

Eastbound I-580 Express Lanes Electronic Toll System Request for Proposals



Released by:

Alameda County
Congestion Management
Agency

Federal Project Number: ESPL-6273(056)



URS

Release Date: November 2009



EASTBOUND I-580 EXPRESS LANES ETS
RFP A09-007

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KEY EASTBOUND I-580 EXPRESS LANES REQUEST FOR PROPOSAL DATES

RFP Issued	November 3, 2009	
Pre-Submittal Conference*	November 18, 2009	10:00am PDT
Deadline for Submitting Questions	November 30, 2009	3:00pm PDT
Deadline for Proposal Submittal	December 18, 2009	3:00pm PDT
Interviews	Week of January 18, 2010	To Be Scheduled

* Attendance at Pre-Submittal Conference is Mandatory.



1. ACRONYMS AND GLOSSARY OF TERMS

ACCMA	Alameda County Congestion Management Agency
ACTIA	Alameda County Transportation Improvement Authority
ASTM	American Society for Testing and Materials
AVI	Automatic Vehicle Identification
AVC	Automatic Vehicle Classification
BAFO	Best and Final Offer
BATA	Bay Area Toll Authority
Bidder	Any firm or company which submits a written technical and cost proposal in response to this RFP.
Caltrans	California Department of Transportation
CASE	Computer Aided Software Engineering
CCTV	Closed Circuit Television
CCR	Camera Control Receiver
CHP	California Highway Patrol
CMP	Configuration Management Plan
Contract	The contract to be signed by the successful Bidder under this RFP
COTS	Commercial off-the-shelf
CSC	Customer Service Center – system and operation to be provided by the Systems Integrator where EB I-580 Express Lanes questions will be addressed on behalf of the ACCMA.
CSR	Customer Service Representative
CTOC	California Toll Operators Committee
Customer	Person, company, or entity that applies and subscribes to the Bay Area Toll Authority for a FasTrak [®] Transponder for use in the Express Lanes.
DBE	Disadvantaged Business Enterprises
DDD	Detailed Design Documentation
DMS	Dynamic Message Sign
DRDS	Dynamic Rate Display Sign
DSRC	Dedicated Short Range Communications



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ED	Executive Director
ETC	Electronic Toll Collection
ETS	Electronic Toll System - The electronic collection of tolls utilizing an antenna and reader in the EB I-580 Express Lanes and a transponder located on or in the vehicle. The antenna reads the transponder and the reader determines the ETC account number for toll payment purposes.
Express Carpool Lane	Another name for Express Lanes
Evaluation Committee	The people that will be selected by the ACCMA to review and evaluate each proposal and provide selection recommendations to the Committee.
FasTrak [®]	FasTrak [®] is the Electronic Tolling System that is utilized in California
FAT	Factory Acceptance Test
FCC	Federal Communications Commission
FIFO	First In First Out
FMAS	Facility Management and Accounting System
GP	General Purpose
GUI	Graphic User Interface
Express Lanes	High Occupancy Toll Lane is a freeway or Expressway lane which is open to HOVs without a toll charge and also open to SOVs that pay a specified toll (also referred to in this RFP and other attached documents as the EB I-580 Express Lanes or the Express Lanes).
Express Lanes System	The Express Lanes System is all of the hardware and software that is required to effectively operate the EB I-580 Express Lanes(s).
HOV	High Occupancy Vehicle
HOV Lane	High Occupancy Vehicle Lane
ITS	Intelligent Transportation System
LED	Light Emitting Diode
LOS	Level of Service
MF	Mixed Flow
MOMS	Maintenance Online Management System
MOT	Maintenance of Traffic
MTBF	Mean Time Between Failure - the mean calculated time, based on life cycle experience, between failures of an item or component.



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MTTR	Mean Time To Repair - the mean time required to repair or replace an item; normally based on testing or actual field experience.
Non-Revenue Vehicle	Non-HOV authorized vehicles that are allowed to travel on ACCMA facilities free of charge.
NTCIP	National Transportation Communications for ITS Protocol
NTP	Notice to Proceed
PDA	Personal Digital Assistant
PDD	Preliminary Design Documentation
PTC	Permission to Commence
RCSC	Regional Customer Service Center, which is operated by BATA.
RTMS	Remote Traffic Microwave Sensor
RFID	Radio Frequency Identification
RF	Radio Frequency
RFP	Request for Proposal
SNMP	Simple Network Management Protocol
Software	Software means any Source Code, Object Code, computer databases and any associated html and graphics files (other than Third Party Software that is separately licensed by the ACCMA) that are supplied to the ACCMA by the Systems Integrator under the Contract.
SOV	Single Occupancy Vehicle
Special Hardware	Special Hardware means any mechanical part and any piece of electrical or digital equipment that the Systems Integrator designs, develops or modifies for the Project, including, without limitation, lane controllers, hand-held reader devices, together with the written instructions necessary or appropriate to install and operate the Special Hardware.
Systems Integrator (SI)	The company who contracts with the ACCMA to provide the fully integrated ETS (excluding individual transponders) and all required services consistent with this RFP.
Systems Manager	The Systems Manager is the consultant that will, working closely with ACCMA staff, oversee the ETS design, development, integration, test, installation, operation and maintenance.
Tag	In-vehicle FasTrak [®] Transponder
TCP/IP	Transmission Control Protocol/Internet Protocol



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Title 21	The Caltrans standard for Automatic Vehicle Identification Equipment, set forth in Title 21 of the California Code of Regulations, which must be followed by every electronic tolling system deployed in California
TDC	Toll Data Center - subsystem that will collect all roadside subsystem generated data and support the dynamic pricing process.
Tolling Zone	The Tolling Zone is the area at which the EB I-580 Express Lanes FasTrak [®] roadside equipment is to be installed.
Transponder	A small in-vehicle electronic device, used for the payment of tolls, which contains a unique identification number.
TMC	Traffic Management Center
TZC	Tolling Zone Controller
UDBE	Underutilized Disadvantaged Business Enterprises
UPS	Uninterruptible Power Supply
VDS	Vehicle Detection System
Violation	When an SOV not equipped with a FasTrak [®] transponder in good standing passes through a tolling zone or is in violation of the California Vehicle Code.
VPN	Virtual Private Network
VTA	Santa Clara Valley Transportation Authority
WAN	Wide Area Network



2. INTRODUCTION AND PROCUREMENT OBJECTIVE

2.1 INTRODUCTION

The Alameda County Congestion Management Agency (ACCMA) is responsible for planning, programming, and coordinating Federal, State, and Regional funds for transportation projects within Alameda County. In addition to the programming duties, the ACCMA acts as project sponsor for certain projects, or phases of projects in Alameda County. This is the case for the Eastbound (EB) I-580 High Occupancy Toll (HOT) Lanes Project in Alameda County. The EB I-580 HOT Lanes Project will be referred subsequently in this RFP as the EB I-580 Express Lanes Project.

2.2 GENERAL DESCRIPTION OF THE PROJECT

In order to provide better traffic flow on I-580 in Alameda County, an eastbound High Occupancy Vehicle (HOV) lane and a portion of the adjacent shoulder and mixed flow lane will be used to construct dual eastbound Express lanes. The Project Limits are just from west of the Hacienda Drive Interchange to just east of the Greenville Road Interchange. The California Legislature under AB 2032 and the Federal Highway Administration (FHWA) authorized this conversion as a project to improve travel efficiency in the corridor and provide more options to individual travelers. The ACCMA has been tasked and authorized to incorporate the existing HOV lane in the eastbound direction into dual Express Lanes. The ACCMA will administer and operate the EB I-580 Express Lanes. This Project is referred to as the EB I-580 Express Lanes (EL) Project. The California Department of Transportation (Caltrans) is responsible for the design, construction and maintenance of the EB I-580 HOV Lane.

2.3 PROJECT PHASES

The I-580 Express Lanes Project is divided into the following four (4) overall phases:

- **Phase I – Design, Development, Procurement, and Factory Test** – This phase includes the ETS design, civil engineering development, equipment procurement/fabrication, unit/component testing, integration and the conduct of a detailed Factory Acceptance Test (FAT) of the ETS components;
- **Phase II - Installation, Testing, and Approval** – This phase includes ETS equipment, gantries, conduit, all necessary ancillaries and software installation and configuration, conduct of comprehensive on-site operational and System Acceptance Test and ACCMA/Systems Manager approval for the Express Lanes System to be opened to traffic;
- **Phase III – System Performance Evaluation** – This phase includes a performance evaluation period of 90 days which includes conduct of a 90-Day Operational Test under



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actual I-580 Express Lanes operation, full ETS support, maintenance and operations by BATA, ACCMA, Caltrans, and the SI; and

- **Phase IV - Warranty Period** – This phase includes full ETS maintenance support by the Systems Integrator (SI) during a Warranty Period that shall extend 270 days after Phase III approval, which would be granted upon successful system performance testing that shall include at least a 30-day period of continuous error-free System operation.

2.4 NON-DISCRIMINATION

The Bidder shall not unlawfully discriminate, harass or allow harassment, against any employee or applicant for employment because of sex, sexual orientation, race, religious creed, color, national origin, ancestry, denial of family and medical care leave, medical condition (cancer/genetic characteristics) physical handicap, disability (mental or physical) including HIV and AIDS, denial of pregnancy disability leave or reasonable accommodation, marital status, age (40 and above), in the performance of ACCMA contracts. Bidders and any subcontractors shall ensure that the evaluation and treatment of their employees and applicants for employment are free from such discrimination and harassment.

Bidder shall include the non-discrimination and compliance provisions of the above clause in all subcontracts to perform work under this contract.

2.5 ISSUING OFFICE

This Request for Proposals (RFP) is being issued by the ACCMA:

Alameda County Congestion Management Agency (ACCMA)
1333 Broadway, Suite 220
Oakland, CA 94612

2.6 SOLE POINT OF CONTACT

The sole point of contact for all purposes of this procurement shall be ACCMA's Contracts Administrator, Ms. Liz Brazil. Ms. Brazil's address and contact information is presented below:

Liz Brazil, Contracts Administrator
Alameda County Congestion Management Agency
1333 Broadway, Suite 220
Oakland, CA 94612
Email Address: lbrazil@accma.ca.gov



2.7 MANDATORY PRE-SUBMITTAL CONFERENCE

A mandatory pre-submittal conference will be held on November 18, 2009, beginning at 10:00 a.m. PDT, in the ACTIA Board Room at 1333 Broadway, Suite 300, Oakland, CA 94612. The pre-submittal conference will allow prospective Bidders to learn more about the project and to ask questions pertaining to the EB I-580 Express Lanes Project, the RFP, procurement process, the project schedule, etc.

Attendance at the pre-submittal conference is mandatory.

2.8 QUESTIONS AND INQUIRES

During the pre-submittal conference verbal questions will be accepted from prospective Bidders attending the conference. All verbal questions during the pre-submittal conference will be documented and answers to those questions will be provided, via the ACCMA website, to all prospective Bidders. Any questions that cannot be answered fully during the pre-submittal conference will also be addressed and provided to prospective Bidders via the ACCMA website. Any prospective Bidder finding a discrepancy in or omission from the RFP, or in doubt as to the meaning of any provision in the RFP, must raise the issue(s) at the pre-submittal conference.

Other questions, inquiries, discrepancies or omissions, including those arising subsequent to the pre-submittal conference, must be submitted in writing and received by the Contracts Administrator by 5:00 p.m. (local time) on November 30, 2009 at the address referenced in Section 2.5, with the phrase "Eastbound I-580 Express Lanes ETS RFP" prominently typed on the face of the envelope. Questions may also be transmitted via email to the Contracts Administrator. All such emails must include the subject line "Eastbound I-580 Express Lanes ETS RFP Question:" and then the stated question in the body of the email. It is up to the Bidder to confirm that the email was received by the Contracts Administrator by the above-referenced deadline. The ACCMA is not obligated to change the RFP in any way, but questions affecting the content of the RFP in a material way, or clarifying the intent, will be answered by means of an addendum to the RFP, which will be made available on the ACCMA's website to all of those companies that were represented at the pre-submittal meeting. The ACCMA will not be responsible for any communications concerning this RFP which are not in writing or are not made at the pre-submittal meeting.

2.9 SUBMISSION DEADLINE

To be considered, proposals must be received by the Contracts Administrator at the address referenced in Section 2.5 **no later than 3:00 PDT on December 18, 2009**. Bidders who submit their proposals by mail should allow sufficient mailing and internal delivery time to ensure timely receipt by the Contracts Administrator. Proposals or unsolicited amendments to proposals arriving after the closing date and time will be rejected and returned unopened.

Bidders shall complete and submit their proposals on the forms furnished with the RFP. All proposal forms are to be signed by an individual authorized to bind the Bidder, notarized if so



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indicated, placed in the appropriate envelope or package, and directed to the Contracts Administrator at the address referenced in Section 2.5.

Technical Proposals and Cost Proposals must be submitted in separate sealed envelopes or packages addressed to the Contracts Administrator and clearly marked as to their contents, (e.g., "Technical Proposal, Eastbound I-580 Express Lanes ETS RFP" or "Cost Proposal, Eastbound I-580 Express Lanes ETS RFP"), and received by the Contracts Administrator at the address referenced in Section 2.5 no later than the time and date referenced above. If the separate Technical Proposal and Cost Proposal envelopes or packages are mailed or delivered in one larger envelope or package, the words "Eastbound I-580 Express Lanes ETS RFP" must be prominently typed on the face thereof. Failure to submit the proposals in the manner requested may result in the proposal being rejected as unacceptable.

Proposals shall not be opened publicly, and the identity of a Bidder shall not be disclosed prior to contract award.

2.10 DURATION OF OFFER

Proposals and, if required, Best and Final Offers (BAFOs) submitted in response to this solicitation are irrevocable for a period of 90 days following the closing date for the receipt of proposals and/or the BAFO(s). This period may be extended if requested by the Contracts Administrator and agreed to by a Bidder, in writing.

2.11 BOND REQUIREMENTS

The successful Bidder (Systems Integrator) shall be required to furnish, at the time of award of the Contract, a Performance Bond in the full amount of the Contract.

Acceptable security for the performance bond shall be limited to:

- A Bond in a form satisfactory to ACCMA, underwritten by a surety company authorized to do business in the State of California. Attached to this RFP is the ACCMA Bond form that should be utilized by the Bidders;
- A bank certified check, bank cashier's check, bank treasurer's check, or trust account; or
- A pledge of securities backed by the full faith and credit of the United States Government or bonds issued by the State of California.



3. GENERAL INFORMATION AND CONTRACT PROVISIONS

3.1 PURPOSE

The purpose of this section is to provide information to Bidders interested in preparing and submitting proposals to provide the Express Lanes System including design, development, integration, implementation, and maintenance in accordance with the requirements set forth in this document and its references.

3.2 REVISIONS TO RFP

If it becomes necessary or desirable to revise any part of this RFP, or to provide additional information to enable potential Bidders to interpret its provisions, the ACCMA will issue an addendum that will be provided to all prospective Bidders via the ACCMA website. Acknowledgement of the receipt of any and all addenda will be required of Bidders, and shall accompany the Bidder's Technical Proposal.

3.3 PROPOSAL ACCEPTANCE, REJECTION, DISCUSSION AND BASIS FOR AWARD

The ACCMA reserves the right to accept or reject, in whole or in part, any and all proposals received in response to this RFP; to waive or permit cure of minor irregularities, and to conduct discussions with all qualified Bidders who have submitted acceptable proposals, in any manner necessary to serve the best interests of the ACCMA. The ACCMA also reserves the right, at its sole discretion, to award (or not to award) a contract based upon the written proposals received, without discussions or negotiations.

Award of the contract will be subject to the approval of the Executive Director (ED) of the ACCMA.

3.4 ORAL PRESENTATIONS

Bidders may be required to make one or more oral presentations in order to clarify their proposals and to respond to the questions of the Evaluation Committee. Only Bidders that submit proposals that have been judged to be compliant with the RFP requirements and, therefore, eligible to be considered for selection, will be invited to make oral presentations. Oral presentations may be sound and/or video recorded for the exclusive use of the Evaluation Committee and associated ACCMA members. The oral presentations will be scheduled at the convenience of the ACCMA after the initial review and as part of the overall evaluation of the proposals.



3.5 BEST AND FINAL OFFER

The ACCMA reserves the right to request Best and Final Offers (BAFOs) from any or all of the Bidders. If the BAFO process is utilized, the ACCMA may enter into discussions with one or more Bidders and request a BAFO document from such Bidders, or the ACCMA may request BAFO(s) without first discussing any issues with the selected Bidder(s). All Bidders that are selected to participate in discussions with the ACCMA may be advised of any deficiencies in their proposals, and ACCMA may issue a change in the scope of the work or to other provisions of the Contract documents. The selected Bidder shall be offered a reasonable opportunity to correct or resolve any deficiencies for which ACCMA provides notification and to submit such cost and/or other technical revisions to their proposals that may result from the discussions. At the conclusion of the discussions, a final common cut-off date which allows a reasonable opportunity for submission of written final revisions shall be established, and those Bidders that are selected to remain in contention for the Contract will be notified, in writing, to submit proposal revisions. The ACCMA will consider the revised cost and/or technical information and re-evaluate and possibly revise the proposal ratings as might be appropriate.

3.6 INCURRED PROPOSAL EXPENSES

The ACCMA will not be responsible for any costs incurred by a Bidder in preparing and submitting a response to this RFP, or for any other associated actual or consequential costs, including attendance at the pre-submittal meeting, representation at the oral presentation, attendance at BAFO meeting(s), etc.

3.7 PROPOSAL FORM

Proposals should be prepared simply and economically, providing a straightforward and clear description of the Bidder's proposal for meeting the requirements of this procurement. Proposals shall meet all of the requirements that are presented in Section 4 of this RFP. Oral, facsimile, or electronic proposals or amendments will not be accepted unless specifically requested in writing by the Contracts Administrator.

One original, fifteen (15) type-written copies, and one (1) CD copy of the Bidder's proposal shall be received by the Contracts Administrator at the time and on the date as previously stated in this RFP in Section 2.8. The proposal of each Bidder shall be developed using 12-font size text and shall be signed by a corporate officer, partner, proprietor, or other person authorized to legally bind the Bidder.

3.8 CALIFORNIA PUBLIC RECORDS ACT NOTICE

Each Bidder should give specific attention to the identification of those portions of its proposal that it considers to be confidential, proprietary commercial information or trade secrets, and provide justification, upon request, as to why such materials, should not be disclosed by the ACCMA under the California Public Records Act, California Government Code Sections 6250, *et seq.*



3.9 SOFTWARE AND HARDWARE DEFINITIONS

The definitions below are to be used with the license, confidential information and escrow provisions in Sections 3.10 through 3.13 of this RFP.

3.9.1 Confidential Information

Confidential Information with respect to a person or entity means information, knowledge or data, whether in written, oral, visual, machine recognizable or electronic form, which provides independent economic value to such person or entity from (i) not being generally known in the relevant trade or industry or (ii) not being generally known to, or readily accessible by proper means by, competitors of such person or entity and other persons who can obtain economic value from them, including, without limitation, information about the dynamic pricing algorithms and information from third parties and all other information which a person or entity has a reasonable basis to know was created, modified or used and held secret by another party or that was accepted by such other person or entity from any third party under an obligation of confidentiality. Notwithstanding the foregoing, Confidential Information shall not include: (i) information which a party (the "Recipient") can demonstrate by its files was already in its possession prior to receipt of such information from the other party (the "Disclosing Party") (provided that access to such information was gained by the Recipient from a third party which had the right to disclose such information without restriction), (ii) information which is in the public domain prior to the date of the Contract, (iii) information which, not as a result of the disclosure by the Recipient, becomes part of the public domain after disclosure, and (iv) information which is hereafter lawfully disclosed to Recipient by a third party (other than any employees or agents of either party) who is not under an obligation to maintain the confidentiality of the information.

3.9.2 Development Documents

Development Documents mean those documents that are delivered to the ACCMA by the SI during the system design, development and implementation processes.

3.9.3 Intellectual Property Rights

Intellectual property rights means any and all legal rights regarding intangible property existing from time to time under domestic and international patent law, copyright law, moral rights law, trade secret law, trademark law, unfair competition law or other similar rights.

3.9.4 Express Lanes Development

Express Lanes Development means: (i) those portions of the Software and the Special Hardware that were developed under the Contract to satisfy the specifications or requirements of the Express Lanes project; (ii) those modifications of pre-existing software and hardware that were made to satisfy the specifications or requirements of the EB I-580 Express Lanes project, and (iii) any changes to the foregoing that are made in response to requests by the ACCMA or to address the changing needs of the EB I-580 Express Lanes project.



3.9.5 Object Code

Object Code means: (i) the machine readable code version of the Software, which is substantially or entirely in binary form and is intended to be executable by a computer after suitable processing or linking but without intervening steps of compilation or assembly; and (ii) the written instructions necessary or appropriate for the ACCMA to install and use the Object Code form of the Software for the EB I-580 Express Lanes System.

3.9.6 Personal Information

Personal Information means information that identifies individual EB I-580 Express Lanes System users, such as the user's name, address, telephone number, email address, credit card number, FasTrak[®] account number, and expiration date and license plate number.

3.9.7 Release Event

Release Event has the meanings specified in Sections 3.13.2 and 3.13.3.

3.9.8 Software

Software for the purposes of this document means any Source Code, Object Code, and web pages of programs developed by the SI, computer databases and any associated html and graphics files (other than Third Party Software that is separately licensed by the ACCMA) that are supplied to the ACCMA by the SI under the Contract, together with all enhancements, improvements and modification to the foregoing.

3.9.9 Software Documentation

Software Documentation means the Source Code on industry standard media and source code listings in human readable form of all Software including logic equations for programmable array logic integrated circuits (as well as the compiler or assembler and associated software tools for the Source Code); all design documents, specifications, flow charts, data flow diagrams, Computer Aided Software Engineering (CASE) and development tools, and other materials or documents which explain the performance, function or operation of individual software programs and the interaction of programs within the Express Lanes System; all control files and scripts used to compile, link, load and/or make the applications and systems, test scripts, test plans and test data; all password security codes and any other information and documents necessary to operate and maintain the Software.

3.9.10 Source Code

Source Code is any collection of statements or declarations written in any human-readable computer programming language. Source code allows the programmer to communicate with the computer using a reserved number of instructions.

3.9.11 Special Hardware

Special Hardware means any mechanical part and any piece of electrical or electronic equipment that SI designs, develops or modifies for the Project including, without limitation, lane



controllers, hand-held reader devices, together with manuals and written instructions necessary or appropriate to install and operate the Special Hardware. The SI shall not infringe on any Intellectual Property Rights with respect to any Special Hardware.

3.9.12 Special Hardware Documentation

Special Hardware Documentation means the documents that contain the necessary drawings/diagrams and specifications for fabricating and manufacturing the Special Hardware. This includes, the following: art work and electronic components necessary to fabricate circuit boards; license(s) to all applicable Intellectual Property Rights, if any; all drawings from equipment housing, ports and connectors and mounting, through assembly, sub-assembly, and fabricated piece parts drawings necessary to manufacture the equipment; all schematics and wiring diagrams and cable harness drawings; all installation, configuration, and layout drawings; all block diagrams and family trees; all assembly instructions and drawings; all test specifications for top-level equipment and for all assemblies to the lowest testable level of assembly; all test procedures for all tests; all maintenance manuals and procedures; all operator manuals; all flow charts relevant to the manufacture, assembly, programming, and operation of the equipment; part lists containing sufficient information to procure all parts and material required to manufacture the equipment from its primary source, except software products available commercially; documentation for the source code if not provided otherwise; all password security codes and any other information and documents necessary to manufacture and maintain the Special Hardware. Notwithstanding the foregoing, the Special Hardware Documentation does not have to include the information necessary to manufacture any Special Hardware part that is generally commercially available from at least two suppliers.

3.9.13 System Information

System Information means the Software Documentation and the Special Hardware Documentation.

3.9.14 Third Party Software

Third Party Software means commercial-off-the-shelf (COTS) computer programs/applications including computer databases, CASE and software development tools, operating systems, drivers and utilities as well as any firmware not developed by the SI but is necessary for the proper functioning of the EB I-580 Express Lanes System.

3.10 LICENSES

The provisions below substantially set forth the terms of the licenses that must be granted to the ACCMA.

3.10.1 Object Code License

The SI shall grant the ACCMA a fully-paid, perpetual, non-exclusive, irrevocable royalty-free right and license to use, copy, perform and sublicense the Software in Object Code form in connection with the installation, maintenance and improvement of the Express Lanes System.



3.10.2 Source Code and Software Documentation License

The SI shall grant the ACCMA a fully-paid, perpetual, non-exclusive, irrevocable royalty-free right and license to use, copy, perform, modify and sublicense, and create derivative works of, the Software in Source Code form (including, without limitation, the right and license to assemble or compile the foregoing into Object Code form) and the Software Documentation, as deemed necessary or appropriate by the ACCMA to operate, maintain and improve the Express Lanes System. Included in this license are the rights to decompile, disassemble or reverse engineer the Software. The license rights granted in this Section 3.10.2 may not be exercised until a Release Event has occurred, at which time they may be exercised automatically without the requirement of further action by the ACCMA or the SI.

3.10.3 Special Hardware Documentation License

The SI shall grant the ACCMA a full-paid, perpetual, non-exclusive, irrevocable right and license to use, copy, perform, modify and sublicense, and create derivative works of the Special Hardware Documentation, as deemed necessary or appropriate by the ACCMA to operate, maintain, manufacture and procure the Special Hardware.

3.10.4 Express Lanes Developments License

Notwithstanding the non-exclusivity provisions of Sections 3.10.1, 3.10.2 and 3.10.3, the SI shall grant the ACCMA a fully-paid, perpetual, exclusive, irrevocable royalty-free right and license to use, copy, perform, modify and sublicense, and create derivative works of the Express lanes facility developments in connection with the installation, maintenance and improvement of the Express Lanes System.

3.10.5 License Limitations

In exercising its rights under Section 3.10.1 through Section 3.10.4, the ACCMA shall not license, sublicense, sell, resell, transfer, assign, distribute or modify the Software for use with any highway or transportation entity other than those under the jurisdiction of the ACCMA.

3.10.6 Other License Terms

1. All modifications, improvements and enhancements to the Software shall be licensed to the ACCMA without any additional charge to the ACCMA.
2. The ACCMA shall have the right, in its discretion, either to contract with the SI for maintenance services and customer services; to provide its own maintenance services and customer services; or, to contract with others for the maintenance services and/or customer services after expiration of the maintenance period described in the Contract.
3. The SI shall deposit in escrow pursuant to the Escrow Agreement (See Section 3.13) all Source Code, Software Documentation and Special Hardware Documentation for the Software and the Special Hardware and for all subsequent modifications, improvements and enhancements to the Software and the Special Hardware.
4. After a Release Event, the ACCMA shall be entitled to make its own modifications, improvements and enhancements to the Software or to contract with others to make such modifications or improvements, which modifications, improvements and enhancements



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the ACCMA may use in connection with the system and the systems of its member organizations.

5. The SI shall indemnify the ACCMA against any infringement by the software of any Intellectual Property Rights of any other party.
6. The SI shall provide maintenance services and other services for the period described in the Contract.
7. The SI shall supply to the ACCMA any new software products which may be useful in the operation of the Express Lanes System on a most favored customer basis during the term of the Contract, including any optional maintenance periods, if exercised.
8. The SI shall represent and warranty that the Software, the Special Hardware and the System Documentation comply with all requirements of the Contract, do not infringe the Intellectual Property Rights of any third party, do not, in the case of the Software, contain any "virus," illicit code or defect and the documentation is clear, concise, accurate, thorough and exceeds the minimum industry standards. The SI shall also make other standard representations and warranties customary in a contract of this nature and scope.

