KHA will provide preliminary training on the graphic configuration, data entry, and most frequently used monitoring tools within the System. Preliminary requirement validation will utilize controllers in this group of controllers. Completion of 15 intersections configured and on-line will be the payment milestone for Task 3.2.
3. City personnel, with guidance from KHA, will be responsible for configuring the remaining intersections by uploading signal timing, entering configuration data, and developing map graphics. Map graphic configuration will require the City to have a documented intersection phase map to a direction. Lane configuration can be granularly configured to depict the intersection operation in more detail. The user will have the option to drag symbols onto the map or to auto-generate the graphics based on populated phase/lane mapping.
4. Unique features and requirements included in the RFP that are not currently available within the 14.9 version of KITS in Austin, TX will be designed and developed. These requirements are listed in Appendix A along with requirements that will not be fully integrated in this initial first phase of the project.
5. KHA will provide incremental software releases in phases to comply with City-requested features included in the RFP.
6. The existing KITS center-to-center (C2C) module will be installed to facilitate the exchange of data with TxDOT. A supplemental scope of work will be needed to account for expected configuration and integration effort C2C with TxDOT, ITSD and TCI.
7. KHA will work with the City to recommend backup strategies for protecting dynamic data collected by KITS. A SQL Server database maintenance procedure will be created and installed by KHA to backup and cleanup data on a regular interval. Email alerts will be configured to notify KHA and the City in the event of errors. In addition, a Remedy ticket will be generated following the successful completion of Task 5.3 if any failures are detected within the database.

8. A backup virtual environment will be provided by City for backup, recovery and continuity of operations. It is expected that the City will provide a clustered SQL Server environment. In the unlikely event of a serious hardware failure, the redundant environment could be manually brought on-line utilizing the documented procedures.
9. KHA will demonstrate continuous successful compliance with system requirements and functionality. The successful demonstration of compliance will constitute Software Acceptance and does not include testing on the interface with 3rd party systems or traffic signal priority. These components of the project will be validated in task 10 once the software development is completed and tested in the KHA lab environment.

Deliverables:

1. System Integration. Payable upon 20 intersections on-line within KITS.
2. Software Acceptance.

Task 4: Traffic Signal Priority Operation

KITS will enable traffic signal priority operation through a center to center interface with VIA Metro Transit. The operation will be consistent with the final version of the TSP requirements as outlined in **RFCSP EXHIBIT 6**. The implementation of special priority operation will occur through three phases described in the following paragraphs.

1. Phase 1 - Finalization of TSP approach and business rules

KHA will participate and lead up to 5 meetings to design and document the C2C interface that will be used to receive priority requests. The priority solution will utilize existing VIA infrastructure to initiate priority requests into the City ATMS.

2. Phase 2 – Proof of concept

In phase 2, KHA will work with the City to demonstrate to VIA a successful proof of concept for achieving priority. Several prerequisites must be achieved by KHA and the City prior to the proof of concept demonstration. These include the deployment and initial integration of KITS within the ITSD virtualized environment and LAN, successful NTCIP IP communication with existing 2070 controllers / NextPhase version 1.7.7, the software development of a web service by KHA, and the creation and definition of new priority phases at three intersections. At least two controllers will be configured within TCI allowing IP communication through the network provided and maintained by the City. Existing intersection timing will be imported by the KHA to test priority sequences. KHA will develop the software for KITS to send a special function command to the NextPhase NTCIP controller. Functionality will be included within the existing timing values form to allow the user to manually call a special function. KITS will be programmed to automatically generate the priority sequence by sending a special function. Following a successful demonstration of this new functionality in the lab, the proof of concept will be exercised for three field intersections utilizing the TSP center to center interface. IP communication polling statistics within KITS must have at least a 90% success rate to exercise the proof of concept tests. KHA will provide a browser-based application to exercise the XML/WSDL center to center interface that

will generate priority requests to the internal facing web-service. This web application will be shared with the City to help with integration efforts.

