MEETING DATE: 12/22/08

AGENDA ITEM: The Consideration to Award a Professional Services Contract to Kimley-Horn Associates (KHA) for the Installation and Integration of a Citywide Traffic Control System (TCS) Component of Work for the Fox Hills Area Traffic Signal Synchronization Project, P-852

ATTACHMENTS

		Pages
1	Staff's Traffic Control System Official Evaluation Summary	1-8
2	Kimley-Horn Associates Original Proposal and Subsequent Supplement to Original Proposal (Basis for Contract)	9-44

Culver CITY
PUBLIC WORKS DEPARTMENT
9770 Culver Boulevard, Culver City, California 90232

Charles D. Herbertson, P.E., LS
Public Works Director and
City Engineer

(310) 253-5600

November 14, 2008

FOX HILLS TRAFFIC SIGNAL SYNCHRONIZATION PROJECT P-852
TRAFFIC CONTROL SYSTEM PROJECT RFP No. 1400
EVALUATION SUMMARY

Vendors were evaluated in five (5) overall areas:

1. Adherence to City's specified system functionality;
2. Available budget versus project alternatives;
3. Readiness of deployment versus needs for additional software development;
4. Availability and adequacy in staffing; and
5. Completeness of vendor's entire package (proposal, interview, clarification response).

SIEMENS

Adherence to City's specified system functionality
Siemens demonstrated a strong understanding of the City's desire to use existing infrastructure and recognized areas for improvement by providing the City with options for upgrades. In each of the alternatives, Siemens touched upon the varying functionality providing a good comprehension of deployed features. Siemens's i2 system meets the City's desired functionality.

Available budget versus project alternatives
Project alternative presented in Siemens' original proposal would provide service, hardware equipment, software components, licenses and maintenance (for three years) for a fixed price of $469,751. In this option, there would be no controller change out. Out of the total fixed price, labor cost is approximately $237,000; hardware, software cost and maintenance is approximately $183,000. With subtle differences between all received proposals taken into consideration, Siemens' overall cost (for Alternative 1) is the lowest among all the proposers. Under other project alternatives, Siemens provided very attractive rates for controller upgrade. Siemens' proposed fixed price falls within the City's intended budget for the project.

Readiness of deployment versus needs for additional software development
As part of the project, sub-consultant/vendor McCain will develop a new Bi-Trans 233 firmware version that supports both AB3418E and Metro's GPS wireless transit signal priority (TSP) technology. The development of a Bi-Trans 233 firmware version that supports AB3418E has commenced and is nearing completion with the deployment of the i2 system in the City of Pasadena. As of the date selection announcement, the City of Pasadena was conducting final testing on the said deployment on the 2033 firmware for 2070 controllers. Testing of the 233 firmware was on the way but not yet completed. One area of concern was the lack of discussion on the utilization of the type 170SC, and 170 controllers; it is unclear if the selected 233 firmware would be able to be deployed on these controllers without further software development.

Availability and adequacy in staffing
Technical presence from the Siemens team primarily resides locally in Pasadena, California. Local presence provides easy access for support and reduces communication difficulties due to time differences and distance. One concern on staffing was the Siemens' team appeared to be proposing essentially one hands-on technical staff.

Completeness of vendors' entire package (proposal, interview, clarification response)
Siemens provided a complete overall package.

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TRANSCORE

Adherence to City's specified system functionality

Transcore provided a strong understanding of the City's needs from the narrative on project approach as well as the response shown on the functionality check list and subsequent request for clarification. Transcore addressed important areas of needs such as Transit Priority, controller compatibility, further software development on controller firmware and the selected firmware functionalities. Trancore has developed an interface to the Los Angeles County Information Exchange Network (IEN) and development at Culver City would include this feature. One area of concern was the reporting capabilities of the Transuite system. Initial conversations indicated reporting format outside of XML was not available. Later conversations indicated reporting capabilities using Jasper reports are now said to be available provided by the deployment at Oregon.

Available budget versus project alternatives

Alternative presented in Transcore's original proposal would provide the service, hardware equipment, software components, licenses and maintenance (for the initial year and three subsequent years) for a fixed price of $635,260. Out of the total fixed price, labor cost is approximately $269,000; hardware and software cost is approximately $235,000; and license and maintenance is approximately $132,000. With subtle differences between all received proposals taken into consideration,

Transcore's overall cost is the highest overall cost among all the proposers. Transcore's proposed fixed price exceeds the City's intended budget for the project.

Readiness of deployment versus needs for additional software development
As part of the project, sub-consultant/vendor McCain will develop a new Bi-Trans 233 firmware version that supports both AB3418E and Metro's GPS wireless transit signal priority (TSP) technology. Transcore currently has a deployment of Bi-Trans 233 firmware in White Plains, New York that supports AB3418E however the deployment is on the type 179 controllers.

Availability and adequacy in staffing
Technical presence from the Transcore team primarily resides in Atlanta however the proposed Project Manager, Chuck Dankocsik is local. One concern is the lack of redundancy of support locally.

Completeness of vendors' entire package (proposal, interview, clarification response)
Transcore provided a very complete overall package. In each category of evaluation, Transcore presented a technically competent team.

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GREENFACTOR

Adherence to City's specified system functionality
GreenFactor is proposing the deployment of the Los Angeles Department of Transportation (LADOT) Adaptive Traffic Control System (ATCS) central software. Functionality of the ATCS technology is proven and provides an added feature: adaptive traffic control. The functionality of the proposed system goes above and beyond the City's specified system functionality. One area of concern was the initial configuration from a city staffing standpoint required to activate the adaptive feature.

Available budget versus project alternatives
GreenFactor's original proposal would provide the service, hardware equipment, software components, licenses and maintenance (for three years) for a fixed price of $338,281. Out of the total fixed price, labor cost is approximately $241,000; and hardware and software cost is approximately $98,000. GeenFactor's overall cost is the lowest among all the proposers. GreenFactor's proposed fixed price is well within the City's intended budget for the project.

Readiness of deployment versus needs for additional software development
GreenFactor's deployment plan would not require additional software development. The proposal includes the usage of the City's existing controller firmware. Among all

the proposals, the deployment plan outlined by GreenFactor requires the least amount of changes to the current traffic signal operation and appears to be the quickest deployment in comparison.

Availability and adequacy in staffing

Technical presence from the GreenFactor team resides locally in the Los Angeles area however it appears the team has little redundancy in technical knowledge and in staffing. There are three primary staff proposed for the effort at Culver City; Canny Quach, Shirley Jung and Ulysses Neri. Mr. Quach has demonstrated extensive knowledge in working with the proposed LADOT ATCS while the support staff doesn't appear to have the experience comparable to Mr. Quach. One major concern is the lack of a technically knowledgeable team member to support Mr. Quach in the event of his absence from the project.

Completeness of vendors' entire package (proposal, interview, clarification response)

GreenFactor provided a complete overall package.

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5. Completeness of vendor's entire package (proposal, interview, clarification response).

KIMLEY-HORN ASSOCIATES

Adherence to City's specified system functionality
Kimley-Horn Associates (KHA) demonstrated a strong understanding of the City's existing conditions and provided an immediate solution to better utilize the current traffic signal equipment and operation infrastructure. KHA also understands the City's desire to use existing infrastructure. KHA's KITS meets the City's desired functionality.

Available budget versus project alternatives
Project alternative presented in KHA's original proposal would provide service, hardware equipment, software components, licenses and maintenance (for one year) for a fixed price of $479,300. In this option, there would be no controller change out. Out of the total fixed price, labor cost is approximately $321,000; hardware, software cost and maintenance is approximately $158,300. With subtle differences between all received proposals taken into consideration, KHA's overall cost is closer to the lower cost spectrum among all the proposers. KHA's proposed fixed price falls within the City's intended budget for the project. One area of noticeable difference is KHA is changing $18,000 for the first year subsequent to deployment where as competitors are including it in the cost of the deployment.

Readiness of deployment versus needs for additional software development
The version of the Bi-Trans 233 firmware version proposed to be deployed at Culver City was previously deployed at Miami on a large scale, in Tennessee and one other location within United States. KHA's deployment history of the subject firmware provided a good measure of successful deployments and more importantly because of the deployment history with the same type of controllers as the City's existing controllers, KHA's effort would not need additional software development, minimizing the risk level for a successful deployment.

Availability and adequacy in staffing
Technical presence and project management presence from the KHA team primarily resides in Phoenix, Arizona. One concern on staffing was the lack of local presence of important roles from the KHA team.

Completeness of vendors' entire package (proposal, interview, clarification response)
KHA provided a complete overall package.

PROPOSAL FOR

CULVER CITY

ITS Traffic Control System

September 18, 2008 | Prepared by
Kimley-Horn and Associates, Inc.

Prepared for
City of Culver City

d. Project Approach

We have done our best over the past several years to understand what you are looking for in a new system. We understand the following:

You would like to take advantage of your existing infrastructure. This includes an extensive copper network throughout the City. All of the communication tests have been successful thus far, although the sections with boot splices have not been tested. You have an extensive deployment of 170 and 170 E controllers. You would like to get as much use out of the existing controllers while still upgrading the functionality to support bus priority. The 172.3 BI Tran firmware is no longer actively supported.

Migrating the existing controllers to run BI 233 firmware is an acceptable solution and your maintenance staff already has a working knowledge of this firmware. You want a system that is rich in functionality and will have significant longevity.

You are looking for an off-the-shelf, turnkey, cost-effective, proven system.

Our approach will maximize your existing infrastructure. While the bus priority enabled intersections will require a few controller upgrades and a wireless receiver, you have more than enough existing 170E controllers to accomplish the required functionality. No new controllers will be required to be purchased—**resulting in a significant cost savings for the City.**

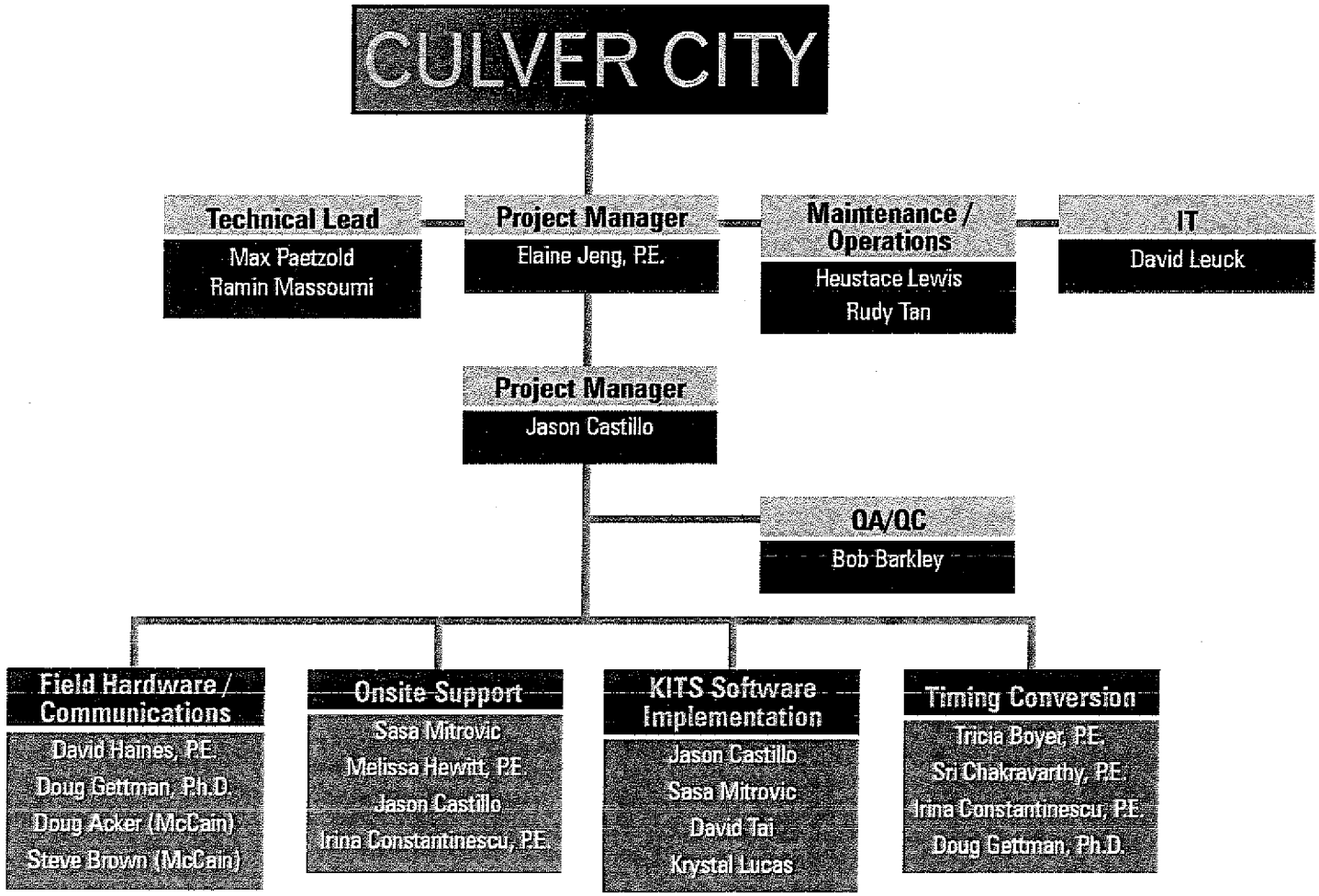
To provide immediate benefit to your motorists, **we will fast-track the deployment of a basic system that will broadcast time several times a day out to your existing controllers utilizing your 172.3 firmware.** This will enable the existing coordinated timing patterns to function as designed and run at the appropriate time of day intervals. We will provide hardware and software to have this solution up within days of receiving notice to proceed.