3.11 THIRD PARTY LICENSES

The SI shall provide the ACCMA with fully-paid, non-exclusive, perpetual, irrevocable, royalty-free licenses to use the Third Party Software, as necessary or appropriate, for the ACCMA to operate, maintain and modify/improve the Express Lanes System.

3.12 OWNERSHIP AND PROTECTION OF CONFIDENTIAL INFORMATION

The following provisions show how Confidential Property should be addressed.

3.12.1 Ownership

The ACCMA shall retain all right, title and interest, including, without limitation, all Intellectual Property Rights, in the Confidential Information furnished by ACCMA to the SI. The SI shall retain all right, title and interest, including, without limitation, all Intellectual Property Rights, in the Confidential Information furnished by the SI to the ACCMA.

3.12.2 Confidential Information in Proposal and Development Documents

The SI shall specify what information in its Proposal it considers its Confidential Information. The ACCMA expects that the designation of Confidential Information will be kept to a minimum and will be limited to pricing. The SI shall also specify what information in the Development Documents it considers to be Confidential Information.

3.12.3 Protection

Except as necessary to carry out its obligations under the Contract, each party (a "Recipient") shall not, at any time during or after the term of the Contract disclose the Confidential Information of the other party (a "Disclosing Party") to any person whatsoever, examine or make copies of any reports or other documents, papers, memoranda or extracts embodying the Confidential Information for other use, or utilize for the Disclosing Party's own benefit or for the



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benefit of any other party any such Confidential Information. Each party shall at all times exercise the same degree of care which it regularly uses to protect its own proprietary information to maintain the confidential, secret or proprietary character of all Confidential Information, provided that each party shall use at least a reasonable degree of care. Notwithstanding the foregoing, either party may disclose Confidential Information of the other party:(i) to its employees and professional advisors to the extent necessary to allow the party to carry out its obligations under the Contract; provided that such persons are advised of the confidential nature of the information and are under an obligation to maintain its confidentiality; and (ii) as may be required by the California Public Records Act. Upon the completion of its obligations to be performed hereunder, the SI shall promptly return to the ACCMA all ACCMA Confidential Information.

3.12.4 Exception from Non-Disclosure

The non-disclosure obligations shall not apply to disclosures made by a party in response to any deposition, interrogatory, request for documents, subpoena, civil investigative demand or similar legal process ("legally compelled disclosure") provided that the conditions of Section 3.12.3 are complied with by the disclosing party. In the event that the disclosing party or any of its representatives are requested or become subject to make a legally compelled disclosure of any of the Confidential Information of the other party, the disclosing party shall first provide the other party with prompt prior written notice of such requirement so that the other party may seek a protective order or other appropriate remedy and/or waive compliance with the terms of the Contract.

3.12.5 Personal Information

Personal Information may be subject to special procedures established by the ACCMA to maintain its confidential nature. The SI shall agree to abide by any such special procedures and to allow the ACCMA to review its implementation of these special procedures.

3.12.6 Injunctive Relief

The parties shall acknowledge that the unauthorized disclosure or misuse by a party of the Confidential Information of the other party could irreparably damage the other party and/or third parties dealing with the other party, and that monetary damage would not be an adequate remedy for any such breach. In the event of a breach or threatened breach by a party of any of the provisions of the Contract, the non-breaching party shall be entitled to injunctive relief in any court of competent jurisdiction restraining the breaching party from breaching the terms hereof or from disclosing any Confidential Information of the non-breaching party to any person. Nothing contained herein shall be construed as prohibiting any party from pursuing any other remedies available to it, either at law or in equity, for such breach or threatened breach, including specific performance and recovery of monetary damages. In addition, the party breaching or threatening breach shall indemnify the other party for its attorneys' fees and court expenses incurred in enforcing the Contract.



3.13 ESCROW

The Proposal shall provide for the Software Documentation to be escrowed substantially as follows:

3.13.1 Escrow Agreement

Within ninety (90) days after the execution of the Contract, the SI shall enter into an escrow agreement (the “Escrow Agreement”) with the ACCMA on the terms and conditions provided in this Section 3.13 and such other terms and conditions as are customary and reasonably acceptable to SI and ACCMA, including but not limited to a provision that California law will govern any dispute related to the Escrow, and a further provision that any action related to or arising out of the Escrow Agreement shall be venued in Alameda County, California. Pursuant to the terms of the Escrow Agreement, the SI shall deposit with an Escrow Agent located in the continental United States and satisfactory to the ACCMA, without charge to the ACCMA, the Software Documentation. If the SI revises or supplements any of the System Information deposited, or creates additional Software Information, the SI shall deposit a complete set of such revised, supplemented or additional Software Information with the Escrow Agent within thirty (30) days of such revision, supplementation or creation, and the SI shall indicate with each deposit which documents and which pages have been revised, supplemented or added to the last deposit. The Escrow Agreement shall continue until there is a Release Event or the Software is no longer in use by the ACCMA. The SI shall be responsible for the payment of all costs arising in connection with the maintenance of the escrow referred to in this section throughout the entire term of the Escrow Agreement.

3.13.2 Release Events

Release event means that one or more of the following have occurred:

- SI has filed a voluntary petition in bankruptcy or for a reorganization or to effect a plan or other arrangement with its creditors, files an answer to a creditor’s petition or other petition against it for an adjudication in bankruptcy or for a reorganization admitting the material allegations thereof, or applied for or permitted the appointment of a receiver, trustee or custodian for any substantial portion of its properties or assets, and such petition or proceeding is not dismissed within sixty (60) days of the filing or initiation thereof;
- SI has ceased its ongoing business operations;
- SI has substantially ceased the sale, licensing, maintenance or other support of the Software;
- SI breaches any material provision of the Contract and fails to cure the breach within fifteen (15) days of notice thereof by the ACCMA; provided that upon the third material breach of the Contract by SI, SI shall have no opportunity to cure the breach and a Release Event shall be deemed to occur; or
- The ACCMA has exercised its right to maintain or engage a third party to maintain the Software, whether such right is exercised at the end of the Warranty Period or at any other time.



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3.13.3 Release

Upon the occurrence of any Release Event, the ACCMA may direct the release of the Software Documentation from the Escrow and exercise its license rights under Sections 3.10.2, 3.10.3, and 3.10.4.

3.14 INSURANCE REQUIREMENTS AND INDEMNITY

The requiring of any and all insurance as set forth in these specifications, or elsewhere, shall be in addition to and not in any way in substitution for all the other protection provided under the Contract Documents.

No acceptance and/or approval of any insurance by the ACCMA shall be construed as relieving or excusing the SI, or the surety issuing its Bonds, from any liability or obligation imposed upon either or both of them by the provisions of the Contract documents.

The SI shall at all times during the term of the Contract maintain in full force and effect the policies of insurance required by this Section. At least annually, the SI shall provide to the ACCMA and the State evidence of the required insurance coverage and, if requested by the ACCMA, shall provide certified true copies of any and all of the policies of insurance.

The SI shall not commence work under the Contract until all of the insurance required under this Section has been obtained and approved by the ACCMA and the State, nor shall the SI allow any subcontractor to commence work on its subcontract until the insurance required of the subcontractor(s) has been obtained and approved. Prior to the start of work, the SI shall submit to the Contracts Administrator a certificate of insurance indicating that it has obtained the required coverage.

All insurance policies required by this Section, or elsewhere in the Contract Documents, shall be so endorsed as to provide that the insurance carrier will be responsible for giving notice to the ACCMA and the State in the event of cancellation or material modification of the insurance policy by either the insurance carrier or the SI, at least sixty (60) days prior to any such cancellation or modification.

The SI shall purchase and maintain, during the life of the Contract, the insurance that is described below in Sections 3.14.1 through 3.14.5.

3.14.1 Workers' Compensation

The SI shall maintain Workers' Compensation insurance as required by the laws of the State of California, and shall include Employer's Liability coverage with a minimum limit of \$2,000,000.



3.14.2 Comprehensive General Liability Insurance

The SI shall maintain occurrence forms of general liability insurance covering the full scope of the Contract with limits of not less than \$1,000,000 per occurrence and \$5,000,000 aggregate for personal or bodily injuries, and \$5,000,000 per occurrence and aggregate for property damage. A combined single limit per occurrence of \$5,000,000 with a combined aggregate of \$10,000,000 is acceptable. Such insurance shall include, but shall not be limited to, Comprehensive Broad Form Endorsement covering the following:

- a. All premises and operations;
- b. Products/completed operations;
- c. Independent contractors;
- d. Contractual liability covering oral or written contracts or agreements, including the Contract;
- e. Additional interests of employees;
- f. Extended definition of bodily injury;
- g. Personal injury coverage (hazards A, B, and C), with no exclusions for liability assumed contractually or injury sustained by employees of SI; and
- h. Broad form property damage.

3.14.3 Comprehensive Business Automobile Liability Insurance

The SI shall maintain comprehensive business automobile liability insurance covering the use of any motor vehicle to be used in conjunction with the Contract, including hired automobiles and non-owned automobiles, providing not less than the following limits:

- \$1,000,000 Bodily Injury each person;
- \$2,000,000 Bodily Injury each occurrence; and
- \$1,000,000 Property Damage each occurrence.

A combined limit of \$3,000,000 each occurrence is acceptable.

Loading and unloading of any motor vehicle must be covered by endorsement to the automobile liability policy or policies.

3.14.4 Umbrella Liability Insurance

The limits of liability set forth in sections 3.14.1, 3.14.2 and 3.14.3, may be provided solely by individual policies, or in combination with an umbrella liability insurance policy which provides coverage at least as broad as the individual underlying policies. If an umbrella policy is purchased, each of the policies specified in the above referenced three sections shall be listed as underlying coverage in the umbrella policy.



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3.14.5 Other Requirements

In addition to the above requirements, all insurance policies required by this section:

- (1) Shall name the ACCMA, BATA, Caltrans, and the California Highway Patrol (CHP) and their respective officers, directors, employees and agents as additional insureds, and evidence of the same shall be provided by proper additional insured endorsements signed by the insurance agent(s) or authorized representative of the insurance company issuing each such policy (not applicable to Worker's Compensation coverage);
- (2) Shall contain provisions or endorsements necessary to assure coverage of claims by one insured against another;
- (3) Shall contain endorsements providing that the SI's policies shall be primary to all other insurance available to the parties named as additional insureds for liability arising out of or resulting from the SI's operations under the Contract; and
- (4) Shall be issued by reputable insurers authorized to issue such policy or policies in the State of California.

3.14.6 Indemnification

The SI shall defend, protect, indemnify and save harmless the ACCMA, BATA, Caltrans, and CHP, and their respective officers, directors, employees and agents, from and against any and all claims, suits, judgments, expenses, actions, damages and costs of every name and description (Claims), to the extent arising out of or resulting from any negligent acts, errors or omissions, recklessness or willful misconduct of the SI.

The SI shall require all architects, engineers and consultants hired as subcontractors for the design of the Express Lanes System and facilities, to indemnify and save harmless the SI and the ACCMA, BATA, Caltrans, and CHP and their respective officers, directors, employees and agents, from and against any and all Claims, to the extent arising out of or resulting from any negligent acts, errors or omissions, recklessness or willful misconduct related to the performance of the services of the architect, engineer or consultant under the subcontract. Each architect, engineer and consultant shall be required by the SI to carry professional liability insurance in the amount of at least \$2,000,000.

3.15 LIQUIDATED DAMAGES

Time is of the essence under the Contract. In the event certain work under the Contract is not satisfactorily completed in a timely manner, the ACCMA will sustain substantial financial and other damages. Accordingly, the Contract shall provide for liquidated damages in the event of certain delays by the SI, as described below.

3.15.1 Liquidated Damages for Completion Delay

In the event the ETS (including the interface to the Bay Area Toll Authority (BATA) Regional Customer Service Center (RCSC) and the Caltrans Traffic Management Center (TMC)) is not



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satisfactorily completed and ready for full use and revenue service by the time of the scheduled EB I-580 Express Lanes System opening to traffic ("Completion Delay"), the ACCMA will sustain substantial financial and other damages. The ACCMA has attempted to estimate the damages which would result from Completion Delay. Given the fact that the Project has a dual role in facilitating transportation and generating revenue, the impact of any such Competition Delay is greater than most public works projects.

Based on the foregoing, in the event of any Completion Delay, **the SI shall pay to the ACCMA as liquidated damages the amount of \$4,900 for each calendar day of Completion Delay.** The parties acknowledge that this amount represents the ACCMA's reasonable estimate of the damages from Completion Delay, and does not constitute a penalty.

3.15.2 Maintenance Delay

Liquidated damages for maintenance performed during the Warranty Period and the Maintenance option periods shall be assessed for failure of the SI to meet the combined response and repair times specified in Table 1 below.

The repair of any spare component shall not relieve the SI of the responsibility to repair any in-service components that malfunctioned or were malfunctioning while such repairs were being conducted. Such failure to repair the in-service components within the time specified in Table 1 may result in the assessment of liquidated damages. Liquidated damages shall be applied at the rates indicated in Table 1, for each hour or fraction thereof in excess of the repair time shown, until the failure or malfunction is resolved, restoring the System to the state it was in prior to failure or malfunction.



Table 1 – Repair/Response Times and Maintenance Liquidated Damages

Equipment/Item	Combined Response and Repair Time (in hours)	Hourly Liquidated Damages (\$US)
Tolling Zone Controllers	4	\$150
Electronic Toll Collection Reader/Antenna	4	150
Vehicle Detectors	4	100
RTMS Equipment	4	100
Hand Held Enforcement Devices	4	50
Tolling Zone Transaction Indicator Beacon (single light gantry mounted)	4	50
Tolling Zone Transaction Indicator Beacon (dual lights pole mounted)	4	50
VES Lane Equipment	4	50
Local Area Network	4	50
Wide Area Network	4	50
All Supplied Standard Workstations	4	50
TDC Computer System	4	150
Dynamic Pricing Subsystem	4	350

3.15.3 Maintenance of Traffic

Reference is made to Appendix 9.5 for Maintenance of Traffic requirements and damages for late lane closure removal.

3.15.4 Collection and Effect of Liquidated Damages

At its option, the ACCMA may deduct any such liquidated damages owed by the SI from amounts otherwise payable to the SI, or may bill the SI as a separate item.

The assessment of liquidated damages by the ACCMA against the SI does not supersede the right of the ACCMA to impose other remedies available to it including, but not limited to, retention or withholding of payments otherwise due to the SI until the SI remedies the situation which has led to the imposition of liquidated damages.

In addition to any other remedies available to it in law or under the Contract, in the event that the SI fails to provide the services, equipment, or other items required for performance of the Contract within the prescribed time limits, the ACCMA may elect to provide or obtain services, equipment, or other items necessary to perform under the Contract. In that event, the SI shall pay the total cost incurred by the ACCMA for obtaining replacement services, equipment and other items necessary to a fully functional EB I-580 Express Lanes System. The ACCMA shall have the unilateral right of source selection when the SI is unable to perform. In addition to the



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replacement costs described above, the SI shall also be required to pay the liquidated damages set forth above for any delay in performance as well as other damages sustained by the ACCMA.

3.16 INCORPORATION BY REFERENCE

All terms and conditions of the RFP and amendments thereto; all provisions of the Bidder's proposal and submittals in response to the RFP, and amendments thereto; all applicable state and federal laws, statutory and regulatory provisions and orders, are incorporated by reference and made a part of the Contracts to be entered into as a result of this RFP.

3.17 RETENTION OF RECORDS AND AUDITS

The SI shall retain all books, records and documents including, but not limited to, cost or pricing data relating to the Contracts, for a period of at least three (3) years after the date of final payment by the ACCMA hereunder or any applicable statute of limitations, whichever is longer, and shall make them available for inspection and audit by authorized representatives of the ACCMA, including the Contracts Administrator or his/her designee, at all reasonable times.

The ACCMA may audit, at any reasonable time during the record retention period, the SI's books and records relating to:

- a. Cost or pricing data submitted by the SI; and
- b. The determination by the ACCMA of the SI's costs or estimated costs in connection with any change order or contractual modification, or proposed change order or contractual modification; and
- c. Matters involving claims by one party against the other.

The SI shall include these provisions in every subcontract.

3.18 CONTINUITY OF SERVICES

The SI recognizes that the services under the Contract must be continued without interruption and that, upon Contract expiration or termination, a successor, either the ACCMA or another contractor, may continue them. The SI agrees to exercise its best efforts and cooperation to effect an orderly and efficient transition to a successor.

The SI shall, upon written notice from the ED:

- (a) Furnish phase-in, phase-out services for up to 90 days after the Contract expires; and
- (b) Negotiate in good faith an agreement and plan with the ACCMA to determine the nature and extent of phase-in, phase-out services required. The scope of such negotiated agreement will be in addition to the scope of the Contract.

The plan shall specify a training program and a date for transferring responsibilities for each division of work described in the plan, and shall be subject to the ED's approval. The SI shall



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provide sufficient experienced personnel during the phase-in, phase-out period to ensure that the services called for by the Contract are maintained at the required level of proficiency.

The SI shall allow as many personnel as practicable to remain on the job to help the successor maintain the continuity and consistency of the services required by the Contract. The SI also shall disclose necessary personnel records and allow the successor to conduct on site interviews with these employees. If selected employees are agreeable to the change, the SI shall release them at a mutually agreeable date and negotiate transfer of their earned fringe benefits to the successor.

3.19 PROMPT PAYMENT OF SUBCONTRACTORS

The SI is responsible for making timely payments to all subcontractors and suppliers as required by the provisions of Section 7108.5 of the Business and Professions Code.

The Contract shall require the SI to make payment to all subcontractors within 10 days of receiving payment from the ACCMA.

Each month, the Systems Manager will review the current pay items with the SI and all involved subcontractors to ensure that all work satisfactorily completed within specifications is included in the monthly progress payment. For payment purposes, the same quantity totals used to compute the payment to the SI will be the basis for payment to the subcontractor.

If the subcontractor does not receive payment within the required 10 days, the Subcontractor shall notify the Systems Manager, in writing, of the amount in dispute including the item numbers and payment quantity for each. The Systems Manager will then notify the ED of the dispute. The ED, or his/her designee, will endeavor to verbally contact the SI within 48 hours to ascertain whether or not a performance dispute exists which necessitates non-payment to the subcontractor. If a performance dispute exists, the SI must demonstrate to the satisfaction of the ED that there is a valid basis to withhold payment from the subcontractor.

If the SI withholds payment from a subcontractor, the SI shall provide to the subcontractor written notice of the withholding of payment. The notice shall detail the reasons for withholding payment as well as the amount. A copy of the notice shall be provided to the surety and the ACCMA. If no valid dispute exists, the SI will be directed to make immediate payment to the subcontractor. The subcontractor will be responsible for notifying the Systems Manager if this payment is not made. Upon receipt of notification, the ED will schedule a meeting with the SI and subcontractor to investigate and discuss the non-payment issue. This meeting will be held at the ACCMA's offices within 2 working days of the ACCMA's contact with the subcontractor. If it is determined that the SI has withheld payment to the subcontractor without cause, further progress payments to the SI will be withheld until the subcontractor is paid. In addition, the ACCMA may order a suspension of work or other administrative actions as it sees fit.



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If an action is taken as stated above, the SI shall notify the Systems Manager when payment is made. After the Systems Manager verifies that payment has been made to the subcontractor the ACCMA shall release withheld progress payments.



4. PROPOSAL REQUIREMENTS

4.1 TECHNICAL PROPOSAL

Presented below are the various requirements that need to be adhered to as Bidders develop their Technical Proposal.

4.1.1 Letter of Transmittal

A letter of transmittal on the Bidder's official letterhead, not to exceed three (3) typed pages in length, shall be included at the front of the Proposal. The letter of transmittal shall be signed in ink by a duly authorized representative of the Bidder and shall include the Bidder's contact person and their address, office phone number, cellular phone number and email address.

The letter should briefly introduce the proposed project team. The letter shall provide the name, title, address, phone number, facsimile number and email address of the person designated by the Bidder to serve as a contact during the selection process.

A statement shall be provided that reflects that the Bidder fully comprehends the nature of the tasks involved in the Scope of Work, and accepts full responsibility, if selected for the award of a contract, for the completion of all of the work required, within the proposed schedule.

4.1.2 Qualifications of Bidder

The Bidder shall set forth his understanding of what work is to be accomplished. Specific reference must be made to the project requirements, the specifications applicable to the I-580 EB Express Lanes Project, and all other required criteria. The general system requirements should be summarized sufficiently to demonstrate the Bidder's understanding of the products expected. However, a recopying of the project requirements, as described in this RFP, is not necessary or desirable. Special requirements of the project should be discussed and any unique circumstances should be presented.

4.1.2.1 General Corporate Description

The Bidder shall provide a general description of the corporate organization, the management structure, and the capabilities of the Bidder itself including each joint venture participant, if any, and of all subcontractors. This shall include, for each firm, an overview of the organization, its history, general business purpose, parent company if appropriate, major divisions or subsidiaries, locations of offices, number of employees, etc.

4.1.2.2 Personnel

The Bidder shall identify each firm and the key persons that will be involved in and committed to the planning, design, construction, installation, integration, and implementation of the EB I-580 Express Lanes System to be provided under the Contract. Personnel shall be listed by position, education, experience, the role they will play and the percentage of their time that will



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be devoted to the Contract. Resumes shall be provided with sufficient information to permit the ACCMA to evaluate each person's ability to contribute to the overall effort. The Bidder shall also identify its proposed Project Manager (PM).

Resumes shall list directly related and general experience of all key personnel who are anticipated to be most responsible for performance of work on the project. All key personnel shall be identified on a proposed organizational chart. Each resume should not be more than two (2) pages in length.

4.1.2.3 Project Experience and Ability

The Bidder shall furnish documentation of its own, and its subcontractors', experience in the planning, design, construction, installation, integration, implementation, maintenance and operation of Express Lanes and conventional Electronic Toll Collection (ETC) systems, as well as its experience pertaining to the integration with other ETC back office service center operations. The experience statement shall include the Bidder's past experience and present contracts, and provide details on system hardware and software utilized, facilities management, system operations, system maintenance, customer relations, fiscal management and any other appropriate information related to the development, implementation and operation of the programs.

The descriptions should indicate any significant similarities and differences to those system(s) and the technical services that are described in this RFP. Information must be provided as to whether the contracts were completed on time and within budget or, if the contracts are ongoing, whether the contracts are on schedule and within budget. The Bidder shall also furnish the name, title, address, phone number and email address of persons who may be contacted by the ACCMA for verification of the information provided. Information for up to seven (7) relevant Express Lanes and tolling system related projects shall be included. Each project description should be no more than 1 page in length.

4.1.2.4 Financial Capability

The Bidder shall provide evidence of the firm's financial condition, sufficient in detail to demonstrate its ability to perform all the proposed services. The submission must include audited financial statements, including all schedules, notes and the opinion of an independent accounting firm, for the three most recently completed fiscal years. The statements must represent the entity submitting the proposal which will be responsible for the performance of all services, not a subsidiary or parent of the Bidder, except that a Bidder may submit audited documentation of the financial viability of a parent company along with a guarantee from said parent company in lieu of the same from the Bidder itself. The Bidder shall include evidence of their ability to provide the required bonding and insurance. Bidders may provide interim financial information, with a statement attesting to the accuracy of the information signed by the Chief Financial Officer (CFO) of the firm, if such interim information is necessary to provide all of the information required by the ACCMA.



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4.1.2.5 Disadvantaged Business Enterprise

This project is subject to Title 49 CFR 26.13(b):

The contractor, sub recipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate.

The UDBE Contract goal for this contract is 3.2 percent. The SI shall take necessary and reasonable steps to ensure that DBEs have opportunity to participate in the contract (49 CFR 26).

To ensure there is equal participation of the DBE groups specified in 49 CFR 26.5, the Agency specifies a goal for Underutilized Disadvantaged Business Enterprises (UDBEs). UDBE is a firm that meets the definition of DBE and is a member of one of the following groups:

1. Black Americans
2. Native Americans
3. Asian-Pacific Americans
4. Women

References to DBEs include UDBEs, but references to UDBEs do not include all DBEs.

Make work available to UDBEs and select work parts consistent with available UDBE subcontractors and suppliers.

Meet the UDBE goal shown in the Notice to Bidders or demonstrate that you made adequate good faith efforts to meet this goal.

It is your responsibility to verify that the UDBE firm is certified as DBE at date of bid opening. For a list of DBEs certified by the California Unified Certification Program, go to:

http://www.dot.ca.gov/hq/bep/find_certified.htm

Only UDBE participation will count towards the UDBE goal. DBE participation will count towards the Agency's Annual Anticipated DBE Participation Level and the California statewide goal.

Credit for materials or supplies you purchase from UDBEs counts towards the goal in the following manner:

1. 100 percent counts if the materials or supplies are obtained from a UDBE manufacturer.



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2. 60 percent counts if the materials or supplies are obtained from a UDBE regular dealer.
3. Only fees, commissions, and charges for assistance in the procurement and delivery of materials or supplies count if obtained from a UDBE that is neither a manufacturer nor regular dealer. 49 CFR 26.55 defines "manufacturer" and "regular dealer."

You receive credit towards the goal if you employ a UDBE trucking company that performs a commercially useful function as defined in 49 CFR 26.55.

4.1.2.6 UDBE Commitment Submittal

Submit UDBE information on the "Local Agency Bidder-UDBE Commitment (Construction Contracts)," Exhibit 15-G(1), form included in the Bid book. If the form is not submitted with the bid, remove the form from the Bid book before submitting your bid.

If the UDBE Commitment form is not submitted with the bid, the apparent low bidder, the 2nd low bidder, and the 3rd low bidder must complete and submit the UDBE Commitment form to the Agency. UDBE Commitment form must be received by the Agency no later than 4:00 p.m. on the 4th business day after bid opening.

Other bidders do not need to submit the UDBE Commitment form unless the Agency requests it. If the Agency requests you to submit a UDBE Commitment form, submit the completed form within 4 business days of the request.

Submit written confirmation from each UDBE stating that it is participating in the contract. Include confirmation with the UDBE Commitment form. A copy of a UDBE's quote will serve as written confirmation that the UDBE is participating in the contract.

If you do not submit the UDBE Commitment form within the specified time, the Agency finds your bid nonresponsive.

4.1.2.7 Good Faith Efforts Submittal

If you have not met the UDBE goal, complete and submit the "UDBE Information - Good Faith Efforts," Exhibit 15-H, form with the bid showing that you made adequate good faith efforts to meet the goal. Only good faith efforts directed towards obtaining participation by UDBEs will be considered. If good faith efforts documentation is not submitted with the bid, it must be received by the ACCMA no later than 4:00 p.m. on the 4th business day after bid opening.

If your UDBE Commitment form shows that you have met the UDBE goal or if you are required to submit the UDBE Commitment form, you must also submit good faith efforts documentation within the specified time to protect your eligibility for award of the contract in the event the Agency finds that the UDBE goal has not been met.