3. Phase 3 - Migration

Following successful outcomes of phases 1 and 2, KHA, VIA, TCI and ITSD will jointly coordinate efforts to migrate integrated bus signal priority from the existing i2 platform to KITS. Requests will be generated from authorized users/transit vehicles and received by servers located within VIA. A populated XML schema will be sent to KITS through a secure web service developed by KHA in Task 2 and hosted by ITSD. KHA will collaborate with VIA and ITSD to strategize on secure network connectivity options. The City will provide authentication credentials if required to interface with the VIA owned servers. A response will be sent indicating the success or failure of a request and information will be logged within the central KITS database. Payment for phase 3 will occur after at least 10 live field intersections have been validated for compliance with the TSP business rules.

KITS mobile performance analysis tools will be provided to the City allowing a user to generate reports that include travel time and second-by-second velocity and location of authorized vehicles. The KITS Mobile web service is both a data collection and a data analytics tool. It can be used to enhance traffic operations by providing data to support operational decisions or evaluate traffic improvements.

The KITS Mobile web service allows users to create a profile for data collection. The user records the start of his or her trip using the KITS Mobile application on a mobile device. KITS Mobile records the location, speed, altitude, heading, and time every second until the user ends the trip. The user can also enter information about the trip to record details such as weather, construction activities, presence of incidents, and other pertinent details. The trip is automatically recorded on a database maintained by in the cloud by Kimley Horn and available an authorized user on the KITS Mobile website.

The trips can be viewed on the KITS Mobile website by user, route, or trip. More than one trip can be selected at a time to compare data. Displaying speed data of the trip is the default view. Other information that can be displayed includes: location, time, heading, and altitude. The data is displayed using Google Earth or Google Maps with standard map navigation to zoom or pan around the map or to zoom to the selected trip. Each data point can be selected individually to display information particular to that point or the map can display information for all of the data points using color coded icons as shown below. The map also displays a legend that can be modified to adjust thresholds for the color coded icons.

The KITS Mobile Android and iOS application can calculate travel times when the user selects two points on any route or trip. The travel time algorithm calculates the trip distance, average speed, and total trip time. The details of the trip are also displayed with the travel time results to show the information input by the user for the weather, incidents, etc.

The KITS Mobile web service provides full reporting functionality for data analytics. The reports can be selected by time range, geographic region, or user. The Reports function allows the users to view raw data or to generate a variety of graphs. A typical graph produced is the “Speed vs. Time” graph shown below. In addition, multiple runs can be compared to each other to show the result of improvements using the “Compare Speed vs. Distance Report.” The screenshots (shown below) show the process of selecting the desired runs and viewing the report. The data can be used to gauge exactly how the improvements impact the performance of the trip. The data is shown by node to identify where speed or delay changes. The data can be exported to an Excel spreadsheet and the average of the runs can be displayed on the graph.

Reports will be created by KHA and integrated into KITS allowing historical reporting for all transit priority requests.

This task allows for multiple iOS or Android devices to concurrently provide data into the KITS mobile web service and for up to 5 users to analyze the data on-line. The City will supply up to five mobile devices and will manage and pay the data plan required for each device. Kimley-Horn will train City staff to set up user accounts, routes, and trips. This task includes the data storage for the data collection, the maintenance of the maps and the reports.

Deliverables:

1. Completion of Phase 1.
2. Completion of Phase 2.
3. Completion of Phase 3.
4. City-wide signal priority license for an unlimited number of authorized vehicles.
5. City-wide license for up to 5 KITS Mobile users.

Task 5: Interface with Third-Party Systems

Based on the requirements stated in the RFP, KHA will create a robust and maintainable interface for the *Remedy* and CRM System. It is expected that KITS will be enhanced to provide the following:

- KITS alert configuration will be modified to enable users to configure a system event/alert to also trigger an outbound message to the *Remedy* and/or CRM system. A user confirmation will be required in advance of sending the outbound message.
- KITS will send a related message that includes existing configuration data to the ITS element generating the event. It is expected that the primary use case will be to automatically generate tickets for communication failures, conflict flash events and any errors associated with the SQL database. KITS will enable the user to set a persistence time for the failure to remain in advance of generating the message.
- The City will be responsible for providing identification numbers that link an asset in the systems along with the desired information configured in KITS to be included.

Deliverables:

1. 25% prototype demonstration.
2. 75% demonstration of functionality.
3. On-site installation and integration.