We will also expedite the upgrade of four field controllers to begin deployment of a single corridor. **This will enable your staff to start using KITS within days of receiving the central system hardware.**

d. Project Approach 10

TASK 1 — PROJECT MANAGEMENT

The staff included for your project has been carefully selected based on experience in Los Angeles County, knowledge of Culver City, and hands-on experience with KITS. Our staff has worked successfully together on different projects across the country. We present our organization chart below.



d. Project Approach

Name	Title	Area of Expertise	Role on Project	Years of Experience	Office Location
Jason Castillo	Project Manager	ITS	Project Manager	17 years total 9 years with KHA	Phoenix, AZ Los Angeles, CA
Bob Barkley	Senior Software Specialist	ITS	QA/QC Reviewer	26years total 10 years with KHA	Phoenix, AZ
David Haines	Engineer	Communications	Communications	20 years total 18 years with KHA	Phoenix, AZ
Doug Gettman	Project Manager	ITS	Communications / Timing Conversion	16 years total 1 years with KHA	Phoenix, AZ
Sasa Mitrovic	Software Engineer	ITS	Software Implementation / Support	2 years total 2 years with KHA	Phoenix, AZ
Krystal Lucas	Software Engineer	ITS	Software Implementation	5 years total 4 years with KHA	Phoenix, AZ
Sri Chakravarthy	Engineer	ITS	Timing Converstion / Support	4 years total 3 years with KHA	Los Angeles, CA
David Tai	Software Engineer	ITS	Software Implementation / Communications	10 years total 10 years with KHA	Phoenix, AZ
Melissa Hewitt	Engineer	Systems Engineering	Onsite Support	13 years total 12 years with KHA	Orange, CA
Irina Constantinesci	Engineer	Traffic Signal Timing	Timing Conversion / Onsite Support	6 years total 3 years with KHA	Los Angeles, CA
Tricia Boyer	Engineer	Traffic Signal Timing	Timing Conversion	9 years total 9 years with KHA	Phoenix, AZ
Doug Acker	Subconsultant McCain	Firmware provider / Field Implementation	Field Hardware	20 years total 7 years with McCain	Vista, CA
Steve Brown	Subconsultant McCain	Firmware provider / Field Implementation	Field Hardware	30 years total 5 years with McCain	Vista, CA

The KHA Team

Jason Castillo — KHA

Jason Castillo's background in software and systems development combined with his management experience makes him uniquely qualified as your project manager. His in-depth technical knowledge will provide your staff with an expert that understands what it takes to successfully deploy a traffic control system. He understands the need to listen the needs of clients before trying to develop a solution. He works extensively in Southern California. Jason has installed KITS in Los Angeles County, Manhattan Beach, El Segundo, Hawthorne, Claremont, and Agoura Hills. San Dimas and City of Commerce have both selected KITS as their system and are in the process of coming under contract. Contracts are already in place that will have Jason involved in the expansion of KITS in Southern California for the next 7 years.

Jason has 17 years of combined project management and software development experience using languages such as C/C++, Visual Basic, Delphi, and HTML with special emphasis on C++ object-oriented design. Jason's select project experience includes the Tallahassee ATMS in Tallahassee, Florida; Center City Signal Improvement Project in Philadelphia, Pennsylvania; and Freeway and Arterial System of Transportation (FAST) in Las Vegas, Nevada. His development experience with operating systems includes all versions of Windows, Macintosh, UNIX and VAX / VMS. In addition, Jason has fourteen years of database application design experience with Oracle, SQL Server, Access, Paradox, and Interbase. Jason also have six years of experience designing and managing software development for Motorola radio and cellular networks.

Bob Barkley — KHA

Bob Barkley has 26 years of combined experience in project management and systems software development and integration, with an emphasis on relational database, real-time processing, and graphics. Bob is the Principal Architect of KITS including software design, equipment integration, field and LAN communications (protocols), and relational database management system (RDBMS) components. Prior to KHA, Bob worked for BI Tran Systems, Inc. A significant portion of his experience is in coding and integrating process control and surveillance systems for a variety of platforms including Windows NT, OS/2 and various minicomputers. He has extensive experience with integrating signal control devices such as Model 170/2070 controllers operating a variety of protocols, including NTCIP, AB3418E, and a variety of manufacturer specific protocols.

Bob has managed numerous traffic management system projects in the U.S and Canada. He currently manages a city-wide traffic control and transit priority system of comparable size and scope for the City of Beverly Hills and a countywide ATMS for Miami-Dade County in Florida. Other projects include Advanced Traffic Management System in Dallas, Texas; Tallahassee ATMS in Tallahassee, Florida; the Center City Signal Improvement Project in Philadelphia, Pennsylvania; and Windsor Traffic Control System in Ontario, Canada.

Doug Gettman, Ph.D. — KHA

Dr. Doug Gettman is an expert in project management, adaptive traffic control, transportation systems management software (central and field controller), systems engineering life-cycle, ITS, modeling, simulation, and optimization systems and algorithms, and software usability and interface design. Doug designed the communications architecture for the City of San Francisco ATMS. Doug is an active member of the ITS and traffic signal systems research and development community.

Sasa Mitrovic — KHA

Sasa Mitrovic is a Systems Engineer with experience providing software support to ITS and traffic control system projects. He has experience with the development, installation, and integration of traffic management software. He is proficient in C++, HTML, XML, Visual Basic, Excel, GIS software packages (ARC View, Map Objects, and Google Earth), SQL Server, and Oracle. His relevant project experience includes Los Angeles County, Beverly Hills, Miami-Dade, and Palm Beach County.

Krystal Lucas — KHA

Krystal Lucas is a Software Engineer and Project Manager who provides software support to traffic control system and ITS projects. Krystal's experience includes software development using languages such as C++, HTML, and XML; object-oriented software design; and database application design with Oracle, SQL server, and Microsoft Access. She is proficient in GIS software packages such as ARC View and Map Objects, and is familiar with BI Tran and AB3418E protocols. Her project experience includes Los Angeles County KITS, Tallahassee Advanced Traffic Management System, Beverly Hills KITS, Miami-Dade ATMS, and the Yuma Traffic Signal System.

David Haines, P.E. — KHA

David Haines, P.E., has specialized experience in wide-area communications architecture design, communication equipment and ITS equipment technology assessments, fiber optic network design, local area network design, lightning protection design, and power distribution design. He is also experienced in software functionality writing, specification writing, plans package production, constructability evaluations, construction support for fiber optic network installations, and troubleshooting/repair of communication equipment. David's project experience includes the Phoenix FMS in Phoenix, Arizona; I-95 Intelligent Corridor System Final

Design, Packages A, B, and C, FDOT District Six, Miami-Dade County, Florida; and Freeway and Arterial System of Transportation (FAST) in Las Vegas, Nevada.

Srikanth Chakravarthy, P.E. — KHA

Sri Chakravarthy has over three years of traffic engineering and transportation planning experience. His experience includes traffic signal timing, signal design, traffic impact analysis, ITS, transportation modeling, grant applications, and statistical analysis. Sri also has extensive knowledge in Traffix, Synchro, CORSIM©, TransCAD 4.5, MicroStation, AutoCAD, and Systat 10 (statistical analysis software).

David Tai — KHA

David Tai has nearly 18 years of experience in software development, engineering programming and simulation, traffic flow, pedestrian flow, and APM simulation. David supports advanced traffic engineering and analysis features of KITS for Miami-Dade County, City of Winsor, and Los Angeles County. He upgraded and converted the original ALPS running on the DOS platform to ALPS2000 on the Microsoft Windows operating environment, incorporating new design and methodologies. He also expanded and improved ALPS2000's modeling capability to ease the model development effort and to suit our clients' needs.

Melissa Hewitt, P.E. — KHA

Melissa Hewitt is a Transportation Systems Engineer with specialized expertise in a wide range of ITS applications, programs, and technologies. She provides technical expertise for both planning and design of advanced traffic management systems, ITS strategic plans, regional early deployment plans, and traffic management center projects, with specialized expertise in ITS architecture development. Her recent experience includes: New Mexico ITS Strategic Plan; OCTA ITS Road Network Study; Pomona Valley ITS Project; Silicon Valley Smart Corridor, Las Vegas FAST; and Kern Region ITS Early Deployment Plan.

Irina Constantinescu, P.E. — KHA

Irina has three years of experience with expertise that covers both private and public sector transportation projects including design and upgrades of traffic signals, communication networks, signing and striping, and traffic control. Irina is actively involved in projects that include design of traffic signals, traffic signal upgrades, and signing and striping plans for local municipalities throughout Southern California. Design projects also involved video detection design, intersection improvements, analyses, and conceptual plans or recommendations.

Tricia Boyer, P.E. — KHA

Tricia Boyer is a project engineer who manages and supports a broad range of traffic engineering/operations and ITS planning and design projects. Her experience ranges from traffic signal system design to coordination/timing services, TMC design to Concept of Operations development, and PS&E preparation to alternative evaluations. Tricia excels at multi-agency coordination, having routinely coordinated with public agencies and multiple jurisdictions as well as utilities in support of project needs. In addition, she is an instructor for Synchro/SimTraffic training. Currently Tricia is the project manager for the KITS deployment in Surprise, Arizona.

Doug Acker — McCain

Doug Acker has over 20 years of experience in many segments of the traffic industry. He possesses an extensive knowledge of both hardware and software and has designed many of the controllers and subassemblies marketed by McCain Inc. Some of the projects include the 170ATC controller, four different HC11 CPU boards for the 170, the ATC12 CPU for the 170, several of the 2070 modules, a CMS sign controller, and a NEMA controller.

Steven Brown — McCain

Steve Brown has over 30 years of experience in all segments of the traffic industry, including sales, marketing, software development, maintenance and construction. He possesses an extensive knowledge of both hardware and software components found in modern ATMS. He has over 13 years of experience in the development, support, and integration of traffic control systems around the country.

Quality Control/Quality Assurance Plan

QA/QC is a key element of our management approach, one that characterizes the entire management and production process. KHA strives to keep submittals free of errors and omissions; we accomplish that goal by training our employees in error-free work.

Our QA/QC program provides engineering and planning services that meet the requirements of specific contracts as well as our internal standards. Quality Control is the responsibility of our project manager, Jason Castillo. Quality Assurance reviews will be conducted by Bob Barkley, a knowledgeable senior professional who is qualified to manage this turnkey system project. Quality Assurance, then, is essentially a check on the Quality Control procedures for the project.

KHA's QA/QC program will include, but not be limited to, the following procedures:

- Jason Castillo will have the complete authority and responsibility to direct all project efforts and call upon corporate resources as required to satisfy project needs.
- An internal kickoff meeting will be held with key team members to clearly define the scope of services, set subtask responsibilities, establish schedules (including QA/QC reviews), and identify milestones and goals.
- Project decisions will be documented by an "electronic paper trail" and be supported by appropriate data that will clearly show the choices evaluated and the basis for our recommendations.
- Supporting calculations, text, or data used to develop a document will be signed and dated by the individual involved when the work is performed. Also, all telephone conversations and meetings that include or affect a project decision will be documented.
- Documents will be reviewed and/or checked by Bob Barkley who will not be directly performing the initial work activity. He will sign and date the documents and prepare a record of review.
- Jason Castillo will check for clarity, accuracy, completeness, and scope compliance. Any follow-up activity required will be noted and initiated as appropriate.

