



BOARD AGENDA

Orange County Transportation Authority Board Meeting
Orange County Transportation Authority Headquarters
Board Room - Conference Rooms 07-08-09
550 South Main Street
Orange, California
Monday, August 28, 2017 at 9:00 a.m.

Any person with a disability who requires a modification or accommodation in order to participate in this meeting should contact the OCTA Clerk of the Board, telephone (714) 560-5676, no less than two (2) business days prior to this meeting to enable OCTA to make reasonable arrangements to assure accessibility to this meeting.

Agenda Descriptions

The agenda descriptions are intended to give members of the public a general summary of items of business to be transacted or discussed. The posting of the recommended actions does not indicate what action will be taken. The Board of Directors may take any action which it deems to be appropriate on the agenda item and is not limited in any way by the notice of the recommended action.

Public Comments on Agenda Items

Members of the public may address the Board of Directors regarding any item. Please complete a speaker's card and submit it to the Clerk of the Board or notify the Clerk of the Board the item number on which you wish to speak. Speakers will be recognized by the Chairman at the time the agenda item is to be considered. A speaker's comments shall be limited to three (3) minutes.

Public Availability of Agenda Materials

All documents relative to the items referenced in this agenda are available for public inspection at www.octa.net or through the Clerk of the Board's office at the OCTA Headquarters, 600 South Main Street, Orange, California.

Call to Order

Invocation

Director Jones

Pledge of Allegiance

Director Steel



BOARD AGENDA

Special Calendar

Orange County Transportation Authority Special Calendar Matters

1. Presentation of Resolutions of Appreciation for Employees of the Month for August 2017

Present Orange County Transportation Authority Resolutions of Appreciation Nos. 2017-069, 2017-070, and 2017-071 to Manual Esparza, Coach Operator; F. Ross Zieke, Maintenance; and Jason Lee, Administration, as Employees of the Month for August 2017.

Consent Calendar (Items 2 through 7)

All matters on the Consent Calendar are to be approved in one motion unless a Board Member or a member of the public requests separate action on a specific item.

Orange County Transportation Authority Consent Calendar Matters

2. Approval of Minutes

Approval of the Orange County Transportation Authority and affiliated agencies' regular meeting minutes of August 14, 2017.

3. Approval of Board Members Travel

Approve travel to New York, New York for Chairman Michael Hennessey, Vice Chair Lisa A. Bartlett, and Finance and Administration Committee Chairman Andrew Do on September 20 - September 23, 2017 for the Orange County Transportation Authority's annual rating agency trip.



BOARD AGENDA

4. Performance Audit of the Orange County Transportation Authority's Storm Water Pollution Prevention Program

Ricco Bonelli/Janet Sutter

Overview

On behalf of the Internal Audit Department, the firm of Sjoberg Evashenk Consulting, Inc., has completed an audit of the Orange County Transportation Authority's Storm Water Pollution Prevention Program. The audit found that the Orange County Transportation Authority generally complied with the requirements for Industrial General Permits and Construction General Permits; however, the auditors made ten recommendations to improve compliance.

Recommendation

Direct staff to implement ten recommendations provided in the Orange County Transportation Authority Performance Audit of OCTA's Storm Water Pollution Prevention Program (SWPPP), Internal Audit Report No. 17-505.

5. Amendment to the 241/91 Express Lanes Connector Project Peer Review

Kirk Avila/Andrew Oftelie

Overview

A direct connector between the State Route 241 toll road and the 91 Express Lanes is included in the State Route 91 Implementation Plan. In order to advance the project, the Foothill/Eastern Transportation Corridor Agency requested that an investment grade traffic and revenue study be prepared by Stantec, Inc. Since Stantec, Inc., also serves as an advisor to the Orange County Transportation Authority, CDM Smith, Inc., was hired to review and analyze the Stantec, Inc., study. An amendment to the CDM Smith, Inc., contract is required to address anticipated further review and analysis.

Recommendation

Authorize the Chief Executive Officer to negotiate and execute Amendment No. 2 to Agreement No. C-5-3798 between the Orange County Transportation Authority and CDM Smith, Inc., in an amount not to exceed \$50,000, for further review and analysis. This will increase the maximum obligation of the agreement to a total contract value of \$107,333.20.



BOARD AGENDA

6. Agreements for Health Insurance Services

Bea Maselli/Maggie McJilton

Overview

The Orange County Transportation Authority currently has agreements with various companies to provide medical, dental, vision, life, accidental death and dismemberment, and disability plans for administrative employees and employees represented by the Transportation Communications International Union, with supplemental life insurance for all eligible employees and their families. These agreements expire on December 31, 2017. Staff is presenting recommendations for medical, dental, vision, life, accidental death and dismemberment, disability, and supplemental life insurance for the calendar year 2018.

Recommendations

- A. Authorize the Chief Executive Officer to negotiate and execute Amendment No. 2 to Agreement No. C-5-3649 between the Orange County Transportation Authority and California State Association of Counties - Excess Insurance Authority for Kaiser Permanente Health Plan, Inc., on a cost per employee basis, for prepaid medical services through December 31, 2018. The annual 2018 Kaiser Permanente Health Plan, Inc., premium cost will vary in accordance with actual enrollment.
- B. Authorize the Chief Executive Officer to negotiate and execute Amendment No. 2 to Agreement No. C-5-3650 between the Orange County Transportation Authority and California State Association of Counties - Excess Insurance Authority for Anthem Blue Cross, on a cost per employee basis, for prepaid medical services through December 31, 2018. The annual 2018 Anthem Blue Cross health maintenance organization premium costs will vary in accordance with actual enrollment.
- C. Authorize the Chief Executive Officer to negotiate and execute Amendment No. 2 to Agreement No. C-5-3651 between the Orange County Transportation Authority and California State Association of Counties - Excess Insurance Authority for Anthem Blue Cross, on a cost per employee basis, for preferred provider organization medical services through December 31, 2018. The annual 2018 Anthem Blue Cross preferred provider organization premium costs will vary in accordance with actual enrollment.



BOARD AGENDA

6. (Continued)

- D. Authorize the Chief Executive Officer to negotiate and execute Amendment No. 2 to Agreement No. C-5-3652 between the Orange County Transportation Authority and California State Association of Counties - Excess Insurance Authority for Anthem Blue Cross, on a cost per employee basis, for a consumer driven health plan through December 31, 2018. The annual 2018 Anthem Blue Cross consumer driven health plan premium costs and health savings account expenses will vary in accordance with actual enrollment.
- E. Authorize the Chief Executive Officer to negotiate and execute Amendment No. 6 to Agreement No. C-1-2996 between the Orange County Transportation Authority and California State Association of Counties - Excess Insurance Authority for Delta Dental, on a cost per employee basis, for preferred provider organization dental services through December 31, 2018. The annual 2018 Delta Dental preferred provider organization premium costs will vary in accordance with actual enrollment.
- F. Authorize the Chief Executive Officer to negotiate and execute Amendment No. 6 to Agreement No. C-1-2995 between the Orange County Transportation Authority and Delta Dental, on a cost per employee basis, for health maintenance organization dental services through December 31, 2018. The annual 2018 Delta Dental health maintenance organization premium costs will vary in accordance with actual enrollment.
- G. Authorize the Chief Executive Officer to negotiate and execute Amendment No. 4 to Agreement No. C-1-2997 between the Orange County Transportation Authority and California State Association of Counties - Excess Insurance Authority for Vision Service Plan, on a cost per employee basis, for vision services through December 31, 2018. The annual 2018 vision services premium costs will vary in accordance with actual enrollment.
- H. Authorize the Chief Executive Officer to negotiate and execute Purchase Order No. C-7-1897 between the Orange County Transportation Authority and California State Association of Counties - Excess Insurance Authority for VOYA for life and accidental death and dismemberment insurance through December 31, 2018. The annual 2018 life and accidental death and dismemberment premium costs will vary in accordance with actual volume in the plan.



BOARD AGENDA

6. (Continued)

- I. Authorize the Chief Executive Officer to negotiate and execute Purchase Order No. C-7-1898 between the Orange County Transportation Authority and California State Association of Counties - Excess Insurance Authority for VOYA to provide supplemental life insurance to employees at their own expense through December 31, 2018.
- J. Authorize the Chief Executive Officer to negotiate and execute Purchase Order No. C-7-1899 between the Orange County Transportation Authority and California State Association of Counties - Excess Insurance Authority for VOYA for short-term and long-term disability insurance through December 31, 2018. The annual 2018 short-term and long-term disability premium costs will vary in accordance with actual volume in the plan.
- K. Authorize the Chief Executive Officer to negotiate and execute Purchase Order No. C-7-1900 between the Orange County Transportation Authority and California State Association of Counties - Excess Insurance Activity for VOYA with Compsych to provide administrative leave through December 31, 2018.

Orange County Local Transportation Authority Consent Calendar Matters

7. Regional Rail and Facilities Engineering Quarterly Report Jennifer Bergener/James G. Beil

Overview

The Regional Rail and Facilities Engineering departments are responsible for the Orange County Transportation Authority's rail project development, rail capital programs, rail operations, and transit facilities engineering projects. This report provides an update on rail and facilities engineering programs through the fourth quarter (April, May, and June) of fiscal year 2016-17.

Recommendation

Receive and file as an information item.



BOARD AGENDA

Regular Calendar

Orange County Local Transportation Authority Regular Calendar Matters

8. **Approval to Release Request for Proposals for Toll Lanes System Integrator Services for the 405 Express Lanes and 91 Express Lanes**
Steven L. King/James G. Beil

Overview

Staff has developed a request for proposals to initiate a competitive procurement process to retain contractor services to provide toll lanes system integrator services for the design, installation, operations, and maintenance of the electronic toll and traffic management system for the 405 Express Lanes and 91 Express Lanes.

Recommendations

- A. Approve the proposed evaluation criteria and weightings for Request for Proposals 7-1911 for selection of a contractor to provide toll lanes system integrator services.
- B. Approve the release of Request for Proposals 7-1911 to provide toll lanes system integrator services for the 405 Express Lanes and 91 Express Lanes.

Discussion Items

9. **Public Comments**

At this time, members of the public may address the Board of Directors regarding any items within the subject matter jurisdiction of the Board of Directors, but no action may be taken on off-agenda items unless authorized by law. Comments shall be limited to three (3) minutes per speaker, unless different time limits are set by the Chairman subject to the approval of the Board of Directors.



BOARD AGENDA

10. Chief Executive Officer's Report

11. Directors' Reports

12. Closed Session

There are no Closed Sessions scheduled.

13. Managed Lanes Workshop

Kia Mortazavi

Overview

Projected growth and limited options to widen highways beyond Measure M2 improvements in Orange County underscores the need to consider options to accommodate future demand for highway travel. At the same time, federal and state policies require serious consideration of managed lanes for future improvements. Against this backdrop, the Managed Lane Workshop provides a forum for the Board of Directors to hear from transportation experts and consider the Orange County Transportation Authority's role in managed lanes as part of the 2018 Long-Range Transportation Plan development process.

Presenters will be Robert Poole, co-founded the Reason Foundation, Kome Ajise, Chief Deputy Director, California Department of Transportation, Patrick Jones, Executive Director and Chief Executive Officer, International Bridge, Tunnel and Turnpike Association, and Stephen Finnegan, Manager of Government and Community Affairs, Automobile Club of Southern California.

14. Adjournment

The next regularly scheduled meeting of this Board will be held at **9:00 a.m. on Monday, September 11, 2017**, at the Orange County Transportation Authority Headquarters, 550 South Main Street, Board Room - Conference Room 07-08, Orange, California.

Minutes of the
Orange County Transportation Authority
Orange County Transit District
Orange County Local Transportation Authority
Orange County Service Authority for Freeway Emergencies
Board of Directors Meeting

Call to Order

The August 14, 2017 regular meeting of the Orange County Transportation Authority (OCTA) and affiliated agencies was called to order by Chairman Hennessey at 9:03 a.m. at the OCTA Headquarters, 550 South Main Street, Board Room – Conference Room 07-08, Orange, California.

Roll Call

Following the Invocation and Pledge of Allegiance, the Clerk of the Board noted a quorum was present, with the following Directors in attendance:

Directors Present: Michael Hennessey, Chairman
Lisa A. Bartlett, Vice Chair
Laurie Davies
Barbara Delgleize
Andrew Do
Lori Donchak
Steve Jones
Mark A. Murphy
Richard Murphy
Al Murray
Miguel Pulido
Tim Shaw
Todd Spitzer
Michelle Steel
Tom Tait
Gregory T. Winterbottom
Ryan Chamberlain, Governor's Ex-Officio Member

Directors Absent: Shawn Nelson

Also Present: Darrell Johnson, Chief Executive Officer
Ken Phipps, Deputy Chief Executive Officer
Laurena Weinert, Clerk of the Board
Olga Prado, Assistant Clerk of the Board
James Donich, General Counsel
Members of the Press and the General Public

Special Calendar

There were no Special Calendar matters.

Consent Calendar (Items 1 through 21)

Orange County Transportation Authority Consent Calendar Matters

1. Approval of Minutes

A motion was made by Director Donchak, seconded by Director Davies, and declared passed by those present, to approve the Orange County Transportation Authority and affiliated agencies' regular meeting minutes of July 24, 2017.

2. Fiscal Year 2016-17 Internal Audit Plan, Fourth Quarter Update

A motion was made by Director Donchak, seconded by Director Davies, and declared passed by those present, to receive and file the fourth quarter update to the Orange County Transportation Authority Internal Audit Department Fiscal Year 2016-17 Internal Audit Plan as an information item.

3. Draft Fiscal Year 2017-18 Internal Audit Plan

A motion was made by Director Donchak, seconded by Director Davies, and declared passed by those present, to:

- A. Approve the Draft Fiscal Year 2017-18 Internal Audit Plan.
- B. Direct the Executive Director of Internal Audit to provide quarterly updates on the Fiscal Year 2017-18 Internal Audit Plan.

4. Federal Transit Administration Grant Authorization Renewal

A motion was made by Director Donchak, seconded by Director Davies, and declared passed by those present, to adopt Orange County Transportation Authority Resolution No. 2017-064 authorizing the Chief Executive Officer, or designee, to file applications and execute grant-related agreements with the Federal Transit Administration.

5. Proposed Response to Orange County Grand Jury Report on the Ortega Highway Project

Vice Chair Bartlett pulled this item, provided comments, and asked for the cooperation of Director Chamberlain and California Department of Transportation (Caltrans) staff to work with OCTA and the stakeholders on value engineering for the Ortega Highway Project.

5. (Continued)

A motion was made by Vice Chair Bartlett, seconded by Director Delgleize, and declared passed by those present, to authorize the Chief Executive Officer to submit the proposed response to the Orange County Grand Jury report's findings and recommendations as required by California Penal Code 933(c).

6. Guidance for Administration of the Orange County Master Plan of Arterial Highways Related to Complete Streets

A motion was made by Director Donchak, seconded by Director Davies, and declared passed by those present, to approve proposed revisions to the Guidance for the Administration of the Orange County Master Plan of Arterial Highways.

7. 2018 State Transportation Improvement Program Overview

A motion was made by Director Donchak, seconded by Director Davies, and declared passed by those present, to receive and file as an information item.

8. Approval of Use of Federal Funds for Orange County Transportation Authority Projects Related to the Federal Fiscal Year 2017-18 Obligation Authority Plan

A motion was made by Director Donchak, seconded by Director Davies, and declared passed by those present, to:

- A. Approve the use of up to \$28.949 million in Congestion Mitigation and Air Quality Improvement Program funds for the Interstate 5 High-Occupancy Vehicle Lane Project from State Route 55 to State Route 57 in place of an equal amount in State Transportation Improvement Program funds.
- B. Approve the use of \$4.5 million in Congestion Mitigation and Air Quality Improvement Program funds for the Rideshare Program.
- C. Authorize staff to process all necessary amendments to the Federal Transportation Improvement Program and execute any necessary agreements to facilitate associated programming actions.

Due to a potential conflict of interest, Director Tait did not participate or vote on this item.

9. Regional Planning Update - Greenhouse Gas Target Review

A motion was made by Director Donchak, seconded by Director Davies, and declared passed by those present, to receive and file as an information item.

10. Active Transportation Update

A motion was made by Director Donchak, seconded by Director Davies, and declared passed by those present, to receive and file as an information item.

11. 2017 Chief Executive Officer's Initiatives and Action Plan - Second Quarter Report

A motion was made by Director Donchak, seconded by Director Davies, and declared passed by those present, to receive and file as an information item.

Orange County Transit District Consent Calendar Matters

12. Low Carbon Transit Operations Program College Student Pass Pilot Program Update

Director Shaw pulled this item and provided the following comments:

- This item was discussed at the August 10th Transit Committee meeting.
- As part of the Santa Ana College student fees, a student could take the bus anywhere in Orange County by using their student ID.
- In order to increase bus ridership, OCTA wants to encourage and think outside of the box.
- The Low Carbon Transit Operations Program provides funding for the pilot program.

A discussion ensued regarding:

- Director Murray stated he received an article regarding declining bus ridership throughout the nation and supports this item's efforts.
- Director Tait also supports this item's efforts and suggested providing the program to other community colleges (i.e., Fullerton College.)
- OCTA has approached Fullerton College and will reach out to the other community colleges.
- Vice Chair Bartlett suggested using smaller vehicles to accommodate the smaller amount of passengers on the bus routes. OCTA is reviewing the bus and paratransit fleet plan.

A motion was made by Director Shaw, seconded by Director R. Murphy, and declared passed by those present, to approve the use of fiscal year 2016-17 Low Carbon Transit Operations Program funds of \$900,000 for a three-year pilot pass program with Rancho Santiago Community College District.

13. Amendments to Cooperative Agreements for Federal Transit Administration Section 5316 and Section 5317 Grant Programs

A motion was made by Director Donchak, seconded by Director Davies, and declared passed by those present, to:

- A. Authorize the Chief Executive Officer to negotiate and execute Amendment No. 4 to Agreement No. C-3-1827 between the Orange County Transportation Authority and Abrazar, Inc., in the amount of \$5,000, to fund the Section 5316 grant program through September 30, 2018. This will increase the maximum obligation of the agreement to a total contract value of \$990,105.
- B. Authorize the Chief Executive Officer to negotiate and execute Amendment No. 4 to Agreement No. C-3-1830 between the Orange County Transportation Authority and Boys and Girls Clubs of Huntington Valley, in the amount of \$60,925, to fund the Section 5316 grant program through September 30, 2018. This will increase the maximum obligation of the agreement to a total contract value of \$288,238.
- C. Authorize the Chief Executive Officer to negotiate and execute Amendment No. 5 to Agreement No. C-3-1831 between the Orange County Transportation Authority and Dayle McIntosh Center for the Disabled, in the amount of \$124,000, to fund the Section 5316 grant programs through September 30, 2018. This will increase the maximum obligation of the agreement to a total contract value of \$767,751.
- D. Authorize the Chief Executive Officer to negotiate and execute Amendment No. 4 to Agreement No. C-3-1833 between the Orange County Transportation Authority and Jewish Federation and Family Services, in the amount of \$120,182, to fund the Section 5316 and Section 5317 grant programs through September 30, 2018. This will increase the maximum obligation of the agreement to a total contract value of \$1,437,582.
- E. Authorize the Chief Executive Officer to negotiate and execute Amendment No. 4 to Agreement No. C-3-1834 between the Orange County Transportation Authority and North Orange County Community College District, in the amount of \$130,000, to fund the Section 5316 grant program through September 30, 2018. This will increase the maximum obligation of the agreement to a total contract value of \$653,107.

13. (Continued)

- F. Authorize the Chief Executive Officer to negotiate and execute Amendment No. 4 to Agreement No. C-3-1837 between the Orange County Transportation Authority and Women Helping Women/Men2Work, in the amount of \$51,868, to fund the Section 5316 grant program through September 30, 2018. This will increase the maximum obligation of the agreement to a total contract value of \$225,080.

14. Amendment to Agreement for the Purchase of Leased Coach Operator Relief Vehicles

A motion was made by Director Donchak, seconded by Director Davies, and declared passed by those present, to authorize the Chief Executive Officer to negotiate and execute Amendment No. 1 to Agreement No. C-2-1414 between the Orange County Transportation Authority and Enterprise Fleet Management, in the amount of \$173,150, for the purchase of 25 compressed natural gas Honda Civic vehicles at the end of the five-year lease. The amendment will increase the maximum obligation of the agreement to a total contract value of \$959,264.

Director Do did not participate or vote on this item.

Orange County Local Transportation Authority Consent Calendar Matters

15. Capital Programs Division - Fourth Quarter Fiscal Year 2016-17 and Planned Fiscal Year 2017-18 Capital Action Plan Performance Metrics

A motion was made by Director Donchak, seconded by Director Davies, and declared passed by those present, to receive and file as an information item.

16. Amendments to Cooperative Agreements with the Cities of Anaheim and Placentia for the OC Bridges Railroad Grade Separation Program

A motion was made by Director Donchak, seconded by Director Davies, and declared passed by those present, to:

- A. Authorize the Chief Executive Officer to negotiate and execute Amendment No. 5 to Cooperative Agreement No. C-9-0412 between the Orange County Transportation Authority and City of Placentia, in the amount of \$161,824, for additional project support services for the Orangethorpe Avenue, Tustin Avenue/Rose Drive, and Lakeview Avenue railroad grade separation projects, and to extend the term of the cooperative agreement through August 1, 2018. This will increase the maximum obligation of the cooperative agreement to a total value of \$1,192,324.

16. (Continued)

- B. Authorize the Chief Executive Officer to negotiate and execute Amendment No. 7 to Cooperative Agreement No. C-9-0413 between the Orange County Transportation Authority and City of Anaheim, in the amount of \$120,000, for additional project support services for the Orangethorpe Avenue, Tustin Avenue/Rose Drive, and Lakeview Avenue railroad grade separation projects, and to extend the term of the cooperative agreement through August 1, 2018. This will increase the maximum obligation of the cooperative agreement to a total value of \$1,882,550.

17. Consultant Selection to Prepare the Plans, Specifications, and Estimates for Anaheim Canyon Metrolink Station Improvement Project

A motion was made by Director Donchak, seconded by Director Davies, and declared passed by those present, to:

- A. Approve the selection of HNTB Corporation as the firm to prepare the plans, specifications, and estimates for the Anaheim Canyon Metrolink Station Improvement project.
- B. Authorize the Chief Executive Officer to negotiate and execute Agreement No. C-7-1609 between the Orange County Transportation Authority and HNTB Corporation to prepare the plans, specifications, and estimates for the Anaheim Canyon Metrolink Station Improvement project.

18. Request to Exercise Second Option Term for On-Call Traffic Engineering Services

A motion was made by Director Donchak, seconded by Director Davies, and declared passed by those present, to authorize the Chief Executive Officer to execute amendments to the following consultant agreements to exercise the second option term for on-call traffic engineering services: Agreement No. C-4-1804 with Albert Grover & Associates, Agreement No. C-4-1805 with DKS Associates, Agreement No. C-4-1316 with Iteris, Inc., and Agreement No. C-4-1806 with Kimley-Horn and Associates, Inc., in the total amount of \$8,400,031, and extend the term of the agreements through May 31, 2020. This will increase the maximum obligation for all the on-call firms for a total combined aggregate contract value of \$23,414,485.

19. Measure M2 Environmental Mitigation Program Update

A motion was made by Director Donchak, seconded by Director Davies, and declared passed by those present, to receive and file as an information item.

20. Measure M2 Comprehensive Transportation Funding Programs - 2018 Annual Call for Projects

A motion was made by Director Donchak, seconded by Director Davies, and declared passed by those present, to:

- A. Approve the proposed revisions to the Comprehensive Transportation Funding Programs Guidelines.
- B. Authorize staff to issue the 2018 annual call for projects for the Regional Capacity Program for approximately \$32 million.
- C. Authorize staff to issue the 2018 annual call for projects for the Regional Traffic Signal Synchronization Program for approximately \$8 million.

21. Measure M2 Environmental Cleanup Program - 2017 Tier 1 Water Quality Grant Funding Allocations

A motion was made by Director Donchak, seconded by Director Davies, and declared passed by those present, to approve the 2017 Tier 1 Environmental Cleanup Program funding recommendations to fund 16 projects, in an amount totaling \$3,130,251.

Due to a potential conflict of interest, Director Tait did not participate or vote on this item.

Regular Calendar

Orange County Local Transportation Authority Regular Calendar Matters

22. Approve the Use of Contractor Pre-Qualification and the Release of the Request for Pre-Qualification for the OC Streetcar Construction Project

Meena Katakia, Contracts Administration and Materials Management Department Manager, provided a PowerPoint presentation for this item as follows:

- What is Contractor Pre-Qualification;
- Legal Authority for Contractor Pre-Qualification;
- Why Use Pre-Qualification For OC Streetcar;
- How Will Pre-Qualification Work;
- Scoring the Questionnaire;
- Scoring; and
- Next Steps.

22. (Continued)

A discussion ensued regarding:

- In the future, this process does not change any other Board of Directors' (Board) approval responsibilities.
- The pre-qualification process is to provide a pool of qualified bidders.
- OCTA has delivered capital projects; however, the risk assessment by the Federal Transit Administration (FTA) notes that OCTA has not delivered a streetcar or light rail project and views it as a risk area.
- OCTA to provide additional oversight, since this is OCTA's first-time to deliver a streetcar project.
- Going forward, include in the staff report OCTA's successful history of delivering on-time and under budget capital projects.
- The Board through this process, and under the FTA and public contracting code, could award an agreement to a pre-qualified contractor with expertise and knowledge to deliver the OC Streetcar project.

A motion was made by Director Murray, seconded by Director Delgleize, and declared passed by those present, to:

- A. Approve the use of a pre-qualification process for the upcoming invitation for bids for construction of the OC Streetcar project.
- B. Approve the release of the Request for Pre-Qualification 7-1882 of contractors for construction of the OC Streetcar project.

Director Tait voted in opposition.

Discussion Items

23. 2017 Orange County Transportation Authority Board of Directors Strategic Initiatives Mid-Year Report

Chairman Hennessy presented the 2017 OCTA Board of Directors Strategic Initiatives Mid-Year report as follows:

- Background on the Interstate 405 (I-405);
- Accelerate the State Route 55 Project between I-405 and Interstate 5;
- Continue the OC Bus 360° Implementation;
- Advance the OC Streetcar Project;
- Integrate Technology Solutions;
- Ensure Fiscal Sustainability; and
- Closing acknowledgements.

24. Interstate 405 Improvement Project Update

Darrell Johnson, Chief Executive Officer (CEO), opened with comments and introduced Jeff Mills, Program Manager for the I-405 Improvement Project, and Christina Byrne, Acting Manager for Public Outreach.

Mr. Mills provided a PowerPoint presentation as follows:

- Project Location and Key Features;
- Project Travel Time Benefits;
- Background;
- Financing Update;
- Project Update;
- Preliminary Bridge Construction Timeline; and
- Next Steps.

Ms. Byrne presented the “Public Outreach Update” section of the presentation.

A discussion ensued regarding:

- For the public outreach, staff was encouraged to highlight the project’s benefits and consider having a catchy slogan.
- In order to keep traffic moving during construction and closure of the bridges, the design-build contractor’s traffic management plan is to be analyzed by the Caltrans, the corridor cities, and OCTA.
- The design-build contractor will not close lanes during the day, which is a contract obligation that includes monetary fines.
- Two primary construction activities are the freeway widening that will take place during the day, and second, the bridge construction that includes closures. In addition, typical nighttime construction is from 11:00 p.m. to 5:00 a.m.
- OCTA partnered with Waze to have the algorithms regularly updated on the app and in real-time to provide commuters detour information.
- OCTA will proactively upload the Waze app with closures and detour information.
- Concerns about impacts to residential communities with the Waze detour options. In addition, it is important to provide public outreach to impacted communities.
- OCTA staff will provide public outreach to the communities several times a month, as well as reach out to the appropriate community groups, chambers of commerces, and neighborhoods.
- The Board appreciates staff’s outreach efforts, and staff will keep the Board apprised on the outreach activities (i.e., CEO’s weekly update, etcetera.)

25. Public Comments

A public comment was heard from Kenneth Neal who stated that he has ridden Bus Route 490 for five years from the Laguna Niguel/Mission Viejo Metrolink Station to the Santa Ana Federal Building. Mr. Neal asked why Route 490 is being discontinued and offered a solution to reduce two trips in the a.m. and p.m. He also expressed concerns about on-time performance, route analysis, and impacts to the Route 490 bus riders.

Chairman Hennessey requested that staff explore the questions and suggestions by Mr. Neal and report back to the Board.

26. Chief Executive Officer's Report

Darrell Johnson, CEO, reported that:

- There is a weekend closure on the Interstate 5 in San Clemente for the reconstruction of the Avenida Pico bridge. The ramps will be closed on Friday, August 18th at 8:00 p.m., and will re-open by 5:00 a.m. on Monday, August 21st. OCTA will notify motorists through all OCTA's regular channels about the closure.
- Yesterday, the Orange County Fair wrapped up. The OC Fair Express recorded approximately under 88,000 boardings. In addition, the ridership was compared with this year's and last year's Saturday and Sunday data and ridership was 33 percent higher than last year.
- On Saturday, August 19th at 8:00 a.m., OCTA is hosting a wilderness preserve hike and equestrian ride at Ferber Ranch. This event gives the public an opportunity to view and have access to the properties OCTA acquired under the Measure M2 Mitigation Plan.
- On September 25th, there will be a Board workshop about managed lanes. Four speakers representing Caltrans, International Bridge Tunnel and Turnpike Association, Reason Foundation, and Automobile Club of Southern California will be in attendance. The Board will receive materials prior to the Board meeting.

27. Directors' Reports

Director Shaw requested an update on the Angels Express ridership at the next Transit Committee meeting. He also asked if the Angels Express service would operate during the Angels playoffs.

Darrell Johnson, CEO, responded that the Angels Express ridership has slightly decreased, and OCTA would work with Metrolink to provide postseason train service.

27. (Continued)

Director Spitzer inquired about the State Route 241/91 (241/91) connector study status. He also stated that last Thursday, the 241/91 connector was discussed by the Transportation Corridor Agencies (TCA.)

Darrell Johnson, CEO, responded that at the next Finance and Administration Committee meeting, there is an agenda item to amend the OCTA peer review contract of the 241/91 Traffic and Revenue (T&R) study which was produced by the TCA's consultant.

Mr. Johnson also stated that in consultation with Chairman Hennessey, Vice Chair Bartlett, and the CEO of the TCA, OCTA recommends a joint OCTA/TCA leadership meeting to discuss OCTA's peer review of TCA's T&R study. A lengthy discussion ensued.

Director Murray thanked Darrell Johnson, CEO, Lance Larson, Executive Director of External Affairs, and David Simpson, Principal Government Relations Representative, for providing the SB 1 provisions presentation to the various agencies. He also thanked staff for the SB 1 presentation at recent City of Tustin Council and Tustin Chamber of Commerce meetings.

Director Delgleize reported that September is disaster preparedness month, and the City of Huntington Beach will hold a town hall meeting. She stated that Doctor Lucy Jones will be speaking at the event, and asked if there is OCTA staff that could be invited to the event.

Darrell Johnson, CEO, responded that OCTA will work with Director Delgleize about staff attending the City's disaster preparedness event.

Vice Chair Bartlett reported on the following:

- The amendment to the 241/91 peer review contract is extremely important. She also stated that the peer review results and the Riverside County Transportation Commission's feedback need to be discussed at the OCTA/TCA leadership meeting. In addition, she noted that there are options to designate air quality compliance.
- This year, the Laguna Beach Summer Breeze shuttle has been successful.
- Congressman Mario Diaz-Balart of the 25th Congressional District in Florida recently visited Orange County to discuss key projects (i.e., I-405 Improvement Project and OC Streetcar project.)
- Vice Chair Bartlett thanked Directors Nelson and Pulido, Darrell Johnson, CEO, Lance Larson, Executive Director of Government Relations, and Kristen Essner, Manager of Government Relations for participating in the meetings with Congressman Diaz-Balart.

28. Closed Session

A Closed Session was held pursuant to Government Code Section 54956.8 to discuss the price and terms of payment for real property located at #9 AN, 1400, 1420 & 1450 N. Lakeview Avenue, Anaheim, CA. The negotiator for OCTA is Peter Andrich of CBRE Brokerage Services. The negotiator for the buyer will be designated by the buyer.

Directors Pulido, Spitzer, and Tait were not present for the Closed Session item.

There was no report out for the Closed Session item.

29. Adjournment

The meeting was adjourned at 10:11 a.m.

The next regularly scheduled meeting of this Board will be held at **9:00 a.m. on Monday, August 28, 2017**, at Orange County Transportation Authority Headquarters, 550 South Main Street, Board Room – Conference Room 07-08, Orange, California.

ATTEST:

Laurena Weinert
Clerk of the Board

Michael Hennessey
OCTA Chairman



OUT-OF-STATE TRAVEL

Board Member Only - Travel Authorization / Request For Payment

Attach copy of the **Travel Worksheet**, **Registration Forms**, and other pertinent documentation for this claim.
Travel **will not** be processed until all information is received.

CONFERENCE / SEMINAR INFORMATION

Name: Chairman Michael Hennessey **Job Title:** Board Member

Department: _____ **Destination:** New York, NY

Program Name: Annual Rating Agency Trip

Description / Justification: Annually, OCTA conducts a series of meetings with the rating agencies, financing institutions, and other interested parties in New York. Traditionally, the Chairman, Vice-Chair of the Board, and the Chairman of the F&A Committee represent the Board of Directors on the trip. This year, OCTA representatives will be discussing the impacts to traffic volumes and revenues for the 91 Express Lanes from the recently completed Riverside County extension, progress on the I-405 Improvement Project, Measure M2 program, sales tax collections, FY 2017-18 approved budget, status of the local economy, and future financing plans. Meetings have been scheduled with Moody's Investor Service, Fitch Ratings, Standard and Poor's, and Kroll Bond Rating Agency on September 21 and September 22, 2017.

COMMENTS

Per Diem: \$74
Other: Parking, Taxi

Conference / Seminar Date:	Departure Date: 9/20/17	Employee
Payment Due Date:	Return Date: 9/23/17	ID #: 4355

ESTIMATED EXPENDITURES

Transportation	\$650.00
Meals	\$296.00
Lodging	\$1,000.00
Registration	
Other	\$200.00
Total	\$2,146.00

APPROVALS

Please Sign:

Clerk of the Board

Date

ACCOUNTING CODES

Travel Org. Key: 0017	Object: 7655	Job Key: M0201	JL: B4B
Registration Org. Key:	Object:	Job Key:	JL:
Month: September	FY: 17/18	Board Date: August 28, 2017	T/A: 572



OUT-OF-STATE TRAVEL

Board Member Only - Travel Authorization / Request For Payment

Attach copy of the **Travel Worksheet**, **Registration Forms**, and other pertinent documentation for this claim.
Travel **will not** be processed until all information is received.

CONFERENCE / SEMINAR INFORMATION

Name: Vice Chair Lisa A. Bartlett **Job Title:** Board Member

Department: **Destination:** New York, NY

Program Name: Annual Rating Agency Trip

Description / Justification: Annually, OCTA conducts a series of meetings with the rating agencies, financing institutions, and other interested parties in New York. Traditionally, the Chairman, Vice-Chair of the Board, and the Chairman of the F&A Committee represent the Board of Directors on the trip. This year, OCTA representatives will be discussing the impacts to traffic volumes and revenues for the 91 Express Lanes from the recently completed Riverside County extension, progress on the I-405 Improvement Project, Measure M2 program, sales tax collections, FY 2017-18 approved budget, status of the local economy, and future financing plans. Meetings have been scheduled with Moody's Investor Service, Fitch Ratings, Standard and Poor's, and Kroll Bond Rating Agency on September 21 and September 22, 2017.

COMMENTS

Per Diem: \$74
Other: Parking, Taxi

Conference / Seminar Date:	Departure Date: 9/20/17	Employee
Payment Due Date:	Return Date: 9/23/17	ID #: 4568

ESTIMATED EXPENDITURES

Transportation	\$650.00
Meals	\$296.00
Lodging	\$1,000.00
Registration	
Other	\$200.00
Total	\$2,146.00

APPROVALS

Please Sign:

Clerk of the Board

Date

ACCOUNTING CODES

Travel Org. Key: 0017	Object: 7655	Job Key: M0201	JL: B4B
Registration Org. Key:	Object:	Job Key:	JL:
Month: September	FY: 17/18	Board Date: August 28, 2017	T/A: 573



OUT-OF-STATE TRAVEL

Board Member Only - Travel Authorization / Request For Payment

Attach copy of the **Travel Worksheet**, **Registration Forms**, and other pertinent documentation for this claim.
Travel **will not** be processed until all information is received.

CONFERENCE / SEMINAR INFORMATION

Name: Finance Committee Chair Andrew Do **Job Title:** Board Member

Department: **Destination:** New York, NY

Program Name: Annual Rating Agency Trip

Description / Justification: Annually, OCTA conducts a series of meetings with the rating agencies, financing institutions, and other interested parties in New York. Traditionally, the Chairman, Vice-Chair of the Board, and the Chairman of the F&A Committee represent the Board of Directors on the trip. This year, OCTA representatives will be discussing the impacts to traffic volumes and revenues for the 91 Express Lanes from the recently completed Riverside County extension, progress on the I-405 Improvement Project, Measure M2 program, sales tax collections, FY 2017-18 approved budget, status of the local economy, and future financing plans. Meetings have been scheduled with Moody's Investor Service, Fitch Ratings, Standard and Poor's, and Kroll Bond Rating Agency on September 21 and September 22, 2017.

COMMENTS

Per Diem: \$74
Other: Parking, Taxi

Conference / Seminar Date:	Departure Date: 9/20/17	Employee
Payment Due Date:	Return Date: 9/23/17	ID #: 4584

ESTIMATED EXPENDITURES

Transportation	\$650.00
Meals	\$296.00
Lodging	\$1,000.00
Registration	
Other	\$200.00
Total	\$2,146.00

APPROVALS

Please Sign:

Clerk of the Board

Date

ACCOUNTING CODES

Travel Org. Key: 0017	Object: 7655	Job Key: M0201	JL: B4B
Registration Org. Key:	Object:	Job Key:	JL:
Month: September	FY: 17/18	Board Date: August 28, 2017	T/A: 574



COMMITTEE TRANSMITTAL

August 28, 2017

To: Members of the Board of Directors

From: Laurena Weinert, ^{MS} Clerk of the Board

Subject: Performance Audit of the Orange County Transportation Authority's Storm Water Pollution Prevention Program

Finance and Administration Committee Meeting of August 23, 2017

Present: Directors Do, Hennessey, Jones, R. Murphy, and Steel
Absent: Directors Pulido and Spitzer

Committee Vote

This item was passed by the Members present.

Committee Recommendation

Direct staff to implement ten recommendations provided in the Orange County Transportation Authority Performance Audit of OCTA's Storm Water Pollution Prevention Program (SWPPP), Internal Audit Report No. 17-505.



August 23, 2017

To: Finance and Administration Committee

From: Darrell Johnson, Chief Executive Officer

Janet Sutter, Executive Director
Internal Audit Department

Subject: Performance Audit of the Orange County Transportation Authority's Storm Water Pollution Prevention Program

Overview

On behalf of the Internal Audit Department, the firm of Sjoberg Evashenk Consulting, Inc., has completed an audit of the Orange County Transportation Authority's Storm Water Pollution Prevention Program. The audit found that the Orange County Transportation Authority generally complied with the requirements for Industrial General Permits and Construction General Permits; however, the auditors made ten recommendations to improve compliance.

Recommendation

Direct staff to implement ten recommendations provided in the Orange County Transportation Authority Performance Audit of OCTA's Storm Water Pollution Prevention Program (SWPPP), Internal Audit Report No. 17-505.

Background

The Santa Ana Regional Water Quality and Control Board regulates storm water runoff for the Orange County Transportation Authority's (OCTA) facilities and activities through two key statewide storm water permits, the Industrial General Permit (IGP) and the Construction General Permit (CGP). The IGP regulates storm water discharges from industrial facilities, while the CGP regulates storm water discharges associated with projects that disturb one or more acres of soil. Both permits require dischargers to develop storm water pollution prevention plans (SWPPPs) that describe practices in place to ensure storm water discharges comply with regulatory levels specified in the permits.

IGP covers industrial facilities, including transportation facilities with vehicle maintenance. OCTA's Health, Safety, and Environmental Compliance Department (HSEC), within the Human Resources and Organizational Development Division, is responsible for managing, overseeing, and monitoring activities undertaken by facility technicians within the Transit Division. Facility technicians located at each of the five bus bases are responsible for conducting daily monitoring of the implementation of best management practices, collecting samples, and identifying any unauthorized non-storm water discharges from the facility area, such as an oil leak.

The CGP generally covers construction or demolition projects that disturb one acre or more of land and includes activities such as clearing, grading, stockpiling, and excavation. Most OCTA construction-related projects subject to the CGP are managed within the Capital Programs Division and are reflected on OCTA's Capital Action Plan. OCTA's role in these projects varies widely, from simply passing through federal funding to local agencies to overseeing and managing the construction phase of projects. The audit focused on projects with construction activities occurring during the period July 1, 2014 through June 30, 2016, and where OCTA had a role in complying with CGP requirements.

Discussion

Based on the audit, Sjoberg Evashenk Consulting, Inc. (auditors) found OCTA generally compliant with the IGP. Observations at the bus base locations, review of documents, and limited testing noted that SWPPPs maintained at each location generally included all required information and that facilities staff had implemented best management practices. Also, the auditors confirmed that facility staff performed and documented required activities. To further enhance compliance, the auditors made six recommendations. These included three recommendations for minor improvements to SWPPPs, enhanced documentation of sampling activities, completion of projects to catch and recycle runoff from the bus wash systems, and expanded use of the job tracking system. Management agreed to implement the recommendations.

With regard to the CGP, the auditors found OCTA generally compliant with certain sections, such as submission of required documents and development of SWPPPs; however, the auditors also identified areas where compliance could be improved. Recommendations included ensuring cooperative agreements clarify the roles and responsibilities associated with compliance with the CGP; enhancing oversight of contractors and personnel carrying out SWPPP-related monitoring; ensuring contractors adhere to required training; and increasing HSEC staff's participation in construction projects to help ensure compliance. Management agreed with these recommendations with one exception. Capital

Programs management agreed to clarify the roles and responsibilities of all individuals and entities associated with CGP compliance in a project memo, rather than in the cooperative agreement.

Summary

An independent audit of OCTA's SWPPP has been completed by the firm of Sjoberg Evashenk Consulting, Inc. The detailed audit scope and results are included in the audit report at Attachment A.

Attachment

- A. Orange County Transportation Authority Performance Audit of OCTA's Storm Water Pollution Prevention Program (SWPPP)

Prepared by:



Ricco Bonelli
Principal Internal Auditor
714-560-5384

Approved by:



Janet Sutter
Executive Director, Internal Audit
714-560-5591

Orange County Transportation Authority

Performance Audit of OCTA's Storm Water Pollution Prevention Program (SWPPP)

July 2017



Table of Contents

Executive Summary	1
Objectives, Scope, and Methodology.....	3
Chapter 1: Industrial General Permit.....	6
Chapter 2: Construction General Permit	12

Executive Summary

The Water Pollution Control Act (Clean Water Act) provides the California Water Boards with the authority and framework for regulating storm water discharges under the National Pollutant Discharge Elimination System Permitting Program. The Santa Ana Regional Water Quality and Control Board regulates storm water runoff for Orange County Transportation Authority's (OCTA) facilities and activities through two key statewide storm water permits:

- Industrial General Permit (IGP) regulates storm water discharges from industrial facilities.
- Construction General Permit (CGP) regulates storm water discharges associated with projects that disturb one or more acres of soil.

Both permits require dischargers to develop storm water pollution prevention plans (SWPPP) that describe practices in place to ensure storm water discharges comply with regulatory levels specified in the permits.

Our review of OCTA's compliance with the permits found that OCTA generally complied with the IGP and the CGP. Related to the IGP, our observations from the site visits of the five bus bases, review of documents, and limited testing found that OCTA implemented the required SWPPPs, employed best management practices, performed site observations, conducted sampling, etc. However, we found that OCTA could improve its compliance with the IGP in the following areas:

- Minor Improvements to the SWPPPs are Necessary.
- Additional Documentation Could Improve Sampling Processes.
- Unauthorized Non-Storm Water Discharges Exist, but Improvements Underway.
- Use of the Ellipse Job Tracking System Could be Expanded.

Related to the CGP, we found that OCTA filed Permit Registration Documents (PRDs) and Notice of Terminations (NOTs) in accordance with permit requirements and SWPPPs were developed by Qualified SWPPP Developers and addressed all key permit objectives. However, we found that OCTA could improve its compliance with the CGP in the following areas:

- Cooperative Agreements Could Better Define Project Responsibilities Related to Compliance with the CGP.
- Key Site Inspections and Sampling Activities Did Not Always Meet Requirements.
- Minor Annual Reporting Improvements were Necessary.
- Some SWPPP Training Documents Could Not Be Provided.
- OCTA Could Further Utilize its Health, Safety, and Environmental Compliance Group to Better Ensure Compliance with the CGP.

The report includes ten recommendations for OCTA to consider to enhance SWPPP compliance, including the following key recommendations:

- Establish a formal process in which technicians maintain documentation supporting why samples could not be collected during a sampling period.
- Continue efforts to eliminate the unauthorized non-storm water discharges related to the bus washes.
- Ensure cooperative agreements clarify roles and responsibilities of all individuals and entities associated with compliance with the CGP.
- Enhance oversight of contractors and personnel carrying out SWPPP related monitoring activities, particularly related to site inspections, sampling, reporting, etc. OCTA should also ensure that agreements with contractors tasked with SWPPP activities include retention requirements.
- Increase Health, Safety and Environmental Compliance (HSEC) group's participation with construction projects and activities to ensure compliance with the CGP.

Objectives, Scope, and Methodology

Sjoberg Evashenk Consulting was hired by the Orange County Transportation Authority (OCTA) to conduct a performance audit to assess the adequacy of OCTA's Storm Water Pollution Prevention Plan (SWPPP) for compliance with the State's Industrial General Permit (IGP) and Construction General Permit (CGP).

The audit was to include testing of OCTA's compliance with key requirements of the IGP, including, but not limited to, development of a SWPPP, monthly observations, storm water sampling, and required submissions to the Storm Water Multiple Application and Report Tracking System (SMARTS). For CGPs, the audit was to evaluate OCTA's program to ensure adequate controls for identifying applicable projects and taking appropriate actions to ensure compliance with permit requirements.

The audit period was July 1, 2014 to June 30, 2016.

To meet the audit objectives, we performed the following audit steps and tasks:

General Tasks

- Reviewed provisions and requirements of the Statewide IGP and CGP, including pertinent program information available on the State's Water Resources Control Board website.
- Performed numerous interviews with key OCTA management and staff, including the following:
 - Manager, Health, Safety, and Environmental Compliance Group
 - Environmental Compliance Specialist, Health, Safety, and Environmental Compliance Group
 - Maintenance Managers, Transit Division Maintenance Department
 - Base Managers, Transit Division Maintenance Department
 - Section Manager and Facilities Staff, Transit Division Maintenance Department
 - Construction Management Program Manager, Capital Programs Division
 - Project Manager, Capital Programs Division Highway Programs
 - Facilities Engineering Manager, Capital Programs Division

Identified and discussed with OCTA staff compliance issues identified and determined if mitigating policies or procedures are in place.

IGP Tasks

- Obtained and reviewed SWPPPs for each of the five bus bases.
- Conducted site visit walkthroughs at each of the five OCTA bus bases focusing on key SWPPP and IGP required activities.
- Performed testing related to processes associated with SWPPP development; monitoring and inspections; sampling; and submissions to SMARTS system.

CGP Tasks

- Reviewed OCTA's Capital Action Plan to identify the types of construction projects underway or planned, which largely consists of the following three types of projects: Freeway, Rail/Station, and Grade Separation.
- From the projects reflected on the Capital Action Plan with active construction activity during the audit timeframe, selected construction projects to perform compliance testing with the CGP:
 - Freeway—because the California Department of Transportation (Caltrans) and its contractors have the major responsibilities on the Freeway projects and Caltrans assumed the responsibility as the Legally Responsible Person (LRP), we did not perform detailed testing of compliance with the construction general permit on the freeway projects reflected on OCTA's Capital Action Plan.
 - Rail/Station—because there was only one rail/station project under construction and covered under the construction general permit and OCTA's role for this project was limited to serving as a pass-through for funding, we did not perform detailed testing of compliance with the construction general permit on Rail/Station projects reflected on OCTA's Capital Action Plan.
 - Grade Separation—there were six grade separation projects with active construction activity reflected on OCTA's Capital Action Plan and for which OCTA was responsible for construction activities, including certain CGP compliance. Of these six projects, we selected two for review. Note: We did not review the responsibilities assumed by outside entities related to compliance with the CGP, such as the city's responsibilities associated with either acting as the legally responsible person or submitting information into SMARTS.
- We also reviewed one Facilities Engineering project on OCTA owned property that did not meet the criteria to be included on OCTA's Capital Action Plan but was covered under the State's construction general permit.
- Obtained and reviewed SWPPPs for each of the selected construction projects.
- Performed testing related to processes associated with SWPPP development; monitoring and inspections; sampling; and submissions to SMARTS system (where applicable).

We conducted this audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Chapter 1: Industrial General Permit

The Federal Clean Water Act prohibits discharges from point sources to waters of the United States, unless the discharges are in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. On April 17, 1997, the California State Water Resources Control Board issued a statewide NPDES Industrial General Permit (IGP) to regulate industrial storm water discharges and authorized non-storm water discharges (NSWDs) from industrial facilities. The 1997 permit was updated in 2014 and became effective on July 1, 2015. The general permit covers many industrial facilities, but compliance with the requirements is the responsibility of the individual facilities. Industrial facilities that are covered under the permit includes manufacturers, hazardous waste facilities, transportation facilities with vehicle maintenance, and recycling facilities.

The IGP has the following key requirements:

- Eliminate unauthorized non-storm water discharges.
- Develop and implement Storm Water Pollution Prevention Plans (SWPPPs) that include minimum best management practices to achieve compliance with the effluent and receiving water limitations.
- Conduct monitoring, including visual observations and sampling.
- Perform the appropriate Exceedance Response Actions (ERAs) when limits are exceeded.
- Electronically submit all permit-related compliance documents via the Storm Water Multiple Application and Report Tracking System (SMARTS).
- Implement a comprehensive training program for individuals assisting dischargers with compliance of the permit.

For coverage under the IGP, an industrial facility owner or operator, i.e. Legally Responsible Person (LRP), must submit a Notice of Intent (NOI) to the State Water Resources Control Board for each facility. The LRP is responsible for all permit related activities at the facility. Additional permit related documents (PRDs) that the LRP must submit include:

- SWPPPs,
- Annual Reports,
- Level 1 ERA Reports, and
- Notices of Termination (NOTs).

The Orange County Transportation Authority (OCTA) owns five bus transportation facilities with maintenance activities located in:

- Santa Ana,

- Garden Grove,
- Anaheim,
- Irvine—Sand Canyon, and
- Irvine—Construction Circle.

While OCTA handles the facilities operations at all five of the bus bases, it oversees maintenance activities at only the Santa Ana and Garden Grove locations. For the remaining three bus base locations, OCTA has contracted with third-party vendors to perform the maintenance operations. Since industrial activity, i.e. bus maintenance and repair, takes place at each of the five bus bases, discharges at each site is regulated by the IGP.

An Environmental Compliance Specialist within OCTA's Health, Safety, and Environmental Compliance group is responsible for managing, overseeing, and monitoring activities undertaken by facility technicians to ensure full compliance with the IGP. Additionally, facility technicians located at each of the five bus bases are responsible for completing specific activities at regular intervals in order to comply with the IGP. This includes conducting daily monitoring of the implementation of best management practices (BMPs), collecting samples, and identifying any unauthorized non-storm water discharges from the facility area, such as an oil leak.

Overall, we found that OCTA generally complied with the IGP, including demonstrating knowledge of permit and SWPPP requirements. For example, our observations from the site visits of the five buses bases, review of documents, and limited testing found that OCTA complied with the following IGP requirements:

- Implemented SWPPPs—with a few minor exceptions discussed later, the bus bases had SWPPPs that generally included the required information, such as facility name and contact information; site map; list of industrial materials; description and assessment of potential pollution sources; and minimum BMPs.
- Employed Best Management Practices—the bus bases' facility staff had implemented the required core best management practices, which included items such as good housekeeping (dry sweeping of particulates and covering industrial bins); preventative maintenance (such as inventory of potential spill points); spill and leak prevention response (drain spill covers used in fueling and brake check activities); material handling and waste management (all maintenance is handled inside covered buildings); and erosion and sediment controls (landscaping and mulching).
- Performed Visual Observations—the bus bases' facility staff performed and documented the required monthly dry visual observations, which included evaluating BMPs and identifying unauthorized non-storm water discharges and other sources of industrial pollutants, etc. Additionally, OCTA's Environmental Compliance Specialist conducts a similar site observation every 30-60 days.

- **Performed Exceedance Response Actions**—Four bus base locations reported sampling exceedances during 2016; in response, all required measures were taken, such as the compilation of an ERA report and evaluation by a Qualified Industrial Storm Water Practitioner (QISP) certified professional, as well as the implementation of improved or additional BMPs.
- **Administered Employee Training**—OCTA provided the required employee training to ensure that staff were properly trained to implement the IGP requirements. The annual training was conducted by a certified QISP and included general permit updates, BMPs, hazardous materials spills response, and activity documentation.
- **Submitted Documents into SMARTS**—OCTA submitted required documents into SMARTS, such as the SWPPPs, Annual Reports, Level 1 ERA Reports, and sampling lab results.

Additionally, the Environmental Compliance Specialist recently obtained the QISP certification, which provides OCTA with the necessary training and expertise to directly administer industrial storm water training and oversee exceedance response actions rather than relying on external consulting firms for these services.

However, we found that OCTA could improve its compliance with the IGP in the following areas:

- **Minor Improvements to the SWPPPs are Necessary**
- **Additional Documentation Could Improve Sampling Processes**
- **Unauthorized Non-Storm Water Discharges Exist, but Improvements Underway**
- **Use of the Ellipse Job Tracking System Could be Expanded**

Minor Improvements to the SWPPPs are Necessary

While we found that the five bus bases had implemented the required SWPPPs and the plans generally included the required information, we found that a few minor improvements were necessary related to ensuring operating hours and SWPPP preparation dates are explicitly documented in the plans and ensuring copies of the SWPPPs are maintained at each facility.

Specifically, the IGP requires that dischargers document in their SWPPP the facility's scheduled operating hours, which is defined as "The time periods when the facility is staffed to conduct any function related to industrial activity..." While bus maintenance activities occur 24/7 at each of the bus bases, we found that these hours were not specifically stated in the SWPPPs of any of the five bus bases. According to OCTA staff, the facility technicians are only available from 5:00 am to 3:30 pm Monday through Friday, which establishes when SWPPP compliance activities can take place, but does not cover all of the hours that the industrial (bus maintenance) activities occur. Nonetheless, the IGP requires that the SWPPP document the time periods when the facility conducts any function related to industrial activity, which is conducted at OCTA bus bases 24/7.

Additionally, during our site visits at each of the bus base locations, we found that four of the five bus facilities maintained a copy of the SWPPP on-site as required by the IGP; however, one bus base was unable to locate a copy of the SWPPP. To make certain staff have the needed SWPPP resources and information closely accessible at all times and to be better prepared for surprise audit visits by the State Water Resources Control Board, OCTA should ensure that copies of the SWPPPs are maintained at all five bus base facilities.

Furthermore, the IGP requires that SWPPPs contain the date that the SWPPP was initially prepared. We found the dates that the SWPPPs were initially prepared were not included within the SWPPP documentation for any of the five bus bases. Providing a date for when each SWPPP was prepared will eliminate any disputes or questions that may arise from the State Water Resources Control Board in regards to verifying when amendments to the SWPPP were made, or if the SWPPP is current.

Additional Documentation Could Improve Sampling Processes

The IGP requires that dischargers collect and analyze storm water samples from two qualifying rain events within the first half of each reporting year (July 1 to December 31), and two QREs within the second half of each reporting year (January 1 to June 30). If there are no qualifying events during the sampling period or if there are dangerous weather conditions during the QRE, sampling cannot be performed.

At each of the five bus bases, we performed a high-level review of the sampling processes, including conducting interviews with staff performing sampling activities and reviewing the testing results logs. We found that each of the five bus bases had consistent processes in place to conduct the bi-annual required testing.

Additionally, we selected one facility to perform detailed verification of the documentation supporting the sampling log information and results that is maintained at the facility and submitted into SMARTS. During the 2015-2016 reporting year, we found that the bus base tested had documentation related to the sampling process associated with only one QRE during each of the two six-month sampling periods rather than documentation showing that the required two QREs were tested from each sample period. When asked why only one QRE was sampled during each sampling period instead of two, OCTA was unable to provide any support or documentation that would explain the discrepancy. OCTA staff indicated it is likely that there was not a second QRE that occurred during the periods and, in that case, additional samples could not be collected. Also, according to OCTA staff, there is currently not a process in place at any of the five bus bases where technicians document why sampling activities could not be performed. In the event the State Water Resources Control Board questioned OCTA as to why the required number of samples were not collected, OCTA should establish a formal process in which technicians maintain documentation supporting why samples could not be collected during a sampling period to avoid potential future noncompliance.

Unauthorized Non-Storm Water Discharges Exist, but Improvements Underway

The IGP describes that unauthorized Non-Storm Water Discharges (NSWDs), such as wash water and irrigation overflow, are prohibited. During our site visits, we were informed by OCTA staff that unauthorized NSWDs existed at each of the bus bases related to excess water run-off from buses after they have gone through the bus wash. OCTA is in the process of resolving the issues by implementing a water capture system that will trap all water run-off, and recycle the run-off for reuse within the bus wash system. We were told during interviews with OCTA staff that the capture systems are slated to be completed at all 5 bus base locations by the summer of 2017. Furthermore, OCTA staff has reported the unauthorized NSWD to the State Water Resources Control Board, and has notified the State Water Resources Control Board of the capture system that is in the process of being implemented.

Use of the Ellipse Job Tracking System Could be Expanded to Improve Tracking

OCTA's Ellipse job tracking system produces a number of daily, weekly, and monthly tasks that must be completed by employees. Depending on how a task was programmed into Ellipse, the system will generate work orders at specified intervals according to the desired completion date. Work orders contain detailed steps as to how the task must be completed by technician staff. Once a work order has been completed, technicians enter updates in the Ellipse system indicating that the task has been completed.

The majority of tasks in Ellipse relate to maintaining the facility building, systems, and assets and include weekly shop inspections, weekly and monthly parts washing, and preventative maintenance bus inspections. Other tasks in Ellipse relate to storm water general permit compliance activities, such as monthly storm water inspections and storm drain filter cleaning. We noted that there are additional storm water tasks related to BMPs that could be incorporated into the Ellipse system to facilitate better tracking and documentation that storm water-related tasks have been completed. After our discussions with the Environmental Compliance Specialist regarding this opportunity for improvement, we were informed that expansion of Ellipse is underway related to the following storm water tasks: verifying contracted sweeping, pressure washing and steam cleaning services.

Chapter 1 Recommendations:

To improve compliance with the IGP and benefit from opportunities for improvement, OCTA should consider the following:

1. Document in the SWPPPs the time periods when the bus bases conduct any function related to industrial activity.

Management Response: SWPPPs will be revised to describe time periods when bus bases conduct industrial activity. Maintenance staff will be included as SWPPP team members.