Task 6: Traffic Adaptive System

The Kadence adaptive decision and KITS congestion manager will be deployed to enable detailed performance related reports and allow the City to deploy adaptive signal control operation on corridors in the future.

1. KHA will provide the City the KITS congestion management module along with the Kadence adaptive module. These two modules will allow the City to configure trigger thresholds from detector occupancy data that will select or suggest alternative control strategies to provide congestion management actions. The congestion management logic will allow the City to use other arterial detectors for triggering actions.
2. The congestion management actions will include the ability to identify conditions under which an alternative control strategy may be beneficial. It will also provide the ability to implement the alternative control strategy automatically or manually as selected (programmed) by the City. This is expected to be particularly valuable in responding to incidents. If the manual implementation method is selected, an alert (alarm) will inform the City staff of the alert condition and recommended response. To activate the alternative control strategy, City staff will acknowledge the alert to enable the alternative control strategy. If the automatic implementation method is selected, the alternative control strategy will be implemented without requiring any City staff actions. It will be possible to let the adaptive module run in monitoring mode. In this mode, all potential modifications to current timing will be logged, but not implemented in the field. The alternative control strategy will provide new baseline split, offset, cycle, and sequence parameters through the Kadence adaptive control module.
3. KHA will install the Kadence adaptive control module (based on ACSLite technology) for use on intersections designated by the City. The City will be responsible for modifications (if any) to detection and communications to support the requirements for adaptive operation. With this integrated module, the City will be able to generate reports on the coordinated phases that provide granular measurement of percent arrivals on green and red. Additional integrated tools will enable the City to visualize historical intersection performance timing and provide quantitative performance output. A license will be granted to the City to use performance reporting for all intersections in the City along with real-time adaptive operation on up to 10 City intersections. A separate license will be required to run adaptive operation on more than 10 City intersections.

Deliverables:

1. Deployment of Traffic Adaptive Decision Support System.
2. Integration of Performance Monitoring Reports.

Task 7: System Support and Maintenance

KHA shall provide support and maintenance for the supplied software for a period of four years from the time of software acceptance. Any ATMS software issues found during this period will be addressed at no additional cost to the City. New functionality, additions, and enhancements made to the software, that do not constitute a separately packaged and marketed version or module of the system, developed by the Consultant during this period shall be offered to the City at no additional license fee. Upon approval by the City, these enhancements shall be installed and integrated based on current hourly rates.

KHA shall provide maintenance services, which will include phone, e-mail, and on-site support as needed during City’s working hours. KHA shall perform periodic check-ups and tune-ups several times a year to validate System performance.

KHA will provide full system and security administration for the City as part of this KITS. Under a day-two support plan, KHA will administer security for all City users of KITS, fully maintain the server processes, confirm compliance with operating system patches, and the support the SQL Server database. Since KITS security relies on Windows Active Directory, it is expected the City will continue manage domain level users as well as KHA remote access into the City’s network (via Citrix or VPN).

Following the conclusion of the four year system support period following system acceptance, the City may, at its option, continue the same level of system warranty and support for five additional years.

Deliverables:

1. System Support and Maintenance for Years 1-4.

Task 8: System Documentation and Training

KHA will provide the following KITS documentation to the City:

- System User’s Manual – provides an overview description of the system, its components, how they are used or accessed by the operators, as well as how to use the GUI’s for all aspects of the system.
- Quick Start Guide – describes initial configuration and setup of the system. This brief document references the User’s Manual, but presents the information in a simple format. The document focuses on data entry, map customization, and initial configuration.

Electronic copies of the final documentation will be provided.

A training schedule will be delivered at least one week prior to the comprehensive training sessions that will detail the date and time for each topic. It is anticipated that the training will be broken up into six one-day sessions. The City will have the opportunity to prioritize topics to help determine the amount of time that is spent on each topic.

Training topics may include:

- Overview of KITS
- Operation and management of the system
- System maintenance
- Security
- Map configuration and customization
- On-line help
- Data integrity
- Naming conventions
- System components
- Effective monitoring
- Advanced functionality

Deliverables:

1. Six sessions of classroom training. Payable after each training session.
2. Electronic and hardcopy system documentation. Payable upon delivery of electronic and hardcopy documentation.