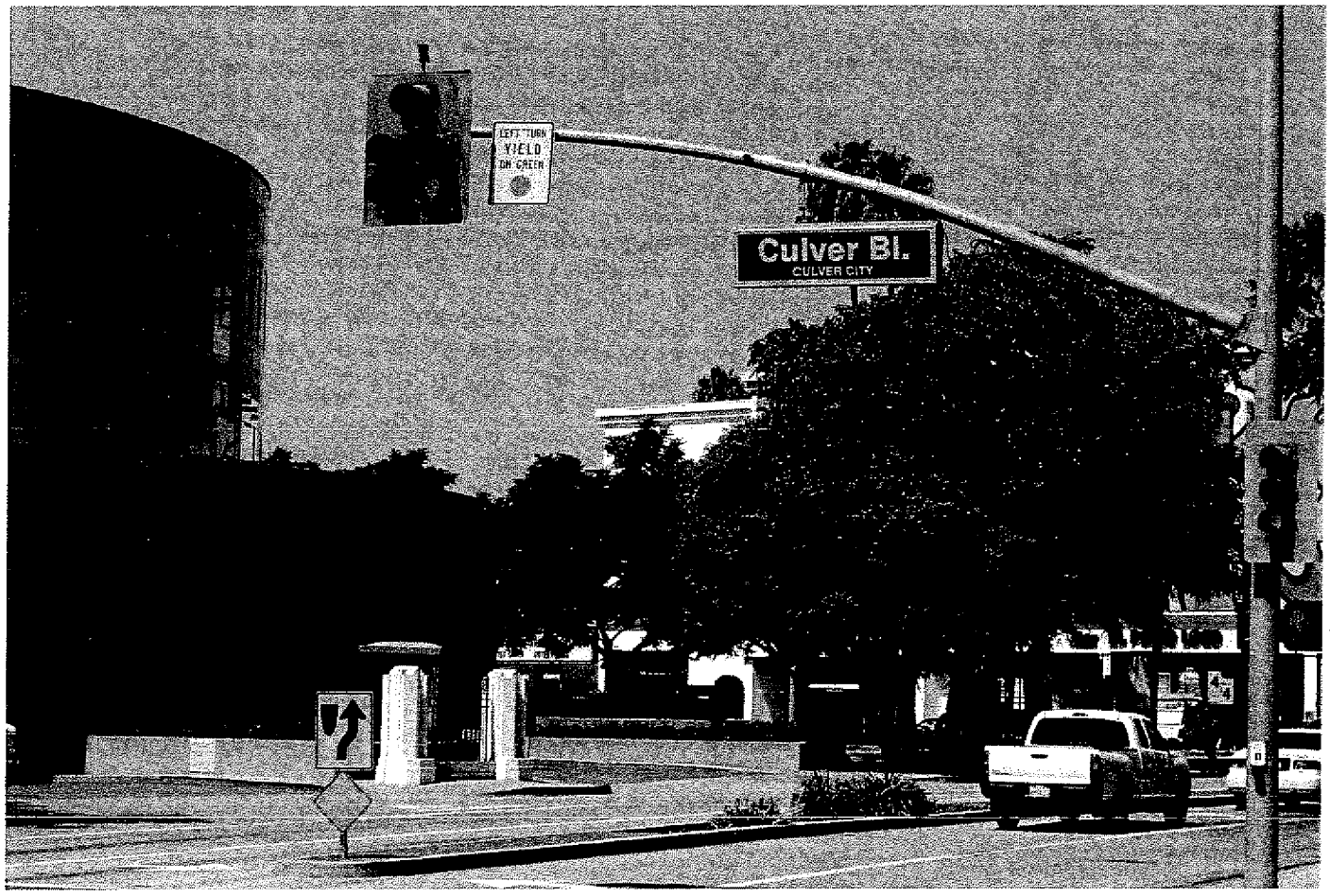
The QA/QC program will include reviews conducted prior to any submittals at key stages in the project. The depth of the QA/QC reviews will be sufficient to assure that proper direction has been provided, that project decisions are documented, that the QA/QC program is followed, and that the project is developed in accordance with the scope. Our work plans, schedules, and budgets are developed with QC tasks, milestones, and hours programmed at the beginning of a project; our system assures that adequate time is allowed for thorough QA/QC reviews throughout the life of a project.

Proposed Schedule

KHA has earned a solid reputation of delivering successful results on complex projects on-time and on-budget. We will utilize our local staff in conjunction with our KITS team to accomplish independent tasks in parallel resulting in a rapidly deployed system. We believe that we can provide immediate value in the following ways:

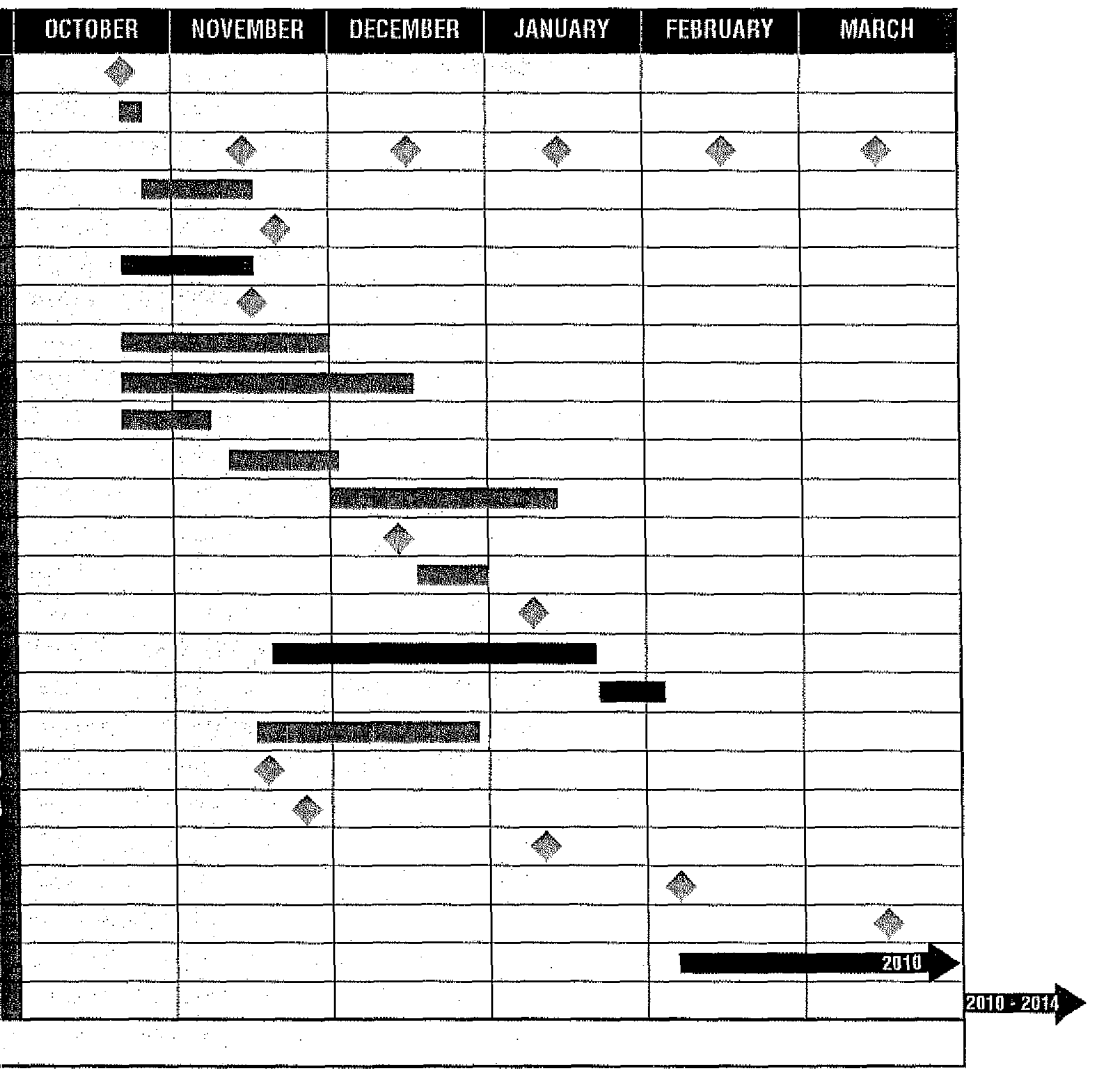
- We will provide KHA hardware, order central modems, and install software from central that will broadcast time to the existing 172.3 firmware, which will improve coordination as soon as possible while the additional tasks are in process
- We can rapidly install and deploy KITS for several controllers within days of receiving central hardware

We believe this aggressive approach will provide your immediate benefits to motorists throughout the City. The complete schedule is presented on the next page.



d.
Project
Approach

TASK	START	FINISH
Notice to Proceed	10.20.08	10.20.08
Project Kickoff & Procurment Meetings	10.20.08	10.24.08
Monthly Project Status Meetings	10.11.08	—
Configuration Time Broadcast	10.27.08	11.14.08
Time Broadcast In Place	11.18.08	11.18.08
Procurement Phase	10.20.08	11.14.08
Order TMC Hardware	11.14.08	11.14.08
Technical Plans	10.20.08	11.28.08
Communication System Testing / Improvements	10.20.08	12.12.08
Determine Existing Controller Parameters	10.20.08	11.7.08
Convert Timing from BI Tran 172.3 to 233	11.13.08	12.2.08
Upgrade Traffic Controller Firmware	12.2.08	1.12.09
Receive TMC Hardware	12.12.08	12.12.08
Configure TMC Hardware	12.18.08	12.31.08
KITS Live	1.7.08	1.7.09
System Implementation	11.24.08	1.23.09
System Acceptance Testing	1.26.09	2.6.09
Documentation	11.18.08	12.29.08
Training Documentation	11.24.08	11.24.08
Training Session 1	11.28.08	11.28.08
Training Session 2	1.9.09	1.9.09
Training Session 3	2.6.09	2.6.09
Training Session 4	3.20.09	3.20.09
Warranty	2.9.09	1.8.10
Maintenance and Upgrades - 2014	1.11.10	3.28.14



Task Critical Task Milestone

Payment Schedule

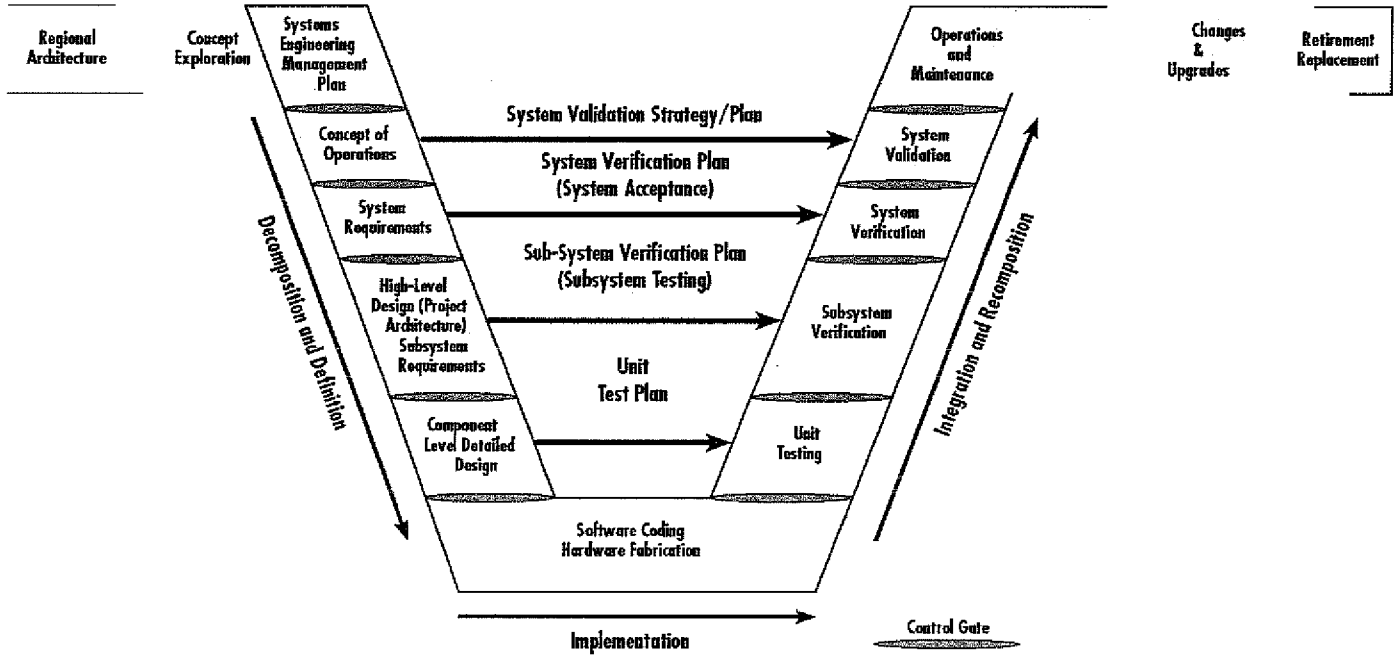
We anticipate the following major milestones:

- Configure time broadcast for existing controllers
- Order Central Hardware and 3rd party tools
- Technical Plans
- Determination of existing 172.3 timing
- Conversion of existing timing to 233
- Configuration of TMC hardware
- System Implementation
- System Acceptance Testing
- Documentation

The schedule depicts the anticipated end dates of major tasks which will correspond with the invoicing submittals.

TASK 2 — TECHNICAL PLANS

The KHA team consists of highly experienced and educated consultants. Our staff for this project includes four degreed Systems Engineers, as well as staff that instructs the systems engineering process on a national level. We understand the importance of taking a holistic view to achieve a successful system.



We will focus on your specific needs and requirements when creating these technical plans.

System Integration and Deployment Plan

The system integration and deployment plan will provide a high-level and low-level guide for integrating controllers onto the system. This will include clearly documenting the steps required to bring a controller online and scheduling the controller firmware change-out activities.

d. Project Approach

Operation and Maintenance Plan

We will work with you to develop an operational plan. Typically the operational plan is a guide discussing how your new system will be used. We view KITS as powerful tool that requires a proper set of procedures to be used effectively.

A Maintenance Plan is essential for you to maintain and grow your system over time. We will spend the time necessary to document and teach you how to install the central software on a new server, workstation, and laptop. We will also focus on teaching you how to best maintain and optimize the performance of your database. Running and maintaining a new traffic control system is not a simple task, but with KHA involved, it will be easier than you might think.

Training Plan

Training is necessary for you to operate, maintain, and grow your system for the future. The training sessions will include both interactive lectures with hands-on experience, printed course materials, technical documentation, and users manuals. Lectures cover a system overview, general operating features, and the theory of operation for the system. Hands-on training provides the user with direct exposure to all aspects of the system and its operation and maintenance. As a minimum, forty hours of on-site instruction for the system will be provided.

Our approach to training is innovative and comprehensive.