2. Ensure that a copy of the SWPPP is maintained at each bus base facility.

Management Response: Hard copies of SWPPP will be maintained at each bus base facility in addition to electronic copies. Each hard copy will be singularly identifiable and OCTA SWPPP members will be notified/trained of their locations.

3. Document the date that each SWPPP was initially prepared.

Management Response: SWPPPs will be revised to include the date that each SWPPP were initially prepared.

4. Establish a formal process in which technicians maintain documentation supporting why samples could not be collected during a sampling period.

Management Response: Monitoring forms used by technicians will be revised to provide supporting documentation/verbiage on why samples could not be collected during a qualified sampling event.

5. Continue efforts to eliminate the unauthorized non-storm water discharges related to the bus washes.

Management Response: Bus wash water track-out capturing systems are expected to be finished and operable by August 2017.

6. Continue efforts to expand the use of the Ellipse system to include additional storm water-related tasks.

Management Response: Current Ellipse work orders related to storm water pollution prevention have been updated and modified. New expanded work orders will be established within Ellipse by August 2017.

Chapter 2: Construction General Permit

On September 2, 2009, the California State Water Resources Control Board adopted the current statewide National Pollution Discharge Elimination System Construction General Permit (CGP) to regulate construction-related storm water discharges and authorized non-storm water discharges. The permit became effective on July 1, 2010 and was later amended in 2010 and 2012. The CGP generally covers construction or demolition projects that disturb one acre or more of land and includes activities such as clearing, grading, stockpiling, and excavation.

The CGP key requirements, which are similar to the Industrial General Permit (IGP), include eliminating unauthorized non-storm water discharges, developing and implementing Storm Water Pollution Prevention Plans (SWPPPs) and Best Management Practices (BMPs), conducting visual observations and sampling, performing the appropriate actions when limits are exceeded, submitting permit-related compliance documents via Storm Water Multiple Application and Report Tracking System (SMARTS), and ensuring individuals assisting dischargers with compliance of this permit are properly trained.

Similar to the IGP, for coverage under the CGP, a project proponent, i.e. Legally Responsible Person (LRP), must submit a Notice of Intent (NOI) to the State Water Resources Control Board prior to the commencement of construction activity. The LRP is responsible for all permit related activities associated with the project and must submit permit registration documents (PRDs) into SMARTS, such as SWPPPs, annual reports, sampling test results, and Notices of Termination (NOTs).

Most of the Orange County Transportation Authority's (OCTA) construction-related projects subject to the CGP are managed through the Capital Programs Division and are reflected on OCTA's Capital Action Plan. OCTA's Capital Action Plan largely consists of the following three categories of construction projects:

- Freeway,
- Rail/Station, and
- Grade Separation projects.

OCTA's role in these projects vary widely from simply passing through federal funding to local agencies to overseeing and managing the construction phase of projects. The audit focused on projects with construction activities occurring during July 1, 2014 to June 30, 2016 that were subject to the CGP, and where OCTA had a role in complying with CGP requirements. As a result,

we did not review in detail either OCTA's freeway¹ projects or Rail/Station² projects. We focused our review efforts on grade separation projects where OCTA was responsible for construction activities—there were six grade separation projects; of these six projects, we selected two for review. We also reviewed one facilities engineering project on OCTA owned property that did not meet the criteria to be included on OCTA's Capital Action Plan, but was covered under the State's construction general permit.

Overall, we found that OCTA generally complied with sections of the CGP, such as:

- PRDs were filed in accordance with permit requirements
- NOTs were filed in accordance with permit requirements
- SWPPPs were developed by Qualified SWPPP Developers (QSDs)
- SWPPPs addressed all key permit objectives

However, we found that OCTA could improve its compliance with the CGP in the following areas:

- Cooperative Agreements Could Better Define Project Responsibilities Related to Compliance with the CGP
- Key Site Inspection Activities Did Not Always Meet Requirements
- Key Sampling Activities Did Not Always Meet Requirements
- Minor Annual Reporting Improvements Necessary
- Some SWPPP Training Documents Could Not Be Provided
- OCTA Could Further Utilize its Health, Safety, and Environmental Compliance Group to Better Ensure Compliance with the CGP

Cooperative Agreements Could Better Define Project Responsibilities Related to Compliance with the CGP

OCTA could better define project responsibilities in the cooperative agreements entered into with local entities (i.e. cities) when assisting with their construction grade separation project, particularly related to compliance with the CGP. Aside from project funding, the City is typically responsible for pre-construction activities (environmental, design, right-of-way acquisition, utility relocation) and OCTA is often responsible for construction activities, including overseeing construction management and hiring construction contractors that are tasked with CGP compliance

¹ Caltrans and its contractors have the major responsibilities on the freeway projects and Caltrans assumed the responsibility as the Legally Responsible Person.

² There was only one rail/station project under construction and covered under the construction general permit during the period of the audit and OCTA's role on this project was limited to serving as a pass-through for funding.

activities. For the two grade separation projects we reviewed, the following outlines the key construction-related responsibilities of a City and OCTA:

City

- Obtaining certain permits such as Caltrans encroachment permits and California Public Utility Commission permits.
- Ensuring Compliance with the State's CGP, including submitting a NOI to comply with the terms CGP and certifying and submitting all required permit-related documents into SMARTS. Most importantly, assuming the responsibility of the Legally Responsible Party to make certain the construction projects comply with the State's construction general permit requirements.

OCTA

- Managing multiple grade separation projects, which includes overseeing environmental clearances, engineering, right of way acquisitions, and construction management and administration of construction contracts.
- Hiring construction contractor responsible for:
 - ✓ Performing construction activities.
 - ✓ Complying with the CGP, including preparing and submitting a SWPPP, performing good housekeeping activities, maintaining Best Management Practices, and conducting on-site inspections and sampling activities.
- Hiring construction management consultant responsible for providing OCTA with staff assistance and technical expertise with project management during the construction phase, including:
 - ✓ Communicating between construction contractor and all other project participants; performing quality assurance inspection services of construction contractor's work; preparing daily construction activity reports and performs control point and benchmark surveying; and reviewing construction contractor's progress payments and processes change order requests.
 - ✓ Providing oversight of the construction contractor's compliance with the CGP, including reviewing the submitted SWPPP and providing comments and acceptance or rejection determination; inspecting erosion control measures and prevention program work on a regular basis; performing and assisting in SWPPP compliance inspections; and ensuring the construction contractor corrected any deficiencies.
- Hiring construction program management consultant responsible for providing OCTA with staff assistance and technical expertise with project management during the construction phase, including pre-construction services, construction management oversight, and

program and project management assistance. Generally, the construction program management consultant does not have a significant role with compliance of the CGP.

While agreements between OCTA and contractors carrying out construction activities are quite detailed, the cooperative agreements between OCTA and the cities could better define certain project responsibilities related to compliance with the CGP. Specifically, the cooperative agreements typically outline funding arrangements and responsibilities such as:

- OCTA agrees to act as the lead agency for construction and construction management, including award construction-related contracts.
- City agrees to provide permits, plans, specifications, and estimates and will assume ownership of the project once the one year warranty period is over after completion of construction.

Our review of OCTA's and City cooperative agreements found that the agreements do not adequately detail each entity's responsibilities associated with compliance with the State's CGP, such as assuming the responsibility of the LRP, submitting permit-related documents to the State Water Resources Control Board, preparing and submitting a SWPPP, and performing on-site activities, such as BMPs, inspections, and sampling activities. Having the cooperative agreement clearly outline these responsibilities is particularly important since both the City and OCTA carry out major responsibilities related to CGP. According to OCTA, while the cooperative agreements do not specifically detail the responsibilities associated with compliance with the CGP, each of the responsibilities are informally agreed to between OCTA and the cities. Additionally, the assignment of some of the responsibilities, such as the LRP, are outlined in permit-related documents submitted to the State Water Resources Control Board. However, for one particular grade separation project reviewed, OCTA and the construction contractor were admittedly unclear as to who was the designated LRP. The designation of responsibility appeared to have changed during the course of the project. This can pose a significant problem if the duties in the cooperative agreements are outlined vaguely or are agreed upon informally.

Key Site Inspection Activities Did Not Always Meet Requirements

The CGP requires specific key routine site inspection activities during the construction phase of a project; our review of site inspection activities associated with two of OCTA's grade separation projects and one facilities engineering project found that they did not always meet the stated requirements. The key required site inspection activities are as follows:

- Weekly Site Inspections ensure best management practices are conducted correctly and effectively and identify any practices that require correction. The inspections are conducted with an inspection checklist and report of corrective actions is completed as needed. Information should be maintained in project files.
- Storm Event Inspections involves pre-storm event, daily storm event, and post-storm event inspections associated with a qualifying rain event to ensure best management practices are conducted effectively and identify any practices that require corrective actions. Conducted with an inspection checklist and report of corrective actions are completed as needed. Information should be maintained in project files and summarized in the Annual Report.
- Quarterly Non-Storm Water Site Inspections are conducted to ensure best management practices are conducted correctly and effectively and identify any practices that require correction, which implementation must begin within 72 hours. Additionally, the inspections are conducted to identify the presence of and source of authorized or unauthorized non-storm water discharges. Inspections are conducted with an inspection checklist and report of corrective actions completed as needed. Information should be maintained in project files and as well as summarized in the Annual Report submitted into SMARTS.

Pre-Storm Event Inspections:

conducted 48 hours prior to a rain event that has at least a fifty percent chance of producing precipitation.

Daily Storm Event Site Inspections:

conducted at least once each 24-hour period during a QRE.

Post-Storm Event Site Inspections:

conducted within 48 hours of a QRE.

For the two grade separation projects and one facilities engineering project selected for review, we analyzed the following activities during the construction phase of the projects for compliance with site inspection requirements:

- Fourteen weekly inspections—five for each of the two grade separation projects and four for the facilities engineering project.
- Five storm event inspections—two (out of ten possible) qualifying rain events for each of the grade separation projects and one (out of seven possible) qualifying rain events for the facilities engineering project.
- Six quarterly non-storm water inspections—two for each project.

Our analysis revealed that key site inspection activities reviewed did not always meet requirements. Specifically:

Weekly Site Inspections

Eight of the fourteen ³weekly site inspection reports selected for review were incomplete as they were missing key elements required by the CGP. Required elements include, but are not limited to, weather information, description of BMPs evaluated and any deficiencies noted, and site information. Our review found that seven weekly inspection reports reviewed were missing site information such as the approximate area of site exposed, disturbed soil area information, construction stage and completed activities, and listing corrective action taken on deficient BMPs. Additionally, one of the weekly site inspection reports was missing site photographs even though the report indicated that photographs had been taken. Although photographs are not required with every site inspection, the CGP requires that photos be provided within the report if photos were taken.

Storm Event Inspections

For four of the five ⁴qualifying rain events selected for review, OCTA staff was unable to provide sufficient documentation demonstrating that all required pre-storm event, daily storm event, and post-storm event site inspections were conducted. Related to two of the qualifying rain events, no documentation was provided that demonstrated any of the required pre-storm, daily, and post-storm site inspections were conducted. With regard to one rain event, the results from the pre-storm, daily, and post-storm site inspections that reportedly occurred over a four-day period were combined into a single report rather than the required separate reports for each site inspection. This makes it difficult to determine which of the three site inspections corresponded with the results documented in the single report.

Additionally, we found separately that there were ten post-storm site inspections ⁵conducted and reports completed that did not correspond with any rain events. Specifically, the ten post-storm inspection reports indicated that no QRE had occurred, or was predicted to occur, during the time the inspection was conducted. When OCTA was asked why post-storm inspections had been conducted when a QRE had not occurred, OCTA indicated that it was the construction contractor's standard independent method of SWPPP inspection reporting. As required by the CGP, post-storm inspections are only performed within 48 hours of a qualifying rain event.

Quarterly Non-Storm Water Inspections

Four of the six ⁶quarterly non-storm water inspection reports selected for review were provided; however, two of the six reports were not provided. The quarterly results were summarized for the

³ Four were from the facilities engineering project and four were from the two grade separation projects.

⁴ One was related to the facilities engineering project, while the other three were related to the two grade separation projects.

⁵ All ten were from the facilities engineering project.

⁶ All four were from the two grade separation projects.

two missing inspection reports within the corresponding annual reports indicating that no non-storm water discharges were observed.

For the four quarterly inspection reports provided, one was missing the required site information and another report indicated that a non-storm water discharge was observed, but no documentation was provided indicating that the required sampling was performed in response; two were missing documentation of observations for all established BMPs; and one report did not include the date the inspection was performed.

The CGP requires dischargers to maintain all SWPPP-related documentation for at least three years after the close of a project. OCTA staff were unable to provide some SWPPP-related documentation due to an information system breach that resulted in the loss of some critical files. OCTA staff reached out to the contractors responsible for SWPPP activities to obtain copies of these documents; however, the contractors failed to provide all of the needed documents. In one instance, the contractor was no longer in business. The agreements between OCTA and the construction contractors do not specifically address SWPPP-related documentation retention requirements and responsibilities.

Key Sampling Activities Did Not Always Meet Requirements

The CGP requires specific sampling activities during the construction phase of a project; our review of sampling activities associated with two of OCTA's grade separation projects found that they did not always meet the stated requirements. The key required sampling activities are as follows:

- Daily Storm Event Discharge Sampling (does not apply to risk level 1 projects)—collect three samples per day of a qualifying rain event and at least one sample per discharge location. Information should be maintained in project files, testing results submitted into SMARTS, and testing activities summarized in the Annual Report. Additionally, if the testing results reveal that discharges exceeded the accepted PH and turbidity levels, an exceedance report must be completed and submitted into SMARTS.
- Non-Storm Water Discharge Sampling—if a non-storm water discharge is found during a quarterly site inspection, test a sample of the discharge. Information should be maintained in project files, testing results submitted into SMARTS, and testing activities summarized in the Annual Report.

For each of the two grade separation projects, we analyzed the required daily sampling activities associated with two qualifying rain events from ten possible events and one non-storm water quarterly inspection. The facilities engineering project did not require daily sampling as the project was classified as a risk level 1 project.

Our analysis revealed that key sampling activities did not always meet requirements. Specifically, related to one rain event, documentation analyzed revealed that no daily storm event discharge

sampling was conducted even though sampling is required by the CGP. Related to a second rain event reviewed, documentation revealed that sampling had been conducted, however maximum Numeric Action Level (NAL) thresholds had been exceeded for both pH and turbidity, but the required exceedance report was not prepared and submitted into SMARTS. According to the CGP, if an NAL threshold is exceeded, the discharger must complete and submit an exceedance report into SMARTS.

Further, related to one quarterly site inspection reviewed that required sampling due to an observed NSW, there was no evidence that sampling had been conducted in response. As specified in the CGP, if a NSW is identified during a site inspection, the discharger must sample the NSW and submit the results into SMARTS as well as maintain the sampling documentation with the project files.

Minor Annual Reporting Improvements Necessary

The CGP requires dischargers to submit an annual report, which provides specific information to the State Water Resources Control Board to demonstrate compliance with all applicable requirements of the permit. We reviewed eight annual reports submitted into SMARTS—six associated with the two grade separation projects and two associated with the one facilities engineering project. We found that all eight reports reviewed required improvements as they were missing required pieces of information and/or documentation or were submitted past the deadline.

For the six annual reports reviewed related to the two grade separation projects, we found the following issues.

- All six reports did not provide the name of the individual who performed the facility inspections and/or visual observations, as well as the date, place, and time that those activities occurred.
- Two reports were missing at least one of these key pieces of information/documentation related to visual observation and sample collection exception records and laboratory reports.
- One was submitted after the September 1st deadline.

Although the staff of the cities were acting as the LRPs on these projects and had the responsibility to submit the annual reports into SMARTS, OCTA hired the contractors that were responsible for ensuring all SWPPP activities were conducted in accordance with CGP requirements, including preparation of the annual reports. As such, OCTA should ensure that its contractors provide all required information in the annual reports.

Furthermore, we found that the two annual reports reviewed related to the facilities engineering project also required improvement. Specifically, the two reports did not include the name of the individuals who performed the facility inspections and/or visual observations and did not include the date, place, and time that those activities occurred. Additionally, we found that one of the

annual reports was submitted after the September 1st deadline. Although OCTA was the LRP on the project, OCTA staff overseeing the project indicated that it was the contractor's responsibility to ensure timely submission of the annual reports.

Some SWPPP Training Documentation Could Not Be Provided

According to the CGP, dischargers shall ensure that all persons responsible for implementing requirements of the CGP shall be appropriately trained; the discharger shall provide documentation of all training for persons responsible for implementing the requirements of the CGP in the annual reports. The annual report asks if training was provided during the reporting year and the instructions state that the discharger must provide training documentation upon request. We requested to review the training documentation related to one annual reporting period associated with each of the grade separation projects and the facilities engineering project.

We were provided with training documentation for staff responsible for implementing the requirements of the CGP on one of the grade separation projects and the facilities engineering project. However, we were only provided with the training documentation for half of the staff responsible for implementing CGP requirements for the for the other grade separation project; OCTA staff noted that the contractor responsible for ensuring CGP compliance had gone out of business.

OCTA Could Further Utilize its Health, Safety, and Environmental Compliance Group to Better Ensure Compliance with the CGP

As described earlier in the report, OCTA's Health, Safety, and Environmental Compliance (HSEC) group is very involved with the day-to-day management, oversight, and monitoring activities associated with compliance with the IGP. However, the group's involvement with ensuring compliance with the CGP is limited as they may perform some monitoring of the construction site conditions but in an indirect, hands off manner. Specifically, according to HSEC staff, a Construction Safety Officer is actively involved with the construction activities related specifically to safety management programs. While HSEC staff may conduct a monthly construction site inspection, staff responsibilities do not involve CGP compliance activities, such as reviewing storm water paperwork, conducting required CGP-related compliance inspections or sampling, or ensuring required construction project documentation and updates are entered into SMARTS. OCTA should consider increasing the HSEC group's participation with construction projects and activities to help ensure compliance with the CGP.

Chapter 2 Recommendations:

To improve compliance with the CGP and benefit from opportunities for improvement, OCTA should consider the following:

7. Ensure cooperative agreements specifically clarify the roles and responsibilities of all individuals and entities associated with compliance with the CGP.

Management Response: Management doesn't agree that the roles and responsibilities of all individuals and entities should be included in the Cooperative Agreements. However, management will implement a procedure to document these roles and responsibilities in a project memo.

8. Enhance oversight of contractors and personnel carrying out SWPPP related monitoring activities, particularly related to site inspections, sampling, reporting, etc. OCTA should also ensure that agreements with contractors tasked with SWPPP activities include retention requirements.

Management Response: Enhanced oversight of contractors and construction management teams will be implemented and monitored. OCTA will ensure current and future agreements with contractors include retention requirements.

9. Ensure contractors adhere to training required by the CGP by periodically requesting to review training records.

Management Response: Periodic reviews of training records will be implemented.

10. Increase the HSEC group's participation with construction projects and activities to help ensure compliance with the CGP.

Management Response: HSEC will continue to participate in CGP compliance efforts and will identify/allocate necessary resources to ensure compliance with the CGP in partnership with OCTA's Capital Programs group via project planning efforts.



COMMITTEE TRANSMITTAL

August 28, 2017

To: Members of the Board of Directors

From: Laurena Weinert, ^{LA}Clerk of the Board

Subject: Amendment to the 241/91 Express Lanes Connector Project Peer Review

Finance and Administration Committee Meeting of August 23, 2017

Present: Directors Do, Hennessey, Jones, R. Murphy, and Steel

Absent: Directors Pulido and Spitzer

Committee Vote

This item was passed by the Members present.

Committee Recommendation

Authorize the Chief Executive Officer to negotiate and execute Amendment No. 2 to Agreement No. C 5-3798 between the Orange County Transportation Authority and CDM Smith, Inc., in an amount not to exceed \$50,000, for further review and analysis. This will increase the maximum obligation of the agreement to a total contract value of \$107,333.20.



August 23, 2017

To: Finance and Administration Committee

From: Darrell Johnson, Chief Executive Officer

Subject: Amendment to the 241/91 Express Lanes Connector Project Peer Review

Overview

A direct connector between the State Route 241 toll road and the 91 Express Lanes is included in the State Route 91 Implementation Plan. In order to advance the project, the Foothill/Eastern Transportation Corridor Agency requested that an investment grade traffic and revenue study be prepared by Stantec, Inc. Since Stantec, Inc., also serves as an advisor to the Orange County Transportation Authority, CDM Smith, Inc., was hired to review and analyze the Stantec, Inc., study. An amendment to the CDM Smith, Inc., contract is required to address anticipated further review and analysis.

Recommendation

Authorize the Chief Executive Officer to negotiate and execute Amendment No. 2 to Agreement No. C-5-3798 between the Orange County Transportation Authority and CDM Smith, Inc., in an amount not to exceed \$50,000, for further review and analysis. This will increase the maximum obligation of the agreement to a total contract value of \$107,333.20.

Discussion

The 91 Express Lanes in Orange County, owned and operated by the Orange County Transportation Authority (OCTA), consists of a four-lane toll road operating in the median of State Route 91 (SR-91) Freeway. The 10-mile facility stretches from the State Route 55/SR-91 interchange to the Orange/Riverside County line, with ingress and egress points located only at the ends of the facility. The Riverside County Transportation Commission (RCTC) extended the 91 Express Lanes facility an additional eight miles east from the Orange/Riverside County line to Interstate 15 in Riverside County as part of the SR-91 Corridor Improvement Project. RCTC's extension of the 91 Express Lanes became operational in March 2017.

The State Route 241 (SR-241) is a 24-mile toll facility operated by the Foothill/Eastern Transportation Corridor Agency (F/ETCA). The SR-241 extends from the Oso Parkway interchange in southern Orange County to the SR-91 interchange to the north. The existing interchange connects all lanes of the northbound and southbound SR-241 to the general purpose lanes on the eastbound and westbound SR-91.

Direct toll to toll connectors from the northbound SR-241 to the eastbound 91 Express Lanes and from the westbound 91 Express Lanes to the southbound SR-241 are currently being evaluated and are included in the SR-91 Implementation Plan. F/ETCA retained Stantec Consulting Services (Stantec) to prepare an investment grade traffic and revenue study for the proposed direct connectors. As part of Stantec's scope, traffic and revenue forecasts were developed for the direct connection between the 91 Express Lanes and the SR-241 for a number of design alternatives.

Procurement Approach

Since Stantec serves as OCTA's traffic and revenue consultant for the 91 Express Lanes, OCTA entered into Agreement No. C-5-3798 with CDM Smith, Inc., (CDM), in the amount of \$49,883, after a competitive procurement to perform an independent peer review of Stantec's study for the F/ETCA proposed direct connectors, on April 11, 2016. The peer review was undertaken in order to assess the reasonableness of Stantec's approach, methodology and findings, with focus on the likely impacts to the 91 Express Lanes. A CDM report detailing their findings was prepared and presented to OCTA and F/ETCA staff.

In May 2017, Amendment No. 1 was executed, in the amount of \$7,450, to incorporate additional scope that was requested internally, as well as including updated traffic information related to RCTC's operation of the extension of the 91 Express Lanes into Riverside County.

In order to allow the flexibility to accommodate further analysis, review, or changes, a time and expense amendment to the contract, in an amount not to exceed \$50,000, is being sought. This amount will cover further analysis, as well as additional meetings and presentations to the F/ETCA and the OCTA Committees and Board.

Fiscal Impact

Funds are included in OCTA's Fiscal Year 2017-18 Budget, 91 Express Lanes Account 0036-7519-B0001-DXT, and will be funded with toll revenues.

Summary

Staff requests Board of Directors' approval for the Chief Executive Officer to execute Amendment No. 2 to Agreement No. C-5-3798 between the Orange County Transportation Authority and CDM Smith, Inc., in an amount not to exceed \$50,000, to provide further review and analysis as requested by the Board of Directors.

Attachment

- A. CDM Smith, Inc., Agreement No. C-5-3798 Fact Sheet

Prepared by:



Kirk Avila
Treasurer/General Manager
Treasury/Toll Roads
(714) 560-5674

Approved by:



Andrew Oftelie
Executive Director
Finance and Administration
(714) 560-5649



Virginia Abadessa
Director, Contracts Administration and
Materials Management
(714) 560-5623

CDM Smith, Inc.
Agreement No. C-5-3798 Fact Sheet

1. April 11, 2016, Agreement No. C-5-3798, \$49,883.20, approved by Contracts Administration and Materials Management Department.
 - Agreement issued for the review, analysis and delivery of an investment grade traffic and revenue study for the proposed 241/91 Express Lanes Connector Project.
 - Term of the agreement effective April 11, 2016 through April 30, 2017.
2. May 10, 2017, Amendment No. 1 to Agreement No. C-5-3798, \$7,450.00, approved by the Contracts Administration and Materials Management Department.
 - Added additional reports to the scope of work deliverables in the Agreement.
 - Increased the maximum cumulative payment obligation by \$7,450
 - Extended the term of the Agreement by six months. New expiration date is October 31, 2017.
3. August 23, 2017, Amendment No. 2 to Agreement No. C-5-3798, \$50,000, pending approval by the Board of Directors.
 - Increase the scope of work to allow for additional reports and analysis as well as updating the traffic information related to the extension of the 91 Express Lanes into Riverside County.

Total committed to CDM Smith, Inc., Agreement No. C-5-3798: \$107,333.20



COMMITTEE TRANSMITTAL

August 28, 2017

To: Members of the Board of Directors
From: Laurena Weinert, Clerk of the Board
Subject: Agreements for Health Insurance Services

Finance and Administration Committee Meeting of August 23, 2017

Present: Directors Do, Hennessey, Jones, R. Murphy, and Steel
Absent: Directors Pulido and Spitzer

Committee Vote

This item was passed by the Members present.

Committee Recommendations

- A. Authorize the Chief Executive Officer to negotiate and execute Amendment No. 2 to Agreement No. C 5-3649 between the Orange County Transportation Authority and California State Association of Counties Excess Insurance Authority for Kaiser Permanente Health Plan, Inc., on a cost per employee basis, for prepaid medical services through December 31, 2018. The annual 2018 Kaiser Permanente Health Plan, Inc., premium cost will vary in accordance with actual enrollment.
- B. Authorize the Chief Executive Officer to negotiate and execute Amendment No. 2 to Agreement No. C 5-3650 between the Orange County Transportation Authority and California State Association of Counties Excess Insurance Authority for Anthem Blue Cross, on a cost per employee basis, for prepaid medical services through December 31, 2018. The annual 2018 Anthem Blue Cross health maintenance organization premium costs will vary in accordance with actual enrollment.



- C. Authorize the Chief Executive Officer to negotiate and execute Amendment No. 2 to Agreement No. C 5-3651 between the Orange County Transportation Authority and California State Association of Counties Excess Insurance Authority for Anthem Blue Cross, on a cost per employee basis, for preferred provider organization medical services through December 31, 2018. The annual 2018 Anthem Blue Cross preferred provider organization premium costs will vary in accordance with actual enrollment.
- D. Authorize the Chief Executive Officer to negotiate and execute Amendment No. 2 to Agreement No. C 5-3652 between the Orange County Transportation Authority and California State Association of Counties Excess Insurance Authority for Anthem Blue Cross, on a cost per employee basis, for a consumer driven health plan through December 31, 2018. The annual 2018 Anthem Blue Cross consumer driven health plan premium costs and health savings account expenses will vary in accordance with actual enrollment.
- E. Authorize the Chief Executive Officer to negotiate and execute Amendment No. 6 to Agreement No. C 1-2996 between the Orange County Transportation Authority and California State Association of Counties Excess Insurance Authority for Delta Dental, on a cost per employee basis, for preferred provider organization dental services through December 31, 2018. The annual 2018 Delta Dental preferred provider organization premium costs will vary in accordance with actual enrollment.
- F. Authorize the Chief Executive Officer to negotiate and execute Amendment No. 6 to Agreement No. C 1-2995 between the Orange County Transportation Authority and Delta Dental, on a cost per employee basis, for health maintenance organization dental services through December 31, 2018. The annual 2018 Delta Dental health maintenance organization premium costs will vary in accordance with actual enrollment.
- G. Authorize the Chief Executive Officer to negotiate and execute Amendment No. 4 to Agreement No. C 1-2997 between the Orange County Transportation Authority and California State Association of Counties Excess Insurance Authority for Vision Service Plan, on a cost per employee basis, for vision services through December 31, 2018. The annual 2018 vision services premium costs will vary in accordance with actual enrollment.



- H. Authorize the Chief Executive Officer to negotiate and execute Purchase Order No. C 7-1897 between the Orange County Transportation Authority and California State Association of Counties Excess Insurance Authority for VOYA for life and accidental death and dismemberment insurance through December 31, 2018. The annual 2018 life and accidental death and dismemberment premium costs will vary in accordance with actual volume in the plan.
- I. Authorize the Chief Executive Officer to negotiate and execute Purchase Order No. C 7-1898 between the Orange County Transportation Authority and California State Association of Counties Excess Insurance Authority for VOYA to provide supplemental life insurance to employees at their own expense through December 31, 2018.
- J. Authorize the Chief Executive Officer to negotiate and execute Purchase Order No. C 7-1899 between the Orange County Transportation Authority and California State Association of Counties Excess Insurance Authority for VOYA for short term and long term disability insurance through December 31, 2018. The annual 2018 short term and long term disability premium costs will vary in accordance with actual volume in the plan.
- K. Authorize the Chief Executive Officer to negotiate and execute Purchase Order No. C 7-1900 between the Orange County Transportation Authority and California State Association of Counties Excess Insurance Activity for VOYA with Compsych to provide administrative leave through December 31, 2018.



August 23, 2017

To: Finance and Administration Committee

From: Darrell Johnson, Chief Executive Officer

Subject: Agreements for Health Insurance Services

A handwritten signature in blue ink, likely belonging to Darrell Johnson, Chief Executive Officer, is written over the "From:" line and extends into the "Subject:" line.

Overview

The Orange County Transportation Authority currently has agreements with various companies to provide medical, dental, vision, life, accidental death and dismemberment, and disability plans for administrative employees and employees represented by the Transportation Communications International Union, with supplemental life insurance for all eligible employees and their families. These agreements expire on December 31, 2017. Staff is presenting recommendations for medical, dental, vision, life, accidental death and dismemberment, disability, and supplemental life insurance for the calendar year 2018.

Recommendations

- A. Authorize the Chief Executive Officer to negotiate and execute Amendment No. 2 to Agreement No. C-5-3649 between the Orange County Transportation Authority and California State Association of Counties – Excess Insurance Authority for Kaiser Permanente Health Plan, Inc., on a cost per employee basis, for prepaid medical services through December 31, 2018. The annual 2018 Kaiser Permanente Health Plan, Inc., premium cost will vary in accordance with actual enrollment.
- B. Authorize the Chief Executive Officer to negotiate and execute Amendment No. 2 to Agreement No. C-5-3650 between the Orange County Transportation Authority and California State Association of Counties – Excess Insurance Authority for Anthem Blue Cross, on a cost per employee basis, for prepaid medical services through December 31, 2018. The annual 2018 Anthem Blue Cross health maintenance organization premium costs will vary in accordance with actual enrollment.

- C. Authorize the Chief Executive Officer to negotiate and execute Amendment No. 2 to Agreement No. C-5-3651 between the Orange County Transportation Authority and California State Association of Counties – Excess Insurance Authority for Anthem Blue Cross, on a cost per employee basis, for preferred provider organization medical services through December 31, 2018. The annual 2018 Anthem Blue Cross preferred provider organization premium costs will vary in accordance with actual enrollment.
- D. Authorize the Chief Executive Officer to negotiate and execute Amendment No. 2 to Agreement No. C-5-3652 between the Orange County Transportation Authority and California State Association of Counties – Excess Insurance Authority for Anthem Blue Cross, on a cost per employee basis, for a consumer driven health plan through December 31, 2018. The annual 2018 Anthem Blue Cross consumer driven health plan premium costs and health savings account expenses will vary in accordance with actual enrollment.
- E. Authorize the Chief Executive Officer to negotiate and execute Amendment No. 6 to Agreement No. C-1-2996 between the Orange County Transportation Authority and California State Association of Counties – Excess Insurance Authority for Delta Dental, on a cost per employee basis, for preferred provider organization dental services through December 31, 2018. The annual 2018 Delta Dental preferred provider organization premium costs will vary in accordance with actual enrollment.
- F. Authorize the Chief Executive Officer to negotiate and execute Amendment No. 6 to Agreement No. C-1-2995 between the Orange County Transportation Authority and Delta Dental, on a cost per employee basis, for health maintenance organization dental services through December 31, 2018. The annual 2018 Delta Dental health maintenance organization premium costs will vary in accordance with actual enrollment.
- G. Authorize the Chief Executive Officer to negotiate and execute Amendment No. 4 to Agreement No. C-1-2997 between the Orange County Transportation Authority and California State Association of Counties – Excess Insurance Authority for Vision Service Plan, on a cost per employee basis, for vision services through December 31, 2018. The annual 2018 vision services premium costs will vary in accordance with actual enrollment.

- H. Authorize the Chief Executive Officer to negotiate and execute Purchase Order No. C-7-1897 between the Orange County Transportation Authority and California State Association of Counties – Excess Insurance Authority for VOYA for life and accidental death and dismemberment insurance through December 31, 2018. The annual 2018 life and accidental death and dismemberment premium costs will vary in accordance with actual volume in the plan.
- I. Authorize the Chief Executive Officer to negotiate and execute Purchase Order No. C-7-1898 between the Orange County Transportation Authority and California State Association of Counties – Excess Insurance Authority for VOYA to provide supplemental life insurance to employees at their own expense through December 31, 2018.
- J. Authorize the Chief Executive Officer to negotiate and execute Purchase Order No. C-7-1899 between the Orange County Transportation Authority and California State Association of Counties – Excess Insurance Authority for VOYA for short-term and long-term disability insurance through December 31, 2018. The annual 2018 short-term and long-term disability premium costs will vary in accordance with actual volume in the plan.
- K. Authorize the Chief Executive Officer to negotiate and execute Purchase Order No. C-7-1900 between the Orange County Transportation Authority and California State Association of Counties – Excess Insurance Activity for VOYA with Compsych to provide administrative leave through December 31, 2018.

Background

Since 2011, staff has focused on developing and maintaining a long-term strategy to contain rising healthcare costs as a multi-year program. The goal is to develop and maintain a sustainable and strategic long-term benefits program that is both cost effective and meets the needs of the employees. The long-term strategy consists of four basic components: 1) provide an equitable cost-sharing structure; 2) manage utilization; 3) educate employees to be better healthcare consumers; and 4) implement a health risk management program.

An equitable employee contribution schedule was developed which rewards tenure within the Orange County Transportation Authority (OCTA) and allows employees to share in the cost as they share in the benefits. Employees who

select the more expensive Preferred Provider Organization (PPO) plan pay a higher percentage of the premium than those electing the lower cost plans.

A consumer driven health plan (CDHP), along with a health savings account, was implemented as a fourth medical plan option. The CDHP model is one that supports employee engagement and encourages employees to be connected to health care dollars, thereby increasing use of generic drugs, reducing emergency visits, and increasing participation in wellness programs. In 2017, the CDHP has the second largest enrollment, with a total of 126 participants. The PPO plan, which is the most expensive plan, has the lowest enrollment of 59 participants. Cost savings continue to increase as employees migrate to the CDHP plan, which has a 26 percent lower premium than the PPO plan.

Discussion

OCTA received proposals from California State Association of Counties – Excess Insurance Authority (CSAC-EIA) for its medical plans effective January 1, 2018 through December 31, 2018. These rates were received by OCTA in early July 2017. Staff recommends the following medical, dental, vision, life, accidental death and dismemberment, disability, administrative services for protected leaves, and supplemental life insurance.

Medical

OCTA is part of CSAC-EIA health care pool and will continue to be for the next year. The CSAC-EIA for Kaiser Permanente Health Plan, Inc. (Kaiser), proposed a renewal premium increase of 2.7 percent, which is lower than last year's renewal of 4.3 percent and lower than the market trend of 5.2 percent increase outside of the CSAC-EIA pool. Approximately 35 percent of the administrative and Transportation Communications International Union (TCU) employees currently utilize Kaiser. Staff recommends continuing to offer Kaiser as one of the medical plan options. A one-year amendment to the contract is requested as Kaiser allows only a one-year term extension.

The CSAC-EIA for Anthem Blue Cross (Anthem) proposed a renewal premium increase of 4.2 percent for the health maintenance organization (HMO) plan, which is lower than the market trend of 12.2 percent increase outside the CSAC-EIA pool. The Anthem PPO and CDHP renewal increases are 4.3 percent. The renewal rates are based on demographics, utilization, and market trends. Staff recommends continuing to offer the Anthem HMO, PPO, and CDHP plans.

Dental

OCTA currently offers two choices of dental plans to its employees. The PPO is offered through CSAC-EIA for Delta Dental, and the HMO is offered directly through Delta Dental. The CSAC-EIA for the Delta Dental PPO proposed a rate decrease of 7.9 percent, and the Delta Dental HMO proposed a rate increase of 3.0 percent.

Vision

The CSAC-EIA for vision insurance proposed no rate increases. The 2018 rate includes an enhanced benefit of computer glasses for employees.

Life Insurance

OCTA provides eligible employees with life insurance, as well as accidental death and dismemberment insurance. The benefit amount is equal to two times the annual salary of the employee to a maximum of \$500,000. CSAC-EIA for Voya life insurance proposed no rate increases.

Supplemental Life Insurance

OCTA offers voluntary supplemental life insurance to all eligible employees at their own expense. CSAC-EIA for Voya proposed no rate increases.

Disability Insurance

OCTA provides employees with short-term and long-term disability insurance. It provides a monthly benefit amount while an employee is on an approved disability leave. CSAC-EIA for Voya proposes no rate increase for short-term disability and a rate increase of 7.1 percent for long-term disability.

Protected Leave Management

CSAC-EIA for Voya provides protected leave administrative services to OCTA. No rate increases are proposed for 2018.

Fiscal Impact

Health care benefits costs were approved in OCTA's Fiscal Year (FY) 2017-18 Budget, assuming a 12 percent increase in rates beginning January 1, 2018. Based on staff recommendations for calendar year 2018, OCTA's cost for health care benefits for the administrative and TCU employees will be

approximately 2.8 percent higher than last calendar year and well within the budgeted amount for FY 2017-18. Since the renewals are on a calendar year basis, OCTA will address the FY 2018-19 amounts, along with the other assumptions utilized in the budget, during the next budgeting cycle.

Summary

Staff is recommending that the Chief Executive Officer be authorized to negotiate and execute amendments to the existing contracts with CSAC-EIA for medical, dental, and vision insurance, and with Delta Dental for dental, as well as negotiate and execute agreements with CSAC-EIA for life, accidental death and dismemberment, short-term and long-term disability, supplemental life, and protected leave management.

Attachments

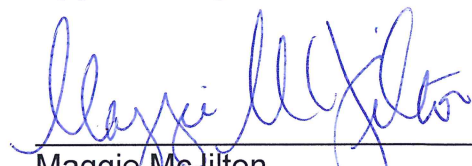
- A. California State Association of Counties – Excess Insurance Authority Kaiser Permanente Health Plan, Inc., Agreement No. C-5-3649 Fact Sheet
- B. California State Association of Counties – Excess Insurance Authority Anthem Blue Cross Health Maintenance Organization, Agreement No. C-5-3650 Fact Sheet
- C. California State Association of Counties – Excess Insurance Authority Anthem Blue Cross Preferred Provider Organization, Agreement No. C-5-3651 Fact Sheet
- D. California State Association of Counties – Excess Insurance Authority Anthem Blue Cross Consumer Driven Health Plan, Agreement No. C-5-3652 Fact Sheet
- E. California State Association of Counties – Excess Insurance Authority Delta Dental Preferred Provider Organization, Agreement No. C-1-2996 Fact Sheet
- F. Delta Dental Health Maintenance Organization, Agreement No. C-1-2995 Fact Sheet
- G. California State Association of Counties – Excess Insurance Authority Vision Service Plan, Agreement No. C-1-2997 Fact Sheet
- H. 2018 Financial Summary
- I. 2018 Monthly Rate Comparison

Prepared by:

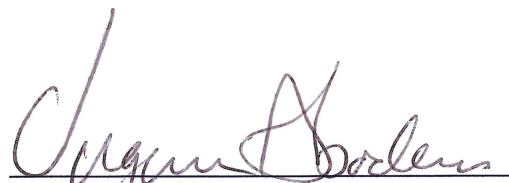


Bea Maselli
Section Manager, Benefits
714-560-5825

Approved by:



Maggie McJilton
Executive Director, Human Resources and
Organizational Development
714-560-5824



Virginia Abadessa
Director, Contracts Administration and
Materials Management
714-560-5623

**California State Association of Counties – Excess Insurance Authority
Kaiser Permanente Health Plan, Inc.
Agreement No. C-5-3649 Fact Sheet**

1. October 12, 2015, Agreement No. C-5-3649, \$2,520,000, approved by the Board of Directors (Board).
2. August 22, 2016, Amendment No. 1 to Agreement No. C-5-3649, \$2,500,000, approved by the Board.
 - To continue services and extend contract for period January 1, 2017 through December 31, 2017.
3. August 28, 2017, Amendment No. 2 to Agreement No. C-5-3649, \$2,760,000, pending approval by the Board.
 - To continue services through December 31, 2017 and extend contract for period January 1, 2018 through December 31, 2018.

Total committed to California State Association of Counties – Excess Insurance Authority for Kaiser Permanente Health Plan, Inc., Agreement No. C-5-3649, in the amount of \$7,780,000.

**California State Association of Counties – Excess Insurance Authority
Anthem Blue Cross Health Maintenance Organization
Agreement No. C-5-3650 Fact Sheet**

1. October 12, 2015, Agreement No. C-5-3650, \$2,500,000, approved by the Board of Directors (Board).
2. August 22, 2016, Amendment No. 1 to Agreement No. C-5-3650, \$2,500,000, approved by the Board.
 - To continue services and extend contract for period January 1, 2017 through December 31, 2017.
3. August 28, 2017, Amendment No. 2 to Agreement No. C-5-3650, \$2,100,000, pending approval by the Board.
 - To continue services and extend contract for period January 1, 2018 through December 31, 2018.

Total committed to the California State Association of Counties – Excess Insurance Authority for Anthem Blue Cross Health Maintenance Organization, Agreement No. C-5-3650, in the amount of \$7,100,000.

**California State Association of Counties – Excess Insurance Authority
Anthem Blue Cross Preferred Provider Organization
Agreement No. C-5-3651 Fact Sheet**

1. October 12, 2015, Agreement No. C-5-3651, \$1,700,000, approved by the Board of Directors (Board).
2. August 22, 2016, Amendment No. 1 to Agreement No. C-5-3651, \$1,300,000, approved by the Board.
 - To continue services and extend contract for period January 1, 2017 through December 31, 2017.
3. August 28, 2017, Amendment No. 2 to Agreement No. C-5-3651, \$1,035,000, pending approval by the Board.
 - To continue services and extend contract for period January 1, 2018 through December 31, 2018.

Total committed to the California State Association of Counties – Excess Insurance Authority for Anthem Blue Cross Preferred Provider Organization, Agreement No. C-5-3651, in the amount of \$4,035,000.

**California State Association of Counties – Excess Insurance Authority
Anthem Blue Cross Consumer Driven Health Plan
Agreement No. C-5-3652 Fact Sheet**

1. October 12, 2015, Agreement No. C-5-3652, \$1,600,000, approved by the Board of Directors (Board).
2. August 22, 2016, Amendment No. 1 to Agreement No. C-5-3652, \$2,900,000, approved by the Board.
 - To continue services and extend contract for period January 1, 2017 through December 31, 2017.
3. August 28, 2017, Amendment No. 2 to Agreement No. C-5-3652, \$2,160,000, pending approval by the Board.
 - To continue services and extend contract for period January 1, 2018 through December 31, 2018.

Total committed to the California State Association of Counties – Excess Insurance Authority for Anthem Blue Cross Consumer Driven Health Plan, Agreement No. C-5-3652, in the amount of \$6,660,000.

**California State Association of Counties – Excess Insurance Authority
Delta Dental Preferred Provider Organization
Agreement No. C-1-2996 Fact Sheet**

1. October 7, 2011, Agreement No. C-1-2996, \$850,000, approved by the Board of Directors (Board).
2. October 22, 2012, Amendment No. 1 to Agreement No. C-1-2996, \$770,000, approved by the Board.
 - To continue services and extend contract for period January 1, 2013 through December 31, 2013.
3. October 11, 2013, Amendment No. 2 to Agreement No. C-1-2996, \$700,000, approved by the Board.
 - To continue services and extend contract for period January 1, 2014 through December 31, 2014.
4. October 13, 2014, Amendment No. 3 to Agreement No. C-1-2996, \$780,000, approved by the Board.
 - To continue services and extend contract for period January 1, 2015 through December 31, 2015.
5. October 12, 2015, Amendment No. 4 to Agreement No. C-1-2996, \$780,000, approved by the Board.
 - To continue services and extend contract for period January 1, 2016 through December 31, 2016.
6. August 22, 2016, Amendment No. 5 to Agreement No. C-1-2996, \$710,000, approved by the Board.
 - To continue services and extend contract for period January 1, 2017 through December 31, 2017.
7. August 28, 2017, Amendment No. 6 to Agreement No. C-1-2996, \$630,000, pending approval by the Board.
 - To continue services and extend contract for period January 1, 2018 through December 31, 2018.

Total committed to California State Association of Counties – Excess Insurance Authority for Delta Dental Preferred Provider Organization, Agreement No. C-1-2996, in the amount of \$5,220,000.

**Delta Dental Health Maintenance Organization
Agreement No. C-1-2995 Fact Sheet**

1. October 7, 2011, Agreement No. C-1-2995, \$18,000, approved by the Board of Directors (Board).
2. October 22, 2012, Amendment No. 1 to Agreement No. C-1-2995, \$18,000, approved by the Board.
 - To continue services and extend contract for period January 1, 2013 through December 31, 2013.
3. October 11, 2013, Amendment No. 2 to Agreement No. C-1-2995, \$15,000, approved by the Board.
 - To continue services and extend contract for period January 1, 2014 through December 31, 2014.
4. October 13, 2014, Amendment No. 3 to Agreement No. C-1-2995, \$19,000, approved by the Board.
 - To continue services and extend contract for period January 1, 2015 through December 31, 2015.
5. October 12, 2015, Amendment No. 4 to Agreement No. C-1-2995, \$19,000, approved by the Board.
 - To continue services and extend contract for period January 1, 2016 through December 31, 2016.
6. August 22, 2016, Amendment No. 5 to Agreement No. C-1-2995, \$16,000, approved by the Board.
 - To continue services and extend contract for period January 1, 2017 through December 31, 2017.
7. August 28, 2017, Amendment No. 6 to Agreement No. C-1-2995, \$15,000, pending approval by the Board.
 - To continue services and extend contract for period January 1, 2018 through December 31, 2018.

Total committed to Delta Dental Health Maintenance Organization, Agreement No. C-1-2995, in the amount of \$120,000.

**California State Association of Counties – Excess Insurance Authority
Vision Service Plan
Agreement No. C-1-2997 Fact Sheet**

1. October 7, 2011, Agreement No. C-1-2997, \$110,000, approved by the Board of Directors (Board).
2. October 22, 2012, Amendment No. 1 to Agreement No. C-1-2997, \$100,000, approved by the Board.
 - To continue services and extend contract for period January 1, 2013 through December 31, 2013.
3. October 11, 2013, Amendment No. 2 to Agreement No. C-1-2997, \$90,000, approved by the Board.
 - To continue services and extend contract for period January 1, 2014 through December 31, 2014.
4. October 13, 2014, Amendment No. 3 to Agreement No. C-1-2997, \$344,500, approved by the Board.
 - To continue services and extend contract for period January 1, 2015 through December 31, 2017.
5. August 28, 2017, Amendment No. 4 to Agreement No. C-1-2997, \$86,000, pending approval by the Board.
 - To continue services and extend contract for period January 1, 2017 through December 31, 2018.

Total committed to the California State Association of Counties – Excess Insurance Authority Vision Service Plan, Agreement No. C-1-2997, in the amount of \$730,500.

2018 Financial Summary



MEDICAL (CSAC-EIA)

Kaiser Annual Premium

161

\$2,609,980

\$2,681,580

2.7%

Anthem HMO Annual Premium

120

\$2,008,860

\$2,093,748

4.2%

Anthem PPO Annual Premium

59

\$990,636

\$1,033,488

4.3%

Anthem CDHP Annual Premium

126

\$2,068,704

\$2,158,248

4.3%

DENTAL (DELTA DENTAL)

Delta DHMO Annual Premium

58

\$14,404

\$14,837

3.0%

Delta DPPO (CSAC-EIA) Annual Premium

409

\$685,514

\$631,524

-7.9%

VISION (CSAC-EIA)

VSP Annual Premium

295

\$86,383

\$90,029

4.2%

BASIC LIFE/AD&D (CSAC-EIA)

Voya Annual Premium

528

\$144,316

\$144,316

0.0%

SHORT TERM DISABILITY (CSAC-EIA)

Voya Annual Premium

492

\$16,554

\$16,554

0.0%

LONG TERM DISABILITY (CSAC-EIA)

Voya Annual Premium

528

\$100,349

\$107,485

7.1%

PROTECED LEAVE ADMINISTRATION (CSAC-EIA)

Voya FML Source Annual Premium

1324

\$23,673

\$23,673

0.0%

TOTAL ANNUAL PREMIUM

\$8,749,373

\$8,995,482

ANNUAL DOLLAR CHANGE

\$246,109

ANNUAL PERCENT CHANGE

2.8%

2018 Monthly Rate Comparison



Kaiser Permanente

Employee Only

Two-Party

Family

Anthem Blue Cross HMO

Employee Only

Two-Party

Family

Anthem Blue Cross PPO

Employee Only

Two-Party

Family

Anthem Blue Cross CDHP

Employee Only

Two-Party

Family

Delta Dental DHMO

Employee Only

Two-Party

Family

Delta Dental PPO

Employee Only

Two-Party

Family

VSP - Vision

Employee Only

Two-Party

Family

CURRENT	RENEWAL	\$ Change
\$637.74	\$655.00	\$17.26
\$1,338.47	\$1,375.00	\$36.53
\$1,912.24	\$1,965.00	\$52.76
\$640.00	\$667.00	\$27.00
\$1,343.00	\$1,400.00	\$57.00
\$1,919.00	\$2,000.00	\$81.00
\$808.00	\$843.00	\$35.00
\$1,696.00	\$1,769.00	\$73.00
\$2,423.00	\$2,528.00	\$105.00
\$594.00	\$620.00	\$26.00
\$1,248.00	\$1,302.00	\$54.00
\$1,782.00	\$1,859.00	\$77.00
\$13.62	\$14.03	\$0.41
\$21.05	\$21.68	\$0.63
\$27.91	\$28.75	\$0.84
\$66.40	\$61.20	(\$5.20)
\$140.10	\$129.10	(\$11.00)
\$187.50	\$172.70	(\$14.80)
\$12.22	\$13.25	\$1.03
\$23.47	\$24.50	\$1.03
\$33.59	\$34.62	\$1.03



August 10, 2017

To: Transit Committee

From: Darrell Johnson, Chief Executive Officer

Subject: Regional Rail and Facilities Engineering Quarterly Report

Overview

The Regional Rail and Facilities Engineering departments are responsible for the Orange County Transportation Authority's rail project development, rail capital programs, rail operations, and transit facilities engineering projects. This report provides an update on rail and facilities engineering programs through the fourth quarter (April, May, and June) of fiscal year 2016-17.

Recommendation

Receive and file as an information item.

Background

The Regional Rail and Facilities Engineering departments (Departments) are responsible for implementing the Orange County Transportation Authority's (OCTA) railroad capital projects, including station parking enhancements and expansions, new station developments, expanded rail services, OC Streetcar, and transit facilities engineering. Additionally, the Departments are responsible for improved and expanded operations of Orange County's rail system by providing rail service that supports and matches the growth and development patterns of Orange County and the region.

Discussion

The report provides an update on the Departments' programs and the projects including rail capital, transit extensions to Metrolink, Regional Rail, and transit facilities engineering.

Rail Capital

Rail Capital projects include a wide range of projects necessary to sustain existing passenger rail service and support future increases in service. This includes new station developments, station parking expansions and enhancements, grade separations and grade crossing enhancements, and various other track and infrastructure projects.

Station Improvements

The Laguna Niguel/Mission Viejo Metrolink Station Improvements project provides Americans with Disabilities Act-(ADA) compliant access ramps that will replace the existing elevators. The station elevators were previously routinely out of service, requiring buses to transport passengers from one side of the station to the other. The elevator rooms are being converted to a restroom, a vending machine room, and storage rooms. The project scope also includes additional benches, shade structures, and relocation of Moulton Niguel Water District's 33-inch sewer line which is in conflict with the project. The construction notice to proceed (NTP) was issued on February 23, 2016. The contractor has completed the relocation of the sewer main and completed major concrete work including ADA ramps, walls, and stairs on both sides of the pedestrian underpass. Work continues with wall finishing, handrails and railings, restroom and vending machine room. ADA ramps are anticipated to open to the public by mid-August 2017 and complete construction by end of August 2017, with a final closeout in October 2017.

The Orange Transportation Center (OTC) parking structure project represents a long-standing effort between the City of Orange and OCTA to increase the parking capacity to accommodate future growth in ridership of the Metrolink system. Per a cooperative agreement between OCTA and the City of Orange, the city is the lead on the design phase, and OCTA is the lead on the construction phase of the project. OCTA has awarded a contract to Hill International to provide construction management services for the OTC project. On June 12, 2017, the OCTA Board of Directors (Board) awarded a contract to Bomel Construction, in the amount of \$18.4 million, for the construction of the project. A ground breaking ceremony was held on July 26, 2017. Completion of the OTC parking structure is anticipated to be early 2019.

The proposed Placentia Metrolink Station will be located on the BNSF Railway (BNSF) and City of Placentia-owned right-of-way (ROW). The station will include platforms, parking, a new bus stop, and passenger amenities. OCTA is the lead for design and construction of the project. Previously completed design plans are being revised to include a parking structure in lieu of surface parking. The project will also include a third track which will assist with

the efficiency and on-time performance of train operations and provide operational flexibility for both freight and passenger trains. BNSF will be the lead on the rail construction, so a construction and maintenance agreement with BNSF for the work will need to be in place before the invitation for bids (IFB) for construction can be released. The plans are anticipated to be complete and will be advertised for bid in October 2017 with an anticipated completion date of September 2019, pending the BNSF agreement is in place.

The Anaheim Canyon Metrolink Station Improvement project includes the addition of a second station track, platform, the extension of the existing platform to accommodate longer train consist, and associated passenger amenities including ticket vending machines, benches, canopies, and signage. OCTA is the lead agency on all phases of project development including construction. Preliminary engineering (30 percent plans) and California Environmental Quality Act (CEQA) clearance was obtained in January 2017 and National Environmental Policy Act (NEPA) clearance was obtained in June 2017. A request for proposal was released for final plans, specification and estimates on April 10, 2017, and final selection of the consultant will be presented to the Board in August 2017. Construction is expected to begin in June 2019 and be completed in August 2020.

The City of Fullerton is the lead agency on a project to add an elevator tower to each side of the existing railroad pedestrian bridge at the Fullerton Transportation Center and modify the restrooms to bring them into compliance with ADA. The City of Fullerton issued the construction NTP in January 2016, and renovations to the restrooms have been completed. The contractor has experienced significant delays on the elevator work due to subcontractor issues and dry utility conflicts. The City of Fullerton is now estimating the completion of the project to be September 2018.

Rail Corridor Improvements

Rail corridor improvements consist of capital and rehabilitation projects that improve the safety, operations, or reliability of the rail infrastructure. OCTA owns over 45 miles of operating railroad.

There are currently six grade separation projects along the Los Angeles – San Diego – San Luis Obispo (LOSSAN) rail corridor that have completed the project study reports or environmental clearance and are not currently advancing due to lack of funds.

The 17th Street Grade Separation project is progressing through the environmental clearance phase. The project report equivalent document was reviewed and approved by the stakeholders. The City of Santa Ana, upon review of the project documents, provided a CEQA statutory exemption determination for the project.

The Office of Historic Preservation (OHP) reviewed the Historical Property Survey Report submitted by the California Department of Transportation (Caltrans) and determined that one of the properties impacted by the project is eligible for listing in the National Register of Historical Places. Caltrans and OHP has reviewed the exhibits from the draft Finding of Effects (FOE) documentation and provided feedback that the project may have adverse effects on the eligible property. The project team is currently revising the FOE and supporting documents to address the comments and resubmit to Caltrans to clarify and support the draft conclusion of no adverse effects. If OHP agrees with the FOE's conclusion, Caltrans will complete the NEPA determination, currently projected to be eligible for Categorical Exclusion. The environmental phase is anticipated to be completed in October 2017, bringing any protracted reviews.

The Laguna Niguel to San Juan Capistrano passing siding project will add approximately 1.8 miles of new passing siding railroad track adjacent to the existing mainline track. The project will enhance operational efficiency of passenger services within the LOSSAN rail corridor. Proposed modifications to the existing Rancho Capistrano private grade crossing, associated with the addition of passing track, were discussed with all the stakeholders including the California Public Utilities Commission (CPUC). Alternatives to address concerns raised by CPUC have been developed in coordination with the stakeholders. Staff met with the CPUC to discuss concerns regarding the grade crossing and recently received concurrence to proceed with the proposed design. The project design schedule has been impacted by an additional six months extending to December 2017 and the anticipated advertisement for construction to February 2018. All advance San Diego Gas & Electric power pole relocation activities were completed in June 2017.

The San Juan Creek railroad bridge in the City of San Juan Capistrano was built in 1917. The existing 300-foot long bridge carries a single mainline track for passenger and freight rail traffic over San Juan Creek and is in need of replacement. The replacement bridge will be constructed adjacent to the existing bridge to minimize disruption of rail traffic. Additionally, the new railroad bridge will incorporate a future bikeway underpass on the south end of the track along the creek. OCTA and the Southern California Regional Rail Authority (SCRRA) are working with the County of Orange to develop a cooperative agreement to identify the roles, responsibilities, and funding to design and construct the additional bikeway underpass to enhance the county's network of trails and bikeways. SCRRA is the overall project lead, and OCTA is the leader for ROW. SCRRA has advanced the design to 60 percent completion where the cost of construction has increased by approximately \$2.5 million due to further development and refinement of the bridge structure. The associated project support costs and contingencies have also increased by \$1.6 million. The total increase is \$4.1 million making the new project budget \$38.3 million. A programming action was approved by the Board on July 10, 2017 to add the

necessary funds to the project. The draft Documented Categorical Exclusion was submitted to Federal Transit Administration (FTA) for review and concurrence in compliance with NEPA. The project received revised CEQA clearance in May 2017. The Board approved the authority to obtain the necessary ROW for the project in June 2017. The preliminary ROW acquisition schedule is anticipated to be 18 months and construction ready by the third quarter 2018.

The Control Point (CP) Fourth project is located in the City of Santa Ana between Fourth Street and Chestnut Avenue, between mile posts 175.45 and 175.80. Metrolink operations utilize Centralize Traffic Control (a train traffic control system) in which a dispatcher controls the railroad traffic through the use of signal blocks. A CP is a set of railroad signals and switches controlled by the dispatcher and authorizes a train to proceed or stop within the block of track it controls. The project includes installation of a turnout to a Union Pacific Railroad spur track along with related civil, signal, and communication modifications and improvements. The project will provide rail operational efficiencies and improve on-time performance. On June 13, 2016, the Board approved a cooperative agreement with SCRRA to define the roles and responsibilities and the funding requirements of the project. SCRRA began removal of existing spur track and installation of new track up to the new CP. Signal materials are being received at the warehouse and new signal house is expected next quarter. SCRRA is working with Union Pacific Railroad to agree on future maintenance responsibilities. A new turnout will be installed during the weekend of August 4-6, 2017. The project is expected to be complete by the second quarter of 2018.