Good faith efforts documentation must include the following information and supporting documents, as necessary:



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1. Items of work you have made available to UDBE firms. Identify those items of work you might otherwise perform with its own forces and those items that have been broken down into economically feasible units to facilitate UDBE participation. For each item listed, show the dollar value and percentage of the total contract. It is your responsibility to demonstrate that sufficient work to meet the goal was made available to UDBE firms.
2. Names of certified UDBEs and dates on which they were solicited to bid on the project. Include the items of work offered. Describe the methods used for following up initial solicitations to determine with certainty if the UDBEs were interested, and the dates of the follow-up. Attach supporting documents such as copies of letters, memos, facsimiles sent, telephone logs, telephone billing statements, and other evidence of solicitation. You are reminded to solicit certified UDBEs through all reasonable and available means and provide sufficient time to allow UDBEs to respond.
3. Name of selected firm and its status as a UDBE for each item of work made available. Include name, address, and telephone number of each UDBE that provided a quote and their price quote. If the firm selected for the item is not a UDBE, provide the reasons for the selection.
4. Name and date of each publication in which you requested UDBE participation for the project. Attach copies of the published advertisements.
5. Names of agencies and dates on which they were contacted to provide assistance in contacting, recruiting, and using UDBE firms. If the agencies were contacted in writing, provide copies of supporting documents.
6. List of efforts made to provide interested UDBEs with adequate information about the plans, specifications, and requirements of the contract to assist them in responding to a solicitation. If you have provided information, identify the name of the UDBE assisted, the nature of the information provided, and date of contact. Provide copies of supporting documents, as appropriate.
7. List of efforts made to assist interested UDBEs in obtaining bonding, lines of credit, insurance, necessary equipment, supplies, and materials, excluding supplies and equipment that the UDBE subcontractor purchases or leases from the prime contractor or its affiliate. If such assistance is provided by you, identify the name of the UDBE assisted, nature of the assistance offered, and date. Provide copies of supporting documents, as appropriate.
8. Any additional data to support demonstration of good faith efforts.

4.1.3 Work Plan

4.1.3.1 General Description

A detailed overall description of the proposed ETS, including any drawings, sketches, charts, graphs and written narrative required to illustrate the system design, development, construction, implementation, and maintenance, to support the logic and methodology used by the Bidder to arrive at the proposed design shall be provided. Presented to Bidders, in Appendix 9.1 to this RFP, is an EB I-580 Express Lanes Concept of Operations document that conveys the ACCMA's project description and operational requirements.



4.1.3.2 Organizational Chart

An organizational chart for the project showing the PM and key personnel, the firm they work for and their project responsibilities shall be provided. The chart shall be accompanied with explanatory text. The particular advantages of the structure chosen should also be described.

The PM will not be required to reside locally to the project area. However, the key personnel in charge of installation (e.g. Installation Manager) will be required to be on-site during the period of installation and during transition to the warranty period. The Maintenance Manager will also be required to reside locally to the project area during the Warranty Period and any subsequent maintenance periods.

4.1.3.3 Management and Work Plan

A proposed management and work plan, including, but not limited to, details for overall and day-to-day project management; management controls and procedures for all tasks of the project; staffing progress reporting, budget tracking, etc. shall be provided by the Bidder. An overview of the various work tasks and how they are to be accomplished, descriptions of the tasks that will be subcontract, and to whom they will be subcontracted shall also be provided in the Work Plan.

4.1.3.4 Accomplishment of Project Requirements

The Bidder shall individually address the requirements of Section 6 - Project Requirements, which sets forth the proposed methodology, techniques and processes to be utilized to accomplish project implementation, warranty and maintenance.

As part of the proposal the Bidder shall provide a requirements trace matrix which demonstrates that each requirement of the RFP has been met by the proposal, including any exceptions or deviations.

In addressing Sections 6.2 through 6.8 of the Project Requirements, a bill of materials of the types and quantities of all equipment, hardware and third party software shall be provided, specifying for each item the vendor, manufacturer, model number, version, item description, warranty information, and the date placed in service, when this information is known. Product information that would assist in review and evaluation of the proposal shall be included in the proposal as an appendix.

Proposed Quality Assurance and Quality Control (QA/QC), Reliability, and Testing Programs shall be described in sufficient detail in the Work Plan. The Reliability Program shall include Mean Time Between Failure (MTBF) commitments for the primary system components included in Sections 6.2 Roadside Equipment Requirements and 6.7 Communications Network.

An ETS Project Schedule including all of the milestones that are presented in this RFP shall be included in the work plan. The proposed project schedule shall be one that the Bidder believes to be realistic and attainable. A Critical Path Method (CPM) or similar type chart shall be prepared with supporting text.



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A description of the proposed Maintainability Program shall be included in the work plan for maintenance and warranty requirements.

No cost information shall be included in the technical proposal. Inclusion of cost information in the technical proposal may result in disqualification of a proposal from consideration for award.

4.1.4 Technical Alternatives

In response to this section, the Bidder may present a technical description of options that it wishes to present to the ACCMA for inclusion in, to supplement or to replace elements of its basic proposal. This opportunity is open only if the Bidder has made an acceptable basic proposal that is fully responsive and in compliance with the requirements of the RFP.

If the Bidder elects to propose technical alternatives, the Bidder shall present the proposed alternative approach in response to this section in a clear and concise manner and identify why the alternative is being proposed and why the ACCMA would benefit from such an alternate solution.

The ACCMA reserves the right to either accept or reject any and all technical alternatives that are proposed.

4.1.5 Product Information

Product information such as brochures and product specifications that would assist the ACCMA in review of the Bidder's proposal shall be included in the proposal as an appendix. Extraneous or advertising information that is not helpful in understanding the Bidder's proposal is not desired. The Appendix should preferably be bound in a separate volume and be limited in size.

4.2 COST PROPOSAL

Each Bidder shall submit one (1) original, fifteen (15) copies and one (1) electronic copy (in PDF format on a CD) of the Cost Proposal on the forms provided subsequently in this document. The ACCMA reserves the right to reject in whole or in part offers containing unbalanced or unreasonable cost proposals for any item(s). The Bidders shall clearly state in their Cost Proposal that the presented program costs are valid for a period for not less than 90 days. The ACCMA reserves the right to request that Bidders extend their proposed costs for 30-day periods, if necessary.

4.2.1 Project Cost Alternatives

The Bidder may present pricing options that it wishes to present to the ACCMA for inclusion in, to supplement or to replace pricing elements of its basic proposal. This opportunity is open only if the Bidder has made an acceptable basic pricing proposal that is fully responsive and in compliance with the RFP.

If the Bidder elects to propose pricing alternatives, the Bidder shall present the proposed alternative pricing approach in response to this section in a clear and concise manner and identify



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why the alternative is being proposed and why the ACCMA would benefit from such an alternate solution.

The ACCMA reserves the right to either accept or reject any and all pricing alternatives that are proposed.



5. PROPOSAL REVIEW, EVALUATION AND SELECTION PROCESS

5.1 PROPOSAL EVALUATION AND SELECTION COMMITTEE

All qualifying proposals received by the submission deadline will be evaluated by an Evaluation Committee (Committee) appointed by the ED of the ACCMA, or his/her designee. The Committee may seek the advice of others in reviewing the Proposals received, including but not limited to consultants and other advisors. However, the Committee will be solely responsible for evaluating the Proposals received and for rendering a collective final recommendation to the ACCMA. An important determination during the proposal evaluation effort will be which of the submitted proposals offers the best value to the ACCMA.

5.2 EVALUATION CRITERIA

The criteria that will be used by the Committee for its evaluation of each qualifying technical proposal are listed below. Factor number 1 is the most important. Factors numbered 2 through 5 are slightly less important, and are approximately equal to each other in value.

1. The qualifications of the Bidder to perform the work required under the contract, including the following factors.
 - The overall management background and experience and the technical competence of the Bidder to plan, design, manufacture, construct, install, integrate and implement an Express Lanes system of the type required by this RFP.
 - The qualifications of the principal persons that are proposed to be involved in the planning, design, development, manufacturing, equipping, construction, installation, integration and implementation of the EB I-580 Express Lanes System covered by this RFP.
 - The direct experience of the Bidder's management and technical staff in the successful planning, design, development, manufacturing, equipping, construction, installation, integration and implementation of EB I-580 Express Lanes systems.
 - The financial capacity and capability to perform all the work required under the Contract, and the ability to provide the required bonding, insurance and indemnification to the ACCMA.
 - The perceived ability of the SI and its subcontractors to complete all of the required work in full accordance with the requirements of the RFP and in the time schedule offered in the proposal.



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2. The ability of the EB I-580 Express Lanes System proposed by the Bidder to perform in accordance with the design objectives specified in this RFP, and to the satisfaction of the ACCMA.
3. The proposed design of the system, with emphasis on quality, durability, efficiency, safety, appearance, ease and economy of maintenance, suitability for the intended use, and overall conformance with the requirements of the RFP will be taken into account by the Committee.
4. The quality, durability and capability of the equipment, software and systems proposed; the methods proposed to minimize downtime and to maintain satisfactory results over the life of the contract.
5. The overall quality of the Bidder's proposal for the project, including but not limited to the Bidder's comprehension of the ACCMA's requirements; the completeness, depth and clarity of the information provided; the Bidder's approach to the various aspects of the development and installation of the system; and its commitment to delivery of the project in accordance with the requirements of the RFP.
6. The evaluation of the Bidder's technical proposal may be affected by the Bidder's oral presentation and response to various questions that are posed by the Committee. However, oral presentations may not be required by the Committee in order to make its determinations and recommendations.

Presented in Figure 1 is a preliminary Technical Proposal evaluation matrix. An evaluation matrix similar to this one will be completed for each Technical Proposal that is received from Bidders.



Figure 1 – Preliminary Technical Proposal Evaluation Matrix

TECHNICAL PROPOSAL		Weight	<Firm #1>		<Firm #2>		<Firm #3>	
			Grade	Product	Grade	Product	Grade	Product
1.a	Overall Qualifications of the Firm to implement the ETS	5		0.000		0.000		0.000
1.b	Qualifications of Key Personnel	10		0.000		0.000		0.000
1.c	Project Manager’s Experience	15		0.000		0.000		0.000
1.d	Financial Capability - Satisfy Bonding, Insurance and Indemnification Requirements	5		0.000		0.000		0.000
1.e	Ability to Complete the Work on schedule	5		0.000		0.000		0.000
2	Conformance with the Design Objectives	10		0.000		0.000		0.000
3	Quality, Robustness, and Suitability of Proposed System Design	20		0.000		0.000		0.000
4	Features and Procedures to Maximize Reliability of Hardware, Software and Equipment	10		0.000		0.000		0.000
5	Overall Quality and Clarity of Proposal	5		0.000		0.000		0.000
6	Strength, Clarity, and Soundness for Express Lanes Project Implementation	15		0.000		0.000		0.000
	TECHNICAL SCORE	100		0.000		0.000		0.000

5.3 QUALIFYING PROPOSALS

The Contracts Administrator will initially review each Technical Proposal for compliance with the instructions contained in this RFP, any addendum, and with any other procedures required in conducting this procurement. Failure to comply with any requirement may disqualify a Bidder’s



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Proposal from consideration by the Committee. Each Bidder must assume full responsibility for meeting the requirements of the procurement.

5.4 TECHNICAL EVALUATION

After the Contracts Administrator selects the qualifying proposals, the Committee will conduct an evaluation of the technical merit of each qualifying proposal. This evaluation will be made on the basis of the evaluation criteria as set forth above in Section 5.2 above. This step of the overall Proposal evaluation may include verification of credentials and stated experience, and the Bidder authorizes the ACCMA to so inquire as the ACCMA sees fit.

Proposals which have been found by the Committee to be non-responsive to the technical requirements of the RFP may be considered ineligible for further consideration at and from this point in the evaluation process.

As part of the technical evaluation, the Committee may require those Bidders whose proposals are initially classified as reasonably considered for being selected for award to appear before the Committee to make oral presentations, to answer questions and/or to provide clarification on their proposals. The individual identified as the PM in the Bidder's Proposal will be expected to play the primary role in the Bidder's interview and presentation.

The Committee will also conduct reference checks of Bidders at this time. The purpose of the reference checks will be to determine the level of satisfaction and quality of service provided to Bidder's present and/or past clients in the areas of general system performance; technical integration; compliance with implementation plans and budgets; general responsiveness; customer satisfaction; and contract compliance.

5.5 COST PROPOSAL EVALUATION

Separately, and after completion of the Technical Proposal evaluation, the Contracts Administrator will unseal the Cost Proposal of each qualifying Bidder. The Committee shall then perform a thorough evaluation and tabulation of the cost information contained in each Bidder's Cost Proposal.

5.6 COMBINED EVALUATION

The Committee will then rank the Bidders based on the combination of their Technical and Cost Proposals. In determining the final ranking of proposals, technical merit might be given more weight than the proposal cost. The ACCMA will evaluate proposals and choose the preferred Bidder not necessarily based upon the lowest cost, but based upon the determined best value to the agency.

5.7 BAFO EVALUATION

If the ACCMA chooses to utilize the BAFO process described in Section 3.5, the Committee will evaluate the received BAFOs from those Bidders that are requested to submit one. The BAFO



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evaluation will be combined with the basic proposal evaluation as part of the SI selection process.

5.8 RECOMMENDATION FOR AWARD

Following completion of the proposal evaluation process and any discussions or negotiations with the Bidders, the Committee will make a recommendation to the ACCMA for award of the contract to that responsible Bidder whose proposal is determined to be the most advantageous to the ACCMA. Award of a contract, if any, is subject to the approval of the ED.

5.9 POST-AWARD AUDIT

The Cost Proposal is subject to a post award audit. The SI shall agree to the following contract language below:

CONSULTANT acknowledges that this AGREEMENT and the cost proposal set forth in **Appendix D** is subject to a post award audit by Caltrans. After CMA receives any post award audit recommendations from Caltrans, the cost proposal and/or the total compensation figure above shall be adjusted by CMA to conform to the audit recommendations. CONSULTANT acknowledges and agrees that individual cost items identified in the audit report may be incorporated into this AGREEMENT at Caltrans' sole discretion. Refusal by CONSULTANT to incorporate interim audit or post award recommendations will be considered a breach of the AGREEMENT and cause for termination of the AGREEMENT.

After any post award audit recommendations are received, the Cost Proposal shall be adjusted by the ACCMA to conform to the audit recommendations.

5.10 BID PROTEST POLICY

The ACCMA Bid Protest Policy ("Policy") shall apply to this RFP. Notices addressed to ACCMA under this Policy must be addressed and delivered to the ACCMA as provided below:

BID PROTEST – PROJECT NUMBER
c/o Liz Brazil, ACCMA Contract Administrator
Alameda County Congestion Management Agency
Oakland, CA 94612



6. PROJECT REQUIREMENTS

6.1 GENERAL REQUIREMENTS

Presented in Appendix 9.2 of this RFP is a copy of the ETS System Requirements document. If there are any differences between the requirements presented in this RFP and the System Requirements document, the RFP shall govern.

6.1.1 Life, Reliability, and Availability

The ETS, with appropriate maintenance, shall be sized and designed for a minimum ten-year usable life. Each major part of the ETS shall meet or exceed the specific Mean-Time-Between-Failure (MTBF) and Mean-Time-To-Repair (MTTR) criteria that are listed below in Table 2.

Table 2 – Equipment MTBF and MTTR

Equipment	Minimum Mean Time Between Failures	Maximum Mean Time To Repair
Tolling Zone Controllers	12,000 hours	2 hours
ETC Reader/Antenna	20,000 hours	2 hours
Vehicle Detector Loops	10,000 hours	2 hours
RTMS Equipment	20,000 hours	2 hours
Hand Held Enforcement Devices	15,000 hours	2 hours
Tolling Zone Transaction Indicator Beacon (amber on the top of gantry)	15,000 hours	2 hours
Tolling Zone Transaction Indicator Beacon (two sets of lights on the pole)	15,000 hours	2 hours
VES Lane Equipment	15,000 hours	2 hours
Local Area Network	20,000 hours	2 hours
Wide Area Network	30,000 hours	2 hours
All Supplied Standard Workstations	10,000 hours	2 hours
TDC Computer System	10,000 hours	2 hours
Dynamic Pricing Subsystem	10,000 hours	2 hours

MTTR is based on average repair times for typical system failures.

6.1.2 Hardware Requirements

System Life- The System shall have a minimum ten (10) year design life. ACCMA approval is required for the procurement of any equipment or component with planned obsolescence/discontinuation within ten years. No equipment shall be designed and fabricated



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using components with planned obsolescence/discontinuation within ten years. Expendable and consumable materials and supplies will not be included in this requirement.

New Equipment- All equipment, supplies, and materials for this system shall be new and unused, when installed. Materials and products which have been previously used for development work, leased systems, or any other type of used equipment, will not be permitted.

Modular Design- Modular design principles shall be used throughout the system, and shall be defined as the packaging of components together in replaceable units according to the function they perform and by using standardized hardware and components to achieve flexibility of use and to facilitate maintenance. Replaceable and repairable modules shall be used whenever possible to simplify troubleshooting, reduce downtime, and reduce operational and maintenance costs.

Accessibility- All assemblies, subassemblies, and modules shall be readily accessible for removal, testing or replacement without extensive removal of other modules or assemblies. Components shall be located so that there is visibility and access for the use of hand tools and standard test probes where maintenance is required.

Circuit Protection- In addition to UPS protection provided to controllers, processors and servers, components and devices which are susceptible to damage upon failure of the regulating element within a power supply shall be protected by means of an over-voltage protective circuit. All fuses shall be mounted with retention devices at both ends. All fuse types shall contain visual indicators to indicate a blown fuse. The SI's design and recommendations shall conform to the applicable lightning protection, surge, and transient protection standards, such as NFPA-78, IEEE Std 587, and UL-1447, as they apply to each area of protection.

Housings and Cabinets- The material and finish for new housings and cabinets shall be environmentally resistant to outdoor highway environments with wide temperature fluctuations. Aluminum panels providing a minimum of ten (10) years service without repairs is required. All cabinets and housings shall be fitted with required gaskets, grommets, and filters to prevent dust, dirt, smoke, moisture or other contaminants from entering the enclosures in accordance with the application in which the equipment is employed.

Hardware- All mounting hardware, bolts, nuts, studs, washers, brackets, screws, hinges, and others shall be new and shall be constructed of non-corrosive material, and of a design to perform their respective purpose and function for the specified ten (10) year system life.

Fabrication- All chassis, attachments, and hardware shall be fabricated from corrosion and rust resistant materials, or properly plated to achieve corrosion and rust resistance. For those housings and cabinets requiring locked covers, there shall be no exposed hardware visible or accessible from the outside. The covers shall fit flush with the main body of the housing with no exposed gaskets or seals visible when the cover is closed.



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Stainless Steel Materials- The provision and fabrication of all stainless steel materials used in the system shall conform to current American Society for Testing and Materials (ASTM) requirements. Austenitic grade stainless steel (e.g., Type 301 and 304) shall be used when welding is involved. All welds shall be thoroughly cleaned to remove all oxide scale. Discoloration resulting from the welding process shall be removed from all external surfaces. All grinding, polishing and buffing shall be in accordance with the requirements of the material used.

Equipment Diagnostic and Self-Test Requirements- Diagnostic software/firmware shall be loaded and embedded in the Tolling Zone Controller (TZC) and be interactive during operation and invoked at the time the equipment is powered on. Diagnostics shall operate automatically to detect malfunctions and failures and to report such failures to the Maintenance On-Line Management System (MOMS) system at the time of occurrence. Diagnostic software shall be provided to evaluate all connected components of the TZC operation, including communications, and the pricing sign modules.

The system operation shall not be adversely affected by the presence of active transponders that are not compliant with Title 21.

The SI shall conduct an inter-modulation study at each roadside site prior to installation to ascertain the existence of any electromagnetic interference in the radio frequency (RF) spectrum that would effect the operation of the ETS subsystem. This includes interfere with existing Caltrans radio equipment. Should any such interference be identified, the SI shall take any required actions to eliminate or mitigate the interference affecting equipment operation, to the complete satisfaction of the ACCMA at no additional cost to the Contract.

Caltrans is fully responsible for operations and maintenance of the State Highway System (SHS), including the civil and structural elements (excluding the dynamic message signs and ETS equipment structures) of the EB I-580 Express Lanes upon completion of construction. Caltrans is also responsible for providing for the authorized expansion of the system and for assessing the impact of improvements proposed by others to the existing system.

To ensure that projects on the SHS are well designed, safe, and properly constructed, all project planning, design, and construction shall be reviewed and approved by Caltrans in accordance with Caltrans standards and practices and according to the Caltrans project development process.

For this reason, the installation of structures, gantries, CCTV Poles, median barrier systems, equipment, electrical and communication conduit, cables, cabinets and all ancillaries within the State's Right of Way requires the ACCMA to secure an Encroachment Permit based upon the Final System Design and to then secure a Rider authorizing the SI or its subcontractors access to perform the approved installation. The SI is expected to assist the ACCMA in securing the Encroachment Permit and Rider and adhering to the requirements set forth in the Caltrans Encroachment Permit Manual, which is available online at:



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<http://www.dot.ca.gov/manuals.htm>

The SI shall be responsible for coordination with PG&E, AT&T and other communication or power service providers as needed to identify available service connection points during the design phase. The SI shall be responsible for preparing the necessary applications and payment of the applicable fees.

The nature of the ETS is such that it will be considered a Locally Funded Project in excess of \$1,000,000 within the State's Right of Way for purposes of the Manual. The Cooperative Agreement, the Project Report and the Environmental Clearance have been or will be completed by the ACCMA. The SI is expected to develop the necessary documents to satisfy the Encroachment Permit Application Submittal Requirements and assist with the actual submittal to Caltrans.

Working drawings, catalog information, or shop plans for all equipment in the system and all work to be permanently installed shall be submitted for approval in accordance with the State of California Department of Transportation Standard Specifications April 2006 and Standard Plans May 2006 and their subsequent updates, as applicable. The SI shall also be responsible to adhere to all other jurisdictional requirements.

6.1.3 Electrical Work Requirements

The System Integrator shall develop the Project Electrical Plans which shall detail connections, cabling, and communication to all ETS devices listed in this RFP. The SI shall furnish and install power, conduit and cables to all ETS devices described in this RFP. The electrical work shall be successfully completed when all ETS components are properly connected and powered up.

The electrical service supplied will be as specified by the SI. The SI shall be responsible for connecting to the utility power and for supply and installation of power cables and equipment to bring power to the Tolling Zones and Enforcement Zones as well as providing and installing cables and equipment to distribute power within the Tolling Zones and Enforcement Zones.

The SI shall provide equipment for filtering, conditioning, and distribution of line power to all necessary Tolling Zone and Enforcement Zone equipment. The SI shall provide an Uninterruptible Power Supply (UPS) for each Tolling Zone and Enforcement Zone. The SI shall provide appropriate switching hardware to provide for continued uninterrupted operation of the toll collection system spanning an interruption of utility power until utility power is restored.

The UPS shall supply sufficient power so that no data is lost or altered due to the power failure for a minimum, twenty (20) minutes and shall allow regular operation of all system equipment as required to keep the following functional capabilities fully operational during the power failure:

- Vehicle detection, ETC tag read capability and transaction processing;
- Violation Enforcement System capability;
- Automatic Vehicle Classification (AVC) capability; and



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- Communications within the Tolling Zones and Enforcement Zones as well as communications to systems external to the Tolling Zones and Enforcement Zones.

The UPS shall be self-monitoring and shall provide operational status, fully charged, charging, depleted, and system failure messages to the MOMS system. UPS should contain SNMP management cards and traps should be sent to notify Key Personnel of outages or faults.

Complete diagnostic reporting of the power systems and UPS shall be available via the maintenance monitoring function of the ETS.

6.1.4 Applicable Codes and Contractor Requirements

All work for the Contract shall be in conformity with the latest published requirements, as and when applicable to a particular element of the System, of the following:

- State of California Department of Transportation Standard Specifications;
- State of California Department of Transportation Standard Plans;
- National Electric Code;
- National Electrical Contractors Association (NECA);
- Occupational Safety and Health Act (OSHA);
- National Fire Protection Association (NFPA);
- National Electrical Manufacturers Association (NEMA);
- Institute of Electrical and Electronic Engineers (IEEE);
- Applicable Electronic Industries Association (EIA) Standards for Interface and Intercommunication; and
- Underwriters Laboratories (UL).

The SI shall ensure that each subcontractor performing construction or installation work under the Contract holds all necessary California contractor's or other licenses. Additionally, the SI shall ensure that each subcontractor performing such work complies with wage requirements applicable to public works contracts under California and federal law, including but not limited to the provisions of California Labor Code Sections 1774 and 1775. If there is a difference between the minimum wage rates predetermined by the United States Secretary of Labor and the general prevailing wage rates determined by the Director of the California Department of Industrial Relations for similar classifications of labor, the subcontractors shall pay not less than the higher wage rate. Prevailing wage rates determined by the Director of Industrial Relations under California law are available online at <http://www.dir.ca.gov/DLSR/PWD>. Federal minimum wage rates are available online at <http://www.gpo.gov/davisbacon>.

6.1.5 Environmental Requirements

The ETS equipment shall be installed either outside or in a building. The assembled equipment shall be rated to perform under those environmental conditions at the five (5) tolling zone and two (2) enforcement zone sites. The SI shall thoroughly investigate all environmental factors that may affect the operation, reliability, and life of the system to be provided under the Contract



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and shall select equipment that is appropriate for operation in the environment or shall take adequate steps to protect the equipment from the environment.

For each environmental area the equipment installed or operated in that area the SI shall provide certified test results from a testing laboratory satisfactory to the ACCMA demonstrating that the equipment meets the environmental specifications as indicated below in Table 3.

Table 3 – Summary of Environmental Requirements

Area	Exterior	Building
Min operating temp	-20°F	50°F
Max operating temp	145°F	85°F
Min operating humidity	15%	15%
Max operating humidity	98%	80%
Shock	98% MIL-STD-810E Method 516.4 procedures IV	MIL-STD-810E Method 516.4 procedures IV
Vibration	±1g from 15Hz through 500 Hz for a period of 15 minutes in three planes.	None
Corrosion	IEC 68-2-11 or NEMA 4X enclosed	None
Electrostatic Discharge	Survives while booth testing	None
Rain	MIL-STD-810E Blowing rain method 506.3 procedure I or NEMA 4X enclosed	None
Dust	IEC-529/MIL STD-810 Sand and dust size smaller or equivalent to coal or salt or NEMA 4X enclosed	None

Certified results from prior testing by the manufacturer or an approved independent test lab may be used to satisfy the environmental qualification requirement.



6.2 ROADSIDE EQUIPMENT REQUIREMENTS

6.2.1 FasTrak® ETC Subsystem

The ETC subsystem, including the reader and antenna, deployed for the EB I-580 Express Lanes System shall meet all California Title 21 requirements of the toll system operational requirement standards that are in place in the Bay Area at time of deployment of the EB I-580 Express Lanes System. The SI shall design the ETS to be upwards compatible and seamlessly support the operation of switchable FasTrak® transponders that might be introduced into the Bay area during the ETS design life.

EB I-580 Express Lanes SOV users will be issued FasTrak® transponders through the BATA RCSC, which is located in San Francisco, after completing an application and making the required account deposit. However, in the event that transponders are procured under the Contract, these items shall comply with all California Title 21 requirements utilizing a protocol for high-speed tolling. Furnished transponders shall be identical in design and function to the FasTrak® transponder per the following:

- Shall be user installable/removable;
- Provide audible tone when the transponder is successfully read; and
- Provided with an RF shielding bag or tag disabling device which would be utilized when the vehicle is traveling as an HOV.

The SI shall be responsible to assist ACCMA, the operating agency, in obtaining an economic area (site) Part 90 radio service Federal Communications Commission (FCC) license, and a temporary license if required to meet the Project schedule. ACCMA will provide elevation, latitude, longitude, and the county for each toll/enforcement zone site.

6.2.2 Tolling Zone Controllers

The Tolling Zone Controllers (TZCs) shall control and monitor the toll collection activities at each tolling zone and be primarily responsible for gathering FasTrak® transaction data and transmitting that information to the Toll Data Center (TDC), in a secure environment, and without duplication, for trip compilation. The TZC shall also interface with the TDC to receive daily FasTrak® tag account status files on, at least, a daily basis.