Comprehensive training will be provided to familiarize the user with all aspects of the local controller, and central system. This training will thoroughly cover:

- Navigating using the user interface
- General operating features
- How to enter commands
- Report generation
- Maintenance and diagnostics
- Basic troubleshooting procedures to isolate malfunctions
- Graphical map generation and animation
- Database development and maintenance
- Procedure for enabling dynamic displays of the traffic signal

Throughout the project, our team will provide formal and informal training. We do more than just provide you with a generic manual. Instead, **our experienced, energetic staff will provide instruction followed by training exercises, which allows your staff to practice the new skills they have learned**. Our team knows from experience the value of involving key members of your extended staff in the training including management, IT personnel (information/network administration), and field technicians. Your system will be more successful with the right blend of staff understanding how to use and maintain the system. Moreover, we will tailor training topics and exercises to your liking. We have found that several sessions, spaced at least a few weeks apart, are most successful. This schedule allows time for participants to digest and practice the new material.

Due to our significant deployments within Los Angeles County, you will have the option to attend any additional training classes conducted at other agencies for no additional charge. We are currently holding training sessions at least once a month at the Los Angeles County TMC.

Configuration Management Plan

The configuration management plan will document:

- The version of software tools
- Statically assigned IP Addresses for all servers
- Make and model of all central hardware
- Configuration settings for operating system patches

Configuration Management is important in software development projects to allow traceability and problem resolution. We do not anticipate any major software development in the initial phase of this project. Since our KITS software has been deployed and accepted at agencies across the country, we do not expect there to be any significant issues.

Acceptance Testing Plan

While the KITS package you receive will be an off-the-shelf, accepted version, we do agree that it will be a valuable exercise to test the software. We have found that due to the robustness of KITS, acceptance testing is as much of a training exercise as it is a test. We will create an acceptance test based off the desired functional checklist that is included within the RFP to assure that you receive the functionality you expect.

TASK 3 — COMMUNICATION SYSTEM IMPROVEMENTS

KITS has integrated reports for communication system testing.

From the existing communication test reports prepared by Dynaelectric, it appears that much of your copper infrastructure is in good condition. **We believe an off-the-shelf system like KITS is a very cost-effective manner to test communication.** During the system implementation phase, we will attempt to communicate with controllers both in the lab as well as the field. KITS has the ability to adjust turn-around time to account for variable communication latency and support all available RS-232 baud rates. If we are not able to bring some intersections on-line, it is likely that a problem exists somewhere in the communication plant. We will develop a clear, well-researched cost estimate if any potential communication infrastructure repairs or improvements are required.

TASK 4 — TRAFFIC CONTROLLER SOFTWARE AND HARDWARE

We agree with your decision to get more out of the existing 170 controllers that are already in place. This will be a significant cost savings to the City. Therefore, we propose to interface with the existing 172.3 firmware as soon as possible to achieve time synchronization across the existing controllers. Our existing KITS interface will be provided to interface with the BI Tran 233 firmware. McCain does recommend replacement of the controllers that are not 170E. We also understand that your maintenance staff values the new 170 front panel that uses text-based menu options for the 233 firmware. This is something that can be discussed further. We do not anticipate any cabinet modifications outside a wireless receiver for BSP-enabled routes.

Alternative	Hardware	Firmware/Software	Cabinet Modifications
1	Existing 170 Controllers	BI Tran 233	None

TASK 5 — TRAFFIC CONTROL SYSTEM (TCS)

Hardware and Servers Required to Operate the TCS

We believe in working within existing specifications to provide a solution that is consistent with your current City standards. There is significant flexibility for all of the central

hardware if the City has specific preferences toward a manufacturer or model. Fortunately, KITS does not require powerful hardware to run effectively. Experience has shown us that it is most beneficial to invest in a powerful server for the database to speed up the access of reports and data. We also see the value of empowering your staff to use KITS anytime, anywhere. We suggest purchasing one more laptop that the RFP lists and one less workstation. With a compatible docking station, you will still have the ability to use an external monitor, keyboard, and mouse when in the office, but will also have the added flexibility to take the laptop where you need to be. We also suggest procuring laptops with displays that can effectively work outdoors. This will allow your maintenance staff to plug directly into a field controller without having to pitch a tent.

We have included 5 year warranties on all hardware components. While we do not anticipate any major hardware issues, we are confident that you will have sufficient redundancy in case of a failure. All servers will have redundant power supplies and disk drives. The communication and application servers will run RAID 1 while the database server will have RAID 5.

Software Operating System and Networking

KITS was intentionally designed and developed to work within the Windows environment. Consistent with our pledge to be technologically advanced, we work with all available versions of Windows currently available in the market. Based on conversations with your IT staff, we recommend Windows Server 2003/2008 and Windows XP for this project. We pledge to continue to support all future versions of the Windows operating system.

KITS Meets Your Functional Requirements

KITS has more baseline functionality than any other system. While some of these additional features may be reflected in the **Functional Requirements Checklist**, most of this advanced functionality is highlighted in **Section H, Additional Information**. We believe many of these features will provide immediate benefit. For example, only KITS has the ability to historically track all controller timing changes. We know that you have a large deployment automated red-light cameras. Motorists will often try to argue their way out of these tickets by requesting specific details about the timing. Due to the significant amount of requests that you get for timing on a particular day, sometimes over a year back, you need the ability to determine quickly exactly what parameters were running in the controller on that day. Our historical log will allow you to quickly export an Excel timing sheet from a particular day and email it.

KITS has more baseline functionality than any other system.

Licensing and Systems Upgrades Practices

We believe in sharing KITS upgrades with all of our clients. We have found this to be a true win-win. Our clients benefit from additional functionality and we benefit from a more consistent code base to manage. To facilitate this, KHA hosts an annual KITS Users Conference. This year our conference will be held in Fort Lauderdale, FL. The focus of the conference each year is to allow our clients to discuss their most desired new features and functionality with our KITS development and management team. This conference also provides the opportunity to discuss using KITS as a tool to solve common challenges shared by all agencies. Below is a sample license agreement.

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, Time Synchronization, and Auto Download. 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. Clarification of 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.

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 KHA and Associates, Inc., 7878 N. 16th Street Suite 250, Phoenix, Arizona 85020.

TASK 6 — SYSTEM HARDWARE

Required Software for the Proposed System

KITS 3rd Party Software Bill of Materials

Manufacturer	Item	Additional Information	Quantity
	Runtime Tools		
Note Page	PageGate 10 pager license	http://www.notepager.com/pagegate.htm	1
ESRI	ArcView Version 9*	http://www.esri.com/software/arcgis/arcview/index.html	1
ESRI	MapObjects*	http://www.esri.com/software/mapobjects	1
Microsoft	SQL Server 2005 Standard Edition with 10 CALs	http://www.microsoft.com/sql	1
Microsoft	Office 2007 with Visio 2007 Standard	http://office.microsoft.com/en-us/visio/default.aspx	1

* = may not be required if Kimley-Horn maintains base map

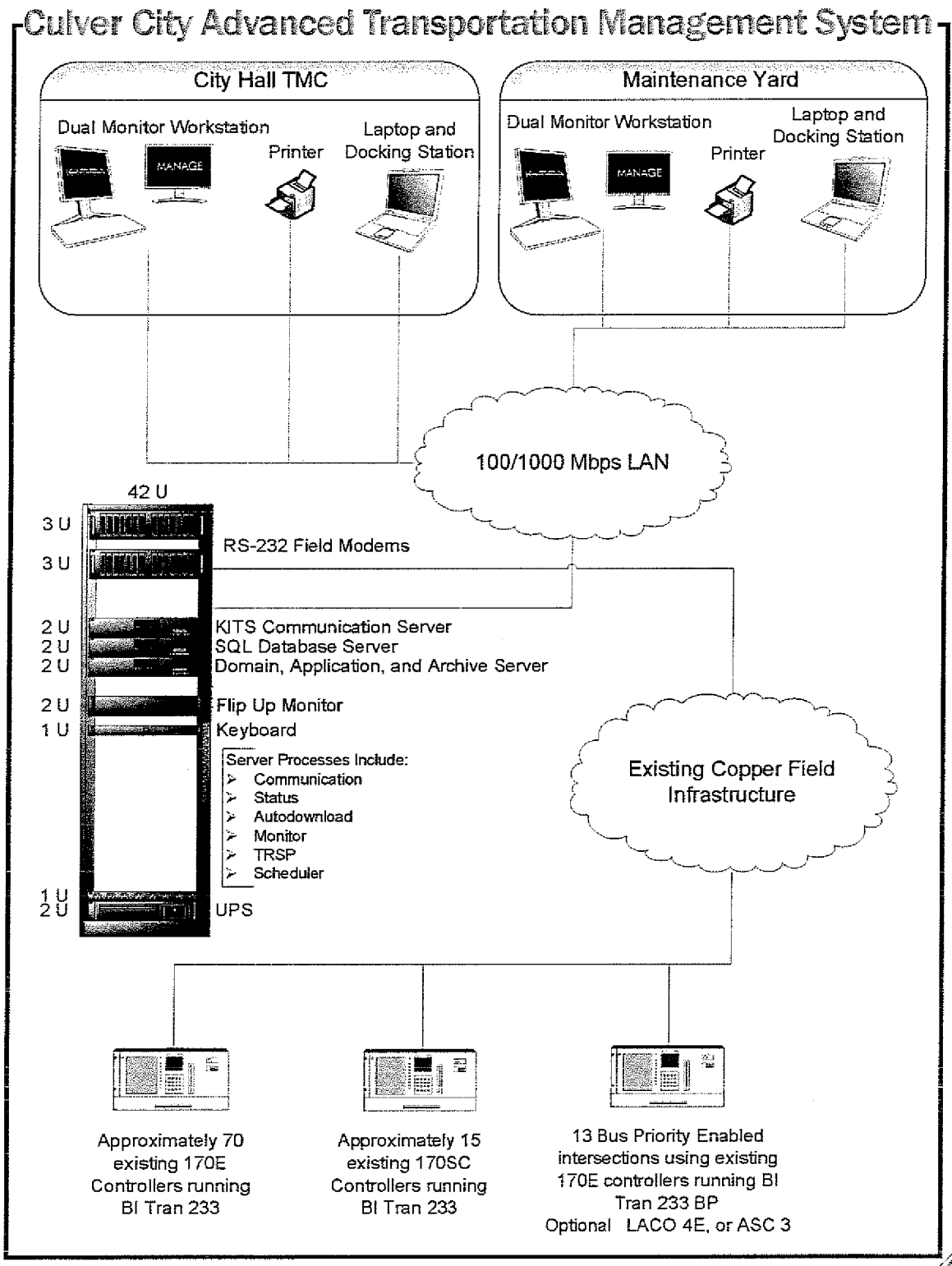
KITS Field Hardware Bill of Materials

Manufacturer	Item	Quantity
McCain	BI Tran Firmware Modification for BSP	1
McCain	BI Tran 233 Firmware License	100
McCain	Controller modem for BSP intersections	15
	Model 496	
McCain	Controller PROM module for BSP intersections	15
	Model 412 C	
CISCO	Wireless receiver for BSP message	15

KITS Central Hardware Bill of Materials

Manufacturer	Item	Additional Information	Quantity
Dell	Database Server	http://www.dell.com/	1
	Dell 2950 III with RAID 5		
Dell	Application Server	http://www.dell.com/	1
	Dell 2950 III		
Dell	Communication Server	http://www.dell.com/	1
	Dell 2950 III		
Samsung	Server Monitor		1
Dell	Laptops / Workstations	http://www.dell.com/	
	Dell Latititude E6500 Laptop		2
	Dell Latititude Docking Station		2
	Dell Precision Workstation T5400		2
	Dell 22" Monitor E228WFP		8
Dell	Server Rack	http://www.dell.com/	1
	Dell 42U Server Rack Model 4210 NS		
US Robotics	Central Modems	http://www.usr.com/home.asp	
	5686E		15
Digi	Digi AccelePort Xem Universal PCI (3.3v & 5v) 16-port RS-232 RJ-45 1U 19" rack w/ power jack option; part 70001757	http://www.digi.com/	1
	Digi PORTS/Xem 16-port RS-232 RJ-45 concentrator* ;part 76000074		1
	Digi AccelePort Xem Cable, EBI HDB44 120" host to PORTS module; part 76000709		1
	Digi 2U 19" Rack mount chassis for PORTS/8em RJ-45 or DB-25 and PORTS/16em RJ-45; part 76000611		1
	Printer	http://www.hp.com	
HP	HP LaserJet 3600		2
	Smart UPS (Battery Backup)	http://www.apc.com/products/family/index.cfm?id=251	
APC	Smart UPS SC1500		2

Individual Hardware Components Functionally Fit into the TCS



d. Project Approach

Expansion of Capabilities and Limitations

Our approach maximizes your existing resources and infrastructure. We commend your decision to make the most of what you currently have.

We have recommended proven equipment that is prepared for the future. You will have the mobility you need to make informed decisions to handle today's transportation challenges. While there is flexibility in actual make and model for all the proposed hardware, we recommend using items that are consistent with the current standards used by the City.

We have recommended proven equipment that is prepared for the future.