The railroad ROW Slope Stabilization project includes eight locations within the OCTA-owned LOSSAN rail corridor that have been identified for improvements to prevent future erosion and slope instability. OCTA's consultant has provided a 90 percent design submittal. Design exceptions for areas 4B, 5B, and 6B were given preliminary approval from SCRRA, waiting for final documentation. Consultant is scheduled to provide 100 percent PS&E first week of August 2017.

Metrolink continues the implementation of positive train control (PTC) throughout the system. In September 2016, Metrolink achieved a significant milestone, becoming the first commuter railroad in the nation to receive approval of conditional PTC system certification from the Federal Railroad Administration (FRA). In December 2016, Metrolink staff submitted a response to the conditions in FRA's letter of conditional certification in hopes of achieving full PTC system certification in 2017.

Transit Extensions to Metrolink: OC Streetcar

The Transit Extensions to Metrolink Program is intended to broaden the reach of Orange County's backbone rail system to key employment, population, and activity centers. The OC Streetcar project will serve the Santa Ana Regional

Transportation Center (SARTC) through downtown Santa Ana, and the Civic Center to Harbor Boulevard in the City of Garden Grove.

90 percent design plans for the streetcar infrastructure and facilities were submitted by the designer in April and June 2017, and are under review by OCTA and the cities of Garden Grove and Santa Ana. Work is proceeding on preparation of the procurement documents for the construction IFB which is scheduled to be released in the fall 2017.

Based upon a risk assessment workshop that was held in March 2017 to finalize the project scope, schedule and budget, FTA recommended minor changes to the project cost estimate, increasing the cost by less than one half of one percent from the 30 percent design cost estimate prepared in July 2016. The updated cost estimate and funding plan were approved by the OCTA Board at the May 22, 2017 Board meeting. The Board also authorized submission of the Full Funding Grant Agreement Application to FTA at the meeting.

The funding request as well as extensive project readiness documents required for the application were submitted to FTA in late May 2017. Staff are coordinating with FTA and its consultants on the federal reviews of the documents.

Staff continued meetings with utility owners to identify conflicts and assist with the response to relocation claim letters. Additionally, negotiations continued regarding acquisition of properties required for the maintenance and storage facility and relocation assistance for the residential and commercial tenants. Staff continued to coordinate with representatives of the Orange County Flood Control District and the Army Corp of Engineers to obtain the permits required for the Santa Ana River Bridge.

In late April 2017, the CPUC approved the Project's Safety and Security Certification Plan, which outlines the detailed procedures that will be followed to obtain the critical safety and security approvals of the project. Staff continued to coordinate with CPUC to discuss the grade crossing applications.

The vehicle manufacturing and delivery procurement was extended to early July 2017 in response to a proposer request. Proposals will be reviewed and the contract award recommendations are scheduled to be presented to the Transit Committee in December 2017 and the OCTA Board in January 2018. Work commenced on development of the scope of services for the operation and maintenance service procurement which is scheduled to be released in fall 2017.

Construction agreements with the cities of Garden Grove and Santa Ana were approved by the OCTA Board and the city councils in April 2017, in addition to

the agreement with the City of Santa Ana for incorporation of streetcar elements at the SARTC.

An environmental analysis for minor design modifications was completed, and staff is coordinating with FTA to obtain approval on the Section 130(c) determination, completing the federal environmental review process. In June 2017, the State Historic Preservation Office concurred that the project could not have an adverse impact on historic properties.

The OCTA Board approved the award of a public awareness campaign contract to Katz Associates. The firm will be assisting with the development and implementation of a public awareness campaign during the pre-construction and construction phases of the project.

Rail Operations

As one of five member agencies that comprise Metrolink, OCTA participates in the design and operation of Metrolink service in Orange County. Rail Operations staff serve as the liaison with Metrolink and are involved in route and service planning, funding, and implementation. In addition to coordination of daily Metrolink operations, the team coordinates the StationLink service, special trains, promotional activities, and outreach.

- The Metrolink Angels Express service continues for the 2017 season, serving 54 weekday home games on the OC Line, including 15 Friday night games on the Inland Empire – Orange County (IEOC) Line, with an extension from Perris Valley. In July and August 2017, kids 18 and under ride free on Angels Express trains. To date, ridership is down by 24 percent, compared to the same period last year.
- Metrolink has received the first of 40 new Tier 4 clean emissions locomotives, with 11 units on site. On June 1, 2017, the FRA gave Metrolink approval to begin non-revenue testing of the new locomotives. Testing is expected to take approximately three months and is currently taking place in Orange County (Irvine).
- Mobile ticketing is completely functional and is available via the Metrolink app, with over 20 percent of Metrolink passenger's systemwide as users. Almost half of the passengers on the IEOC Line use the app exclusively, mainly because there is no transfer in Los Angeles. Metrolink plans to fully integrate transfers through Los Angeles County Metropolitan Transportation Authority (Metro) transit access pass system with the installation of optical readers by October 2017. The installation of optical readers should significantly increase the use of mobile ticketing since 44 percent of riders going to the Los Angeles Union Station transfer to Metro.

Metrolink performance data (ridership and revenue) for the fourth quarter of fiscal year (FY) 2016-17 will be made available in the annual report to the Board this fall 2017.

Rail Operations staff also represent OCTA's interests in the LOSSAN Joint Powers Authority, including the ongoing coordination and service integration efforts on the LOSSAN rail corridor.

Transit Facilities Engineering

Transit Facilities Engineering is responsible for the development and implementation of capital rehabilitation, facility modifications, and new capital projects for all OCTA transit facilities, including the five bus bases and seven park-and-ride lots. Design is underway on six projects, including minor rehabilitation of the bus dock platform at the Fullerton Park-and-Ride, facility modifications for hydrogen buses at the Santa Ana Bus Base, video surveillance system replacement at the Garden Grove and Santa Ana bus bases, bus wash building metal framing and siding repairs at the Irvine Construction Circle Bus Base, liquid hydrogen fueling station at the Santa Ana Bus Base, and preliminary engineering and environmental clearance for the proposed Transit Security Operations Center started this period.

There are three projects in the bid phase for construction, including removal of liquefied natural gas underground storage tanks at the Anaheim and Garden Grove bus bases, bus yard pavement striping and markings at the Garden Grove Bus Base, and hydrogen gas detection upgrades at the Santa Ana Bus Base for the single hydrogen bus demonstration project.

Five projects were under construction this period, including the vehicle inspection station equipment canopy at the Garden Grove Bus Base, bus wash water run-off mitigation modifications at all bus bases, construction started on two new projects including replacement of heating and ventilation units at the Garden Grove Bus Base maintenance shop, and fence repair and bus parking stall wheel stops at the Anaheim Bus Base. The bridge repair at the Laguna Beach Transportation Center was completed on May 19, 2017.

Summary

The Departments are responsible for OCTA's rail project development, rail capital improvement programs, rail operations, and transit facilities engineering projects. For the period covering the third quarter of FY 2016-17, projects generally progressed consistent with scope and schedule.

Attachment

None.

Prepared by:

A handwritten signature in black ink, appearing to read 'Jennifer Bergener', with a stylized flourish at the end.

Jennifer Bergener
Director, Rail Programs and Facilities
Engineering
(714) 560-5462

Approved by:

A handwritten signature in blue ink, appearing to read 'James G. Beil', with a stylized flourish at the end.

James G. Beil, P.E.
Executive Director, Capital Programs
(714) 560-5646

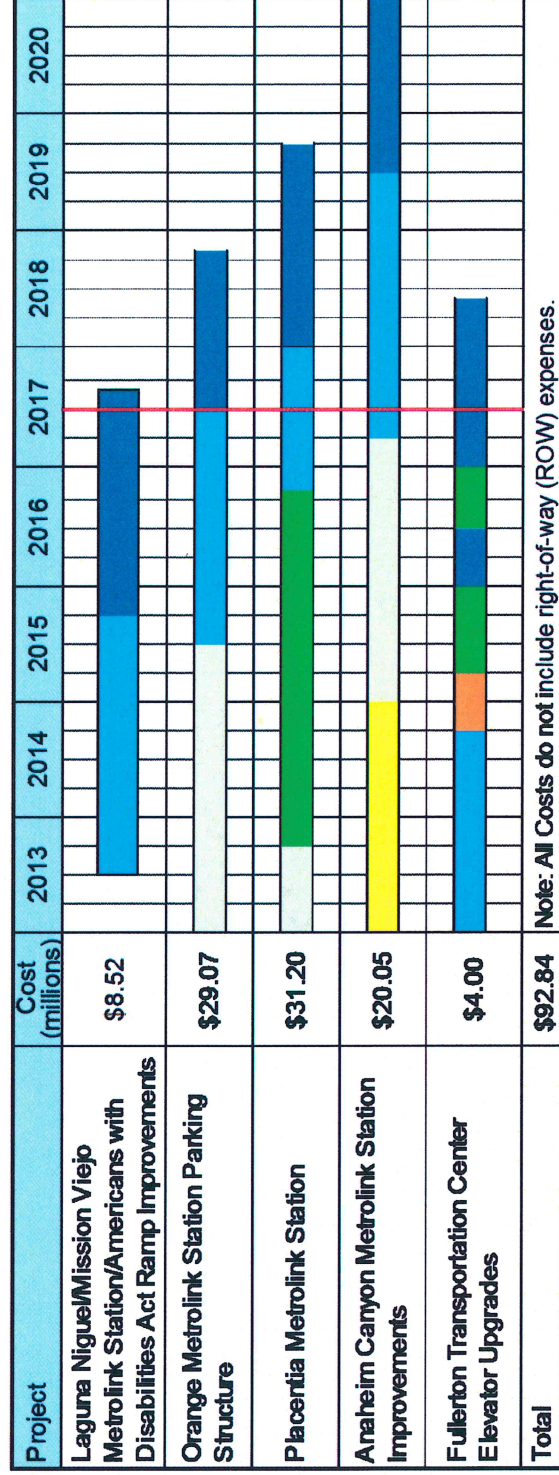
SUPPLEMENTAL

INFORMATION



Regional Rail and Facilities Engineering Quarterly Report

Station Improvements



Rail Corridor Improvements



Schedule / Cost

Project	Cost (millions)	2013	2014	2015	2016	2017	2018	2019
17th Street Grade Separation	\$ 158.32							
Laguna Niguel-San Juan Capistrano Passing Siding	\$ 30.83							
San Juan Creek Bridge Replacement	\$ 38.33							
Control Point Fourth	\$ 8.51							
Positive Train Control Program (Orange County Transportation Authority (OCTA) Share)	\$ 39.92							
Rail ROW Slope Stabilization	\$ 2.00							
Total	\$ 277.91							

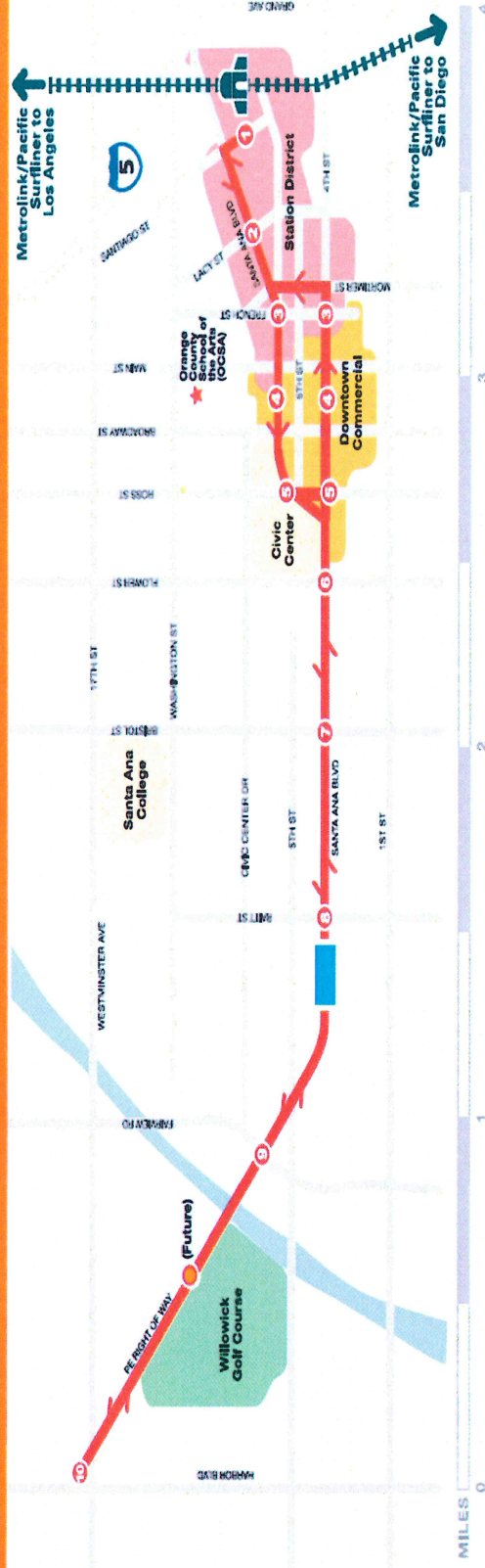
PA/ED

Final Design

Construction

Planning

Transit Extensions to Metrolink: Santa Ana/Garden Grove Fixed-Guideway



LEGEND
 Streetcar Route
 Stop
 Willowick: Potential Future Stop
 Santa Ana Regional Transportation Center
 Operations and Maintenance Facility
 LOSSAN Rail Corridor

STOPS

1 Santa Ana Regional Transportation Center
2 Lacy Street
3 French Street
4 Sycamore Street
5 Ross Street
6 Flower Street

7 Bristol Street
8 Rialt Street
9 Fairview Street
10 Harbor Boulevard

Schedule	2013	2014	2015	2016	2017	2018	2019	2020
Alternatives Analysis, state/federal environmental clearance, and conceptual engineering								
Project Development/Preliminary Engineering/Engineering*								
Construction**								

* Phases partially funded (Future programming and budget action subject to Board of Directors' approval)

** Pursuing federal New Starts

Rail Operations

Angels Express

- Special Metrolink service to 54 home games from March 30 to September 29, 2017.
- OCTA received a Mobile Source Air Pollution Reduction Review Committee (MSRC) grant for operation of Metrolink trains with Tier 2 clean emissions locomotives.
- Kids 18 and under ride free in July and August 2017; adult tickets are \$7 round trip.

Rail Series

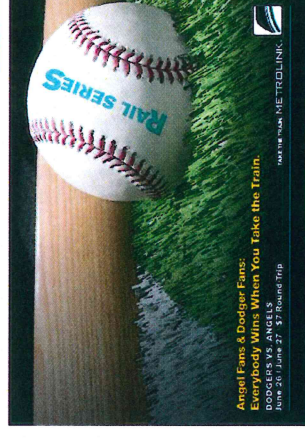
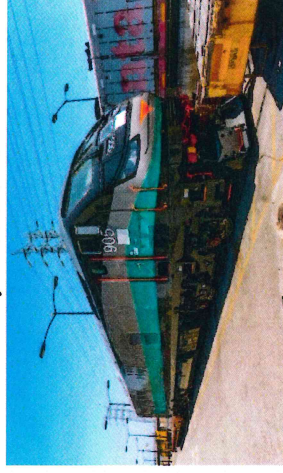
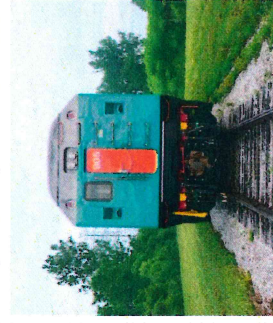
- A combination of regular and special Metrolink service on the Orange County Line for two Dodgers vs. Angels games at Dodger Stadium June 26 - 27, 2017.
- Passengers took regular service to L.A. Union Station, and transferred to the free Dodgers Express bus, and returned to Orange County on the special Metrolink train following the game.
- Ridership neared 150 each night on the return trip to Orange County.
- Special train and bus shuttle was funded by Los Angeles County Metropolitan Transportation Authority's MSRC grant.

New Sunday Service on Holidays

- Metrolink now offers a Sunday train schedule on holidays, on all lines with weekend service.
- The three lines serving Orange County operated a Sunday schedule on May 29 and July 4, 2017.

Tier 4 Locomotives

- Metrolink ordered 40 Tier 4 clean emissions locomotives and delivery has begun.
- With 11 Tier 4 units on site, testing of the new locomotives started on June 1, 2017 and will last up to three months.
- Metrolink expects to operate Tier 4 locomotives in revenue service as early as October 2017.



Facilities Engineering

Project	Cost (millions)	2016	2017	2018
Ana, GG Bases - LNG Underground Storage Tanks Removal	\$ 1.50			
Ana Base - Fence Repair and Bus Parking Stall Wheel Stops	\$ 0.07			
LBTC - Bridge Assessment and Repair	\$ 0.20			
FPNR - Bus Dock Platform Minor Rehabilitation	\$ 0.25			
GG Base - Maintenance Building HV Unit Replacement	\$ 0.29			
GG Base - Vehicle Inspection Station Equipment Canopy	\$ 0.26			
All Bases - Bus Wash Run-Off Mitigation	\$ 0.65			
SA Base - Liquid Hydrogen Fueling Station	\$ 4.77			
SA Base - Facility Modifications for Hydrogen Buses	\$ 1.13			
GG Base - Bus Yard Pavement Striping	\$ 0.07			
SA, GG Bases - Video Surveillance System	\$ 1.20			
TSOC - Preliminary Engineering and Environmental Clearance	\$ 0.92			
TOTAL	\$ 11.31			

Final Design Bid Construction

OCTA Facility Legend:

Ana	Anaheim Bus Base
FPNR	Fullerton Park-and-Ride
GG	Garden Grove Bus Base
IvCC	Irvine Construction Circle Bus Base
IvSC	Irvine Sand Canyon Bus Base
BPNR	Brea Park-and-Ride
GWTC	Golden West Transportation Center
NPTC	Newport Transportation Center
LBTC	Laguna Beach Transportation Center
SA	Santa Ana Bus Base
TSOC	Transit Security Operations Center



GG Maintenance Building
HV Unit Replacement



GG Bus Wash Water
Run-Off Mitigation



August 28, 2017

To: Members of the Board of Directors

From: Darrell Johnson, Chief Executive Officer

Subject: Approval to Release Request for Proposals for Toll Lanes System Integrator Services for the 405 Express Lanes and 91 Express Lanes

Overview

Staff has developed a request for proposals to initiate a competitive procurement process to retain contractor services to provide toll lanes system integrator services for the design, installation, operations, and maintenance of the electronic toll and traffic management system for the 405 Express Lanes and 91 Express Lanes.

Recommendations

- A. Approve the proposed evaluation criteria and weightings for Request for Proposals 7-1911 for selection of a contractor to provide toll lanes system integrator services.
- B. Approve the release of Request for Proposals 7-1911 to provide toll lanes system integrator services for the 405 Express Lanes and 91 Express Lanes.

Discussion

The Orange County Transportation Authority (OCTA), in cooperation with the California Department of Transportation, is implementing the Interstate 405 (I-405) Improvement Project between State Route 73 (SR-73) and Interstate 605 (I-605) (Project). The Project will add one general purpose lane from Euclid Street to I-605, consistent with Measure M2 Project K, and will add an additional lane in each direction that would combine with the existing high-occupancy vehicle lane to provide dual express lanes in each direction on I-405 from SR-73 to I-605, otherwise known as the 405 Express Lanes.

On October 12, 2015, the OCTA Board of Directors (Board) approved assumptions for the 405 Express Lanes as described in the 405 Express Lanes Toll Policy and Finance Plan Decisions Document (Decisions Document). This document identified that the facility would operate in a manner similar to the 91 Express Lanes with all-electronic tolling using transponders (or future non-cash/electronic tolling) and with the same account types and violation process. On May 23, 2016, the Board approved the 405 Express Lanes Toll Policy and preliminary finance plan using the operating assumptions outlined in the Decisions Document.

OCTA has over a decade of experience operating the 91 Express Lanes, a ten-mile, tolled express lanes facility in the median of State Route 91 between State Route 55 and the Orange County/Riverside County Line. Satisfaction surveys consistently indicate that nine out of ten customers are satisfied with the 91 Express Lanes. In addition, OCTA continues to meet its bond covenants, and the 91 Express Lanes have provided net excess revenues to invest in corridor improvements.

Systems and services required for both the 405 Express Lanes and 91 Express Lanes include the electronic toll and traffic management system (ETTM) (e.g. toll lanes system integrator), back office system, back office staffing, traffic operations center staffing, and customer assistance patrol.

On September 26, 2016, staff presented to the Board the toll systems and operations services procurement approach for the 405 Express Lanes, describing a multiple procurement approach that provides the most favorable options for encouraging state of the art technology and competition, high levels of customer service, and potential to achieve the best value for OCTA. This toll lanes system integrator procurement is the first of these multiple procurements described in the September 26, 2016 presentation. As part of this procurement, the toll lanes system integrator will be responsible for the design, installation, operations, and maintenance of the ETTM systems for both 405 and 91 toll facilities. The ETTM system will be comprised of several subsystems that identify and capture information for customer account billing or violation processing. The toll lanes system integrator requires close coordination with the I-405 design-build contractor providing the physical infrastructure supporting the equipment and technology.

OCTA is also scheduled to replace the 91 Express Lanes ETTM system in the next few years; therefore, the timing of combining the 405 Express Lanes and 91 Express Lanes procurement for toll lanes system integrator services is ideal. As outlined in the September 26, 2016 presentation to the Board, combining the

405 Express Lanes and 91 Express Lanes into a single procurement would be the most cost effective and efficient procurement approach, further encouraging competition and state of the art technology.

Procurement Approach

OCTA's Board-approved procurement policies and procedures require that the Board approve all requests for proposals (RFP) over \$1,000,000, as well as approve the evaluation criteria and weightings. Staff is submitting for Board approval the draft RFP and evaluation criteria and weightings, which will be used to evaluate proposals received in response to the RFP.

The proposed evaluation criteria and weights are as follows:

- | | |
|-------------------------------------|------------|
| • Qualification of the Firm | 15 percent |
| • Staffing and Project Organization | 25 percent |
| • Work Plan | 15 percent |
| • Technical Approach | 25 percent |
| • Cost and Price | 20 percent |

Several factors were considered in developing the criteria weights. Staff assigned weights with a greater level of importance to staffing and project organization, and technical approach. The qualifications of the firm in performing similar work and providing required services is significant to the success of the Project. Qualifications of the project manager and other key personnel combined with the work plan are of most importance to the timely delivery of the Project and coordination with the I-405 design builder. Also of importance is the firm's technical approach, which includes systems to collect and process transaction information, monitor system performance, and future maintenance requirements. The cost and price criterion is also very important in that it allows firms to demonstrate competitiveness in the proposed prices to carry out the required services for both express lanes facilities.

The proposals evaluation committee will be aided by a group of subject matter experts who will review the technical proposals and prepare a supplemental report that outlines the strengths and weaknesses of each proposal. The report does not carry scores, and is intended to assist the evaluation committee members in evaluating and scoring the proposals.

The combined procurement approach for both express lanes facilities is most favorable to OCTA as outlined in the September 26, 2016 presentation to the Board.

Approval to Release Request for Proposals for Toll Lanes *Page 4*
System Integrator Services for the 405 Express Lanes and
91 Express Lanes

The agreement resulting from this procurement will have an initial term of ten years, with two two-year option terms.

The RFP will be released upon Board approval of this recommendation.

Fiscal Impact

Funding for the 91 Express Lanes portion is included in OCTA's Fiscal Year 2017-18 Budget, Account 0036-9028-B0001-GXM, and will be funded through 91 Express Lanes funds. Funding for the 405 Express Lanes portion will be requested with the contract award in Account 0037-9028-A9510-GXM and will be funded through federal, state, and 405 Express Lanes funds.

Summary

Board of Directors' approval is requested to release Request for Proposals 7-1911 to provide toll lanes system integrator services for the 405 Express Lanes and 91 Express Lanes, as well as approve the proposed evaluation criteria and weightings.

Attachment

- A. Draft Request for Proposals (RFP) 7-1911, Toll Lanes System Integrator Services for the 405 Express Lanes and 91 Express Lanes

Prepared by:

A blue ink signature of Steven L. King, consisting of a stylized 'S' followed by a series of loops and a final 'K'.

Steven L. King, P.E.
Project Manager
(714) 560-5874

Approved by:

A blue ink signature of James G. Beil, featuring a stylized 'J' followed by several loops and a final 'B'.

James G. Beil, P.E.
Executive Director, Capital Programs
(714) 560-5646

A blue ink signature of Virginia Abadessa, written in a cursive style.

Virginia Abadessa
Director, Contracts Administration and
Materials Management
(714) 560-5623

DRAFT REQUEST FOR PROPOSALS (RFP) 7-1911

TOLL LANES SYSTEM INTEGRATOR SERVICES FOR THE 405 EXPRESS LANES AND 91 EXPRESS LANES



**ORANGE COUNTY TRANSPORTATION AUTHORITY
550 South Main Street
P.O. Box 14184
Orange, CA 92863-1584
(714) 560-6282**

Key RFP Dates

Issue Date:	August 28, 2017
Pre-Proposal Conference Date:	September 14, 2017
Question Submittal Date:	September 21, 2017
Authority's Response Date:	October 10, 2017
Proposal Submittal Date:	October 26, 2017
Interview Dates:	December 5 and 6, 2017

TIFIA PROJECT NUMBER 20171012A

TABLE OF CONTENTS

SECTION I:	INSTRUCTIONS TO OFFERORS	1
SECTION II:	PROPOSAL CONTENT	11
SECTION III:	EVALUATION AND AWARD	22
EXHIBIT A:	ACRONYMS AND DEFINITIONS	26
EXHIBIT B:	SCOPE OF WORK AND REQUIRMENTS.....	27
EXHIBIT C:	PRELIMINARY IMPLEMENTATION SCHEDULE	28
EXHIBIT D:	PRICE PROPOSAL AND INSTRUCTIONS TO PROPOSERS	29
EXHIBIT E:	PROPOSED AGREEMENT	31
EXHIBIT F:	MILESTONES FOR RELEASE OF RETENTION	32
EXHIBIT G:	HEALTH, SAFETY AND ENVIRONMENTAL SPECIFICATIONS	33
FORM A:	PROPOSER’S QUESTIONS FORM	55
FORM B:	CAMPAIGN CONTRIBUTION DISCLOSURE FORM.....	56
FORM C:	STATUS OF PAST AND PRESENT CONTRACTS.....	61
FORM D:	DISADVANTAGED BUSINESS ENTERPRISE (DBE) PROGRAM AND FORMS	63
FORM E:	RESTRICTIONS ON LOBBYING CERTIFICATION	76
FORM F:	CERTIFICATION OF CONSULTANT COMMISSION AND FEES	88
FORM G:	PROPOSAL EXCEPTIONS AND/OR DEVIATIONS.....	90
FORM H:	SURETY COMMITMENT LETTER.....	92
FORM I:	ESCROW AGREEMENT.....	93

FORM J:	PERFORMANCE BOND	94
FORM K:	PAYMENT BOND.....	95
FORM L:	OPERATIONS AND MAINTENANCE BOND	96
FORM M:	IRAN CONTRACTING CERTIFICATION.....	97
FORM N:	BUY AMERICA CERTIFICATION.....	98
FORM O:	RECENT CLIENT LIST	99
FORM P:	REFERENCE FORMS.....	100
FORM Q:	LIST OF SUBCONTRACTORS.....	101



NOTICE OF REQUEST FOR PROPOSALS

(RFP): 7-1911 "TOLL LANES SYSTEM INTEGRATOR SERVICES FOR THE 405 EXPRESS LANES AND THE 91 EXPRESS LANES"

TO: ALL OFFERORS

FROM: ORANGE COUNTY TRANSPORTATION AUTHORITY

The Orange County Transportation Authority (Authority) invites proposals from qualified firms to provide toll system services related to the replacement of the existing 91 Express Lanes Electronic Toll and Traffic Management (ETTM) system, and the implementation of a new ETTM system for the I-405 (405) Express Lanes as part of the I-405 Design-Build Improvement Project.

Required services under this RFP include the implementation and operations and maintenance of an electronic toll and traffic management system for both 405 Express Lanes and 91 Express Lanes. The Authority intends to award a single contract as result of this procurement, issuing a notice-to-proceed to authorize each of the two implementation phases.

The projects covered by this procurement are funded by federal, state and local funds. The 405 Express Lanes project is mainly funded by the Transportation Infrastructure Finance and Innovation Act (TIFIA) funds. The estimated budget for this Project is \$60,699,029.

The Authority has set a **2%** Disadvantaged Business Enterprise (DBE) participation goal for the 405 Express Lanes project only, as it is mainly funded with federal funds. Award of this contract is contingent upon Consultant's commitment to meet the DBE attainment requirements including good faith effort to meet the established goal.

Offerors are advised that the evaluation of team composition with regards to conflicts of interest will be done on a case-by-case basis.

Offerors are advised that by signing their proposal, they are certifying that they and their subcontractors are not debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any federal department or agency.

Proposals must be received in the Authority's office at or before 2:00 p.m. on Thursday October 26, 2017.

Proposals delivered in person or by a means other than the U.S. Postal Service shall be submitted to the following:

**Orange County Transportation Authority
Contracts Administration and Materials Management
600 South Main Street, (Lobby Receptionist)
Orange, California 92868
Attention: Ms. Reem Hashem, Section Manager III**

Proposals delivered using the U.S. Postal Service shall be addressed as follows:

**Orange County Transportation Authority
Contracts Administration and Materials Management
P.O. Box 14184
Orange, California 92863-1584
Attention: Ms. Reem Hashem, Section Manager III**

Proposals and amendments to proposals received after the date and time specified above will be returned to the Offerors unopened.

All firms interested in doing business with the Authority are required to register their business on-line at CAMM NET. The website can be found at <https://cammnet.octa.net>. From the site menu click on CAMM NET to register.

Offerors are advised that the Authority is now on Facebook, at www.facebook.com/Cammnetconnect. Cammnet Connect was created by the Authority to provide a tool for firms to build business and partnering relationships with other firms interested in business opportunities with the Authority.

Firms interested in obtaining a copy of this Request For Proposals (RFP) may do so by downloading the RFP from CAMM NET at <https://cammnet.octa.net>.

To receive all further information regarding this RFP 7-1911, firms and subcontractors must be registered on CAMM NET with at least one of the following commodity codes for this solicitation selected as part of the vendor's on-line registration profile:

<u>Category:</u>	<u>Commodity:</u>
Professional Consulting	Consultant Services –Tolling Design and Construction Consultant Services - Intelligent Transportation Systems A&E Design Consulting
Professional Services	Inspection – Testing & Analysis
Professional Services Construction	Inspection – Testing & Analysis Construction (Electrical) Installation Concrete
Rental & Lease	Equipment Rental or Lease Equipment – Rental / Supplies

A pre-proposal conference will be held on September 14, 2017, at 9:30 a.m. at the Authority's Administrative Office, 550 South Main Street, Orange, California, in Conference Room 08. All prospective Offerors are encouraged to attend the pre-proposal conference.

The Authority has established December 5 and 6, 2017, as the dates to conduct interviews. All prospective Offerors will be asked to keep these dates available.

Offerors are encouraged to subcontract with small businesses to the maximum extent possible.

All Offerors will be required to comply with all applicable equal opportunity laws and regulations.

The award of this contract is subject to receipt of federal, state and/or local funds adequate to carry out the provisions of the proposed agreement including the identified Scope of Work.

SECTION I: INSTRUCTIONS TO OFFERORS

SECTION I. INSTRUCTIONS TO OFFERORS**A. PRE-PROPOSAL CONFERENCE**

A pre-proposal conference will be held on September 14, 2017, at 9:300 a.m. at the Authority's Administrative Office, 600 South Main Street, Orange, California, in Conference Room 08. All prospective Offerors are encouraged to attend the pre-proposal conference.

B. EXAMINATION OF PROPOSAL DOCUMENTS

By submitting a proposal, Offeror represents that it has thoroughly examined and become familiar with the work required under this RFP (including all exhibits and addenda) and that it is capable of performing quality work to achieve the Authority's objectives. Failure of Offeror to so examine and inform itself shall be at its sole risk, and no relief for discrepancy, deficiency, ambiguity, error, or omission will be provided by the Authority.

C. ADDENDA

Any Authority changes to the requirements will be made by written addendum to this RFP. Any written addenda issued pertaining to this RFP shall be incorporated into the terms and conditions of any resulting Agreement. The Authority will not be bound to any modifications to or deviations from the requirements set forth in this RFP as the result of oral or written instructions. Offerors shall acknowledge receipt of addenda in their proposals. Failure to acknowledge receipt of Addenda may cause the proposal to be deemed non-responsive to this RFP and be rejected.

D. AUTHORITY CONTACT

All communication and/or contacts with Authority staff regarding this RFP are to be directed to the following Contract Administrator:

Ms. Reem Hashem, Section Manager III
Contracts Administration and Materials Management Department
600 South Main Street
P.O. Box 14184
Orange, CA 92863-1584
Phone: 714.560.5446, Fax: 714.560.5792
Email: rhashem@octa.net

Commencing on the date of the issuance of this RFP and continuing until award of the contract or cancellation of this RFP, no proposer, subcontractor, lobbyist or agent hired by the proposer shall have any contact or communications regarding this RFP with any Authority's staff; member of the evaluation committee for this RFP; or any contractor or consultant involved with the procurement, other than the Contract Administrator named above or unless expressly permitted by this RFP.

Contact includes face-to-face, telephone, electronic mail (e-mail) or formal written communication. Any proposer, subcontractor, lobbyist or agent hired by the proposer that engages in such prohibited communications may result in disqualification of the proposer at the sole discretion of the Authority.

E. CLARIFICATIONS

1. Examination of Documents

Should an Offeror require clarifications of this RFP, the Offeror shall notify the Authority in writing in accordance with Section E.2. below. Should the Authority find in its sole discretion that the point in question is not clearly and fully set forth in the RFP, the Authority will issue a written addendum clarifying the matter which will be sent to all firms registered on CAMM NET under the commodity codes specified in this RFP. The Authority shall be under no obligation to respond to any comments or questions.

2. Submitting Requests

- a. All questions, including questions that could not be specifically answered at the pre-proposal conference must be put in writing, using the attached Form A, Proposer's Questions Form, and must be received by the Authority no later than 5:00 p.m., on September 21, 2017.
- b. Requests for clarifications, questions and comments must be clearly stated and submitted, by 5:00 p.m., on September 21, 2017, in the Proposer's Questions Form, attached to this RFP as FORM A. The Authority is not responsible for failure to respond to a request that has not been submitted as such.
- c. Any of the following methods of delivering written requests for clarifications, questions, and comments are acceptable as long as the questions are received no later than the date and time specified above:
 - (1) U.S. Mail: Orange County Transportation Authority, 550 South Main Street, P.O. Box 14184, Orange, California 92863-1584.
 - (2) Personal Delivery: Contracts Administration and Materials Management Department, 600 South Main Street, Lobby Receptionist, Orange, California 92868.
 - (3) Facsimile: (714) 560-5792
 - (4) Email: rhashem@octa.net

3. Authority Responses

Responses from the Authority will be posted on CAMM NET, no later than October 10, 2017. Offerors may download responses from CAMM NET at <https://cammnet.octa.net>, or request responses be sent via U.S. Mail by emailing or faxing the request to Ms. Reem Hashem, Section Manager. To the extent that responses are provided, they will not be considered part of the Contract Documents, nor will they be relevant in interpreting the Contract Documents, except as expressly set forth therein.

To receive email notification of Authority responses when they are posted on CAMM NET, firms and subcontractors must be registered on CAMM NET with at least one of the following commodity codes for this solicitation selected as part of the vendor's on-line registration profile:

<u>Category:</u>	<u>Commodity:</u>
Professional Consulting	Consultant Services –Tolling Design and Construction Consultant Services - Intelligent Transportation Systems A&E Design Consulting
Professional Services	Inspection – Testing & Analysis
Professional Services Construction	Inspection – Testing & Analysis Construction (Electrical) Installation Concrete
Rental & Lease	Equipment Rental or Lease Equipment – Rental / Supplies

Inquiries received after 5:00 p.m. on September 21, 2017, will not be responded to.

F. SUBMISSION OF PROPOSALS

1. Date and Time

Proposals must be received in the Authority's office at or before 2:00 p.m. on October 26, 2017.

Proposals received after the above-specified date and time will be returned to Offerors unopened.

2. Address

Proposals delivered in person or by a means other than the U.S. Postal Service shall be submitted to the following:

**Orange County Transportation Authority
Contracts Administration and Materials Management (Camm)
600 South Main Street, (Lobby Receptionist)
Orange, California 92868
Attention: Ms. Reem Hashem, Section Manager III**

Or proposals delivered using the U.S. Postal Services shall be addressed as follows:

**Orange County Transportation Authority
Contracts Administration and Materials Management (Camm)
P.O. Box 14184
Orange, California 92863-1584
Attention: Ms. Reem Hashem, Section Manager III**

3. Identification of Proposals

Offeror shall submit an **original and 10 copies** of its Proposal in a sealed package, addressed as shown above in F.2. The outer envelope must show the Offeror's name and address and clearly marked with the RFP number. In addition to the above, Proposers shall also include one (1) electronic copy of their entire RFP submittal package in "PDF" format, on a CD or DVD, or flash drive.

The Price Proposal must be submitted in a sealed envelope, separate from the Proposal package, with one (1) electronic copy on CDs/DVDs or flash drives, in its native file format.

4. Acceptance of Proposals

- a. The Authority reserves the right to accept or reject any and all proposals, or any item or part thereof, or to waive any informalities or irregularities in proposals.
- b. The Authority reserves the right to withdraw or cancel this RFP at any time without prior notice and the Authority makes no representations that any contract will be awarded to any Offeror responding to this RFP.
- c. The Authority reserves the right to postpone proposal openings for its own convenience and modify any dates set for the project in the RFP.

- d. Submitted proposals are not to be copyrighted. Confidential and proprietary materials must be marked as such.
- e. The Authority reserves the right to approve or disapprove of an Offeror's Key Personnel or changes in an Offeror's organization.

G. PRE-CONTRACTUAL EXPENSES

The Authority shall not, in any event, be liable for any pre-contractual expenses incurred by Offeror in the preparation of its proposal. Offeror shall not include any such expenses as part of its proposal.

By way of example but not limitation, pre-contractual expenses include expenses incurred by Offeror in:

- 1. Preparing its proposal in response to this RFP;
- 2. Submitting that proposal to the Authority;
- 3. Negotiating with the Authority any matter related to this proposal; or
- 4. Any other expenses incurred by Offeror prior to date of award, if any, of the Agreement.

H. JOINT OFFERS

Where two or more firms desire to submit a single proposal in response to this RFP, they should do so on a prime-subcontractor basis rather than as a joint venture. The Authority intends to contract with a single firm and not with multiple firms doing business as a joint venture.

I. TAXES

Offerors' proposals are subject to State and Local sales taxes. However, the Authority is exempt from the payment of Federal Excise and Transportation Taxes.

J. PROTEST PROCEDURES

The Authority has on file a set of written protest procedures applicable to this solicitation that may be obtained by contacting the Contract Administrator responsible for this procurement. Any protests filed by an Offeror in connection with this RFP must be submitted in accordance with the Authority's written procedures.

K. CONTRACT TYPE

It is anticipated that the Agreement resulting from this solicitation, if awarded, will be a firm-fixed and variable price contract specifying firm-fixed prices for individual

milestones, and variable pricing for portions of the work during the Operations and Maintenance periods, as specified in the Scope of Work and Requirements, included in this RFP as Exhibit B.

L. FUNDING

Funding for the two projects covered by this solicitation is as follows: for the 91 Express Lanes Project, only Local funds will be used. Funding for the 405 Express Lanes Project includes Federal, State and Local funds.

M. CONFLICT OF INTEREST

All Offerors responding to this RFP must avoid organizational conflicts of interest which would restrict full and open competition in this procurement. An organizational conflict of interest means that due to other activities, relationships or contracts, an Offeror is unable, or potentially unable to render impartial assistance or advice to the Authority; an Offeror's objectivity in performing the work identified in the Scope of Work is or might be otherwise impaired; or an Offeror has an unfair competitive advantage. Conflict of Interest issues must be fully disclosed in the Offeror's proposal.

All Offerors must disclose in their proposal and immediately throughout the course of the evaluation process if they have hired or retained an advocate to lobby Authority staff or the Board of Directors on their behalf.

Offerors hired to perform services for the Authority are prohibited from concurrently acting as an advocate for another firm who is competing for a contract with the Authority, either as a prime or subcontractor.

N. CODE OF CONDUCT

All Offerors agree to comply with the Authority's Code of Conduct, available at www.octa.net, as it relates to Third-Party contracts which is hereby referenced and by this reference is incorporated herein. All Offerors agree to include these requirements in all of its subcontracts.

O. DISADVANTAGED BUSINESS ENTERPRISE

The Authority has established a two (2%) percent Disadvantaged Business Enterprise (DBE) participation goal for the services outlined in the Scope of Work and Requirements.

Offerors are advised that commitment letters from proposed subcontractors that are intended to satisfy the DBE participation goal are required. The letters must

include the dollar amounts and percentages of the CONTRACTOR's price committed, and be submitted along with the Proposal.

P. PROHIBITION

The following restrictions apply to this procurement:

The firm, including all subcontractors (at any tier), regardless of the level of service provided by said subcontractor(s), awarded this contract for Toll Lanes System Integration Services for the 405 improvement project will be ineligible to participate (at any tier) as a member of the existing design-build delivery team for the same project. Furthermore, no member of the 405 design-build delivery team will be eligible to participate (at any tier) as a member of the CONTRACTOR team that is awarded this contract for Toll Lanes System Integration Services.

The firm, including all subcontractors (at any tier), regardless of the level of service provided by said subcontractor(s), awarded the program management services contract for the Highway Delivery Department, may not submit a proposal to this procurement.

The firm, including all subcontractors (at any tier), regardless of the level of service provided by said subcontractor(s), awarded the program management consultant contract for this 405 improvement project, may not submit a proposal to this procurement.

The firm, including all subcontractors (at any tier), regardless of the level of service provided by said subcontractor(s), awarded the construction management consultant contract for this 405 improvement project, may not submit a proposal to this procurement.

Furthermore, Offeror(s) are advised that the evaluation of team composition with regards to conflicts of interest will be done on a case-by-case basis.

Q. PRIME AND LOWER TIER DEBARMENT

Offerors are advised that by signing their proposal, they are certifying that they and their subcontractors are not debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any federal department or agency.

R. PREVAILING WAGES

This project is funded under a financial assistance contract by the U.S. Department of Transportation and is subject to all conditions of the Davis-Bacon Act (40 U.S.C. 276a) and the Labor Code of the State of California commencing in Section 1770 et. seq. It is required that all mechanics and laborers employed or working at the

site be paid not less than the current basic hourly rates of pay and fringe benefits. Wage schedules are available at the Authority's Offices or on the internet at www.dir.ca.gov/DLSR/statistics_research.html and www.access.gpo.gov/davisbacon/. Bidders shall utilize the relevant prevailing wage determinations in effect on the first advertisement date of the Notice Inviting Sealed Bids. In the event there are any differences between the minimum wage rates as determined by the United States Secretary of Labor and those determined by the State of California, the highest rate must be paid.

S. PERMITS AND INSPECTION COSTS

Successful bidder shall procure all permits and licenses; pay all charges, assessments and fees, as may be required by the ordinances and regulations of the public agencies having jurisdiction over the areas in which the work is located, and shall comply with all the terms and conditions thereof and with all lawful orders and regulations of each such public agency relating to construction operations under the jurisdiction of such agency.

T. EXECUTION OF CONTRACT

The successful bidder shall submit to the Authority: Form E "Certification of Restrictions on Lobbying", the Surety Commitment Letter as shown in Form H, the required contract bonds shown in Forms J, K and L, and acceptable insurance certificates, as required by the proposed Agreement, within fifteen (15) business days after notification of contract award from the Authority. Failure to sign the contract and submit applicable bonds, "Certification of Restrictions on Lobbying" form and acceptable insurance certificates within the specified time shall be cause to cancel the award. Transfers of contract, or of interest in contracts, are prohibited.

Additionally, at Authority's sole discretion, a letter of Guaranty may be requested from Offerors if deemed necessary.

U. LIQUIDATED DAMAGES

Authority reserves the right to assess liquidated damages related to CONTRACTOR's performance, key personnel, time and schedule, guaranteed completion dates and delay against the CONTRACTOR, as detailed in the Proposed Agreement included in this RFP as Exhibit E.

V. PUBLIC RECORDS AND INFORMATION

Proposals received by Authority are considered public information and will be made available to the public if requested to do so. In no event shall the Authority

or any of its agents, representatives, consultants, directors, officers, or employees be liable to an Offeror for the disclosure of any materials or information submitted in response to the RFP.

SECTION II: PROPOSAL CONTENT

SECTION II. PROPOSAL CONTENT

A. PROPOSAL FORMAT AND CONTENT

1. Format

Proposals should be typed with a standard 12 point font, double-spaced and submitted on 8 1/2" x 11" size paper, using a single method of fastening. Charts and schedules may be included in 11"x17" format. Proposals should not include any unnecessarily elaborate or promotional materials. Proposals should not exceed seventy-five (75) pages in length, excluding any appendices, cover letters, resumes, project schedule, or required forms.

Proposal sections to be completed by Offeror and submitted with the Proposal include the following appendices with Table of Contents, preliminary bill of materials for all equipment, software and hardware including manufacturer, model number, quantities and cut sheets. There is no page count limitation on these documents.

2. Letter of Transmittal

The Letter of Transmittal shall be addressed to Ms. Reem Hashem, Section Manager III, and must, at a minimum, contain the following:

- a. Identification of Offeror that will have contractual responsibility with the Authority. Identification shall include legal name of company, corporate address, telephone and fax number, and email address. Include name, title, address, email address, and telephone number of the contact person identified during period of proposal evaluation. Licensing information, if applicable, such as license number and status of license, must be submitted.
- b. Identification of all proposed subcontractors including legal name of company, whether the firm is a Disadvantaged Business Enterprise (DBE), contact person's name and address, phone number and fax number, and email address; relationship between Offeror and subcontractors, if applicable. Also, the committed dollar amount and percentage of Contractor's price must be included for each proposed DBE subcontractor, supported by commitment letters from each of the DBE subcontractors. Licensing information, if applicable, such as license number and status of license, must be submitted.
- c. Acknowledgement of receipt of all RFP addenda, if any.

- d. A statement to the effect that the proposal shall remain valid for a period of not less than 180 days from the date of submittal.
- e. Signature of a person authorized to bind Offeror to the terms of the proposal.
- f. Signed statement attesting that all information submitted with the proposal is true and correct.

3. Executive Summary

The Executive Summary shall be a brief overview, summarizing the Technical Proposal, and explaining how the Proposal being offered best addresses the evaluation criteria listed in this RFP. Describe your understanding of Authority's needs and your approach in developing and integrating the system, coordination with OCTA and other contractors, and how the System's integrity will be protected and enhanced over the life of the Contract. Describe the amount of Design and Software development anticipated. Identify any Subcontractors and discuss their proposed roles on the Project.

4. Technical Proposal

a. Qualifications, Related Experience and References of Offeror

This section of the proposal should establish the ability of Offeror to satisfactorily perform the required work by reasons of: experience in performing work of a similar nature; demonstrated competence in the services to be provided; strength and stability of the firm; staffing capability; work load; record of meeting schedules on similar projects; and supportive client references.

Offeror to:

- (1) Provide a brief profile of the firm, including the types of services offered; the year founded; form of the organization (corporation, partnership, sole proprietorship); number, size and location of offices; and number of employees.
- (2) Provide a general description of the firm's financial condition and identify any conditions (e.g., bankruptcy, pending litigation, planned office closures, impending merger) that may impede Offeror's ability to complete the project.

- (3) Describe the firm's experience in performing work of a similar nature to that solicited in this RFP, and highlight the participation in such work by the key personnel proposed for assignment to this project.
- (4) Identify subcontractors by company name, address, contact person, telephone number, email, and project function. Describe Offeror's experience working with each subcontractor.
- (5) Identify all firms hired or retained to provide lobbying or advocating services on behalf of the Offeror by company name, address, contact person, telephone number and email address. This information is required to be provided at time of proposal submittal and updated by the Offeror immediately during the evaluation process, if a lobbyist or advocate is hired or retained.
- (6) Provide as a minimum three (3) references for the projects cited as related experience, and furnish the name, title, address, telephone number, and email address of the person(s) at the client organization who is most knowledgeable about the work performed. Offeror may also supply references from other work not cited in this section as related experience.

b. Proposed Staffing and Project Organization

This section of the proposal should establish the method, which will be used by the Offeror to manage the project as well as identify key personnel assigned.

Offeror to:

- (1) Identify key personnel proposed to perform the work in the specified tasks and include major areas of subcontract work. Include the person's name, current location, proposed position for this project, current assignment, level of commitment to that assignment, availability for this assignment and how long each person has been with the firm.
- (2) Furnish brief resumes (not more than two [2] pages each) for the proposed Project Manager and other key personnel that includes education, experience, and applicable professional credentials.
- (3) Indicate adequacy of labor resources utilizing a table projecting the labor-hour allocation to the project by individual task.
- (4) Include a project organization chart, which clearly delineates communication/reporting relationships among the project staff.

- (5) Include a statement that key personnel will be available to the extent proposed for the duration of the project acknowledging that no person designated as "key" to the project shall be removed or replaced without the prior written consent of the Authority.

c. Technical Approach

Offeror should provide a narrative and diagrams, which addresses the Scope of Work and Requirements, and describes the Offeror's technical systems and processes approach.

Offeror to:

- (1) Describe the proposed process for transitioning from the existing 91 Express Lanes system to the new ETTM System and how the Proposer will minimize lane closures and potential loss of revenue.
- (2) Describe the proposed process for working with 405 Design Builder to ensure proper ETTM System Infrastructure design, as well as the coordination of MOT, ETTM System installation and testing to ensure quality and meet the schedule.
- (3) Furnish ETTM System diagrams that provide equipment layouts for each at the ETTM Site types.
- (4) Describe how the Offeror's ETTM Toll Collection and Enforcement Site and ETTM Transponder Read Site designs provide for ease of installation and maintenance, minimization of maintenance related lane closures, as well as any unique design or operational features that benefit the Authority.
- (5) Describe unique design or operational features of the Roadside Support Systems that benefit the Authority, specifically address trip building logic, image review processes to ensure accuracy; system monitoring; and Shadow Dynamic Pricing;
- (6) Offeror is encouraged to propose enhancements and technical innovations to the Scope of Work that do not materially deviate from the objectives or required content of the Project.
- (7) Offeror is to provide in a separate appendix a preliminary bill of materials for all equipment, software and hardware including manufacturer, model number, quantities and cut sheets. There is no page count limitation on these documents.

d. Work Plan

Offeror should provide a narrative, which addresses the Scope of Work and Requirements, and shows Offeror's understanding of Authority's needs and requirements.

Offeror to:

- (1) Describe the approach to completing the tasks specified in the Scope of Work and Requirements. The approach to the work plan shall be of such detail to demonstrate the Offeror's ability to accomplish the project objectives and overall schedule.
- (2) Outline sequentially the activities that would be undertaken in completing the tasks and specify who would perform them.
- (3) Furnish a project schedule for completing the tasks in terms of elapsed weeks.
- (4) Identify methods that Offeror will use to ensure quality control as well as budget and schedule control for the project.
- (5) Identify any special issues or problems that are likely to be encountered in this project and how the Offeror would propose to address them.
- (6) Offeror is encouraged to propose enhancements or procedural or technical innovations to the Scope of Work that do not materially deviate from the objectives or required content of the project.

e. Exceptions/Deviations

State any technical and/or contractual exceptions and/or deviations from the requirements of this RFP, including the Authority's technical requirements and contractual terms and conditions set forth in the Scope of Work and Requirements (Exhibit B) and Proposed Agreement (Exhibit E), using the form entitled "Proposal Exceptions and/or Deviations" (Form G) included in this RFP. This Proposal Exceptions and/or Deviations form must be included in the original proposal submitted by the Offeror.

If no technical or contractual exceptions and/or deviations are submitted as part of the original proposal, Offerors are deemed to have accepted the Authority's technical requirements and contractual terms and conditions set forth in the Scope of Work and Requirements (Exhibit B) and Proposed Agreement (Exhibit E.) Offerors will not be allowed to submit the Proposal Exceptions and/or

Deviations from or any technical and/or contractual exceptions after the proposal submittal date identified in the RFP. Exceptions and/or deviations submitted after the proposal submittal date will not be reviewed by Authority.

All exceptions and/or deviations will be reviewed by the Authority and will be assigned a “pass” or “fail” status. Exceptions and deviations that “pass” do not mean that the Authority has accepted the change but that it is a potential negotiable issue. Exceptions and deviations that receive a “fail” status means that the requested change is not something that the Authority would consider a potential negotiable issue. Offerors that receive a “fail” status on their exceptions and/or deviations will be notified by the Authority and will be allowed to retract the exception and/or deviation and continue in the evaluation process. Any exceptions and/or deviation that receive a “fail” status and the Offeror cannot or does not retract the requested change may result in the firm being eliminated from further evaluation.

5. Cost and Price Proposal

As part of the cost and price proposal, the Offeror shall submit proposed pricing to provide the services for each work task described in the Scope of Work and Requirements.

The Offeror shall complete the "Price Proposal" form (Exhibit D) included with this RFP and submit in a separately sealed envelope from the Technical Proposal as further set forth below. The Offeror shall furnish any narrative required to explain the prices quoted in the Price Proposal.

All boxes, packages, and envelopes containing Price Proposals shall be clearly labeled with Offeror's name, "Price Proposal" and this RFP title and number (along with the package number (e.g., 1 of 1). The original Price Proposal envelope shall be marked "Original".

Two CDs/DVDs or flash drives containing the Price Proposal in electronic format shall be provided in the Price Proposal envelope. The file format for the electronic copy of the Price Proposal shall be Microsoft Excel 2010. The CD/DVDs or flash drive containing the Price Proposal shall be clearly labeled with the same nomenclature identified for the outside of the sealed Price Proposal package. In the event of a discrepancy between the signed hard copy Price Proposal and the electronic copy, the signed hard copy submittal will take precedence. File names shall also be clearly identified with the Proposer's name, contents label, and RFP number

It is anticipated that the Authority will enter into a firm fixed and variable price contract specifying firm fixed prices for the Implementation Phases, as

well as other variable prices for portions of the work during the Operations and Maintenance periods, as specified in the Scope of Work and Requirements, included in this RFP.

6. Appendices

Information considered by Offeror to be pertinent to this project and which has not been specifically solicited in any of the aforementioned sections may be placed in a separate appendix section. Offerors are cautioned, however, that this does not constitute an invitation to submit large amounts of extraneous materials. Appendices should be relevant and brief.

B. FORMS

Forms are to be submitted in a separate proposal section entitled "Forms". The following forms shall be included in this Proposal Section:

1. Proposer's Questions Form – Form A

Offerors shall use this form to submit any questions they may have with respect to this RFP or any part thereof.

2. Campaign Contribution Disclosure Form – Form B

In conformance with the statutory requirements of the State of California Government Code Section 84308, part of the Political Reform Act and Title 2, California Code of Regulations 18438 through 18438.8, regarding campaign contributions to members of appointed Boards of Directors, Offeror is required to complete and sign the Campaign Contribution Disclosure Form provided in this RFP and submit as part of the proposal. Offeror is required to submit only one copy of the completed form(s) as part of its proposal and it should be included in only the original proposal. The prime consultant, subcontractors, lobbyists and agents are required to report all campaign contributions from the proposal submittal date up and until the Board of Directors makes a selection, which is currently scheduled for February 12, 2018.

3. Status of Past and Present Contracts Form – Form C

Offeror shall complete and sign the form entitled "Status of Past and Present Contracts" provided in this RFP and submit as part of its proposal. Offeror shall identify the status of past and present contracts where the firm has either provided services as a prime vendor or a subcontractor during the

past five (5) years in which the contract has been the subject of or may be involved in litigation with the contracting authority. This includes, but is not limited to, claims, settlement agreements, arbitrations, administrative proceedings, and investigations arising out of the contract. Offeror shall have an ongoing obligation to update the Authority with any changes to the identified contracts and any new litigation, claims, settlement agreements, arbitrations, administrative proceedings, or investigations that arise subsequent to the submission of Offeror's proposal.

A separate form must be completed for each identified contract. Each form must be signed by the Offeror confirming that the information provided is true and accurate. Offeror is required to submit one copy of the completed form(s) as part of its proposals and it should be included in only the original proposal.

4. Disadvantaged Business Enterprise Program and Forms – Form D

Offeror shall complete Forms D-1, D-2, D-3, D-4, D-5, D-6, and D-7 per the instructions set forth in “DISADVANTAGED BUSINESS ENTERPRISE (DBE) PROVISIONS FOR FEDERALLY-ASSISTED CONTRACTS.”

5. Restrictions on Lobbying Form – Form E

As a recipient of federal funds, the Authority is required to certify compliance with the influencing restrictions and efforts of Offeror to influence federal officials regarding specific procurements in excess of \$100,000.00 that must be disclosed pursuant to section 1352, Title 31, U.S. Code.

This RFP includes, under Form E, the following forms: a certification form entitled “Certification of Restrictions on Lobbying,” the office of Management and Budget (OMB) Standard Form E entitled “Disclosure of Lobbying Activities,” and a document entitled “Limitation on Payments to Influence Certain Federal Transactions.”

The Offeror to this solicitation will be required to complete and submit to the Authority in their proposal, the certification form entitled “Certification of Restrictions on Lobbying” whether or not any lobbying efforts took place. If the Offeror did engage in lobbying activities, then OMB Standard Form E “Disclosure of Lobbying Activities” must also be completed and submitted to the Authority.

6. Certification of Consultant Commission and Fees- Form F

In receiving federal funds, Offerors are required to complete the Certification of Consultants, Commissions and Fees form. This form is to be included with the Offeror's proposal.

7. Proposal Exceptions and/or Deviations Form – Form G

Offerors shall complete the form entitled "Proposal Exceptions and/or Deviations" provided in this RFP and submit it as part of the original proposal. For each exception and/or deviation, a new form should be used, identifying the exception and/or deviation and the rationale for requesting the change. Exceptions and/or deviations submitted after the proposal submittal date will not be reviewed nor considered by the Authority.

8. Surety Commitment Letter – Form H

Offerors shall complete, sign, seal, and submit this Surety Commitment Letter with the Proposal.

9. Escrow Agreement – Form I

10. Performance Bond – Form J

11. Payment Bond – Form K

12. Operations and Maintenance Bond – Form L

13. Iran Contracting Certification – Form M

Offerors shall complete and submit this Iran Contracting Certification form at the time of submitting Proposals.

14. BIDDER'S CERTIFICATE REGARDING "BUY AMERICA"- FORM N

Pursuant to 49 CFR Part 661, as amended by Section 337 of the Surface Transportation and Uniform Relocation Act of 1987, no federal funds authorized by the Urban Mass Transportation Act of 1964, as amended; 23 USC 103 (e)(4); and Section 14 of the National Capital Transportation Act of 1969 as amended; and which were obligated by the Federal Transit Administration (FTA) after January 6, 1983 shall be obligated by the Authority unless steel and manufacturers' products used in such articles are produced in the United States.

A bidder providing articles that do not meet the above provision must submit a written request to the Authority, which may be forwarded, to FTA. FTA shall review the request for waiver and FTA may grant such a waiver if FTA determines that:

1. The application of the domestic preference requirements would be inconsistent with the public interest; Materials are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality; or

2. The inclusion of a domestic item or domestic material will increase the cost of the contract for the item or material by more than 25 percent.