The SI shall be responsible for the design, procurement and installation of the Tolling Zone and Enforcement Zone gantries, gantry foundations, median concrete barrier railing around each tolling zone, a minimum of two transaction indicator beacon lights, and two dual light beacons per zone, cabinets and controllers, cabinet foundations, conduits and cables, connections to power and communications sources, and all the necessary miscellaneous items to provide operational tolling and enforcement zones including traffic handling plans.

6.2.2.1 Tolling Zone Controller Primary Functions

The primary functions of the TZC shall be to:



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- Create and transmit transaction records and summary vehicle counts;
- Provide visual feedback of valid FasTrak[®] transactions, through the use of transaction indicator beacons and dual light beacons installed at the tolling zones and enforcement zones in such a position that it can be easily viewed by stationary CHP officers;
- Monitor its peripheral tolling zone equipment (i.e. FasTrak[®] reader, vehicle detection system equipment, etc) and report on the status of these pieces of equipment; and
- Receive daily transponder account status update files from the TDC.

The TZC shall accommodate a system administration and maintenance interface. This interface shall be used by maintenance personnel to accomplish tasks such as modifying system configuration files, time synchronization, uploading transaction data, on-site diagnostics, performing preventive maintenance tasks, etc.

The TZC shall be capable of storing no less than 30 days of vehicle, event and FasTrak[®] transaction data. The TZCs shall also store no less than 10 million FasTrak[®] transponder account status entries.

All TZC messages (i.e. vehicle, event, FasTrak[®] transaction, maintenance, and configuration/administration) shall contain a unique sequence number.

The TZCs shall include at least the following information in the transaction record:

- Transponder number;
- Transponder status;
- FasTrak[®] transaction date;
- FasTrak[®] transaction time;
- Transponder handshake count;
- Lane controller date;
- Lane controller time;
- All pertinent Vehicle Detection System (VDS) data; and
- Equipment states.

The TZC's vehicle sequencing logic shall be self-correcting. The TZC shall record all transponders ID numbers that are read by the FasTrak[®] tolling zone subsystem.

The TZC shall be able to operate normally without network communications, storing current records for later transmission to the TDC. TZC shall include a portable hard drive to manually transfer data to and from the TDC.

6.2.2.1.1 Equipment Monitoring and Control

The TZCs shall monitor the following peripheral equipment through real-time data connections:

- VDS equipment;



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- FasTrak[®] transponder reader;
- Transaction indicator beacons
- Dual light beacons; and
- All other power supply and communications equipment that is located at the tolling zone.

The system monitoring functionality shall include the ability to receive maintenance status messages from ETC subsystem and it shall incorporate logical processes, local to the toll/enforcement zone controller, which evaluate operations and create maintenance alerts based upon sets of rules and expected conditions.

The maintenance alerts that are generated by the toll/enforcement zone controller shall be sent to MOMS which executes on the TDC.

MOMS shall be responsible for compiling the raw maintenance data into a database and creating maintenance alerts and work orders that define actual maintenance events that are then dispatched via text messaging to technicians. Technicians shall be able to remotely access the System to retrieve assigned work orders.

6.2.2.1.2 Lane Controller Data and File Transmission

The TZCs shall be connected to the TDC through a local carrier (e.g. T1, DS1) connection and transmit files to the TDC server in real-time.

The TZCs shall transmit vehicle detection information, FasTrak[®] transaction data, equipment diagnostics and maintenance data.

The TZCs shall receive, at a minimum, daily FasTrak[®] tag account status update files and system configuration files.

The TZC serial ports shall be configurable as either RS-232 or RS-422.

Serial communications interfaces shall provide for error detection protocols.

6.2.2.2 Lane Controller Equipment Requirements

Under normal conditions, the TZC shall operate in an automated fashion without intervention from operational personnel.

All ETS functions, including but not limited to, transaction assembly, equipment status monitoring and file transmission shall be designed to function independent of human interaction.

The TZCs shall consist of environmentally hardened components and housed in an environmentally protected and controlled enclosure to operate under the weather conditions found in the Bay Area.



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The TZCs shall be designed with discrete input and output signal lines and use optical isolation circuitry for protection.

The TZCs shall store data redundantly.

The TZCs shall provide for a local user interface for maintenance and administration purposes.

The TZC data storage process shall be based on First in First out (FIFO) technology.

The TZC performance shall be ample to handle all lane processes as designed at a rate of 2,500 vehicles per lane per hour, with 50% of those vehicles having transponders.

For any 10 second period, the TZC shall be capable of handling all Express Lane processes for transponder vehicle passage rates of 7,200 vehicles per lane per hour, assuming that all vehicles have transponders.

The TZCs shall capture transponder reads for 99.98% of the vehicles with properly mounted Title 21 compliant transponders passing through the tolling zone.

The TZCs shall capture transponder reads for less than 0.01% of the transponders traveling in the General Purpose (GP) lane closest to the Express Lanes (left-most GP lane).

The TZCs shall be capable of determining the direction of travel for all vehicles in the Express Lanes with an error rate in the determination of travel direction of no more than 0.01%.

6.2.2.3 Lane Controller Operating System

The TZC Operating System (OS) shall be robust enough to support all of the operations of the tolling zone subsystems while meeting the requirements stated in the RFP.

The TZC OS shall function in such a way that it allows for the real-time collection and transmission of data across a local carrier provided network that also supports remote, real-time user connections (for maintenance purposes).

The TZCs shall provide TCP/IP network support and TCP utilities such as Simple Network Management Protocol (SNMP), telnet, and ping.

6.2.2.4 Lane Controller Interface to the Toll Data Center

Each TZC shall maintain a real-time interface with the TDC. This interface shall allow for the transmission and reception, in real-time, of any data collected and assembled in the lane and any data compiled at the TDC which is necessary for tolling zone subsystem operations.

The TZC to TDC interface shall be fully automated and not require human intervention.



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The TZC shall broadcast lane events in near real-time to the TDC to support the monitoring activities carried out by operations or maintenance personnel.

The TZCs shall transmit a periodic heartbeat, or status, message to the TDC for maintenance purposes.

If communication between the toll/enforcement zone controller and the TDC fails, the TZC shall periodically and automatically attempt to re-establish the connection until the connection is made.

The TZCs shall periodically (at least daily) receive tag status files from the TDC. The TDC shall receive the tag status files from the BATA RCSC. Upon receiving tag status files from the TDC, the TZC software shall subject the file to various sanity checks to ensure that the file is valid prior to downloading the new data file into its static memory. Typical sanity checks would include checking the file type, the file size, the file header and footer data, etc.

The TZCs shall acknowledge TDC-initiated command execution.

6.2.2.5 Lane Controller Equipment Interface

All TZC interfaces to peripheral equipment shall incorporate means of detecting whether the equipment is operating properly or if it experiences malfunction.

6.2.2.5.1 Lane Controller Interface to the Vehicle Detection Systems

The interface between the TZCs and the VDS equipment, at those locations in which this communications link is established, shall be in real-time.

The VDS data that is gathered shall consist of raw vehicle speed, occupancy and volume data from the Express Lanes by means of in-pavement detectors and overhead radar sensors and in the GP lanes by means of overhead radar sensors only. Accurate and timely data collected by the VDS controllers is essential to successful dynamic pricing operations.

6.2.2.5.2 Lane Controller Interface to the FasTrak[®] Reader

The interface between the TZCs and the FasTrak[®] transponder reader shall be in real-time and not be encumbered by latency.

The bidirectional interface shall allow for the exchange of toll/enforcement zone controller commands and FasTrak[®] system transponder data. The necessity of the accurate and timely exchange of data between the two subsystems is essential to successful ETS operations. The “personality” of the reader shall be configurable from the TDC or a local portable computer.

6.2.2.5.3 Lane Controller Interconnection to the Transaction Indicator Beacon

The toll/enforcement zone controller shall send a digital I/O signal to the tolling zone transaction indicator beacon when a valid FasTrak[®] transponder is detected and processed.



6.2.2.5.4 Uninterruptible Power Supply

The UPS shall support an intelligent interface for monitoring battery status and sending alarms when electrical service is automatically or manually converted to battery power. The TZCs shall interface directly to Uninterruptible Power Supply's (UPS) intelligent interface to monitor the status of the battery power back-up, particularly when commercial power fails.

The use of UPS equipment shall also ensure that the TZC software is shut down in an orderly fashion if commercial power is not restored prior to expiration of the UPS run time.

6.2.3 Vehicle Detection System Equipment

The primary functions of Express Lanes VDS equipment shall be to accurately, and in near real-time, detect vehicles in the Express Lanes and GP lane to determine the traffic volume, occupancy and the speed for use by the TDC and toll/enforcement zone controllers.

The SI shall be responsible for the design, procurement and installation of VDS equipment including the wireless sensors, RTMS equipment, RTMS poles and foundations, cabinets and controllers, cabinet foundations, conduits and cables, connections to power and communications sources, and all the necessary miscellaneous items to provide operational vehicle detection systems including traffic handling plans.

6.2.3.1 Magnetic Wireless Sensors in Express Lanes

Magnetic sensors with advanced packet radio technology shall be installed in the eastbound Express Lanes at the locations identified in the Project Electrical Plans, which shall be developed by the SI and will be subject to the approval of the ACCMA and the Systems Manager. Installation of the vehicle detection sensors shall be in accordance with all relevant Caltrans specifications.

The wireless magnetic sensors shall be able to automatically detect vehicles traveling at speeds ranging between 5 and 100 mph and shall have an operating life of at least 10 years.

Each VDS controller shall communicate directly with the wireless sensors and provide near real-time traffic data to the TDC for input to the dynamic pricing module/software for setting the current prices to use the facility from a particular entry point.

6.2.3.2 Remote Traffic Microwave Sensors

In order to collect travel time data from the GP lanes, Remote Traffic Microwave Sensor (RTMS) devices shall be installed along the outside GP lane. RTMSs shall be located per the Electrical Plans that shall be developed by the SI and approved by the ACCMA and Systems Manager. Installation of the RTMS shall be in accordance with all relevant Caltrans specifications.

The RTMSs shall be capable of detecting vehicles using a "side-fire" type installation.



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The RTMSs shall be capable of detecting vehicle volume, count and speed across all GP lanes and in the Express Lanes at vehicle speeds between 5 and 100 mph. The RTMS units shall also determine in which lane the vehicles are traveling.

The RTMSs shall be configured to capture vehicles in the Express Lanes to both supplement the in-pavement detectors and in the event an in-pavement vehicle detector fails allow the RTMS units to be used as data back-up.

6.2.4 Dynamic Message Signs

6.2.4.1 Primary DMS Functions

The Dynamic Message Signs (DMS) shall be located approximately 1/4-mile upstream from each entry point to the eastbound EB I-580 Express Lanes and shall be the primary method of informing the public of what the price will be if Single Occupant Vehicle (SOV) operators choose to use the Express Lanes.

When the TDC trip processor calculates a price for an entry point, the price shall be communicated to the DMS controller utilizing the IP address for that DMS controller.

The DMS controller shall energize the Light Emitting Diodes (LEDs), comprising the full matrix panel installed in the pricing sign, which consists of a static, fixed panel sign with DMS display modules inserted in cutouts. The energized LEDs shall display either a price or a message and the controller shall acknowledge to the TDC that the requested message was received and properly displayed.

The DMS controller shall be polled by the TDC at regular intervals (at least every 60 seconds) and shall monitor the operating state of the LED panel electronics and return a status message. The DMS controller shall be capable of reporting to the TDC what is being displayed by interrogating the display module sign pixels.

6.2.4.2 DMS Equipment Requirements

The DMS shall be consistent with the Caltrans approved signage program.

The DMS shall include both static and dynamic portions.

The Express Lanes DMS shall combine a static sign information panel with dynamic LED modules or panels that display dynamically changing prices. These display modules/panels, which shall be provided by the SI, shall be capable of forming at least 12 alpha numeric characters that are at least 18 inches in height.

The static portion of the DMSs, which will be provided by others, shall show permanent information (i.e. downstream destinations, allowed vehicles, HOV eligibility requirements,



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restricted hours, as applicable, FasTrak[®] and HOV lane logos). The SI shall be responsible to install the LED portion of the DMSs to the static portion of the signs.

Each display module/panel shall include at least two photocells to measure the ambient light and adjusts the intensity of the LEDs to be visible under all light conditions (full sun to full dark). The LED color shall be amber.

The DMS shall be managed by a sign controller which will be located either in a weather hardened roadside enclosure or on the mounted sign.

The DMS controller shall communicate to the TDC via a communications network utilizing the National Transportation Communications for ITS Protocol (NTCIP) standard sets over the local carrier's network.

The DMS controller shall have a unique IP address that identifies its location.

Overhead sign structures (not including the LED panel for the DMS signs) shall be furnished and installed by others.

6.2.5 Closed Circuit TV Subsystems

Closed Circuit Television (CCTV) camera systems shall be deployed at each of the tolling zones for traffic condition surveillance, monitoring of the tolling zones and for safety reasons. CCTV cameras shall also be used to assist Caltrans staff in detecting incidents and to track the progress of incident response and vehicle clearance. Video from the CCTV cameras shall be sent to the TDC and Caltrans TMC where it shall be made available to third parties over the Internet.

During normal operational periods ACCMA staff shall have control over the pan, tilt and zoom camera features for all cameras installed within the Project Limits and Caltrans staff shall have only view access. During emergency situations, control of the video shall be provided to TMC staff.

The SI shall be responsible for the design, procurement and installation of the CCTV equipment, the CCTV poles and foundations, cabinets and controllers, cabinet foundations, conduits and cables, connections to power and communications sources, and all the necessary miscellaneous items to provide fully operational CCTV systems, as indicated elsewhere in this document, including traffic handling plans.

6.2.5.1 CCTV Camera Locations

The CCTV cameras shall be installed at locations according to the Installation Plan.

6.2.5.2 CCTV Subsystem Requirements

The CCTV subsystems shall include the following components:

- CCTV camera, in a dome configuration;
- Camera mounting pole;



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- Pole foundation;
- CCTV control cabinet; and
- Video, electrical and communication components, conduit and cables.

CCTV cameras shall be able to turn 360 degrees and contain pan, tilt and zoom capabilities. The CCTV subsystem shall use Ethernet-based communications and protocols.

6.2.5.3 Camera Assembly

Each camera assembly shall consist of the following fully integrated components:

- Solid state color camera;
- Zoom lens;
- Weatherproof camera housing;
- Pan and Tilt; and
- Camera mounting assembly.

The camera assemblies shall be assembled and tested in accordance with these specifications prior to delivery to the ACCMA. Factory testing documentation shall be furnished to the ACCMA. Camera assemblies shall be furnished as a complete unit.

Individual components of the camera assembly shall conform to the specifications in the following sections.

6.2.5.4 Solid State Color Camera

Solid state Charged-Coupled Device (CCD) color cameras shall be provided, which shall meet or exceed the requirements presented in Table 4 below.

Table 4 – Solid State Color Camera Requirements

Color System/Signal Format	Phase Alteration Line (PAL) standard
Image Sensor	1/3" interline transfer, progressive scan CCD
Horizontal Resolution	Minimum 470 horizontal television lines
Sensitivity	3.0 lux @ 1/60 second (color day) 0.2 lux @ 1/4 second (color day) 0.3 lux @ 1/60 second (mono night) 0.02 lux @ 1/4 second (mono night)
Day/Night Switchover	Day (color) / night (mono), manual or auto
On-screen ID	Presets, Sectors and two alarms programmable (enable/disable)
Title Generation	8 lines



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The camera shall be specifically designed to operate under low light conditions and shall function satisfactorily over a wide range of dynamic lighting conditions ranging from low light to full sunlight. To improve sensitivity under low light conditions, the camera may switch from full color to monochrome operation.

6.2.5.5 Zoom Lens

The camera lens shall be a motorized zoom lens that meets or exceeds the requirements that are presented below in Table 5.

Table 5 – Camera Lens Requirements

Optical Zoom Range	Integral 23X optical (3.6 to 82.8 mm)
Digital Zoom range	1X through 10X digital
Auto focus	Selectable Auto/Manual

6.2.5.6 Waterproof Camera Enclosure

The cameras shall be furnished in waterproof enclosures. The enclosures shall be designed to ensure that the complete CCTV camera assembly operates satisfactorily and in compliance with the specifications in the meteorological and ambient conditions prevailing in the San Francisco Bay Area in general and the East Bay in particular.

The enclosure shall be weatherproofed and sealed. The enclosure shall protect against water, grime, dirt, sand and moisture.

The enclosure shall include an integral sunshield to reduce internal temperatures and minimize glare caused by direct sunlight.

6.2.5.7 Pan and Tilt

The camera assembly shall include remote controlled pan and tilt functions that, at a minimum, meet the minimum requirements as stated below in Table 6.

Table 6 – Camera Assembly Requirements

Pan	360 degrees continuous pan
Tilt	0 – 90 degrees down, Auto flip at 90 degrees
Presets	64
Preset speed	> 250 ° / second preset, at 0.1 ° accuracy
Tours	8, each of 32 presets with dwell time per preset per tour
Sectors	16
Privacy Zones	8 programmable zones can be set for video blanking



Digital position feedback	Yes
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6.2.5.8 Camera Mounting Assembly

The cameras shall be installed on poles. The SI shall supply and install all necessary fixtures and fittings for mounting the camera assembly onto the poles and building rooftops. The camera mounting bracket shall be capable of supporting the weight of the camera assembly and shall be capable of withstanding winds with no appreciable movement for speeds up to the maximum design wind velocity as experienced in the San Francisco Bay Area in general and the East Bay in particular.

6.2.5.9 Pole Mounting Brackets

For pole mounted cameras, CCTV camera assemblies shall be provided with camera mounting assemblies, to mount cameras on CCTV poles.

6.2.5.10 Mounting Bracket Design

The SI shall be responsible for the design and construction of the mounting brackets and for conducting a field survey to determine the most suitable method of mounting the cameras. Shop drawings of the mounting method shall be submitted to the ACCMA and Caltrans for approval prior to manufacture of the camera mounting brackets.

6.2.5.11 Camera Cable

The SI shall furnish and install all necessary cables and connectors between the camera assembly and the outstation cabinet. Pole mounted camera cables shall be routed down the inside of the pole and through underground duct to the outstation cabinet.

6.2.5.12 Camera Control Receiver (CCR)

The SI shall furnish and install digital camera control receivers in outstation cabinets at each camera location. The control receivers shall respond to signals from the central camera control system and provide D/A conversion of camera control function commands. Output voltages from the CCR shall be as required by the camera assembly provided.

6.2.5.13 CCR Requirements

The CCR units shall transmit and receive bi-directional control signals to and from the Caltrans TMC over the communications network, as specified in Section 6 above. The control receiver shall provide the drive signals to the camera, lens, and the pan and tilt functions, and transmit status information over the communications network to the TDC and the TMC for processing.

The SI shall furnish and install all necessary cables and connections between the CCR and the communications network.



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The CCRs shall be fully compatible with the camera control software and the camera assemblies provided. At a minimum, the CCRs shall provide the following functions:

- Zoom in;
- Zoom out;
- Pan left;
- Pan right;
- Tilt up;
- Tilt down;
- Focus near;
- Focus far;
- Camera power on;
- Camera power off;
- Iris override;
- Iris open (manual/automatic); and
- Iris close

Each CCR shall provide a means for the local control of the above functions. The control panel shall also include a main power switch, fuse and breaker, as well as “off” settings from zoom, focus, pan, tilt, and iris. The CCR shall provide video testing capabilities, to allow observation of the video signal from the camera in the field.

The CCR shall have eight (minimum) form “C” relays to activate auxiliary devices in the field. The CCR shall have eight (minimum) status inputs available to monitor conditions in the field, such as cabinet entry, loss of camera enclosure pressure, etc.

6.2.5.14 CCTV Cabinets

The CCTV cabinets may be used to house the CCR and other necessary equipment required for CCTV camera operations and maintenance, provided that it is located near enough to the CCTV camera and adequate space is available within the cabinet to facilitate maintenance operations.

If the SI determines that a separate cabinet is required to house the CCR, all costs associated with the cabinet shall be included in the cost of the CCTV subsystem. The location of any CCTV cabinets, if any, shall be subject to the approval of the ACCMA and Caltrans.

6.2.5.15 CCTV Communications Equipment

The SI shall furnish and install fiber-optic modems, cables and connectors, as necessary to provide transmission of the camera video signal from the outstation cabinet to the TDC and the Caltrans TMC and to provide two-way transmission of digital camera control signals and camera feedback data.

Video transmission shall meet all State and local standards. Control data shall utilize RS-422 serial interface and standard video industry control protocols.



CCTV communications equipment shall be provided in accordance with Section 6 of the RFP.

6.2.5.16 CCTV Testing

The SI shall locally test and demonstrate the performance and quality of the installed camera. CCTV camera system components shall be set and configured by the SI using licensed software provided by the specified manufacturer(s) or approved equal using a portable computer and monitor in strict coordination with the Agency Engineer or representative.

The SI shall prepare and submit test procedures at least three weeks prior to the scheduled field testing. Proposed testing shall include the following:

- a. Inspect the continuity and resistance of ground and surge suppression devices;
- b. Measure power supply voltages and connected loads at camera cabinet;
- c. Confirm continuity across connections and inspect all terminations;
- d. Measure and compare video output (e.g. V p-p) to specified output. Verify quality of video image and compliance with NTSC standards at the camera site with a vector scope or waveform monitor and color video monitor;
- e. Demonstrate camera sensitivity at low light levels to meet the manufacturer's related performance specifications;
- f. Demonstrate the camera's image stabilization capability by viewing video output under high winds or a large, loaded tractor trailer passing adjacent to the camera at a speed exceeding the posted speed limit.
- g. Confirm and certify the operation of heater and fan for the installed dome camera system whenever temperature and condensation would affect the operation or performance of the dome camera system output.
- h. Using a portable computer loaded with camera control software, demonstrate pan, tilt, zoom, focus, iris opening, manual iris control selection and operation, preset positioning, and power on/off functions;
- i. Demonstrate the pan/tilt speed and full range of movement to meet the manufacturer's applicable specifications;
- j. Verify functioning of encoder using a decoder, portable computer and color video monitor.



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Results of the field test shall be documented and include in a detailed report submitted to the Engineer or representative. Any equipment or component found to be defective or degraded during testing shall be replaced and retested. This shall be repeated until the specified performance is demonstrated.

The SI shall submit a detailed system acceptance test plan to the Engineer or representative for review and approval two weeks before the proposed start of testing. Video quality will be accepted by the Agency as viewed from the Caltrans TMC and the TDC prior to final acceptance.

The SI acceptance test plan shall at a minimum consider the following:

- a. System Acceptance will be based on the clarity and resolution of the video output at the TMC and TDC under sunny, overcast and low light conditions by locating test vehicles at pre-established distances from the camera. Video quality shall at least be equal to the clarity and resolution provided by existing cameras at the TMC of the same type under the same lighting and distance when viewed side by side at the TMC.
- b. A minimum of ten (10) presets shall be configured and demonstrated from both a new TDC and existing TMC workstation.
- c. Control of a full range of pan, tilt and zoom camera movements from a TMC and TDC workstation shall be demonstrated with video displayed on a monitor.
- d. Control of all other non-PTZ camera functions contained in the manufacturer's product literature for the specified camera system.

6.3 ENFORCEMENT EQUIPMENT REQUIREMENTS

In order to manage the traffic in the EB I-580 Express Lanes using dynamic pricing, careful and efficient system enforcement is essential. Uncontrolled use of the Express Lanes by unauthorized vehicles will cause overcrowding, disproportionately burden paying SOV users with higher prices, and jeopardize the success of the project.

The EB I-580 Express Lanes enforcement process will include visual monitoring to determine how many occupants are in the vehicles that are traveling in the Express Lanes. Visual enforcement will be performed by CHP officers observing driver behavior as they drive through tolling zones and determining if a transponder is visible on the windshield. CHP enforcement vehicles will also be stationed in three enforcement zones located within the inside shoulder. These enforcement zones will also be used by the CHP officers to pull over potential violators for verification that they did not violate the EB I-580 Express Lanes system.

Access to the Express Lanes will be controlled through the use of triple painted lines (one solid white line and double solid yellow lines). Primary emphasis for enforcement will be reducing or attempting to eliminate the number of SOVs that use the Express Lanes without a valid



transponder and minimizing occurrences of vehicles crossing the double yellow lines. However, it is presumed that all other typical traffic violations will also be enforced by the CHP in the eastbound EB I-580 Express Lanes corridor, including speeding, seat belt violations, etc.

The SI shall be responsible for the design, procurement and installation of the CHP enforcement zone gantries, gantry foundations, median concrete barrier rail around each CHP enforcement zone, a minimum of two transaction indication beacon lights per enforcement zone, cabinets and controllers, cabinet foundations, conduits and cables, connections to power and communications sources, and all the necessary miscellaneous items to provide an operational CHP enforcement zone including traffic handling plans.

6.3.1.1 EB I-580 Express Lanes System Enforcement Tools

The CHP will make use of the following two (2) enforcement tools, which will be provided to them and be maintained by the SI pursuant to the Contract:

- Hand Held Devices; and
- Tolling Zone Transaction Indicator Beacons.

6.3.1.1 Hand-Held Device

A hand held device shall provide a tool to CHP cruiser and motorcycle enforcement officers to confirm the validity of a transponder mounted on an SOV vehicle.

6.3.1.1.1 Hand Held Device Primary Functions

The hand held device shall provide the following functions:

- The hand held device shall be able to read a transponder and determine whether it is a linked to a FasTrak[®] account that is in good standing; and
- The hand held device shall comply with the FasTrak[®] Title-21 protocol and operating standards.

6.3.1.1.2 Hand Held Equipment Requirements

The hand held device shall be small in size, weatherproof, and environmentally hardened for use outside and suitable for use by a CHP motorcycle and cruiser officers.

A Personal Digital Assistant (PDA) unit shall be integrated with the hand held enforcement devices.

6.3.1.1.3 Hand Held PDA Display Unit

PDAs shall be used in support of the hand held enforcement devices.

The PDA shall provide CHP officers with readily accessible information on transponder identification numbers and related customer account status information.



The PDA shall also receive tag status downloads on at least a daily basis.

6.3.1.1.4 Hand Held PDA Primary Functions

The PDA shall provide the following functions:

- The PDA shall receive tag status file data, which includes the daily updated list of the valid transponders ID numbers as recognized by the BATA RCSC. This data shall be downloaded from both a docking station located at the CHP office and, subject to the approved communication system design and cost effectiveness, from the TDC.
- The PDA shall also be able to receive and utilize tag status updates periodically throughout the day. This data shall be downloaded as described above.
- The PDA shall contain software to compare a transponder's identification number with the resident tag status file, and determine if there is a match, which would mean the transponder is linked to a FasTrak[®] account that is in good standing; and
- The PDA shall display information in an intuitive format that requires minimal interaction on the part of the user and be configurable to use audible signals to confirm successful read status.

6.3.1.1.5 Hand Held PDA Equipment Requirements

The PDA shall be small in size, weather proof, environmentally hardened for use outside of CHP vehicles and also suitable for use by CHP motorcycle officers in combination with the hand held device.

The PDA display screen shall be visible under all lighting conditions.

The PDA shall be able to receive data via a docking station and over a secure, high-speed, wireless WAN connection.

For the hand held PDAs, a rechargeable battery shall be used that allows use for up to 12 hours of continuous PDA operation based on 250 transponder reads.

6.3.1.2 Tolling Zone Transaction Indicator Beacon

The TZCs, which are located at each tolling zone and enforcement zone, shall send a signal to energize two transaction indicator beacons (one for each EL mounted on a top of the tolling zone gantry and enforcement zone gantry) every time a vehicle with an invalid tag, an HOV or an SOV without a tag traverses the tolling zone or enforcement zone. In addition two dual light beacons shall be installed on each gantry at a height that makes it easily viewable to enforcement officers through their rearview mirror of the patrol vehicle. The beacons shall be able to be moved up or down without requiring major installation.