Task 9: Project Acceptance

Following the substantial completion of the project, an acceptance procedure will be executed to validate compliance with the City's required functionality. A matrix of functionality will be developed along with procedures to verify proper functionality. This testing will include all aspects of the project. It is expected that the testing will require a maximum 12 hours to complete and may be observed by member(s) of City's staff.

Deliverables:

1. Project acceptance.

Other

File Format for Electronic Files and Communication

KHA shall use the standard City software set forth below when preparing deliverables. KHA shall provide deliverables in the appropriate file format (by downloads and/or via e-mail) as follows:

- Microsoft Word or Adobe PDF – Word Processing
- Microsoft Excel – Spreadsheet
- Microsoft PowerPoint – Presentation Materials

The City shall provide comments in electronic format using the same software as outlined above.

Optional Services and Operational Support

Additional services may be provided in support of the system, its operations, or the communication infrastructure for the City. Authorization by the City is required prior to

beginning any of these tasks. Services that are not included in this scope but may be provided as additional services include, but are not limited to:

- Integration services for additional intersections
- Database population
- Additional intersection graphic configuration
- Integrated, stand-alone laptop operation
- Communication troubleshooting and integration
- Corridor retiming
- System operational services
- Performance measurement services

Appendix B

KITS EULA - This license applies to all software components, developed by Consultant or a Subconsultant, which comprise the KITS software.

- 1. Use – The Software may be installed and used by the CITY and its employees for an unlimited amount of time. This permanent license will cover all KITS functionality installed including the following modules: Traffic Control, Traffic Responsive, CCTV, Scheduler, Alert Manager, DMS, TxDOT C2C, and Time Synchronization. The CITY will not be required to pay additional license fees for future upgrades to these KITS modules.*
- 2. Distribution - The software may not be used by or distributed to outside entities without the expressed written permission of the CONSULTANT. The source code for the system will be placed in escrow. The source code will be released from escrow to the CITY in the event the owner of the source code or its designated representative no longer provides support.*
- 3. Restrictions – The City may not provide, in any way, any portion of the program to another person or entity without the expressed written permission of the CONSULTANT. This applies to the Software in object form as well as the Software documentation.*
- 4. Copyright – All intellectual property rights in the Software and user documentation are owned by the CONSULTANT and are protected by US copyright laws, other applicable copyright laws, and International treaty provisions. The CONSULTANT retains all rights not expressly granted.*
- 5. Limited Warranty – Except as specifically provided herein, the CONSULTANT makes no warranty, representation, promise or guarantee, expressed or implied, statutory or otherwise, with respect to the Software, user documentation or related technical support, including their quality, performance or fitness for a particular purpose. The CONSULTANT will in no way be responsible for any ramification resulting from modification to the Software or hardware configuration by the CITY.*
- 6. Liability – To the fullest extent permitted by law, CONSULTANT shall indemnify and hold harmless the CITY, CITY'S officers, directors, and employees from and against any and all costs, losses, and damages to the extent they arise out of the negligent acts, errors or omissions of the CONSULTANT in the performance and furnishing of the CONSULTANT's services under this Agreement. The CONSULTANT will not be responsible for operating system, 3rd party software, or hardware failures. It is the CITY'S responsibility to make periodic backup copies of data for protection against a system failure. Notwithstanding any other provision in the Agreement, with respect to any use of KITS Consultant shall have no obligation to indemnify or defend the City, its officers, directors, and employees from and against any costs, losses, and damages that arise out of the negligence or wilful misconduct of the City or of third parties for whom the Consultant is not responsible.*
- 7. Government Restricted Rights – The Software and/or user documentation are provided with RESTRICTED AND LIMITED RIGHTS. Use, duplication or disclosure by the CITY is subject to restrictions as set forth in FAR 52.227-14 (June 1987) Alternate III(g)(3) (June 1987), FAR 52.227-19 (June 1987), as applicable. CONTRACTOR/CONSULTANT is Kimley-Horn and Associates, Inc., 7740 N. 16th Street Suite 300, Phoenix, Arizona 85020.*