FTA may grant a waiver in the case of the procurement of buses and other rolling stock (including train control, communications and traction power equipment), if the cost of components and subcomponents of such items which are produced in the United States is more than 60 percent for contracts entered into after April 1, 1992 with any supplier or contractor or any successor in interest or assignee which complied with the requirements of Section 165(b)(3) of the Surface Transportation Assistance Act of 1982 prior to April 2, 1987.

To determine costs of components or subcomponents for compliance with the Buy America Requirements, the bidder is referred to the Federal Register, Volume 56, No. 6, Dated January 9, 1991.

In order to demonstrate compliance with the Buy America Requirements, bidder shall complete the Certificates of Compliance/Noncompliance, included in this IFB. Failure to complete the appropriate certificate shall render a bidder non-responsive to this solicitation and will result in the rejection of the bid.

15. Recent Client List – Form O

16. Reference Forms – Form P

SECTION III: EVALUATION AND AWARD

SECTION III. EVALUATION AND AWARD

A. EVALUATION CRITERIA

The Authority will evaluate the offers received based on the following criteria:

- 1. Qualifications of the Firm 15%**

Technical experience in performing work of a closely similar nature; experience working with public agencies; strength and stability of the firm; strength, stability, experience and technical competence of subcontractors; assessment by client references.
- 2. Staffing and Project Organization 25%**

Qualifications of project staff, particularly key personnel and especially the Project Manager; key personnel's level of involvement in performing related work cited in "Qualifications of the Firm" section; logic of project organization; adequacy of labor commitment; concurrence in the restrictions on changes in key personnel.
- 3. Work Plan 15%**

Depth of Offeror's understanding of Authority's requirements and overall quality of work plan; logic, clarity and specificity of work plan; appropriateness of resource allocation among the tasks; reasonableness of proposed schedule; utility of suggested technical or procedural innovations.
- 4. Technical Approach 25%**

Quality of Offeror's technical approach to systems, processes and functionality including, lane systems design and ease of installation and maintenance; beneficial functionality; transaction and image processing; trip building and image review; configurability; flexibility for growth; fault tolerance; automated monitoring and issue tracking/escalation.
- 5. Cost and Price 20%**

Reasonableness of the total price as well as the individual tasks; competitiveness with other offers received; adequacy of data in support of figures quoted.

B. EVALUATION PROCEDURE

All proposals received in response to this RFP, will be reviewed by two groups of evaluators. The committees are comprised of Authority staff and may include outside personnel.

The first group is the Technical Review Committees and is comprised of subject-matter experts who are tasked with reviewing only the proposals' technical information, and providing input to the evaluation committee. The second group is the evaluation committee, which is appointed and tasked with reviewing and scoring the proposals' technical and price information. The evaluation committees' members will evaluate the written proposals using the criteria identified in Section III A. A list of top ranked proposals, firms within a competitive range, will be developed by the evaluation committee based upon the totals of each committee members' score for each proposal.

During the evaluation period, the Authority may interview some or all of the proposing firms. The Authority has established December 5 & 6, 2017, as the dates to conduct interviews. All prospective Offerors are asked to keep these dates available. No other interview dates will be provided, therefore, if an Offeror is unable to attend the interview on this date, its proposal may be eliminated from further discussion. The interview may consist of a short presentation by the Offeror after which the evaluation committee will ask questions related to the firm's proposal and qualifications.

At the conclusion of the proposal evaluations, Offerors remaining within the competitive range may be asked to submit a Best and Final Offer (BAFO). In the BAFO request, the firms may be asked to provide additional information, confirm or clarify issues and submit a final cost/price offer. A deadline for submission will be stipulated.

At the conclusion of the evaluation process, the evaluation committee will recommend to the Regional Planning and Highway Committee, the Offeror with the highest final ranking or a short list of top ranked firms within the competitive range whose proposal(s) is most advantageous to the Authority. The Board Committee will review the evaluation committee's recommendation and forward its decision to the full Board of Directors for final action.

C. AWARD

The Authority will evaluate the proposals received and will submit, with approval of the Regional Planning and Highway Committee, the proposal considered to be the most competitive to the Authority's Board of Directors, for consideration and selection. The Authority may also negotiate contract terms with the selected Offeror prior to award, and expressly reserves the right to negotiate with several Offerors simultaneously and, thereafter, to award a contract to the Offeror offering the most favorable terms to the Authority.

The Authority reserves the right to award its total requirements to one Offeror or to apportion those requirements among several Offerors as the Authority may deem to be in its best interest. In addition, negotiations may or may not be conducted with Offerors; therefore, the proposal submitted should contain Offeror's most

favorable terms and conditions, since the selection and award may be made without discussion with any Offeror.

The selected offeror will be required to submit to the Authority's Accounting department a current IRS W-9 form prior to commencing work.

D. NOTIFICATION OF AWARD AND DEBRIEFING

Offerors who submit a proposal in response to this RFP shall be notified via CAMM NET of the contract award. Such notification shall be made within three (3) business days of the date the contract is awarded.

Offerors who were not awarded the contract may obtain a debriefing concerning the strengths and weaknesses of their proposal. Unsuccessful Offerors, who wish to be debriefed, must request the debriefing in writing or electronic mail and the Authority must receive it within three (3) business days of notification of the contract award.

EXHIBIT A: ACRONYMS AND DEFINITIONS

EXHIBIT A

ACRONYMS & DEFINITIONS

**Electronic Toll and Traffic Management
(ETTM) System**

SR-91 and I-405 Express Lanes

August 14, 2017

Acronyms

The following Acronyms shall have the following meanings:

Acronym	Meaning
AD	Active Directory
AET	All-Electronic Tolling
ALPR	Automatic License Plate Recognition
ATMS	Advanced Traffic Management System
AVC	Automatic Vehicle Classification
AVD	Automatic Vehicle Detection
AVI	Automatic Vehicle Identification
BAFO(s)	Best and Final Offer(s)
BCP	Business Continuity Plan
BOM	Bill of Materials
BOS	Back Office System
BR	Business Rules
CA	California
CAD	Computer Aided Design
Caltrans	California Department of Transportation
CAP	Corrective Action Plan
CARB	California Air Resource Board
CASS™	Coding Accuracy Support System
CAT6	Category 6 Cable
CAV	Clean Air Vehicle
CCB	Change Control Board
CCTV	Closed-Circuit Television
CDRL	Contract Deliverables Requirements List
CHP	California Highway Patrol
CIS	Compliance Information System
CMDB	Configuration Management Database
CMS	Changeable Message Sign
COTS	Commercial Off-the-Shelf

CPU	Central Processing Unit
CRM	Customer Relationship Management
CSC	Customer Service Center
CSC BOS	Customer Service Center BOS
CSR	Customer Service Representative
CSWRD	Conformed Scope of Work and Requirements Document
CTOC	California Toll Operators Committee
DB	Design-Build
DBA	Database Administrator
DBE	Disadvantaged Business Enterprise
DMV	California Department of Motor Vehicles
DPS	Dynamic Pricing System
DR	Disaster Recovery
DRP	Disaster Recovery Plan
DVAS	Digital Video Audit System
EDMS	Electronic Document Management Software
EMI	Electromagnetic Interference
EMV	Europay, MasterCard and Visa,
ERD	Entity Relationship Diagram
ETTM	Electronic Toll and Traffic Management
FAT	Factory Acceptance Test
FCC	Federal Communications Commission
FHWA	Federal Highway Administration
FIFO	First in First Out
FTP	File Transfer Protocol
GAAP	General Accepted Accounting Principles
GASB	Government Accounting Standards Board
GP	General Purpose
GSA	Government Services Administration
GUI	Graphical User Interface
HOT	High Occupancy Toll Lane
HOV	High Occupancy Vehicle

HTML	Hypertext Transfer Markup Language
HTTPS	Hypertext Transfer Protocol Secure
HVAC	Heating Ventilation and Air Conditioning
ICD	Interface Control Document
ICLP	Interoperable Customer License Plate
ICPS	Image Capture and Processing System
ID	Identification
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IP	Internet Protocol
IRS	Internal Revenue Service
ISA	Internal Security Assessor
ISO	International Standards Organization
ISP	Internet Service Provider
IT	Information Technology
I-Toll	Image Toll
ITS	Intelligent Transportation Systems
IVR	Interactive Voice Response
KPIs	Key Performance Indicators
KVM	Keyboard, Video, and Mouse
LAN	Local Area Network
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LIFO	Last in First Out
LNG	Liquified Natural Gas
LOS	Level of Service
LP	Liquid Propane
MAP-21	Moving Ahead for Progress in the 21 st Century Act
MBE/WBE	Minority Business Enterprise/Women Based Enterprise
MICR	Magnetic Ink Character Recognition line
MOMS	Maintenance Online Management System
MOT	Maintenance of Traffic

MS	Microsoft
MTBF	Mean Time Between Failures
MTP	Master Test Plan
MTTR	Mean Time to Repair
MUTCD	Manual on Uniform Traffic Control Devices
NCOA	National Change of Address
NCR	Non-Conformance Report
NEC	National Electric(al) Code
NEMA	National Electrical Manufacturers Association
NFC	Near-Field Communication
NIOP	National Interoperability
NPST	Not Posted Status
NSF	Insufficient funds
NTCIP	National Transportation Communications for ITS Protocol
NTP	Notice to Proceed
OCR	Optical Character Recognition
OCTA	Orange County Transportation Authority
ODS	Occupancy Detection System
OIT	Onsite Installation Test
OJT	On-the-Job Training
OLAP	Online Analytical Processing
ORT	Open Road Tolling
OSHA	Occupational Safety and Health Administration
PA-DSS	Payment Application Data Security Standards
PBX	Private Branch Exchange
PCI	Payment Card Industry
PCI-DSS	Payment Card Industry Data Security Standards
PDF	Portable Document Format
PII	Personally Identifiable Information
PIN	Personal Identification Number
PMBOK	Project Management Body of Knowledge
PMI	Project Management Institute

PMMS	Performance Management and Monitoring System
PMP	Project Management Plan
POS	Point-of-Sale
PPA	Prepaid Video Account
PTS	Personal Identification Number Transaction Security
PTZ	Pan-Tilt-Zoom
QA	Quality Assurance
QC	Quality Control
QSA	Qualified Security Assessor
RAID	Redundant Array of Independent Disks
RDBMS	Relational Database Management System
RF	Radio Frequency
RFI	Radio Frequency Interference
RFP	Request for Proposal
RMA	Return Merchandise Authorization number
ROC	Report on Compliance
ROI	Region of Interest
ROV	Registered Owner of Vehicle
RPO	Recovery Point Objective
RSS	Roadway Support System
RTF	Rich Text Format
RTM	Requirements Traceability Matrix
RTO	Recovery Time Objective
SAN	Storage Area Network
SAS	Statement on Auditing Standards
SDDD	System Detailed Design Document
SDLC	Software Development Life Cycle
SDP	Software Development Plan
SFTP	Secure File Transfer Protocol
SIP	Session Initiation Protocol
SMS	Short Message Service
SNMP	Simple Network Management Protocol

SOV	Single Occupancy Vehicle
SOW	Scope of Work
SNMP	Simple Network Management Protocol
SRD	System Requirements Documents
SRR	System Requirements Review
SSAE-16	Statement on Standards for Attestation Engagements (SSAE) No. 16, Reporting on Controls at a Service Organization
SSOP	System Standard Operating Procedures
TAP	Transit Access Pass
TCP/IP	Transmission Control Protocol/Internet Protocol
TEB	Toll Equipment Building
TDS	Traffic Detection System
TEES	Transportation Electrical Equipment Specification
TMC	Transportation Management Center
TOC	Toll Operations Center
TOD	Time of Day
TPB	Toll Plaza Building
TS&M	Traffic Simulator and Modeling
TSI	Toll System Integrator
TSL	Transponder Status List
TTY	Teletype Writer
UIL	User Identification Lists
UL	Underwriter's Laboratory
UO	Unusual Occurrence
UPS	Uninterruptible Power Supply
URL	Uniform Resource Locator
USPS	United States Postal Service
VExpress Lane	Violation Enforcement List
VLAN	Virtual Local Area Network
VPN	Virtual Private Network
VSR	Vehicle Signature Recognition
W3C	World Wide Web Consortium

WAN	Wide Area Network
WBS	Work Breakdown Structure
WIC	Walk-in Center
XML	Extensible Markup Language

Definitions

The following Terms, as used in this RFP and the Agreement, are capitalized throughout the document and shall be defined as follows:

Term	Definition
91 Express Lanes	The existing Express Lanes on SR-91 between the Costa Mesa Freeway (SR-55) in Anaheim and Orange County/Riverside County line operated by the AUTHORITY.
91 Express Lanes TOC	The location from which the AUTHORITY will oversee the 91 Express Lanes and location of the 91 Advanced Traffic Management System.
Acceptance	Approval of a Phase or a test by AUTHORITY, based on meeting certain conditions and test requirements, including Approvals.
Account	A User Account created by a customer, CSR or automatically by the System that includes but is not limited to information, such as an associated license plate, Transponder, customer demographics, and/or vehicle information, as well as, in most cases, associated contact and/or address information.
Advanced Traffic Management System (ATMS)	The system that takes the inputs from the ETTM Roadside Equipment and is used by the TOC operators to monitor and provide traffic management for the Express Lanes.
Agent	A third-party representative designated in writing to act by AUTHORITY on its behalf on specified matters.
Agreement	The set of documents containing the terms and conditions, and all the attached documents, including scope of work, schedule, pricing documents, that are pertinent to CONTRACTOR's Services, including all amendments thereto.
Agreement Amendment	A modification to any term, condition, scope of work, price, or any other aspect of the Agreement that is agreed to in writing and executed by both parties. Also referred to as "Amendment"
Agreement Term	The duration of the Agreement, period during which all CONTRACTOR's services must be completed and delivered to AUTHORITY.
Alert(s)/ed/ing)	Electronic Notifications sent by the System to notify Authorized Users or Customers of System issues or states that may require their attention.

All-Electronic Tolling (AET)	Cashless toll collection system where tolls are collected electronically while vehicles travel through the Toll Zone without stopping.
All-Electronic Tolling (AET) Facility	A Toll Facility that utilizes AET.
Amendment	See "Agreement Amendment".
Annual System Certification	A CONTRACTOR provided annual process to verify that the System is operating as designed.
Approve	The term "Approve" and its variations (e.g., "Approval" or "Approved"), when capitalized in this Agreement refer to Acceptance of a process, vendor, document, condition, action or Deliverable in writing by AUTHORITY. Approval by AUTHORITY shall not be construed to mean endorsement or assumption of liability by AUTHORITY nor shall it relieve CONTRACTOR of its responsibilities under the Agreement.
Approved Baseline Implementation Schedule	The Baseline Implementation Schedule Approved pursuant to the Agreement.
As-Built	The term "As-Built" used alone or in conjunction with varying document types (for example, Drawings, Plans, etc.) that constitutes a complete and accurate record of the ETTM System or portions thereof as Designed, delivered, installed, Accepted and Approved.
AUTHORITY or Authority	Orange County Transportation Authority, or its designated representative.
Authorized User	Using a role-based login, a user with specific authority to perform a function(s) in the System. An Authorized User could be CONTRACTOR, AUTHORITY user, or a Third-Party Service Provider designated by AUTHORITY.
Automated License Plate Recognition (ALPR)	An automated Software process that extracts license plate information from the image of the license plate.
Automatic Vehicle Classification (AVC) System	A CONTRACTOR provided System that classifies the vehicles by vehicle type based on characteristics, such as number of axles or profile.
Automatic Vehicle Detection (AVD) System	A CONTRACTOR provided System that detects the presence of a vehicle in the Toll Zone.
Automatic Vehicle Identification (AVI)	A CONTRACTOR provided System of integrated devices and components that reads Transponders in the Toll Zone and is used to associate the Transponder to a vehicle and associated customer account in the Back Office System.
Back Office System (BOS)	The Existing BOS or the New BOS, or both, as the context requires. An AUTHORITY system provided by a third-party contractor used to support functions, including customer service,

RFP 7-1911
Exhibit A

	account management, transaction and payment processing and interfaces to Interoperable Agencies.
Baseline Implementation Schedule	The detailed schedule developed and maintained by CONTRACTOR that lists all tasks related to the Design, development, testing, installation and Go-Live of the System. The schedule is subject to Approval by Authority. Upon Approval, it becomes the Approved Baseline Implementation Schedule pursuant to the Agreement.
BOS Contractor	The third-party contractor that is providing back-office operations services to OCTA. Depending upon context this term could refer to the Existing BOS Contractor or the New BOS Contractor.
Business Continuity	Continuance of Express Lanes operations in the event of serious incidents or disasters such that AUTHORITY is able to recover to an operational state and proceed with Operations quickly and efficiently.
Business Day	A weekday, excluding AUTHORITY observed Holidays, beginning at 12:00:00 a.m. and ending at 11:59:59 p.m.
Business Rules	The set of AUTHORITY operational and System rules that detail how the 91 and I-405 Express Lanes operate.
Calendar Day	One day, beginning at 12:00:00 a.m. and ending at 11:59:59 p.m. If the date to perform any act or give any notice specified in the Agreement Documents (including the last date for performance or provision of notice "within" a specified time period) falls on a non-Business Day, such act or notice may be timely performed on the next succeeding Day which is a Business Day.
California Department of Transportation (Caltrans)	The State transportation organization that is responsible for managing California's highway and freeway lanes, providing inter-city rail services, overseeing public-use airports and special-use hospital heliports, and working with local agencies.
California Highway Patrol (CHP)	The law enforcement agency of the state of California that has patrol jurisdiction over all California highways and provides occupancy declaration, transponder requirement and general traffic code enforcement on the Express Lanes.
California Toll Operators Committee Agency (CTOC Agency)	The California Toll Operators Committee (CTOC) is a collaborative organization composed of California's toll facility operators/owners of which AUTHORITY is a member. CTOC is the primary resource for Interoperability and coordination among tolling facilities, and education and advocacy regarding tolling in California.
Certificate of ETTM System Infrastructure Turnover	Notification issued by AUTHORITY to Design Builder that Design Builder has achieved ETTM System Infrastructure Turnover with respect to a specific Toll Site Set.
Certification	CONTRACTOR's written verification and validation, with full supporting Documentation (including test results where applicable) that CONTRACTOR has completed development of

RFP 7-1911
Exhibit A

	the Deliverable and certified its readiness for approval, testing or review, as applicable.
Chargeable Failure	Any failure that is not identified by the AUTHORITY as a Non-Chargeable Failure and for which CONTRACTOR shall be held accountable in its performance, in accordance with the Scope of Work and Agreement.
Clean Air Vehicle (CAV)	A designation provided by the California Air Resource Board (CARB) and decals by the California Department of Motor Vehicles (DMV) which identifies a vehicle as a low emission vehicle which may be privy to discounts and/or use of the carpool or Express Lanes.
Commercial Off-the-Shelf (COTS)	Commercially available off-the-shelf Hardware and Software that is sold to the general public in the same precise form and requires little to no modification to use.
Commission	The term Commission and its approved variations (e.g. "Commissioned" and "Commissioning") when capitalized in this Scope of Work and the Agreement means the test that occurs upon completion and Approval of installation that indicates readiness for Operations.
Configurable	Functionality provided such that changes to the System thresholds, values, methods, parameters and/or settings shall not require additional Software development and Software testing effort. Verification of the change for this purpose is not considered testing. This same meaning applies to all variations, e.g. Configured.
Conformed Scope of Work and Requirements Document (CSWRD)	The updated Scope of Work and Requirements as agreed to between AUTHORITY and CONTRACTOR, executed as part of the Contract, including any addenda executed during the RFP process. When the term "Scope of Work and Requirements" is referred to in the executed Agreement Documents it is referring to the CSWRD, unless otherwise indicated.
Contract Closeout	Contract Closeout shall have the meaning as set forth in Article 23 of the Agreement.
Contract Deliverables Requirements List (CDRL)	The document developed and maintained by CONTRACTOR that identifies and tracks the status of all Deliverables/Submittals on the Project.
CONTRACTOR or Contractor	The Party to the Agreement with Authority responsible for delivering the Services in accordance with the Agreement. CONTRACTOR, as used herein, refers to the CONTRACTOR, its subcontractors and suppliers.
Contractor Project Manager	CONTRACTOR's duly authorized representative designated to manage CONTRACTOR's performance of the Work in accordance with the Agreement.
Corridor(s)	An independent Express Lanes facility operated and maintained by the AUTHORITY. For example, the 91 and I-450 Express Lanes are separate Corridors.

Corridor Cities	For 91 Express Lanes: Cities of Anaheim and Yorba Linda. For I-405 Express Lanes: Cities of Fountain Valley, Costa Mesa, Westminster, Huntington Beach, and Seal Beach
Customer Service Center (CSC)	The place or places of businesses that provides for all OCTA customer service operations activities.
Dashboard	A computer application to monitor the ETTM System in pictorial view, including but not limited to real-time monitoring of Toll Zone traffic, Maintenance data including device health, operational modes for the Toll Zones, Toll Rate CMS, incident modes/status and System performance monitoring.
Data Warehouse	A central repository of integrated data from one or more sources. The Data Warehouse stores current and historical data in accordance with the Scope of Work and Requirements.
Day/Days	See Calendar Day(s).
Deliverable(s)	All Documentation and any items of any nature submitted by CONTRACTOR to AUTHORITY for review and approval pursuant to the terms of this Agreement. See also "Submittal".
Design	The process and Documentation and Deliverables that define and establish all elements of the System, including but not limited to the architecture, components, Modules, Interfaces and data for the System to satisfy the Scope of Work and Requirements and the Agreement. Also, refers to the Design Document. See "Design Documentation".
Design-Builder	AUTHORITY's contractor responsible for the design and construction of the I-405 Express Lanes Infrastructure.
Design Documentation	Documentation, including Deliverables that describe, document and elaborate the Design for review and Approval by AUTHORITY, including as examples: System Requirements Document, System Detailed Design Document, Requirements Traceability Matrix, Business Rules and other materials required to adequately document the System as Designed.
Digital Video Audit System (DVAS)	A CONTRACTOR provided System that captures digital video and still images, stores captured video and images, and provides a retrieval system and auditing capability to independently monitor System lane activities.
Disaster Recovery	The process of re-establishing and making available the AUTHORITY ETTM System and Operations after an event which renders the primary System inoperable.
Documentation	Material, Submittals and Deliverables provided by CONTRACTOR for approval by the AUTHORITY.
Effective Date	The date of execution of the Agreement.
Electronic Document Management System (EDMS)	AUTHORITY-provided document repository which is used as the master repository for all Project Documentation.

Electronic Toll and Traffic Management (ETTM) Site	The combination of all toll sites including the ETTM Toll Collections and Enforcement Sites, the ETTM Transponder Read Sites, the ETTM Toll Rate CMS Sites, the ETTM CCTV Camera Sites and ETTM Traffic Detection System Sites.
Electronic Toll and Traffic Management (ETTM) System	The Roadside System, Roadway Support Systems, and all communications and interfaces provided by CONTRACTOR required to capture and process toll transactions and trips on the Express Lanes. The ETTM System interfaces with the BOS for purposes of toll collection.
End of Contract Transition Plan	Plan provided by CONTRACTOR describing the process by which the ETTM System will be transitioned at the end of the Contract Term.
Enhancements	Any change that is a significant increase to Software or Hardware functionality or performance, including user or customer access and functionality, above that specified in the Scope of Work and Requirements and Agreement.
Equipment	See "Hardware".
Escrow	An asset held by a third-party on behalf of the AUTHORITY and CONTRACTOR until certain conditions are met, as defined in Exhibit C, Agreement.
ETTM Communications Network	Infrastructure provided by Design-Builder (I-405 Express Lanes) or in place (91 Express Lanes) for ETTM System communications. ETTM Communications Network includes the conduit and fiber optic backbone and lateral connections to Equipment cabinets/enclosures. ETTM Communications Network does not include data/communications service connections and connection between Equipment cabinets/enclosures and Equipment.
ETTM Intelligent Transportation Systems (ITS)	The Roadside System and all communications and interfaces provided by CONTRACTOR required to provide traffic detection and full video coverage for monitoring the Express Lanes.
ETTM System Infrastructure	Infrastructure, facilities and other elements built by Design-Builder or provided to CONTRACTOR for installation of the ETTM System.
ETTM System Infrastructure Turnover	For each Toll Site Set, the Design Builder has provided CONTRACTOR with unencumbered access to ETTM Sites within a particular Toll Site Set, following completion of the ETTM System Infrastructure in the Toll Site Set, and satisfaction of all conditions to turnover of the Toll Site Set as confirmed by AUTHORITY's issuance of a Certificate of ETTM System Infrastructure Turnover.
ETTM System Infrastructure Turnover Date	The date on which Design Builder has achieved ETTM System Infrastructure Turnover with respect to a specific Toll Site Set.
ETTM Toll CCTV Camera Site	The location of an ETTM System subsystem that records video of the Express Lanes.

**RFP 7-1911
Exhibit A**

ETTM Toll Collection and Enforcement Site	The location of an ETTM System subsystem that collects Transponder and license plate information to support creation of a toll transaction and provides information to enforce Express Lane vehicle eligibility.
ETTM Traffic Detection System (TDS) Site	The location of an ETTM System subsystem that detects the presence of every vehicle in the Express Lanes and general purpose lanes and reports the data to the ATMS.
ETTM Transponder Read Site	The location of an ETTM System subsystem that collects information regarding "where" and "when" a vehicle enters or exits the Express Lanes to support creation of a toll transaction.
ETTM Toll Rate CMS Site	The location of an ETTM System subsystem that displays the Express Lane toll rates to motorists on an overhead electronic sign.
Exempt List	List of License Plates that will not be billed.
Existing BOS	The existing 91 Express Lanes back-office system (for both AUTHORITY and the Riverside County Transportation Commission), including customer service and Violation processing activities.
Existing BOS Contractor	AUTHORITY's contractor currently responsible for the operations of the Existing BOS.
Existing ETTM Contractor	AUTHORITY's contractor currently responsible for the operations and maintenance of the existing 91 Express Lanes ETTM System.
Express Lanes	OCTA Express Lanes consisting of the 91 Express Lanes and the planned I-405 Express Lanes.
Extra Work	Changes in the general scope of the Agreement, including but not limited to the Services furnished to AUTHORITY by CONTRACTOR.
FasTrak®	California's trademarked electronic toll system that allows customers to use any toll road, bridge, or express lane in California without stopping to pay.
FasTrak® Flex	A type of FasTrak® Transponder with a switch which can be set to indicate the number of people in the vehicle (one (1), two (2) or three (3) or more.
FasTrak® Transponder	A device required to use the Express Lanes. Using the Transponder, drivers or their passengers are responsible for declaring the number of people in the vehicle as one (1), two (2) or three (3) or more passengers via an Occupancy Setting.
Final Acceptance	Final Acceptance shall have the meaning as set forth in Article 23 of the Agreement.
Fiscal Year	AUTHORITY's fiscal year, defined as July 1 through the subsequent June 30th.

RFP 7-1911
Exhibit A

Flag(s)	A mark that signals a condition or status or that an event has occurred. The Flag is said to be <i>set</i> when it is turned on. Flags may be related to a specific transaction(s) directing the ETMM System to take some form of action.
Force Majeure	Force Majeure shall have the meaning set forth in Article 72 of the Agreement.
Go-Live	The date on which all required installation and testing requirements have been met and revenue collection Operations commence, using the CONTRACTOR provided ETMM System on each of the I-405 and 91 Express Lanes.
Hardware	An all-inclusive term to mean the Equipment, Hardware, associated peripherals, associated firmware, electrical and other materials and supplies necessary or furnished by CONTRACTOR to provide Services pursuant to the Agreement.
High Occupancy Vehicle (HOV)	A designation applied to vehicles to allow free or discounted passage based on occupancy of the vehicle and other criteria, established by Authority, Federal, or State regulations.
Holiday(s)	<p>Days which are observed by AUTHORITY as holidays:</p> <ul style="list-style-type: none"> • New Year's Day – January 1 • Birthday of Martin Luther King, Jr. – 3rd Monday in January • Lincoln's Birthday – February 12 • Washington's Birthday – 3rd Monday in February • Cesar Chavez Day – March 31 • Memorial Day – Last Monday in May • Independence Day – July 4 • Labor Day – 1st Monday in September • Columbus Day – 2nd Monday in October • Veterans Day – November 11 • Thanksgiving Day – 4th Thursday in November • Day after Thanksgiving Day – Day after Thanksgiving Day • Christmas Day – December 25 <p>If January 1, February 12, March 31, July 4, November 11, or December 25 falls on a Sunday, the Monday following is a Holiday. If November 11 falls on a Saturday, the preceding Friday is a Holiday.</p>
Host or Host System	The central computer System that controls and manages the data to and from the Roadside System and which Interfaces with the BOS and along with the other Roadway Support System

RFP 7-1911
Exhibit A

	components, also provides support functionality such as Maintenance Online Management System (MOMS) and Digital Video Audit System (DVAS) functionality.
I-405 Express Lanes Toll Operations Center (TOC)	The location from which the AUTHORITY will oversee the I-405 Express Lanes.
Image Capture and Processing System (ICPS)	A CONTRACTOR provided System used to capture and record vehicle license plate images.
Image-Based Transaction	A toll transaction that is based on the image of a license plate (as opposed to a Transponder-Based Transaction).
Implementation Phase	The phase of the Project, which begins at Notice to Proceed and ends at System Acceptance.
Infrastructure	The elements built by the Design Builder and provided to CONTRACTOR for installation of the ETTM System.
Interface Control Document (ICD)	The document that governs the exchange of information between two systems or entities.
Interoperable (Interoperability)	A relationship between tolling agencies or entities where their systems are capable of capturing and transmitting transactions/trips generated on an agency's roads by customers of the other agency or entity. Generally, requires that Reciprocity agreements between agencies and entities are in place to govern payments and reconciliation.
Interoperable Agency(ies)	Entities that have agreed to accept each other's Transponders and/or license plates, to identify customers and settle payment. In the case of this Contract, such entities will have entered into a Reciprocity agreement which dictates the processes and payment policies, for example CTOC.
ISO 18000-6C	Non-proprietary wireless (RFID) protocol used for communication between the transponder in the vehicle and the roadside Equipment in the lanes.
Jurisdiction (License Plate)	The governing entity, such as state or country that controls the issuing of a particular vehicle license plate and provides registered vehicle owner information.
Key Personnel	Staff designated by the AUTHORITY as "key" in the Agreement and Scope of Work and Requirements, subject to minimum experience qualifications and to the conditions set forth in the Agreement.
Lane Closure	A shutdown of lanes to vehicular traffic. Includes Permitted Lane Closure or an Unpermitted Lane Closure, or both, as the context requires.
Maintenance	Services to be performed by CONTRACTOR related to the maintenance of System. Also see "Maintenance Services" or "Maintenance and Software Support Services."
Maintenance and Software Support Services	Services to be performed by CONTRACTOR related work including the maintenance, monitoring and administration of the Software.

**RFP 7-1911
Exhibit A**

Maintenance Online Management System (MOMS)	An automated, fully integrated System that monitors the status of operational Equipment in real time, records Equipment and process failures, notifies Maintenance personnel, generates and tracks work orders, maintains preventative Maintenance schedules, generates repair history, and maintains parts inventory and asset management.
Maintenance Services	The Maintenance and related Services required to be furnished by CONTRACTOR, pursuant to the Scope of Work and Requirements.
Master Test Plan (MTP)	A comprehensive testing plan that describes the different test phases, CONTRACTOR's testing concepts and approach and the administration of each test.
Maximum Obligation	The maximum, not to exceed dollar amount that CONTRACTOR shall be paid for Work performed under this Agreement, including any Agreement Amendments.
Module	A group of functions developed simultaneously for specific tasks, such as a reporting Module, a security Module or a maintenance Module.
New BOS	The new AUTHORITY back-office system that will be implemented during the Operations and Maintenance Phase to support customer service and Violation processing activities for the 91 Express Lanes and the future I-405 Express Lanes, either jointly or individually.
New BOS Contractor	An AUTHORITY's contractor responsible for the operations of the New BOS that will be implemented during the Operations and Maintenance Phase.
Non-Chargeable Failure	Failure for which CONTRACTOR will not be held accountable in its performance measurement.
Notice	A formal communication addressing legal and contractual matters, not applicable to daily Implementation Phase and Operation and Maintenance Phase communications.
Notice to Proceed (NTP)	The written authorization by AUTHORITY designating the date for CONTRACTOR to commence Work.
Occupancy Detection System (ODS)	A subsystem which captures and analyzes and image of the passenger compartment and reports the number of occupants. This result is compared with the number of occupants declared by the customer either by the transponder (I-405) or by selection of lane at the tolling point (91).
OCTA Policy	Guidelines established and published by the AUTHORITY.
Orange County Transportation Authority (AUTHORITY)	A public entity organized pursuant to Public Utilities Code sections 13000 et seq., which is responsible for this procurement and implementation of the Project. Also referred to as "the AUTHORITY".

RFP 7-1911
Exhibit A

Operational Alert Notification	Role-based Alert sent to AUTHORITY operational personnel, notifying them of a BOS condition that requires their attention or an issue that they should be aware of.
Operations	Services performed, such as transaction processing and image review to be furnished under this Agreement.
Operations and Maintenance Phase	The Phase beginning upon Go-Live through the end of the Agreement Term.
Optical Character Recognition (OCR)	A Software process that automatically recognizes license plate characters without requiring human intervention and which, in this application, extracts and provides the license plate numbers and Jurisdiction from the image of the license plate.
Order of Precedence	The order in which Agreement documents control in the event of a conflict or ambiguity in such documents as such precedence is established in the Agreement. Refer to Article 1 of Agreement.
Performance Requirements	The required level of CONTRACTOR performance established in the Scope of Work and Requirements.
Permitted Lane Closure	A full or partial closure of any portion of a general purpose lane or Express Lane by CONTRACTOR in connection with the Work, and which is approved in advance by AUTHORITY in accordance with the Scope of Work and Requirements and occurs wholly within the time period set out in the Scope of Work and Requirements.
Pervasive Defect	A persistent or reoccurring issue or problem as further set forth in the Agreement.
Plan(s)	CONTRACTOR Deliverable that identifies approach to a particular aspect of the Work submitted for approval, including as examples, Project Management Plan, Disaster Recovery Plan, Software Development Plan, Installation Plan and Business Continuity Plan.
Plate Correction List	A list of License Plate numbers maintained by AUTHORITY that have been identified as problematic for Image-Based Transactions and that require additional review and verification.
Plaza	See "Toll Plaza."
Preliminary Implementation Schedule	Implementation schedule provided by the CONTRACTOR as part of its Proposal.
Preventive Maintenance	Scheduled Maintenance Services performed by CONTRACTOR related to the maintenance of ETTM System as described in the Scope of Work.
Price Proposal	CONTRACTOR pricing provided in response to this RFP and in accordance with the instructions provided.
Priority	Ranking and assignment of importance used in the identification, monitoring, correction and reporting of System problems, bugs, and failures.

RFP 7-1911
Exhibit A

Project	The total Services set forth in the Scope of Work and Requirements and as further set forth and detailed in the Agreement.
Project Acceptance	Project Acceptance shall have the meaning as set forth in Article 23 of the Agreement.
Project Management Plan (PMP)	Approved document used to guide both project execution and project control.
Project Manager	AUTHORITY's duly authorized representative designated to manage the Work and Agreement.
Proposal	A Proposer's entire submission in response to this RFP.
Proposer	An entity that has submitted a Proposal in response to this RFP. Also referred to in RFP as Offeror.
Quality Assurance (QA)	A process which occurs after the final Work product is complete, to ensure the Work was completed as expected and required.
Quality Control (QC)	A process which occurs before a final product is produced or presented, to ensure the Work product is accurate.
Requirements	Each of the required Work activities in numbered form (and in narratives and introductions within the requirements) that CONTRACTOR shall perform, including but not limited to technical, functional, Project management, Operations and Maintenance and Performance.
Requirements Traceability Matrix (RTM)	The structured collection of information that summarizes the requirements of the ETTM System submitted by CONTRACTOR for Approval by AUTHORITY and that serves to track completion of Design, development and testing.
Responsibility Matrix	The matrix that defines respective responsibilities of the Agreement parties and other interfacing third-party Contractors.
Roadside Generator	Mechanical equipment at each Toll Zone and Toll Rate CMS location to supply continuous power service in the event of a utility power loss
Roadside (Toll) System	The subsystems and Equipment and Software that control and manage the ETTM System at all ETTM Sites.
Roadway Support Systems (RSS)	The subsystems that support the Roadside System, provides key transaction and image processing functionality and ETTM System monitoring. Interfaces with the BOS,
Segment	A segment of Express Lanes which consists of one or more Toll Zone.
Services	All CONTRACTOR activities required by this Agreement. Also see "Work".
Shadow Dynamic Pricing System	An automated system developed and implemented by CONTRACTOR to develop Toll Rates for each trip based on collected Operating conditions data and dynamic pricing algorithms. The Toll Rates developed by the Shadow Dynamic

	Pricing System will be used to inform the Time of Day price setting process.
Shadow Toll Rate	The calculated toll rate in any given interval, given the prevailing speeds and traffic volumes on the facility, used to inform the AUTHORITY on routine updates to the Time of Day pricing schedules
Single Occupancy Vehicle (SOV)	Any vehicle that does not meet the criteria to qualify as a High Occupancy Vehicle.
Site(s)	Any of the locations where Services under this Agreement are performed.
Software	All computer programs, media, procedures, rules and associated Documentation pertaining to the control and operation of the data processing and data storage for the System. Software includes all associated features and functions described in the Scope of Work and Requirements, including all Agreement Modifications, updates, derivative works, Enhancements, modifications or Upgrades thereto, and all error corrections, patches and bug fixes provided by CONTRACTOR and which is made part of the System, as well as all related or ancillary data files, Modules, libraries, tutorial and demonstration programs, and other components thereof, all source and object code, firmware and all Documentation.
State	The State of California.
Scope of Work and Requirements	The Agreement Document that captures and defines the Work activities, Submittals and Deliverables and Performance that CONTRACTOR must execute in performance of the Work.
Status (Account)	The life cycle stage of an Account at a given point in time, such as active or closed.
Subcontractor	Any person, firm or corporation, other than CONTRACTOR's employees, who enters into a subcontract with Proposer to furnish labor, or labor and materials for the Project or in connection with the Services, whether directly or indirectly, on CONTRACTOR's behalf and whether or not in privity with CONTRACTOR.
Submittal	See "Deliverable".
Supplier	Any person, firm, or corporation, other than CONTRACTOR's employees, who enters into a subcontract with Proposer to furnish materials, Equipment, or supplies for incorporation in or in connection with the Services, whether directly or indirectly, on CONTRACTOR's behalf and whether or not in privity with CONTRACTOR.
System	The Software and components including firmware, Hardware, Equipment, components, subcomponents, furniture and fixtures provided, procured, furnished and installed under this Agreement to meet the Requirements of the System, as further set forth in the Agreement Documents.

System Acceptance	The completion of the Implementation Phase, established upon of System Acceptance Testing as further set forth in the Scope of Work and Requirements and the Agreement.
System Detail Design Document (SDDD)	Document Deliverable that includes but is not limited to the defined architecture, components, Interfaces, Design and functionality for the ETTM System to satisfy applicable Requirements, which is submitted by CONTRACTOR for Approval by AUTHORITY.
System Maintenance	Part of CONTRACTOR-provided support of the Hardware Systems and System Software during the Operations and Maintenance Phase.
Third-Party Service Providers and Business Partners	Entities which have a relationship with Express Lanes and/or CONTRACTOR to perform work and/or request that work be performed, such as collection companies.
Time-of-Day (TOD) Pricing	The toll pricing method used by AUTHORITY for the 91 and I-405 Express Lanes, whereby toll rates are based on a predetermined day of the week and the time of day schedule that is assessed and updated periodically.
Title 21	The open compatibility specifications for a two-way communications protocol for AVI including an initial set of Transaction Record Type codes mandated for statewide electronic toll collection use developed by the California Department of Transportation. These specifications codified in the California Code of Regulations as Title 21, Chapter 16, Articles 1 through 4.
Toll Facility	The 91 Express Lanes or the I-405 Express Lanes.
Toll Plaza (Plaza)	A Toll collection point located on a tolled facility.
Toll Policy	The policy adopted by Authority in connection with the Project.
Toll Rate CCTV camera	A CCTV camera integrated with the ETTM System to record the data displayed on the Toll Rate CMS upon every change in message.
Toll Rate Changeable Message Sign (CMS)	The signs installed before all entrances to the Express Lanes that display the rate information.
Toll Site Set	A grouping of one or more ETTM Sites, as determined by the Design Builder, to be turnover over to CONTRACTOR in accordance with this Scope of Work and Requirements.
Toll Zone	The area within a single ETTM Toll Collection and Enforcement Site or ETTM Transponder Read Site which vehicles pass through, where information from automatic vehicle detection and classification, license plate image capture, and automatic vehicle identification is captured and is use to create a transaction.
Traffic Detection System (TDS)	A CONTRACTOR provided System that detects the volume, speed, and other data of every vehicle in the Express Lanes and general purpose lanes and passes this information to the TOC.

Traffic Simulator and Modeling	The process of traffic modeling and simulating the Express Lanes and general purpose lanes to test, assess pricing performance, and refine the Dynamic Pricing System.
Transponder-Based Transaction	A transaction that is originated in the lane using Transponder technology (as opposed to an Image-Based Transaction).
Transition Plan	The Plan to transition from the current lane toll systems to the CONTRACTOR provided ETTM System, in accordance with the Work and Requirements.
Transponder	In-vehicle radio frequency device read by the Roadside System RF antenna(s) and reader Equipment in a toll lane.
Transponder Status List (TSL)	The list or file maintained by AUTHORITY of Transponders issued by AUTHORITY and other CTOC agencies, which denotes the status and class of each Transponder issued.
Transponder Occupancy Setting	The switch setting on the FasTrak® Flex Transponder when the vehicle passes through the Tolling Zone.
Transponder Occupancy Setting Correction List	A list of transactions where the occupancy was confirmed to be incorrect as a result of customer disputes, audit checks, and quality control.
Trip Transaction	The package of information formed by the RSS identifying a trip made by a vehicle comprised of either single or multiple transactions.
Unpermitted Lane Closure	A fully or partial closure by CONTRACTOR of any portion of a general purpose lane or Express Lane that is not a Permitted Lane Closure.
Unpermitted Vehicle	Vehicle type not permitted to use the Express Lanes.
Update	Generally, refers to a patch released for existing Software to fix any identified bugs, errors or security issues; may also include providing support for new Hardware, as well as performance tuning.
Upgrade (able/ed)	Generally, refers to transforming existing Software to a new version; provides new features and functionalities rather than fixing existing bugs, errors or security issues but does not include significant new functionality.
Validate (ed/ion)	Confirming a license plate image plate number, Jurisdiction, plate type, Vehicle Class and vehicle type through a combination of manual image review and electronic image processing so that subsequent images can be automatically processed with high confidence.
Vehicle Classification	A means of identifying different types of vehicles for the purpose of charging different tolls and applicable fees, based on applicable Account Types and/or Transponder types.
Vehicle Signature Recognition (VSR)	A CONTRACTOR provided System that improves the license plate data extraction performance to minimize manual image

RFP 7-1911
Exhibit A

	review, and return the license plate number, jurisdiction and plate type that is associated to the transaction.
Work	See "Services".

EXHIBIT B: SCOPE OF WORK AND REQUIREMENTS

EXHIBIT C: PRELIMINARY IMPLEMENTATION SCHEDULE

EXHIBIT C

Preliminary Implementation Schedule

Major Milestone Description	Projected Start Date	Projected End Date
Notice to Proceed	3/30/18	
Project Kickoff Meeting	April 2018	
Initial Project Planning Documentation Project Management Plan, Baseline Implementation Schedule, Software Development Plan, Document Control Work Plan, Health and Safety Plans, Quality Assurance Plan	Q2 2018	Q2 2018
I-405 Express Lanes ETTM System Infrastructure Design Requirements Document Full Requirements Documentation and Plans Submitted	NTP	NTP + 90 day
Second Group of Planning Documentation Installation Plan, Master Test Plan, Individual Test Plans, Test Procedures, Disaster Recovery Plan, Transition Plan	Q2 2018	Q4 2018
System Design (91 EL and applicable portions 405 EL) ETTM System Installation Design Package, RSS Installation Design Documentation, Requirements Traceability Matrix, Installation Checklist, Business Rules Document and Final System Detail Design Documents	Q2 2018	Q4 2018
Third Group of Planning Documentation Maintenance Plans, Operations Plan, Emergency Response Management Plan, Training Plan, Manuals, End of Contract Transition Plan	Q4 2018	Q2 2019
System Development and Initial Testing (91 EL and applicable portions of 405 EL) AVI Certification Report (Third-Party), Software Development, Factory Acceptance Test (FAT), Unit Testing	Q3 2018	Q2 2019
Installation and Testing (91 EL) Installation of all ETTM Sites, Installation RSS, Onsite Installation Test (OIT)	Q2 2019	Q3 2019
Final Testing and Go-Live (91 EL) Installation and Commissioning Test, Data Migration (as required), Go-Live all 91 EL ETTM	Q3 2019	Q4 2019
System Operations / Acceptance for the 91 (Start of Maintenance Phase for 91 EL) As-Built Documentation and Drawings, Operational and Acceptance Testing, Decommissioning of existing 91 EL Equipment, 91 EL Acceptance	Q4 2019	Q2 2019

System Design Remaining Portions of I-405 EL) ETTM System Installation Design Package, I-405 TOC Design Requirements Document, RSS Installation Design Documentation, Requirements Traceability Matrix, Installation Checklist, Business Rules Document and Final System Detail Design Documents	Q3 2019	Q2 2021
Updates to All Planning Documentation	Q2 2021	Q1 2022
System Development and Initial Testing (Remaining portions of 405 EL) AVI Certification Report (Third-Party), Software Development, Factory Acceptance Test (FAT), Unit Testing	Q2 2021	Q1 2022
Installation and Testing (I-405 EL) Installation of all ETTM Sites, Installation RSS, Onsite Installation Test (OIT)	Q2 2022	Q4 2022 ¹
Final Testing and Go-Live (I-405 EL) Installation and Commissioning Test, Data Migration (as required), Go-Live all I-405 EL ETTM	Q4 2022	Q1 2023 ¹
System Operations / Acceptance for the 405 (Start of Maintenance Phase for I-405) As-Built Documentation and Drawings, Operational and Acceptance Testing, I-405 EL Acceptance	Q1 2023	Q3 2023 ¹
Project Acceptance		Q3 2023 ¹

1. Installation, Testing, and Acceptance of I-405 Express Lane ETTM System contingent upon Design-Builder schedule.

EXHIBIT D: PRICE PROPOSAL AND INSTRUCTIONS TO PROPOSERS

PRICE PROPOSAL

REQUEST FOR PROPOSALS (RFP) 7-1911

PLEASE REFER TO THE ATTACHED PRICING SHEETS, AND THE INSTRUCTIONS TO PROPOSERS FOR GUIDANCE ON COMPLETING THE PRICING SHEETS.

THE ACKNOWLEDGMENT BELOW MUST BE SIGNED AND SUBMITTED WITH THE PROPOSAL.

-
1. I acknowledge receipt of RFP 7-1911 and Addenda No.(s) _____
2. This offer shall remain firm for _____ days from the date of proposal
(Minimum 180)

COMPANY NAME _____

ADDRESS _____

TELEPHONE _____

FACSIMILE # _____

EMAIL ADDRESS _____

SIGNATURE OF PERSON
AUTHORIZED TO BIND OFFEROR _____

NAME AND TITLE OF PERSON
AUTHORIZED TO BIND OFFEROR _____

DATE SIGNED _____

1. PRICE PROPOSAL SHEETS

1.1. Detailed Instructions To Proposers

1. There are eighteen (18) Price Proposal sheets as detailed below, including five (5) pricing summary sheets (Sheets 1, 2, 3, 4, and 5) and associated back-up information on back-up sheets for each pricing sheet. The back-up sheets for each summary sheet are labeled to identify the corresponding summary pricing sheet; for example, Sheet 2-1a is a back-up sheet to pricing Sheet 2. Back-up sheets are located after the summary sheets. Additional Services Rates Sheet 6, the End of Contract Transition Cost Summary Sheet 7, the Optional Future Facilities Implementation and Maintenance Cost Sheet 8 and the Payment Schedule are standalone sheets and do not require backup sheets.
2. Proposers must complete the Price Proposal Form in its entirety. The Price Proposal includes the following:
 - a. Project Summary Sheet 1
 - b. Implementation and Roadway Support Cost Sheets 2, 2-1a and 2-1b:
 - i. Sheet 2: Implementation and Roadway Support Cost Summary
 - ii. Sheet 2-1a: Back-up 91 and I-405 Express Lanes Implementation and Roadway Support Cost Details
 - iii. Sheet 2-1b: Back-up 91 and I-405 Express Lanes Implementation and Roadway Support Cost – Staff Rates and Hours
 - c. Roadside Systems Equipment (by Location Type) Cost Sheets 3, 3-1a and 3-1b:
 - i. Sheet 3: Roadside Systems Equipment (by Location Type) Cost Summary
 - ii. Sheet 3-1a: Back-up 91 and I-405 Express Lanes Roadside Systems Equipment Detailed Cost by Location Type
 - iii. Sheet 3-1b: Back-up 91 and I-405 Express Lanes Roadside Systems Equipment – Staff Rates and Hours
 - d. Base Contract and Optional Extensions Maintenance Cost Sheets 4, 4-1a, 4-1b, 4-2a and 4-2b:
 - i. Sheet 4: Base Contract and Optional Extensions Maintenance Cost Summary
 - ii. Sheet 4-1a: Back-up 91 and I-405 Express Lanes Roadway Support Systems Maintenance Cost Detail - Monthly Schedule of Labor and Other Direct Cost Items
 - iii. Sheet 4-1b: Back-up 91 and I-405 Express Lanes Roadway Support Systems Maintenance Support - Staff Rates and Hours
 - iv. Sheet 4-2a: Back-up 91 and I-405 Express Lanes Roadside Systems Maintenance Support Cost Detail - Monthly Schedule of Labor and Other Direct Cost Items
 - v. Sheet 4-2b: Back-up 91 and I-405 Express Lanes Roadside Systems Maintenance Support – Staff Rates and Hours

- e. Base Contract and Optional Extensions Variable Operations Cost Sheets 5 and 5-1:
 - i. Sheet 5: Base Contract and Optional Extensions Variable Operations Cost Summary
 - ii. Sheet 5-1: 91 and I-405 Express Lanes Base Contract and Optional Extensions Monthly Variable Operations Cost Details
 - f. Additional Services Rates 91 and I-405 Express Lanes Sheet 6
 - g. End of Contract Transition (91 and I-405 Express Lanes) Cost Summary Sheet 7
 - h. Optional Future 91 and I-405 Express Lanes Facilities Implementation and Maintenance Cost Sheet 8
 - i. Payment Schedule
3. Proposers shall not fill in any grayed-out cells on the Price Proposal Forms, nor shall the Proposer make any other entry on or alteration to the Price Proposal Forms other than in accordance with these Price Proposal Instructions.
 4. OCTA may waive or correct any error appearing in the Proposer's completed Price Proposal Forms if the correct amount can be clearly ascertained from the information provided; however, OCTA is under no obligation to do so. In the event of an inconsistency between the amount stated in numbers and the amount stated in written words, the amount stated in written words will control. In the event of a mathematical miscalculation, the correct sum will control.
 5. An officer of the Proposer who is authorized to bind the Proposer to the Contract or an individual otherwise authorized in writing by an officer of the Proposer must sign and date the eight Price Proposal Forms (Sheets 1, 2, 3, 4, 5, 6, 7 and 8) in the appropriate place as identified on each Price Proposal Form.
 6. All elements of the Price Proposal must be completed. If zero (0) quantities are included in the Proposal, a zero (0) must be entered into the corresponding cell. In addition, all items identified by OCTA in the price sheets will be assumed to be included in the Proposal and the Price Proposal shall be considered to be compliant to (e.g., inclusive of all Requirements) the ETTM System Scope of Work and Requirements.
 7. The Price Proposal shall be inclusive of all costs, fees and applicable taxes associated with the Project necessary to meet the all Requirements of the Project as described in the RFP, including, but not limited to the ETTM System Scope of Work and Requirements. No price escalation will be allowed above the price provided on the Price Proposal Forms to complete the Work.
 8. The electronic copies of the Price Proposal Form are password protected. Only those cells in which Proposers may enter data are unlocked for Proposers to enter data. Proposers shall not unlock or otherwise alter the spreadsheets.
 9. On most sheets, there are formulas that are automatically calculated based on data entered from elsewhere in the sheet or work book. Font and background colors are used to differentiate different types of input/cells as follows:
 - Black font – Indicates the cell cannot be altered.
 - Light yellow background – Indicates optional text input allowed, if Proposers need to provide additional detail.

- Light yellow with red font – Indicates Proposer must enter data for any applicable item.
- Light red background with red font – ***Indicates required Proposer input.*** All such cells must be completed accordingly.
- Light green background – Indicates that data has been entered into the cell. Light red and light yellow background will change to light green when any non-zero data is entered. The background for any cells where the Proposer enters zero (0) will not change colors in this manner.

10. While OCTA has made every effort to ensure the Price Proposal Forms contain accurate formulas and calculations, Proposers are required to independently verify that formulas and calculations are being performed correctly.

1.1.1. Project Summary –Sheet 1

The Proposer's price for the Total Project Costs shall be the aggregate of all costs included in Project Summary Sheet 1. Sheet 1 Project Summary will automatically summarize the costs and pricing detailed in Sheet 2 Implementation and Roadway Support Cost Summary, Sheet 3 Roadside Systems Equipment Cost Summary, Sheet 4 Base Contract and Optional Extensions Maintenance Cost Summary, Sheet 5 Base Contract and Optional Extensions Variable Operations Cost Summary, Sheet 6 Additional Services Rates and Sheet 7 End of Contract Transition Cost Summary.

1.1.2. Completion of Implementation Costs - Sheets 2, 2-1a and 2-1b

The Proposer's total price for the Implementation and Roadway Support Cost Summary shall be the aggregate of all costs included in Sheet 2. The costs shall also include without limitation all Implementation Services, Documentation and Deliverables, Hardware, Equipment, Software supplies, labor, third party services, parts and materials, furnishing, fixtures overhead, burden, profit, taxes, duties, fees, Contractor-acquired permits, licenses, warranties and other items necessary to meet requirements of the ETTM System Scope of Work and Requirements.

To complete Sheets 2, 2-1a and 2-1b Proposers shall do the following:

1. Begin with Sheet 2-1a. In the Description of Items column (A) enter a description for each cost component in as much detail as space allows. Starting with Base Contract Price elements and then moving down the sheet to the Optional Items, in column (B) enter the number of units for each Implementation price component for 91 and I-405 Express Lanes Combined Costs. In column (C) enter the unit cost. If the item is provided as a lump sum, the lump sum amount shall be entered in column (C) and the quantity (column (B)) shall be shown as 1. Total unit costs will be calculated automatically in column (D). In column (E), enter the labor costs associated with each of the price components. The costs for each price element will then automatically be calculated.

Next in column (G) enter the enter the number of units for each Implementation price component for 91 Express Lanes Costs Only for the Base Contract and Optional Items. In column (H) enter the unit cost. If the item is provided as a lump sum, the lump sum amount shall be entered in column (H) and the quantity (column (G)) shall be shown as 1. Total unit costs will be calculated automatically in column (I). In column (J), enter the labor costs associated with each of the price components. The costs for each price element will then automatically be calculated.

Then in column (L) enter the enter the number of units for each Implementation price component for I-405 Express Lanes Costs Only for the Base Contract and Optional Items. In

column (M) enter the unit cost. If the item is provided as a lump sum, the lump sum amount shall be entered in column (M) and the quantity (column (L)) shall be shown as 1. Total unit costs will be calculated automatically in column (N). In column (O), enter the labor costs associated with each of the price components. The costs for each price element will then automatically be calculated.

The total cost for each cost component including 91 and I-405 Express Lanes Combined Costs, 91 Express Lanes Cost Only and I-405 Express Lanes Costs Only will be calculated in column (Q) and will be shown in the appropriate line item on Sheet 2 Implementation Cost Summary.

2. Move to Sheet 2-1b. This sheet provides the back-up Implementation Costs for staffing including rates and hours. Enter names for each of the positions at the top of the list identified as key positions on the project. Next, enter specific loaded labor rate, including burden and profit, in the loaded labor rate column (D) and their number of hours in column (E). Moving down the sheet, enter additional labor categories for all labor to be used to complete this Work, including rates and hours. The staff names are not required for these additional positions. The total loaded labor dollars will be automatically calculated for each staff person and labor category and a grand total will be calculated. The Base Contract and Optional Items total provided must match the Labor Grand Total dollars for the Base Contract and Optional Items Implementation and Roadway Support Costs shown on Sheet 2-1a. A labor check cell is provided on the sheet to assist Proposers with verifying that the two (2) labor totals are equal.

1.1.3. Completion of Roadside Systems Equipment Cost -Sheets 3, 3-1a and 3-1b

The Proposer's total price for the Roadside Systems Equipment Costs Summary shall be the aggregate of all costs included in Sheet 3. The costs shall also include without limitation all Implementation Services, Documentation and Deliverables, Hardware, Equipment, Software supplies, labor, third party services, parts and materials, furnishing, fixtures overhead, burden, profit, taxes, duties, fees, Contractor-acquired permits, licenses, warranties and other items necessary to meet requirements of the ETTM System Scope of Work and Requirements.

To complete Sheets 3, 3-1a and 3-1b Proposers shall do the following:

1. Begin with Sheet 3-1a. In the rows provided under each Toll Location and Enforcement Site type for 91 Express Lanes, in column (B) enter the number of units for each Toll Collection and Enforcement Site price component. In column (C) enter the unit cost. If the item is provided as a lump sum, the lump sum amount shall be entered in column (C) and the quantity (column (B)) shall be shown as 1. Total unit costs will be calculated automatically in column (D). In column (E), enter the labor costs associated with each of the price components. The costs for each price element will then automatically be calculated and the summary will be shown in the appropriate line item for 91 Express Lanes on Sheet 3 Roadside Systems Equipment (by Location Type) Cost Summary.
2. Next in in column (G) enter the number of units for each Toll Collection and Enforcement Site price component for I-405 Express Lanes. In column (H) enter the unit cost. If the item is provided as a lump sum, the lump sum amount shall be entered in column (H) and the quantity (column (G)) shall be shown as 1. Total unit costs will be calculated automatically in column (I). In column (J), enter the labor costs associated with each of the price components. The costs for each price element will then automatically be calculated and the summary will be shown in the appropriate line item for I-405 Express Lanes on Sheet 3 Roadside Systems Equipment (by Location Type) Cost Summary.