This verification shall be done automatically by the TZC by matching the transponder ID number to the corresponding ID number on the latest tag status list, which only contains ID numbers associated with a FasTrak[®] account in good standing. Median observation enforcement zones



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located upstream of the tolling gantries are needed for CHP vehicles to station and observe the indicator beacons as part of the enforcement process.

6.3.2 EB I-580 Express Lanes Lane Level Violation Enforcement Equipment

The SI shall furnish and install all components of the Violation Enforcement System (VES). All the equipment, supplies, and materials for this VES shall be new, unused, COTS, field proven items, of the latest model and technology when installed.

The work under this section shall include all labor, materials, licenses, and support services to complete the design, documentation, installation, integration, packaging, delivery, testing, and acceptance of the hardware and software for the VES lane processing system. The VES lane subsystem shall process all violation information in real-time.

6.3.2.1 VES Lane Image Acquisition Module

The VES image acquisition module shall include, but not be limited to, cameras, electronic sensors, lights, strobes, connectors, interfaces, wires, conduits, mounting components, housings, optical devices such as lenses, shutters, and filters necessary to detect the position, capture the image of the violating vehicle (including its license plate), and transmit it to the VES lane and/or back office processors.

The image capture system shall require no operator intervention after the original set up and deployment tests (for example: no aperture or focal adjustments). The system may sense light and other conditions and/or adjust lighting conditions in order to ensure proper exposure and ensure image quality.

The VES lane image acquisition module components shall be designed and installed to minimize vandalism.

6.3.2.1.1 Image Capture

VES equipment shall be installed to capture rear license plate images at every tolling zone and enforcement zone traffic lane, in adjacent shoulders and in a location to capture an image of the license plates for wrong-way traveling vehicles at those tolling and enforcement zone locations. The VES equipment shall include, but not be limited to, high speed cameras including an environmentally protected housing, lens, high speed shutter, and filter (as needed), violation trigger device(s), supplemental lighting, wires, cables and connectors, image processing software and hardware with lane equipment and network or server interfaces, mounting brackets, plates and components. These equipment and materials shall be designed, procured, integrated, installed and tested to receive a signal and/or message when and where a violation has occurred, detect an accurate position of the rear license plate of the vehicle. The video system shall capture 24 bit color digital images of the vehicle's rear license plates. The number of images shall be as needed to ensure the capture of one or more readable license plate images. The system shall forward for human review no more than three (3) rear images for each vehicle and the readability success rate shall be judged from the images forwarded.



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The system shall be capable of capturing readable images of all license plates including motorcycle, light truck and bus plates. The images and related transaction data shall be transmitted to an automatic license plate reading (ALPR) capability where the images are processed to acquire the plate number and jurisdiction of issue.

All violation transactions involving lanes operating with defective equipment at the time of the violation shall code the transaction as to the type of equipment malfunction.

- **OCR Image Processor**

The OCR image processor shall be provided to receive, process, and store images sent from connected cameras or from the tolling or enforcement zone controllers. It may be an element of the tolling or enforcement zone controller or a separate standalone controller. The OCR image processor shall OCR the images before storing and forwarding them to the TDC. The image processor may be located at each of the tolling and enforcement zones or at a remote location. The OCR process shall produce both plate number and jurisdiction of issue for all types of license plates, including motorcycle, light truck and bus plates. The OCR process shall be capable of reading plate fonts for plates issued by California and by all its contiguous neighbor states. The image processor shall be capable of error logging and shall contain diagnostic software to report errors/failures to the MOMS to facilitate the response to problems encountered by the VES.

- **Cameras**

The number of cameras provided, camera orientation, and camera resolution shall be sufficient to support the image capture and ALPR requirements. Camera housings and cabling shall be designed to meet expected environmental requirements in the Bay area. Camera housings and mounting hardware shall be designed for quick installation and replacement. The likelihood of capturing a full-plate image for each violation shall be maximized by ensuring that adjacent camera views overlap sufficiently and that image sets from both of two adjacent cameras are captured whenever the vehicle position straddles their field of view. The violation images captured in the lanes at the tolling and enforcement zones and then stored and forwarded by the image processor shall be in an uncompressed digital or “lossless” compression format.

- **Image Trigger**

A reliable and accurate means of triggering the capture of images of the rear license plates of the vehicle shall be provided. The trigger device selected shall be capable of supporting the capture of license plate images for vehicles traveling at any speed and/or for vehicles that are in the Express Lanes or straddle adjacent lanes or travel (or straddle) the roadway shoulder. The image trigger shall interface with the tolling and enforcement zone controllers. The trigger shall also interface directly with the image processor to



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support capture of the license plates of passing vehicles when communications with the tolling and/or enforcement zone controller(s) fail.

- **Supplemental Illumination**

Supplemental lighting shall be provided, if the SI deems necessary, to improve lighting deficiencies experienced at various times in the tolling and enforcement zone lanes and enhance the quality of the captured image for OCR processing. Any supplemental lighting that the SI chooses to install shall be deployed within the current right-of-way for each Express Lane and shall not cause light pollution at the tolling and enforcement zones.

VES lighting design shall avoid impairing the vision of the motorists departing the tolling and enforcement zones (cameras for rear plate capture). The VES lighting design shall consider traffic in adjacent lanes and roads as well as traffic traveling in the opposite direction, where applicable. The preferred solution for the supplemental lighting is high speed, high intensity, pulsed or flashed light energized only when images are taken and for only the duration needed to capture images. The lighting design shall incorporate automatic intensity adjustment of the light source based on ambient light if and as needed to assure uniform quality of captured images and successful OCR processing. The VES design shall incorporate provisions to actively monitor the status of the supplemental light source (working/not working) and report failures through the MOMS in a timely manner.

6.3.2.2 VES Lane Processor and Sensing Subsystem

The VES lane processor and sensing subsystem may be included as part of the lane controller or as a separate unit, which can process the dual Express Lanes. The VES lane processor and/or its integrated system shall meet, at a minimum, the following requirements:

- The SI shall provide the VES lane processing platform, memory and other devices deemed necessary to meet the functionality and performance specifications of this RFP;
- The VES lane processor and/or its integrated system shall be capable of a graceful/safe shutdown and re-start procedure under all failure conditions;
- The VES lane processor shall contain a watchdog timer to monitor the VES lane function/activity, utilizing a real-time clock alarm function and be capable of automatically triggering a hardware reset. In the event of a hardware reset or the detection of a failure in any of the related peripherals, a standard failure message indicating the nature and type of failure shall be generated and transmitted to the MOMS. This error message shall be logged and recorded within the VES for use during the violation fail safe issuance analysis; and
- The VES lane processor shall be powered by the UPS system according to electrical codes referenced in this RFP.

The VES lane processor and sensing subsystem shall control all VES-related lane equipment, and interface with the lane controllers or its functionality and automatically capture, associate



and store violation evidence including violation image and violation data. The VES lane processor and sensing subsystem shall include:

- VES lane processor; and
- VES lane vehicle sensor.

6.3.2.2.1 VES Lane Processor

The SI shall provide processing capability at the lane and/or the TDC level to control all VES-related peripheral devices described in the subsection above. The VES lane processor shall be capable of:

- Capturing the image of every vehicle, including the vehicle's rear license plate;
- Capturing the toll transaction data associated with the captured image;
- Communicating with the lane controller to identify which transactions and associated images are violations and/or anomalies that require additional processing;
- Transferring the violation information over the communication links to the TDC;
- Self-synchronizing with the lane controller, in order to maintain accurate records regarding the images and the toll transactional/timing information;
- Storing violation related data in a violation data buffer in the event that upstream communications is interrupted;
- The SI shall describe and provide diagrams of the VES lane processes, indicating the logic, location of the vehicle, the processing time required for each lane configuration in which VES is required; and
- The VES lane processor logic shall address the most common lane conditions including but not limited to:
 - Steady state flow of traffic,
 - Stop and go traffic,
 - High speed traffic,
 - Standard passenger vehicles,
 - Standard vehicle with trailer,
 - Buses,
 - Motorcycles.

6.3.2.2.2 VES Lane Vehicle Sensor

The SI shall provide, install, and integrate into the VES subsystem a vehicle sensor that shall be used to determine when the vehicles and their license plate are correctly positioned for image capture. These sensors may be part of or used by the lane controller for other functions. The Proposal shall include the description and cost of the items in this subsection, only if these items are exclusively used for the VES function.



6.3.2.3 VES Lane Infrastructure

All lane-to-lane and lane-to-TDC communication shall use optical fiber as the transfer medium. All intra-lane communications may use twisted shielded pair or coaxial cable as communication medium.

6.3.2.4 VES Lane Design and Performance Parameters

The VES lane hardware and software shall meet and/or exceed the following design and performance requirements:

- The captured VES image shall be readable by the human reviewer at the VES workstation;
- The VES lane system shall be capable of storing (buffer) an average of 48 hours of violation data at each lane (images and transactional data), in the event that the communication link to the CPS fails;
- The image capture system shall capture rear images and the license plate images of all vehicles traversing the Express Lanes:
 - At approximately the same vehicle location within the lane regardless of vehicle speed,
 - Under all lighting conditions,
 - Under all traffic conditions,
 - Regardless of vehicle configuration, including but not limited to, motorcycles, passenger vehicles, van, light trucks, buses and vehicles pulling trailers.
- In the event of vehicles pulling trailers the system shall capture the trailer's license plate. The camera systems shall use:
 - Full frame progressive scan digital camera technology or better technology,
 - Pixel isolation/control and/or "anti-blooming" technology,
 - All final evidentiary images shall be "digital images".
- Image data compression that does not alter the image in any way may be used prior to OCR processing;
- The image capture system shall be designed to eliminate or minimize the blurring effect of speed in the captured image;
- Minimum performance requirements shall include, but are not limited to:
 - Capturing images of license plates at vehicle speeds of 0-100 mph for all lane configurations,
 - Rate of image capture per camera shall be a minimum of two (2) images per second.
- Minimum VES image quality requirements shall include:
 - Field of view at the focal plane shall cover, as minimum, an area 8 feet wide by 6 feet high,



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- Pixelation at the license plate / focal plane shall be a minimum of 9 pixels per inch in the horizontal and vertical directions,
- Pixels contrast level shall be a minimum of 256 gray levels or 256 colors,
- Equivalent shutter speed shall be faster (or less than) 1 / 2,000 second,
- Image quality adequate for OCR.

6.3.2.5 VES Express Lanes Functionality – Software

This section provides a basic description of the functionality required of the I-580 Express Lanes VES Lane software. The lane software shall provide complete and efficient operation of the system within the Express Lanes. The RFP does not require a specific design and/or configuration as long as the proposed system provides the functionality described in this RFP and falls within general accepted industry standards.

Regardless of configuration, the SI shall provide a complete and fully operational system which meets the functionality and performance described throughout the RFP. The VES lane software shall include, but it is not limited to, the following functionality:

- Control of VES lane resources;
- The VES shall periodically perform a self-configuration and diagnostic test;
- Interface and synchronize with the lane controller and all other peripherals required to perform the VES data/evidence gathering including lane sensors, lane controller transactions, and operations. This includes, but is not limited to:
 - Initiate or respond to EL events,
 - Transfer and synchronize date, time, and transaction event data,
 - Transfer lane specific identification and operational environments (lane ID, status of lane equipment, and lane configuration).

In general, the VES lane software shall control and/or interface with other lane devices to allow the recording of each violation and/or anomaly, which may occur at the lane (during startup, steady state operations, and shut down). The recorded violation data shall contain, but is not limited to, the following data:

- Identity of person responsible for the deployment of the VES at the lane and TDC level;
- Location of lane, lane ID, direction of travel and/or lane specific information;
- Date and time of the violation;
- Type or cause of anomaly or violation, i.e., invalid transponder, no transponder, insufficient payment, classification mismatch, etc.;
- Violation image at the time of the violation, including a machine readable license plate; and
- Status of the VES equipment at the time of the violation.



6.4 TOLL DATA CENTER SYSTEM REQUIREMENTS

The TDC shall function as the central and primary logical unit for the EB I-580 Express Lanes System.

The TDC shall interface with the following ETS components that comprise the Express Lanes System:

- Tolling zone lane controllers;
- DMS controller installed as part of each dynamic pricing sign;
- Intelligent enforcement equipment used by the CHP;
- The Caltrans Traffic Management Center; and
- The BATA Regional Customer Service Center.

6.4.1 Primary Functions of the TDC

6.4.1.1 Traffic Demand Pricing Calculation

The TDC shall continuously and dynamically calculate the facility usage price based upon Express Lanes and GP lane traffic speed, volume and density information. The primary objective of toll-rate setting is to maximize facility revenues subject to the maintenance of a minimum speed or level of service (LOS) constraint for the Express Lanes, along with certain other constraints as listed within this section.

Traffic data shall be collected from the Express Lanes via Caltrans approved wireless magnetic sensors embedded in the pavement that will be installed in the Express Lanes at a maximum spacing of one mile along the 14-mile eastbound EB I-580 Express Lanes facility.

To ensure that toll facility optimization occurs in compliance with the objectives, and to effectively cover the entire roadway, RTMS devices shall be installed concurrently with the magnetic sensors beyond the outside shoulder at a maximum spacing of one mile along the eastbound EB I-580 Express Lanes corridor, as well as at least one point upstream and downstream from the EB I-580 Express Lanes Project limits. RTMS equipment shall be used to collect volume, density and speed data from the GP lanes and shall also be used as back-up for the magnetic sensors that will be installed in the Express Lanes to collect raw traffic volume, density and speed data.

The TDC shall collect traffic volume, occupancy and speed data at a minimum interval of every 15 seconds. The actual time interval of collection of this vehicle data by the TDC shall be determined by the SI during the system design process.

The toll calculation shall strive to optimize tolls for each price update interval so as to achieve the objective of maximizing facility revenues subject to the following constraints:

- The toll shall not be less than the agency-specified minimum toll amount.



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- The toll shall not be more than the agency-specified maximum toll amount.
- The toll amount shall remain constant for at least the agency approved minimum tolling interval to avoid driver confusion.
- The toll amount shall be recalculated at every minimum tolling interval, which may not require an update to the current price.
- The toll amount shall not change by more than the agency-specified maximum change increment from any one tolling interval to the next, based on an exponential change function of average travel speed to the toll change delta.
- The toll shall be sufficient to ensure that the Express Lanes maintain a minimum specified speed or LOS. The agency may choose to allow the maximum toll and maximum increment constraints to take precedence over the speed or level-of-service constraint.
- Because there are multiple tolling points, meeting the speed or LOS constraint may require “reserving” some capacity in the downstream segment(s) by posting a higher toll for trips in the upstream segment(s) that include segment(s) that would otherwise be posted lower. Proposals should specifically address the bidder’s approach to meeting this constraint.
- A reserve shall be built-in to account for the unmanageable volume of HOV and violators during peak, and off-peak on weekdays and week ends that may require historical tracking of unmanageable vehicles.
- The system shall have the capability to detect unstable or inappropriate toll amounts (e.g., due to unusual circumstances or equipment failure) and, as necessary, the ability to fall back to an historical table-driven toll schedule for a particular traffic flow period on a weekday or week end.

The agency-specified constraint parameters shall be set initially during the ETS design task of the Project, but the System shall provide the ability for the ACCMA ED, or his/her designee, to modify them at any time in the future. All agency-specified settings for the pricing calculation shall be adjustable by authorized, non-technical persons.

The initial implementation will be segment-based tolling with the above-listed constraints applied to each segment and the expectation that a new access could be added to any particular Segment.

The pricing calculation portion of the TDC must be implemented as a separate module with a clearly and completely documented API that describes all interactions with other parts of the TDC architecture with sufficient specificity that the pricing calculation module can be replaced in the future by another contractor.

The dynamic pricing method and calculation shall be formulated by the Systems Integrator during the ETS design phase of the project (Phase II) subject to the required algorithm constraints and parameters, within allowed tolerances, contained in this ETS RFP.



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During Detailed Design Review, the Systems Integrator shall produce a working model of the dynamic pricing calculation engine that demonstrates the capability of the chosen algorithms to set tolls in accordance with the above-stated objectives, functions and constraints. The working model shall simulate the toll-setting process by accepting simulation data where each record represents one 15-second time increment and will contain speeds and traffic-counts for each of 26 Express Lane VDSs and 13 RTMSs. The working model will output toll amounts for each trip destination from a particular entry point for five-minute increments. The working model should emulate the operation of the ultimate production model, to the maximum practical extent. The working model shall incorporate a computer-screen or window that emulates the “dashboard” of the actual implementation. Such a dashboard should display current settings of agency-set parameters, manual override tools, indicators of system operating state, and measures of current system performance vis-à-vis, for example, comparisons of current versus prior period performance by plotting the price output relative to input of simulated volume, occupancy and speed data input.

A separate application, provided by the ACCMA, will generate the simulation data based on reasonable traffic patterns during peak and off-peak periods. This application will generate volume, occupancy and speed data that simulates traffic conditions in the Express Lanes under varying levels of congestion in the GP Lanes and assumed volumes of HOV and violators in the Express Lanes during peak, off-peak and shoulder periods. The SI will produce multiple plots of speed or density versus price to discern a consistent and repeatable price response to similar traffic operations patterns.

Proposals shall include descriptions and justifications of the bidder’s intended toll-setting methods and shall, at a minimum, address each of the following:

1. The method and frequency of updating tolls so as to achieve facility objectives.
2. The use in the toll-setting process of the data collected by the system.
3. The degree of automation contemplated for the toll-setting process.
4. The method of determining the initial or startup price table dependent on either speed or density and other system parameters.
5. The method, purpose, and duration of data storage.
6. The variables that will be used in calculating destination prices. (It is expected that the calculated prices will take into account at least: upstream traffic conditions, traffic conditions in the adjacent segments of the Express Lanes, traffic conditions in parallel GP lanes, and traffic conditions downstream).
7. The quantity and location of upstream traffic sensors needed to implement the toll-setting procedures.
8. The timeliness of response to unusual circumstances (e.g., incidents, lane blockage) in the Express Lanes or in the GP lanes.
9. The method(s) of detection of sudden instability (e.g., from unusual circumstances or equipment failure) of the calculated tolls.
10. The robustness of the pricing calculation algorithm to unusual circumstances or equipment failures.



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11. A fall-back procedure when algorithmic pricing calculation fails to function properly.
12. Any parameters (other than those described herein) that are required to maximize flexibility to make adjustments not involving software modifications to result in pricing that maintains free flow conditions while striving to maximize revenue.
13. A description of any mechanisms that would be designed into the dynamic pricing system to measure or adjust priority of compliance with objectives and/or constraints.

The Systems Integrator shall provide, at a minimum, the following:

- A dynamic, real-time, parameter- or heuristic-driven price calculation program that successfully achieves the stated toll and operational objectives and constraints;
- A price calculation process that accounts for traffic speed and densities in both the Express Lanes and the GP lanes to use as a test to validate Express Lanes changes in density or speed by trending conditions in the GP lanes at upstream locations.
- A price calculation program that accounts for disparities in traffic densities or speed occurring simultaneously at various locations over the entire length of the EB I-580 Express Lanes corridor;
- A pricing reset interval (e.g., every 5 minutes) that successfully controls Express Lanes demand without creating driver confusion by changing too frequently, or sacrifices facility objectives by not changing frequently enough;
- An individual operator adjustable price increment of \$D.CC that successfully manages Express Lanes demand in a manner that avoids pricing out prospective users before demand must be curtailed;
- A user settable minimum and maximum price of \$D.CC; and
- A dynamic pricing structure that provides the ability to toll by segment.

6.4.1.2 Express Lanes Trip Assembly

The TDC shall be responsible for gathering and compiling vehicle and transponder data from all tolling zone lane controllers and building individual trip transaction records that shall eventually be sent to BATA for processing.

When a FasTrak[®] transponder enters the EB I-580 Express Lanes and passes through a tolling zone, the transponder is detected by the antenna/reader and the lane controller verifies that the transponder is valid by comparing the transponder ID number to the tag status file that is resident in the lane controller's memory. Data, including the transponder ID number, date, time, and the tolling zone location where the transponder was read, the Express Lanes shall be sent to the TDC. This series of events occurs every time a vehicle equipped with a FasTrak[®] transponder passes through an Express Lanes tolling zone. Therefore, if it is a through-trip, each time the vehicle traverses a tolling zone a distinct transaction record shall be generated.

If a transponder is detected and it is determined to be valid, the lane controller shall send a command to illuminate the transaction indicator beacon. The transaction indicator beacon shall illuminate within 0.1 seconds from the time in which the lane controller makes this



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determination. Based on the vehicle detection input of the VDS installed at the toll/enforcement zone, a transaction record shall be built for each passing vehicle, regardless of the presence of a transponder.

The TDC computer shall then compile each of the vehicle transaction records and event data collected throughout the specific vehicle trip and determine for a particular transponder ID number where the trip began, which segments were traveled, when and where the trip ended, and what price applies.

In the course of determining which transactions belong to a trip, TDC shall determine whether or not there is a more recent Express Lanes tolling zone transaction than the most recently received record by comparing the record times to indicate that the specific trip is now complete. A possible solution for assuring transactions are properly applied to a trip, a timer can be set after each transaction record for a particular transponder ID number is received at the TDC that triggers a database scan when a configurable threshold is reached to determine if another transaction has occurred. A System parameter would establish how many scans that don't result in finding a transaction would be allowed before the last recorded transaction is declared the trip end.

Based upon these internal calculations, the TDC shall then develop an Express Lanes trip record, store this record at the TDC and send the trip record to the BATA RCSC for posting to the FasTrak[®] customer account and to collect the revenue associated with that Express Lanes trip. The TDC shall be designed to store Express Lanes trip records for at least 12 months on line.

The ETS shall include parameters that define the logic that accounts for events such as a change in direction of travel or a communications failure with one or more tolling zone lane controllers.

The Express Lanes System shall be configured to charge one price per trip, for example the price that is displayed on the DMS as the vehicle enters the Express Lanes, but the ETS shall also include functionality that allows for segment-based tolling.

6.4.1.2.1 Price Safeguards

When a vehicle enters the EB I-580 Express Lanes, the price might change between the time at which the driver views the price on the DMS and the time at which the driver passes through the tolling zone. Based upon near real-time traffic density and speed data, the TDC shall calculate the amount of time it takes for a vehicle to view the price and then pass through the tolling zone that is immediately downstream from the DMS that conveyed the price to that vehicle operator. If the price changes during that interval of time, the driver shall be charged the lesser of the two rates.

The TDC shall also include logic that accounts for DMS communication failures that result in the display of incorrect prices.



6.4.1.3 EB I-580 Express Lanes Trip Reconciliation

The TDC shall include Express Lanes trip audit and reconciliation functionality. It shall provide a secure user interface which will allow TDC personnel to view and reconcile Express Lanes trips and revenue data. The interface shall also include reporting capabilities that allow users to create, execute, and store reports.

The interface shall provide detailed transaction data such as tag-read times and locations, price data, and other supporting raw transaction information. This information shall then be used to verify that trips were properly created and can be reconciled.

The interface shall allow authorized users to make adjustments to the data and correct errors in compiled revenue bearing trips. Users shall be able to adjust individual transactions or bulk sets of transactions if it is determined that an Express Lanes trip needs to be deleted and/or modified.

The TDC database shall store configurable audit parameters, and provide a permanent audit record, or trail, of any adjustments that are made to summary or detail information.

6.4.1.4 Tolling Zone Operation Monitoring

The TDC shall include a secure, browser-based monitoring interface that shall allow authorized users to view raw and summarized transaction and event data, as it occurs in near real-time, at each tolling zone.

The TZCs shall broadcast data in near real-time to the TDC and this data shall be compiled and displayed in an easily understood, graphical manner.

Presented below is typical example data:

- Last 10 transponder reads;
- Transponder and/or traffic volume during the last 15 minutes, last 30 minutes, last hour, since 6:00 a.m., etc;
- Discrete messages and events from the roadside equipment,(i.e., TZC, VDS and DMS controllers) including
 1. Transponder Identification (ID);
 2. Transponder read time;
 3. Transponder handshakes (the number of times during vehicle passage through a tolling zone that the transponder and the antenna communicate with one another);
 4. Vehicle speed;
 5. Traffic density on a particular segment;
 6. Travel time data in the GP lanes;
 7. Roadside equipment events(e.g., UPS status);
 8. VDS equipment events;
 9. DMS events; etc.



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The interface security authentication process shall support ACCMA defined user roles, which includes providing different sets of data to different user categories. The interface is intended for use by operations staff and maintenance personnel.

The interface shall protect customer information and operate under the requirements of California State privacy legislation.

6.4.1.5 TDC Reporting

The TDC shall provide a fully integrated reporting module to support trip building and reconciliation, Express Lanes operations, BATA record posting and reconciliation and ACCMA managerial system monitoring requirements.

The module shall include predefined traffic and revenue reports as well as support for ad hoc reporting needs.

The reporting system shall allow users to browse, choose, and run reports through a clearly displayed and user-friendly Graphical User Interface (GUI).

The reporting interface shall allow users to schedule reports to be run in the future.

The reporting interface shall allow reports to be output, saved, or printed in at least the following formats:

1. On-screen;
2. PDF;
3. HTML; and
4. Excel.

When accessing or running reports, the execute-to-display or execute-to-print time shall be less than one minute for each request.

The TDC report server shall be operational and available 24 hours per day, seven days a week.

Presented below is a list, at a minimum, of the required sample TDC reports:

- Express Lanes Revenue Report;
- Express Lanes Traffic Report (by segment and entire facility);
- Express Lanes Trip Posting (to BATA) Report;
- BATA Express Lanes Trip Reconciliation Report;
- Transaction and Trip Adjustment Report;
- Tolling Zone History Report;
- Detailed FasTrak[®] Transaction Report;
- Price Change Tables by Tolling Zone;



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- EB I-580 Express Lanes Travel Time Report (by segment and by facility);
- GP Lane Travel Time Report (by segment and by facility);
- Equipment Maintenance Reports; etc.

6.4.1.6 Data Transmission

Data transmissions originating from the TDC shall occur automatically and utilize guaranteed delivery protocol.

Data communication between the TDC and the EB I-580 Express Lanes website shall be via an Ethernet connection.

Data communication between the TDC and the BATA RCSC shall be via FTP for Express Lanes trip records to and from a pre-configured drop box.

6.4.1.7 TDC Security

The TDC shall securely maintain Express Lanes data through a standard login and password-based security system.

Secure user accounts shall be administered through a system administration interface.

The system shall operate under the provisions of all California State privacy laws. For example, customer data that is output for uses other than internal Express Lanes operations shall be masked to maintain customer privacy.

The database shall use security service enterprise authentication for connections to the database. This will centralize database security in one location.

All users shall have their own user name and password that is the same across all databases.

Users shall have individual resource usage limits set for them to prevent unauthorized or excessive utilization of system resources.

Profiles shall be used to define resource usage limits by work activity or job type.

Users shall be granted profiles according to their job needs.

The database shall be able to restrict data access down to the row level.

6.4.1.8 Receipt and Downloading of Tag Status Files

The TDC will receive, at least once per day, updated tag status files from the BATA RCSC.

The file acquisition process shall adhere to the BATA Interface Control Document (ICD), a copy of which shall be presented in the appendices of the RFP.



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The TDC shall automatically, upon receipt of tag status data from BATA and integrating the files into the TDC database, download either the full or an incremental tag file to each of the seven tolling and enforcement zone lane controllers. The incremental tag status file download would include any new FasTrak[®] accounts or changes to existing accounts.