We will request an meeting as soon as possible with David Leuck, Culver City IT, to discuss our proposed hardware. This will be on the critical path to deployment. We will attempt to acquire central modems first to allow for fast-tracked central time broadcast functionality to the existing 172.3 firmware. KITS supports many different controller options. In the future, you will have the option to directly integrate LA City 2070 firmware, LACO 4E on the 170E or an ACS/3 directly with KITS.

Licensing and Systems Upgrades Practices for Hardware

The recommended equipment can be purchased with a 5 year warranty. It is important to examine the cost vs. benefit of extended warranties. With the rapid rate of improvement in hardware, in some cases, it may not be cost effective to purchase an up-front 5 year warranty. Our hope is that will we have detailed discussions of your future signal system hardware in a meeting scheduled shortly after receiving notice to proceed.

Maintenance and Support Process

In a similar manner that we empower your staff to have access to KITS anytime, anywhere, we recommend that he KHA support team has the same access. While much of our support can be provided remotely, we also have local staff available from our three local offices to provide immediate on-site support. Our KITS team has effectively worked together to support our installations all over Los Angeles County.

While you are under a maintenance agreement, we will upgrade our software to ensure compatibility with future versions of all 3rd party tools and operating systems. Additional enhancements developed for other agencies will be offered for no license fee. There may be some features that require modest integration effort. For example, client developed features for different firmware (e.g. the Econolite ASC/3) may not directly port into your system, if this is the case we will provide a clear level of effort estimate. Many other features developed by other clients for the BI Tran 233 will be available to you at no cost.

TASK 7 — SYSTEM IMPLEMENTATION

TCS to Operate and Manage Signalized Intersections

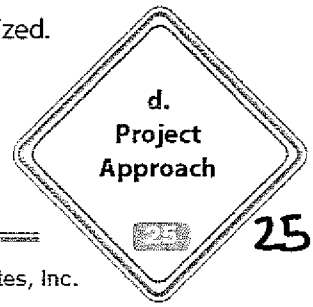
The scope of work included in the RFP details the process that we will go through to deploy a successful system. We have no major exceptions to the scope provided in the RFP.

Upgrade Controller Hardware at Signalized Intersections

We will take advantage of what you already have. Existing cabinets and controllers can be utilized.

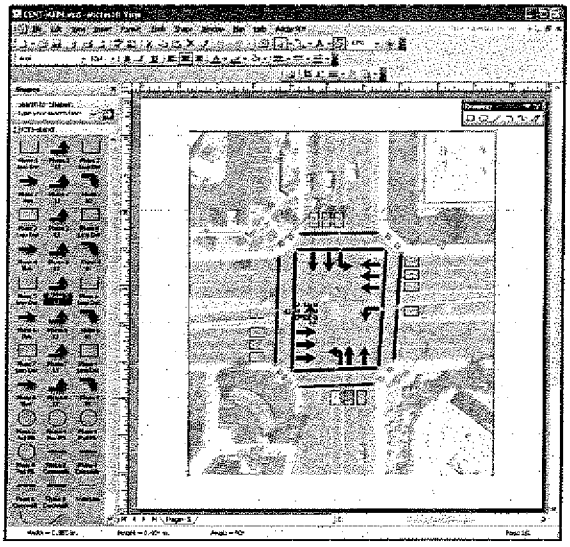
Convert and Implement Existing Settings at each Intersection

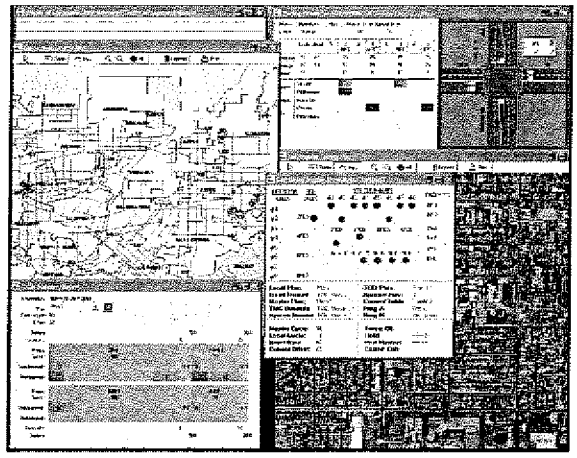
Determination of existing settings must be done first. We request that we partner with the City to retrieving existing setting from the controllers.

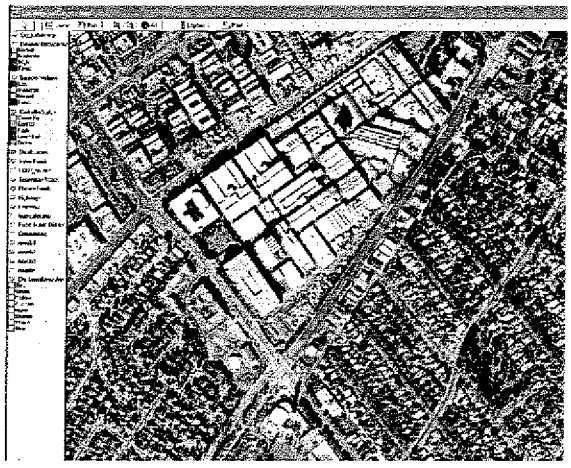


Graphic Displays

We already have an agreement with Los Angles County to receive graphics and GIS updates free of charge for use within Los Angeles County. We have integrated aerials of Culver City that can be used for your intersection graphics. Creating custom graphics are as simple as drag and drop using aerial photography or template style graphics. Samples of graphic displays are shown below.







Existing Communication System

While KITS is clearly technologically advanced, we also have a strong history of utilizing legacy infrastructure. As a system integrator, KHA does not sell or markup any hardware nor distribute any field equipment hardware. This assures you that your best interests will always be kept in mind when evaluating replacement or upgrade of any of your existing field equipment.

Based on the reports included in the RFP, it appears that there are no major issues with the existing infrastructure. KITS can effectively achieve once per second communication at 1200 baud based on your existing system configuration reported in the RFP.

Development of a Conversion Plan

The conversion plan will be developed to minimize the impact on your motorists. Firmware will be upgraded during off-peak hours. Since your controller clocks are not currently synchronized, we believe that the driving public will only experience improvement during this project.

TASK 8 — ACCEPTANCE TESTS

Acceptance Testing of the Project Components

We will create a detailed test plan based off the requirements checklist. All equipment will be configured and staged in City Hall and the signal shop prior to live deployment. Our approach to testing respects your time. Our experienced team will exercise each

component of the system to provide a turn-key approach to acceptance testing. The entire test procedure will be run on-site by KHA staff prior to formal acceptance testing.

TASK 9 — SYSTEM SUPPORT – WARRANTY

We anticipate few software-related issues due to the wide deployment of KITS across Los Angeles County and across the U.S. We have trained local staff who work and live within minutes of your City Hall. Should a more challenging issue arise, our KITS development team can log into your system remotely to troubleshoot. We will work with your IT department to configure remote VPN access into KITS.

Our staff will make frequent visits to your TOC, but we will also have the option of immediately logging into the system and performing analysis as if we were there. Our software was designed to minimize the bandwidth required to remotely access the system. Windows XP now allows us to perform remote maintenance on your computers by using an efficient protocol that is now built into the operating system. We believe that this will take much of the maintenance burden off of your staff and allow our proven quality client service to improve even more.

Company Policy and Ability to Provide Support

Maintenance

The KHA team has extensive experience maintaining our COTS. Our KITS deployments have significantly longer life-cycle relative to the competition—some have been deployed for over 18 years. This is due to our understanding of current technology as well quickly identifying future trends in the market place. We are confident that your system will have a life-cycle of at least 20 years.

Our core KITS deployment and development team will be made available to you by phone and/or in person. This will include after-hour support for any major issues. If a problem is identified, we use issue-tracking software that integrates with our development tools.

This software manages the process of identifying, correcting, testing, and deploying required updates. We strongly believe in our clients leveraging each other's effort. At least four times a year, you will be notified of upgraded functionality that may be of interest to you. Our annual Users Group conference allows all agencies to see detailed demonstrations of new functionality. We hope you are able to attend our next conference November 5 - 7 in Fort Lauderdale, Florida.

Statement of Response Time

Due to the off-the-shelf nature of this software, we do not anticipate any major problems. Below is a statement of response time that quantifies our commitment to providing timely service.

As part of Maintenance Services, KHA shall perform corrective maintenance to correct failures of the System Software and to remedy Deficiencies such that the System Software operates in accordance with the requirements. In the event that Corrective Maintenance is required of KHA, the City will notify KHA of the need for Corrective Maintenance and will determine if the error or malfunction is a Level I, Level II or Level III Priority (each, a "Problem Severity Level"):

"Level I Priority" means an error or malfunction, including a Deficiency, that causes the System Software or a component or application of the System Software to completely halt processing, and for which no reasonable workaround is available.

"Level II Priority" means an error or malfunction, including a Deficiency, that impairs required functionality, but at the time of the error or malfunction, a reasonable

workaround is available to proceed, and such workaround does not impair the City's normal business operations.

"Level III Priority" means an error or malfunction, including a Deficiency, which is inconvenient or an annoyance but does not affect functionality.

KHA shall provide Corrective Maintenance in accordance as described below: For Level I Priority, KHA shall provide expedient action to determine if there is a Deficiency. If KHA reasonably determines that there is a Deficiency, KHA shall provide continuous action to correct the Deficiency. A workaround restoring functionality must be provided within one business day. For Level II Priority, KHA shall provide expedient action to determine if there is a Deficiency. If KHA reasonably determines that there is a Deficiency, KHA shall provide ongoing and diligent action to correct the Deficiency. A workaround restoring functionality must be provided within seven (7) business days. For Level III Priority, KHA shall provide expedient action to determine if there is a Deficiency. If KHA reasonably determines that there is a Deficiency, KHA shall provide ongoing and diligent action to correct the Deficiency and will correct it within sixty (60) calendar days.

Hardware Warranties

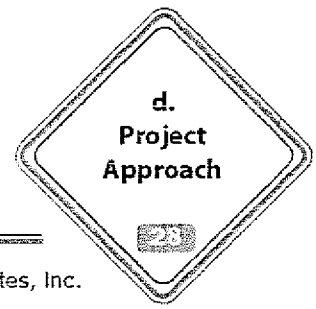
We have priced three year warranties on all hardware components. While we do not anticipate any major hardware issues, we are confident that you will have sufficient redundancy in case of a failure. We have included a redundant server into the system deployment.

Diagnostics

Hardware included in the central system deployment will be covered with a three year manufacturer warranty. Diagnostics for the central equipment are typically performed by low cost off-the-shelf tools such as serial line analyzers and LAN diagnostic tools used by IT professionals.

TASK 10 — DOCUMENTATION/TRAINING

As outlined in our training plan under Task 2, we will provide training sessions throughout the project. Our final comprehensive training session will include a final documentation review.



e. Overview of Proposed TCS Conceptual Operation

A general overview of the concepts and components is provided in section h Additional Information. This section will discuss the specific topics called out in the RFP.

Traffic Signal Priority

KHA KITS for the City is integrated with the McCain BI Tran 233. McCain's BI Tran Program 233 for Model 170 controllers provides the capability of providing priority to transit vehicles.

We will use the BSP priority message based on the AB3418E protocol.

The priority signal is requested via the input file using those inputs designated as Emergency Vehicle preemption inputs. Typically, transit priority requests are received via an optical signaling system such as the 3M Opticom™ or TOMAR™ Preemption signaling systems.

Under preemption operation, the controller can quickly terminate the current phases, if necessary, skip the intervening phases in the sequence, and quickly advance to the preemption phases to give the emergency vehicle the right of way. While this assures quick passage of emergency vehicles through a signalized network, it also disrupts coordination for a period of time during and after the preemption event. If signals are preempted with any frequency, it can cause serious disruption to orderly traffic flow in a coordinated system.

Low priority operation is intended to reduce the travel time for transit vehicles, without producing the disruptive effects of full preemption operation. It is designed to work cooperatively with background coordination schemes, while providing some consideration to the efficient movement of transit priority vehicles. As implemented in Program 233, a transit priority request will cause the controller to 'hurry' through intervening phases so that the transit priority phase can be started earlier than it normally would. In addition, during a transit priority event, the controller can hold in the transit priority phase longer than it would normally. However, in contrast to full preemption operation, phases cannot be skipped, assuring that all side street phases are served. In addition, operator settable limits control the degree to which non-priority phases can be shortened and the degree to which the priority phase can be lengthened. In general, transit priority will not cause the controller to fall out of coordination with its neighboring controllers. While the yield point may move slightly in response to a transit priority request, it will return to its proper point within one cycle. Finally, Program 233 allows the traffic engineer to establish a minimum headway between priority request events. Transit priority request that violate the minimum headway requirement are not served. This prevents priority operation from becoming too disruptive to the orderly flow of traffic through the signalized network.

By setting the appropriate parameters, the traffic engineer can give a preference to the phase(s) associated with the approach direction of a priority vehicle. When the controller is in low priority operation, Call/Active light 9 on the front panel is turned on.

Program 233 supports up to four independent traffic priority sequences. Each of four low priority sequences can have associated phases. When a request is received, a steady demand is placed on the associated phase(s) to prevent it (them) from "gapping" out. Each low priority input has an associated output that can be used to provide an indication the controller is in priority operation.