3. Moving down Sheet 3-1a. In the rows provided under Optional Items, Automatic Vehicle Classification (at ETTM Toll Collection and Enforcement Site only), Occupancy Detection System Design, Testing and Integration (at ETTM Toll Collection and Enforcement Site only) and Occupancy Detection System Integration with 3rd Party (at ETTM Toll Collection and Enforcement Site only) for the 91 Express Lanes and the I-405 Express Lanes enter the number of units for each price component in columns (B/G). Then enter the unit cost in column (C/H). If the item is provided as a lump sum, the lump sum amount shall be entered in column (C/H) and the quantity (column (B/G)) shall be shown as 1. Total unit costs will be calculated automatically in column (D/I). In column (E/J), enter the labor costs associated with each of the price components. The costs for each price element will then automatically be calculated and the summary will be shown in the appropriate line item for 91 Express Lanes and I-405 Express Lanes on Sheet 3 Roadside Systems Equipment (by Location Type) Cost Summary.
4. Move to Sheet 3-1b. This sheet provides the back-up Roadside Systems Equipment Costs for staffing rates and hours for the Base Contract and Optional Items. Enter names for each of the positions at the top of the list identified as key positions on the project. Next, enter specific loaded labor rate, including burden and profit, in the loaded labor rate column (D) and their number of hours in column (E). Moving down the sheet, enter additional labor categories for all labor to be used to complete this Work, including rates and hours. The staff names are not required for these additional positions. The total loaded labor dollars will be automatically calculated for each staff person and labor category and a grand total will be calculated. The Base Contract and Optional Items total provided must match the Labor Grand Total dollars for the Base Contract and Optional Items Roadside Systems Equipment Costs shown on Sheet 3-1a. A labor check cell is provided on the sheet to assist Proposers with verifying that the two (2) labor totals are equal.
5. Sheet 3 is automatically populated from Sheet 3-1a and the total cost will automatically be calculated.

1.1.4. Completion of Base Contract and Optional Extensions Maintenance - Sheets 4, 4-1a, 4-1b, 4-2a and 4-2b

The Proposer's total price for Base Contract and Optional Extensions Maintenance Cost shall be the aggregate of all costs included in Sheet 4.

The costs shall include (without limitation) all Contractor management, administrative and support labor costs, as well as all direct costs associated with maintaining the ETTM System. The total price shall include (without limitation) all overhead, burden, profit, taxes, duties, fees, warranties, Equipment, supplies, Software, parts and materials, Contractor-acquired permits, licenses, warranties, and all other items necessary to meet the Contractor contractual requirements associated with the ETTM System. All labor rates provided are to include overhead, burden and profit ("Loaded Labor Rate").

To complete Sheets 4, 4-1a, 4-1b, 4-2a, and 4-2b Proposers shall do the following:

1. Begin with Sheet 4-1a. For the Base Contract (Maintenance Years 1-9), as well as for Optional Extension #1 (Maintenance Years 10-11) and for Optional Extension #2 (Maintenance Years 12-13), each year is identified with a corresponding set of Work elements for the Roadway Support Systems Maintenance, however the Proposer may add an item below the existing components listed if needed. In the Description of Items column (A) enter a description for an additional cost component in as much detail as space allows. Starting with the 91 Express Lanes in column (B), enter the monthly cost for each item. Next enter the monthly associated

labor costs in column (C). Total monthly cost will be calculated automatically in Column (D). The costs for each price element will then automatically be calculated and the summary will be shown in the appropriate line item on Sheet 4 Base Contract and Optional Extensions Maintenance Cost Summary.

Next for the Base Contract (Maintenance Years 5–9), as well as for Optional Extension #1 (Maintenance Years 10-11) and for Optional Extension #2 (Maintenance Years 12-13) for the Roadway Support Systems Maintenance for I-405 Express Lanes starting in column (E), enter the monthly cost for each item. Next enter the monthly associated labor costs in column (F). Total monthly cost will be calculated automatically in Column (G). The costs for each price element will then automatically be calculated and the summary will be shown in the appropriate line item on Sheet 4 Base Contract and Optional Extensions Maintenance Cost Summary.

2. Move to Sheet 4-1b. This sheet provides the back-up Roadway Support Systems Maintenance Costs for staffing including rates and hours for the Base Contract (Maintenance Years 1–9), as well as for Optional Extension #1 (Maintenance Years 10-11) and for Optional Extension #2 (Maintenance Years 12-13) for both 91 and I-405 Express Lanes. Enter names for each of the positions at the top of the list identified as key positions on the project. Next, enter specific loaded labor rate, including burden and profit, in the loaded labor rate column (D) and their number of hours in column (E). Moving down the sheet, enter additional labor categories for all labor to be used to complete this Work, including rates and hours. The staff names are not required for these additional positions. Moving to the right, enter rates and hours for the remaining Base Contract and Optional Extension years. The total loaded labor dollars will be automatically calculated for each staff person and labor category, an annual total and a grand total will be calculated. The Base Contract and Optional Extensions total provided must match the Labor Grand Total dollars for the Base Contract and Optional Extension Roadway Support System Maintenance on Sheet 4-1a. A labor check cell is provided on the sheet to assist Proposers with verifying that the two (2) labor totals are equal.
3. Move to Sheet 4-2a. For the Base Contract (Maintenance Years 1–9), as well as for Optional Extension #1 (Maintenance Years 10-11) and for Optional Extension #2 (Maintenance Years 12-13), each year is identified with a corresponding set of Work elements for the Roadside System Maintenance, which should not be altered. Starting with 91 Express Lanes in column (B), enter the monthly cost for each item. Next enter the monthly associated labor costs in column (C). Total monthly cost will be calculated automatically in Column (D). The costs for each price element will then automatically be calculated and the summary will be shown in the appropriate line item on Sheet 4 Base Contract and Optional Extensions Maintenance Cost Summary.

Next for the Base Contract (Maintenance Years 5–9), as well as for Optional Extension #1 (Maintenance Years 10-11) and for Optional Extension #2 (Maintenance Years 12-13) for the Roadside System Maintenance for I-405 Express Lanes in column (E) enter the monthly cost for each item. Then enter the monthly associated labor costs in column (F). Total monthly cost will be calculated automatically in Column (G). The costs for each price element will then automatically be calculated and the summary will be shown in the appropriate line item on Sheet 4 Base Contract and Optional Extensions Maintenance Cost Summary.
3. Move to Sheet 4-2b. This sheet provides the back-up Roadside Systems Maintenance Costs for staffing including rates and hours for the Base Contract (Maintenance Years 1–9), as well as for Optional Extension #1 (Maintenance Years 10-11) and for Optional Extension #2

(Maintenance Years 12-13) for both 91 and I-405 Express Lanes. Enter names for each of the positions at the top of the list identified as key positions on the project. Next, enter specific loaded labor rate, including burden and profit, in the loaded labor rate column (D) and their number of hours in column (E). Moving down the sheet, enter additional labor categories for all labor to be used to complete this Work, including rates and hours. The staff names are not required for these additional positions. Moving to the right, enter rates and hours for the remaining Base Contract and Optional Extension years. The total loaded labor dollars will be automatically calculated for each staff person and labor category, an annual total and a grand total will be calculated. The Base Contract and Optional Extensions total provided must match the Labor Grand Total dollars for the Base Contract and Optional Extension Roadside System Maintenance Support on Sheet 4-2a. A labor check cell is provided on the sheet to assist Proposers with verifying that the two (2) labor totals are equal.

4. Sheet 4 is automatically populated from Sheets 4-1a and 4-2a and the annual cost is automatically calculated.

1.1.5. Completion of Base Contract and Optional Extensions Variable Operations - Sheets 5 and 5-1

The Proposer's total price for Base Contract and Optional Extensions Variable Operations Cost shall be the aggregate of all costs included in Sheet 5.

To complete Sheets 5 and 5-1 Proposers shall do the following:

1. Begin with Sheet 5-1. For the Base Contract (Operations Years 1-9), as well as for Optional Extension #1 (Operations Years 10-11) and for Optional Extension #2 (Operations Years 12-13) provide three (3) tiers of volumes (Level 1 through 3) which shall represent the Proposer's volume pricing break points associated with the Manually Reviewed Image-based Transactions Processed. Three tiers have been provided. The Contractor shall be permitted to **invoice for no more than 30% of the Manually Reviewed Image-based Transactions**, as it is assumed that automated functionality will process a significant portion of the images at the required accuracy. The Contractor shall be paid a sum of the all levels that applies to the actual total volume of transactions for the month for the allowable Manually Reviewed Image-based Transactions Processed. In other words, whenever the allowable total volume falls within one or more of the Contractor's proposed pricing fee structure will determine the fee paid. Note that the Level 1 volume begins with 1 transaction already entered in the "Minimum" column and Level 3 volume ends with a "greater than" sign (>) already entered in the "Maximum" column, which means that anything greater than the Level 3 "Minimum" amount entered by the Proposer is covered under Level 3 pricing.
2. Next enter the unit cost to Manually Review Image-based Transactions associated with each of the three (3) levels for all base and optional extension years for providing operations services. Each entered amount should include total per item costs, including labor and other direct, non-labor costs. The Total Monthly Cost for each level where applicable will then automatically calculate and represent the monthly payment that the Proposer will receive for operations services for the specific levels as determined by the volume of images processed in a given month. Fees are cumulative in that the Contractor will be paid based on each level the total Manually Review Image-based Transactions fall into.
3. Sheet 5 is automatically populated from Sheet 5-1 and the annual cost is automatically calculated.

1.1.6. Completion of Additional Services Rates Sheet 6

The Additional Services Rates (including Hours for Evaluation Purposes) sheet, Proposer's shall provide fully loaded hourly labor rates, including burden and profit for the staff shown in this Sheet 6. Additional Services hours have been provided for each year of the Base Contract and Optional Extensions, for evaluation purposes only. The Proposer shall also provide a labor rate escalation percentage for evaluation purposes for years 2-13. The purpose is to provide pricing for future Work not currently included in the ETTM System Scope of Work and Requirements. All changes to the Contract involving labor shall use the hourly labor rates in this table. Sheet 1 is automatically populated from Sheet 6.

1.1.7. Completion of End of Contract Transition Cost Summary Sheet 7

The Proposer's total price for the End of Contract Transition Costs Summary shall be the aggregate of all costs included in Sheet 7. This sheet shall include all costs for the Contractor to provide the End of Contract Transition Services as further set forth in the ETTM System Scope of Work and Requirements and the Contract. This item is a one-time fee to be paid for End of Contract Transition Services at the time of end of contract, whenever this occurs within the Agreement period.

1. Begin with Sheet 7. In the Description of Items column (A) enter a description for the identified cost items and other direct costs associated with the End of Contract Transition – 91 and I-405 Express Lanes in as much detail as space allows. Next in column (B) enter the number of units for each price component. In column (C) enter the unit cost. If the item is provided as a lump sum, the lump sum amount shall be entered in column (C) and the quantity (column (B)) shall be shown as 1. Total unit costs will be calculated automatically in column (D). In column (E), enter the labor cost associated with each line item. The costs for each price element will then automatically be calculated and the summary will be shown in the appropriate line item on Sheet 1.

1.1.8. Completion of Optional Future Facilities Implementation and Maintenance - Sheet 8

The Proposer's shall provide a pricing schedule for the Optional Future Facilities Implementation and Maintenance Cost in Sheet 8. The costs shall also include without limitation all Implementation Services, Documentation and Deliverables, Hardware, Equipment, Software supplies, labor, third party services, parts and materials, furnishing, fixtures overhead, burden, profit, taxes, duties, fees, Contractor-acquired permits, licenses, warranties and other items necessary to meet requirements of the ETTM System Scope of Work and Requirements and the Contract.

To complete Sheet 8 Proposers shall do the following:

1. Begin with Sheet 8. Provide the lump sum cost associated with the Implementation and the incremental increase in monthly maintenance for each item listed in the table below, including Optional Items, for the Base Contract and Optional Extensions years.

Item #	Description of Items	Detailed Description
1	ETTM Toll Collection and Enforcement Sites	Provision and installation of a fully functional, 2-lane site configured as the I-405 Express Lanes sites herein and tested assuming the testing regiment specified herein for the I-405 sites. Assume the same provision of infrastructure by a design-builder with a similar Package Turnover process for infrastructure turnover.
2	ETTM Transponder Read Sites	Provision and installation of a fully functional, 2-lane site configured as the I-405 Express Lanes sites herein and tested assuming the testing regiment specified herein for the I-405 sites. Assume the same provision of infrastructure by a design-builder with a similar Package Turnover process for infrastructure turnover.
3	ETTM Toll Rate DMS Sites	Provision and installation of a fully functional, stand-alone site configured as the I-405 Express Lanes sites herein and tested assuming the testing regiment specified herein for the I-405 sites. Assume the same provision of infrastructure by a design-builder with a similar Package Turnover process for infrastructure turnover.
4	ETTM Toll CCTV Camera Sites	Provision and installation of a fully functional, stand-alone site configured as the I-405 Express Lanes sites herein and tested assuming the testing regiment specified herein for the I-405 sites. Assume the same provision of infrastructure by a design-builder with a similar Package Turnover process for infrastructure turnover.
5	ETTM Toll Traffic Detector Sites	Provision and installation of a fully functional, stand-alone site configured as the I-405 Express Lanes sites herein and tested assuming the testing regiment specified herein for the I-405 sites. Assume the same provision of infrastructure by a design-builder with a similar Package Turnover process for infrastructure turnover.
6	Roadway Support Systems	Assume the addition of the new facility to the existing Roadway Support System assuming the testing regiment specified herein for the I-405.

Item #	Description of Items	Detailed Description
7	Project Management Cost per New Facility	Provide the cost of project management for the implementation of a new facility.
8	Mobilization Cost per New Facility	Provide the cost of mobilizing installation crews to install ETTM System on a new facility.
9	Review and Input to Toll Infrastructure Construction Plans	Provide the cost of providing input and at least three (3) reviews of ETTM System infrastructure construction plans.
10	Design and Document Update Cost per New Facility	Provide the cost of updating all Plans, Designs and Documents to support a new facility.
11	Insurance and Bonding	Via text, description of the calculation for determining the cost insurance and bonding.
Optional Items		
12	Automatic Vehicle Classification (at ETTM Toll Collection and Enforcement Site only)	Incremental Cost
13	Occupancy Detection System Design, Testing and Integration (at ETTM Toll Collection and Enforcement Site only)	Incremental Cost

1.1.9. Payment Schedule

The Payment Schedule sheet applies the total Implementation Phase cost to payment milestones and associated percentages shown in RFP 7-1911 Payment Schedule. The sheet takes the Proposer's Implementation price shown on Sheets 2 and 3 and multiplies it by the percentage associated with each payment milestone. The result is a dollar amount to be paid for each milestone.

Sheet 1
Project Summary

DESCRIPTION OF SERVICES	91 EXPRESS LANES	I-405 EXPRESS LANES	GRAND TOTAL COST (\$)
BASE CONTRACT			
Implementation Phase			
Implementation and Roadway Support Costs (Sheet 2)	\$ -	\$ -	\$ -
Roadside Systems Equipment Costs (Sheet 3)	\$ -	\$ -	\$ -
Total Implementation Phase	\$ -	\$ -	\$ -
Operations and Maintenance Phase			
Maintenance Support Costs (Maintenance Years 1-9) (Sheets 4)	\$ -	\$ -	\$ -
Variable Operations Costs (Operations Years 1-9) (Sheet 5)	\$ -	\$ -	\$ -
Additional Services (Maintenance Years 1-9) (Sheets 6)	\$ -	\$ -	\$ -
End of Contract Transition (Sheet 7)	\$ -	\$ -	\$ -
Total Operations and Maintenance Phase	\$ -	\$ -	\$ -
Optional Items			
Optional Implementation and Roadway Support Costs for Occupancy Detection System (Sheet 2)	\$ -	\$ -	\$ -
Optional Roadside Systems Equipment Costs for AVC and Occupancy Detection System (Sheet 3)	\$ -	\$ -	\$ -
Total Optional Items	\$ -	\$ -	\$ -
TOTAL IMPLEMENTATION , OPERATIONS, AND MAINTENANCE COST	\$ -	\$ -	\$ -
TOTAL IMPLEMENTATION , OPERATIONS, MAINTENANCE, AND OPTIONAL ITEMS COST	\$ -	\$ -	\$ -
OPTIONAL EXTENSIONS			
Optional Extension #1 Maintenance Support Costs (Maintenance Years 10-11) (Sheets 4)	\$ -	\$ -	\$ -
Optional Extension #1 Variable Operations Costs (Operations Years 10-11) (Sheet 5)	\$ -	\$ -	\$ -
Optional Extension #1 Additional Services (Maintenance Years 10-11) (Sheets 6)	\$ -	\$ -	\$ -
Optional Extension #2 Maintenance Support Costs (Maintenance Years 12-13) (Sheets 4)	\$ -	\$ -	\$ -
Optional Extension #2 Variable Operations Costs (Operations Years 12-13) (Sheet 5)	\$ -	\$ -	\$ -
Optional Extension #2 Additional Services (Maintenance Years 12-13) (Sheets 6)	\$ -	\$ -	\$ -
TOTAL OPTIONAL EXTENSIONS (YEARS 10-13)	\$ -	\$ -	\$ -
TOTAL IMPLEMENTATION, OPERATIONS, MAINTENANCE, AND OPTIONAL EXTENSION YEARS	\$ -	\$ -	\$ -
TOTAL IMPLEMENTATION, OPERATIONS, MAINTENANCE, OPTIONAL ITEMS AND OPTIONAL EXTENSION YEARS	\$ -	\$ -	\$ -

Dollars

Officer Signature

Date

Typed Name, Title, Address and Phone Number

Sheet 2
Implementation and Roadway Support Cost Summary

ITEM #	DESCRIPTION OF ITEMS	UNIT	91 EXPRESS LANES	I-405 EXPRESS LANES	TOTAL COST (\$)
BASE CONTRACT					
1	Mobilization	LS	\$ -	\$ -	\$ -
2	Project Management	LS	\$ -	\$ -	\$ -
3	Engineering and Design	LS	\$ -	\$ -	\$ -
4	Design Documentation	LS	\$ -	\$ -	\$ -
5	Plans and Manuals	LS	\$ -	\$ -	\$ -
6	In-Lane Systems Software Licensing (not included directly with Roadside Systems)	LS	\$ -	\$ -	\$ -
7	Roadway Support System Software Custom Software and Development	LS	\$ -	\$ -	\$ -
8	3rd Party Software and Software Installation (OS, Database, Applications)	LS	\$ -	\$ -	\$ -
9	Roadway System Hardware and Installation	LS	\$ -	\$ -	\$ -
10	Communications Equipment	LS	\$ -	\$ -	\$ -
11	ATMS	LS	\$ -	\$ -	\$ -
12	Factory Acceptance Testing (FAT) and Equipment Environmental Testing (EET)	LS	\$ -	\$ -	\$ -
13	Unit Testing	LS	\$ -	\$ -	\$ -
14	Onsite Installation Testing and MOT	LS	\$ -	\$ -	\$ -
15	Operational and Acceptance Testing	LS	\$ -	\$ -	\$ -
16	Training Manuals and Delivery	LS	\$ -	\$ -	\$ -
17	Insurance and Bonding	LS	\$ -	\$ -	\$ -
	Implementation Costs		\$ -	\$ -	\$ -
OPTIONAL ITEMS					
18	Occupancy Detection System Design, Testing and Integration	LS	\$ -	\$ -	\$ -
19	Occupancy Detection System Integration with 3rd Party	LS	\$ -	\$ -	\$ -
	Optional Implementation Costs		\$ -	\$ -	\$ -

Dollars

Officer Signature

Date

Typed Name, Title, Address and Phone Number

Sheet 3
Roadside Systems Equipment (by Location Type) Cost Summary

ITEM NUMBER	COST ITEM	QUANTITY	COST PER LOCATION (\$)	TOTAL COST (\$)	QUANTITY	COST PER LOCATION (\$)	TOTAL COST (\$)	TOTAL COST (\$)
BASE CONTRACT		91 Express Lanes			I-405 Express Lanes			Totals
1	ETTM Toll Collection and Enforcement Site	2	\$ -	\$ -	6	\$ -	\$ -	\$ -
2	ETTM Transponder Read Site	3	\$ -	\$ -	6	\$ -	\$ -	\$ -
3	ETTM Toll Rate CMS Sites				9	\$ -	\$ -	\$ -
4	ETTM Toll CCTV Camera Site (Integrated Site)	15	\$ -	\$ -	14	\$ -	\$ -	\$ -
5	ETTM Toll CCTV Camera Site (Stand-Alone Site)	10	\$ -	\$ -	10	\$ -	\$ -	\$ -
6	ETTM Toll Traffic Detector Sites (Integrated Site)				25	\$ -	\$ -	\$ -
7	ETTM Toll Traffic Detector Sites (Stand-Alone Site)				20	\$ -	\$ -	\$ -
8	Corridor Systems (Not included in RSS)	1	\$ -	\$ -	1	\$ -	\$ -	\$ -
Roadside System Costs				\$ -			\$ -	\$ -
OPTIONAL ITEMS		91 Express Lanes			I-405 Express Lanes			Totals
9	Automatic Vehicle Classification (at ETTM Toll Collection and Enforcement Site only)	2	\$ -	\$ -	6	\$ -	\$ -	\$ -
10	Occupancy Detection System Design, Testing and Integration (at ETTM Toll Collection and Enforcement Site only)	2	\$ -	\$ -	6	\$ -	\$ -	\$ -
11	Occupancy Detection System Integration with 3rd Party (at ETTM Toll Collection and Enforcement Site only)	2	\$ -	\$ -	6	\$ -	\$ -	\$ -
Total Roadside System Costs (Optional Items)				\$ -			\$ -	\$ -
Total Roadside System Costs (Base and Optional Items)				\$ -			\$ -	\$ -

Dollars

Officer Signature

Date

Typed Name, Title, Address and Phone Number

Sheet 4
Base Contract and Optional Extensions Maintenance Cost Summary

ITEM NUMBER	Description of Items	Monthly Cost (\$)	Annual Cost (\$)	Monthly Cost (\$)	Annual Cost (\$)	Monthly Cost (\$)	Annual Cost (\$)	Monthly Cost (\$)	Annual Cost (\$)	Total Annual Cost (\$)
Base Contract		Roadway Support System Maintenance 91 Express Lanes (From Sheet 4-1a)		Roadway Support System Maintenance I-405 Express Lanes (From Sheet 4-1a)		Roadside Systems Maintenance 91 Express Lanes (From Sheet 4-2a)		Roadside Systems Maintenance I-405 Express Lanes (From Sheet 4-2a)		Total Annual Roadway and RS Support Maintenance Cost
1	Year 1 of Maintenance	\$ -	\$ -			\$ -	\$ -			\$ -
2	Year 2 of Maintenance	\$ -	\$ -			\$ -	\$ -			\$ -
3	Year 3 of Maintenance	\$ -	\$ -			\$ -	\$ -			\$ -
4	Year 4 of Maintenance	\$ -	\$ -			\$ -	\$ -			\$ -
5	Year 5 of Maintenance	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
6	Year 6 of Maintenance	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
7	Year 7 of Maintenance	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
8	Year 8 of Maintenance	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9	Year 9 of Maintenance	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total Base Contract Maintenance (Maintenance Years 1-9)		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Optional Extension #1 (Maintenance Years 8-10)										
10	Optional Year 10 of Maintenance	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
11	Optional Year 11 of Maintenance	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total Optional Extension #1 (Maintenance Years 10-11)		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Optional Extension #2 (Maintenance Years 11-13)										
12	Optional Year 12 of Maintenance	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
13	Optional Year 13 of Maintenance	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total Optional Extension #2 (Maintenance Years 12-13)		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

_____ Dollars

Officer Signature

Date

Typed Name, Title, Address and Phone Number

Sheet 5

Base Contract and Optional Extensions Variable Operations Cost Summary

ITEM #	DESCRIPTION	TOTAL MONTHLY VARIABLE COST (\$)	TOTAL ANNUAL VARIABLE COST (\$)
BASE CONTRACT			
1	Year 1 of Operations	\$ -	\$ -
2	Year 2 of Operations	\$ -	\$ -
3	Year 3 of Operations	\$ -	\$ -
4	Year 4 of Operations	\$ -	\$ -
5	Year 5 of Operations	\$ -	\$ -
6	Year 6 of Operations	\$ -	\$ -
7	Year 7 of Operations	\$ -	\$ -
8	Year 8 of Operations	\$ -	\$ -
9	Year 9 of Operations	\$ -	\$ -
Total Base Contract (Operation Years 1-9)			\$ -
OPTIONAL EXTENSION #1 (Operations Years 10-11)			
10	Optional Year 10 of Operations	\$ -	\$ -
11	Optional Year 11 of Operations	\$ -	\$ -
Total Optional Extension #1 (Maintenance Years 10-11)			\$ -
OPTIONAL EXTENSION #2 (Operations Years 12-13)			
12	Optional Year 12 of Operations	\$ -	\$ -
13	Optional Year 13 of Operations	\$ -	\$ -
Total Optional Extension #2 (Maintenance Years 12-13)			\$ -

Dollars

Officer Signature

Date

Typed Name, Title, Address and Phone Number

Sheet 6
Additional Services Rates
91 and I-405 Express Lanes
(including Hours for Evaluation Purposes)

Annual Hourly Rate Escalation for Evaluation Purposes		0.00%				
		Year 1 of Maintenance	Year 1 of Maintenance	Year 1 of Maintenance	Year 2 of Maintenance	Year 2 of Maintenance
ITEM #	STAFF POSITION/CLASSIFICATION	FULLY LOADED HOURLY RATE	Evaluation Hours	Evaluation Dollars	Evaluation Hours	Evaluation Dollars
1	Project Principal	\$ -	30	\$ -	25	\$ -
2	Project Manager	\$ -	30	\$ -	25	\$ -
3	Deputy Project Manager	\$ -	30	\$ -	25	\$ -
4	Quality Control/Assurance Manager	\$ -	30	\$ -	25	\$ -
5	Civil/Mechanical/Electrical Engineering Manager	\$ -	30	\$ -	25	\$ -
6	I-405 ETTM System Infrastructure Lead	\$ -	30	\$ -	25	\$ -
7	System Design Engineer	\$ -	30	\$ -	25	\$ -
8	Lead Test Engineer	\$ -	30	\$ -	25	\$ -
9	Installation & Commissioning Manager	\$ -	30	\$ -	25	\$ -
10	Systems & Equipment Maintenance Manager	\$ -	30	\$ -	25	\$ -
11	System Analyst	\$ -	30	\$ -	25	\$ -
12	Software Architect	\$ -	30	\$ -	25	\$ -
13	Hardware Engineer	\$ -	30	\$ -	25	\$ -
14	Software Developer Senior	\$ -	30	\$ -	25	\$ -
15	Software Developer	\$ -	30	\$ -	25	\$ -
16	Tester	\$ -	30	\$ -	25	\$ -
17	Network Engineer	\$ -	30	\$ -	25	\$ -
18	System Administrator	\$ -	30	\$ -	25	\$ -
19	Database Administrator	\$ -	30	\$ -	25	\$ -
20	Training Manager	\$ -	30	\$ -	25	\$ -
21	Trainer	\$ -	30	\$ -	25	\$ -
22	Quality Control	\$ -	30	\$ -	25	\$ -
23	Licensed Electrician	\$ -	30	\$ -	25	\$ -
24	Electrician Helper	\$ -	30	\$ -	25	\$ -
25	Installation Technician	\$ -	30	\$ -	25	\$ -
26	Installation Supervisor	\$ -	30	\$ -	25	\$ -
27	Sr. Maintenance Technician	\$ -	30	\$ -	25	\$ -
28	Maintenance Technician	\$ -	30	\$ -	25	\$ -
29	Traffic Management Ops Manager	\$ -	30	\$ -	25	\$ -
30	Traffic Management Ops Staff	\$ -	30	\$ -	25	\$ -
31	Image Review Manager	\$ -	30	\$ -	25	\$ -
32	Image Review Staff	\$ -	30	\$ -	25	\$ -
33	CADD Technician	\$ -	30	\$ -	25	\$ -
34	Documentation Specialist	\$ -	30	\$ -	25	\$ -
35	Administrative Assistant	\$ -	30	\$ -	25	\$ -
YEARLY TOTALS				\$ -		\$ -
BASE AND OPTIONAL TOTALS						

Dollars

Officer Signature

Date

Typed Name, Title, Address and Phone Number

Sheet 6
Additional Services Rates
91 and I-405 Express Lanes
(including Hours for Evaluation Purposes)

Annual Hourly Rate Escalation for Evaluation Purposes					
		Year 3-9 and Optional Years 10-13 of Maintenance	Year 3 of Maintenance	Year 4 of Maintenance	Year 5 of Maintenance
ITEM #	STAFF POSITION/CLASSIFICATION	Evaluation Hours	Evaluation Dollars	Evaluation Dollars	Evaluation Dollars
1	Project Principal	15	\$ -	\$ -	\$ -
2	Project Manager	15	\$ -	\$ -	\$ -
3	Deputy Project Manager	15	\$ -	\$ -	\$ -
4	Quality Control/Assurance Manager	15	\$ -	\$ -	\$ -
5	Civil/Mechanical/Electrical Engineering Manager	15	\$ -	\$ -	\$ -
6	I-405 ETTM System Infrastructure Lead	15	\$ -	\$ -	\$ -
7	System Design Engineer	15	\$ -	\$ -	\$ -
8	Lead Test Engineer	15	\$ -	\$ -	\$ -
9	Installation & Commissioning Manager	15	\$ -	\$ -	\$ -
10	Systems & Equipment Maintenance Manager	15	\$ -	\$ -	\$ -
11	System Analyst	15	\$ -	\$ -	\$ -
12	Software Architect	15	\$ -	\$ -	\$ -
13	Hardware Engineer	15	\$ -	\$ -	\$ -
14	Software Developer Senior	15	\$ -	\$ -	\$ -
15	Software Developer	15	\$ -	\$ -	\$ -
16	Tester	15	\$ -	\$ -	\$ -
17	Network Engineer	15	\$ -	\$ -	\$ -
18	System Administrator	15	\$ -	\$ -	\$ -
19	Database Administrator	15	\$ -	\$ -	\$ -
20	Training Manager	15	\$ -	\$ -	\$ -
21	Trainer	15	\$ -	\$ -	\$ -
22	Quality Control	15	\$ -	\$ -	\$ -
23	Licensed Electrician	15	\$ -	\$ -	\$ -
24	Electrician Helper	15	\$ -	\$ -	\$ -
25	Installation Technician	15	\$ -	\$ -	\$ -
26	Installation Supervisor	15	\$ -	\$ -	\$ -
27	Sr. Maintenance Technician	15	\$ -	\$ -	\$ -
28	Maintenance Technician	15	\$ -	\$ -	\$ -
29	Traffic Management Ops Manager	15	\$ -	\$ -	\$ -
30	Traffic Management Ops Staff	15	\$ -	\$ -	\$ -
31	Image Review Manager	15	\$ -	\$ -	\$ -
32	Image Review Staff	15	\$ -	\$ -	\$ -
33	CADD Technician	15	\$ -	\$ -	\$ -
34	Documentation Specialist	15	\$ -	\$ -	\$ -
35	Administrative Assistant	15	\$ -	\$ -	\$ -
YEARLY TOTALS			\$ -	\$ -	\$ -
BASE AND OPTIONAL TOTALS					

 Officer Signature

Typed Name, Title, Address and Phone Number

Sheet 6
Additional Services Rates
91 and I-405 Express Lanes
(including Hours for Evaluation Purposes)

Annual Hourly Rate Escalation for Evaluation Purposes					
		Year 6 of Maintenance	Year 7 of Maintenance	Year 8 of Maintenance	Year 9 of Maintenance
ITEM #	STAFF POSITION/CLASSIFICATION	Evaluation Dollars	Evaluation Dollars	Evaluation Dollars	Evaluation Dollars
1	Project Principal	\$ -	\$ -	\$ -	\$ -
2	Project Manager	\$ -	\$ -	\$ -	\$ -
3	Deputy Project Manager	\$ -	\$ -	\$ -	\$ -
4	Quality Control/Assurance Manager	\$ -	\$ -	\$ -	\$ -
5	Civil/Mechanical/Electrical Engineering Manager	\$ -	\$ -	\$ -	\$ -
6	I-405 ETTM System Infrastructure Lead	\$ -	\$ -	\$ -	\$ -
7	System Design Engineer	\$ -	\$ -	\$ -	\$ -
8	Lead Test Engineer	\$ -	\$ -	\$ -	\$ -
9	Installation & Commissioning Manager	\$ -	\$ -	\$ -	\$ -
10	Systems & Equipment Maintenance Manager	\$ -	\$ -	\$ -	\$ -
11	System Analyst	\$ -	\$ -	\$ -	\$ -
12	Software Architect	\$ -	\$ -	\$ -	\$ -
13	Hardware Engineer	\$ -	\$ -	\$ -	\$ -
14	Software Developer Senior	\$ -	\$ -	\$ -	\$ -
15	Software Developer	\$ -	\$ -	\$ -	\$ -
16	Tester	\$ -	\$ -	\$ -	\$ -
17	Network Engineer	\$ -	\$ -	\$ -	\$ -
18	System Administrator	\$ -	\$ -	\$ -	\$ -
19	Database Administrator	\$ -	\$ -	\$ -	\$ -
20	Training Manager	\$ -	\$ -	\$ -	\$ -
21	Trainer	\$ -	\$ -	\$ -	\$ -
22	Quality Control	\$ -	\$ -	\$ -	\$ -
23	Licensed Electrician	\$ -	\$ -	\$ -	\$ -
24	Electrician Helper	\$ -	\$ -	\$ -	\$ -
25	Installation Technician	\$ -	\$ -	\$ -	\$ -
26	Installation Supervisor	\$ -	\$ -	\$ -	\$ -
27	Sr. Maintenance Technician	\$ -	\$ -	\$ -	\$ -
28	Maintenance Technician	\$ -	\$ -	\$ -	\$ -
29	Traffic Management Ops Manager	\$ -	\$ -	\$ -	\$ -
30	Traffic Management Ops Staff	\$ -	\$ -	\$ -	\$ -
31	Image Review Manager	\$ -	\$ -	\$ -	\$ -
32	Image Review Staff	\$ -	\$ -	\$ -	\$ -
33	CADD Technician	\$ -	\$ -	\$ -	\$ -
34	Documentation Specialist	\$ -	\$ -	\$ -	\$ -
35	Administrative Assistant	\$ -	\$ -	\$ -	\$ -
YEARLY TOTALS		\$ -	\$ -	\$ -	\$ -
BASE AND OPTIONAL TOTALS					\$ -

 Officer Signature
 Typed Name, Title, Address and Phone Number

Sheet 6
Additional Services Rates
91 and I-405 Express Lanes
(including Hours for Evaluation Purposes)

Annual Hourly Rate Escalation for Evaluation Purposes		OPTIONAL EXTENSION #1		OPTIONAL EXTENSION #2	
		Optional Year 10 of Maintenance	Optional Year 11 of Maintenance	Optional Year 12 of Maintenance	Optional Year 13 of Maintenance
ITEM #	STAFF POSITION/CLASSIFICATION	Evaluation Dollars	Evaluation Dollars	Evaluation Dollars	Evaluation Dollars
1	Project Principal	\$ -	\$ -	\$ -	\$ -
2	Project Manager	\$ -	\$ -	\$ -	\$ -
3	Deputy Project Manager	\$ -	\$ -	\$ -	\$ -
4	Quality Control/Assurance Manager	\$ -	\$ -	\$ -	\$ -
5	Civil/Mechanical/Electrical Engineering Manager	\$ -	\$ -	\$ -	\$ -
6	I-405 ETTM System Infrastructure Lead	\$ -	\$ -	\$ -	\$ -
7	System Design Engineer	\$ -	\$ -	\$ -	\$ -
8	Lead Test Engineer	\$ -	\$ -	\$ -	\$ -
9	Installation & Commissioning Manager	\$ -	\$ -	\$ -	\$ -
10	Systems & Equipment Maintenance Manager	\$ -	\$ -	\$ -	\$ -
11	System Analyst	\$ -	\$ -	\$ -	\$ -
12	Software Architect	\$ -	\$ -	\$ -	\$ -
13	Hardware Engineer	\$ -	\$ -	\$ -	\$ -
14	Software Developer Senior	\$ -	\$ -	\$ -	\$ -
15	Software Developer	\$ -	\$ -	\$ -	\$ -
16	Tester	\$ -	\$ -	\$ -	\$ -
17	Network Engineer	\$ -	\$ -	\$ -	\$ -
18	System Administrator	\$ -	\$ -	\$ -	\$ -
19	Database Administrator	\$ -	\$ -	\$ -	\$ -
20	Training Manager	\$ -	\$ -	\$ -	\$ -
21	Trainer	\$ -	\$ -	\$ -	\$ -
22	Quality Control	\$ -	\$ -	\$ -	\$ -
23	Licensed Electrician	\$ -	\$ -	\$ -	\$ -
24	Electrician Helper	\$ -	\$ -	\$ -	\$ -
25	Installation Technician	\$ -	\$ -	\$ -	\$ -
26	Installation Supervisor	\$ -	\$ -	\$ -	\$ -
27	Sr. Maintenance Technician	\$ -	\$ -	\$ -	\$ -
28	Maintenance Technician	\$ -	\$ -	\$ -	\$ -
29	Traffic Management Ops Manager	\$ -	\$ -	\$ -	\$ -
30	Traffic Management Ops Staff	\$ -	\$ -	\$ -	\$ -
31	Image Review Manager	\$ -	\$ -	\$ -	\$ -
32	Image Review Staff	\$ -	\$ -	\$ -	\$ -
33	CADD Technician	\$ -	\$ -	\$ -	\$ -
34	Documentation Specialist	\$ -	\$ -	\$ -	\$ -
35	Administrative Assistant	\$ -	\$ -	\$ -	\$ -
YEARLY TOTALS		\$ -	\$ -	\$ -	\$ -
BASE AND OPTIONAL TOTALS			\$ -		\$ -

Officer Signature
Typed Name, Title, Address and Phone Number

Sheet 7
End of Contract Transition (91 and I-405 Express Lanes) Cost Summary

DESCRIPTION OF ITEMS	# UNIT	UNIT (\$)	TOTAL UNIT (\$)	LABOR (\$)	TOTAL COST (\$)
BASE CONTRACT					
End of Contract Transition - 91 and I-405 Express Lanes	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
End of Contract Transition Costs			\$ -	\$ -	\$ -

_____ Dollars

Officer Signature
Typed Name, Title, Address and Phone Number

Date

Sheet 8

Optional Future 91 and I-405 Express Lanes Facilities Implementation and Maintenance Cost

ITEM #	Description of Items	UNITS	UNIT \$	UNIT \$	UNIT \$	UNIT \$	UNIT \$	UNIT \$
	Future In-Lane System Implementation Cost (by Lane Type)	Quantities	Implementation Cost	Incremental Increase in Monthly Maintenance Cost	Implementation Cost	Incremental Increase in Monthly Maintenance Cost	Implementation Cost	Incremental Increase in Monthly Maintenance Cost
			Year 1 of Maintenance		Year 2 of Maintenance		Year 3 of Maintenance	
1	ETTM Toll Collection and Enforcement Sites	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2	ETTM Transponder Read Sites	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
3	ETTM Toll Rate DMS Sites	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
4	ETTM Toll CCTV Camera Sites	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
5	ETTM Toll Traffic Detector Sites	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
6	Roadway Support Systems	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
7	Project Management Cost per New Facility	1	\$ -		\$ -		\$ -	
8	Mobilization Cost per New Facility	1	\$ -		\$ -		\$ -	
9	Review and Input to Toll Infrastructure Construction Plans	1	\$ -		\$ -		\$ -	
10	Design and Document Update Cost per New Facility	1	\$ -		\$ -		\$ -	
11	Insurance and Bonding	1	\$ -		\$ -		\$ -	
Optional Items								
12	Automatic Vehicle Classification (at ETTM Toll Collection and Enforcement Site only)	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
13	Occupancy Detection System Design, Testing and Integration (at ETTM Toll Collection and Enforcement Site only)	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Dollars

Officer Signature

Date

Typed Name, Title, Address and Phone Number

Sheet 8

Optional Future 91 and I-405 Express Lanes Facilities Implementation and Maintenance Cost

ITEM #	Description of Items	UNITS	UNIT \$	UNIT \$	UNIT \$	UNIT \$	UNIT \$	UNIT \$
	Future In-Lane System Implementation Cost (by Lane Type)	Quantities	Implementation Cost	Incremental Increase in Monthly Maintenance Cost	Implementation Cost	Incremental Increase in Monthly Maintenance Cost	Implementation Cost	Incremental Increase in Monthly Maintenance Cost
			Year 4 of Maintenance		Year 5 of Maintenance		Year 6 of Maintenance	
1	ETTM Toll Collection and Enforcement Sites	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2	ETTM Transponder Read Sites	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
3	ETTM Toll Rate DMS Sites	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
4	ETTM Toll CCTV Camera Sites	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
5	ETTM Toll Traffic Detector Sites	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
6	Roadway Support Systems	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
7	Project Management Cost per New Facility	1	\$ -		\$ -		\$ -	
8	Mobilization Cost per New Facility	1	\$ -		\$ -		\$ -	
9	Review and Input to Toll Infrastructure Construction Plans	1	\$ -		\$ -		\$ -	
10	Design and Document Update Cost per New Facility	1	\$ -		\$ -		\$ -	
11	Insurance and Bonding	1	\$ -		\$ -		\$ -	
Optional Items								
12	Automatic Vehicle Classification (at ETTM Toll Collection and Enforcement Site only)	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
13	Occupancy Detection System Design, Testing and Integration (at ETTM Toll Collection and Enforcement Site only)	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Dollars

Officer Signature

Date

Typed Name, Title, Address and Phone Number

Sheet 8

Optional Future 91 and I-405 Express Lanes Facilities Implementation and Maintenance Cost

ITEM #	Description of Items	UNITS	UNIT \$	UNIT \$	UNIT \$	UNIT \$	UNIT \$	UNIT \$
	Future In-Lane System Implementation Cost (by Lane Type)	Quantities	Implementation Cost	Incremental Increase in Monthly Maintenance Cost	Implementation Cost	Incremental Increase in Monthly Maintenance Cost	Implementation Cost	Incremental Increase in Monthly Maintenance Cost
			Year 7 of Maintenance		Year 8 of Maintenance		Year 9 of Maintenance	
1	ETTM Toll Collection and Enforcement Sites	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2	ETTM Transponder Read Sites	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
3	ETTM Toll Rate DMS Sites	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
4	ETTM Toll CCTV Camera Sites	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
5	ETTM Toll Traffic Detector Sites	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
6	Roadway Support Systems	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
7	Project Management Cost per New Facility	1	\$ -		\$ -		\$ -	
8	Mobilization Cost per New Facility	1	\$ -		\$ -		\$ -	
9	Review and Input to Toll Infrastructure Construction Plans	1	\$ -		\$ -		\$ -	
10	Design and Document Update Cost per New Facility	1	\$ -		\$ -		\$ -	
11	Insurance and Bonding	1	\$ -		\$ -		\$ -	
Optional Items								
12	Automatic Vehicle Classification (at ETTM Toll Collection and Enforcement Site only)	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
13	Occupancy Detection System Design, Testing and Integration (at ETTM Toll Collection and Enforcement Site only)	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Dollars

Officer Signature

Date

Typed Name, Title, Address and Phone Number

Sheet 8

Optional Future 91 and I-405 Express Lanes Facilities Implementation and Maintenance Cost

ITEM #	Description of Items	UNITS	UNIT \$	UNIT \$	UNIT \$	UNIT \$	UNIT \$	UNIT \$
	Future In-Lane System Implementation Cost (by Lane Type)	Quantities	Implementation Cost	Incremental Increase in Monthly Maintenance Cost	Implementation Cost	Incremental Increase in Monthly Maintenance Cost	Implementation Cost	Incremental Increase in Monthly Maintenance Cost
			Optional Year 10 of Maintenance		Optional Year 11 of Maintenance		Optional Year 12 of Maintenance	
1	ETTM Toll Collection and Enforcement Sites	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2	ETTM Transponder Read Sites	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
3	ETTM Toll Rate DMS Sites	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
4	ETTM Toll CCTV Camera Sites	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
5	ETTM Toll Traffic Detector Sites	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
6	Roadway Support Systems	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
7	Project Management Cost per New Facility	1	\$ -		\$ -		\$ -	
8	Mobilization Cost per New Facility	1	\$ -		\$ -		\$ -	
9	Review and Input to Toll Infrastructure Construction Plans	1	\$ -		\$ -		\$ -	
10	Design and Document Update Cost per New Facility	1	\$ -		\$ -		\$ -	
11	Insurance and Bonding	1	\$ -		\$ -		\$ -	
Optional Items								
12	Automatic Vehicle Classification (at ETTM Toll Collection and Enforcement Site only)	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
13	Occupancy Detection System Design, Testing and Integration (at ETTM Toll Collection and Enforcement Site only)	1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Dollars

Officer Signature

Date

Typed Name, Title, Address and Phone Number

Sheet 8
Optional Future 91 and I-405 Express Lanes Facilities Implementation and Maintenance Cost

ITEM #	Description of Items	UNITS	UNIT \$	UNIT \$
	Future In-Lane System Implementation Cost (by Lane Type)	Quantities	Implementation Cost	Incremental Increase in Monthly Maintenance Cost
			Optional Year 13 of Maintenance	
1	ETTM Toll Collection and Enforcement Sites	1	\$ -	\$ -
2	ETTM Transponder Read Sites	1	\$ -	\$ -
3	ETTM Toll Rate DMS Sites	1	\$ -	\$ -
4	ETTM Toll CCTV Camera Sites	1	\$ -	\$ -
5	ETTM Toll Traffic Detector Sites	1	\$ -	\$ -
6	Roadway Support Systems	1	\$ -	\$ -
7	Project Management Cost per New Facility	1	\$ -	
8	Mobilization Cost per New Facility	1	\$ -	
9	Review and Input to Toll Infrastructure Construction Plans	1	\$ -	
10	Design and Document Update Cost per New Facility	1	\$ -	
11	Insurance and Bonding	1	\$ -	
Optional Items				
12	Automatic Vehicle Classification (at ETTM Toll Collection and Enforcement Site only)	1	\$ -	\$ -
13	Occupancy Detection System Design, Testing and Integration (at ETTM Toll Collection and Enforcement Site only)	1	\$ -	\$ -

Dollars

Officer Signature

Date

Typed Name, Title, Address and Phone Number

Sheet 2-1a Back-up
91 and I-405 Express Lanes
Implementation and Roadway Support Cost Details

DESCRIPTION OF ITEMS	# UNIT	UNIT (\$)	TOTAL UNIT (\$)	LABOR (\$)	TOTAL COST (\$)
BASE CONTRACT	91 and I-405 Express Lanes Combined Costs				
Mobilization					
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
Total			\$ -	\$ -	\$ -
Project Management					
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
Total			\$ -	\$ -	\$ -
Engineering and Design					
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
Total			\$ -	\$ -	\$ -
Design Documentation					
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
Total			\$ -	\$ -	\$ -
Plans and Manuals					
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
Total			\$ -	\$ -	\$ -
In-Lane Systems Software Licensing (not included directly with Roadside Systems)					
Total					
Roadway Support System Software Custom Software and Development					
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
Total			\$ -	\$ -	\$ -

Sheet 2-1a Back-up
91 and I-405 Express Lanes
Implementation and Roadway Support Cost Details

DESCRIPTION OF ITEMS	# UNIT	UNIT (\$)	TOTAL UNIT (\$)	LABOR (\$)	TOTAL COST (\$)
BASE CONTRACT	91 and I-405 Express Lanes Combined Costs				
3rd Party Software and Software Installation (OS, Database, Applications)					
Total					
Roadway System Hardware and Installation					
Total					
Communications Equipment					
Total					
ATMS					
Total					
Factory Acceptance Testing (FAT) and Equipment Environmental Testing (EET)					
Total					
Unit Testing					
Total					
Onsite Installation Testing and MOT					
Total					

Sheet 2-1a Back-up
91 and I-405 Express Lanes
Implementation and Roadway Support Cost Details

DESCRIPTION OF ITEMS	# UNIT	UNIT (\$)	TOTAL UNIT (\$)	LABOR (\$)	TOTAL COST (\$)
BASE CONTRACT	91 and I-405 Express Lanes Combined Costs				
Operational and Acceptance Testing					
Total					
Training Manuals and Delivery					
Total					
Insurance and Bonding					
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
Total			\$ -	\$ -	\$ -
TOTAL IMPLEMENTATION AND ROADWAY SUPPORT COST (Base)			\$ -	\$ -	\$ -
OPTIONAL ITEMS	91 and I-405 Express Lanes Combined Costs				
Occupancy Detection System Design, Testing and Integration					
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
Total			\$ -	\$ -	\$ -
Occupancy Detection System Integration with 3rd Party					
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
Total			\$ -	\$ -	\$ -
TOTAL IMPLEMENTATION AND ROADWAY SUPPORT COST (Optional Items)			\$ -	\$ -	\$ -
TOTAL IMPLEMENTATION AND ROADWAY SUPPORT COST (Incl Base and Optional Items)			\$ -	\$ -	\$ -
Labor Grand Total	\$ -				
Labor Check - Cell B145 (from Sheet 2-1b, cell 50) should equal cell B144	\$ -				

Sheet 2-1a Back-up
91 and I-405 Express Lanes
Implementation and Roadway Support Cost Details

DESCRIPTION OF ITEMS	# UNIT	UNIT (\$)	TOTAL UNIT (\$)	LABOR (\$)	TOTAL COST (\$)
BASE CONTRACT	91 Express Lanes Costs Only				
Mobilization					
Total					
Project Management					
Total					
Engineering and Design					
Total					
Design Documentation					
Total					
Plans and Manuals					
Total					
In-Lane Systems Software Licensing (not included directly with Roadside Systems)					
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
Total			\$ -	\$ -	\$ -
Roadway Support System Software Custom Software and Development					
Total					

Sheet 2-1a Back-up
91 and I-405 Express Lanes
Implementation and Roadway Support Cost Details

DESCRIPTION OF ITEMS	# UNIT	UNIT (\$)	TOTAL UNIT (\$)	LABOR (\$)	TOTAL COST (\$)
BASE CONTRACT	91 Express Lanes Costs Only				
3rd Party Software and Software Installation (OS, Database, Applications)					
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
Total			\$ -	\$ -	\$ -
Roadway System Hardware and Installation					
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
Total			\$ -	\$ -	\$ -
Communications Equipment					
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
Total			\$ -	\$ -	\$ -
ATMS					
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
Total			\$ -	\$ -	\$ -
Factory Acceptance Testing (FAT) and Equipment Environmental Testing (EET)					
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
Total			\$ -	\$ -	\$ -
Unit Testing					
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
Total			\$ -	\$ -	\$ -
Onsite Installation Testing and MOT					
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
Total			\$ -	\$ -	\$ -

Sheet 2-1a Back-up
91 and I-405 Express Lanes
Implementation and Roadway Support Cost Details

DESCRIPTION OF ITEMS	# UNIT	UNIT (\$)	TOTAL UNIT (\$)	LABOR (\$)	TOTAL COST (\$)
BASE CONTRACT	91 Express Lanes Costs Only				
Operational and Acceptance Testing					
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
Total			\$ -	\$ -	\$ -
Training Manuals and Delivery					
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
Total			\$ -	\$ -	\$ -
Insurance and Bonding					
Total					
TOTAL IMPLEMENTATION AND ROADWAY SUPPORT COST (Base)			\$ -	\$ -	\$ -
OPTIONAL ITEMS	91 Express Lanes Costs Only				
Occupancy Detection System Design, Testing and Integration					
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
Total			\$ -	\$ -	\$ -
Occupancy Detection System Integration with 3rd Party					
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -
Total			\$ -	\$ -	\$ -
TOTAL IMPLEMENTATION AND ROADWAY SUPPORT COST (Optional Items)			\$ -	\$ -	\$ -
TOTAL IMPLEMENTATION AND ROADWAY SUPPORT COST (Incl Base and Optional Items)			\$ -	\$ -	\$ -
Labor Grand Total					
Labor Check - Cell B145 (from Sheet 2-1b, cell 50) should equal cell B144					

Sheet 2-1a Back-up
91 and I-405 Express Lanes
Implementation and Roadway Support Cost Details

DESCRIPTION OF ITEMS	# UNIT	UNIT (\$)	TOTAL UNIT (\$)	LABOR (\$)	TOTAL COST (\$)	TOTAL COST (\$)
BASE CONTRACT	I-405 Express Lanes Costs Only					Totals
Mobilization						
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
Total			\$ -	\$ -	\$ -	\$ -
Project Management						
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
Total			\$ -	\$ -	\$ -	\$ -
Engineering and Design						
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
Total			\$ -	\$ -	\$ -	\$ -
Design Documentation						
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
Total			\$ -	\$ -	\$ -	\$ -
Plans and Manuals						
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
Total			\$ -	\$ -	\$ -	\$ -
In-Lane Systems Software Licensing (not included directly with Roadside Systems)						
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
Total			\$ -	\$ -	\$ -	\$ -
Roadway Support System Software Custom Software and Development						
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
Total			\$ -	\$ -	\$ -	\$ -

Toll Lanes System Integrator Services

RFP 7-1911
Exhibit DSheet 2-1a Back-up
91 and I-405 Express Lanes
Implementation and Roadway Support Cost Details

DESCRIPTION OF ITEMS	# UNIT	UNIT (\$)	TOTAL UNIT (\$)	LABOR (\$)	TOTAL COST (\$)	TOTAL COST (\$)
BASE CONTRACT	I-405 Express Lanes Costs Only					Totals
3rd Party Software and Software Installation (OS, Database, Applications)						
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
Total			\$ -	\$ -	\$ -	\$ -
Roadway System Hardware and Installation						
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
Total			\$ -	\$ -	\$ -	\$ -
Communications Equipment						
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
Total			\$ -	\$ -	\$ -	\$ -
ATMS						
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
Total			\$ -	\$ -	\$ -	\$ -
Factory Acceptance Testing (FAT) and Equipment Environmental Testing (EET)						
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
Total			\$ -	\$ -	\$ -	\$ -
Unit Testing						
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
Total			\$ -	\$ -	\$ -	\$ -
Onsite Installation Testing and MOT						
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
Total			\$ -	\$ -	\$ -	\$ -

Toll Lanes System Integrator Services
**RFP 7-1911
Exhibit D**

Sheet 2-1a Back-up
91 and I-405 Express Lanes
Implementation and Roadway Support Cost Details

DESCRIPTION OF ITEMS	# UNIT	UNIT (\$)	TOTAL UNIT (\$)	LABOR (\$)	TOTAL COST (\$)	TOTAL COST (\$)
BASE CONTRACT	I-405 Express Lanes Costs Only					Totals
Operational and Acceptance Testing						
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
Total			\$ -	\$ -	\$ -	\$ -
Training Manuals and Delivery						
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
Total			\$ -	\$ -	\$ -	\$ -
Insurance and Bonding						
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
Total			\$ -	\$ -	\$ -	\$ -
TOTAL IMPLEMENTATION AND ROADWAY SUPPORT COST (Base)			\$ -	\$ -	\$ -	\$ -
OPTIONAL ITEMS	I-405 Express Lanes Costs Only					Totals
Occupancy Detection System Design, Testing and Integration						
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
Total			\$ -	\$ -	\$ -	\$ -
Occupancy Detection System Integration with 3rd Party						
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	\$ -	
Total			\$ -	\$ -	\$ -	\$ -
TOTAL IMPLEMENTATION AND ROADWAY SUPPORT COST (Optional Items)			\$ -	\$ -	\$ -	\$ -
TOTAL IMPLEMENTATION AND ROADWAY SUPPORT COST (Incl Base and Optional Items)			\$ -	\$ -	\$ -	\$ -
Labor Grand Total						
Labor Check - Cell B145 (from Sheet 2-1b, cell 50) should equal cell B144						

Sheet 2-1b Back-up 91 and I-405 Express Lanes
Implementation and Roadway Support Cost - Staff Rates and Hours

Item #	STAFF NAMES	POSITION/CLASSIFICATION	Base Contract and Optional Items		
			Loaded Labor Rate (\$)	Hours	Total Loaded Labor Cost (\$)
1		<i>Project Principal</i>	\$ -	0	\$ -
2		<i>Project Manager</i>	\$ -	0	\$ -
3		<i>Deputy Project Manager</i>	\$ -	0	\$ -
4		<i>Quality Control/Assurance Manager</i>	\$ -	0	\$ -
5		<i>Civil/Mechanical/Electrical Engineering Manager</i>	\$ -	0	\$ -
6		<i>I-405 ETTM System Infrastructure Lead</i>	\$ -	0	\$ -
7		<i>System Design Engineer</i>	\$ -	0	\$ -
8		<i>Lead Test Engineer</i>	\$ -	0	\$ -
9		<i>Installation & Commissioning Manager</i>	\$ -	0	\$ -
10		<i>Systems & Equipment Maintenance Manager</i>	\$ -	0	\$ -
11		System Analyst	\$ -	0	\$ -
12		Software Architect	\$ -	0	\$ -
13		Hardware Engineer	\$ -	0	\$ -
14		Software Developer Senior	\$ -	0	\$ -
15		Software Developer	\$ -	0	\$ -
16		Tester	\$ -	0	\$ -
17		Network Engineer	\$ -	0	\$ -
18		System Administrator	\$ -	0	\$ -
19		Database Administrator	\$ -	0	\$ -
20		Training Manager	\$ -	0	\$ -
21		Trainer	\$ -	0	\$ -
22		Quality Control	\$ -	0	\$ -
23		Licensed Electrician	\$ -	0	\$ -
24		Electrician Helper	\$ -	0	\$ -
25		Installation Technician	\$ -	0	\$ -
26		Installation Supervisor	\$ -	0	\$ -
27		Sr. Maintenance Technician	\$ -	0	\$ -
28		Maintenance Technician	\$ -	0	\$ -
29		Traffic Management Ops Manager	\$ -	0	\$ -
30		Traffic Management Ops Staff	\$ -	0	\$ -
31		Image Review Manager	\$ -	0	\$ -
32		Image Review Staff	\$ -	0	\$ -
33		CADD Technician	\$ -	0	\$ -
34		Documentation Specialist	\$ -	0	\$ -
35		Administrative Assistant	\$ -	0	\$ -
36			\$ -	0	\$ -
37			\$ -	0	\$ -
38			\$ -	0	\$ -
39			\$ -	0	\$ -
40			\$ -	0	\$ -
41			\$ -	0	\$ -
42			\$ -	0	\$ -
43			\$ -	0	\$ -
44			\$ -	0	\$ -
45			\$ -	0	\$ -
46			\$ -	0	\$ -
Grand Total Labor Cost					\$ -

Sheet 3-1a Back-up
91 and I-405 Express Lanes
Roadside Systems Equipment Detailed Cost by Location Type

DESCRIPTION OF ITEMS BY SITE TYPE	# UNIT	UNIT \$	TOTAL UNIT \$	LABOR \$	TOTAL	# UNIT	UNIT \$	TOTAL UNIT \$	LABOR \$	TOTAL
BASE CONTRACT	91 Express Lanes					I-405 Express Lanes				
ETTM Toll Collection and Enforcement Site	3 Lane Configuration					2 Lane Configuration				
1. Redundant Zone Controllers and In-lane Electronics	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
2. AVI System (ETC Antenna, Reader w/ RF Module and Software)	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
3. AVDS (Sensors, Controllers and Miscellaneous Components)	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
4. ICPS (Cameras, Illumination, Controllers w/ Miscellaneous Components)	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
5. OCR/ALPR (Included in ICPS)	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
6. VSR (Included in RSS)	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
7. Enforcement Beacons	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
8. DVAS	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
9. Communications Equipment	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
10. Equipment Cabinets/Access Control	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
11. UPS	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
12. Generator	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
13. Installation and Commissioning Test	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
14. Installation and Commissioning Test	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
15. MOT Provided by Design-Builder on I-405	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
Total			\$ -	\$ -	\$ -			\$ -	\$ -	\$ -
ETTM Transponder Read Site	1 Lane Configuration					1 Lane Configuration				
1. Redundant Zone Controllers and In-lane Electronics	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
2. AVI System (ETC Antenna, Reader w/ RF Module and Software)	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
3. AVDS (Sensors, Controllers and Miscellaneous Components)	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
4. ICPS (Cameras, Illumination, Controllers w/ Miscellaneous Components)	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
5. OCR/ALPR (Included in ICPS)	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
6. VSR (Included in RSS)	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
7. DVAS	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
8. Communications Equipment	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
9. Equipment Cabinets	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
10. UPS	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
11. Generator	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
12. Installation and Commissioning Test	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
13. Installation and Commissioning Test	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
14. MOT Provided by Design-Builder on I-405	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
Total			\$ -	\$ -	\$ -			\$ -	\$ -	\$ -