The method of file download shall be according to the BATA RCSC ICD.

6.4.1.9 Handheld Enforcement Device Data Transmission

The TDC shall send tag status data through a wireless link to the on-board handheld enforcement device to enable the CHP officers to enforce the Express Lanes.

This secure data communications application shall be hosted on a wireless network to enable enforcement vehicles to obtain the tag status file data in a real-time basis.

6.4.2 System Data and Software Backups

All TDC data shall be properly backed up to ensure a continuous operation and virtually no loss of data or accounting information.

Activity logs shall be saved weekly on tape backup for 90 days.

Daily partial and weekly full backups of all data shall be conducted and properly logged.

Transaction logs and records shall be retained for five years.

6.4.3 TDC Express Lane Standby System Design

The need for a TDC system with high availability has been identified as a key element to the success of this project. In order to ensure that transaction records, events and messages are never lost or delayed, the TDC shall have to perform all of its functions in a highly reliable failover environment. Below is a description of an automatic failover design that needs to be incorporated into the ETS to ensure that the TDC offers the required high operating availability.

Running a database server on virtual machines has the same characteristics as running on physical machines. However in a virtual environment all servers automatically become highly available. This approach using third party virtual machine software protects against application outages by automatically starting virtual servers, applications and services on different hardware, just like other cluster configurations, but protection automatically applies to all servers in the same environment. Provided below in Figure 2 is a suggested configuration of the TDC Hot Standby operating approach. In this example, the EB I-680 TDC subsystem would be the same as the "TCS-Host".

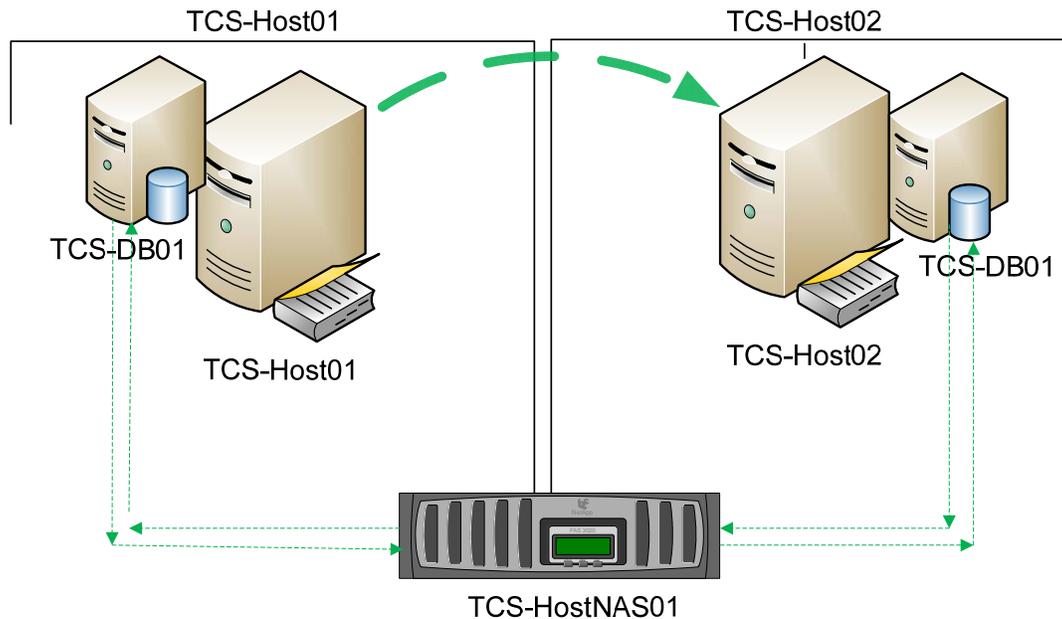


Figure 2 – TDC Hot Standby Configuration

Under this TDC Hot Standby configuration, the following would occur:

- The database files and database logs would reside on the NAS;
- The NAS would be configured with the appropriate RAID level for performance and redundancy;
- The virtual machine application shall monitor and detect virtual machines for failures and will automatically restart the machines;
- The virtual machine application shall detect server failures automatically, using a “heartbeat” on the servers;
- The virtual machine application shall detect server failures and initiates restarts of virtual machines almost instantly without human intervention;
- The virtual machine application shall ensure that capacity is always available in order to restart all virtual machines affected by server failure; and
- If an entire server goes down (TCS-Host01) the virtual machine application would automatically start a failover of the other virtual machine (TCS-Host02).

The virtual machine cluster shall provide continuous service availability in unplanned system downtime situations such as server failures. In the event of a TDC failure in the cluster, the virtual machine application shall be designed to automate the restarting of the virtual machine on the other TDC. This virtual machine software shall protect the infrastructure from multiple sources of failures and will offer pervasive failover protection; automatically without human interaction.



6.5 REGIONAL CUSTOMER SERVICE CENTER INTEGRATION

6.5.1 BATA ICD

The SI shall design and develop the TDC and its functions in accordance with any applicable requirements identified in the BATA Interface Control Document (ICD). A copy of the most current ICD is presented in the Appendix 9.7. The SI shall be responsible to maintain the proper TDC/BATA RCSC interface to ensure that the TDC is properly interfaced to the RCSC when any ICD updates are implemented throughout the EB I-580 Express Lanes ETS Contract.

6.6 SYSTEM INTEGRATION REQUIREMENTS

6.6.1 System to System Interfaces

The TDC shall be required to interface with three other systems to obtain data required for EB I-580 Express Lanes toll collection and operations.

The BATA RCSC shall be the single point in which Express Lanes toll trips shall be transferred for posting, which shall include debiting the toll charge from the FasTrak[®] customer accounts. The TDC shall also receive tag status files from the RCSC on, at a minimum, a daily basis, reconciliation files and transaction files.

The TDC shall provide the Caltrans TMC with traffic volume, density and speed data from the Express and GP lanes.

The incident detection process shall be the responsibility of Caltrans. In the event that an incident does occur that would require temporary suspension of the ETS and/or Express Lanes closure, this shall be accomplished via a command issued by the TMC Manager to the TDC and then to the DMSs. The procedure that will be followed when TMC operator involvement is required will be identified during the system design phase.

As part of the EB I-580 Express Lanes enforcement effort, the TDC shall also interface to the enforcement equipment that is provided to the CHP.

The TDC shall download the full California Toll Operators Committee (CTOC) tag status file at least once per day to the lane controllers and the hand held enforcement devices. Incremental tag status file updates shall also be automatically sent from the TDC to the lane controllers and the enforcement equipment when they are received from the RCSC.

There will be incidents on eastbound EB I-580 that may necessitate the closing of the Express Lanes or the diversion of MF traffic to the Express Lanes. These actions should only be taken by the CHP and authorized Caltrans TMC staff, with input from the ACCMA ED.

The TMC shall be included in the system network in order to facilitate emergency actions in the Express Lanes.



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All actions taken by TMC personnel shall be logged into the Express Lanes TDC system database and reports generated that detail those actions.

6.6.2 Equipment Interfaces

6.6.2.1 Lane Controller

The TDC shall interface to each tolling/enforcement zone lane controller via a near real-time local carrier connection.

The interface will support the transmission of raw vehicle, transponder, and event data. It will also support the transmission of daily incremental transponder status files.

The interface shall be automatic and not require human intervention.

The interface control document shall be developed by the SI during Phase II of the project.

6.6.2.2 Dynamic Message Sign Rate Display

The TDC shall interface with each DMS via a near real-time data and communications connection.

The interface shall support the transmission of message data as well as system status requests and be NTCIP compliant.

The DMS Interface Control Document (ICD) shall be supplied by the vendor that is selected by the SI.

6.7 COMMUNICATIONS NETWORK

It shall be the responsibility of the SI to design, develop, test, implement and maintain a communications network that best supports Express Lanes operations. Below is a description of the required communication links. The communication links shall provide a minimum 1.5Mbps data rate and shall have a high level of availability (99.999%).

6.7.1 Tolling Zone to Tolling Zone

Tolling Zone to Tolling Zone communication shall be used that provides a primary and backup communications path to the two tolling zones that have a leased line connection to the TDC so that an alternative path exists if the primary communications path to the designated tolling zone fails.

VDS controller to VDS controller communication shall be used to support a primary and backup communications path to the two tolling zones that have a leased line connection to the TDC so that an alternative path exists if the primary communication path to the designated tolling zone fails.



6.7.2 Tolling Zone to TDC

Due to the distances between the Tolling Zones and the TDC and the relatively high costs associated with adding new underground infrastructure, the communication links between the Tolling Zones and the TDC shall utilize leased data communication link services that provide a redundant communication path.

Each VDS controller shall be assigned (as a primary link) to one of the two toll/enforcement zones having a leased line communication to the TDC.

6.7.3 TDC to RCSC

The network communication between the TDC and BATA RCSC shall utilize leased data communication services and shall be based upon availability of existing communications infrastructure, cost of implementation and performance requirements. The physical link between the TDC and RCSC shall be through frame relay technology.

Data communication between the TDC and the BATA RCSC shall be via FTP for Express Lanes trip records to and from a pre-configured drop box. SSL and appropriate encryption shall be incorporated into this communication link.

6.7.4 TDC to Caltrans Traffic Management Center

The network communication between the TDC and the Caltrans TMC shall utilize leased data communication services and shall be based upon availability of existing communications infrastructure, cost of implementation and performance requirements. The physical link between the TDC and RCSC shall be through frame relay technology.

Video shall be sent from roadside surveillance cameras to the TDC using MPEG-4 format that is transmitted over one of the two T1 lines interconnecting the toll/enforcement zone controllers. From the TDC, the video shall be immediately sent to the TMC using the dedicated leased line connection. This link shall also be used for TDC staff to access the TMC video matrix switch to route selected video output from cameras within the corridor for viewing on monitors at the TDC. Encoders and decoders shall be provided to support video to the TDC.

6.7.5 TDC to System Enforcement Equipment

Communications between the TDC and enforcement devices, including the hand-held devices and the PDAs, shall utilize a secure, high-speed data connection to the PDA over a wireless communication network.

- The cellular data communications network shall provide uninterrupted coverage over the entire length of the project.
- The cellular data communications network shall provide a minimum data rate of 128kbps.
- The communication link between the enforcement device and the TDC shall utilize Virtual Private Network (VPN) tunneling to establish a secure and encrypted connection.



6.8 ACCMA WEBSITE REVIEW AND SUPPORT

The ACCMA EB I-580 Express Lanes website will be developed by others. However, the SI shall be responsible to provide website development and support to the website developer as appropriate and required by ACCMA. The primary purpose of the website shall be to provide EB I-580 Express Lanes information to the public. The website shall be secure and shall be maintained with up-to-date and current security technology at all times. The website shall provide, at a minimum, the following facilities to the public, accountholders and potential accountholders:

- General information on the EB I-580 Express Lanes configuration and operation;
- Via a website link to the BATA FasTrak[®] website and after logging into the account management system, check an existing FasTrak[®] accounts on-line related to the following types of information:
 1. Account status
 2. Account balance
 3. Last deposit amount and date
 4. Recent EB I-580 Express Lanes trips
 5. Prices for recent trips
- Provide Information
 1. RCSC location and hours of operation
 2. List of access terminal locations
 3. EB I-580 Express Lanes description
 4. FasTrak[®] brochure
 5. Frequently Asked Questions (FAQs)
- Link to the ACCMA website
- Link to the CHP
- Link to the 511.org FasTrak[®] website
- Links to road, travel, weather conditions and the Caltrans TMC website
- Download EB I-580 Express Lanes marketing materials and operating polices and procedures
- Website links to related transportation sites



7. PROJECT MILESTONES

This part of the RFP provides an overall summary of the EB I-580 Express Lanes ETS project phasing, scheduling, and testing requirements.

7.1 PROJECT PHASES

The development program under the Contract shall be divided into four (4) overall phases, generally delineated by successful completion of major test milestones. These phases include:

Phase I – Design, Manufacturing, and Factory Test – This phase includes the design, development, fabrication and pretest of components of the entire ETS up to and including civil engineering designs and successful conduct of a full and detailed Factory Acceptance Test (FAT) of all equipment, software and subsystems in accordance with a pre-approved test plan, which shall be developed by the SI. This test shall be performed by the SI under the supervision of the ACCMA ED and the Systems Manager;

Phase II - Installation, Testing, and Approval - Field equipment, conduits and cables, gantries, barrier rail systems, CCTV and RTMS poles, VDS, and software installation, including on-site SI testing and debugging, conduct of a detailed Field Acceptance Test and approval for use of the ETS with all components and interfaces fully integrated for Express Lanes operation;

Phase III – System Performance Evaluation - Performance evaluation period of 90 days under actual EB I-580 Express Lanes operation during which time any outstanding problems shall be immediately corrected by the SI. This phase also includes full ETS support and maintenance by the SI, culminating in Final System Approval; and

Phase IV - Warranty Period - Provision of full ETS maintenance, operations and system support during a Warranty Period that shall extend 270 days after issuance of Final System Approval. During this phase the SI shall correct any outstanding problems and transfer the maintenance program over to others if the maintenance options are not selected by the ACCMA. Successful completion of Phase IV shall culminate in Final System Acceptance, which effectively closes the SI Contract.

A written NTP will be submitted by the ACCMA to the SI which shall indicate the official commencement date of Phase I. Presented below in Table 7 are the contractual completion deadlines that are required for Phases I, II, III, and IV of the work program:



Table 7 – Project Phases

PROJECT PHASE	COMPLETION DEADLINE CALANDER DAYS FROM NTP
Phase I – Design, Manufacturing, and Factory Test Approval	300
Phase II – Installation, Testing, and Approval	450
Phase III – System Performance Evaluation Approval	540
Phase IV – Warranty Period Completion	810

The ETS shall be ready for full use and revenue service not later than the time of Express Lanes open to traffic, which is planned for August 10, 2011 or the date cited in the latest approved Program Schedule at time of award. If ETS equipment and/or software problems are detected during the system performance evaluation period, and the equipment and/or software is not operating at an acceptable level of performance as defined in the Contract, the SI shall be notified in writing. All problems or defects shall be promptly resolved by the SI. Final System Approval shall not be granted by the ACCMA until the ETS performs satisfactorily. It is also noted that within each overall Project phase there are several interim deliverable deadlines, as outlined in this document.

7.2 PROJECT SCHEDULE

The SI shall begin work on the date specified in the written NTP for Phase I. The NTP will be issued by the ACCMA no later than 30 days subsequent to execution of the Contract.

Within 15 days after issuance of NTP and prior to the project kick-off meeting, the SI shall prepare and submit a detailed Project Schedule, using MS project, outlining the order in which they propose that all of the work shall be performed and clearly identifying the critical path(s). The specific milestone completion dates and installation deadlines set forth in the Contract shall be clearly identified in the Project Schedule. The schedule shall be used as a basis for progress tracking throughout the course of all work on the Contract.

If a delay in the Project Schedule arises due to circumstances beyond the SI’s control, the SI shall submit a revised Project Schedule within 10 working days after it is requested by the Systems Manager. Any failure or delinquency in submission of the Schedule shall be treated as default on the part of the SI who will then become susceptible to possible actions by the ED, including withholding of any payments due on the Contract.

7.3 WORK PROGRESS

The SI shall use all practical means to make the progress of the work conform fully to the Project Schedule. If the SI fails to meet the dates that are presented in the Project Schedule, the Systems Manager may require the SI to take any or all of the following actions, at no additional cost to the ACCMA:

- Perform overtime work;
- Increase the number of personnel assigned to the project; and



- Increase plant or machine capacity.

The SI shall prepare and submit to the Systems Manager monthly progress reports on the status of all major project items and activities. The monthly progress reports shall include an updated Project Schedule.

Project progress meetings shall be conducted monthly at the offices of the ACCMA, at a schedule to be proposed by the SI and approved by the ACCMA ED and the Systems Manager. The SI PM shall attend these monthly meetings. The purpose of these meetings will be to monitor progress, discuss design issues, plan for system installation, prepare for and conduct testing activities, start up of operations, etc.

In order for all of the Project team members to keep apprised of all important developments on the Project, bi-weekly conference calls will also be held. During more intensive periods of the Project more routine meetings and/or calls might be required.

7.4 PHASE I – DESIGN, MANUFACTURING, AND FACTORY TEST

Upon issuance of NTP to the SI and submittal of the Project Schedule, a kick-off meeting shall be held within 30 days of issuance of NTP by the ACCMA. At the kick-off meeting all appropriate lines of communication for both oral and written correspondence shall be established. Appropriate methods for documenting meetings, telephone conversations and other communications shall also be defined. The SI's Project Schedule shall be reviewed in detail and refined, as may be necessary. The Systems Manager shall submit, in writing, to the SI any required modification to the Project Schedule. A plan for civil engineering work, including a detailed description of any required tolling zones, enforcement zones, gantries, CCTV and RTMS poles, barrier rail systems, and/or TDC modifications, and all conduit requirements shall be submitted to the Systems Manager within the time period specified in this RFP.

Work during this phase shall include all ETS design, Civil Engineering design, software development, hardware procurement and/or fabrication, shop testing, software testing, integration testing, software documentation and overall ETS design documentation culminating in a full and complete FAT. Periodically throughout this phase, the Systems Manager may visit the SI's development facility in order to inspect work in progress and might, from time-to-time, request reasonable demonstrations of ETS equipment, software, interfaces and subsystem operations. The Systems Manager will give reasonable advance notice to the SI prior to any factory visits. At such time that the SI has completed all development, fabrication and integration of the ETS, including detailed internal testing, the SI shall provide written notice to the Systems Manager requesting the scheduling of a full and complete FAT. The SI shall provide test scripts for the review and approval of the Systems Manager no later than 60 days prior to the scheduled date of the FAT.

Table 8 below presents the submittal date, based upon number of days from NTP, for all of the documentation that is required under the Contract.



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Table 8 – Documentation Submittal Schedule

ITEM NO.	DOCUMENT SUBMITTAL	PROJECT PHASE	DUE DATE (CALENDAR DAYS)
1	Project Schedule (re-submittal within 10 days if requested)	I	30 Days from NTP
2	Project Management Plan	I	30 Days from NTP
3	Preliminary Test Plan	I	60 Days from NTP
4	Software Development Plan	I	60 Days from NTP
5	Sepias and Shop Drawing Documents	I	90 Days from NTP
6	Sample of all On-Demand and Automatically Generated Reports	I	90 Days from NTP
7	Preliminary Installation Plan	I	90 Days from NTP
8	Quality Assurance Plan	I	90 Days from NTP
9	Software Specification	I	90 Days from NTP
10	Draft Civil and Electrical Engineering Plans	I	90 Days from NTP
11	Roadway Contractor (s) Gantries, CCTV Poles, Barrier Rail Systems, Conduit and Cable Design Plan Review/Comments	I	90 Days from NTP
12	Preliminary Design Document	I	120 Days from NTP
13	Factory Acceptance Test Plan	I	120 Days from NTP
14	Detailed Design Document	I	150 Days from NTP
15	Field Test Plan	I	180 Days from NTP
16	Final Civil and Electrical Engineering Plans	I	180 Days from NTP
17	Final Installation Plan	I	180 Days from NTP
18	Wiring Diagrams	I	180 Days from NTP
19	Training Plan	I	270 Days from NTP
20	Maintenance Plan	I	270 Days from NTP
21	TDC Systems Operator Manual (Final)	I	30 Days before Phase II Approval
22	System Auditor Manual (Final)	I	30 Days before Phase II Approval
23	Customer Service Representative Manual (Final)	I	30 Days before Phase II Approval
24	CHP Enforcement Manual (Final)	I	30 Days before Phase II Approval
25	Maintenance Service Manual (Final)	I	30 Days before Phase II Approval
26	Draft Software Documentation	II	30 Days after Phase I Approval
27	Preliminary Maintenance Service Manual	II	60 Days after Phase I Approval
28	Parts List	II	60 Days after Phase I Approval
29	Schedule of Preventive Maintenance	II	60 Days after Phase I Approval
30	Final Draft Software Documentation	II	30 Days after Phase II Approval
31	Final Software Documentation	II	30 Days before Phase III Approval
32	Final As-Built Drawings	II	30 Days before Phase III Approval



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The SI shall provide written results and evidence of his own testing prior to the FAT. If the proposed test scripts have been approved and, if after reviewing evidence of satisfactory SI internal testing of the ETS and all of its' interfaces, the Systems Manager will send a letter to the SI indicating that they are allowed to proceed with the FAT.

The FAT shall involve testing of all subsystems to be installed as part of the Express Lanes ETS. All components shall be fully fabricated and integrated and ready for installation at the time of the FAT. At least one complete subsystem of each category shall be installed at the SI's site for the purpose of this FAT, including:

- One tolling zone subsystem, including the lane controller, a complete FasTrak[®] subsystem (reader, antenna and transponders), a tolling zone transaction indicator beacon, a loop VDS, an RTMS VDS, a DMS, plus all necessary communication equipment;
- A CCTV subsystem, including all necessary communications equipment;
- Enforcement subsystem, including use of the tolling zone transaction indicator beacon, the hand-held device, plus all necessary communication equipment;
- The TDC subsystem with a fully configured computer system including all software, printers, dynamic pricing algorithm subsystem, the TDC workstation operations, and any necessary communication equipment; and
- All of the TDC interfaces, including with the tolling zone subsystems (2-way), the other roadside equipment, the BATA RCSC (both ways), the Caltrans TMC, and the enforcement subsystem.

Any ETS functions defined in the Contract, as well as any Contract amendments, shall be subject to detailed testing and verification by the Engineer during the FAT. If, in the judgment of the Engineer, the FAT indicates that the ETS equipment and software appear to be functioning satisfactorily in accordance with a predefined test plan and all functional and technical requirements of the Contract, the Systems Manager shall issue written approval of the FAT and authorize shipment of equipment to the site for field installation.

This Approval of the FAT shall in no way reduce or eliminate the SI's full responsibility to resolve any problems and make the ETS operate in full conformance with the requirements of the Contract. Nor shall it limit the rights of the ACCMA or the Systems Manager, to bring ETS related problems to the attention of the SI at a later time.

7.5 PHASE II – INSTALLATION, TESTING, AND APPROVAL

With the issuance of FAT approval by the Systems Manager, the SI may be authorized to immediately commence shipment of the ETS equipment to the site to begin the installation phase. No actual equipment installation activity shall take place on site until FAT approval and an Encroachment Permit from Caltrans have been obtained and the Caltrans Resident Engineer



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approves the access to the State's Right-of-Way (ROW) as called for by the Encroachment Permit. However, if any conduit installation or other minor physical modifications at the tolling zone sites are required, these may be performed prior to approval of the FAT, provided the Encroachment Permit is in hand and the Caltrans Resident Engineer approves the access to the State's Right of Way. Any pre-FAT approval installation activity shall be approved, in writing, by the Systems Manager.

The SI's Installation Manager shall be on-site throughout the entire equipment installation period. The installation and site testing shall begin at the tolling zone that is identified in the Installation Plan and when successfully completed, installation may begin at the other tolling zone sites. The SI may present a proposal to partially overlap installation at the tolling zone sites for the consideration and approval of the Systems Manager. If an overlap in installation is proposed, it shall be clearly identified in the Project Schedule.

An Installation Plan for all civil works shall be submitted by the SI to the Systems Manager and Caltrans for review and approval. Actual installation will be inspected by, and subject to the approval of the ACCMA's and Caltrans designated representative. Installation of the ETS equipment shall be performed by trained personnel who are familiar with all aspects of the equipment. During the installation phase of the project, the SI shall provide a Resident Installation Manager conveniently located and accessible to the Systems Manager from a local office. During phases other than the installation phases, the SI's Project Manager shall be readily accessible via telephone and/or pager. In addition, the SI's Project Manager shall report to the site within 24 hour notification from the ACCMA or the Systems Manager.

In the event that any structure is damaged due to the SI's activities, such damage shall be repaired immediately at the SI's expense and to the satisfaction of the ACCMA and the Systems Manager, or to the satisfaction of Caltrans with respect to any Caltrans-owned facilities.

The SI shall make its own arrangement for the supply of communications and permanent power to all of the ETS equipment. The SI shall also make its own arrangement for temporary power, as needed, water and waste at the work site.

The SI, under the supervision of the Systems Manager, shall perform the Field Acceptance Test. This testing shall include individual lane equipment, subsystem testing, testing of the dynamic pricing algorithm, TDC testing, communication networks and any other reasonable test that may be required to verify proper functioning of the ETS.

Phase II field testing shall include full end-to-end simulated system load testing. Software simulators shall be used to generate realistic data at each tolling zone site. The simulated data shall pass through the entire ETS including the communications network and the TDC, and ultimately to simulated account postings at the RCSC, output reports, etc. Testing shall include a minimum of five (5) full days of real time simulated operations.



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The conclusion of Phase II shall be signified by the completion of installation and testing of the new ETS, the completion of site verification tests at the seven (7) tolling and enforcement zone sites and at the TDC.

It is anticipated that work by other contractors may be in progress adjacent to or within the limits of this project during progress of the work on this contract. The following table lists contracts that are anticipated to be in progress during the installation, testing and approval phases of this contract.

Contract No.	Co-Rte-KP	Location	Type of Work
04-171304	Ala-580	Livermore	New Interchange
04-233794	Ala-580	Dublin, Pleasanton	West Dublin BART Station
04-257604	Ala-580-26.0/27.4	Dublin, Pleasanton	Interchange Modification
04-290844	Ala-580-R12.6/21.2	Livermore	Freeway Widening and Pavement
04-470804	Ala-580	Near Route 205	Truck Bypass
04-4A5314	Ala-580-10.5/49.4	Alameda County	Traffic Operation Systems

The SI and their contractor(s) must attend joint weekly meetings, at a time and location determined by the Systems Manager and/or Engineer, to coordinate work and traffic control with the contractor(s) for the above listed projects. The SI shall bring to the meeting a detailed 3-week look ahead schedule that includes all work that may affect the public through traffic, noise or vibration work that affects the operations of contracts listed above and work that requires lane, ramp and freeway closures. The SI shall accommodate and coordinate with other project contractors when preparing operations and work schedule.

7.6 PHASE III – SYSTEM PERFORMANCE EVALUATION

Phase III will begin after the successful conclusion of Phase II and with the opening of the EB I-580 Express Lanes to traffic. If the SI is informed that the project is not ready to open to traffic at the completion of Phase II, the SI’s work will be suspended until the roadway is ready to open to traffic. During Phase III of the Contract, a 90-day period of observation and evaluation of the new ETS under actual use shall take place. The SI shall be required to fully support and maintain the ETS, in accordance with provisions set forth in the Maintenance Provisions of this document. Any problems detected during the monitoring of the ETS during Phase III shall be immediately brought to the attention of the SI for resolution. At the conclusion of this evaluation period, if the ETS is considered to be operating fully in compliance with the RFP and the Contract requirements, the Systems Manager will provide the SI with written notice of Final System Approval.

The SI shall also be responsible for TDC operational support during Phase III and through the Warranty Period. Starting at the beginning of Phase II and continuing through the end of Phase III, the SI shall provide technical and operational support to advise and assist the ACCMA in start-up and initial operation of the ETS. It will be necessary for this SI individual to be



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knowledgeable in all aspects of the ETS and he/she shall be particularly familiar with the TDC operations.

7.7 PHASE IV – WARRANTY PERIOD

The final phase of the Contract, Phase IV, shall include continued ETS maintenance through the 270-day Warranty Period. The Warranty Period shall commence with the granting of Final System Approval to the SI by the Systems Manager.

All provisions set forth in this RFP and the other Contract documents shall be in effect throughout the Warranty Period. During this Period the SI shall supply adequate maintenance personnel, spare parts, and factory support to ensure the ETS remains fully operational in full accordance with system performance requirements and that problems are corrected within the repair/replacement times as indicated in the maintenance section of this RFP.