There are two operator settable timing parameters associated with low priority operation.

e. TCS Conceptual Operation

Maximum Early Green Time

The Maximum Early Green time is set in seconds. This is the maximum time that the 'favored' transit priority phase can be started early to accommodate the transit vehicle. The early start is achieved by shortening the green time of the preceding phases. However, no phases are skipped and all minimum safety intervals (Minimum Green, Walk, Pedestrian Clearance, Yellow Change and All Red) are observed.

Maximum Green Extension

The Maximum Green Extension time is set in seconds. This is the amount of time that the 'favored' transit priority phase can be extended beyond its usual termination point.

Description of Low Priority Operation During Coordinated Operation

During coordinated operation, Program 233 determines if the controller is already in the priority phase(s) or not. If not, the force-off times of the intervening phases will be reduced by the Maximum Early Green time to provide an early green indication for the phase(s) associated with the low priority approach.

If the controller is already in the associated phase(s) while the priority demand is active and if the controller is at its normal yield point, the yield point will be extended one time by the amount of time left on the low priority extension timer. This will result in an extended green for the low priority approach.

Description of Low Priority Operation During Free (Uncoordinated) Operation

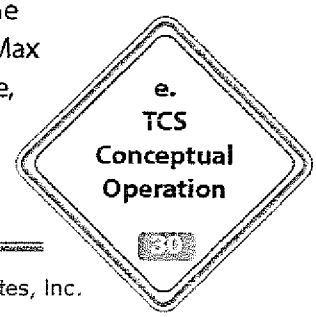
If the controller is not in the priority phase(s), the maximum timer for the current phase will be reduced by an amount equal to the Maximum Early Green time. If the controller is in the priority phase(s), the maximum timer will be increased by the Maximum Green Extension time.

Headway Management

Program 233 allows the traffic engineer to establish minimum headway constraints for transit priority operation. Minimum headway can be changed by time of day and day of week and can be independently set for each of the four (4) low priority sequences. Minimum headway can be set from 0 to 15 minutes. If a minimum headway requirement is established, any vehicle that arrives after a previous transit vehicle, but before the minimum headway interval has expired will not receive priority treatment. This feature can be used or can be disabled by the traffic engineer. When used it allows the traffic engineer to protect coordinated operation from being severely disrupted as a result of too frequent transit priority operation. Thus, it allows those charged with traffic management to strike a balance between giving favorable treatment to transit vehicles and providing for the efficient movement of all traffic through the traffic network.

Scenarios

1. Single priority request while not in preempt phases – The 233 will test against the headway timer for the direction of the received priority call. If the headway is greater than the user set headway, then the 233 will grant priority. The 233 will attempt to provide an early green by shortening non-preempt phases within the operator set minimums. If the priority request drops prior to the preempt phases' normal termination point, the preempt phases will terminate normally. If the priority request is still active when the preempt phases would normally terminate, the 233 will provide a green extension up to the Max Green Extension Time. Should the priority request drop prior to the Max Green Extension Time, the preempt phases will terminate and the 233 will return to normal operation.



2. Single priority request while in the preempt phases – The 233 will test against the headway timer for the direction of the received priority call. If the headway is greater than the user set headway, then the 233 will grant priority. Since the preempt phases are already being served at the time the priority request is received, Early Green Time will not be provided. If the priority request drops prior to the preempt phases' normal termination point, the preempt phases will terminate normally. If the priority request is still active when the preempt phases would normally terminate, the 233 will provide a green extension up to the Max Green Extension Time. Should the priority request drop prior to the Max Green Extension Time, the preempt phases will terminate and the 233 will return to normal operation.

3. Multiple priority request while not in preempt phases – The 233 will serve the calls on a first come, first server basis. The 233 will test against the headway timer for the direction of the first received priority call. If the headway is greater than the user set headway, then the 233 will grant priority. If the first priority request fails the headway test, then the 233 will test the second received priority call. If at least one of the priority calls passes the headway test, then the 233 will grant priority. The 233 will attempt to provide an early green by shortening non-preempt phases within the operator set minimums. If both priority requests drop prior to the preempt phases' normal termination point, the preempt phases will terminate normally. If at least one of the priority request is still active when the preempt phases would normally terminate, the 233 will provide a green extension up to the Max Green Extension Time. Should both priority requests drop prior to the Max Green Extension Time, the preempt phases will terminate and the 233 will return to normal operation.

4. Multiple priority request while in the preempt phases – The 233 will serve the calls on a first come, first server basis. The 233 will test against the headway timer for the direction of the first received priority call. If the headway is greater than the user set headway, then the 233 will grant priority. If the first priority request fails the headway test, then the 233 will test the second received priority call. If at least one of the priority calls passes the headway test, then the 233 will grant priority. Since the preempt phases are already being served at the time the priority request is received, Early Green Time will not be provided. If both priority requests drop prior to the preempt phases' normal termination point, the preempt phases will terminate normally. If at least one of the priority request is still active when the preempt phases would normally terminate, the 233 will provide a green extension up to the Max Green Extension Time. Should both priority requests drop prior to the Max Green Extension Time, the preempt phases will terminate and the 233 will return to normal operation.

Traffic Responsive

The Traffic Responsive module within KITS selects optimal timing plans for a section based on current traffic conditions. KITS allows operators to create the timing plans and set input thresholds to trigger timing plan changes.

The primary data items used for traffic responsive operation are volume and occupancy from system detectors. These parameters are key inputs to the pattern matching process used by the traffic responsive module.

In most effective traffic responsive operations, system detectors are placed at mid-block, exit-side, or significantly upstream locations from an intersection. Utilizing stop-bar detectors for traffic responsive operation can produce unpredictable and undesirable results.

Detector signatures data is defined on a section-by-section basis. Signatures can vary by time-of-day (TOD) period so that different signal timing plan strategies could be applied during AM and PM peak periods. In addition to detector signature data, the input parameters for the traffic responsive module include detector failure thresholds, improvement factors, and the lockout period. The improvement factor and lockout period are used to prevent the

module from rapidly changing the signal timing plan from one to another and then back based on fluctuations in the input detector data.

Traffic Responsive Setup

The operator can use the *Traffic Responsive Setup* form to view, edit, or delete traffic responsive setup information for a given section. This form is used to specify the detectors, their weights (between 1 and 100), and the timing plans for traffic responsive signatures in a given section and time-of-day period. When traffic responsive is selected as the mode for a section, it will choose the signal timing plan to run by comparing the volume and occupancy signatures for each candidate signal timing plan to the current (smoothed) volume and occupancy for the input detectors.

The KITS Traffic Responsive Operational performance is tuned by editing the improvement factor and lock out period parameters for a section.

- Improvement Factor sets the percentage (between 1 and 100) of improvement in the data pattern match between the current signal timing plan and the candidate traffic responsive timing plan. The newly selected signal timing plan will not be implemented if the minimum improvement percentage is not achieved.
- Lock Out Period sets the interval (between 5 and 60 minutes) for Traffic Responsive calculations. This ensures that a selected signal timing plan for the section must be in effect for at least this many minutes before the system will evaluate changing to a different plan based on the pattern matching calculations.

Traffic Responsive Signatures

The Traffic Responsive Signatures form is used to configure traffic responsive signatures for a given section and time-of-day period. Traffic responsive compares real-time detector data with the signatures listed in this form. The plan with the corresponding volume and occupancy signatures that most closely match the current weighted detector conditions will be selected and sent to each intersection contained in the section.

Detector Thresholds

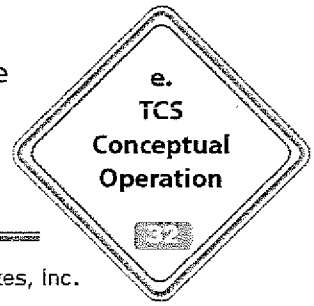
The *Detector Thresholds form* is used to view or edit minimum and maximum volume and occupancy settings for all traffic responsive detectors selected in a given section and time-of-day period. The Traffic responsive module compares real-time detector data with the minimum and maximum volume and occupancy thresholds listed in this form. If a given detector's volume and/or occupancy exceeds a threshold, the detector's historical replacement data will be used instead.

Manual Command for Traffic Responsive

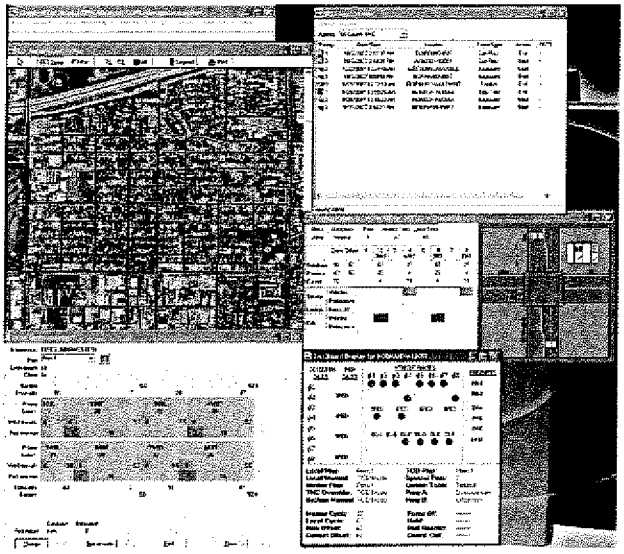
In addition to scheduled traffic responsive operation, KITS includes the ability for an operator to enable a *traffic responsive manual command* allowing a user to command a section or the system into traffic responsive mode. The section or system will be commanded into the plan that the traffic responsive algorithm selects according to the configuration settings established for that section. Traffic responsive criteria can be defined in the Traffic Responsive Setup form.

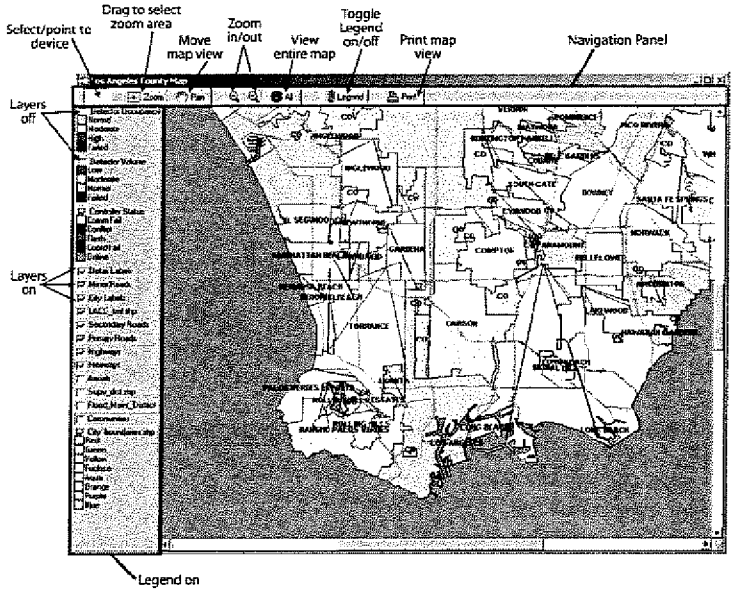
Map Interface

KITS uses standard ESRI layers to build the area map. The map consists of some base static layers such as city boundaries, streets, camera locations, DMS locations, parks, etc, and some dynamic layers such as controller communication status, coordination status, controller phasing, detector VOS data, and congestion levels.



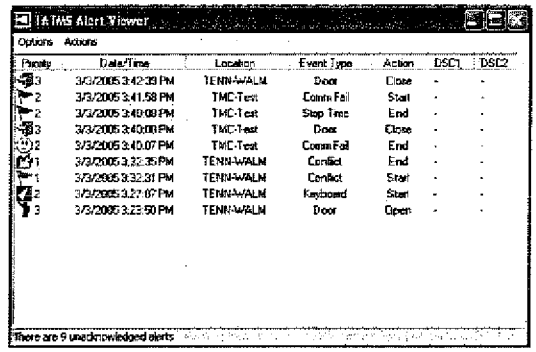
The intuitive map navigation tools have been developed to be consistant with modern map functionality such as rubber band zoom and pan methods.





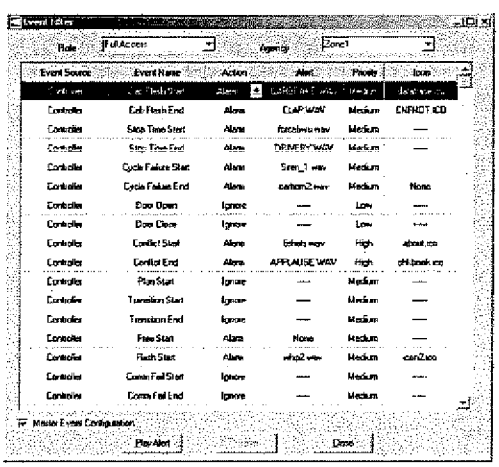
Alarms and Alerts

KITS supports a variety of alarm notifications. The alarms can be displayed in the alert viewer of the GUI and configured to sound an audible alert. Any alarm can be configured to send a page, email, or text message to a user. KITS supports configuration of an on-call schedule to determine who receives the alert.



The alarms displayed in the *Alert viewer* list below can be filtered by user role or jurisdiction (i.e. operator, administrator, communications specialist, etc.). Once an alert is received the user is able to open the alert manager and acknowledge an alert or multiple alerts at one time by holding down the SHIFT or CTRL key.

The Event Filter form is used to identify which alerts are displayed for a given user role and what action should be taken. When an alert is displayed, the sound file chosen for the particular alert can be played. Sounds may be disabled through the Options menu item. System events cover essentially all system components and change of status of field devices. The user may customize the event filter settings based on the agency and role.