Sheet 3-1a Back-up
91 and I-405 Express Lanes
Roadside Systems Equipment Detailed Cost by Location Type

DESCRIPTION OF ITEMS BY SITE TYPE	# UNIT	UNIT \$	TOTAL UNIT \$	LABOR \$	TOTAL	# UNIT	UNIT \$	TOTAL UNIT \$	LABOR \$	TOTAL
ETTM Toll Rate CMS Sites			-					-		
1.CMS LED Panel, Controller and In-lane Electronics	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
2. Communications Equipment	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
3. Equipment Cabinets	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
4. UPS	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
5. Generator	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
6. Installation and Commissioning Test	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
7. MOT for Installation and Commissioning Test	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
Total			\$ -	\$ -	-			\$ -	\$ -	-
ETTM Toll CCTV Camera Site (Integrated Site)			-					-		
1.Camera, Controller and In-lane Electronics	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
2. Communications Equipment	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
3. Equipment Cabinet	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
4. UPS	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
5. Installation and Commissioning Test	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
6. MOT for Installation and Commissioning Test	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
Total			\$ -	\$ -	-			\$ -	\$ -	-
ETTM Toll CCTV Camera Site (Stand-Alone Site)			-					-		
1.Camera, Controller and In-lane Electronics	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
2. Communications Equipment	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
3. Equipment Cabinet	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
4. UPS	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
5. Installation and Commissioning Test	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
6. MOT for Installation and Commissioning Test	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
Total			\$ -	\$ -	-			\$ -	\$ -	-
ETTM Toll Traffic Detector Sites (Integrated Site)			-					-		
1.Detector, Controller and In-lane Electronics	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
2. Communications Equipment	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
3. Equipment Cabinet	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
4. UPS	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
5. Installation and Commissioning Test	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
6. MOT for Installation and Commissioning Test	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
	0	\$ -	\$ -	\$ -	-	0	\$ -	\$ -	\$ -	-
Total			\$ -	\$ -	-			\$ -	\$ -	-

Sheet 3-1a Back-up
91 and I-405 Express Lanes
Roadside Systems Equipment Detailed Cost by Location Type

DESCRIPTION OF ITEMS BY SITE TYPE	# UNIT	UNIT \$	TOTAL UNIT \$	LABOR \$	TOTAL	# UNIT	UNIT \$	TOTAL UNIT \$	LABOR \$	TOTAL
ETTM Toll Traffic Detector Sites (Stand-Alone Site)										
1.Detector, Controller and In-lane Electronics	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
2. Communications Equipment	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
3. Equipment Cabinet	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
4. UPS	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
5. Installation and Commissioning Test	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
6. MOT for Installation and Commissioning Test	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
Total			\$ -	\$ -	\$ -			\$ -	\$ -	\$ -
Corridor Systems (Not included in RSS)										
1. Corridor Server	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
2. Communications for Facility	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
3. Installation and Commissioning Test	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
4. MOT for Installation and Commissioning Test	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
Total			\$ -	\$ -	\$ -			\$ -	\$ -	\$ -
OPTIONAL ITEMS	91 Express Lanes					I-405 Express Lanes				
Automatic Vehicle Classification (at ETTM Toll Collection and Enforcement Site only)										
	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
Total			\$ -	\$ -	\$ -			\$ -	\$ -	\$ -
Occupancy Detection System Design, Testing and Integration (at ETTM Toll Collection and Enforcement Site only)										
1.Detection, Controller and In-lane Electronics	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
2.Incremental Increase in Installation and Commissioning	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
3. Incremental Increase in MOT for Installation and Commissioning Test	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
Total			\$ -	\$ -	\$ -			\$ -	\$ -	\$ -
Occupancy Detection System Integration with 3rd Party (at ETTM Toll Collection and Enforcement Site only)										
1.Incremental Increase in Installation and Commissioning	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
2. Incremental Increase in MOT for Installation and Commissioning Test	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
	0	\$ -	\$ -	\$ -	\$ -	0	\$ -	\$ -	\$ -	\$ -
Total			\$ -	\$ -	\$ -			\$ -	\$ -	\$ -
Labor Grand Total	\$ -									
Labor Check - Cell B121 (from Sheet 3-1b, cell 50) should equal cell B120	\$ -									

Sheet 3-1b Back-up
91 and I-405 Express Lanes
Roadside Systems Equipment - Staff Rates and Hours

Item #	STAFF NAMES	POSITION/CLASSIFICATION	Base Contract and Optional Items		
			Loaded Labor Rate (\$)	Hours	Total Loaded Labor Cost (\$)
1		<i>Project Principal</i>	\$ -	0	\$ -
2		<i>Project Manager</i>	\$ -	0	\$ -
3		<i>Deputy Project Manager</i>	\$ -	0	\$ -
4		<i>Quality Control/Assurance Manager</i>	\$ -	0	\$ -
5		<i>Civil/Mechanical/Electrical Engineering Manager</i>	\$ -	0	\$ -
6		<i>I-405 ETTM System Infrastructure Lead</i>	\$ -	0	\$ -
7		<i>System Design Engineer</i>	\$ -	0	\$ -
8		<i>Lead Test Engineer</i>	\$ -	0	\$ -
9		<i>Installation & Commissioning Manager</i>	\$ -	0	\$ -
10		<i>Systems & Equipment Maintenance Manager</i>	\$ -	0	\$ -
11		System Analyst	\$ -	0	\$ -
12		Software Architect	\$ -	0	\$ -
13		Hardware Engineer	\$ -	0	\$ -
14		Software Developer Senior	\$ -	0	\$ -
15		Software Developer	\$ -	0	\$ -
16		Tester	\$ -	0	\$ -
17		Network Engineer	\$ -	0	\$ -
18		System Administrator	\$ -	0	\$ -
19		Database Administrator	\$ -	0	\$ -
20		Training Manager	\$ -	0	\$ -
21		Trainer	\$ -	0	\$ -
22		Quality Control	\$ -	0	\$ -
23		Licensed Electrician	\$ -	0	\$ -
24		Electrician Helper	\$ -	0	\$ -
25		Installation Technician	\$ -	0	\$ -
26		Installation Supervisor	\$ -	0	\$ -
27		Sr. Maintenance Technician	\$ -	0	\$ -
28		Maintenance Technician	\$ -	0	\$ -
29		Traffic Management Ops Manager	\$ -	0	\$ -
30		Traffic Management Ops Staff	\$ -	0	\$ -
31		Image Review Manager	\$ -	0	\$ -
32		Image Review Staff	\$ -	0	\$ -
33		CADD Technician	\$ -	0	\$ -
34		Documentation Specialist	\$ -	0	\$ -
35		Administrative Assistant	\$ -	0	\$ -
36			\$ -	0	\$ -
37			\$ -	0	\$ -
38			\$ -	0	\$ -
39			\$ -	0	\$ -
40			\$ -	0	\$ -
41			\$ -	0	\$ -
42			\$ -	0	\$ -
43			\$ -	0	\$ -
44			\$ -	0	\$ -
45			\$ -	0	\$ -
46			\$ -	0	\$ -
Grand Total Labor Cost					\$ -

Sheet 4-1a

91 and I-405 Express Lanes

Roadway Support System Maintenance Cost Detail

Monthly Schedule of Labor and Other Direct Cost Items

Description of Items	Monthly Cost (\$)	Monthly Labor (\$)	Total Monthly Cost All Lanes (\$)	Monthly Cost (\$)	Monthly Labor (\$)	Total Monthly Cost All Lanes (\$)
Base Contract	91 Express Lanes					
Year 1 of Maintenance: System Maintenance and Software Support Services						
Maintenance Labor		\$ -	\$ -			
Upgrades	\$ -		\$ -			
Materials	\$ -		\$ -			
Equipment	\$ -		\$ -			
Software Licenses	\$ -		\$ -			
	\$ -		\$ -			
Total Monthly Year 1	\$ -	\$ -	\$ -			
Year 2 of Maintenance: System Maintenance and Software Support Services						
Maintenance Labor		\$ -	\$ -			
Upgrades	\$ -		\$ -			
Materials	\$ -		\$ -			
Equipment	\$ -		\$ -			
Software Licenses	\$ -		\$ -			
	\$ -		\$ -			
Total Monthly Year 2	\$ -	\$ -	\$ -			
Year 3 of Maintenance: System Maintenance and Software Support Services						
Maintenance Labor		\$ -	\$ -			
Upgrades	\$ -		\$ -			
Materials	\$ -		\$ -			
Equipment	\$ -		\$ -			
Software Licenses	\$ -		\$ -			
	\$ -		\$ -			
Total Monthly Year 3	\$ -	\$ -	\$ -			

Sheet 4-1a

91 and I-405 Express Lanes

Roadway Support System Maintenance Cost Detail

Monthly Schedule of Labor and Other Direct Cost Items

Description of Items	Monthly Cost (\$)	Monthly Labor (\$)	Total Monthly Cost All Lanes (\$)	Monthly Cost (\$)	Monthly Labor (\$)	Total Monthly Cost All Lanes (\$)
Year 4 of Maintenance: System Maintenance and Software Support Services						
Maintenance Labor		\$ -	\$ -			
Upgrades	\$ -		\$ -			
Materials	\$ -		\$ -			
Equipment	\$ -		\$ -			
Software Licenses	\$ -		\$ -			
	\$ -		\$ -			
Total Monthly Year 4	\$ -	\$ -	\$ -			
Beginning of 91 and I-405 Joint Maintenance	91 Express Lanes (Proportional Share)			I-405 Express Lanes (Proportional Share)		
Year 5 of Maintenance: System Maintenance and Software Support Services						
Maintenance Labor		\$ -	\$ -		\$ -	\$ -
I-405 TOC Labor			\$ -		\$ -	\$ -
Upgrades	\$ -		\$ -	\$ -		\$ -
Materials	\$ -		\$ -	\$ -		\$ -
Equipment	\$ -		\$ -	\$ -		\$ -
Software Licenses	\$ -		\$ -	\$ -		\$ -
	\$ -		\$ -	\$ -		\$ -
Total Monthly Year 5	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Year 6 of Maintenance: System Maintenance and Software Support Services						
Maintenance Labor		\$ -	\$ -		\$ -	\$ -
I-405 TOC Labor			\$ -		\$ -	\$ -
Upgrades	\$ -		\$ -	\$ -		\$ -
Materials	\$ -		\$ -	\$ -		\$ -
Equipment	\$ -		\$ -	\$ -		\$ -
Software Licenses	\$ -		\$ -	\$ -		\$ -
	\$ -		\$ -	\$ -		\$ -
Total Monthly Year 6	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Sheet 4-1a
91 and I-405 Express Lanes
Roadway Support System Maintenance Cost Detail
Monthly Schedule of Labor and Other Direct Cost Items

Description of Items	Monthly Cost (\$)	Monthly Labor (\$)	Total Monthly Cost All Lanes (\$)	Monthly Cost (\$)	Monthly Labor (\$)	Total Monthly Cost All Lanes (\$)
Year 7 of Maintenance: System Maintenance and Software Support Services						
Maintenance Labor		\$ -	\$ -		\$ -	\$ -
I-405 TOC Labor			\$ -		\$ -	\$ -
Upgrades	\$ -		\$ -	\$ -		\$ -
Materials	\$ -		\$ -	\$ -		\$ -
Equipment	\$ -		\$ -	\$ -		\$ -
Software Licenses	\$ -		\$ -	\$ -		\$ -
	\$ -		\$ -	\$ -		\$ -
Total Monthly Year 7	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Year 8 of Maintenance: System Maintenance and Software Support Services						
Maintenance Labor		\$ -	\$ -		\$ -	\$ -
I-405 TOC Labor			\$ -		\$ -	\$ -
Upgrades	\$ -		\$ -	\$ -		\$ -
Materials	\$ -		\$ -	\$ -		\$ -
Equipment	\$ -		\$ -	\$ -		\$ -
Software Licenses	\$ -		\$ -	\$ -		\$ -
	\$ -		\$ -	\$ -		\$ -
Total Monthly Year 8	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Year 9 of Maintenance: System Maintenance and Software Support Services						
Maintenance Labor		\$ -	\$ -		\$ -	\$ -
I-405 TOC Labor			\$ -		\$ -	\$ -
Upgrades	\$ -		\$ -	\$ -		\$ -
Materials	\$ -		\$ -	\$ -		\$ -
Equipment	\$ -		\$ -	\$ -		\$ -
Software Licenses	\$ -		\$ -	\$ -		\$ -
	\$ -		\$ -	\$ -		\$ -
Total Monthly Year 9	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Sheet 4-1a

91 and I-405 Express Lanes

Roadway Support System Maintenance Cost Detail

Monthly Schedule of Labor and Other Direct Cost Items

Description of Items	Monthly Cost (\$)	Monthly Labor (\$)	Total Monthly Cost All Lanes (\$)	Monthly Cost (\$)	Monthly Labor (\$)	Total Monthly Cost All Lanes (\$)
Optional Extension #1	91 Express Lanes (Proportional Share)			I-405 Express Lanes (Proportional Share)		
Optional Year 10 of Maintenance: System Maintenance and Software Support Services						
Maintenance Labor		\$ -	\$ -		\$ -	\$ -
I-405 TOC Labor			\$ -		\$ -	\$ -
Upgrades	\$ -		\$ -	\$ -		\$ -
Materials	\$ -		\$ -	\$ -		\$ -
Equipment	\$ -		\$ -	\$ -		\$ -
Software Licenses	\$ -		\$ -	\$ -		\$ -
	\$ -		\$ -	\$ -		\$ -
Total Monthly Optional Year 10	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Optional Year 11 of Maintenance: System Maintenance and Software Support Services						
Labor		\$ -	\$ -		\$ -	\$ -
I-405 TOC Labor			\$ -		\$ -	\$ -
Upgrades	\$ -		\$ -	\$ -		\$ -
Materials	\$ -		\$ -	\$ -		\$ -
Equipment	\$ -		\$ -	\$ -		\$ -
Software Licenses	\$ -		\$ -	\$ -		\$ -
	\$ -		\$ -	\$ -		\$ -
Total Monthly Optional Year 11	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Sheet 4-1a

91 and I-405 Express Lanes

Roadway Support System Maintenance Cost Detail

Monthly Schedule of Labor and Other Direct Cost Items

Description of Items	Monthly Cost (\$)	Monthly Labor (\$)	Total Monthly Cost All Lanes (\$)	Monthly Cost (\$)	Monthly Labor (\$)	Total Monthly Cost All Lanes (\$)
Optional Extension #2	91 Express Lanes (Proportional Share)			405 Express Lanes (Proportional Share)		
Optional Year 12 of Maintenance: System Maintenance and Software Support Services						
Maintenance Labor		\$ -	\$ -		\$ -	\$ -
I-405 TOC Labor			\$ -		\$ -	\$ -
Upgrades	\$ -		\$ -	\$ -		\$ -
Materials	\$ -		\$ -	\$ -		\$ -
Equipment	\$ -		\$ -	\$ -		\$ -
Software Licenses	\$ -		\$ -	\$ -		\$ -
	\$ -		\$ -	\$ -		\$ -
Total Monthly Optional Year 12	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Optional Year 13 of Maintenance: System Maintenance and Software Support Services						
Maintenance Labor		\$ -	\$ -		\$ -	\$ -
I-405 TOC Labor			\$ -		\$ -	\$ -
Upgrades	\$ -		\$ -	\$ -		\$ -
Materials	\$ -		\$ -	\$ -		\$ -
Equipment	\$ -		\$ -	\$ -		\$ -
Software Licenses	\$ -		\$ -	\$ -		\$ -
	\$ -		\$ -	\$ -		\$ -
Total Monthly Optional Year 13	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Labor Totals		\$ -			\$ -	
Labor Grand Total	\$ -					
Labor Check Cell B122 (from Sheet 4-1b, cell AP49) should equal cell B121	\$ -					

Sheet 4-1b Back-up
91 and I-405 Express Lanes
Roadway Support Systems Maintenance Support
Staff Rates and Hours

Item #	STAFF NAMES	POSITION/CLASSIFICATION	LOADED HOURLY BILLING RATES Year 1 of Maintenance			LOADED HOURLY BILLING RATES Year 2 of Maintenance		
			First Year Rate	Year 1 Hours	Year 1 Total Labor Cost	Year 2 Rate	Year 2 Hours	Year 2 Total Labor Cost
1		Project Principal	\$ -	0	\$ -	\$ -	0	\$ -
2		Project Manager	\$ -	0	\$ -	\$ -	0	\$ -
3		Deputy Project Manager	\$ -	0	\$ -	\$ -	0	\$ -
4		Quality Control/Assurance Manager	\$ -	0	\$ -	\$ -	0	\$ -
5		Civil/Mechanical/Electrical Engineering Manager	\$ -	0	\$ -	\$ -	0	\$ -
6		I-405 ETTM System Infrastructure Lead	\$ -	0	\$ -	\$ -	0	\$ -
7		System Design Engineer	\$ -	0	\$ -	\$ -	0	\$ -
8		Lead Test Engineer	\$ -	0	\$ -	\$ -	0	\$ -
9		Installation & Commissioning Manager	\$ -	0	\$ -	\$ -	0	\$ -
10		Systems & Equipment Maintenance Manager	\$ -	0	\$ -	\$ -	0	\$ -
11		System Analyst	\$ -	0	\$ -	\$ -	0	\$ -
12		Software Architect	\$ -	0	\$ -	\$ -	0	\$ -
13		Hardware Engineer	\$ -	0	\$ -	\$ -	0	\$ -
14		Software Developer Senior	\$ -	0	\$ -	\$ -	0	\$ -
15		Software Developer	\$ -	0	\$ -	\$ -	0	\$ -
16		Tester	\$ -	0	\$ -	\$ -	0	\$ -
17		Network Engineer	\$ -	0	\$ -	\$ -	0	\$ -
18		System Administrator	\$ -	0	\$ -	\$ -	0	\$ -
19		Database Administrator	\$ -	0	\$ -	\$ -	0	\$ -
20		Training Manager	\$ -	0	\$ -	\$ -	0	\$ -
21		Trainer	\$ -	0	\$ -	\$ -	0	\$ -
22		Quality Control	\$ -	0	\$ -	\$ -	0	\$ -
23		Licensed Electrician	\$ -	0	\$ -	\$ -	0	\$ -
24		Electrician Helper	\$ -	0	\$ -	\$ -	0	\$ -
25		Installation Technician	\$ -	0	\$ -	\$ -	0	\$ -
26		Installation Supervisor	\$ -	0	\$ -	\$ -	0	\$ -
27		Sr. Maintenance Technician	\$ -	0	\$ -	\$ -	0	\$ -
28		Maintenance Technician	\$ -	0	\$ -	\$ -	0	\$ -
29		Traffic Management Ops Manager	\$ -	0	\$ -	\$ -	0	\$ -
30		Traffic Management Ops Staff	\$ -	0	\$ -	\$ -	0	\$ -
31		Image Review Manager	\$ -	0	\$ -	\$ -	0	\$ -
32		Image Review Staff	\$ -	0	\$ -	\$ -	0	\$ -
33		CADD Technician	\$ -	0	\$ -	\$ -	0	\$ -
34		Documentation Specialist	\$ -	0	\$ -	\$ -	0	\$ -
35		Administrative Assistant	\$ -	0	\$ -	\$ -	0	\$ -
36			\$ -	0	\$ -	\$ -	0	\$ -
37			\$ -	0	\$ -	\$ -	0	\$ -
38			\$ -	0	\$ -	\$ -	0	\$ -
39			\$ -	0	\$ -	\$ -	0	\$ -
40			\$ -	0	\$ -	\$ -	0	\$ -
41			\$ -	0	\$ -	\$ -	0	\$ -
42			\$ -	0	\$ -	\$ -	0	\$ -
43			\$ -	0	\$ -	\$ -	0	\$ -
44			\$ -	0	\$ -	\$ -	0	\$ -
	Total Labor Cost				\$ -			\$ -
	Grand Total Labor Cost							

Sheet 4-1b Back-up
91 and I-405 Express Lanes
Roadway Support Systems Maintenance Support
Staff Rates and Hours

Item #	STAFF NAMES	POSITION/CLASSIFICATION	LOADED HOURLY BILLING RATES Year 3 of Maintenance			LOADED HOURLY BILLING RATES Year 4 of Maintenance		
			Year 3 Rate	Year 3 Hours	Year 3 Total Labor Cost	Year 4 Rate	Year 4 Hours	Year 4 Total Labor Cost
1		Project Principal	\$ -	0	\$ -	\$ -	0	\$ -
2		Project Manager	\$ -	0	\$ -	\$ -	0	\$ -
3		Deputy Project Manager	\$ -	0	\$ -	\$ -	0	\$ -
4		Quality Control/Assurance Manager	\$ -	0	\$ -	\$ -	0	\$ -
5		Civil/Mechanical/Electrical Engineering Manager	\$ -	0	\$ -	\$ -	0	\$ -
6		I-405 ETTM System Infrastructure Lead	\$ -	0	\$ -	\$ -	0	\$ -
7		System Design Engineer	\$ -	0	\$ -	\$ -	0	\$ -
8		Lead Test Engineer	\$ -	0	\$ -	\$ -	0	\$ -
9		Installation & Commissioning Manager	\$ -	0	\$ -	\$ -	0	\$ -
10		Systems & Equipment Maintenance Manager	\$ -	0	\$ -	\$ -	0	\$ -
11		System Analyst	\$ -	0	\$ -	\$ -	0	\$ -
12		Software Architect	\$ -	0	\$ -	\$ -	0	\$ -
13		Hardware Engineer	\$ -	0	\$ -	\$ -	0	\$ -
14		Software Developer Senior	\$ -	0	\$ -	\$ -	0	\$ -
15		Software Developer	\$ -	0	\$ -	\$ -	0	\$ -
16		Tester	\$ -	0	\$ -	\$ -	0	\$ -
17		Network Engineer	\$ -	0	\$ -	\$ -	0	\$ -
18		System Administrator	\$ -	0	\$ -	\$ -	0	\$ -
19		Database Administrator	\$ -	0	\$ -	\$ -	0	\$ -
20		Training Manager	\$ -	0	\$ -	\$ -	0	\$ -
21		Trainer	\$ -	0	\$ -	\$ -	0	\$ -
22		Quality Control	\$ -	0	\$ -	\$ -	0	\$ -
23		Licensed Electrician	\$ -	0	\$ -	\$ -	0	\$ -
24		Electrician Helper	\$ -	0	\$ -	\$ -	0	\$ -
25		Installation Technician	\$ -	0	\$ -	\$ -	0	\$ -
26		Installation Supervisor	\$ -	0	\$ -	\$ -	0	\$ -
27		Sr. Maintenance Technician	\$ -	0	\$ -	\$ -	0	\$ -
28		Maintenance Technician	\$ -	0	\$ -	\$ -	0	\$ -
29		Traffic Management Ops Manager	\$ -	0	\$ -	\$ -	0	\$ -
30		Traffic Management Ops Staff	\$ -	0	\$ -	\$ -	0	\$ -
31		Image Review Manager	\$ -	0	\$ -	\$ -	0	\$ -
32		Image Review Staff	\$ -	0	\$ -	\$ -	0	\$ -
33		CADD Technician	\$ -	0	\$ -	\$ -	0	\$ -
34		Documentation Specialist	\$ -	0	\$ -	\$ -	0	\$ -
35		Administrative Assistant	\$ -	0	\$ -	\$ -	0	\$ -
36			\$ -	0	\$ -	\$ -	0	\$ -
37			\$ -	0	\$ -	\$ -	0	\$ -
38			\$ -	0	\$ -	\$ -	0	\$ -
39			\$ -	0	\$ -	\$ -	0	\$ -
40			\$ -	0	\$ -	\$ -	0	\$ -
41			\$ -	0	\$ -	\$ -	0	\$ -
42			\$ -	0	\$ -	\$ -	0	\$ -
43			\$ -	0	\$ -	\$ -	0	\$ -
44			\$ -	0	\$ -	\$ -	0	\$ -
	Total Labor Cost				\$ -			\$ -
	Grand Total Labor Cost							

Sheet 4-1b Back-up
91 and I-405 Express Lanes
Roadway Support Systems Maintenance Support
Staff Rates and Hours

Item #	STAFF NAMES	POSITION/CLASSIFICATION	LOADED HOURLY BILLING RATES Year 5 of Maintenance			LOADED HOURLY BILLING RATES Year 6 of Maintenance		
			Year 5 Rate	Year 5 Hours	Year 5 Total Labor Cost	Year 6 Rate	Year 6 Hours	Year 6 Total Labor Cost
1		<i>Project Principal</i>	\$ -	0	\$ -	\$ -	0	\$ -
2		<i>Project Manager</i>	\$ -	0	\$ -	\$ -	0	\$ -
3		<i>Deputy Project Manager</i>	\$ -	0	\$ -	\$ -	0	\$ -
4		<i>Quality Control/Assurance Manager</i>	\$ -	0	\$ -	\$ -	0	\$ -
5		<i>Civil/Mechanical/Electrical Engineering Manager</i>	\$ -	0	\$ -	\$ -	0	\$ -
6		<i>I-405 ETTM System Infrastructure Lead</i>	\$ -	0	\$ -	\$ -	0	\$ -
7		<i>System Design Engineer</i>	\$ -	0	\$ -	\$ -	0	\$ -
8		<i>Lead Test Engineer</i>	\$ -	0	\$ -	\$ -	0	\$ -
9		<i>Installation & Commissioning Manager</i>	\$ -	0	\$ -	\$ -	0	\$ -
10		<i>Systems & Equipment Maintenance Manager</i>	\$ -	0	\$ -	\$ -	0	\$ -
11		System Analyst	\$ -	0	\$ -	\$ -	0	\$ -
12		Software Architect	\$ -	0	\$ -	\$ -	0	\$ -
13		Hardware Engineer	\$ -	0	\$ -	\$ -	0	\$ -
14		Software Developer Senior	\$ -	0	\$ -	\$ -	0	\$ -
15		Software Developer	\$ -	0	\$ -	\$ -	0	\$ -
16		Tester	\$ -	0	\$ -	\$ -	0	\$ -
17		Network Engineer	\$ -	0	\$ -	\$ -	0	\$ -
18		System Administrator	\$ -	0	\$ -	\$ -	0	\$ -
19		Database Administrator	\$ -	0	\$ -	\$ -	0	\$ -
20		Training Manager	\$ -	0	\$ -	\$ -	0	\$ -
21		Trainer	\$ -	0	\$ -	\$ -	0	\$ -
22		Quality Control	\$ -	0	\$ -	\$ -	0	\$ -
23		Licensed Electrician	\$ -	0	\$ -	\$ -	0	\$ -
24		Electrician Helper	\$ -	0	\$ -	\$ -	0	\$ -
25		Installation Technician	\$ -	0	\$ -	\$ -	0	\$ -
26		Installation Supervisor	\$ -	0	\$ -	\$ -	0	\$ -
27		Sr. Maintenance Technician	\$ -	0	\$ -	\$ -	0	\$ -
28		Maintenance Technician	\$ -	0	\$ -	\$ -	0	\$ -
29		Traffic Management Ops Manager	\$ -	0	\$ -	\$ -	0	\$ -
30		Traffic Management Ops Staff	\$ -	0	\$ -	\$ -	0	\$ -
31		Image Review Manager	\$ -	0	\$ -	\$ -	0	\$ -
32		Image Review Staff	\$ -	0	\$ -	\$ -	0	\$ -
33		CADD Technician	\$ -	0	\$ -	\$ -	0	\$ -
34		Documentation Specialist	\$ -	0	\$ -	\$ -	0	\$ -
35		Administrative Assistant	\$ -	0	\$ -	\$ -	0	\$ -
36			\$ -	0	\$ -	\$ -	0	\$ -
37			\$ -	0	\$ -	\$ -	0	\$ -
38			\$ -	0	\$ -	\$ -	0	\$ -
39			\$ -	0	\$ -	\$ -	0	\$ -
40			\$ -	0	\$ -	\$ -	0	\$ -
41			\$ -	0	\$ -	\$ -	0	\$ -
42			\$ -	0	\$ -	\$ -	0	\$ -
43			\$ -	0	\$ -	\$ -	0	\$ -
44			\$ -	0	\$ -	\$ -	0	\$ -
	Total Labor Cost				\$ -			\$ -
	Grand Total Labor Cost							

Sheet 4-1b Back-up
91 and I-405 Express Lanes
Roadway Support Systems Maintenance Support
Staff Rates and Hours

Item #	STAFF NAMES	POSITION/CLASSIFICATION	LOADED HOURLY BILLING RATES Year 7 of Maintenance			LOADED HOURLY BILLING RATES Year 8 of Maintenance		
			Year 7 Rate	Year 7 Hours	Year 7 Total Labor Cost	Year 8 Rate	Year 8 Hours	Year 8 Total Labor Cost
1		Project Principal	\$ -	0	\$ -	\$ -	0	\$ -
2		Project Manager	\$ -	0	\$ -	\$ -	0	\$ -
3		Deputy Project Manager	\$ -	0	\$ -	\$ -	0	\$ -
4		Quality Control/Assurance Manager	\$ -	0	\$ -	\$ -	0	\$ -
5		Civil/Mechanical/Electrical Engineering Manager	\$ -	0	\$ -	\$ -	0	\$ -
6		I-405 ETTM System Infrastructure Lead	\$ -	0	\$ -	\$ -	0	\$ -
7		System Design Engineer	\$ -	0	\$ -	\$ -	0	\$ -
8		Lead Test Engineer	\$ -	0	\$ -	\$ -	0	\$ -
9		Installation & Commissioning Manager	\$ -	0	\$ -	\$ -	0	\$ -
10		Systems & Equipment Maintenance Manager	\$ -	0	\$ -	\$ -	0	\$ -
11		System Analyst	\$ -	0	\$ -	\$ -	0	\$ -
12		Software Architect	\$ -	0	\$ -	\$ -	0	\$ -
13		Hardware Engineer	\$ -	0	\$ -	\$ -	0	\$ -
14		Software Developer Senior	\$ -	0	\$ -	\$ -	0	\$ -
15		Software Developer	\$ -	0	\$ -	\$ -	0	\$ -
16		Tester	\$ -	0	\$ -	\$ -	0	\$ -
17		Network Engineer	\$ -	0	\$ -	\$ -	0	\$ -
18		System Administrator	\$ -	0	\$ -	\$ -	0	\$ -
19		Database Administrator	\$ -	0	\$ -	\$ -	0	\$ -
20		Training Manager	\$ -	0	\$ -	\$ -	0	\$ -
21		Trainer	\$ -	0	\$ -	\$ -	0	\$ -
22		Quality Control	\$ -	0	\$ -	\$ -	0	\$ -
23		Licensed Electrician	\$ -	0	\$ -	\$ -	0	\$ -
24		Electrician Helper	\$ -	0	\$ -	\$ -	0	\$ -
25		Installation Technician	\$ -	0	\$ -	\$ -	0	\$ -
26		Installation Supervisor	\$ -	0	\$ -	\$ -	0	\$ -
27		Sr. Maintenance Technician	\$ -	0	\$ -	\$ -	0	\$ -
28		Maintenance Technician	\$ -	0	\$ -	\$ -	0	\$ -
29		Traffic Management Ops Manager	\$ -	0	\$ -	\$ -	0	\$ -
30		Traffic Management Ops Staff	\$ -	0	\$ -	\$ -	0	\$ -
31		Image Review Manager	\$ -	0	\$ -	\$ -	0	\$ -
32		Image Review Staff	\$ -	0	\$ -	\$ -	0	\$ -
33		CADD Technician	\$ -	0	\$ -	\$ -	0	\$ -
34		Documentation Specialist	\$ -	0	\$ -	\$ -	0	\$ -
35		Administrative Assistant	\$ -	0	\$ -	\$ -	0	\$ -
36			\$ -	0	\$ -	\$ -	0	\$ -
37			\$ -	0	\$ -	\$ -	0	\$ -
38			\$ -	0	\$ -	\$ -	0	\$ -
39			\$ -	0	\$ -	\$ -	0	\$ -
40			\$ -	0	\$ -	\$ -	0	\$ -
41			\$ -	0	\$ -	\$ -	0	\$ -
42			\$ -	0	\$ -	\$ -	0	\$ -
43			\$ -	0	\$ -	\$ -	0	\$ -
44			\$ -	0	\$ -	\$ -	0	\$ -
	Total Labor Cost				\$ -			\$ -
	Grand Total Labor Cost							

Sheet 4-1b Back-up
91 and I-405 Express Lanes
Roadway Support Systems Maintenance Support
Staff Rates and Hours

Item #	STAFF NAMES	POSITION/CLASSIFICATION	LOADED HOURLY BILLING RATES Year 9 of Maintenance			LOADED HOURLY BILLING RATES Optional Year 10 of Maintenance		
			Year 9 Rate	Year 9 Hours	Year 9 Total Labor Cost	Optional Year 10 Rate	Optional Year 10 Hours	Optional Year 10 Total Labor Cost
1		Project Principal	\$ -	0	\$ -	\$ -	0	\$ -
2		Project Manager	\$ -	0	\$ -	\$ -	0	\$ -
3		Deputy Project Manager	\$ -	0	\$ -	\$ -	0	\$ -
4		Quality Control/Assurance Manager	\$ -	0	\$ -	\$ -	0	\$ -
5		Civil/Mechanical/Electrical Engineering Manager	\$ -	0	\$ -	\$ -	0	\$ -
6		I-405 ETTM System Infrastructure Lead	\$ -	0	\$ -	\$ -	0	\$ -
7		System Design Engineer	\$ -	0	\$ -	\$ -	0	\$ -
8		Lead Test Engineer	\$ -	0	\$ -	\$ -	0	\$ -
9		Installation & Commissioning Manager	\$ -	0	\$ -	\$ -	0	\$ -
10		Systems & Equipment Maintenance Manager	\$ -	0	\$ -	\$ -	0	\$ -
11		System Analyst	\$ -	0	\$ -	\$ -	0	\$ -
12		Software Architect	\$ -	0	\$ -	\$ -	0	\$ -
13		Hardware Engineer	\$ -	0	\$ -	\$ -	0	\$ -
14		Software Developer Senior	\$ -	0	\$ -	\$ -	0	\$ -
15		Software Developer	\$ -	0	\$ -	\$ -	0	\$ -
16		Tester	\$ -	0	\$ -	\$ -	0	\$ -
17		Network Engineer	\$ -	0	\$ -	\$ -	0	\$ -
18		System Administrator	\$ -	0	\$ -	\$ -	0	\$ -
19		Database Administrator	\$ -	0	\$ -	\$ -	0	\$ -
20		Training Manager	\$ -	0	\$ -	\$ -	0	\$ -
21		Trainer	\$ -	0	\$ -	\$ -	0	\$ -
22		Quality Control	\$ -	0	\$ -	\$ -	0	\$ -
23		Licensed Electrician	\$ -	0	\$ -	\$ -	0	\$ -
24		Electrician Helper	\$ -	0	\$ -	\$ -	0	\$ -
25		Installation Technician	\$ -	0	\$ -	\$ -	0	\$ -
26		Installation Supervisor	\$ -	0	\$ -	\$ -	0	\$ -
27		Sr. Maintenance Technician	\$ -	0	\$ -	\$ -	0	\$ -
28		Maintenance Technician	\$ -	0	\$ -	\$ -	0	\$ -
29		Traffic Management Ops Manager	\$ -	0	\$ -	\$ -	0	\$ -
30		Traffic Management Ops Staff	\$ -	0	\$ -	\$ -	0	\$ -
31		Image Review Manager	\$ -	0	\$ -	\$ -	0	\$ -
32		Image Review Staff	\$ -	0	\$ -	\$ -	0	\$ -
33		CADD Technician	\$ -	0	\$ -	\$ -	0	\$ -
34		Documentation Specialist	\$ -	0	\$ -	\$ -	0	\$ -
35		Administrative Assistant	\$ -	0	\$ -	\$ -	0	\$ -
36			\$ -	0	\$ -	\$ -	0	\$ -
37			\$ -	0	\$ -	\$ -	0	\$ -
38			\$ -	0	\$ -	\$ -	0	\$ -
39			\$ -	0	\$ -	\$ -	0	\$ -
40			\$ -	0	\$ -	\$ -	0	\$ -
41			\$ -	0	\$ -	\$ -	0	\$ -
42			\$ -	0	\$ -	\$ -	0	\$ -
43			\$ -	0	\$ -	\$ -	0	\$ -
44			\$ -	0	\$ -	\$ -	0	\$ -
	Total Labor Cost				\$ -			\$ -
	Grand Total Labor Cost							

Sheet 4-1b Back-up
91 and I-405 Express Lanes
Roadway Support Systems Maintenance Support
Staff Rates and Hours

Item #	STAFF NAMES	POSITION/CLASSIFICATION	LOADED HOURLY BILLING RATES Optional Year 11 of Maintenance			LOADED HOURLY BILLING RATES Optional Year 12 of Maintenance		
			Optional Year 11 Rate	Optional Year 11 Hours	Optional Year 11 Total Labor Cost	Optional Year 12 Rate	Optional Year 12 Hours	Optional Year 12 Total Labor Cost
1		<i>Project Principal</i>	\$ -	0	\$ -	\$ -	0	\$ -
2		<i>Project Manager</i>	\$ -	0	\$ -	\$ -	0	\$ -
3		<i>Deputy Project Manager</i>	\$ -	0	\$ -	\$ -	0	\$ -
4		<i>Quality Control/Assurance Manager</i>	\$ -	0	\$ -	\$ -	0	\$ -
5		<i>Civil/Mechanical/Electrical Engineering Manager</i>	\$ -	0	\$ -	\$ -	0	\$ -
6		<i>I-405 ETTM System Infrastructure Lead</i>	\$ -	0	\$ -	\$ -	0	\$ -
7		<i>System Design Engineer</i>	\$ -	0	\$ -	\$ -	0	\$ -
8		<i>Lead Test Engineer</i>	\$ -	0	\$ -	\$ -	0	\$ -
9		<i>Installation & Commissioning Manager</i>	\$ -	0	\$ -	\$ -	0	\$ -
10		<i>Systems & Equipment Maintenance Manager</i>	\$ -	0	\$ -	\$ -	0	\$ -
11		System Analyst	\$ -	0	\$ -	\$ -	0	\$ -
12		Software Architect	\$ -	0	\$ -	\$ -	0	\$ -
13		Hardware Engineer	\$ -	0	\$ -	\$ -	0	\$ -
14		Software Developer Senior	\$ -	0	\$ -	\$ -	0	\$ -
15		Software Developer	\$ -	0	\$ -	\$ -	0	\$ -
16		Tester	\$ -	0	\$ -	\$ -	0	\$ -
17		Network Engineer	\$ -	0	\$ -	\$ -	0	\$ -
18		System Administrator	\$ -	0	\$ -	\$ -	0	\$ -
19		Database Administrator	\$ -	0	\$ -	\$ -	0	\$ -
20		Training Manager	\$ -	0	\$ -	\$ -	0	\$ -
21		Trainer	\$ -	0	\$ -	\$ -	0	\$ -
22		Quality Control	\$ -	0	\$ -	\$ -	0	\$ -
23		Licensed Electrician	\$ -	0	\$ -	\$ -	0	\$ -
24		Electrician Helper	\$ -	0	\$ -	\$ -	0	\$ -
25		Installation Technician	\$ -	0	\$ -	\$ -	0	\$ -
26		Installation Supervisor	\$ -	0	\$ -	\$ -	0	\$ -
27		Sr. Maintenance Technician	\$ -	0	\$ -	\$ -	0	\$ -
28		Maintenance Technician	\$ -	0	\$ -	\$ -	0	\$ -
29		Traffic Management Ops Manager	\$ -	0	\$ -	\$ -	0	\$ -
30		Traffic Management Ops Staff	\$ -	0	\$ -	\$ -	0	\$ -
31		Image Review Manager	\$ -	0	\$ -	\$ -	0	\$ -
32		Image Review Staff	\$ -	0	\$ -	\$ -	0	\$ -
33		CADD Technician	\$ -	0	\$ -	\$ -	0	\$ -
34		Documentation Specialist	\$ -	0	\$ -	\$ -	0	\$ -
35		Administrative Assistant	\$ -	0	\$ -	\$ -	0	\$ -
36			\$ -	0	\$ -	\$ -	0	\$ -
37			\$ -	0	\$ -	\$ -	0	\$ -
38			\$ -	0	\$ -	\$ -	0	\$ -
39			\$ -	0	\$ -	\$ -	0	\$ -
40			\$ -	0	\$ -	\$ -	0	\$ -
41			\$ -	0	\$ -	\$ -	0	\$ -
42			\$ -	0	\$ -	\$ -	0	\$ -
43			\$ -	0	\$ -	\$ -	0	\$ -
44			\$ -	0	\$ -	\$ -	0	\$ -
	Total Labor Cost				\$ -			\$ -
	Grand Total Labor Cost							

Sheet 4-1b Back-up
91 and I-405 Express Lanes
Roadway Support Systems Maintenance Support
Staff Rates and Hours

Item #	STAFF NAMES	POSITION/CLASSIFICATION	LOADED HOURLY BILLING RATES Optional Year 13 of Maintenance		
			Optional Year 13 Rate	Optional Year 13 Hours	Optional Year 13 Total Labor Cost
1		<i>Project Principal</i>	\$ -	0	\$ -
2		<i>Project Manager</i>	\$ -	0	\$ -
3		<i>Deputy Project Manager</i>	\$ -	0	\$ -
4		<i>Quality Control/Assurance Manager</i>	\$ -	0	\$ -
5		<i>Civil/Mechanical/Electrical Engineering Manager</i>	\$ -	0	\$ -
6		<i>I-405 ETTM System Infrastructure Lead</i>	\$ -	0	\$ -
7		<i>System Design Engineer</i>	\$ -	0	\$ -
8		<i>Lead Test Engineer</i>	\$ -	0	\$ -
9		<i>Installation & Commissioning Manager</i>	\$ -	0	\$ -
10		<i>Systems & Equipment Maintenance Manager</i>	\$ -	0	\$ -
11		System Analyst	\$ -	0	\$ -
12		Software Architect	\$ -	0	\$ -
13		Hardware Engineer	\$ -	0	\$ -
14		Software Developer Senior	\$ -	0	\$ -
15		Software Developer	\$ -	0	\$ -
16		Tester	\$ -	0	\$ -
17		Network Engineer	\$ -	0	\$ -
18		System Administrator	\$ -	0	\$ -
19		Database Administrator	\$ -	0	\$ -
20		Training Manager	\$ -	0	\$ -
21		Trainer	\$ -	0	\$ -
22		Quality Control	\$ -	0	\$ -
23		Licensed Electrician	\$ -	0	\$ -
24		Electrician Helper	\$ -	0	\$ -
25		Installation Technician	\$ -	0	\$ -
26		Installation Supervisor	\$ -	0	\$ -
27		Sr. Maintenance Technician	\$ -	0	\$ -
28		Maintenance Technician	\$ -	0	\$ -
29		Traffic Management Ops Manager	\$ -	0	\$ -
30		Traffic Management Ops Staff	\$ -	0	\$ -
31		Image Review Manager	\$ -	0	\$ -
32		Image Review Staff	\$ -	0	\$ -
33		CADD Technician	\$ -	0	\$ -
34		Documentation Specialist	\$ -	0	\$ -
35		Administrative Assistant	\$ -	0	\$ -
36			\$ -	0	\$ -
37			\$ -	0	\$ -
38			\$ -	0	\$ -
39			\$ -	0	\$ -
40			\$ -	0	\$ -
41			\$ -	0	\$ -
42			\$ -	0	\$ -
43			\$ -	0	\$ -
44			\$ -	0	\$ -
	Total Labor Cost				\$ -
	Grand Total Labor Cost				\$ -

Sheet 4-2a Back-up
91 and I-405 Express Lanes
Roadside Systems Maintenance Support Cost Detail
Monthly Schedule of Labor and Other Direct Cost Items by Month

Description of Items	Monthly Cost (\$)	Monthly Labor (\$)	Total Monthly Cost (\$)	Monthly Cost (\$)	Monthly Labor (\$)	Total Monthly Cost (\$)
Base Contract	91 Express Lanes					
Year 1 of Maintenance - Monthly In-Lane Hardware Maintenance and Software Support Services (Warranty)						
Labor		\$ -	\$ -			
MOT	\$ -		\$ -			
Material, Tools	\$ -		\$ -			
Equipment	\$ -		\$ -			
Other	\$ -		\$ -			
Maintenance Payment of Performance Bond (X%)	\$ -		\$ -			
Total Monthly Year 1	\$ -	\$ -	\$ -			
Year 2 of Maintenance - Monthly In-Lane Hardware Maintenance and Software Support Services						
Labor		\$ -	\$ -			
MOT	\$ -		\$ -			
Material, Tools and Occupancy	\$ -		\$ -			
Equipment	\$ -		\$ -			
Other	\$ -		\$ -			
Maintenance Payment of Performance Bond (X%)	\$ -		\$ -			
Total Monthly Year 2	\$ -	\$ -	\$ -			
Year 3 of Maintenance - Monthly In-Lane Hardware Maintenance and Software Support Services						
Labor		\$ -	\$ -			
MOT	\$ -		\$ -			
Material, Tools and Occupancy	\$ -		\$ -			
Equipment	\$ -		\$ -			
Other	\$ -		\$ -			
Maintenance Payment of Performance Bond (X%)	\$ -		\$ -			
Total Monthly Year 3	\$ -	\$ -	\$ -			

Sheet 4-2a Back-up
91 and I-405 Express Lanes
Roadside Systems Maintenance Support Cost Detail
Monthly Schedule of Labor and Other Direct Cost Items by Month

Description of Items	Monthly Cost (\$)	Monthly Labor (\$)	Total Monthly Cost (\$)	Monthly Cost (\$)	Monthly Labor (\$)	Total Monthly Cost (\$)
Year 4 of Maintenance - Monthly In-Lane Hardware Maintenance and Software Support Services						
Labor		\$ -	\$ -			
MOT	\$ -		\$ -			
Material, Tools and Occupancy	\$ -		\$ -			
Equipment	\$ -		\$ -			
Other	\$ -		\$ -			
Maintenance Payment of Performance Bond (X%)	\$ -		\$ -			
Total Monthly Year 4	\$ -	\$ -	\$ -			
Beginning of 91 and I-405 Joint Maintenance	91 Express Lanes (Proportional Share)			I-405 Express Lanes (Proportional Share)		
Year 5 of Maintenance - Monthly In-Lane Hardware Maintenance and Software Support Services						
Labor		\$ -	\$ -		\$ -	\$ -
MOT	\$ -		\$ -	\$ -		\$ -
Material, Tools and Occupancy	\$ -		\$ -	\$ -		\$ -
Equipment	\$ -		\$ -	\$ -		\$ -
Other	\$ -		\$ -	\$ -		\$ -
Maintenance Payment of Performance Bond (X%)	\$ -		\$ -	\$ -		\$ -
Total Monthly Year 5	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Year 6 of Maintenance - Monthly In-Lane Hardware Maintenance and Software Support Services						
Labor		\$ -	\$ -		\$ -	\$ -
MOT	\$ -		\$ -	\$ -		\$ -
Material, Tools and Occupancy	\$ -		\$ -	\$ -		\$ -
Equipment	\$ -		\$ -	\$ -		\$ -
Other	\$ -		\$ -	\$ -		\$ -
Maintenance Payment of Performance Bond (X%)	\$ -		\$ -	\$ -		\$ -
Total Monthly Year 6	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Sheet 4-2a Back-up
91 and I-405 Express Lanes
Roadside Systems Maintenance Support Cost Detail
Monthly Schedule of Labor and Other Direct Cost Items by Month

Description of Items	Monthly Cost (\$)	Monthly Labor (\$)	Total Monthly Cost (\$)	Monthly Cost (\$)	Monthly Labor (\$)	Total Monthly Cost (\$)
Year 7 of Maintenance - Monthly In-Lane Hardware Maintenance and Software Support Services						
Labor		\$ -	\$ -		\$ -	\$ -
MOT	\$ -		\$ -	\$ -		\$ -
Material, Tools and Occupancy	\$ -		\$ -	\$ -		\$ -
Equipment	\$ -		\$ -	\$ -		\$ -
Other	\$ -		\$ -	\$ -		\$ -
Maintenance Payment of Performance Bond (X%)	\$ -		\$ -	\$ -		\$ -
Total Monthly Year 7	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Year 8 of Maintenance - Monthly In-Lane Hardware Maintenance and Software Support Services						
Labor		\$ -	\$ -		\$ -	\$ -
MOT	\$ -		\$ -	\$ -		\$ -
Material, Tools and Occupancy	\$ -		\$ -	\$ -		\$ -
Equipment	\$ -		\$ -	\$ -		\$ -
Other	\$ -		\$ -	\$ -		\$ -
Maintenance Payment of Performance Bond (X%)	\$ -		\$ -	\$ -		\$ -
Total Monthly Year 8	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Year 9 of Maintenance - Monthly In-Lane Hardware Maintenance and Software Support Services						
Labor		\$ -	\$ -		\$ -	\$ -
MOT	\$ -		\$ -	\$ -		\$ -
Material, Tools and Occupancy	\$ -		\$ -	\$ -		\$ -
Equipment	\$ -		\$ -	\$ -		\$ -
Other	\$ -		\$ -	\$ -		\$ -
Maintenance Payment of Performance Bond (X%)	\$ -		\$ -	\$ -		\$ -
Total Monthly Year 9	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Sheet 4-2a Back-up
91 and I-405 Express Lanes
Roadside Systems Maintenance Support Cost Detail
Monthly Schedule of Labor and Other Direct Cost Items by Month

Description of Items	Monthly Cost (\$)	Monthly Labor (\$)	Total Monthly Cost (\$)	Monthly Cost (\$)	Monthly Labor (\$)	Total Monthly Cost (\$)
Optional Extension #1	91 Express Lanes (Proportional Share)			I-405 Express Lanes (Proportional Share)		
Optional Year 10 of Maintenance - Monthly In-Lane Hardware Maintenance and Software Support Services						
Labor		\$ -	\$ -		\$ -	\$ -
MOT	\$ -		\$ -	\$ -		\$ -
Material, Tools and Occupancy	\$ -		\$ -	\$ -		\$ -
Equipment	\$ -		\$ -	\$ -		\$ -
Other	\$ -		\$ -	\$ -		\$ -
Maintenance Payment of Performance Bond (X%)	\$ -		\$ -	\$ -		\$ -
Total Monthly Optional Year 10	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Optional Year 11 of Maintenance - Monthly In-Lane Hardware Maintenance and Software Support Services						
Labor		\$ -	\$ -		\$ -	\$ -
MOT	\$ -		\$ -	\$ -		\$ -
Material, Tools and Occupancy	\$ -		\$ -	\$ -		\$ -
Equipment	\$ -		\$ -	\$ -		\$ -
Other	\$ -		\$ -	\$ -		\$ -
Maintenance Payment of Performance Bond (X%)	\$ -		\$ -	\$ -		\$ -
Total Monthly Optional Year 11	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Sheet 4-2a Back-up
91 and I-405 Express Lanes
Roadside Systems Maintenance Support Cost Detail
Monthly Schedule of Labor and Other Direct Cost Items by Month

Description of Items	Monthly Cost (\$)	Monthly Labor (\$)	Total Monthly Cost (\$)	Monthly Cost (\$)	Monthly Labor (\$)	Total Monthly Cost (\$)
Optional Extension #2	91 Express Lanes (Proportional Share)			I-405 Express Lanes (Proportional Share)		
Optional Year 12 of Maintenance - Monthly In-Lane Hardware Maintenance and Software Support Services						
Labor		\$ -	\$ -		\$ -	\$ -
MOT	\$ -		\$ -	\$ -		\$ -
Material, Tools and Occupancy	\$ -		\$ -	\$ -		\$ -
Equipment	\$ -		\$ -	\$ -		\$ -
Other	\$ -		\$ -	\$ -		\$ -
Maintenance Payment of Performance Bond (X%)	\$ -		\$ -	\$ -		\$ -
Total Monthly Optional Year 12	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Optional Year 13 of Maintenance - Monthly In-Lane Hardware Maintenance and Software Support Services						
Labor		\$ -	\$ -		\$ -	\$ -
MOT	\$ -		\$ -	\$ -		\$ -
Material, Tools and Occupancy	\$ -		\$ -	\$ -		\$ -
Equipment	\$ -		\$ -	\$ -		\$ -
Other	\$ -		\$ -	\$ -		\$ -
Maintenance Payment of Performance Bond (X%)	\$ -		\$ -	\$ -		\$ -
Total Monthly Optional Year 13	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Labor Totals		\$ -			\$ -	
Labor Grand Total	\$ -					
Labor Check cell B113 (from Sheet 4-2b cell AP49) should equal cell B112	\$ -					

Sheet 4-2b Back-up
91 and I-405 Express Lanes

Roadside Systems Maintenance Support - Staff Rates and Hours

Item #	STAFF NAMES	POSITION/CLASSIFICATION	LOADED HOURLY BILLING RATES Year 1 of Maintenance			LOADED HOURLY BILLING RATES Year 2 of Maintenance		
			First Year Rate	Year 1 Hours	Year 1 Total Labor Cost	Year 2 Rate	Year 2 Hours	Year 2 Total Labor Cost
1		Project Principal	\$ -	0	\$ -	\$ -	0	\$ -
2		Project Manager	\$ -	0	\$ -	\$ -	0	\$ -
3		Deputy Project Manager	\$ -	0	\$ -	\$ -	0	\$ -
4		Quality Control/Assurance Manager	\$ -	0	\$ -	\$ -	0	\$ -
5		Civil/Mechanical/Electrical Engineering Manager	\$ -	0	\$ -	\$ -	0	\$ -
6		I-405 ETTM System Infrastructure Lead	\$ -	0	\$ -	\$ -	0	\$ -
7		System Design Engineer	\$ -	0	\$ -	\$ -	0	\$ -
8		Lead Test Engineer	\$ -	0	\$ -	\$ -	0	\$ -
9		Installation & Commissioning Manager	\$ -	0	\$ -	\$ -	0	\$ -
10		Systems & Equipment Maintenance Manager	\$ -	0	\$ -	\$ -	0	\$ -
11		System Analyst	\$ -	0	\$ -	\$ -	0	\$ -
12		Software Architect	\$ -	0	\$ -	\$ -	0	\$ -
13		Hardware Engineer	\$ -	0	\$ -	\$ -	0	\$ -
14		Software Developer Senior	\$ -	0	\$ -	\$ -	0	\$ -
15		Software Developer	\$ -	0	\$ -	\$ -	0	\$ -
16		Tester	\$ -	0	\$ -	\$ -	0	\$ -
17		Network Engineer	\$ -	0	\$ -	\$ -	0	\$ -
18		System Administrator	\$ -	0	\$ -	\$ -	0	\$ -
19		Database Administrator	\$ -	0	\$ -	\$ -	0	\$ -
20		Training Manager	\$ -	0	\$ -	\$ -	0	\$ -
21		Trainer	\$ -	0	\$ -	\$ -	0	\$ -
22		Quality Control	\$ -	0	\$ -	\$ -	0	\$ -
23		Licensed Electrician	\$ -	0	\$ -	\$ -	0	\$ -
24		Electrician Helper	\$ -	0	\$ -	\$ -	0	\$ -
25		Installation Technician	\$ -	0	\$ -	\$ -	0	\$ -
26		Installation Supervisor	\$ -	0	\$ -	\$ -	0	\$ -
27		Sr. Maintenance Technician	\$ -	0	\$ -	\$ -	0	\$ -
28		Maintenance Technician	\$ -	0	\$ -	\$ -	0	\$ -
29		Traffic Management Ops Manager	\$ -	0	\$ -	\$ -	0	\$ -
30		Traffic Management Ops Staff	\$ -	0	\$ -	\$ -	0	\$ -
31		Image Review Manager	\$ -	0	\$ -	\$ -	0	\$ -
32		Image Review Staff	\$ -	0	\$ -	\$ -	0	\$ -
33		CADD Technician	\$ -	0	\$ -	\$ -	0	\$ -
34		Documentation Specialist	\$ -	0	\$ -	\$ -	0	\$ -
35		Administrative Assistant	\$ -	0	\$ -	\$ -	0	\$ -
36			\$ -	0	\$ -	\$ -	0	\$ -
37			\$ -	0	\$ -	\$ -	0	\$ -
38			\$ -	0	\$ -	\$ -	0	\$ -
39			\$ -	0	\$ -	\$ -	0	\$ -
40			\$ -	0	\$ -	\$ -	0	\$ -
41			\$ -	0	\$ -	\$ -	0	\$ -
42			\$ -	0	\$ -	\$ -	0	\$ -
43			\$ -	0	\$ -	\$ -	0	\$ -
44			\$ -	0	\$ -	\$ -	0	\$ -
	Total Labor Cost				\$ -			\$ -
	Grand Total Labor Cost							

Sheet 4-2b Back-up
91 and I-405 Express Lanes

Roadside Systems Maintenance Support - Staff Rates and Hours

Item #	STAFF NAMES	POSITION/CLASSIFICATION	LOADED HOURLY BILLING RATES Year 3 of Maintenance			LOADED HOURLY BILLING RATES Year 4 of Maintenance		
			Year 3 Rate	Year 3 Hours	Year 3 Total Labor Cost	Year 4 Rate	Year 4 Hours	Year 4 Total Labor Cost
1		Project Principal	\$ -	0	\$ -	\$ -	0	\$ -
2		Project Manager	\$ -	0	\$ -	\$ -	0	\$ -
3		Deputy Project Manager	\$ -	0	\$ -	\$ -	0	\$ -
4		Quality Control/Assurance Manager	\$ -	0	\$ -	\$ -	0	\$ -
5		Civil/Mechanical/Electrical Engineering Manager	\$ -	0	\$ -	\$ -	0	\$ -
6		I-405 ETTM System Infrastructure Lead	\$ -	0	\$ -	\$ -	0	\$ -
7		System Design Engineer	\$ -	0	\$ -	\$ -	0	\$ -
8		Lead Test Engineer	\$ -	0	\$ -	\$ -	0	\$ -
9		Installation & Commissioning Manager	\$ -	0	\$ -	\$ -	0	\$ -
10		Systems & Equipment Maintenance Manager	\$ -	0	\$ -	\$ -	0	\$ -
11		System Analyst	\$ -	0	\$ -	\$ -	0	\$ -
12		Software Architect	\$ -	0	\$ -	\$ -	0	\$ -
13		Hardware Engineer	\$ -	0	\$ -	\$ -	0	\$ -
14		Software Developer Senior	\$ -	0	\$ -	\$ -	0	\$ -
15		Software Developer	\$ -	0	\$ -	\$ -	0	\$ -
16		Tester	\$ -	0	\$ -	\$ -	0	\$ -
17		Network Engineer	\$ -	0	\$ -	\$ -	0	\$ -
18		System Administrator	\$ -	0	\$ -	\$ -	0	\$ -
19		Database Administrator	\$ -	0	\$ -	\$ -	0	\$ -
20		Training Manager	\$ -	0	\$ -	\$ -	0	\$ -
21		Trainer	\$ -	0	\$ -	\$ -	0	\$ -
22		Quality Control	\$ -	0	\$ -	\$ -	0	\$ -
23		Licensed Electrician	\$ -	0	\$ -	\$ -	0	\$ -
24		Electrician Helper	\$ -	0	\$ -	\$ -	0	\$ -
25		Installation Technician	\$ -	0	\$ -	\$ -	0	\$ -
26		Installation Supervisor	\$ -	0	\$ -	\$ -	0	\$ -
27		Sr. Maintenance Technician	\$ -	0	\$ -	\$ -	0	\$ -
28		Maintenance Technician	\$ -	0	\$ -	\$ -	0	\$ -
29		Traffic Management Ops Manager	\$ -	0	\$ -	\$ -	0	\$ -
30		Traffic Management Ops Staff	\$ -	0	\$ -	\$ -	0	\$ -
31		Image Review Manager	\$ -	0	\$ -	\$ -	0	\$ -
32		Image Review Staff	\$ -	0	\$ -	\$ -	0	\$ -
33		CADD Technician	\$ -	0	\$ -	\$ -	0	\$ -
34		Documentation Specialist	\$ -	0	\$ -	\$ -	0	\$ -
35		Administrative Assistant	\$ -	0	\$ -	\$ -	0	\$ -
36			\$ -	0	\$ -	\$ -	0	\$ -
37			\$ -	0	\$ -	\$ -	0	\$ -
38			\$ -	0	\$ -	\$ -	0	\$ -
39			\$ -	0	\$ -	\$ -	0	\$ -
40			\$ -	0	\$ -	\$ -	0	\$ -
41			\$ -	0	\$ -	\$ -	0	\$ -
42			\$ -	0	\$ -	\$ -	0	\$ -
43			\$ -	0	\$ -	\$ -	0	\$ -
44			\$ -	0	\$ -	\$ -	0	\$ -
	Total Labor Cost				\$ -			\$ -
	Grand Total Labor Cost							