If through and at the conclusion of the 270-day Warranty Period the system is operating in full accordance with the RFP and the Contract documents the ACCMA shall grant written Final System Acceptance.

The ACCMA shall advise the SI as to whether or not the Maintenance Option(s) will be exercised at least 90 days prior to the scheduled completion of Phase IV.

7.8 PROJECT MILESTONES

The following section shall define the project milestones and payment provisions for the Contract. Presented in Table 9 below is a chart that shows the major Express Lanes Project milestones and the number of calendar days from NTP each of the milestones shall be completed by the SI. The SI shall successfully complete each milestone prior to proceeding with the next milestone activity.

Upon completion of each milestone, the ACCMA's Systems Manager will issue a letter of certification indicating that the SI has successfully completed the milestone.



Table 9 – Project Milestones

PROJECT MILESTONE	PROJECT PHASE	CALENDAR DAYS FROM NTP
Detail Design Review	I	270
Factory Acceptance Test	I	300
Equipment Installation	II	390
System Acceptance Test	II	450
Final System Approval	III	540
Final System Acceptance	IV	810

7.8.1 Detail Design Review

Successful completion of the Detail Design Review milestone shall be achieved when the ACCMA, Caltrans and the Systems Manager have reviewed and approved the Detail Design and accompanying documents submitted by the SI.

7.8.2 Factory Acceptance Test

Successful completion of the FAT milestone shall be achieved when the SI has demonstrated that the Express Lanes System, as demonstrated during the FAT, has met all of the functional and performance requirements set forth in this RFP, in the Project Contract documents, and in accordance with the FAT Plan and procedures. This determination will be made by the ED and the Systems Manager.

7.8.3 Equipment Installation

Successful completion of the ETS equipment installation, including all of the roadside FasTrak[®] equipment, the TZCs, the VDS devices, communications hardware/software, TDC equipment and devices that are used to interface to external systems (BATA RCSC, Caltrans TMC, CHP system enforcement units), and the Express Lanes website.

7.8.4 System Acceptance Test

Successful completion of the System Acceptance Test milestone shall be achieved when the SI has demonstrated, to the satisfaction of the ED and the Systems Manager, that the installed Express Lanes System equipment has met all of the functional and performance requirements set forth in this RFP, in the Project Contract documents, and in accordance with the System Acceptance Test Procedures.

7.8.5 Final System Approval

Successful completion of the 90-Day Operational Test shall be achieved when, as judged by the ED and the Systems Manager, the Express Lanes System has operated without equipment failure and in accordance with the functional and performance requirements for a continuous period of 30 days without major equipment or functional failure. The 90-Day Operational Test might need to be extended in order to achieve a full 30-day period of continuous operation without any



major equipment or functional failure. The determination of whether a subsystem or equipment failure should be categorized as major or not will be made by the ED and the Systems Manager prior to the commencement of the 90-Day Operational Test.

7.8.6 Final System Acceptance

Final System Acceptance shall be considered achieved when the ACCMA and the Systems Manager has certified that the 90-Day Operational Test has been completed and that all other project documentation and activities required of the SI have been provided.

Issuance of Final System Acceptance shall also indicate the beginning of the 270-day Warranty Period.

7.9 OPTIONAL MAINTENANCE PERIODS

ACCMA reserves the right to extend the Contract for up to three consecutive one-year maintenance periods. The ACCMA will inform the SI in writing, at least 120 days prior to the conclusion of the Warranty Period or current one-year maintenance period, whether or not the ACCMA elects to extend the contract for the next one-year period. During any one-year maintenance period covered by such extended Contract, the SI shall maintain the Express Lanes System according to the requirements presented in this RFP and in the Contract documents. If the ACCMA extends the contract for any one-year maintenance period, the SI shall obtain a performance bond covering the SI's maintenance obligations during the entirety of such period in form and protection satisfactory to the ACCMA in its sole discretion, prior to the commencement of such maintenance period. Bidders shall submit a cost for each of the three possible one-year maintenance periods as part of the Cost Proposal.

7.10 QUALITY ASSURANCE

7.10.1 Quality Control Program

The SI shall establish and maintain an effective quality assurance and quality control (QA/QC) program to assure compliance with the requirements of the Contract. The program and procedures used shall be developed by the SI and carefully tailored to meet Contract requirements.

The SI's QA/QC program shall address all aspects of the Express Lanes System from design through manufacture, installation, system acceptance, and final acceptance. Software as well as hardware shall be under the control of the SI's quality program.

The SI shall describe its QA/QC program in the technical proposal. At a minimum, the proposal response shall describe the following elements of the SI's QA/QC program as it shall apply to the EB I-580 Express Lanes System.

- Inspection and Verification Program;
- Testing Program;



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- Vendor Control Program (sub-contracting);
- Written Instructions for Control of Work;
- Calibration of Test and Measuring Equipment;
- Deficiency Tracking and Corrective Action Program;
- QA/QC Organization and Personnel Assigned; and
- Quality Records Maintained.

The SI shall assign to the Project an engineer whose sole responsibilities shall be the quality and reliability of the Express Lanes System. This engineer shall be in place within 30 days of Contract award and shall remain assigned to the Express Lanes System throughout the Contract until final acceptance of the system.

The SI's quality program shall include those internal inspections by an independent inspector or verifications necessary to ensure that the Express Lanes System being provided meets the requirements of these specifications and the highest standards of quality.

Inspections and/or verifications shall be used by the SI for all appropriate steps related to the Contract and the Express Lanes System. Inspections/verifications shall be appropriate for design, incoming materials, fabrication, in-process inspection, final assembly, unit and system testing, and at any other point in the development process at which quality must be assured.

Inspections or verifications for function or performance shall be accomplished in accordance with written procedures. Such procedures shall define the objectives to be met as well as the step-by-step inspection/verification to be accomplished. Accept/reject criteria shall be included within the written procedures. Inspections or verifications for trade workmanship may or may not require written procedures, as determined by the SI.

When inspections require ACCMA witnessing, those inspection procedures shall require ACCMA approval before scheduling the inspection.

Inspections/verifications for function or performance conducted by the SI shall require the generation of records that shall include the legible signature of the SI employee performing the inspection or verification. The ACCMA shall retain the right to review and audit such records either at the SI's place of business or after submission by the SI to the ACCMA.

System plans, drawings, work procedures, and inspection documents shall identify the inspections or verifications to be carried out. (Conventional QA terminology identifies inspection points as "I" and verification points as "V" on documentation.)

Status records of inspections/verifications shall be maintained by the SI to preclude the issue or use of material, equipment, or components that have not passed inspection/verification successfully. Non-compliant materials or products of any type shall be tagged and separated from acceptable product.



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At a minimum, the final assembly inspection (which may be combined with the inspection at source) shall confirm that all applicable prior in-process or assembly inspections/verifications have been successfully completed before performance of the final assembly or source inspection. The SI shall not ship to the site any Express Lanes System equipment, components, or software that have not completed all prior inspections or verifications required by the Contract and/or the SI's own QA/QC program.

The SI is advised that the ACCMA shall require not less than 30 working days for review and comment on inspection or test procedures submitted for approval unless longer periods are indicated within these specifications. The resubmission of inspection or test procedures should be anticipated on documents that generate numerous ACCMA comments or questions. The 30 working day period shall commence upon receipt of the document at the ACCMA office (date stamps shall be used).

Inspection and test procedures that require ACCMA approval shall have a format and content that, at a minimum, generally conform to the following:

- Test or inspection methodology (step-by-step instructions for conducting the test or inspection);
- Accept/Reject Criteria;
- Test or Inspection Report to be provided; and
- Any special requirements or concerns.

7.11 DESIGN AND IMPLEMENTATION

Presented in the Appendices to this RFP is a copy of the Systems Engineering Management Plan (SEMP) that was developed for the EB I-580 Express Lanes Project. This document includes a description of the various SEMF guidelines that the SI should use during the ETS design, development, integration, testing and implementation phases of the Contract. It is important to note that the SI is fully responsible to develop a series of system design, development, integration, testing and implementation plans as part of the Contract and, therefore, the SEMF is being provided for informational purposes only.

Also presented in the Appendices to this RFP is a copy of the Systems Integration Document Control Process document that the SI shall adhere to during the conduct of work on the Project. This document describes the various roles and responsibilities all of Project team members and the method in which the document control process shall be conducted.

7.11.1 Documentation Requirements

The SI shall submit all documentation and plans in the English language.

The SI shall submit documentation and Plans for ACCMA review and approval in sufficient time for a minimum of two iterations of review. ACCMA will endeavor to expeditiously review submitted documents but the SI should plan for a minimum ACCMA review time of ten (10)



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business days (excluding holidays). Multiple simultaneous submittals may extend ACCMA's review times. Approval of documents shall not relieve or limit the SI's responsibility to provide systems in full compliance with the technical provisions in the RFP and in the Contract file. If corrections or improvements are requested, the SI shall resubmit the Documentation and Plans until such time as it is fully acceptable. Any need for re-submittal shall not be seen as a cause for delay in completing the project in accordance with the schedule requirements.

Deviations from the technical requirements that may be contained within the SI submitted documents, even though the document may be approved by ACCMA, shall not have the effect of modifying Contract requirements. Only specific requests to ACCMA from the SI for waivers or specification change that are formally approved by ACCMA shall void or change requirements in the Contract.

For the EB I-580 Express Lanes System development portion of the work the documentation shall include, at a minimum, the documents listed below:

- Project Management Plan;
- Software Development Plan;
- Software Specifications;
- Configuration Management Plan;
- Preliminary Design Document;
- Detailed Design Document; and
- Various Test Plans.

7.11.1.1 Project Management Plan

The SI shall be responsible to prepare a Project Management Plan (PMP), as well as developing, implementing, maintaining, and adhering to the Project management organization and system contained in the PMP. The PMP shall describe the organization, authority, reporting relationships, and procedures to be implemented to manage and control the Work. The Systems Integrator shall provide the personnel, equipment, and tools necessary to plan, design, construct, and perform all Work. The management organization must manage the Work in a manner that ensures safety, quality, and environmental sensitivity.

7.11.1.2 Software Development Plan

A detailed Software Development Plan (SDP) shall be prepared by the SI and submitted to ACCMA for review and approval. This plan shall indicate all elements of the software development process and shall include, but not be limited to, the following:

- Software Development Schedules;
- Software Development Tools;
- Assignments to Sub-contractors;
- Programming Languages;
- Software Development Quality Control and Quality Assurance;



- Software Testing Plan;
- Software Documentation Plan; and
- Software Management Plan.

A complete program of software testing shall be defined as part of the SDP Plan. The Integrator's testing plan shall include a summary of test procedures, dates and equipment to be used for each particular test. The SDP shall include a description of documentation to be provided for application programs, as well as incorporating standards to be followed and sample documentation, where available.

7.11.1.3 Software Specification

The SI shall prepare a detailed Software Specification (SS) that includes a description of all programs and subroutines satisfying all functional requirements, as set forth in the Contract documents. Flow diagrams shall be included in the software specification for programs used in all subsystems to clearly identify data flow through the system and to illustrate the relationship between individual programs and/or subroutines.

A preliminary data dictionary and file/record document shall also be included in the software specification. This document shall define all data messages, records and files accessed by more than one program in the Express Lanes System.

7.11.1.4 Configuration Management Plan

The SI shall develop and provide a Configuration Management Plan (CMP) for the review and approval by ACCMA to be adhered to throughout the duration of this project. A method of configuration management shall be utilized in order to efficiently and accurately track and monitor the progress and changes that occur in all areas of this project.

At a minimum, the CMP shall address the following areas:

- Configuration Control;
 1. Requirements Management.
 2. Deviation and specification change requests.
 3. Data Management.
 4. Configuration Audits;
 - a) Functional.
 - b) Physical.
 5. Approval Requirements for installed systems.
 6. Testing Requirements for installed systems.
- Configuration Status Accounting;
 1. Document Control and the Library Function.
 2. Approved Documents.
 3. Revision History for Documents.



4. Physical Item Content.
5. Physical Item Where Used.
6. Status of Changes.
7. Changes by Product/Serial Number.
8. Results of Configuration Audits.
9. Configuration Management Accounting (As Designed, As Built, As Delivered).
10. Mod Status of Installed Systems.

7.11.1.5 Back-Up and Disaster Recovery Plan

The SI shall develop and submit a backup and disaster recovery plan for the ETS in accordance with the relevant guidelines of the State of California. The plan submittal and the ETS design shall support the approved plan. During the operations phase of the Contract the SI shall conduct the plan testing described in the above referenced disaster recovery guidelines.

The ETS data storage system shall provide built-in redundancy using a technique such as data mirroring.

A new image copy of the entire ETS shall be created after any application and/or operating system upgrade performed by the SI. The monthly backup shall include all files, data, and software to completely restore the system to an operational state.

7.11.1.6 Preliminary Design Documentation

The Preliminary Design Documentation (PDD) shall include detailed information on schedule, organization, technical approach, methodology, risk mitigation and other issues related to a complete plan for software development. The topics for the PDD shall include, but shall not necessarily be limited to, the following:

- Schedule;
- Organization;
- Methodology;
- Overall System Architecture;
- Requirements for each System or Subsystem;
- Project Management Plan;
- Quality Assurance Plan;
- Software Development Plan;
- SI Organization and Schedule Configuration Management Plan;
- Civil Work Plan;
- Examine and Assess Alternatives, where appropriate, for Each Subsystem or Component;
- Assess Design Issues and Associated Risk;
- Risk Mitigation;
- Assess Design Alternatives; and
- Status of environmental testing for system components.



In addition, the SI shall address and show compliance with quality assurance, reliability, maintainability, software development, and other system requirements. Hardware concept drawings and preliminary level engineering specifications shall be submitted during this review. The PDD will be reviewed by ACCMA and Systems Manager staff and comments will be submitted to the SI. A meeting will be convened to discuss the ACCMA's comments and the SI shall then submit a revised version of the document. This process will repeat until the ED and the Systems Manager determine that the PDD is at an acceptable level. Once the ED and Systems Manager decide that the PDD is complete, a PDD approval letter will be sent to the SI.

7.11.1.7 Detailed Design Documentation

The SI shall provide a functional narrative text, system and subsystem block diagrams, data flow diagrams, data structure diagrams, schematics, and any other graphic illustrations to demonstrate the technical adequacy of the system design approach and compliance for system hardware and software with quality assurance, reliability, maintainability, software development, and other requirements of these specifications.

The Detailed Design Documentation (DDD) shall be an extension of the approved PDD document. It shall include such detail as block diagrams, software design, testing procedures, operational procedures, etc. A list of equipment for each function along with a description of its role shall be provided.

The DDD shall be an extension of both the Contract documents and the System Integrator's Proposal. It shall include such detail as block diagrams, screen layouts, report formats, software design, testing procedures, operational procedures, and other pertinent design documentation. A list of equipment for each function along with a description of its role shall be provided. Any equipment listed in the DDD that has not been listed in the Cost Proposal or supplemental cost sheets shall be accompanied by the equipment specifications. Such equipment shall be provided at no increased cost to ACCMA.

The topics to be discussed in the DDD shall include, at a minimum, the following:

- Scope of Project;
- Master Schedule;
- Compliance Review Matrix;
- Document Requirements and Explanation, including for:
 - Roadside Equipment and Tolling Zone Design
 - Functionality
 - System Function Flow Chart – Each Tolling Zone Type
 - Hardware, Specifications and Integration
 - VDS Subsystem
 - TDC Host Server
 - Network Communications
 - Maintenance Functionality
 - MOMS



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- MOMS Messages
- Maintenance Service and User Interface
- Spare Parts complement to be provided
- Hardware, Specifications and Integration
 - Network Communications
 - Maintenance Functionality
 - MOMS
 - Maintenance Service and User Interface
- Software / Database Design
 - Software Specification
 - Operating System (OS)
 - Programming Language
 - Version Management
- Reports
- Performance Standards
 - Capacities
 - Degraded Modes of Operations
 - Speed
 - System availability calculations
 - Environmental Requirements and Specifications
 - Network Communications
- Environmental Testing Results

The DDD will be reviewed by ACCMA and Systems Manager staff and comments and suggested changes will be submitted to the SI. A meeting will be held to discuss the ACCMA/Systems Manager comments and the SI shall then submit a revised version of the document. This process will repeat until the ED and the Systems Manager determine that the DDD is at an acceptable level. Once the decision is made that the DDD is complete, an approval letter of the DDD will be sent to the SI.

7.11.2 Testing Requirements

7.11.2.1 Test Plan

The SI shall prepare a detailed plan for testing all components of the Express Lanes System. This plan shall include environmental certification, functional tests, performance tests, operational tests and all other ad-hoc tests that might be required as deemed appropriate by the ED and/or the Systems Manager. The SI shall submit a written report documenting the results for all tests performed and comparing them to the expected results.

Tentative dates for conducting the various tests shall be included in the Test Plan, as submitted by the SI. Reasonable modifications to these dates may be permitted during the course of the Work provided a written request for such changes is made at least two (2) weeks prior to the revised test date.



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The Test Plan shall define the following:

Environmental Certification - The process for certifying that each item of tolling zone equipment satisfies the environmental requirements is presented above in Section 6.1.3. This is to be accomplished either by providing documentation for tests previously performed or conducting environmental testing to certify the equipment item.

Factory Acceptance Testing – The Integrator shall perform factory acceptance tests, which shall include testing of the hardware, software and various subsystems that will be provided by the Integrator. These tests shall be conducted at the Integrator's facility using their test facility. The purpose of the FAT is to internally verify as many of the system requirements prior to the on-site Express Lanes System Approval Test as practical. To minimize the risk of later discovery of problems, the FAT tests will, as much as possible, be performed as an integrated system rather than as independent subsystems, using a representative system slice of the tolling hardware and integrated software that is assembled and connected using the WAN and LAN configured for the actual production system. ACCMA, and/or its representatives, reserve the right to witness and participate in the FAT.

Operational Testing- The Test Plan shall define procedures for evaluating the Express Lanes System in a real world environment. The operational testing, which includes testing during the installation period and testing subsequent to the Express Lanes System being open to traffic (90-Day Operational Test) is to be conducted and evaluated by the SI. The operational testing procedures shall include but not limited to the following:

- Review of recorded transaction data to identify any patterns that suggest erratic or faulty system behavior. Such indications may prompt further analysis or investigation.
- Review of MOMS and other maintenance data to identify reliability problems.
- Controlled testing through the insertion of test vehicles into real traffic.

Performance Audit - The Test Plan shall define controlled test procedures for evaluating the Express Lanes System on an annual basis to ensure that system reliability and accuracy have not degraded over time and the Express Lanes System continues to satisfy the functional and performance requirements. Procedures should be similar to those defined for Operational Testing. The SI shall also incorporate selected ACCMA ad hoc tests into the Performance Audit test procedures.

Test plans shall include details on the test environment including the hardware, software and test items and dependencies comprising the test environment, and the overall flow of the test activities. The Test Plan shall provide a matrix listing each requirement and how that requirement is to be tested or demonstrated, by inspection, analysis or test. For those requirements that are to be verified through testing, the matrix shall outline the particulars such that the test shall be clearly identified and a description or objective given for each test, including the requirement under test, and the conditions/scenario of the test and the number of test runs



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planned in addition to the method of verification. Each condition or scenario detailed within test plan shall also include the types of data to be recorded and the acceptance criteria for the test.

Conditions and scenarios should detail individual tests that relate to the capture, generation, contents, and transfer of all transaction types individually and in combination and their related requirements. Scenarios should also include tests that require the tolling zone to be able to process a specific rate of transactions and successfully transfer those transactions in both normal operational modes and various degraded modes of operation.

Conditions and scenarios of the tests should include items such as lighting, type of vehicle, and the speed and movement of the vehicles through the Tolling Zone (left to right, straddling lanes, vehicle speed, and mix of vehicles with and without tags). The Express Lanes System Acceptance and 90-Day Operational Tests shall include correlation testing where platoons of closely spaced vehicles, some with and some without tags, are used as test vehicles. These tests shall also include many different types of dynamic pricing testing to ensure that the software algorithms are working properly.

7.11.3 Factory Acceptance Test, Procedures and Reporting

The tests to be performed shall be according to internal plans and procedures of the SI and shall be witnessed by the SI's Quality Control staff. It is the responsibility of the SI to ensure best practices are being utilized to test with perceptiveness and thoroughness. Issues and problems uncovered during the FAT which result in a design or process change shall be reported to ACCMA. While intended as an internal test, ACCMA reserves the right to review all plans, procedures and data generated from the internal FAT. Special focus of the FAT should be on the operations of the dynamic pricing algorithms and how the change in pricing affects the LOS in the Express Lanes. The SI shall clearly describe how this process will be tested at the factory level.

7.11.4 EB I-580 Express Lanes System Acceptance Test

The tests to be performed shall be defined in the Express Lanes System Acceptance Test procedures which the SI shall prepare and submit to ACCMA. Prior to conducting the System Acceptance Test all test scripts and scenarios shall be approved by ACCMA and the Systems Manager.

Tentative dates for conducting the various tests shall be included with the Express Lanes System Test Plan. Reasonable modifications to these dates without delaying the overall schedule may be permitted by ACCMA during the course of the project work, provided a written request for such changes is made at least two (2) weeks prior to the revised test date.

If there are any failures or anomalies in conducting any test step, the SI shall take the necessary corrective action and the test shall be repeated. In the case that corrective action is undertaken by the SI, it shall perform any necessary regression testing to ensure that such corrective action has not adversely affected the system's ability to pass previously conducted test steps. If necessary this process shall continue until success is achieved.



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If a System Acceptance Test indicates that the system and its components are satisfactory, ACCMA will issue written approval of the test for the configuration. If the results are not satisfactory, according to the ACCMA and the Systems Manager, the SI shall request the scheduling of a subsequent test re-run to occur after corrective action is completed.

Components used in the System Acceptance Test shall be production models, which would be suitable for installation at tolling zones, in the Express and GP lanes, at the TDC and at the TMC.

The System Acceptance Test shall be performed by the SI under the supervision of, and with the participation of, ACCMA staff and the Systems Manager. ACCMA staff and the Systems Manager shall be permitted to conduct ad hoc testing that they deem appropriate during or after the formal tests. Any observed repeatable deficiencies shall be brought to the attention of SI and these shall be incorporated in the test review and evaluation. Each installed piece of ETS and TDC equipment and subsystem shall be subjected to testing during the System Acceptance Test. Once ACCMA and Systems Manager staff determine that the FAT is successful, a FAT approval letter will be submitted to the SI.

7.11.5 EB I-580 Express Lanes System Acceptance Test Procedures

The SI shall prepare detailed Express Lanes System Acceptance Test procedures or scripts for the EB I-580 Express Lanes System Acceptance Test. The Test procedures shall cover test set-up, step by step procedures for controlled tests, and the expected results for each step. Tests shall be "end-to-end" so that results are tracked through the system, whenever possible. For example, the impact of parameters set by and communicated from the ACCMA TDC to outside systems shall be closely observed in the behavior of the lane systems or results of tests that are conducted in the lanes at the tolling zones are tracked at the TDC. ACCMA will arrange for reports of the transmitted test transactions and to be processed by the BATA RCSC and the posting information to be provided to the SI.

The following are illustrative of the aspects of the Express Lanes ETS that are, at a minimum, to be demonstrated during conduct of the System Acceptance Test:

- Power up tests;
- Verify initialization;
- Verify data integrity (no loss of data);
- Verify diagnostic messages;
- Introduce failures;
- Verify diagnostic messages;
- MOMS Reporting;
- Normal FasTrak[®] Transaction Tests;
- Lane operational tests;
- Functioning of the TDC;
- TDC interface to the TZCs;
- TDC interface and data processing to and from the BATA RCSC;



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- TDC interface to and the operation of the Caltrans TMC;
- TDC interface and data transfers to and from the CHP on-board devices;
- System enforcement equipment operation and processing;
- Transponder detection by vehicles at speeds from 5mph to 100mph through the tolling zones;
- Transponder detection during a platoon of vehicles;
- Proper association of vehicles and transponders;
- ETC transaction tests;
- Tag status file download and upload tests;
- Production of various TDC traffic, revenue and audit reports;
- Tolling zone and TDC stand-alone operation tests; and more.

Once ACCMA and Systems Manager staff determine that the System Acceptance Test has been successfully completed, an approval letter indicating so will be submitted to the SI.

7.11.6 EB I-580 Express Lanes System Acceptance Test Report

Within 15 days after the Express Lanes System Acceptance Test has been successfully completed, the SI shall submit a detailed report of the results. The report shall include, at a minimum, the following:

- An executive summary of the overall test results highlighting the general conclusions of the testing and any problems found and corrected;
- A testing compliance matrix modified to include indications of any changes to the testing conducted from the initial submission and an assessment of the system's conformance to the requirements;
- Results of any ACCMA and Systems Manager requested ad hoc testing that was undertaken and brought to the SI's attention during or after the tests; and
- An appendix containing the detailed results of the performance of the test scripts.

7.11.7 90-Day Operational Test

The EB I-580 Express Lanes System shall undergo a 90-day operational evaluation period after the entire Express Lanes System has been installed and integration tested successfully completed. The Express Lanes system will be closely observed as to its functional and performance characteristics during this 90-day period.

The Express Lanes System shall operate reliably and perform in accordance with the specifications and Contract Document requirements during the test. The Express Lanes System shall operate without equipment failure and in accordance with the functional and performance requirements for the last 30 days of the evaluation period or the operational test shall be extended until 30 days of operation without major equipment failure is achieved. For this purpose major equipment failure is one that results in the loss of functionality related to system requirements in the RFP and the contract documents. Successful completion of the 90-Day Operational Test is required for the granting of System Acceptance.



7.11.8 90-Day Operational Test Procedures

The SI shall prepare 90-Day Operational Test Procedures defining the procedures and tests to be performed for the installed and operating roadside equipment, tolling zones, the TDC, enforcement equipment, and all internal and external interfaces.

7.11.9 90-Day Operational Test Report

Within 15 days after the 90-Day Operational Test has been successfully completed, the SI shall submit a report of the results. The report shall include but shall not be limited to the following:

- A summary of the overall test results highlighting the general conclusions of the testing and any problems found and corrected; and
- An appendix containing the test results and data used in evaluating the system's operational performance.

7.11.10 Performance Audit

On an annual basis, the SI shall conduct a Performance Audit for each operational tolling zone to verify that system reliability and accuracy has not degraded over time and the Express Lanes System continues to satisfy the functional and performance requirements that are presented in the system design documentation and all other Contract documents.

System transaction data and reports plus MOMS data for at least the 30 days preceding the Performance Audit shall be utilized in the analysis. In addition, controlled tests shall be conducted by utilizing test vehicles mixed with real life traffic. ACCMA and Systems Manager staff may choose to perform ad hoc operational testing as part of the Performance Audit. The initial Performance Audit shall be conducted and successfully completed as a condition of Final System Acceptance. A Performance Audit will be deemed successful by ACCMA and the Systems Manager if it is determined that the audit shows that the system requirements presented herein are met.

7.11.11 Performance Audit Procedures

The SI shall prepare Performance Audit Procedures defining the procedures and tests to be performed for the installed and operating Express Lanes System. The procedures shall identify the test vehicles that are to be mixed with real traffic and the results to be obtained from the tests. The Performance Audit Procedures shall also define the operational data to be reviewed and the analysis that will be conducted on that data.

7.11.12 Performance Audit Report

Within 15 days after the Performance Audit has been completed, the SI shall submit a report of the results. The report shall include but shall not be limited to the following:



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- A summary of the overall test results highlighting the general conclusions of the testing and any problems found and corrected; and
- An appendix containing the test results and data used in evaluating the system's operational performance.