The system has the option of either displaying all alerts or only the active ones (i.e. – the alerts that have not yet ended). This will also include the option of not including alerts associated with "test" intersections.

Alarm Reporting

All alerts and acknowledgements are logged and are available in a number of pre-defined reports. The Event log lists alarms and alerts with date and time stamp and relevant details. The acknowledged alert log lists alerts/alarms that have been acknowledged

e. TCS Conceptual Operation

by a user along with the username that performed the acknowledgment, the date/time when the alert was acknowledged, and relevant details of the alert.

Reports

KITS has a variety of Historical and Real-Time reports available to the user including:

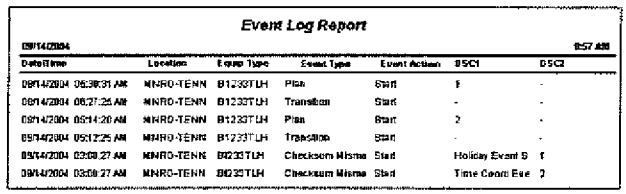
- historical events, alarms and alerts
- user activities
- controller communications statistics, preemption logs, early entry / late exit (coordination failures), and time sync logs
- system detector, count detector, speed trap, and link data
- TOD schedule information, Intersection status, arterial schedules
- Detector and phase malfunction conditions

KITS uses the Crystal Reports COTS reporting tool. By using this tool, users can create their own report formats if desired and develop custom database queries. Crystal Reports supports export of the report data to a .CSV file, Excel, mail message, PDF, and HTML for display on the internet.

A wide variety of filtering criteria are available (tailored to each report type) including:

- location,
- grouping by section, zone, or area,
- date and time limits, and
- various numeric threshold limits.

All of the reports are initially displayed on the screen with an option provided to print the report to printer, PDF, or mail attachment.


Event Log Report

DateTime	Location	Equip Type	Event Type	Event Action	D5C1	D5C2
09/14/2004 06:38:31 AM	MNRO-TENN	B1233TLH	Plan	Start	8	-
09/14/2004 06:27:25 AM	MNRO-TENN	B1233TLH	Transition	Start	-	-
09/14/2004 05:14:20 AM	MNRO-TENN	B1233TLH	Plan	Start	2	-
09/14/2004 05:12:25 AM	MNRO-TENN	B1233TLH	Transition	Start	-	-
09/14/2004 03:09:27 AM	MNRO-TENN	B1233TLH	Checksum Misma	Start	Holiday Event S	1
09/14/2004 03:09:27 AM	MNRO-TENN	B1233TLH	Checksum Misma	Start	Time Coord Eve	2

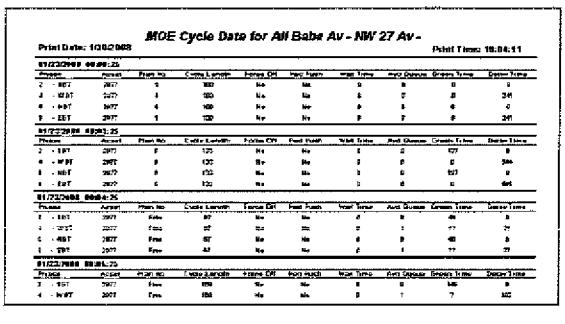
Intersection Measures of Effectiveness

KITS provides two detailed intersection measures-of-effectiveness (MOE) cycle data reports for the BiTran 233 controller:

- Cycle-by-cycle measures of effectiveness from the controller
- Historical Intersection Timing Analysis Report (H.I.T. report)

Cyclic Measures of Effectiveness

The data in the Cyclic MOE report consists of a cycle-by-cycle listing of:


MOE Cycle Data for All Babe Av - NW 27 Av -

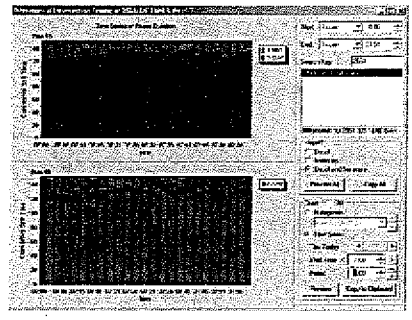
- Phase duration and cycle length
- Force off or gap out
- Pedestrian service
- Wait time since the last time this phase was served
- Average queue – average number of actuations for detectors serving this phase

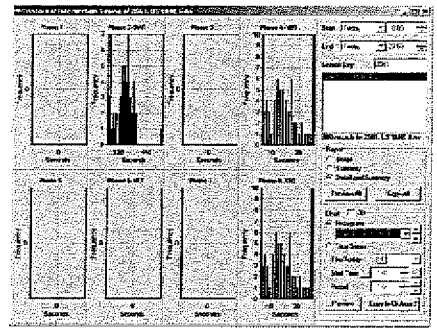
At the end of the MOE Cycle Data report, a summary of the phase duration statistics and the TOD schedule information is displayed. The summary statistics include:

- Number of phase actuations
- Number of times the phase was forced off
- Average duration of actuation time
- Standard deviation of actuation time

HIT Report

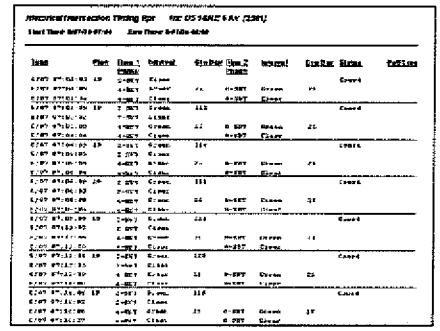
The Historical Intersection Timing Report allows a user to view detailed information on the second-by-second performance of a particular intersection. The HIT report can be displayed as a printed repor, a time-series of cyclic performance, and a histogram of phase durations.





Where Second-by-second phase status information is returned for an intersection, KITS can store this detailed information for every connected intersection for the past seven days. This detailed information includes:

- Changes to phase interval for all phases on each ring
- Changes to plan number
- Changes to plan mode
- Loss of communications
- Anomalies in poll frequency



Scheduled Reports

KITS also provides the option to schedule reports for printing or email daily, weekly, bi-monthly, or monthly. Each user of the system can be sent different reports on different time frequencies. All reports in the system can be configured to be available through scheduled reports.

Global Commands

The Command Menu provides the capability to manually command individual intersections and groups of intersections into various operational modes such as:

- Specific timing plan, flash, free, or local standby
- TOD or traffic responsive mode
- Section assignment
- Incident response plan selection
- Enable and disable police control
- Enable and disable dial-up communications

In addition to mode selection, the Command menu includes features to upload preemption logs and display all current commands.

All Manual commands remain in effect until cancelled by a user. In Fall 2008, the commands functionality is being updated to allow a user to:

- Schedule a manual command override to expire after a certain amount of time
- Allow a user to command changes to splits, offsets, cycle time
- Allow a user to command changes to min/max recall for phases at an intersection

Global Time Broadcast

The user can use the Time Download Report form to send the current date and time of the communication server to a selected communications line, section, or the entire system. A time upload is initiated automatically after the download is complete to verify that the download was successful.

e. TCS Conceptual Operation

g. Price Proposal

We believe that you will receive maximum value if you select KHA for your traffic signal management system. With our substantial local presence, we are absolutely committed to a successful project—no exceptions.

As a professional service provider, we are willing and able to provide a turn-key system. Here are a few items to consider that would reduce the overall cost of this contract:

We would prefer to include the hardware, 3rd party tools, and controller upgrade costs under a different contract.

- Have the City take a leadership role on determining the current parameters for the existing controllers.
- Have the City take a leadership role on installing central rack, computers and modems.
- Reduce the number of documents required under Task 2, Technical Plans.
- Utilize City staff to enter timing and configuration data within KITS.
- Utilize City staff to create intersection graphics, time-space diagrams and configure the base map
- While KHA would be happy to fully maintain the hardware, most of our clients benefit from having consistent hardware that can be supported by their on-site IT staff.

Since we do not mark up prices on hardware, we would prefer to only include KHA and McCain labor within our contract. Some of our clients have been able to purchased hardware off different, existing contracts. We have found that it is also is easier for you to manage your TMC computers, licenses and inventory if you purchase the hardware and 3rd party tools directly where you are currently purchasing similar equipment. We present the price proposal on the next page.

Key Staff identified for Initial Phase

Key Staff	Classification
Jason Castillo	PROJECT MANAGER
Bob Barkley	PROJECT DIRECTOR
Doug Gettman	SENIOR PROFESSIONAL
Melissa Hewitt	SENIOR PROFESSIONAL
David Haines	SENIOR PROFESSIONAL
David Tai	PROFESSIONAL
Krystal Lucas	PROFESSIONAL
Sasa Mitrovic	PROFESSIONAL
Tricia Boyer	PROFESSIONAL
Sri Chakravarthy	PROFESSIONAL
Irina Constantinescu	PROFESSIONAL
Melissa Fry	SUPPORT STAFF
Tia Newby	SUPPORT STAFF

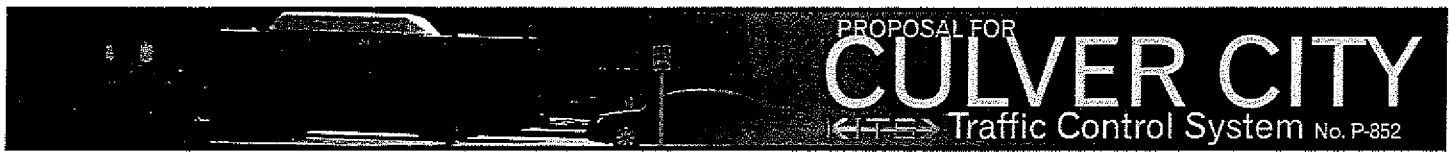
Rate Schedule

Classification	2008 Hourly Rate
SUPPORT STAFF	$85.00
PROFESSIONAL	$135.00
PROJECT MANAGER	$185.00
SENIOR PROFESSIONAL	$180.00
PROJECT DIRECTOR	$210.00

Communication repairs will be made using the lowest prices available at the time of procurement. We do not anticipate major effort. Sample requested prices are below:

1 50P Signal Interconnect Cable $8.00 per linear foot.
3" Interconnect Conduit Sch 80 PVC $47.00 per linear foot

g. Price Proposal



Deliverable Expense Summary

Expense Costs per Task/Deliverable		
Task #	Task/Deliverable from RFP	Expense
1	Project Management - travel and direct project expenses	$10,000
3	Communication System Improvements - estimated	$5,000
5	KITS License Fee	$50,000
5	License already paid for agencies within Los Angeles County	($50,000)
6	Requested Central Hardware	$30,500
6	3rd Party Software Tools	$9,800
6	Field Hardware, Firmware and Change-out	$103,000
	Subtotal for Expenses	**$158,300**

KHA Labor and Total Costs

		Approximate Hours					
Task #	Task/Deliverable from RFP	PM/QC	Senior Prof.	Prof.	Support Staff	Total Hours	Labor Costs
1	Project Management	120	40	40	40	240	$38,000
2	Technical Plans	20	80	80	10	190	$30,000
3	Communication System Improvements	5	10	10	10	35	$4,000
4	Traffic Controller Software and Hardware	5	10	10	0	25	$4,000
4	KITS Support for BI Tran 233 Bus Priority	5	5	25	10	45	$6,000
5	Traffic Control System	5	10	5	5	25	$4,000
6	System Hardware Procurement and Installation	20	25	30	40	115	$16,000
6	Field Hardware, Firmware, and Change-Out	20	40	60	80	200	$25,000
7	Configure TCS	20	40	50	20	130	$20,000
7	Determine Existing Controller Settings	20	20	40	60	140	$17,000
7	Convert Timing from 172.3 to 233	20	40	60	40	160	$23,000
7	Configure Data within KITS for all Intersections	30	30	70	70	200	$27,000
7	Develop Graphic Displays	20	20	50	70	160	$20,000
7	Field Integration	50	80	40	10	180	$30,000
8	Acceptance Testing	20	20	20	10	70	$11,000
9	Warranty and Maintenance (Per year)	40	20	40	20	120	$18,000
10	Documentation and Training	50	50	50	30	180	$28,000
					Subtotal Labor		**$321,000**
					Subtotal Expenses		**$158,300**
					TOTAL		**$479,300**

g. Price Proposal

Kimley-Horn
and Associates, Inc.

Suite 300
7878 N. 16th Street
Phoenix, Arizona
85020

December 1, 2008

Elaine Jeng, P.E.
City of Culver City
Engineering Division, 2nd Floor
9770 Culver Boulevard, Culver City, CA 90232
Re: Proposal for Culver City Traffic Control System No. P-852

Dear Elaine:

Kimley-Horn and Associates, Inc. (KHA) is pleased to submit our price summary for the deployment of KITS. Following the City's selection of KHA, the following modifications were made to the original proposal:

- 3rd party software, central hardware, and field equipment was specified in more detail. Some equipment will be provided by the City.
- Modifications were made to the schedule to reflect a December 23rd notice to proceed.
- Bus signal priority field hardware and integration was removed from this phase of the contract. The firmware will be modified to accept the BSP AB3418E message as originally proposed. This modification created an overall decrease in the amount of estimated expenses.
- The KHA warrantee and support period for KITS was extended from one year to three years following system acceptance. This accounts for an increase in labor.