Sheet 4-2b Back-up
91 and I-405 Express Lanes

Roadside Systems Maintenance Support - Staff Rates and Hours

Item #	STAFF NAMES	POSITION/CLASSIFICATION	LOADED HOURLY BILLING RATES Year 5 of Maintenance			LOADED HOURLY BILLING RATES Year 6 of Maintenance		
			Year 5 Rate	Year 5 Hours	Year 5 Total Labor Cost	Year 6 Rate	Year 6 Hours	Year 6 Total Labor Cost
1		Project Principal	\$ -	0	\$ -	\$ -	0	\$ -
2		Project Manager	\$ -	0	\$ -	\$ -	0	\$ -
3		Deputy Project Manager	\$ -	0	\$ -	\$ -	0	\$ -
4		Quality Control/Assurance Manager	\$ -	0	\$ -	\$ -	0	\$ -
5		Civil/Mechanical/Electrical Engineering Manager	\$ -	0	\$ -	\$ -	0	\$ -
6		I-405 ETTM System Infrastructure Lead	\$ -	0	\$ -	\$ -	0	\$ -
7		System Design Engineer	\$ -	0	\$ -	\$ -	0	\$ -
8		Lead Test Engineer	\$ -	0	\$ -	\$ -	0	\$ -
9		Installation & Commissioning Manager	\$ -	0	\$ -	\$ -	0	\$ -
10		Systems & Equipment Maintenance Manager	\$ -	0	\$ -	\$ -	0	\$ -
11		System Analyst	\$ -	0	\$ -	\$ -	0	\$ -
12		Software Architect	\$ -	0	\$ -	\$ -	0	\$ -
13		Hardware Engineer	\$ -	0	\$ -	\$ -	0	\$ -
14		Software Developer Senior	\$ -	0	\$ -	\$ -	0	\$ -
15		Software Developer	\$ -	0	\$ -	\$ -	0	\$ -
16		Tester	\$ -	0	\$ -	\$ -	0	\$ -
17		Network Engineer	\$ -	0	\$ -	\$ -	0	\$ -
18		System Administrator	\$ -	0	\$ -	\$ -	0	\$ -
19		Database Administrator	\$ -	0	\$ -	\$ -	0	\$ -
20		Training Manager	\$ -	0	\$ -	\$ -	0	\$ -
21		Trainer	\$ -	0	\$ -	\$ -	0	\$ -
22		Quality Control	\$ -	0	\$ -	\$ -	0	\$ -
23		Licensed Electrician	\$ -	0	\$ -	\$ -	0	\$ -
24		Electrician Helper	\$ -	0	\$ -	\$ -	0	\$ -
25		Installation Technician	\$ -	0	\$ -	\$ -	0	\$ -
26		Installation Supervisor	\$ -	0	\$ -	\$ -	0	\$ -
27		Sr. Maintenance Technician	\$ -	0	\$ -	\$ -	0	\$ -
28		Maintenance Technician	\$ -	0	\$ -	\$ -	0	\$ -
29		Traffic Management Ops Manager	\$ -	0	\$ -	\$ -	0	\$ -
30		Traffic Management Ops Staff	\$ -	0	\$ -	\$ -	0	\$ -
31		Image Review Manager	\$ -	0	\$ -	\$ -	0	\$ -
32		Image Review Staff	\$ -	0	\$ -	\$ -	0	\$ -
33		CADD Technician	\$ -	0	\$ -	\$ -	0	\$ -
34		Documentation Specialist	\$ -	0	\$ -	\$ -	0	\$ -
35		Administrative Assistant	\$ -	0	\$ -	\$ -	0	\$ -
36			\$ -	0	\$ -	\$ -	0	\$ -
37			\$ -	0	\$ -	\$ -	0	\$ -
38			\$ -	0	\$ -	\$ -	0	\$ -
39			\$ -	0	\$ -	\$ -	0	\$ -
40			\$ -	0	\$ -	\$ -	0	\$ -
41			\$ -	0	\$ -	\$ -	0	\$ -
42			\$ -	0	\$ -	\$ -	0	\$ -
43			\$ -	0	\$ -	\$ -	0	\$ -
44			\$ -	0	\$ -	\$ -	0	\$ -
	Total Labor Cost				\$ -			\$ -
	Grand Total Labor Cost							

Sheet 4-2b Back-up
91 and I-405 Express Lanes

Roadside Systems Maintenance Support - Staff Rates and Hours

Item #	STAFF NAMES	POSITION/CLASSIFICATION	LOADED HOURLY BILLING RATES Year 7 of Maintenance			LOADED HOURLY BILLING RATES Year 8 of Maintenance		
			Year 7 Rate	Year 7 Hours	Year 7 Total Labor Cost	Optional Year 8 Rate	Optional Year 8 Hours	Optional Year 8 Total Labor Cost
1		Project Principal	\$ -	0	\$ -	\$ -	0	\$ -
2		Project Manager	\$ -	0	\$ -	\$ -	0	\$ -
3		Deputy Project Manager	\$ -	0	\$ -	\$ -	0	\$ -
4		Quality Control/Assurance Manager	\$ -	0	\$ -	\$ -	0	\$ -
5		Civil/Mechanical/Electrical Engineering Manager	\$ -	0	\$ -	\$ -	0	\$ -
6		I-405 ETTM System Infrastructure Lead	\$ -	0	\$ -	\$ -	0	\$ -
7		System Design Engineer	\$ -	0	\$ -	\$ -	0	\$ -
8		Lead Test Engineer	\$ -	0	\$ -	\$ -	0	\$ -
9		Installation & Commissioning Manager	\$ -	0	\$ -	\$ -	0	\$ -
10		Systems & Equipment Maintenance Manager	\$ -	0	\$ -	\$ -	0	\$ -
11		System Analyst	\$ -	0	\$ -	\$ -	0	\$ -
12		Software Architect	\$ -	0	\$ -	\$ -	0	\$ -
13		Hardware Engineer	\$ -	0	\$ -	\$ -	0	\$ -
14		Software Developer Senior	\$ -	0	\$ -	\$ -	0	\$ -
15		Software Developer	\$ -	0	\$ -	\$ -	0	\$ -
16		Tester	\$ -	0	\$ -	\$ -	0	\$ -
17		Network Engineer	\$ -	0	\$ -	\$ -	0	\$ -
18		System Administrator	\$ -	0	\$ -	\$ -	0	\$ -
19		Database Administrator	\$ -	0	\$ -	\$ -	0	\$ -
20		Training Manager	\$ -	0	\$ -	\$ -	0	\$ -
21		Trainer	\$ -	0	\$ -	\$ -	0	\$ -
22		Quality Control	\$ -	0	\$ -	\$ -	0	\$ -
23		Licensed Electrician	\$ -	0	\$ -	\$ -	0	\$ -
24		Electrician Helper	\$ -	0	\$ -	\$ -	0	\$ -
25		Installation Technician	\$ -	0	\$ -	\$ -	0	\$ -
26		Installation Supervisor	\$ -	0	\$ -	\$ -	0	\$ -
27		Sr. Maintenance Technician	\$ -	0	\$ -	\$ -	0	\$ -
28		Maintenance Technician	\$ -	0	\$ -	\$ -	0	\$ -
29		Traffic Management Ops Manager	\$ -	0	\$ -	\$ -	0	\$ -
30		Traffic Management Ops Staff	\$ -	0	\$ -	\$ -	0	\$ -
31		Image Review Manager	\$ -	0	\$ -	\$ -	0	\$ -
32		Image Review Staff	\$ -	0	\$ -	\$ -	0	\$ -
33		CADD Technician	\$ -	0	\$ -	\$ -	0	\$ -
34		Documentation Specialist	\$ -	0	\$ -	\$ -	0	\$ -
35		Administrative Assistant	\$ -	0	\$ -	\$ -	0	\$ -
36			\$ -	0	\$ -	\$ -	0	\$ -
37			\$ -	0	\$ -	\$ -	0	\$ -
38			\$ -	0	\$ -	\$ -	0	\$ -
39			\$ -	0	\$ -	\$ -	0	\$ -
40			\$ -	0	\$ -	\$ -	0	\$ -
41			\$ -	0	\$ -	\$ -	0	\$ -
42			\$ -	0	\$ -	\$ -	0	\$ -
43			\$ -	0	\$ -	\$ -	0	\$ -
44			\$ -	0	\$ -	\$ -	0	\$ -
	Total Labor Cost				\$ -			\$ -
	Grand Total Labor Cost							

Sheet 4-2b Back-up
91 and I-405 Express Lanes

Roadside Systems Maintenance Support - Staff Rates and Hours

Item #	STAFF NAMES	POSITION/CLASSIFICATION	LOADED HOURLY BILLING RATES Year 9 of Maintenance			LOADED HOURLY BILLING RATES Optional Year 10 of Maintenance		
			Optional Year 9 Rate	Optional Year 9 Hours	Optional Year 9 Total Labor Cost	Optional Year 10 Rate	Optional Year 10 Hours	Optional Year 10 Total Labor Cost
1		Project Principal	\$ -	0	\$ -	\$ -	0	\$ -
2		Project Manager	\$ -	0	\$ -	\$ -	0	\$ -
3		Deputy Project Manager	\$ -	0	\$ -	\$ -	0	\$ -
4		Quality Control/Assurance Manager	\$ -	0	\$ -	\$ -	0	\$ -
5		Civil/Mechanical/Electrical Engineering Manager	\$ -	0	\$ -	\$ -	0	\$ -
6		I-405 ETTM System Infrastructure Lead	\$ -	0	\$ -	\$ -	0	\$ -
7		System Design Engineer	\$ -	0	\$ -	\$ -	0	\$ -
8		Lead Test Engineer	\$ -	0	\$ -	\$ -	0	\$ -
9		Installation & Commissioning Manager	\$ -	0	\$ -	\$ -	0	\$ -
10		Systems & Equipment Maintenance Manager	\$ -	0	\$ -	\$ -	0	\$ -
11		System Analyst	\$ -	0	\$ -	\$ -	0	\$ -
12		Software Architect	\$ -	0	\$ -	\$ -	0	\$ -
13		Hardware Engineer	\$ -	0	\$ -	\$ -	0	\$ -
14		Software Developer Senior	\$ -	0	\$ -	\$ -	0	\$ -
15		Software Developer	\$ -	0	\$ -	\$ -	0	\$ -
16		Tester	\$ -	0	\$ -	\$ -	0	\$ -
17		Network Engineer	\$ -	0	\$ -	\$ -	0	\$ -
18		System Administrator	\$ -	0	\$ -	\$ -	0	\$ -
19		Database Administrator	\$ -	0	\$ -	\$ -	0	\$ -
20		Training Manager	\$ -	0	\$ -	\$ -	0	\$ -
21		Trainer	\$ -	0	\$ -	\$ -	0	\$ -
22		Quality Control	\$ -	0	\$ -	\$ -	0	\$ -
23		Licensed Electrician	\$ -	0	\$ -	\$ -	0	\$ -
24		Electrician Helper	\$ -	0	\$ -	\$ -	0	\$ -
25		Installation Technician	\$ -	0	\$ -	\$ -	0	\$ -
26		Installation Supervisor	\$ -	0	\$ -	\$ -	0	\$ -
27		Sr. Maintenance Technician	\$ -	0	\$ -	\$ -	0	\$ -
28		Maintenance Technician	\$ -	0	\$ -	\$ -	0	\$ -
29		Traffic Management Ops Manager	\$ -	0	\$ -	\$ -	0	\$ -
30		Traffic Management Ops Staff	\$ -	0	\$ -	\$ -	0	\$ -
31		Image Review Manager	\$ -	0	\$ -	\$ -	0	\$ -
32		Image Review Staff	\$ -	0	\$ -	\$ -	0	\$ -
33		CADD Technician	\$ -	0	\$ -	\$ -	0	\$ -
34		Documentation Specialist	\$ -	0	\$ -	\$ -	0	\$ -
35		Administrative Assistant	\$ -	0	\$ -	\$ -	0	\$ -
36			\$ -	0	\$ -	\$ -	0	\$ -
37			\$ -	0	\$ -	\$ -	0	\$ -
38			\$ -	0	\$ -	\$ -	0	\$ -
39			\$ -	0	\$ -	\$ -	0	\$ -
40			\$ -	0	\$ -	\$ -	0	\$ -
41			\$ -	0	\$ -	\$ -	0	\$ -
42			\$ -	0	\$ -	\$ -	0	\$ -
43			\$ -	0	\$ -	\$ -	0	\$ -
44			\$ -	0	\$ -	\$ -	0	\$ -
	Total Labor Cost				\$ -			\$ -
	Grand Total Labor Cost							

Sheet 4-2b Back-up
91 and I-405 Express Lanes

Roadside Systems Maintenance Support - Staff Rates and Hours

Item #	STAFF NAMES	POSITION/CLASSIFICATION	LOADED HOURLY BILLING RATES Optional Year 11 of Maintenance			LOADED HOURLY BILLING RATES Optional Year 12 of Maintenance		
			Optional Year 11 Rate	Optional Year 11 Hours	Optional Year 11 Total Labor Cost	Optional Year 12 Rate	Optional Year 12 Hours	Optional Year 12 Total Labor Cost
1		Project Principal	\$ -	0	\$ -	\$ -	0	\$ -
2		Project Manager	\$ -	0	\$ -	\$ -	0	\$ -
3		Deputy Project Manager	\$ -	0	\$ -	\$ -	0	\$ -
4		Quality Control/Assurance Manager	\$ -	0	\$ -	\$ -	0	\$ -
5		Civil/Mechanical/Electrical Engineering Manager	\$ -	0	\$ -	\$ -	0	\$ -
6		I-405 ETTM System Infrastructure Lead	\$ -	0	\$ -	\$ -	0	\$ -
7		System Design Engineer	\$ -	0	\$ -	\$ -	0	\$ -
8		Lead Test Engineer	\$ -	0	\$ -	\$ -	0	\$ -
9		Installation & Commissioning Manager	\$ -	0	\$ -	\$ -	0	\$ -
10		Systems & Equipment Maintenance Manager	\$ -	0	\$ -	\$ -	0	\$ -
11		System Analyst	\$ -	0	\$ -	\$ -	0	\$ -
12		Software Architect	\$ -	0	\$ -	\$ -	0	\$ -
13		Hardware Engineer	\$ -	0	\$ -	\$ -	0	\$ -
14		Software Developer Senior	\$ -	0	\$ -	\$ -	0	\$ -
15		Software Developer	\$ -	0	\$ -	\$ -	0	\$ -
16		Tester	\$ -	0	\$ -	\$ -	0	\$ -
17		Network Engineer	\$ -	0	\$ -	\$ -	0	\$ -
18		System Administrator	\$ -	0	\$ -	\$ -	0	\$ -
19		Database Administrator	\$ -	0	\$ -	\$ -	0	\$ -
20		Training Manager	\$ -	0	\$ -	\$ -	0	\$ -
21		Trainer	\$ -	0	\$ -	\$ -	0	\$ -
22		Quality Control	\$ -	0	\$ -	\$ -	0	\$ -
23		Licensed Electrician	\$ -	0	\$ -	\$ -	0	\$ -
24		Electrician Helper	\$ -	0	\$ -	\$ -	0	\$ -
25		Installation Technician	\$ -	0	\$ -	\$ -	0	\$ -
26		Installation Supervisor	\$ -	0	\$ -	\$ -	0	\$ -
27		Sr. Maintenance Technician	\$ -	0	\$ -	\$ -	0	\$ -
28		Maintenance Technician	\$ -	0	\$ -	\$ -	0	\$ -
29		Traffic Management Ops Manager	\$ -	0	\$ -	\$ -	0	\$ -
30		Traffic Management Ops Staff	\$ -	0	\$ -	\$ -	0	\$ -
31		Image Review Manager	\$ -	0	\$ -	\$ -	0	\$ -
32		Image Review Staff	\$ -	0	\$ -	\$ -	0	\$ -
33		CADD Technician	\$ -	0	\$ -	\$ -	0	\$ -
34		Documentation Specialist	\$ -	0	\$ -	\$ -	0	\$ -
35		Administrative Assistant	\$ -	0	\$ -	\$ -	0	\$ -
36			\$ -	0	\$ -	\$ -	0	\$ -
37			\$ -	0	\$ -	\$ -	0	\$ -
38			\$ -	0	\$ -	\$ -	0	\$ -
39			\$ -	0	\$ -	\$ -	0	\$ -
40			\$ -	0	\$ -	\$ -	0	\$ -
41			\$ -	0	\$ -	\$ -	0	\$ -
42			\$ -	0	\$ -	\$ -	0	\$ -
43			\$ -	0	\$ -	\$ -	0	\$ -
44			\$ -	0	\$ -	\$ -	0	\$ -
	Total Labor Cost				\$ -			\$ -
	Grand Total Labor Cost							

Sheet 4-2b Back-up
91 and I-405 Express Lanes
Roadside Systems Maintenance Support - Staff Rates and Hours

Item #	STAFF NAMES	POSITION/CLASSIFICATION	LOADED HOURLY BILLING RATES Optional Year 13 of Maintenance		
			Optional Year 13 Rate	Optional Year 13 Hours	Optional Year 13 Total Labor Cost
1		<i>Project Principal</i>	\$ -	0	\$ -
2		<i>Project Manager</i>	\$ -	0	\$ -
3		<i>Deputy Project Manager</i>	\$ -	0	\$ -
4		<i>Quality Control/Assurance Manager</i>	\$ -	0	\$ -
5		<i>Civil/Mechanical/Electrical Engineering Manager</i>	\$ -	0	\$ -
6		<i>I-405 ETTM System Infrastructure Lead</i>	\$ -	0	\$ -
7		<i>System Design Engineer</i>	\$ -	0	\$ -
8		<i>Lead Test Engineer</i>	\$ -	0	\$ -
9		<i>Installation & Commissioning Manager</i>	\$ -	0	\$ -
10		<i>Systems & Equipment Maintenance Manager</i>	\$ -	0	\$ -
11		System Analyst	\$ -	0	\$ -
12		Software Architect	\$ -	0	\$ -
13		Hardware Engineer	\$ -	0	\$ -
14		Software Developer Senior	\$ -	0	\$ -
15		Software Developer	\$ -	0	\$ -
16		Tester	\$ -	0	\$ -
17		Network Engineer	\$ -	0	\$ -
18		System Administrator	\$ -	0	\$ -
19		Database Administrator	\$ -	0	\$ -
20		Training Manager	\$ -	0	\$ -
21		Trainer	\$ -	0	\$ -
22		Quality Control	\$ -	0	\$ -
23		Licensed Electrician	\$ -	0	\$ -
24		Electrician Helper	\$ -	0	\$ -
25		Installation Technician	\$ -	0	\$ -
26		Installation Supervisor	\$ -	0	\$ -
27		Sr. Maintenance Technician	\$ -	0	\$ -
28		Maintenance Technician	\$ -	0	\$ -
29		Traffic Management Ops Manager	\$ -	0	\$ -
30		Traffic Management Ops Staff	\$ -	0	\$ -
31		Image Review Manager	\$ -	0	\$ -
32		Image Review Staff	\$ -	0	\$ -
33		CADD Technician	\$ -	0	\$ -
34		Documentation Specialist	\$ -	0	\$ -
35		Administrative Assistant	\$ -	0	\$ -
36			\$ -	0	\$ -
37			\$ -	0	\$ -
38			\$ -	0	\$ -
39			\$ -	0	\$ -
40			\$ -	0	\$ -
41			\$ -	0	\$ -
42			\$ -	0	\$ -
43			\$ -	0	\$ -
44			\$ -	0	\$ -
	Total Labor Cost				\$ -
	Grand Total Labor Cost				\$ -

Toll Lanes System Integrator Services

RFP 7-1911

Exhibit D

Sheet 5-1 Back-up
91 and I-405 Express Lanes

Base Contract and Optional Extensions Monthly Variable Operations Cost Details

DESCRIPTION OF ITEMS		MINIMUM	MAXIMUM	YEAR 1 MONTHLY EVALUATION # UNITS	UNIT \$	TOTAL MONTHLY COST(\$)	YEAR 2 MONTHLY EVALUATION # UNITS	UNIT \$	TOTAL MONTHLY COST(\$)
BASE CONTRACT AND OPTIONAL YEARS				Year 1 of Operations Based on Volume 3 Levels Monthly Variable Fee			Year 2 of Operations Based on Volume 3 Levels Monthly Variable Fee		
VARIABLE COST - PER ITEM PRICING BY LEVEL									
	EVALUATION VALUE			140,000			140,000		
1	Manually Reviewed Image-based Transaction - Level 1	1	0		\$ -	\$ -		\$ -	\$ -
2	Manually Reviewed Image-based Transaction - Level 2	0	0		\$ -	\$ -		\$ -	\$ -
3	Manually Reviewed Image-based Transaction- Level 3	0	>		\$ -	\$ -		\$ -	\$ -
	Total Monthly Variable Operations Cost by Year					\$ -			\$ -

Toll Lanes System Integrator Services

RFP 7-1911

Exhibit D

Sheet 5-1 Back-up
91 and I-405 Express Lanes

Base Contract and Optional Extensions Monthly Variable Operations Cost Details

DESCRIPTION OF ITEMS		MINIMUM	MAXIMUM	YEAR 3 MONTHLY EVALUATION # UNITS	UNIT \$	TOTAL MONTHLY COST(\$)	YEAR 4 MONTHLY EVALUATION # UNITS	UNIT \$	TOTAL MONTHLY COST(\$)
BASE CONTRACT AND OPTIONAL YEARS				Year 3 of Operations Based on Volume 3 Levels Monthly Variable Fee			Year 4 of Operations Based on Volume 3 Levels Monthly Variable Fee		
VARIABLE COST - PER ITEM PRICING BY LEVEL									
	EVALUATION VALUE			140,000			140,000		
1	Manually Reviewed Image-based Transaction - Level 1	1	0		\$ -	\$ -		\$ -	\$ -
2	Manually Reviewed Image-based Transaction - Level 2	0	0		\$ -	\$ -		\$ -	\$ -
3	Manually Reviewed Image-based Transaction- Level 3	0	>		\$ -	\$ -		\$ -	\$ -
	Total Monthly Variable Operations Cost by Year					\$ -			\$ -

Toll Lanes System Integrator Services

RFP 7-1911

Exhibit D

Sheet 5-1 Back-up
91 and I-405 Express Lanes

Base Contract and Optional Extensions Monthly Variable Operations Cost Details

DESCRIPTION OF ITEMS		MINIMUM	MAXIMUM	YEAR 5 MONTHLY EVALUATION # UNITS	UNIT \$	TOTAL MONTHLY COST(\$)	Year 6 MONTHLY EVALUATION # UNITS	UNIT \$	TOTAL MONTHLY COST(\$)
BASE CONTRACT AND OPTIONAL YEARS				Year 5 of Operations Based on Volume 3 Levels Monthly Variable Fee			Year 6 of Operations Based on Volume 3 Levels Monthly Variable Fee		
VARIABLE COST - PER ITEM PRICING BY LEVEL									
	EVALUATION VALUE			940,000			1,000,000		
1	Manually Reviewed Image-based Transaction - Level 1	1	0		\$ -	\$ -		\$ -	\$ -
2	Manually Reviewed Image-based Transaction - Level 2	0	0		\$ -	\$ -		\$ -	\$ -
3	Manually Reviewed Image-based Transaction- Level 3	0	>		\$ -	\$ -		\$ -	\$ -
	Total Monthly Variable Operations Cost by Year					\$ -			\$ -

Toll Lanes System Integrator Services

RFP 7-1911

Exhibit D

Sheet 5-1 Back-up
91 and I-405 Express Lanes

Base Contract and Optional Extensions Monthly Variable Operations Cost Details

DESCRIPTION OF ITEMS		MINIMUM	MAXIMUM	Year 7 MONTHLY EVALUATION # UNITS	UNIT \$	TOTAL MONTHLY COST(\$)	Year 8 MONTHLY EVALUATION # UNITS	UNIT \$	TOTAL MONTHLY COST(\$)
BASE CONTRACT AND OPTIONAL YEARS				Year 7 of Operations Based on Volume 3 Levels Monthly Variable Fee			Year 8 of Operations Based on Volume 3 Levels Monthly Variable Fee		
VARIABLE COST - PER ITEM PRICING BY LEVEL									
	EVALUATION VALUE			1,170,000			1,290,000		
1	Manually Reviewed Image-based Transaction - Level 1	1	0		\$ -	\$ -		\$ -	\$ -
2	Manually Reviewed Image-based Transaction - Level 2	0	0		\$ -	\$ -		\$ -	\$ -
3	Manually Reviewed Image-based Transaction- Level 3	0	>		\$ -	\$ -		\$ -	\$ -
	Total Monthly Variable Operations Cost by Year					\$ -			\$ -

Toll Lanes System Integrator Services
RFP 7-1911
Exhibit D

 Sheet 5-1 Back-up
 91 and I-405 Express Lanes

Base Contract and Optional Extensions Monthly Variable Operations Cost Details

DESCRIPTION OF ITEMS		MINIMUM	MAXIMUM	Year 9 MONTHLY EVALUATION # UNITS	UNIT \$	TOTAL MONTHLY COST(\$)	OPTIONAL Year 10 MONTHLY EVALUATION # UNITS	UNIT \$	TOTAL MONTHLY COST(\$)
BASE CONTRACT AND OPTIONAL YEARS				Year 9 of Operations Based on Volume 3 Levels Monthly Variable Fee			Optional Year 10 of Operations Based on Volume 3 Levels Monthly Variable Fee		
VARIABLE COST - PER ITEM PRICING BY LEVEL									
	EVALUATION VALUE			1,090,000			1,140,000		
1	Manually Reviewed Image-based Transaction - Level 1	1	0		\$ -	\$ -		\$ -	\$ -
2	Manually Reviewed Image-based Transaction - Level 2	0	0		\$ -	\$ -		\$ -	\$ -
3	Manually Reviewed Image-based Transaction- Level 3	0	>		\$ -	\$ -		\$ -	\$ -
	Total Monthly Variable Operations Cost by Year					\$ -			\$ -

Toll Lanes System Integrator Services
RFP 7-1911
Exhibit D

 Sheet 5-1 Back-up
 91 and I-405 Express Lanes

Base Contract and Optional Extensions Monthly Variable Operations Cost Details

DESCRIPTION OF ITEMS		MINIMUM	MAXIMUM	OPTIONAL Year 11 MONTHLY EVALUATION # UNITS	UNIT \$	TOTAL MONTHLY COST(\$)	OPTIONAL Year 12 MONTHLY EVALUATION # UNITS	UNIT \$	TOTAL MONTHLY COST(\$)
BASE CONTRACT AND OPTIONAL YEARS				Optional Year 11 of Operations Based on Volume			Optional Year 12 of Operations Based on Volume		
VARIABLE COST - PER ITEM PRICING BY LEVEL				3 Levels Monthly Variable Fee			3 Levels Monthly Variable Fee		
	EVALUATION VALUE			1,180,000			1,190,000		
1	Manually Reviewed Image-based Transaction - Level 1	1	0		\$ -	\$ -		\$ -	\$ -
2	Manually Reviewed Image-based Transaction - Level 2	0	0		\$ -	\$ -		\$ -	\$ -
3	Manually Reviewed Image-based Transaction- Level 3	0	>		\$ -	\$ -		\$ -	\$ -
	Total Monthly Variable Operations Cost by Year					\$ -			\$ -

Sheet 5-1 Back-up
91 and I-405 Express Lanes

Base Contract and Optional Extensions Monthly Variable Operations Cost Details

DESCRIPTION OF ITEMS		MINIMUM	MAXIMUM	OPTIONAL Year 13 MONTHLY EVALUATION # UNITS	UNIT \$	TOTAL MONTHLY COST(\$)
BASE CONTRACT AND OPTIONAL YEARS				Optional Year 13 of Operations Based on Volume 3 Levels Monthly Variable Fee		
VARIABLE COST - PER ITEM PRICING BY LEVEL						
	EVALUATION VALUE			1,200,000		
1	Manually Reviewed Image-based Transaction - Level 1	1	0		\$ -	\$ -
2	Manually Reviewed Image-based Transaction - Level 2	0	0		\$ -	\$ -
3	Manually Reviewed Image-based Transaction- Level 3	0	>		\$ -	\$ -
	Total Monthly Variable Operations Cost by Year					\$ -

Payment Schedule

A. Payments for System Costs (Excluding Hardware, Equipment and Off-the-Shelf Software)					\$ -			\$ -
Payment Number	Payment Milestone	Pay Items	% Paid	Cum % Paid	91 Express Lanes	% Paid	Cum % Paid	I-405 Express Lanes
A-1	Notice to Proceed	Notice to Proceed	5.00%	5.00%	\$ -	5.00%	5.00%	\$ -
A-2	Initial Project Planning Documentation	Project Management Plan, Baseline Implementation Schedule, Document Control Work Plan, Quality Assurance Plan Approved	5.00%	10.00%	\$ -	5.00%	10.00%	\$ -
A-3	Second Group of Planning Documentation	ETTM System Infrastructure Design Requirements Document, Software Development Plan, Master Test Plan, Installation Plan, Safety Plans, Disaster Recovery Plan, Transition Plan Approved	5.00%	15.00%	\$ -	5.00%	15.00%	\$ -
A-4	Third Group of Planning Documentation	Maintenance Plans, Operations Plan, Emergency Response Management Plan, Training Plan, End of Contract Transition Plan Approved	5.00%	20.00%	\$ -	5.00%	20.00%	\$ -
A-5	System Design	ETTM System Installation Design Package, RSS Installation Design Documentation, Requirements Traceability Matrix, KPI Reporting and Management Plan, Business Rules and Final SDDD Approved	12.50%	32.50%	\$ -	12.50%	32.50%	\$ -
A-6	Factory Acceptance Testing (FAT)	Factory Acceptance Testing Approved	7.50%	40.00%	\$ -	7.50%	40.00%	\$ -
A-7-1	Onsite Installation Testing (OIT) Roadway Support System (91 Express Lanes)	Installation of Roadway Support System and OIT Approved (91 Express Lanes)	5.00%	45.00%	\$ -			
A-7-2	Onsite Installation Testing (OIT) Roadway Support System (I-405 Express Lanes)	Installation of Roadway Support System and OIT Approved (I-405 Express Lanes)				5.00%	45.00%	\$ -
A-8-1	Go-Live Roadway Support to BOS (91 Express Lanes)	Go-Live of Roadway Support System to BOS Approved (91 Express Lanes)	10.00%	55.00%	\$ -			
A-8-2	Go-Live Roadway Support to BOS (I-405 Express Lanes)	Go-Live of Roadway Support System to BOS Approved (I-405 Express Lanes)				10.00%	55.00%	\$ -
A-9-1	Go-Live All Tolling Locations (91 Express Lanes)	Go-Live at all Tolling Locations Approved (91 Express Lanes)	20.00%	75.00%	\$ -			
A-9-2	Go-Live All Tolling Locations (I-405 Express Lanes)	Go-Live at all Tolling Locations Approved (I-405 Express Lanes)				20.00%	75.00%	\$ -
A-10	Manuals and Training	Manuals and Training Completed and Approved	5.00%	80.00%	\$ -	5.00%	80.00%	\$ -
A-11-1	System Acceptance (91 Express Lanes)	System Acceptance Approved (91 Express Lanes)	20.00%	100.00%	\$ -			
A-11-2	System Acceptance (I-405 Express Lanes)	System Acceptance Approved (I-405 Express Lanes)				20.00%	100.00%	\$ -

Payment Schedule

B. Payments for Hardware, Equipment and Off-the-Shelf Software				
Payment Number	Payment Milestone	% Paid	Cum.% Paid	
	91 Express Lanes			\$ -
B-1	Ordering Verified 91 Express Lanes	10.00%	10.00%	\$ -
B-2	Purchased, Received and Verified 91 Express Lanes	45.00%	55.00%	\$ -
B-3	Installation Approved 91 Express Lanes (to be paid in equal installments by Toll Location)	45.00%	100.00%	\$ -
	I-405 Express Lanes			\$ -
B-3	Ordering Verified I-405 Express Lanes	10.00%	10.00%	\$ -
B-4	Purchased, Received and Verified I-405 Express Lanes	45.00%	55.00%	\$ -
B-5	Installation Approved I-405 Express Lanes (to be paid in equal installments by Toll Location)	45.00%	100.00%	\$ -

EXHIBIT E: PROPOSED AGREEMENT

1 **WHEREAS**, AUTHORITY requires assistance from CONTRACTOR to design, implement, install,
2 operate and maintain a toll collection system ("Services") for the existing 91 Express Lanes and planned
3 405 Express Lanes (the "Project"); and

4 **WHEREAS**, the Services necessary to implement the Project cannot be performed by the regular
5 employees of AUTHORITY; and

6 **WHEREAS**, CONTRACTOR has represented that it has the requisite personnel and experience,
7 and is capable of performing the Services; and

8 **WHEREAS**, CONTRACTOR wishes to perform the Services; and

9 **WHEREAS**, Procurement of the Services is authorized under Section 130238 and Sections
10 130240 et seq. of the Public Utilities Code and AUTHORITY's Procurement Policy and Procedures.

11 **WHEREAS**, The Parties intend for this Agreement to be a comprehensive agreement obligating
12 CONTRACTOR to perform all Services, as more particularly described in the Agreement and all attached
13 documents;

14 **WHEREAS**, the AUTHORITY's Board of Directors authorized this Agreement on_____ .

15 **NOW, THEREFORE**, it is mutually understood and agreed by AUTHORITY and CONTRACTOR as
16 follows:

17 **WHEREAS**, the federal provisions in this Agreement shall only apply to the portion of this
18 Agreement that is federally-funded (405 Implementation Phase).

19 **ARTICLE 1. COMPONENTS OF AGREEMENT/INTERPRETATION**

20 A. Agreement Documents: This Agreement, including all attached documents, as that term is
21 defined in the attached Exhibit A, entitled "Acronyms & Definitions", constitutes the complete and
22 exclusive statement of the terms and conditions of the agreement between AUTHORITY and
23 CONTRACTOR for the Services and supersedes all prior representations, understandings and
24 communications. The invalidity in whole or in part of any term or condition of this Agreement shall not
25 affect the validity of other terms or conditions. Terms capitalized herein shall, unless otherwise defined
26 herein, have the same meaning as set forth in Exhibit A.

1 B. Agreement Interpretation: This Agreement and each of the attached documents are an
2 essential part of the Parties agreement and should be interpreted in a manner which harmonizes their
3 provisions. However, if an actual conflict exists, the following descending order of precedence shall apply:

- 4 1. Agreement amendments adopted in accordance with this Agreement;
- 5 2. This Agreement;
- 6 3. All Exhibits attached hereto; and
- 7 4. The Proposal.

8 C. AUTHORITY's failure to insist in any one or more instances upon CONTRACTOR's
9 performance of any terms or conditions of this Agreement shall not be construed as a waiver or
10 relinquishment of AUTHORITY's right to such performance by CONTRACTOR or to future performance
11 of such terms or conditions and CONTRACTOR's obligation in respect thereto shall continue in full force
12 and effect. This Agreement may be amended or modified only by mutual written agreement of the Parties.
13 CONTRACTOR shall only commence work covered by an amendment after the amendment is executed
14 and notification to proceed has been provided by AUTHORITY.

15 **ARTICLE 2. AUTHORIZED DESIGNEES**

16 A. The Chief Executive Officer of AUTHORITY, or designee, shall have the authority to act
17 for and exercise any of the rights of AUTHORITY as set forth in this Agreement.

18 B. In its letter of transmittal accompanying Contractor's Proposal, the CONTRACTOR
19 designated [name] _____ as an officer of the CONTRACTOR, who
20 shall be authorized to sign this Agreement and any amendments to this Agreement and to speak for and
21 make commitments on behalf of the CONTRACTOR.

22 **ARTICLE 3. SCOPE OF WORK AND REQUIREMENTS**

23 A. CONTRACTOR shall perform the Services necessary to complete in a manner satisfactory
24 to AUTHORITY in accordance with the attached Exhibit B, entitled "Scope of Work and Requirements".

25 B. The CONTRACTOR shall provide all resources, personnel, Equipment, Software and
26 supplies necessary to perform the Services. The CONTRACTOR shall provide the Services described

herein in a competent and professional manner, in conformance with the highest industry standards, to the satisfaction of the AUTHORITY. The AUTHORITY shall be entitled to full and prompt cooperation by the CONTRACTOR in all aspects of the Services. The AUTHORITY shall have the right to inspect the performance of such Services at any time, and the CONTRACTOR shall fully and promptly cooperate with the AUTHORITY in the execution of such inspections.

ARTICLE 4. CONTRACTOR'S PERSONNEL

A. Non-Key Personnel:

1. The CONTRACTOR agrees that it will at all times employ, maintain and assign to the performance of the Services a sufficient number of competent and qualified professionals and other personnel to perform the Services in a timely manner.

2. CONTRACTOR warrants and represents that its staff personnel and subcontractors have the proper skill, training, background, knowledge, experience, rights, authorizations, integrity, character and licenses necessary to perform the services described herein, in a competent and professional manner.

3. At the request of the AUTHORITY, in its sole discretion, the CONTRACTOR shall promptly remove from assignment to the performance of Services pursuant to this Agreement any employee, subcontractor, or any other person performing Services hereunder. AUTHORITY's request to remove an employee or subcontractor shall have no bearing on CONTRACTOR's decision to retain the employee or subcontractor for work outside of this Agreement.

B. Key Personnel:

1. The Project Manager identified in the Proposal is a "Key Personnel" and shall act as the primary point of contact in all matters on behalf of CONTRACTOR. The Project Manager shall assign other individuals as contacts with regard to specific functional areas of the Services, subject to the approval of the AUTHORITY.

2. The Request for Proposal (RFP) and Exhibit B, Scope of Work and Requirements, identify certain other job categories as Key Personnel for the Agreement. CONTRACTOR identified Key

1 Personnel assigned to this Project in its Proposal whom shall be approved as part of the Project
2 Management Plan. CONTRACTOR acknowledges that the award of this Agreement to CONTRACTOR
3 was based in significant part on the qualifications of such Key Personnel and CONTRACTOR's
4 representation that they will be made available to perform the Services to completion, which availability
5 is a material term of this Agreement. Key Personnel shall be required to work in the position indicated in
6 the Proposal and in the approved Project Management Plan.

7 3. No Key Personnel shall be removed or replaced by CONTRACTOR, or have any
8 change in function or any significant reduction in the level of commitment, without the prior written consent
9 of AUTHORITY. Should AUTHORITY determine during the Term of the Agreement (as defined in Article
10 5) that the list of Key Personnel does not include personnel essential to the successful performance of
11 the Services, the AUTHORITY may require the CONTRACTOR to add any existing job category to such
12 list.

13 4. If AUTHORITY becomes dissatisfied with the performance of any person
14 designated as Key Personnel, AUTHORITY shall notify CONTRACTOR in writing. Within seven (7)
15 Business Days of receipt of such Notice, the CONTRACTOR shall either propose a replacement person
16 for evaluation and approval by AUTHORITY or present to AUTHORITY a plan for correcting the
17 incumbent's performance deficiencies. If AUTHORITY rejects the replacement person for evaluation,
18 then CONTRACTOR shall propose another replacement person within seven (7) Business Days, which
19 process shall be followed until CONTRACTOR proposes a replacement person acceptable to OCTA. If
20 AUTHORITY rejects the plan of correction, or approves the plan of correction, but the incumbent's
21 performance deficiencies are not corrected to AUTHORITY's satisfaction within the thirty (30) Calendar
22 Days of AUTHORITY's approval of the plan, then the CONTRACTOR shall, propose to AUTHORITY a
23 replacement person for evaluation and approval by AUTHORITY within the time and manner set forth
24 above.

25 5. Should the services of any Key Personnel become no longer available to
26 CONTRACTOR, the resume and qualifications of the proposed replacement shall be submitted to

1 AUTHORITY for approval as soon as possible, but in no event later than seven (7) Business Days after
2 the CONTRACTOR becomes aware that the Key Personnel is unavailable. AUTHORITY will respond to
3 CONTRACTOR within seven (7) Business Days following receipt of these qualifications concerning
4 acceptance of the candidate for replacement. As used in this paragraph, "no longer available to
5 CONTRACTOR" means that the Key Personnel is no longer employed by CONTRACTOR or is otherwise
6 unable to perform under this Agreement.

7 **ARTICLE 5. TERM OF AGREEMENT**

8 A. Initial Term: This Agreement shall commence upon the Effective Date, and shall continue in
9 full force and effect for a period of ten (10) years through March 30, 2028 ("Initial Term"), unless earlier
10 terminated or extended as provided in this Agreement.

11 B. Extensions: AUTHORITY, at its sole discretion, may elect to extend the Initial Term of
12 this Agreement up to an additional twenty-four (24) months ("Option Term 1"), and thereupon require
13 CONTRACTOR to provide the Services and otherwise perform in accordance with the Scope of Work,
14 and at the rates set forth in Exhibit D, entitled "Price Summary Sheets." AUTHORITY, at its sole
15 discretion, may elect to extend the Initial Term, as extended by Option Term 1, up to an additional twenty-
16 four (24) months ("Option Term 2"), and thereupon require CONTRACTOR to continue to provide
17 Services and otherwise perform in accordance with the Scope of Work and Requirements and at the
18 rates set forth in Exhibit D, Price Proposal. The Initial Term and any extensions thereof shall be referred
19 to as "Term" in this Agreement.

20 C. Extensions Not Constituting Waiver: AUTHORITY's election to extend the Initial Term under
21 Option Term 1 and/or Option Term 2, shall not diminish its right to terminate the Agreement for
22 AUTHORITY's convenience or CONTRACTOR's default as provided elsewhere in this Agreement. The
23 maximum term of this Agreement shall be 14 years from the Effective Date.

24 **ARTICLE 6. TIME AND SCHEDULE/COMPLETION DATES**

25 A. Schedule and Submittals

26 1. CONTRACTOR's Submittal requirements and Submittal schedule shall be as set out in

1 CONTRACTOR's approved Program Management Plan and CONTRACTOR's Approved Baseline
2 Implementation Schedule, in accordance with the Scope of Work and Requirements.

3 2. AUTHORITY's written approval will be required for Submittals.

4 3. Within fifteen (15) Calendar Days of the Notice to Proceed CONTRACTOR shall submit
5 a Baseline Implementation Schedule in a format acceptable to AUTHORITY for AUTHORITY's review
6 and approval. The Preliminary Implementation Schedule at the time of the execution of the Agreement,
7 included as Exhibit C, shall be the basis for the development of CONTRACTOR's submitted Baseline
8 Implementation Schedule. The Baseline Implementation Schedule shall propose dates by which
9 CONTRACTOR will submit required permits, documents, applications, and design; develop; deliver;
10 install; test, and implement the required System, including all necessary documents in support thereof.
11 Sufficient information shall be shown on the Baseline Implementation Schedule to enable proper control
12 and monitoring of the tasks and subtasks in the Scope of Work and Requirements.

13 4. Upon completion of the Baseline Implementation Schedule by the CONTRACTOR to the
14 satisfaction of AUTHORITY, the AUTHORITY will approve the schedule, and it will thereafter be deemed
15 the Approved Baseline Implementation Schedule and will constitute the schedule for the submittals set
16 forth in Article 6. Paragraph A.1.

17 5. Progress of Work shall be measured against the Approved Baseline Implementation
18 Schedule and submitted to AUTHORITY monthly until the Project Implementation Phase has been
19 completed. Submission of monthly progress updates to the schedule shall not release or relieve
20 CONTRACTOR from full responsibility for completing the Work within the time set forth in the Approved
21 Baseline Implementation Schedule.

22 5. Changes to the Approved Baseline Implementation Schedule are only permitted through
23 an amendment to this Agreement. The CONTRACTOR shall clearly label each approved revision to the
24 Approved Baseline Implementation Schedule, pursuant to the requirements of the approved Project
25 Management Plan, which upon approval of the amendment by AUTHORITY shall be deemed
26 incorporated into the Approved Baseline Implementation Schedule.

1 6. CONTRACTOR shall furnish sufficient resources to ensure the performance of the
2 Services in accordance with the Approved Baseline Implementation Schedule. If CONTRACTOR falls
3 behind in the performance of the Services as indicated in the Approved Baseline Implementation
4 Schedule, CONTRACTOR shall take such steps as may be necessary to improve its progress.
5 CONTRACTOR shall manage the risks to the Approved Baseline Implementation Schedule to avoid any
6 potential delays or make every effort to work around any potential delays and mitigate the impact of delay.

7 7. CONTRACTOR shall not be held responsible for delays in the Approved Baseline
8 Implementation Schedule due to delays in approvals caused by Force Majeure events as in Article 68 of
9 this Agreement. However, nothing in this section relieves CONTRACTOR of its responsibility to provide
10 complete and accurate Submittals and Deliverables that meet the requirements of the Scope of Work
11 and Requirements. Submittals rejected by AUTHORITY due to the CONTRACTOR's failure to meet the
12 requirements of the Submittal or Deliverable or to address the previous comments provided by
13 AUTHORITY are not Force Majeure events and CONTRACTOR shall be held responsible for all
14 associated delays.

15 8. If comments forms are established in the Project Management Plan to be used for the
16 resolution of questions and issues on a Submittal, the Submittal shall not be considered approved until
17 all written comments are addressed to the satisfaction of the AUTHORITY. Such lack of approval shall
18 be considered a rejection until such time as the comments are fully resolved.

19 B. Guaranteed Completion Dates:

20 In executing this Agreement CONTRACTOR is guaranteeing that the phases of the System will
21 be fully operational by the following specified dates, Guaranteed Completion Dates, subject to any
22 extensions thereof approved by AUTHORITY in accordance with this Agreement.

23 1. The 91 Express Lanes shall be fully operational and shall have achieved Go-Live, as
24 determined by AUTHORITY, within Five-hundred Fifty (550) Calendar Days from NTP1.

25 2. The 405 Express Lanes shall be fully operational and shall have achieved and Go-Live,
26 as determined by AUTHORITY, within Four-hundred (400) Calendar Days from NTP2, and in accordance

1 with the ETTM System Infrastructure Toll Site Set turnover identified in the Scope of Work and
2 Requirements, and the Approved Baseline Implementation Schedule.

3 3. In addition to all other rights and remedies available to AUTHORITY, if CONTRACTOR
4 fails to meet any of the Guaranteed Completion Dates, as such Guaranteed Completion Dates may be
5 extended pursuant to this Agreement, the CONTRACTOR shall be subject to liquidated damages as
6 specified in Article 18, Liquidated Damages/Lane Rental Fees, of this Agreement.

7 C. Delays:

8 1. If at any time CONTRACTOR fails to complete any activity by the completion date in the
9 Approved Baseline Implementation Schedule, unless previously excused by AUTHORITY in writing,
10 CONTRACTOR will be required, within seven (7) days of AUTHORITY's request, to submit to
11 AUTHORITY a statement as to how it plans to return to compliance, including a recovery schedule if
12 directed by AUTHORITY.

13 2. If CONTRACTOR fails or refuses to implement measures sufficient to bring its Services
14 back into conformity with the Approved Baseline Implementation Schedule, it shall be considered an
15 Event of Default and AUTHORITY may exercise all rights provided herein therefor, including permitting
16 CONTRACTOR to proceed under specified conditions required by AUTHORITY and agreed upon by
17 CONTRACTOR.

18 3. No AUTHORITY review or approval of a schedule submitted by CONTRACTOR shall
19 release or relieve CONTRACTOR from full responsibility for the accurate, complete and timely
20 performance of the Services, including the accuracy and completeness of the schedules, or any other
21 duty, obligation or liability imposed on it by this Agreement including the responsibility for completing the
22 Services within the time set forth in this Agreement. AUTHORITY's Approval of a schedule shall not
23 constitute a representation by AUTHORITY that CONTRACTOR will be able to proceed or complete the
24 Services in accordance with the dates contained in said schedule.

25 **ARTICLE 7. START OF WORK**

26 A. Implementation Phases: CONTRACTOR shall not be entitled to any compensation under

1 this Agreement and shall incur no costs or perform any Services, unless and until a Notice to Proceed
2 ("NTP") has been given to CONTRACTOR by AUTHORITY for an Implementation Phase. The
3 Implementation Phase will be performed in two phases. Phase 1 shall consist of design of the 91 Express
4 Lanes and 405 Express Lanes Systems, and Implementation of the 91 Express Lanes System.
5 CONTRACTOR may begin performing Services and incurring costs for Phase 1 upon AUTHORITY's
6 issuance of NTP1. Phase 2 shall consist of the Implementation of the 405 Express Lanes System and
7 shall commence at a date to be determined in accordance with the Approved Baseline Implementation
8 Schedule and shall continue until the Acceptance of the 405 Express Lanes. CONTRACTOR may begin
9 performing Services and incurring costs for Phase 2 upon AUTHORITY's issuance of NTP2.

10 B. Conditions precedent to AUTHORITY issuing NTP1 are CONTRACTOR furnishing the
11 Exhibit E , Performance Bond, Exhibit F , Payment Bond, and certificates of insurance and endorsements
12 thereof as required by this Agreement. CONTRACTOR shall furnish said documents within ten (10)
13 Business Days after notification of award of this Agreement from AUTHORITY. AUTHORITY shall
14 thereafter, issue NTP1.

15 C. Operations and Maintenance Phase: The Operations and Maintenance Phase of the 91
16 Express Lanes shall commence upon Go-Live of the 91 Express Lanes System and shall continue
17 through the end of the Term. The Operations and Maintenance Phase of the 405 Express Lanes shall
18 commence upon Go-Live of the 405 Express Lanes and shall continue through the end of the Term.

19 **ARTICLE 8. MAXIMUM OBLIGATION**

20 Notwithstanding any provisions of this Agreement to the contrary, AUTHORITY and
21 CONTRACTOR mutually agree that AUTHORITY's maximum cumulative payment obligation (including
22 obligation for CONTRACTOR's profit) for all Services during the Initial Term shall be _____ Dollars
23 (\$____.00) (the "Maximum Obligation"). This is based on fixed and variable price components and
24 includes, but is not limited to, all amounts payable to CONTRACTOR for its subcontracts, leases,
25 materials and costs arising from, or due to termination of, this Agreement and as further set forth in Article
26 9, Payment.

ARTICLE 9. PAYMENT

A. Payment of Maximum Obligation: AUTHORITY shall pay to CONTRACTOR up to the Maximum Obligation amount, for CONTRACTOR's full and complete performance of its obligations under this Agreement on a firm fixed and variable unit price basis in accordance with the following provisions.

B. Payments for Implementation Phase: Payments to the CONTRACTOR for the Implementation Phase will be as indicated in Exhibit D, Price Proposal, and, Payment Schedule, subject to any adjustments allowed pursuant to this Article 9, Payment. Payments for System development, System design, integration and testing, and payments for installation will be made using firm fixed prices for completed and approved Deliverables.

C. Payments for Maintenance: Payments for Maintenance will be made on a monthly basis, and where applicable, based on fixed monthly prices for Maintenance and variable unit it prices for image review in accordance with the Price Proposal. Adjustments to these payments may be made for CONTRACTOR performance which falls below required Performance Requirements as further set forth in the Scope of Work and Requirements.

D. Full and Complete Compensation: All Services performed by CONTRACTOR in meeting the requirements of the Agreement shall be paid under one of the above payment methods, which shall constitute full compensation for the Services, including but not limited to: (a) the cost of all insurance and bond premiums, home office, job site and other overhead, and profit relating to CONTRACTOR's performance of the Services; (b) the cost of performance of each and every portion of the Services (including all costs of all Services provided by subcontractor(s); (c) the cost of obtaining all governmental approvals; (d) all costs of compliance with and maintenance of such governmental approvals; (e) all risk of inflation, unless otherwise noted, currency risk, interest and other costs of funds associated with the progress payment schedule for the Work as provided herein; and (f) payment of any taxes, duties, permits and other fees and/or royalties imposed with respect to the Services and any Equipment, materials or labor included therein.

E. Schedule of Fixed Payment: The following schedule shall establish the firm fixed payment to

CONTRACTOR by AUTHORITY for each phase set forth in the Scope of Work and Requirements.

<u>Phase</u>	<u>Description</u>	<u>Firm Fixed Price</u>
1	Implementation Phase for 91 Express Lanes	0.00
2	Implementation Phase for 405 Express Lanes	<u>0.00</u>
Total for Implementation Phase		0.00

F. Schedule of Fixed Price and variable Payment for Maintenance and Operations Phases: the following schedule shall establish the time and expense payment to CONTRACTOR by AUTHORITY for the Operations and Maintenance (O&M) phases set forth in the Scope of Work and Requirements.

<u>Phase</u>	<u>Description</u>	<u>Firm Fixed Price</u>
1	Operations and Maintenance Phase-Fixed Price for the 405 Express Lanes	0.00
2	Operations and Maintenance Phase-Fixed Price for the 91 Express Lanes	0.00
3	Operations and Maintenance Phase-Variable Costs based on Unit Prices	<u>0.00</u>
Total for Operations and Maintenance Phase		0.00
MAXIMUM OBLIGATION FOR IMPLEMENTATION AND O&M PHASES		<u>0.00</u>

G. Invoice Requirements: CONTRACTOR shall invoice AUTHORITY on a monthly basis for payments corresponding to the work actually completed by CONTRACTOR and approved by AUTHORITY and the payment methods as set forth in paragraphs B and C of this Article 9, Payment. Deliverables completed and approved by AUTHORITY shall be documented in a monthly progress report prepared by CONTRACTOR, which shall accompany each invoice submitted by CONTRACTOR. At its sole discretion, AUTHORITY may decline to make full payment for any Deliverable until such time as CONTRACTOR has documented to AUTHORITY's satisfaction, that CONTRACTOR has fully completed all work required under the Deliverable. AUTHORITY's payment in full for any task completed shall not constitute AUTHORITY's Final Acceptance of CONTRACTOR's work under such Deliverable; Final

1 Acceptance shall occur only when AUTHORITY's release of the retention described in, paragraph H of
2 this Article 9, Payment.

3 H. Retention: As partial security against CONTRACTOR's failure to satisfactorily fulfill all of its
4 obligations under this Agreement, AUTHORITY shall retain ten percent (10%) of the amount of each
5 invoice submitted for payment by CONTRACTOR. During the Term at its sole discretion, AUTHORITY
6 reserves the right to release all or a portion of the retained amount based on CONTRACTOR's
7 satisfactory completion of certain milestones. CONTRACTOR shall invoice AUTHORITY for the release
8 of the retention in accordance with this Article 9, and Exhibit F, Milestones for Release of Retention. All
9 remaining retained funds shall be released by AUTHORITY and shall be paid to CONTRACTOR within
10 sixty (60) Calendar Days of payment of final invoice, unless AUTHORITY elects to audit
11 CONTRACTOR's records in accordance with Article 44, Audit and Inspection of Records. If AUTHORITY
12 elects to audit, retained funds shall be paid to CONTRACTOR within thirty (30) Calendar Days of
13 completion of such audit in an amount reflecting any adjustment required by such audit.

14 I. Submission of Invoices: Invoices shall be submitted by CONTRACTOR in duplicate to
15 AUTHORITY's Accounts Payable office. CONTRACTOR may also submit invoices electronically to
16 AUTHORITY's Accounts Payable at vendorinvoices@octa.net. Each invoice shall be accompanied by
17 the monthly progress report specified in paragraph G of this Article, and the Scope of Work and
18 Requirements. AUTHORITY shall remit payment within thirty (30) Calendar Days of the receipt and
19 approval of each invoice. Each invoice shall include the following information:

- 20 1. Agreement No. C-7-1911 ;
- 21 2. The specific phase number for which payment is being requested;
- 22 3. System generated report to validate quantities for the variable unit price items, that
23 segregates those prices for the 91 Express Lanes from those of the 405 Express Lanes;
- 24 4. The time period covered by the invoice;
- 25 5. Total monthly invoice (including project-to-date cumulative invoice amount) and
26 retention for the time period covered by the invoice and cumulative retention held;

6. Monthly Progress Report and updated Approved Baseline Implementation schedule;

7. Weekly certified payroll for personnel subject to prevailing wage requirements, if applicable;

8. Certification signed by the CONTRACTOR or his/her designated alternate that a) The invoice is a true, complete and correct statement of reimbursable costs and progress; b) The backup information included with the invoice is true, complete and correct in all material respects; c) All payments due and owing to subs and suppliers have been made; d) Timely payments will be made to subcontractors and suppliers from the proceeds of the payments covered by the certification and; e) The invoice does not include any amount which CONTRACTOR intends to withhold or retain from a subcontractor or supplier unless so identified on the invoice;

9. Any other information as agreed or requested by AUTHORITY to substantiate the validity of an invoice.

10. Failure to comply with AUTHORITY's Direction: CONTRACTOR shall not be entitled to have any invoices processed or to have any payment made for Services performed if it has failed to comply with any lawful or proper direction from AUTHORITY concerning the Services , following receipt of written notice from AUTHORITY that the Design-builder has failed to comply and that the AUTHORITY will exercise its right to withhold payment of invoices within five (5) Business Days of the date of such notice, unless and until such time as compliance is achieved.

ARTICLE 10. PROMPT PAYMENT OF SUBCONTRACTORS

A. CONTRACTOR agrees to pay each subcontractor for the satisfactory work performed under this Agreement, no later than seven (7) Calendar Days from the receipt of each payment CONTRACTOR receives from AUTHORITY. CONTRACTOR agrees further to pay to subcontractor any retainage withheld by CONTRACTOR, which retainage shall not exceed AUTHORITY's retainage, within thirty (30) Calendar Days after the subcontractor's work is satisfactorily completed. AUTHORITY reserves the right to request the appropriate documentation from CONTRACTOR showing payment has been made to the subcontractors. Any delay or postponement of payment from the above referenced time frames may

1 occur only for good cause following written approval by AUTHORITY.

2 B. Failure to comply with this provision or delay in payment without prior written approval from
3 AUTHORITY will constitute noncompliance, which may result in appropriate administrative sanctions,
4 including, but not limited to a penalty of two (2%) percent of the invoice amount due per month for every
5 month that payment is not made.

6 C. These prompt payment provisions must be incorporated in all subcontract agreements
7 issued by CONTRACTOR under this Agreement.