7.12 WARRANTY PERIOD AND MAINTENANCE REQUIREMENTS

7.12.1 General

The SI shall establish and maintain an effective maintenance program for the new EB I-580 Express Lanes. The SI shall be solely responsible for full maintenance of the ETS, including the roadside and TDC hardware and software, from the time of commissioning through the Warranty Period and for the term of any successive maintenance options that may be exercised by the ACCMA. Maintenance shall be provided through field service, operational testing, remote diagnostics and control, and by maintenance personnel either on-duty or on-call 24 hours a day, seven days a week.

The standards for response time and repair time established herein shall be met by the SI until completion of the Warranty Period and through each of the maintenance periods that might be selected by the ACCMA. Where specific guidance is not provided for response and/or repair times, the total downtime of any component or subsystem shall not exceed six hours.

During the Warranty Period the SI shall replace, at no cost to the ACCMA, any piece of equipment, component or software that is deemed by the ACCMA to not be fully operating within the requirements that are set forth in the Contract documents.

The SI shall provide an Operations Coordinator to coordinate the project operations with the ACCMA during the execution of the Warranty Period.

7.12.2 Maintainability Goals and Objectives of the ACCMA

The Bidder shall provide with their technical proposal predictions for component and lane maintainability values (MTTR) derived from maintenance records or tests of the SI's product line. The SI proposed equipment and systems shall meet the dictated life, reliability and availability requirements that are presented above in Table 2 (in Section 6.1.1). The SI shall propose only those maintainability values (MTTR) that it can readily defend by engineering data and that it is prepared to be held accountable for during the on-line maintainability demonstration test and duration of the Contract.

The MTTR shall be the total corrective maintenance time divided by the total number of corrective maintenance actions during a given period of time. Corrective maintenance actions shall be those associated with relevant and chargeable failures only.



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Response and repair time criteria cited herein shall apply 24 hours a day, seven days a week, for all components of the Express Lanes System. The required maintenance analysis and Maintenance Plan shall be used by the SI to show how the criteria shall be met during the maintenance periods.

Response time is defined as the interval of time that transpires between the SI's notification of equipment or system failure and the arrival of the SI's maintenance technician at the failure site to perform the required troubleshoot/repair.

Unless written relief is given by an authorized ACCMA employee at the time of the maintenance call, the response time to all tolling zones covered by the Contract shall not exceed two hours. Emergency situations shall be handled on an exception basis.

Repair time is defined as the interval of time that transpires between arrival at the failure site by the SI's maintenance technician and complete resolution of the failed component or subsystem to full operational service. On average, repair times shall not exceed the specified MTTR values that are presented in Table 2.

7.12.3 Maintenance Analysis Requirements

The SI shall use analytical methods, appropriate models, and a documented study that shall lead to the definition of resources to be used for maintenance of the Express Lanes System. This means that the number and types of maintenance service personnel assigned to maintenance of the Express Lanes System shall be derived from a careful analysis of System and ACCMA needs. The spare parts required shall also be derived from a careful and documented analysis. In the case of both personnel and spare parts, the SI shall start its analysis from the contractually required response and repair times as set forth herein and provided in the Proposal.

Personnel and spare parts analysis shall carefully consider geographic distribution of the maintenance sites, vehicles available to transport personnel and spares, traffic and driving times, and back-up services available.

The maintenance analysis shall be documented within the appropriate sections of the maintenance plan. Approval of the maintenance plan shall depend in part on the quality and acceptability of the maintenance analysis incorporated into the plan.

7.12.4 Maintenance Personnel Experience Requirements

The Maintenance Plan that is required shall address the requirements for describing the maintenance organization and personnel to be used for maintaining the EB I-580 Express Lanes System. This section provides additional requirements for personnel qualifications to be satisfied by the SI while maintaining the System.

The numbers and types of maintenance personnel to be used by the SI for maintaining the System as well as the distribution of personnel shall be the product of maintenance analysis and documented within the maintenance plan.



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The Maintenance Manager shall be responsible for the overall maintenance activities for the Project. The individual designated as the Maintenance Manager must have demonstrated and sufficient experience and capabilities in maintenance activities that are similar in scope to what is expected for the Project, including, without limitation, specific experience in electronic toll system design projects, maintenance procedures of toll system equipment and subsystems, and managing field technician personnel. The individual designated as the Maintenance Manager by the SI shall require the approval of the ACCMA.

The SI shall not replace the Maintenance Manager without the prior written approval by the ACCMA. The SI's request to replace the Maintenance Manager shall name a proposed replacement manager, include his/her qualifications and include a statement that he/she will be available within thirty (30) days.

The maintenance service technicians (of any discipline) shall have an appropriate technical education background and at least three years of experience servicing electronic and/or toll system equipment.

Any maintenance subcontracts used by the SI shall be fully described within the Maintenance Plan submitted for the ACCMA approval, and the Subcontract agreements themselves shall be made available for review by the ACCMA upon request.

ETS software maintenance personnel shall have equal or greater education and experience as is required for the maintenance service technicians. The SI shall describe in the Maintenance Plan how ETC software maintenance support shall be provided.

All SI personnel shall be subject to appropriate security checks conducted to the satisfaction of the ACCMA. The SI shall obtain written approval from the ACCMA for all maintenance service personnel.

7.12.5 Maintenance Plan

The SI shall submit a detailed Maintenance Plan. The plan shall include maintenance staffing and administration, dispatch procedures, communication requirements, preventive maintenance techniques, schedules, and support from outside maintenance service (for example, computer manufacturers and COTS vendor suppliers), final maintenance equipment list, and other details as may be appropriate for inclusion in the Maintenance Plan.

If maintenance procedures require any lane closures these shall only be undertaken after the ACCMA and Caltrans has approved the lane closure and the SI shall be responsible for maintenance of traffic (MOT). The SI shall adhere to the MOT plans that are presented as attachments to this RFP for the Roadway Contract.

The Maintenance Plan shall include procedures to be used from the first use of the System through completion of the Maintenance/Warranty Period and throughout any of the maintenance



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options that may be selected by the ACCMA. The Plan shall address, at a minimum, the following:

- Standards and General Procedures;
- Equipment Maintenance;
- Software Maintenance;
- Maintenance Tools;
- Spare Parts and Inventory Control;
- Maintenance On-line Maintenance System (MOMS);
- Emergency/Corrective Maintenance Procedures;
- Preventive Maintenance Procedures and Schedules;
- Support Services:
- Personnel:
- Staff Location;
- Staff Qualifications;
- Training;
- Maintenance Facilities/Workshop(s);
- Maintenance Records;
- Failure Tracking and Corrective Action;
- Lane Closure Procedures (using the attached MOT Plans as the basis for procedures);
- Reliability and Maintainability Analysis and Calculation;
- Spare Parts Inventory Levels; and
- Maintenance Activity Reports.

7.12.6 Preventive Maintenance

The SI shall develop a preventive maintenance schedule designed to cover all electronic toll collection system components and to ensure optimum maintenance of the system to meet the contractually required reliability and maintainability values. The preventive maintenance schedule shall be submitted as part of the Maintenance Plan.

7.12.7 Corrective and Emergency Maintenance

The SI shall maintain a staff of trained personnel of sufficient quantity and quality to ensure that urgent repairs can be performed 24 hours a day, every day of the year. The SI shall be required to respond to a maintenance call and have a technician on-site and ready to fix the reported problem within 2 hours from issuance of the maintenance call that is generated and sent by MOMS. In addition, the SI shall be required to resolve the reported problem within 2 hours from the time in which the technician is physically on-site. The SI maintenance technician shall be responsible to report that they have reached the site of the reported problem by contacting the designated ACCMA representative.



7.12.8 Spare Parts

The SI shall provide and periodically maintain an inventory of all spare parts required to maintain the System according to the requirements presented herein. The initial inventory shall be a complete complement of spare parts. The SI shall maintain adequate reserve stock of spare parts and items of equipment located in proximity to the EB I-580 Express Lanes. Inability to complete repairs due to the lack of timely availability of spare parts shall not relieve the SI of its maintenance obligations.

The SI shall maintain a comprehensive, accurate, and auditable parts and spares inventory at a system level by using the MOMS maintenance data base.

7.12.9 Maintenance Transportation

The SI shall provide all necessary vehicles to effectively maintain the System. All vehicles shall be registered in the State of California. Vehicles shall not carry any special identification unless authorized to do so by the ACCMA. All SI maintenance personnel on duty shall be equipped for rapid two-way communication with the Maintenance Manager's office (e.g., a beeper system).

Each SI vehicle shall be equipped, at the SI's expense, with the test equipment and spare parts that are required to effectively maintain the System. The test equipment and spare parts to be carried in each vehicle shall be documented in the Maintenance Plan.

7.12.10 Maintenance Facilities/Workshop

The SI shall be responsible for the provision of maintenance office and work facilities equipped and capable of supporting the maintenance of hardware and software for the System. The facility shall house spare parts, documentation, communications, and personnel necessary to maintain the System according to the requirements presented herein.

7.12.11 Maintenance On-Line Management System

The SI shall provide a MOMS. The MOMS shall allow for monitoring and reporting of equipment failures within the entire set of tolling zones that may be procured under the Contract.

MOMS shall be the focal point for all Express Lanes System maintenance activities including routine preventive and corrective maintenance, real-time monitoring, repair calls, report generation, etc.

Access to MOMS information shall require entry of the user's identification and password from which the system shall retrieve the user's assigned role(s). Personnel access levels to MOMS shall be determined by ACCMA staff.

At a minimum, MOMS shall be capable of providing the following information:

- Current Tolling Zone operational status;
- Failure and/or malfunction location;



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- Failure and/or malfunction description (w/ priority level);
- Spare parts inventory quantity and control;
- Part and equipment description (including part number and serial number);
- Record of last maintenance activity for a part entered by maintenance staff;
- Record of last preventive and corrective maintenance activity for all parts as entered by maintenance staff; and
- Historical system information/report generation.

The SI shall provide a monthly maintenance summary report to the ACCMA. The ACCMA reserves the right to review the maintenance records and database files for compliance with System performance requirements.

For every monthly maintenance payment period the SI shall prepare a report ("Maintenance Report") that tracks malfunctions, the times that malfunctions were recorded, the time the technician responded to the service call and the time the technician completed the repair. The report shall also provide the percent availability figures for the month.

7.12.11.1 Failure Detection and Reporting

One primary purpose of MOMS is to automate the issuance of repair/service calls to maintenance technicians.

MOMS shall be designed with the ability to generate work orders with little or no human intervention. Work order formats and specifications shall be determined during the design process and approved in writing by ACCMA, or their designated representative.

The MOMS shall provide for generating a minimum of four (4) different types of work orders, including ad hoc, preventive, corrective, and emergency maintenance.

The work order shall record the source of the work order, either as automatically triggered by MOMS monitoring, or the person reporting the failure, or both.

The MOMS shall also provide the capability to build ad hoc work orders for unusual maintenance activities. In addition, a work order shall include, but not be limited to, the following information:

- Date/Time of work order generation;
- Date/Time/Location of repair or maintenance call;
- Work order number (sequential); and
- Failure or malfunction description.

MOMS shall also provide the capability to generate blank work orders for repairs or malfunctions not directly reported by MOMS. Blank work orders shall still be generated for the sequential list maintained in MOMS.



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MOMS shall allow both automatic and manually activated paging of technicians once a work order has been generated.

MOMS shall be designed to accommodate the assignment of priority levels for each failure type.

MOMS shall assign an initial priority level to each failure but shall provide for manual override to account for aspects that impact severity level and MOMS cannot assess.

The paging process shall check to determine the assigned active technician and update the dispatch grid to include the new service call.

MOMS shall monitor the disposition of service calls and shall generate a page to the maintenance technician and/or the maintenance manager for any work order not responded to or repaired within the required time.

7.12.11.2 System Monitoring

MOMS shall report the status and performance of all levels of Express Lanes System equipment in real-time.

The performance monitoring function shall allow the user to select and observe the status and/or performance of several pre-defined portions of the Express Lanes System. The following is a breakdown of the various levels, and, at a minimum, the degree of information required to be displayed for each level:

- Tolling Zone level components; and
- All equipment statuses for:
 1. Status of all Tolling Zone applications;
 2. Tolling Zone identification (ID);
 3. Tolling Zone location (Tolling Zone ID);
 4. Tolling Zone overall operation status (operational/degraded);
 5. Current operational status of each major subsystem; and
 6. Status of Tolling Zone communications link.

7.12.11.3 Availability Tracking

MOMS shall track and calculate the availability of each tolling zone by function.

The calculations shall be performed automatically whenever an availability report is run.

The availability report shall take into account the number of installed Tolling Zones and the length of outages affecting the particular Tolling Zone function.



7.12.11.4 Remote Access

MOMS shall be designed with the capability to allow technicians and other users to access the MOMS network over the internet.

Technicians or maintenance staff shall typically utilize this function while off-site or to log-in and close out a work order.

The dial-up access shall be designed to utilize simple dial-up connection tools typically found on laptop computers.

Access shall be password protected to prevent unauthorized users from gaining access to MOMS. A single network password shall not be acceptable for dial-up users. Each user shall use a personal password when logging into MOMS.

7.12.11.5 Inventory/Spare Parts Control

The SI shall provide an integrated spare unit and spare parts inventory control as part of MOMS.

This function shall be integrated with the work order generation function which shall automatically update and maintain the system and spare parts inventory based on work orders and technicians recording of parts used during work order closeout.

7.12.12 Force Majeure Repairs

The SI shall repair ETS elements that are damaged by Force Majeure events. After making the repair and presenting acceptable evidence of a Force Majeure repair and documentation of the costs incurred, the SI shall be reimbursed by the ACCMA on a time and materials basis. Maintenance repair response time requirements shall not apply in the case of Force Majeure events.

7.12.13 Maintenance and Service Manual

A Maintenance and Service Manual shall be provided to the ACCMA for review and approval. The schedule for the submittal of the draft and final versions of the Maintenance and Service Manual shall be according to the timelines described previously in Table 5. Five (5) copies of the Final Maintenance and Service shall be submitted by the SI. The Maintenance and Service Manual will be used primarily by the SI's maintenance staff but shall be provided to the ACCMA in the event ACCMA should at some point decide to take over the maintenance responsibility for the System. This comprehensive document shall provide complete detailed technical descriptions of maintenance operations including, at a minimum:

- Preventive Maintenance Schedule;
- Troubleshooting Techniques;
- Corrective Measures, both temporary and permanent;
- Maintenance Techniques (routine, preventive, and remedial);



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- Location and availability of support services for all major components;
- Point-to-point component wiring schematics and logic signal flows; and
- Assembly and disassembly drawings, including exploded view drawings.

The Manual shall be prepared for technical personnel assigned to the maintenance of the ETS. This Manual shall include a general description, theory of operation, operator instructions, detailed electrical/electronic logic circuit analysis, mechanical functions, installation, test and trouble-shooting procedures, and preventive and corrective maintenance procedures. The Manual shall also contain diagrams, schematics, layouts and parts lists required to service each component and circuit board utilized in the System.

Standard service manuals for unmodified commercial products used in the System shall be acceptable if they contain details and accurate information in order to properly service the specific toll equipment supplied under the Contract. Large size diagrams and mechanical assembly diagrams do not have to be reduced or incorporated into the manuals if these drawings are delivered with the manuals.

The final Maintenance and Service Manuals shall be delivered to the ACCMA 90 days prior to Phase V Approval.

7.12.14 End of Warranty Period and Optional Maintenance Periods

The SI shall be responsible to satisfy the following conditions in order for the ACCMA to declare the end of any optional maintenance period. The SI shall not be released from their maintenance obligations until each of the below described conditions are met to the satisfaction of the ACCMA and this is documented, in writing, by the appropriate ACCMA representative.

- Inspection – A detailed inspection will be performed by ACCMA staff and the SI shall provide reasonable support for the inspection;
- Maintenance Records – The SI shall provide to the ACCMA all current and historical maintenance records, equipment and software support contact information, outstanding equipment and second source software warranty paperwork, service records, and other relevant documentation to the satisfaction of the ACCMA;
- Spare Parts, Components, Tools – The SI shall transfer to the ACCMA all spare parts, components, boards, tools, and other spare parts. The spare parts and components will be cross-referenced with MOMS to ensure that all parts and components are transferred to the ACCMA;
- Passwords – The SI shall provide all system passwords, user names, and other access and system security information to the ACCMA;
- Training – The SI shall provide maintenance training to designated ACCMA staff to the satisfaction of the ACCMA;
- Manuals and Drawings – The SI shall provide revised, fully updated versions of all Maintenance and Service Manuals, current Maintenance Plan, installation drawings, as-built drawings, and other relevant documentation to the satisfaction of the ACCMA; and
- Spare Equipment Repair – The SI shall repair all spare equipment, to the satisfaction of the ACCMA.



The ACCMA will not grant successful completion of any maintenance period until each of the above listed conditions is met, to the satisfaction of the ACCMA.

7.13 TRAINING REQUIREMENTS

The SI shall provide a training schedule for TDC Operators/Auditors, selected CHP officers and maintenance personnel. A separate training course shall be provided, at a location in the Oakland area that is designated by the ACCMA, for each of the following categories of personnel:

- TDC Operators;
- TDC Auditors;
- CHP Enforcement Officers; and
- Maintenance Personnel.

Manuals that describe in detail the various operating parameters shall be developed and submitted by the SI for the TDC Operators, the TDC Auditors, the CHP Enforcement Officers, and the ACCMA maintenance personnel. The documentation delivery dates are presented to Table 5. These manuals will be used as the basis for SI training of the various types of System users. CHP Enforcement Officer and maintenance training shall include both classroom and field training.

SI training of the CHP Enforcement Officers, the TDC Operators, and Auditors shall be successfully completed, as determined by ACCMA and Systems Manager staff, no later than 30 days prior to Express Lanes System commissioning. Training by SI staff of the ACCMA maintenance personnel shall be completed, to the satisfaction of the ACCMA and the Systems Manager, at least 30 days prior to the end of any Maintenance Period. Training courses shall be required for not more than five (5) persons.

7.14 PROJECT PAYMENT PROVISIONS

Payment for equipment, software, services and materials provided by the SI under the terms of the Contract shall be made at various intervals based on project milestones being successfully met, as determined by the ED and the Systems Manager. The below sections describe the payment process for each of the payment categories that are listed in the Cost Proposal table, which is provided subsequently in this RFP.

7.14.1 Retainage

Five (5) percent of all payments of any kind required to be made to the SI pursuant to the Contract shall be retained by the ACCMA. Payment of the five (5) percent retainage will be made in full upon ACCMA granting of Final System Acceptance.



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7.14.2 System Software

Presented below is the payment process that will be followed for the System Software cost, which is Item “F” of the Cost Proposal table:

- 10% payment upon issuance of NTP to the SI (this represents a project mobilization payment);
- 15% payment upon issuance of DDD approval letter;
- 25% payment upon issuance of FAT approval letter;
- 30% payment upon issuance of Systems Acceptance Test approval letter; and
- 20% payment upon granting of Final System Acceptance to the SI

7.14.3 Project Management

Payment for Program Management, which is Item “J” of the Cost Proposal table, will be made in 18 equal monthly payments. The first monthly payment will be made 30 days after issuance of NTP-2 and the final monthly payment will be upon issuance of Final System Approval.

7.14.4 ETS Hardware

Payment for the ETS Hardware, which includes Items “A”, “B”, “C”, “D”, “E”, “G” and “H” of the Cost Proposal table, will be made based upon the SI meeting the following milestones:

- 60% payment upon all of the ETS equipment being received on-site (receipt of all ETS equipment on site this will be determined by the Systems Manager);
- 30% payment upon granting of Final System Approval; and
- 10% payment upon granting of Final System Acceptance.

7.14.5 Documentation

Payment for Documentation, which is Item “K” of the Cost Proposal table, will be made as follows:

- 50% payment upon ACCMA/Systems Manager acceptance of the documents listed from item #1 through item #13 on Table 8;
- 30% payment upon ACCMA/Systems Manager acceptance of the documents listed from item #14 through item #23 on Table 8 in conjunction with the granting of Final System Approval; and
- 20% payment upon ACCMA/Systems Manager acceptance of the documents listed from item #24 through item #30 on Table 8 in conjunction with the granting of Final System Acceptance.

7.14.6 Equipment Installation

Payment for Equipment Installation, which is Item “T” of the Cost Proposal table, will be made based upon the following schedule:



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- 25% upon delivery of equipment to the work site as verified by the Systems Manager;
- 50% payment upon completion of the equipment and software installation process as determined by the Systems Manager; and
- 25% payment upon granting of Final System Approval.

7.14.7 Training

Payment for Training, which is Item “L” of the Cost Proposal table, will be made in full upon successful completion of the training process. The determination of completion will be made by the Systems Manager.

7.14.8 Warranty Period

Payments for the Warranty Period, which is Item “M” of the Cost Proposal table, will be made in nine (9) equal monthly payments. The first monthly payment will be made 30 days after the commencement of the Warranty Period and the final monthly payment will be upon issuance of Final System Acceptance.

7.14.9 Optional Maintenance Period(s)

Payments for the Optional Maintenance Period(s), which is Item “N” of the Cost Proposal table, will be made in 12 equal monthly payments. The first monthly payment will be made 30 days after the commencement of the Optional Maintenance Period and the final monthly payment will be upon completion of the 12th month of the Period.



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8. COST PROPOSAL FORM

EB I-580 Express Lanes ETS Project					
Cost Sheet					
Category	Description	Quantity	Units	Unit Price \$US	Extended Price \$US
A	Express Lanes Equipment				
	Tolling Zone and Enforcement Zone Controller	7	EA		
	Mounting Brackets, Cabinets, etc.	7	Set		
	Uninterruptible Power Supply (if required)	7	EA		
		Express Lanes Equipment Sub Total			
B	Tolling Zone Equipment				
	CCTV Camera Assembly	7	EA		
	CCTV Camera Housing	7	EA		
	CCTV Camera System	7	EA		
	CCTV Communication Interfaces and Equipment	7	EA		
	Tolling Zone Transaction indicator beacons (including software) gantry mounted above each EL	14	EA		
	Tolling Zone Transaction indicator dual light beacons (including software)	14	EA		
	Uninterruptible Power Supply (UPS)	7	EA		
		Tolling Zone Equipment Sub Total			
C	Violation Enforcement System (VES)				
	VES Lane Image Acquisition Module	14	EA		
	VES Image Processor and Sensing Subsystem	14	EA		
	VES Camera System	14	EA		
	Lane Infrastructure	14	EA		
	Uninterruptible Power Supply (UPS)	14	EA		
		Violation Enforcement System Sub Total			
D	Common Equipment				
	Dynamic Message Signs	5	EA		
	Vehicle Detection Stations in Express Lanes(s) (including installation)	26	EA		
	Vehicle Detection Stations in General Purpose Lanes (including installation)	13	EA		
	CCTV Monitoring and Data Storage Station	1	EA		



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	Video Monitors and Workstations	2	EA		
	Video Signal , Switching and Control Equipment	1	Set		
	CCTV System UPS (if required)	1	EA		
	Communication Interfaces and Equipment	1	Set		
	Mounting Brackets, Cabinets, etc.	1	Set		
	Hand-Held Enforcement Devices (including training)	15	EA		
	TDC Hardware (including 3 workstations, laser printer, communications equipment & UPS)	1	LS		
	TDC Office Furniture	1	LS		
		Common Equipment Sub Total			
E	ETC Equipment				
	ETC Readers	19	EA		
	ETC Lane Kits (including antenna)	19	EA		
	ETC Equipment Tuning	19	EA		
		ETC Equipment Sub Total			
F	Communications System				
	Toll Data Center to Tolling Zones and Enforcement Zones	1	LS		
	Toll Data Center to BATA RCSC and Caltrans TMC	1	LS		
	Toll Data Center to the CHP Enforcement Equipment	1	LS		
	Toll Data Center to VES	1	LS		
	Intra Tolling Zone and Enforcement Zone Communications	1	LS		
	Vehicle Detection Systems in Express Lanes(s)	26	EA		
	Vehicle Detection Systems in General Purpose Lanes	13	EA		
		Communications System Sub Total			
G	System Software				
	Tolling Zone and Enforcement Zone Controller Software License	1	LS		
	Local Area Network (LAN) License	1	LS		
	Video Surveillance Software License	1	LS		
	Toll Data Center System Reports	1	LS		



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	TDC Software (Dynamic Pricing Module, BATA RCSC Interface and access)	1	LS		
	Lane Level VES Software	1	LS		
		System Software Sub Total			
H	Test Bench Simulator				
	Test Bench Simulator (including software)	1	EA		
	Lane Controller	1	EA		
	ETC Lane Subsystem	1	EA		
	Tolling Zone and Enforcement Zone Transaction indicator beacons	1	EA		
	Standard Workstation	1	EA		
	VES Lane Subsystem	1	EA		
		Test Bench Simulator Sub Total			
I	Spare Equipment				
	Tolling Zone Controller	2	EA		
	ETC Lane Subsystem	2	EA		
	Standard Workstation	1	EA		
	Vehicle Detection System in Express Lanes(s)	12	EA		
	Vehicle Detection System in General Purpose Lanes	3	EA		
	CCTV Camera	1	EA		
	Mounting Brackets, Cabinets, etc.	1	Set		
	VES Lane Image Acquisition Module	1	EA		
	VES Image Processor and Sensing Subsystem	1	EA		
	VES Camera System	1	EA		
		Spare Equipment Sub Total			
J	Equipment Installation				
	CCTV Installation (including poles, mounting & all civil work)	7	EA		
	DMS Installation (including LED mounting, brackets and civil work)	5	EA		
	Tolling and Enforcement Zone Equipment Installation including all civil work	7	Per Zone		
	TDC Equipment Installation	1	LS		
	Maintenance of Traffic	1	LS		
		Equipment Installation Sub Total			



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K	Electrical Work				
	Electrical Plans Development	1	LS		
	Installation of power and communication conduits, cables and wires	1	LS		
L	Project Management				
	Project Management	1	LS		
		Project Management Sub Total			
M	Documentation				
	Documentation	1	LS		
		Documentation Sub Total			
N	Training				
	Training	1	LS		
		Training Sub Total			
O	Warranty Period				
	Warranty Period Technical Support (hardware & software)	1	LS		
	Maintenance During the Warranty Period	1	LS		
		Warranty Period Sub Total			
Category	Subtotal Summary				
A	Express Lanes Equipment				
B	Tolling Zone Equipment				
C	Violation Enforcement System				
D	Common Equipment				
E	ETC Equipment				
F	Communications System				
G	System Software				
H	Test Bench Simulator				
I	Spare Equipment				
J	Equipment Installation				
K	Electrical Work				
L	Project Management				
M	Documentation				
N	Training				
O	Warranty Period				



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		TOTAL SYSTEM COST			
P	Optional Maintenance Periods				
	First 1-Year Period	1	EA		
	Second 1-Year Period	1	EA		
	Third 1-Year Period	1	EA		
		Optional Maintenance Periods			



9. APPENDICES

9.1 EB I-580 EXPRESS LANES SYSTEM CONCEPT OF OPERATIONS DOCUMENT

9.2 EB I-580 EXPRESS LANES SYSTEMS ENGINEERING MANAGEMENT PLAN

9.3 EB I-580 EXPRESS LANES CONCEPTUAL SIGN LOCATIONS

9.4 TYPICAL EXPRESS LANES ROADSIDE SIGNS AND PAVEMENT DELINEATION PLAN

9.5 LANE CLOSURE CHARTS AND RELATED SPECIFICATIONS

9.6 EB I-580 SYSTEMS INTEGRATION DOCUMENT CONTROL PROCESS PLAN

9.7 BATA REGIONAL CSC INTERFACE CONTROL DOCUMENT (ICD)