The following attachments supersede items from the original proposal.

If you have any questions, please feel free to contact me at (602) 906-1108.

Very truly yours,

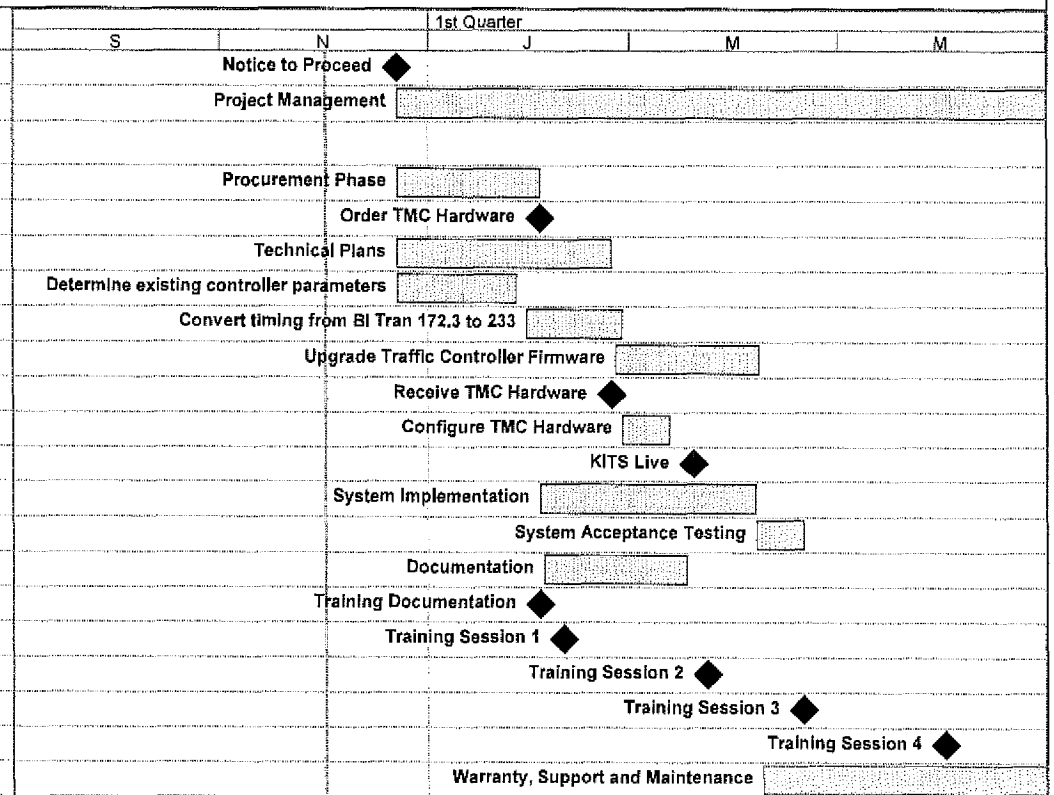
KIMLEY-HORN AND ASSOCIATES, INC.

Jason Castillo
Project Manager

TEL 602 944 5500
FAX 602 944 7423

Culver City KITS
Project Schedule

ID	Task Name	Start	Finish
1	Notice to Proceed	Tue 12/23/08	Tue 12/23/08
2	Project Management	Tue 12/23/08	Wed 5/19/10
3	Configure time broadcast / on site test system. Communication testing	Wed 12/24/08	Tue 3/10/09
4	Procurement Phase	Tue 12/23/08	Mon 2/2/09
5	Order TMC Hardware	Mon 2/2/09	Mon 2/2/09
6	Technical Plans	Tue 12/23/08	Mon 2/23/09
7	Determine existing controller parameters	Tue 12/23/08	Mon 1/26/09
8	Convert timing from BI Tran 172.3 to 233	Fri 1/30/09	Thu 2/26/09
9	Upgrade Traffic Controller Firmware	Wed 2/25/09	Tue 4/7/09
10	Receive TMC Hardware	Mon 2/23/09	Mon 2/23/09
11	Configure TMC Hardware	Fri 2/27/09	Thu 3/12/09
12	KITS Live	Thu 3/19/09	Thu 3/19/09
13	System Implementation	Tue 2/3/09	Mon 4/6/09
14	System Acceptance Testing	Tue 4/7/09	Mon 4/20/09
15	Documentation	Wed 2/4/09	Tue 3/17/09
16	Training Documentation	Tue 2/3/09	Tue 2/3/09
17	Training Session 1	Mon 2/9/09	Mon 2/9/09
18	Training Session 2	Mon 3/23/09	Mon 3/23/09
19	Training Session 3	Mon 4/20/09	Mon 4/20/09
20	Training Session 4	Mon 6/1/09	Mon 6/1/09
21	Warranty, Support and Maintenance	Thu 4/9/09	Mon 4/9/12



Task	Rolled Up Task	External Tasks	
Critical Task	Rolled Up Critical Task	Project Summary	
Progress	Rolled Up Milestone	Group By Summary	
Milestone	Rolled Up Progress	Deadline	
Summary	Split		

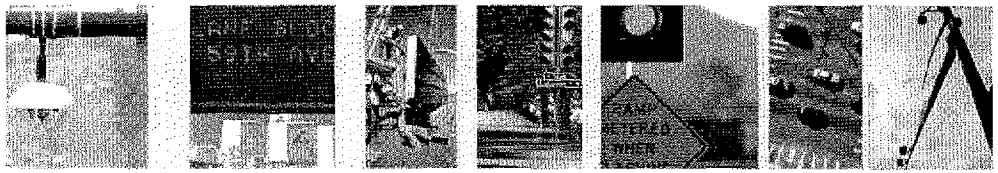
Exhibit A - Price and Schedule of Payments
Culver City KITS
SCHEDULE OF DELIVERABLES AND PAYMENTS

Project Costs & Schedule per Task/Deliverable

Task/Deliverable	Value (Labor)	Holdback Amount	Aggregate Invoice Amount
1. Project Management / Status Meetings			
1.1 Project Kickoff Meeting	$8,000	$800	$7,200
1.2 Status Meeting 1	$6,000	$600	$5,400
1.3 Status Meeting 2	$6,000	$600	$5,400
1.4 Status Meeting 3	$6,000	$600	$5,400
1.5 Status Meeting 4	$6,000	$600	$5,400
1.6 Status Meeting 5	$6,000	$600	$5,400
2. Procurement			
2.1 Bill of Materials for Central System Equipment	$10,000	$1,000	$9,000
2.2 Bill of Materials for Field and Communication Equipment	$10,000	$1,000	$9,000
2.3 Bill of Materials for 3rd Party Software	$10,000	$1,000	$9,000
3. Controller Timing			
3.1 Determine Existing Controller Settings	$17,000	$1,700	$15,300
3.2 Convert BI Tran 172.3 Timing to 233	$24,000	$2,400	$21,600
4. Technical Plans			
4.1 System Integration and Deployment Plan	$6,000	$600	$5,400
4.2 Operation and Maintenance Plan	$6,000	$600	$5,400
4.3 Training Plan	$6,000	$600	$5,400
4.4 Configuration Managment Plan	$6,000	$600	$5,400
4.5 Acceptance Testing Plan	$6,000	$600	$5,400
5. Citywide System Configuration			
5.1 Configuration of TMC Hardware	$20,000	$2,000	$18,000
5.2 KITS Installation with Test Controller	$20,000	$2,000	$18,000
5.3 KITS Citywide Data Configuration	$30,000	$3,000	$27,000
5.4 Develop Citywide Graphic Displays	$20,000	$2,000	$18,000
6. System Implementation			
6.1 KITS Live with Two Field Intersections	$20,000	$2,000	$18,000
6.2 KITS Live with Twenty Field Intersections	$10,000	$1,000	$9,000
6.2 KITS Live with Remainder of Field Intersections	$10,000	$1,000	$9,000
7. Testing			
7.1 Acceptance Testing	$10,000	$1,000	$9,000
8. Documentation and Training			
8.1 Acceptance Test Report	$8,000	$800	$7,200
8.2 Electronic copy of the KITS Manual	$2,000	$200	$1,800
8.3 Training Session 1	$3,000	$300	$2,700
8.4 Training Session 2	$3,000	$300	$2,700
8.5 Training Session 3	$3,000	$300	$2,700
8.6 Training Session 4	$3,000	$300	$2,700
9. Warranty and Support			
9.1 Three Years of KITS Support and Warranty	$54,000	$5,400	$48,600
Additional Services			
Labor Subtotal	**$355,000**		
Estimated Expenses	**$118,516**		
TOTAL	**$473,516**		

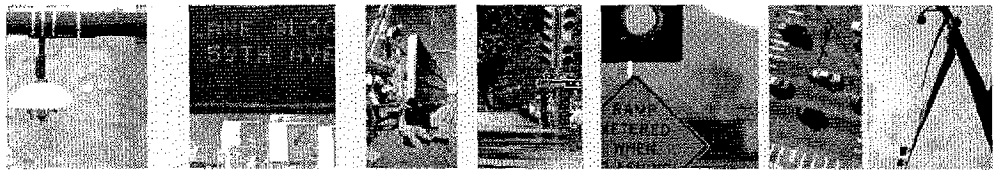
KITS 3rd Party Software Bill of Materials

Manufacturer	Item	Additional Information		Approximate Unit Cost	Total Cost
	Runtime Tools				
Note Page	PageGate 10 pager license	http://www.notepager.com/pagegate.htm	1	$ 300	$ 300
ESRI	ArcView Version 9*	http://www.esri.com/software/arcgis/arcview/index.html	1	$ -	$ -
ESRI	MapObjects	http://www.esri.com/software/mapobjects	1	$ 5,000	$ 5,000
Microsoft	SQL Server 2008 Standard Edition with 10 CALs	http://www.microsoft.com/sql	1	$ 2,500	$ 2,500
Microsoft	Office 2007**	http://office.microsoft.com	4	$ -	$ -
Microsoft	Visio 2007 Standard	http://office.microsoft.com/en-us/visio/default.aspx	1	$ 200	$ 200
		3rd Party Software Cost Estimate			$ 8,000



Culver City KITS Central Hardware Bill of Materials

Manufacturer	Item	Additional Information	Quantity	Approximate Unit Cost	Total Cost
Dell	**Database Server**	http://www.dell.com/	1	$5,200	$5,200
Dell	**Application Server**	http://www.dell.com/	1	$3,700	$3,700
Dell	**Communication Server**	http://www.dell.com/	1	$3,700	$3,700
Dell	**Server Monitor****		1	$0	$0
Dell	**Laptops / Workstations**	http://www.dell.com/			
	Dell Latititude E6500 Laptop		1	$2,000	$2,000
	Dell Latititude Docking Station		1	$200	$400
	Dell Precision Workstation T5400		3	$1,000	$3,000
	Dell Monitors**		8	$0	$0
	Dell 3 year server warrantee		3	$300	$900
	Dell shipping		1		$400
	Dell Compatible Server Rack	http://www.dell.com/			
	Server rack		1	$1,000	$1,000
	Rack mounting hardware for servers, modems, and UPS		1	$700	$700
	Rack shipping		1	$600	$600
GDI	**Central Modem Power Supply and 16 slot Chassis***	www.gdi.com	2	$2,300	$4,600
	Central modem wiring and cabling to existing punch block		1	$2,500	$2,500
Digi	**Digi AccelePort Xem Universal PCI (3.3v & 5v) 16-port RS-232 RJ-45 1U 19" rack w/ power jack option; part 70001757**	http://www.digi.com/	1	$1,250	$1,250



Culver City KITS Central Hardware Bill of Materials

Manufacturer	Item	Additional Information	Quantity	Approximate Unit Cost	Total Cost
	Digi PORTS/Xem 16-port RS-232 RJ-45 concentrator* ;part 76000074		1	$700	$700
	Digi AccelePort Xem Cable, EBI HDB44 120" host to PORTS module; part 76000709		1	$80	$80
	Digi 2U 19" Rack mount chassis for PORTS/8em RJ-45 or DB-25 and PORTS/16em RJ-45; part 76000611		1	$70	$70
	Serial port extender cables		32	$45	$1,440
	Digi Shipping		1	$100	$100
	Printer	http://www.hp.com			
HP	HP LaserJet 3600		2	$800	$1,600
	HP Shipping		1	$100	$100
	Smart UPS (Battery Backup)	http://www.apc.com/products/family/index.cfm?id=251			
APC	Smart UPS SC1500		2	$350	$700
	APC Shipping		1	$200	$200
		Central Hardware Cost Estimate			$34,940
	*GDI 400 modems provided by the City				
	**Monitors provided by the City				

Culver City KITS Field Hardware Bill of Materials

Manufacturer	Item		Quantity	Approximate Unit Cost	Total Cost
McCain	BI Tran Firmware Modification for 233 BSP		1	$25,000	$25,000
McCain	BI Tran 233 Site License		1	$40,000	$40,000
GDI	Controller field modem		105	$0	$0
McCain	Controller 412 C module for BSP intersections**		2	$288	$576
	Field Hardware Cost Estimate				$65,576

* Assumption that there are working modems in each cabinet

**Used to test BSP parameters in firmware

Field hardware does not include communication expenses

Summary

Field Hardware	$65,576
Central Hardware	$34,940
3rd Party Software	$8,000
Travel	$10,000
	$118,516