8 **ARTICLE 11. NOTICES**

9 All notices hereunder and communications regarding the interpretation of the terms of this
10 Agreement, or changes thereto, shall be effected by delivery of said notices in person or by depositing
11 said notices in the U.S. mail, registered or certified mail, returned receipt requested, postage prepaid and
12 addressed as follows:

13 To CONTRACTOR:

To AUTHORITY:

14 Orange County Transportation AUTHORITY

15 550 South Main Street

16 P.O. Box 14184

17 , Orange, CA 92863-1584

18 ATTENTION:

ATTENTION:

19 Ms. Reem Hashem

20 Section Manager III

21
22 Phone:

Phone: (714) 560 – 5446

23 Email:

Email: rhashem@octa.net

24 **ARTICLE 12. INDEPENDENT CONTRACTOR**

25 CONTRACTOR's relationship to AUTHORITY in the performance of this Agreement is that of an
26 independent contractor. CONTRACTOR's personnel performing services under this Agreement shall at

all times be under CONTRACTOR's exclusive direction and control and shall be employees of CONTRACTOR and not employees of AUTHORITY. CONTRACTOR shall pay all wages, salaries and other amounts due its employees in connection with this Agreement and shall be responsible for all reports and obligations respecting them, such as social security, income tax withholding, unemployment compensation, workers' compensation and similar matters.

ARTICLE 13. BONDS

A. All bonds required by this Agreement shall be issued by sureties authorized to do business in the State of California with an A.M Best Rating of A-, Class VIII, or better, or as otherwise approved by AUTHORITY in its sole discretion referred to hereinafter as "Eligible Surety". Notwithstanding any other provision set forth in this Agreement, performance by a surety of any obligations of CONTRACTOR shall not relieve CONTRACTOR of any of its obligations under this Agreement.

B. As partial security against CONTRACTOR's failure to satisfactorily fulfill all Services and obligations under this Agreement, CONTRACTOR shall submit and keep in place until Final Acceptance, a Performance Bond and Payment Bond referred to hereinafter as "Bonds" in the forms, respectively, set forth in Forms J and K, and attached to this Agreement. The Bonds shall each be in the sum of one-hundred (100%) percent of the Total Firm Fixed Price for the Implementation Phases as shown in Sheet 1 of the Price Proposal entitled Project Summary, cell E7, Grand Total Cost. If the Total Firm Fixed Price for the Implementation Phases is increased in connection with an amendment, AUTHORITY may, in its sole discretion, require a corresponding increase in the amount of the Bonds or new Bonds covering the amendment.

C. Upon Final Acceptance of Phase 1 CONTRACTOR may request a reduction in the amount of the Bonds equal to the firm fixed price for Phase 1. Upon Final Acceptance of Phase 2, CONTRACTOR may obtain a release of the remaining Bonds. As a condition of such reduction or release, all claims against such Bonds shall have been fully paid and unconditional releases of all stop notices obtained or if no claims have been filed on the Bonds, the expiration of the applicable statute of limitations.

1 D. An Operations and Maintenance Bond referred to hereinafter as "O&M Bond" shall be
2 required for the 91 Express Lanes in the form of Form L, prior to commencement of Go-Live operations
3 and as a condition of Final Acceptance of Phase 1. As a condition of Final Acceptance of Phase 2, an
4 O&M Bond for the combined Operations and Maintenance Phase for the 91 Express Lanes and the 405
5 Express Lanes shall be required also in the form of Form L. The Implementation Phase Bond for each
6 Phase shall not be released until the O&M Bond for the phase is in place. The initial bonding level for the
7 Operations and Maintenance Phase shall be provided at one-hundred (100%) percent of Year 1 of
8 Operations and Maintenance. For purposes of the Surety Commitment Letter contained in Form H,
9 bonding levels are as shown in Sheet 4 of the Price Proposal entitled Base Contract and Optional
10 Extensions Maintenance Cost Summary, cell K4 (Year 1), Total Annual Roadway and Roadside Support
11 Maintenance Cost, and may be renewed each year at the anniversary date of Final Acceptance for each
12 Phase through the end of the Contract. For subsequent years after the first year, the bonding level for the
13 Operations and Maintenance phase shall be based on the projected costs for that year, in accordance
14 with the Price Proposal. The renewed Operation and Maintenance Bonds shall be submitted to
15 AUTHORITY at least ten (10) Business Days prior to the anniversary date of each Phase. Upon Approval
16 thereof, AUTHORITY will release the prior year's Bonds.

17 E. If any Bond previously provided becomes ineffective, or if the Eligible Surety that provided
18 the Bond no longer meets the Agreement requirements, CONTRACTOR shall provide a replacement
19 Bond in the same form issued by an Eligible Surety within five (5) Business Days of CONTRACTOR's
20 knowledge of same. CONTRACTOR shall provide Notice to AUTHORITY promptly following such Bond
21 being rendered ineffective or when such Bond's surety is no longer an Eligible Surety, in no case later
22 than three days thereafter.

23 F. Additionally, the Performance Bond shall meet the following requirements:

- 24 1. Identify AUTHORITY and Agreement No. C-7-1911 for which the performance
25 bond is provided;
- 26 2. Upon written notice by AUTHORITY that CONTRACTOR has defaulted under this

Agreement, the Eligible Surety will have ten (10) Business Days to make a determination on the claim and to notify AUTHORITY accordingly.

ARTICLE 14. INDEMNIFICATION

A. CONTRACTOR shall indemnify, defend and hold harmless AUTHORITY, Caltrans, FHWA, the Cities of Costa Mesa, Garden Grove, Fountain Valley, Huntington Beach, Seal Beach and Westminster and their officers, directors, employees and agents, (hereafter, the "Indemnitees") from and against any and all claims (including attorneys' fees and reasonable expenses for litigation or settlement) for any loss or damages, bodily injuries, including death, damage to or loss of use of property caused by the negligent acts, omissions or willful misconduct by CONTRACTOR, its officers, directors, employees, agents, Subcontractors or Suppliers in connection with or arising out of the performance of this Agreement. In addition to any other defense and indemnity obligations that CONTRACTOR has assumed under this Agreement, CONTRACTOR shall defend, indemnify and hold harmless the Indemnitees from and against any and all liabilities, actions, suits, claims, and legal expenses, including attorneys' fees, which arise out of any claim asserting a cause of action for trespass, inverse condemnation or any other unlawful entry onto property by CONTRACTOR, its subcontractors, agents or employees. In the event that any damage shall occur to any part of AUTHORITY's toll collection system on account of Equipment, Software or Services provided by CONTRACTOR or its Subcontractors or Suppliers, AUTHORITY shall have the right to cause such damage to be repaired and to charge the expense of such repairs to the CONTRACTOR. Such sum may be deducted from any monies due or to become due to CONTRACTOR hereunder or under any other agreement between CONTRACTOR and AUTHORITY.

B. Intellectual Property.

1. CONTRACTOR shall be liable and responsible without limitation for any and all claims made against AUTHORITY for infringement of Intellectual Property rights, by the use or supplying of any Equipment or Software in the course of performance or completion of, or in any way connected with, the Services, or AUTHORITY's continued use of such Equipment or Software. The CONTRACTOR shall indemnify AUTHORITY against and save it harmless from all loss and expense incurred in the

1 defense, settlement or satisfaction of any claims in the nature of Intellectual Property infringement arising
2 out of or in connection with AUTHORITY's use, pursuant to this Agreement, of the Equipment and
3 Software

4 2. In the event that any Intellectual Property, Equipment or Software employed to
5 provide Services pursuant to this Agreement, or portion thereof, is held to constitute an infringement and
6 its use is or may be enjoined, the CONTRACTOR shall have the obligation at AUTHORITY's option to
7 do one or more of the following:

8 a. Require CONTRACTOR to, at its own expense, supply, temporarily or
9 permanently, replacement the Intellectual Property, Equipment or Software of similar quality and function
10 which is not subject to such an infringement or injunction;

11 b. Require CONTRACTOR to, at its own expense, remove all such Intellectual
12 Property, Equipment and Software and refund to AUTHORITY the cost thereof or equitably adjust
13 compensation;

14 c. Take such steps as is necessary to ensure compliance by AUTHORITY with such
15 injunction;

16 d. modify, or require that the applicable Subcontractor or Supplier modify, the alleged
17 infringing Intellectual Property at its own expense, without impairing in any respect the functionality or
18 performance thereof that is non-infringing; and/or

19 e. procure for AUTHORITY, at CONTRACTOR's expense, the rights provided under
20 this Agreement to use the infringing Intellectual Property, Equipment or Software.

21 f. The options set forth herein are in addition to any other rights AUTHORITY may
22 have in law and equity.

23 3. CONTRACTOR shall be solely responsible for determining and informing
24 AUTHORITY whether a prospective Supplier or Subcontractor is a party to any litigation involving
25 Intellectual Property infringement or misappropriation or any injunction related to thereto, or arising out of
26 any Intellectual Property, Equipment and/or Software provided hereunder. The CONTRACTOR shall

1 enter into agreements with all Suppliers and Subcontractors at its own risk. AUTHORITY may reject any
2 Intellectual Property, Equipment or Software, which it believes to be the subject of any such litigation or
3 injunction, or if, in AUTHORITY's judgment, use thereof does not meet the objectives of Services, restricts
4 or impairs AUTHORITY's rights in any Intellectual Property, or be unlawful.

5 **ARTICLE 15. INSURANCE**

6 A. CONTRACTOR shall procure and maintain insurance coverage during the Term
7 of this Agreement. Coverage shall be full coverage and not subject to self-insurance provisions.
8 CONTRACTOR shall provide the following insurance coverage:

9 1. Commercial General Liability, to include Products/Completed Operations, Independent
10 CONTRACTORS', Contractual Liability, and Personal Injury, and Property Damage with a minimum limit of
11 \$5,000,000.00 per occurrence and \$10,000,000.00 general aggregate.

12 2. Automobile Liability to include owned, hired and non-owned autos with a minimum
13 combined single limit of \$1,000,000.00;

14 3. Workers' Compensation with limits as required by the State of California including a
15 waiver of subrogation in favor of AUTHORITY, its officers, directors, employees and agents;

16 4. Employers' Liability with minimum limits of \$1,000,000.00;

17 5. Professional Liability with minimum limits of \$2,000,000.00 per claim. The
18 CONTRACTOR shall maintain professional liability coverage for a minimum of three (3) years after
19 expiration of the Term or other termination of this Agreement;

20 6. Completed Products coverage in the amount of \$2,000,000, if storage option is required;

21 7. Commercial Crime with limits no less than \$5,000,000; and

22 8. Security and Privacy Liability with minimum limits of \$5,000,000.

23 9. Technology Errors & Omissions- The CONTRACTOR shall maintain technology errors &
24 omissions liability (or technology professional liability coverage) insurance, covering liability for all
25 professional products and services performed, including liabilities arising from acts, errors or omissions
26 in rendering computer or information technology services including 1) systems analysis 2) systems

1 programming 3) data processing 4) systems integration 5) outsourcing development and design 6)
2 systems design, consulting, development and modification 7) training services relating to computer
3 Software or Hardware 8) management, repair and Maintenance of computer products, networks and
4 systems 9) marketing, selling, servicing, distributing, installing and maintaining computer Hardware or
5 Software 10) data entry, modification, verification, Maintenance, storage, retrieval or preparation of data
6 output with a limit not less than ten million dollars (\$10,000,000) per occurrence. This insurance shall
7 provide coverage for Software copyright liability and contractual liability. Such Technology E&O insurance
8 coverage may be met through or combined with the Professional Liability Insurance referenced in
9 paragraph 5 above, however, if combined then the coverage requirement for Technology E & O insurance
10 shall be equal or greater than the combined aggregate.

11 10. Cyber Liability Insurance. The CONTRACTOR shall maintain Privacy and Network
12 Security (Cyber Liability) insurance covering liability arising from 1) hostile action, or a threat of hostile
13 action, with the intent to affect, alter, copy, corrupt, destroy, disrupt, damage, or provide unauthorized
14 access/unauthorized use of a computer system including exposing or publicizing confidential electronic
15 data or causing electronic data to be inaccessible 2) computer viruses, Trojan horses, disabling codes,
16 trap doors, back doors, time bombs drop-dead devices, worms and any other type of malicious or
17 damaging code 3) dishonest, fraudulent, malicious, or criminal use of a computer system by a person,
18 whether identified or not, and whether acting alone or in collusion with other persons, to affect, alter, copy,
19 corrupt, delete, disrupt, or destroy a computer system or obtain financial benefit for any party or to steal
20 or take electronic data 4) denial of service for which the insured is responsible that results in the
21 degradation of or loss of access to internet or network activities or normal use of a computer system 5)
22 loss of service for which the insured is responsible that results in the inability of a third-party, who is
23 authorized to do so, to gain access to a computer system and conduct normal internet or network activities
24 6) access to a computer system or computer system resources by an unauthorized person or persons or
25 an authorized person in an unauthorized manner with a limit not less than ten million dollars (\$10,000,000)
26 per occurrence. This insurance shall provide coverage for personal injury (including emotional distress

1 and mental anguish). Such Cyber Liability insurance coverage may be met through or combined with the
2 Professional Liability Insurance coverage referenced in Item 5. above; however, if combined then the
3 coverage requirement for Cyber Liability insurance shall be equal or greater than the combined
4 aggregate.

5 B. Proof of such coverage, in the form of a certificate of insurance, a copy of the
6 insurance policy and/or an insurance company issued policy endorsement shall be provided to
7 AUTHORITY. Proof of insurance coverage must be received by AUTHORITY within ten (10) Calendar
8 Days from the effective date of this Agreement and endorsements evidencing the requirements for
9 additional insureds. Such insurance shall be primary and non-contributory to any insurance or self-
10 insurance maintained by AUTHORITY. AUTHORITY reserves the right to request certified copies of all
11 related insurance policies.

12 C. CONTRACTOR shall include on the face of the Certificate of Insurance the
13 Agreement Number and OCTA's Contract Administrator's Name, Reem Hashem, Principal Contracts
14 Administrator.

15 D. AUTHORITY, Its officers, directors, employees and agents must be named as
16 additional insured on Commercial General Liability and Automobile Liability Certificates and on the
17 insurance policy endorsement with respect to performance hereunder.

18 E. CONTRACTOR shall also include in each subcontract the stipulation that
19 subcontractors shall maintain insurance coverage in the amounts required from CONTRACTOR as
20 provided in this Agreement and name the Indemnitees as additional insureds, if CONTRACTOR's
21 insurance does not cover Subcontractors acts or omissions.

22 F. CONTRACTOR shall be required to immediately notify AUTHORITY of any
23 modifications or cancellation of any required insurance policies.

24 G. CONTRACTOR shall at all times during the Term of this Agreement maintain
25 insurance in such form as is satisfactory to AUTHORITY, and will furnish AUTHORITY with continuing
26 evidence of insurance as provided below. All insurance policies shall be issued by companies licensed

1 to do business in the State of California, with an A.M. Best Rating of A-, Class VII, or better, or as
2 otherwise approved by AUTHORITY. CONTRACTOR shall at all times comply with the terms of such
3 insurance policies, and all requirements of the insurer under any such insurance policies, except as they
4 may conflict with existing California laws or this Agreement.

5 H. CONTRACTOR shall provide AUTHORITY with certificates showing the required
6 coverage to be in effect and a copy of the insurance policy or endorsements evidencing the requirements
7 for the additional insureds. Such policies shall provide that the insurance shall not be materially modified
8 or cancelled except upon thirty (30) days prior written notice to AUTHORITY. Copies of all insurance
9 policies and endorsements shall be provided to AUTHORITY upon request.

10 I. AUTHORITY reserves the right to review all insurance coverage and amounts of
11 insurance coverage on an annual basis and to require the CONTRACTOR to adjust the insurance
12 coverage and amounts of insurance coverage based on industry standards for contracts of this size and
13 type. CONTRACTOR shall timely pay all premiums and deductibles when due for all insurance coverage
14 required herein. The above insurance shall not contain a self-insurance retention (SIRs) unless approved
15 by AUTHORITY.

16 J. Pertaining to the above paragraphs regarding professional liability, technology
17 errors and omissions, and cyber liability insurance, if coverage is written on a claims made basis, such
18 insurance shall be maintained in force at all times during the Term and for a period of three (3) years
19 thereafter for Services completed during the Term. Additionally, if a sub-limit applies to any elements of
20 coverage, the policy endorsement evidencing the coverage above must specify the coverage section and
21 the amount of the sub-limit.

22 K. Providing and maintaining adequate insurance coverage described herein is a
23 material obligation of the CONTRACTOR and is of the essence for this Contract. The limits of coverage
24 under each insurance policy maintained by the CONTRACTOR shall not be interpreted as limiting the
25 CONTRACTOR's liability and obligations under the Contract.

26 L. Subcontractors' Insurance. The CONTRACTOR shall either require each Subcontractor

to obtain and maintain Workers' Compensation Insurance, Commercial General Liability, Business Automobile Liability and Professional Liability coverage similar to those required above in this section for the CONTRACTOR, or any other coverage deemed necessary to the successful performance of the Agreement, or cover Subcontractors under the CONTRACTOR's policies. Such coverage shall be in effect at all times that a Subcontractor is performing Work under the Contract. The CONTRACTOR shall have responsibility to enforce Subcontractor compliance with these or similar insurance requirements; provided the CONTRACTOR shall upon AUTHORITY's request provide acceptable evidence of insurance for any subcontractor. The CONTRACTOR shall assume all reasonability for risks or casualties of every description, for any and all damage, loss or injury, to persons or property arising out of the nature of the Services, including but not limited to the negligence or failure of its Subcontractors (as well as CONTRACTOR's employees) to comply with this Agreement.

ARTICLE 16. CHANGES/EXTRA WORK

A. By written notice or order, AUTHORITY may, from time to time, order work suspension, add work ("Extra Work"), and/or make changes in the general scope of this Agreement hereinafter these three terms together are referred to as "Changes" including, but not limited to, the Services furnished to AUTHORITY by CONTRACTOR as described in the Scope of Work.

B. Any such Changes shall result in the issuance of an amendment signed by both AUTHORITY and the CONTRACTOR. No Extra Work shall be compensated or time extensions therefore permitted, except pursuant to an Amendment.

C. If any such Changes cause an increase or decrease in the price of this Agreement or in the time required for its performance, CONTRACTOR shall promptly notify AUTHORITY thereof of any possible adjustment to price and/or schedule, within ten (10) Calendar Days after the Change is ordered. However, nothing in this clause shall excuse CONTRACTOR from proceeding immediately with the requested Change.

D. In determining additional compensation to be paid for Change, the Parties shall use the labor and equipment costs and rates included in the Price Proposal for labor and material in preparing

1 the amendment, including the Price Proposal's labor rates for additional Services rates. Contractor is
2 required to use the overhead and profit rate identified in the Price Proposal's Sheet 6, cell C2. For Change
3 not covered or anticipated in the Price Proposal, a catalog or market price of a commercial product sold
4 in substantial quantities shall be used as the basis for costs.

5 E. If the cost of Change cannot be established on this basis or on the basis of prices set
6 by the Agreement, law or regulation, CONTRACTOR shall submit detailed cost breakdowns, including
7 information on labor and materials costs and other direct costs. If agreement cannot be reached,
8 compensation for the Change shall not exceed the sum of the following amounts and such amounts only:
9 i) the actual net cost in money of the labor (including premiums for workers' compensation insurance,
10 taxes, vacation allowances and union dues and assessments required to be paid by the employer on the
11 basis of such labor costs) and material required for such Change; and ii) a markup amount (for Extra
12 Work only) equal to the lesser of overhead and profit provided in the Price Proposal on Sheet 6, cell C2
13 or ten (10%) percent of the amount of Change. No Change shall be performed by a Subcontractor without
14 the approval of AUTHORITY.

15 F. CONTRACTOR agrees that it will accept as full compensation for Change, a price
16 mutually agreed upon in writing, via an Amendment, by the AUTHORITY AND CONTRACTOR, or Work
17 Directive as set forth in paragraph G.

18 G. If the CONTRACTOR disagrees with the amount of compensation or time extension
19 provided in the Amendment or Work Directive, the CONTRACTOR shall submit a written dispute to
20 AUTHORITY within fifteen (15) Calendar Days after the receipt of the Amendment or Work Directive.
21 Notwithstanding CONTRACTOR'S disagreement, CONTRACTOR shall proceed diligently with
22 performance if directed by AUTHORITY. The dispute shall state the points of disagreement and, if
23 possible, the contract specification references, quantities and costs involved. If a written dispute is
24 not submitted within the above period, payment will be made as set forth in the Amendment or Work
25 Directive and such payment shall constitute full compensation for all work included therein or required
26 thereby. Such undisputed approved amendment or work directive will be considered as executed

contract amendments.

H. CONTRACTOR shall promptly notify AUTHORITY in writing when it receives direction, instruction, interpretation or determination from any source other than AUTHORITY that may lead to or cause change in the work. Such written notification shall be given to AUTHORITY and Authority shall approve before CONTRACTOR acts on said direction, instruction, interpretation or determination.

ARTICLE 17. DISPUTES

A. All claims and other disputes between CONTRACTOR and AUTHORITY arising under this Agreement, shall be resolved in accordance with this Article 17, Disputes, except those matters referenced in Article 17 paragraph H below. All disputes shall be decided in accordance with this Agreement and general principles of State law. Questions of fact and law may be considered in this dispute process; providing that nothing in this Agreement shall be construed as making the final decision of any AUTHORITY official on a question of law. The Parties shall diligently cooperate with one another and with the person(s) appointed to resolve the dispute, and shall perform such acts as may be necessary to obtain a prompt and expeditious resolution of the dispute.

B. Upon commencement of the dispute resolution process, the Parties shall first attempt to resolve the dispute between AUTHORITY's Project Manager and CONTRACTOR's Project Manager. Those two Parties shall meet in good faith within five (5) Business Days after the date that the written request for dispute resolution is submitted, and attempt to resolve it. There shall be at least one meeting to attempt project level resolution. The project level negotiation may be continued upon the agreement of all Parties. If the AUTHORITY's and CONTRACTOR's Project Managers are able to resolve the dispute, the resolution shall be set forth in writing. If such resolution results in a Change, an Amendment shall be executed pursuant to Article 16, Changes/Extra Work. If the dispute cannot be resolved the dispute at the meeting or any continuance thereof, the dispute shall be submitted to AUTHORITY's Director of Contracts Administration and Materials Management (Camm) within ten (10) Business Days, of such meeting or continuance thereof.

C. The Parties shall each submit the following written information to the Director of Camm:

1 (a) an explanation of the nature of the dispute; (b) the Party's position; (c) the dollar amount and/or
2 schedule impact of the dispute; and (d) any supporting documents the Party believes will aid the Director
3 of CAMM in arriving at a decision. The Director of CAMM will issue a written decision within ten (10)
4 Business Days; provided that if no written decision is submitted within that time, or any agreed upon
5 extension thereof, the AUTHORITY will have been deemed to have denied CONTRACTOR's position.
6 The decision of the Director of CAMM shall be the final and conclusive administrative decision of the
7 AUTHORITY.

8 D. If a dispute arises which must be resolved expeditiously in order to prevent serious
9 damage to revenues, person or property, or serious interference with Project Schedule, both Parties shall
10 make every effort to resolve such dispute immediately. If such dispute cannot be resolved immediately,
11 AUTHORITY will issue a Work Directive, in accordance with Article 16, Changes/Extra Work, and
12 CONTRACTOR shall expeditiously proceed with Work Directive. Once the urgent aspects of the dispute
13 have been resolved, the Parties may continue with the remaining procedures for dispute resolution, in
14 accordance with this Article, if necessary and to the extent applicable.

15 E. Nothing in this Agreement, however, shall be construed as making final the decision of
16 any AUTHORITY official or representative on a question of law, which questions shall be settled in
17 accordance with the laws of the State of California.

18 F. If all other means of dispute resolution set forth above are not successful, either Party
19 may commence an action in Orange County Superior Court or upon terms agreed to by both Parties,
20 elect mediation or arbitration. CONTRACTOR shall as a condition precedent to commencing an action
21 in Orange County Superior Court file a claim pursuant to the Government Claims Act, Government
22 Code sections 900 et seq. For purposes of the claims filing requirement, the running of the time period
23 in which a claim must be filed shall be suspended until the AUTHORITY's final administrative decision
24 by the Director of CAMM.

25 G. Notwithstanding the foregoing, in the event there is a dispute as among AUTHORITY,
26 CONTRACTOR and the Design-Build Contractor which is subject to the dispute resolution process set

1 forth in Section 19 of the Design-Build Contract, CONTRACTOR agrees to fully participate and be bound
2 by such dispute resolution process. Further, CONTRACTOR shall take such actions to join any third
3 parties or Subcontractors which may be necessary as participants in the dispute resolution process set
4 forth in this Article 17, Disputes.

5 H. The dispute resolution procedures set forth in this Article shall not apply to the following:

- 6 1. Any matters that the Agreement Documents expressly state are final, binding
7 or not subject to dispute resolution;
- 8 2. Any claim or dispute that does not arise under the Agreement;
- 9 3. Disputes regarding compliance with Governmental Rules, liability or
10 indemnification;
- 11 4. Any claim for injunctive relief;
- 12 5. Any claim against an insurance company, including any subcontractor dispute
13 that is covered by insurance;
- 14 6. Disputes regarding matters under the jurisdiction of Cal-OSHA;
- 15 7. Issues regarding DBE participation;
- 16 8. Any claim or dispute that is the subject of litigation in a lawsuit filed in court to
17 which the procedures established in this Article do not apply, including any effort to interplead a party
18 into such a lawsuit in order to make the procedures established in this Article applicable;
- 19 9. Any claim for, or dispute based on, remedies expressly created by statute;
- 20 10. Any dispute that is actionable only against a Surety; and
- 21 11. Any claim arising from this Agreement to which a third party is a necessary party
22 and has not agreed to participate in the process; provided that the Parties shall nevertheless proceed
23 with resolution of disputes in accordance with this Article to the maximum extent possible.

24 **ARTICLE 18. LIQUIDATED DAMAGES/LANE RENTAL FEES**

25 A. If CONTRACTOR fails to complete the Services by the Guaranteed Completion Dates or
26 any authorized extension thereof, in accordance with the Agreement Documents, timely coordinate with

the Design-Build Contractor or provide Key Personnel, the actual damage to AUTHORITY for delays, untimeliness and provision of Key Personnel will be difficult or impossible to determine. Therefore, the Parties have agreed to stipulate to the amount payable to the AUTHORITY as liquidated damages in order to fix and limit CONTRACTOR's costs and to avoid later disputes over what amount of damages are proper. The Parties agree that the amount of liquidated damages are reasonable in light of the anticipated or actual damage to the AUTHORITY caused by the potential significant loss of toll revenue, additional costs associated with the delay in delivery of the System, the public's inability to use the System and resulting traffic congestion, the difficulties of proving losses and the infeasibility of obtaining an adequate remedy. Liquidated damages shall be assessed as follows:

B. System Implementation Delays:

In the event that CONTRACTOR has not completed the Services required for Implementation of the 91 Express Lanes System or the 405 Express Lanes System and achieved Go-Live by the Guaranteed Completion Dates, CONTRACTOR shall be assessed liquidated damages in the following amounts:

1. For 91 Express Lanes: \$7,500 per Calendar Day, but not to exceed 60 days or \$450,000.
2. For 405 Express Lanes: \$45,000 per Calendar Day, but not to exceed 60 days or \$2,700,000.

C. Timely Design Input to Design Build Contractor:

CONTRACTOR shall be responsible for submission of the complete ETTM System Infrastructure Design Document for the 405 Express Lanes to the AUTHORITY and the Design Build Contractor, within ninety (90) Calendar Days of NTP1. Such input shall be as further set forth in the Scope of Work. For failure to provide such design inputs to the Design Build Contractor per the Scope of Work and Requirements, and Approved Baseline Implementation Schedule, liquidated damages of \$2,500 per day shall be assessed.

/

D. Key Personnel:

CONTRACTOR acknowledges that the award of this Agreement by AUTHORITY was based in significant part on the qualifications and experience of the Key Personnel listed in CONTRACTOR's Proposal and CONTRACTOR representation that they would be available to perform the Services. In the event that the CONTRACTOR Project Manager becomes unavailable to perform the Services, AUTHORITY may, in its sole discretion, assess CONTRACTOR liquidated damages in the amount of \$20,000, per occurrence. In the event other Key Personnel become unavailable for the performance of duties as required in the Scope of Work and Requirements or if CONTRACTOR elects to not appoint qualified Key Personnel to a Key Personnel position in the event of a vacancy, for each event of unavailability or unfilled vacancy that extends beyond twenty (20) Calendar Days, at the Authority's discretion, liquidated damages in the amount of \$1,000 per day shall be assessed, not to exceed \$15,000, per position, per occurrence.

E. Failure to Meet Performance Standards:

Performance Requirements establish a minimum level of service for Maintenance and Software Support Services. Failure to meet such Performance Requirements shall result in the assessment of liquidated damages in the form of fee adjustments as set forth in the Scope of Work and Requirements. These adjustments shall result in a reduction of the amount of the monthly fee AUTHORITY would otherwise pay to CONTRACTOR for the Services. Standard reports shall be developed by CONTRACTOR to measure whether the performance standards have been met. These reports' format and content shall be approved during the Design and generated by the System and shall be run on a scheduled basis by the CONTRACTOR and provided to AUTHORITY on a monthly basis, unless another frequency is otherwise specified in the Scope of Work and Requirements.

F. AUTHORITY may deduct liquidated damages from any monies due or that may become due to CONTRACTOR under the Agreement. AUTHORITY is not obligated, however, to make such a deduction or to provide notice thereof. If such deducted monies are insufficient to recover the liquidated damages owing, CONTRACTOR or CONTRACTOR's surety shall pay to AUTHORITY any deficiency

within thirty (30) Calendar Days after Final Acceptance of each system to which the liquidated damages apply or termination of this Agreement. All liquidated damages are separate and cumulative.

G. Lane Rental Fees:

1. Lane Rental Fees shall be charged to the CONTRACTOR during the Implementation Phase and Operations and Maintenance Phase, in the event that the CONTRACTOR fails to reopen a toll lane or lanes of traffic within the allowable lane closure time limits and the lanes remain closed during a time period in which a lane closure is not allowed. Allowable lane closure time limits are defined in the Scope of Work and Requirements with regard to daily, weekend and Holiday period closures for the CONTRACTOR's use and occupancy in order to perform Contract Work. During the allowable lane closure time limits, AUTHORITY will not assess Lane Rental Fees.

2. The chargeable Lane Rental Fee rate for the 91 Express Lanes project is \$10,000 per 10 minutes, and for the 405 project the rate is in accordance with the table below:

Lane Rental Charges for Lane Closures for 405 Express Lanes

Type of Facility	Route or Segment	Period	Damages / Interval (\$)
Mainline	405/SB and 405/ NB	1 st half hour	\$5,000 / 10 minutes
		2 nd half hour	\$7,000 / 10 minutes
		2 nd hour and beyond	\$10,000 / 10 minutes
Connector	405-22 Connectors	1 st half hour	\$3,000 / 10 minutes
	405-605 Connectors	2 nd half hour	\$5,000 / 10 minutes
		2 nd hour and beyond	\$10,000 / 10 minutes

H. The failure of AUTHORITY to assess any liquidated damages authorized under this Article or to impose lane rental fees shall not constitute a waiver of AUTHORITY's right to assess such adjustments or liquidated damages at a future date.

ARTICLE 19. ACTUAL DAMAGES

A. During the Operations and Maintenance Phase, CONTRACTOR shall reimburse AUTHORITY for lost revenue not otherwise addressed in Article 18, Liquidated Damages/Lane Rental Fees, which AUTHORITY or CONTRACTOR identifies as having been lost due to the fault of the

CONTRACTOR. Lost revenue includes, but is not limited to, such events as lost transactions, lost images, lost data, revenue lost due to data security breach, and transactions that are not able to be collected due to delays in transaction processing. Such actual damages shall be calculated based on a determination of a comparable period made by AUTHORITY, acting reasonably, and shall consider the day, month, time of day, location, season, whether the day is a weekday, weekend or holiday, and such other factors as AUTHORITY deems reasonable. If actual traffic data is available for the relevant time period in the affected express lanes, such data will be considered in the calculation as applicable. If AUTHORITY does not have actual traffic data or operating history data from a comparable period, Actual Damages shall be determined by reference to the available traffic and revenue study estimates for the period of time in question. AUTHORITY may choose, in its sole discretion, to recover such lost revenue from the CONTRACTOR by deducting such amounts from payments otherwise due and owing from AUTHORITY to the CONTRACTOR.

B. CONTRACTOR shall be responsible for all additional costs associated with any data or security breach associated with CONTRACTOR's provision of Services during the Operations and Maintenance Phase, including but not limited to, improper handling of these transactions, special mailings notifying customers of a mistake in their monthly statements due to inaccurate reporting of information by CONTRACTOR and providing credit monitoring services to customers.

ARTICLE 20. RISK OF LOSS

A. CONTRACTOR shall bear all risk of damage or loss to the System except for damage and loss caused by the sole negligence or willful misconduct of AUTHORITY or Force Majeure.

B. In the case of damage or loss that AUTHORITY agrees was caused by the sole negligence or willful misconduct of AUTHORITY or Force Majeure, CONTRACTOR shall promptly replace the damaged or lost portions of the System at CONTRACTOR's cost after such cost is pre-approved by AUTHORITY, and submit the amount(s) thus expended to AUTHORITY for reimbursement as a clearly identified, separate item on its next invoice to AUTHORITY.

/

ARTICLE 21. DEFAULT

A. Event of Default:

1. An "Event of Default" shall mean a material breach of this Agreement by the CONTRACTOR. Without limiting the generality of the foregoing and in addition to those instances referred to elsewhere in this Agreement as a breach, an Event of Default shall include the following:

a. CONTRACTOR fails to timely remit or credit revenues due AUTHORITY pursuant to this Agreement;

b. CONTRACTOR fails to timely deliver and/or maintain Deliverables to AUTHORITY, which Deliverables include, but are not limited to, all insurance, bonds or other performance security required by this Agreement or to maintain in force and effect any such insurance, bonds or performance security;

c. CONTRACTOR fails to promptly perform the Services following AUTHORITY's issuance of a Notice to Proceed; to diligently perform the Services in accordance with the Approved Baseline Implementation Schedule; suspends or otherwise ceases to perform the Services (excepting therefrom excused suspensions directed by AUTHORITY or due to force majeure); or promptly resume performance of the Services which have been suspended as directed by AUTHORITY;

d. CONTRACTOR fails to perform the Services in accordance with this Agreement, including, but not limited to, the Requirements;

e. CONTRACTOR fails to supply enough properly skilled workers or proper materials to perform the Services required under this Agreement;

f. CONTRACTOR fails to make prompt payment to Subcontractors or Suppliers in accordance with this Agreement absent a valid dispute as between the CONTRACTOR and its Subcontractors or Suppliers;

g. CONTRACTOR fails to make any payment due AUTHORITY under this Agreement, including but not limited to, liquidated damages;

h. CONTRACTOR commences any suit or any suit is commenced against

1 CONTRACTOR, under any bankruptcy, insolvency or similar law to liquidate, reorganize or dissolve
2 CONTRACTOR, or which seeks the appointment of a receiver, trustee, custodian or other similar official
3 to attach, execute or such similar process for any substantial part of CONTRACTOR's assets; or
4 CONTRACTOR assigns the proceeds received from this Agreement for the benefit of its creditors, or it
5 has taken advantage of any insolvency statute or debtor/creditor law or if the CONTRACTOR's property
6 or affairs have been put in the hands of a receiver; or any of the foregoing events occurs with respect to
7 any Surety, which Surety is not promptly replaced by CONTRACTOR;

8 i. CONTRACTOR fails to obtain the approval of AUTHORITY where required by this
9 Agreement;

10 j. CONTRACTOR fails to provide adequate assurances as required under
11 paragraph 2. below;

12 k. CONTRACTOR has failed in the representation of any warranties stated herein;

13 l. Any person authorized to act on CONTRACTOR's behalf makes a statement to
14 any person authorized to act on AUTHORITY's behalf, indicating that CONTRACTOR cannot or will not
15 perform any one or more of its obligations under this Agreement;

16 m. CONTRACTOR has a pattern of repeated failures to provide the Services and
17 meet the SOW and Requirements of this Agreement.

18 n. CONTRACTOR fails to remedy Pervasive Defects;

19 o. the suspension or revocation of any license, permit, or registration necessary for
20 the performance of the Contractor's obligations under this Agreement; or

21 2. When, in the opinion of AUTHORITY, reasonable grounds for uncertainty exist
22 with respect to the CONTRACTOR's ability to perform the Services or any portion thereof, AUTHORITY
23 may request that the CONTRACTOR, within the time frame set forth in AUTHORITY's request, provide
24 adequate assurances to AUTHORITY, in writing, of CONTRACTOR's ability to perform in accordance
25 with terms of this Agreement. Until AUTHORITY receives such assurances, AUTHORITY may suspend
26 all payments to CONTRACTOR. In the event that CONTRACTOR fails to provide to AUTHORITY the

requested assurances within the prescribed time frame, AUTHORITY may:

a. treat such failure as a material breach of this Agreement;

b. resort to any remedy for breach provided herein or at law or equity, including, but not limited to, taking over the performance of the Services or any part thereof either by itself or through others;

c. remove all technical documentation deposited with the escrow agent set forth in Attachment 1 to Form I, Escrow Agreement, with the purpose of competitively procuring any equipment or software or providing any Services based on such documentation; and

d. terminate CONTRACTOR's performance hereunder.

3. The enumeration in this Article or elsewhere in this Agreement of specific rights or remedies of AUTHORITY shall not be deemed to limit any rights or remedies which AUTHORITY would have in the absence of such enumeration and no exercise by AUTHORITY of any right or remedy shall operate as a waiver of any other of AUTHORITY's rights or remedies not inconsistent therewith or to stop AUTHORITY from exercising such other rights or remedies.

B. Notice of Default - Chance to Cure:

If, in the determination of AUTHORITY, an Event of Default has occurred, AUTHORITY will notify CONTRACTOR by delivery of a notice hereinafter referred to as "Default Notice" specifying the basis for such default, and advising the CONTRACTOR that such default must be cured as set forth therein or this Agreement may be terminated. AUTHORITY shall allow the CONTRACTOR to cure the default to AUTHORITY's reasonable satisfaction within fifteen (15) Calendar Days, or such shorter time if the Event of Default requires it; provided that AUTHORITY is not required to issue a Default Notice if an Event of Default which by nature cannot be cured. Failure to provide a Default Notice shall not preclude AUTHORITY from exercising other available remedies short of termination. AUTHORITY may grant an additional period to cure of such duration as AUTHORITY shall deem appropriate without waiver of any of AUTHORITY's rights hereunder, so long as the CONTRACTOR has commenced curing such default and is effectuating a cure with diligence and continuity during

such fifteen (15) Calendar Day period or any other period which AUTHORITY prescribes. The Default Notice shall specify the date the CONTRACTOR is to discontinue all Services, the "Termination Date", in the event CONTRACTOR does not promptly effect a cure, and the CONTRACTOR shall thereafter discontinue the Services upon the Termination Date.

C. Remedies in the Event of Default:

1. If CONTRACTOR does not cure the Event of Default within the time prescribed or the Event of Default is not subject to cure, AUTHORITY may declare an Event of Default, which shall be in writing and provided to CONTRACTOR. In addition to all other rights and remedies under this Agreement and/or the bonds, AUTHORITY shall, upon declaration of an Event of Default, have the right to terminate this Agreement and/or perform or cause to be performed the Services or any portion thereof, which are required of CONTRACTOR. In exercising such rights, AUTHORITY may immediately take possession of, and CONTRACTOR shall deliver, all applicable equipment, software and data, and facilities that house such items as AUTHORITY may direct. AUTHORITY shall also have the right to complete the Services with CONTRACTOR's Subcontractors and CONTRACTOR shall assign such subcontracts as AUTHORITY directs. AUTHORITY, as part of its right to complete the Services, may take possession of and use, and CONTRACTOR shall be required to deliver to AUTHORITY, any or all of the materials, plants, tools, equipment, supplies and property of every kind, provided, purchased, maintained, leased, owned, or rented by CONTRACTOR, including but not limited to all technical specifications, drawings, source code, and object code placed into escrow; make available such escrowed materials to third parties; third party licenses and Software, and/or procure other materials, plant, tools, equipment, and supplies. AUTHORITY may charge CONTRACTOR and the CONTRACTOR shall be liable to AUTHORITY for the expense of said labor, materials, plant, tools, equipment, supplies and property.

2. If AUTHORITY declares an Event of Default, CONTRACTOR shall be liable for those damages provided herein resulting from the default, including but not limited to:

a. losses as defined in Risk of Loss;

1 b. the difference between the actual costs incurred by AUTHORITY in completing
2 the Services and the compensation AUTHORITY would otherwise have paid CONTRACTOR under
3 this Agreement for completing such Services;

4 c. Liquidated damages, actual damages and lane rental fees

5 The CONTRACTOR shall remain liable for any other liabilities and claims related to
6 CONTRACTOR's default. All damages and costs may be deducted and paid out of any monies due
7 from AUTHORITY to CONTRACTOR.

8 D. If an Event of Default occurs, CONTRACTOR and any Surety shall be jointly and
9 severally liable to AUTHORITY for all losses and damages incurred by AUTHORITY or any party
10 acting on AUTHORITY's behalf in completing the Services. Upon the occurrence of an Event of
11 Default and for so long as it occurs, AUTHORITY may withhold all of any portion of further payments
12 to CONTRACTOR until the date that AUTHORITY accepts the Project as complete at which time
13 AUTHORITY will determine if CONTRACTOR is entitled to any further payments. AUTHORITY will
14 deduct, from any moneys due or which become due CONTRACTOR or its surety, all costs and
15 charges incurred by AUTHORITY, including attorneys, accountants and expert witness fees and costs.
16 If AUTHORITY's losses or damages exceed payments owing CONTRACTOR, then the
17 CONTRACTOR and its Surety shall be liable and pay such amount to AUTHORITY within ten (10)
18 Calendar Days of AUTHORITY's written demand. If CONTRACTOR or its Surety fail to pay such
19 demand within such timeframe, AUTHORITY may collect interest thereon at the lessor of 10% per
20 annum or the maximum rate allowed under State law from the date of the written demand.

21 E. In the event that it is later determined that the Agreement was terminated upon grounds
22 which did not justify a termination for Event of Default, such termination shall be deemed a termination
23 for convenience pursuant to Article 22, Termination for Convenience.

24 F. Performance by Surety: Upon receipt of a demand from AUTHORITY requiring Surety to
25 complete the Services, Surety shall diligently and promptly take charge of the Services and complete this
26 Agreement pursuant to its terms at its own expense, receiving the balance of the funds due

CONTRACTOR, minus any permissible deductions under this Agreement. In the event AUTHORITY undertakes to complete the Services with its own forces or by way of contract, all costs incurred by AUTHORITY shall be deducted from the amounts due or may become due to CONTRACTOR. If such expense exceeds the sum payable under this Agreement, then CONTRACTOR and Surety shall be jointly and severally liable for the amount of the excess expense up to the amount of the Performance Bond in existence at the time this Agreement is terminated.

ARTICLE 22. TERMINATION FOR CONVENIENCE

AUTHORITY may terminate this Agreement for its convenience at any time in whole or in part, by giving CONTRACTOR written notice thereof. AUTHORITY shall terminate by delivering to CONTRACTOR a written Notice of Termination for Convenience specifying the extent of termination and its effective date. Upon termination, AUTHORITY shall pay CONTRACTOR its allowable costs incurred to date of that portion terminated. The rights, duties and obligations of the parties shall be construed in accordance with the applicable provisions of CFR Title 48, Chapter 1, Part 49, of the Federal Acquisition Regulation (FAR) and specific subparts and other provisions thereof applicable to termination for convenience. If AUTHORITY sees fit to terminate this Agreement for convenience, said notice shall be given to CONTRACTOR in accordance with the provisions of the FAR referenced above and Article 11, Notices, herein. Upon receipt of said notification, CONTRACTOR shall immediately proceed with all obligations, regardless of any delay in determining or adjusting any amounts due under this Article, and agrees to comply with all applicable provisions of the FAR pertaining to termination for convenience.

ARTICLE 23. SYSTEM AND FINAL ACCEPTANCE

A. System Acceptance of Implementation Phase:

1. The phases of the Project are set forth in Article 6, Time and Schedule.
2. AUTHORITY, in its sole discretion, may grant System Acceptance of an Implementation Phase if it deems that the Services on the applicable Implementation Phase are substantially complete, and the following conditions have been met:

- a. CONTRACTOR has passed the Commissioning test, and Go-Live has been

1 approved, as is set forth in the Scope of Work and Requirements;

2 b. CONTRACTOR, in AUTHORITY's sole determination, has substantially passed
3 and has been given conditional approval of the System Acceptance test; and

4 c. CONTRACTOR has completed all punch list items and provided proof to
5 AUTHORITY's satisfaction thereof.
6

7 3. AUTHORITY shall issue a written Notice of System Acceptance for the applicable
8 Implementation Phase upon satisfaction of the conditions listed above in items 2a through 2c. The
9 occurrence of System Acceptance shall not relieve CONTRACTOR of any of its continuing obligations
10 hereunder.

11 B. Final Acceptance of Implementation Phase

12 Final Acceptance of an Implementation Phase shall be deemed to have occurred when all of the
13 following conditions have been met:

14 1. CONTRACTOR has provided a Final Acceptance letter certification to close out the
15 Implementation Phase. The certification shall include but not be limited to: total costs associated with the
16 Implementation Phase, date of work completion for that phase and any additional required information
17 contained in items 2 through 8 below:

18 2. Successful completion and approval of the Acceptance Test(s), by AUTHORITY, as
19 set forth in the Scope of Work and Requirements;

20 3. Delivery by CONTRACTOR and approval by AUTHORITY of all Deliverables,
21 including As-Built Documentation/Drawings, as defined in the Scope of Work;

22 4. Any and all punch list items have been satisfactorily completed and approved by
23 AUTHORITY;

24 5. An affidavit has been delivered to AUTHORITY signed by the CONTRACTOR, stating
25 all debts and claims of Suppliers and Subcontractors have been paid and/or settled;

26 6. All CONTRACTOR claims for the Implementation Phase are deemed to be resolved

1 by AUTHORITY, and the CONTRACTOR has submitted a statement that no such requests or disputes
2 will be applied for; any and all claims under this Agreement are resolved, and that no such claims will be
3 made;

4 7. All of CONTRACTOR's other obligations under the Implementation Phase shall have
5 been satisfied in full or waived in writing by AUTHORITY; and

6 8. AUTHORITY shall have delivered to the CONTRACTOR a Notice of Final Acceptance
7 for the phase.

8 C. Final Acceptance of Operations and Maintenance Phase

9 Final Acceptance of the Operation and Maintenance Phase shall be deemed to have occurred
10 when all of the following conditions have been met:

11 1. The CONTRACTOR shall provide a Final Acceptance letter certification to close out
12 the Operations and Maintenance Phase. The certification shall include but not be limited to: total costs
13 associated with the phase, date of phase completion and any additional required information contained
14 in items 2 through 7 below:

15 2. Delivery by the CONTRACTOR and approval by AUTHORITY of all Deliverables,
16 including As-Built Documentation/Drawings, as defined in the Scope of Work and Requirements;

17 3. The CONTRACTOR has met all transition and succession requirements pursuant to
18 the Scope of Work and Requirements;

19 4. Any and all punch list and action items have been satisfactorily completed and
20 approved by AUTHORITY;

21 5. An affidavit has been delivered to AUTHORITY signed by CONTRACTOR, stating all
22 debts and claims of Suppliers and Subcontractors have been paid and/or settled;

23 6. All CONTRACTOR claims for the phase are deemed to be resolved by AUTHORITY,
24 and CONTRACTOR has submitted a statement that no such requests or disputes will be applied for; any
25 and all claims under this Agreement are resolved, and that no such claims will be made;

26 7. The CONTRACTOR shall provide AUTHORITY with all required materials, fixtures,

1 furnishings, Equipment and Software; documentation and manuals, either owned by or licensed to
2 AUTHORITY, pursuant to this Agreement. All such materials have been verified by AUTHORITY to be
3 in good working order;

4 8. All of CONTRACTOR's other obligations under the Operations and Maintenance
5 Phase shall have been satisfied in full or waived in writing by AUTHORITY; and

6 9. AUTHORITY shall have delivered to CONTRACTOR a Notice of Final Acceptance for
7 the phase.

8 **D. Project Acceptance and Contract Closeout**

9 1. Project Acceptance shall mean the Final Acceptance for all phases, including both
10 Implementation Phase and Operations and Maintenance Phase. The CONTRACTOR shall provide a
11 Project Acceptance letter certification to close out the Agreement. The certification shall include but not
12 be limited to: total costs associated with the Agreement, date of Work completion and any additional
13 required information requested by AUTHORITY.

14 2. Project Acceptance shall be deemed to have occurred when all obligations under this
15 Agreement have been successfully performed by the CONTRACTOR and all retentions owed to the
16 CONTRACTOR have been released by AUTHORITY and, when AUTHORITY has delivered a Notice of
17 Project Completion to the effect of the foregoing.

18 E. AUTHORITY's beneficial use of the Deliverables during any phase prior to Contract
19 Closeout shall not constitute acceptance of any Deliverable, nor shall such use give rise to a claim for
20 equitable adjustment.

21 **ARTICLE 24. INSPECTION**

22 A. All Services shall be subject to inspection and testing by AUTHORITY at all
23 reasonable times and at all places prior to Approval or Acceptance and as further set forth in the Scope
24 of Work and Requirements. Any such inspection, test and Approval is for the sole benefit of AUTHORITY
25 and shall not relieve CONTRACTOR of the responsibility of providing quality control measures to assure
26 that the Services strictly comply with requirements of this Agreement. No inspection or test or Approval

by AUTHORITY or its representative shall be construed as constituting or implying Acceptance unless all criteria for Acceptance have been met in accordance with Article 23, System and Final Acceptance. Inspection or test or Approval shall not relieve CONTRACTOR of responsibility for damage to or loss of the material prior to Acceptance, nor in any way affect the continuing rights of AUTHORITY after Acceptance of the completed work.

B. CONTRACTOR shall furnish promptly, without additional charge, all facilities, labor, equipment and material reasonably needed for performing inspection and testing in a safe and convenient manner as may be required by AUTHORITY and as further set forth in Exhibit B Scope of Work and Requirements. All inspections and tests by AUTHORITY shall be performed in such manner as to not unnecessarily delay the Services. AUTHORITY reserves the right to charge to CONTRACTOR any additional cost of inspection or test when material or workmanship is not ready at the time specified by CONTRACTOR for inspection or test or when re-inspection or retest is necessitated by prior rejection.

ARTICLE 25. INTELLECTUAL PROPERTY

A. Project Intellectual Property. CONTRACTOR acknowledges and agrees that all Intellectual Property authored, created, invented and/or put into practice by CONTRACTOR under and/or for the purposes of the Project, in any medium, is either owned by AUTHORITY or specially ordered or commissioned by AUTHORITY ("Project Intellectual Property"), including works made for hire in accordance with Section 101 of the Copyright Act of the United States. CONTRACTOR hereby assigns to AUTHORITY all rights, title and interest in and to the Project Intellectual Property including any and all software, work product and designs. AUTHORITY hereby grants to CONTRACTOR a limited, non-exclusive license to use, exploit, manufacture, distribute, reproduce, adapt and display Intellectual Property previously or separately owned by AUTHORITY and Project Intellectual Property solely in connection with and limited to: (a) incorporation of relevant Intellectual Property into the Project or Services; (b) performance, provision, furnishing and discharge of the Services; and (c) licensing to other entities (to the extent required for interoperability). No Intellectual Property rights of AUTHORITY, including the AUTHORITY'S name and other trademarks, and all other rights are reserved to

1 AUTHORITY. All rights granted in this Section shall terminate at the expiration of the then-current Term
2 pursuant to Article 5, Term of Agreement.

3 B. CONTRACTOR Intellectual Property. CONTRACTOR hereby grants to AUTHORITY an
4 irrevocable, perpetual, non-exclusive, transferable (to an AUTHORITY assignee), fully paid-up right and
5 license to use, exploit, manufacture, distribute, reproduce, adapt and display CONTRACTOR Intellectual
6 Property authored, created or invented by CONTRACTOR either (a) prior to the Effective Date or (b)
7 independently of the Agreement ("CONTRACTOR Intellectual Property") in connection with the Project
8 or Services. The rights granted herein shall survive the termination, expiration or cancellation of this
9 Agreement or any rights related thereto.

10 C. Third Party Intellectual Property. CONTRACTOR shall secure perpetual, nonexclusive,
11 transferable, irrevocable, unconditional, royalty-free license(s) in the name of AUTHORITY to use, exploit,
12 manufacture, distribute, reproduce, adapt and display Intellectual Property owned by any person or entity
13 unrelated to CONTRACTOR which is incorporated into the Project or Service ("Third Party Intellectual
14 Property") in connection with AUTHORITY uses, and shall pay any and all royalties and license fees
15 required to be paid for any Intellectual Property incorporated into the Project or any Service.

16 1. CONTRACTOR shall:

17 (a) obtain AUTHORITY's prior written approval of the terms and conditions of Third
18 Party Intellectual Property licenses;

19 (b) identify and disclose to AUTHORITY all Third Party Intellectual Property
20 contained, or included, in the Project Intellectual Property, including (when reasonably available): full and
21 specific information detailing Intellectual Property claimed; date of authorship, creation and/or invention;
22 date of application(s); application number(s) and registering entity(ies); date of registration(s), registration
23 number(s) and registering entity(ies), if any, and owner, including person or entity name and address;
24 and

25 (c) obtain from each owner of the Third Party Intellectual Property prior consent to
26 have the relevant Third Party Intellectual Property deposited into an Intellectual Property Escrow in

accordance with Article 25 (Intellectual Property Escrows), or, to the extent the owner of the relevant Third Party Intellectual Property has not provided such consent, obtain AUTHORITY's prior written approval for a waiver of this requirement.

2. CONTRACTOR shall not incorporate Third Party Intellectual Property into the Project without first obtaining (a) the licenses described in Article 24.C and (b) consent from each owner of the Third Party Intellectual Property or such requirement is waived by AUTHORITY in accordance with Article 24.C.2(c). The rights granted in this Article 24.C.2 shall survive the termination, expiration or cancellation of this Agreement or any rights related thereto.

D. Delivery of IP Materials. In addition to any other delivery obligation under this Agreement, CONTRACTOR shall deliver to AUTHORITY any and all physical embodiments of Intellectual Property ("IP Materials") related to CONTRACTOR Intellectual Property and Third Party Intellectual Property, or deposit such IP Materials into Intellectual Property Escrow(s) in accordance with Article 26, Intellectual Property Escrows, as soon as reasonably practicable following incorporation of the relevant Intellectual Property into the Project or Services. Without limiting the generality of the foregoing, an initial delivery under this Article 25.D. or deposit pursuant to Article 26 shall be made to the Intellectual Property Escrow within ten (10) Calendar Days of Go-Live and within ten (10) Calendar Days of System Acceptance. In the event CONTRACTOR updates, revises or supplements any of the information deposited or creates additional information or other Intellectual Property, CONTRACTOR shall deliver to AUTHORITY or deposit into an Intellectual Property Escrow a complete set of such revised, supplemented, or additional information or Intellectual Property with the IP Escrow Agent pursuant to Article 26, within thirty (30) Calendar Days of such revision, supplement or addition and shall indicate with each deposit what information and which documents and pages have been revised, supplemented or added since the last deposit.

E. Payments Inclusive. CONTRACTOR acknowledges and agrees that the payments provided for in Article 9 include all royalties, fees, costs and expenses arising from or related to the Project Intellectual Property, including without limitation any fees pursuant to Article 26.

ARTICLE 26. INTELLECTUAL PROPERTY ESCROWS

A. AUTHORITY and CONTRACTOR acknowledge that CONTRACTOR and/or third parties that supply Intellectual Property, including without limitation, Software, source code and documentation, may not wish to deliver the applicable IP Materials directly to AUTHORITY, as public disclosure could deprive such Party of commercial value. CONTRACTOR further acknowledges that AUTHORITY nevertheless must be ensured access to such IP Materials at any time, and must be assured that the IP Materials are delivered to AUTHORITY pursuant to Article 25.D, Delivery of IP Materials paragraph.

B. In lieu of delivering the IP Materials directly to AUTHORITY, CONTRACTOR may elect to deposit the IP Materials with a neutral depository. In such event, AUTHORITY and CONTRACTOR shall:

(a) mutually select one or more escrow companies or other neutral depositories (each an "IP Escrow Agent") engaged in the business of receiving and maintaining escrows of software source code and/or other Intellectual Property; (b) establish one or more escrows (each an "Intellectual Property Escrow") with the IP Escrow Agent on terms and conditions substantially similar terms and conditions to the Form of Intellectual Property Escrow Agreement, Form Q, for the deposit, retention, upkeep, authentication, confirmation and release of IP Materials to AUTHORITY pursuant to this Agreement; (c) determine a date for CONTRACTOR's deposit of the IP Materials into the Intellectual Property Escrow; and (d) determine a process for releasing from escrow the IP Materials to be delivered to AUTHORITY pursuant to this Agreement. Intellectual Property Escrows also may include Affiliates as parties and may include deposit of their Intellectual Property. CONTRACTOR shall be responsible for the fees and costs of the IP Escrow Agent.

C. The Intellectual Property Escrows shall survive expiration or earlier termination of this Agreement regardless of the reason.

D. The IP Materials shall be released and delivered to AUTHORITY in any of the following circumstances:

1. this Agreement is terminated for CONTRACTOR default or material breach;
2. a voluntary or involuntary bankruptcy or insolvency of CONTRACTOR occurs;

3. CONTRACTOR is dissolved or liquidated;

4. CONTRACTOR or any third party, pursuant to a license under Article 25.C, (a) fails or ceases to provide services as necessary to permit continued use of any such Intellectual Property or (b) otherwise ceases to engage in the ordinary course of the business of manufacturing, supplying, maintaining and servicing the software, product, part or other item containing such Intellectual Property pursuant to a license or any sublicense thereof.

ARTICLE 27. ESCROW AGREEMENT

A. Within forty-five (45) Calendar Days from the execution of this Agreement, AUTHORITY, an escrow agent, and CONTRACTOR shall enter into an Escrow Agreement substantially as set forth in Form I. Pursuant to the terms of such Escrow Agreement, CONTRACTOR shall deposit without charge to AUTHORITY all information necessary to use, operate and maintain the Equipment and Software. All such information shall be deposited with the escrow agent selected by AUTHORITY. Information so deposited shall include but not be limited to Software, including source and object code, control files, utilities, and packages, operating systems, data base systems and network packages and all associated documentation and instructions to operate.

B. An initial deposit shall be made to the Escrow within ten (10) Calendar Days of Go-Live. In the event CONTRACTOR updates, revises or supplements any of the information deposited or creates additional information, CONTRACTOR shall deposit a complete set of such revised, supplemented, or additional information with the above-named escrow agent within thirty (30) Calendar Days of such revision, supplement or addition and shall indicate with each deposit what information and which documents and pages have been revised, supplemented or added since the last deposit. CONTRACTOR shall be responsible for payment of all costs arising in connection with the maintenance of the escrow referred to in this Article throughout the Term. AUTHORITY shall be responsible for all costs arising in connection with the maintenance of the escrow referred to in this Article beyond the Term.

ARTICLE 28. WARRANTIES

A. CONTRACTOR warrants the following:

1 1. All guarantees and warranties made herein are fully enforceable by AUTHORITY acting
2 in its own name.

3 2. The Equipment and Software CONTRACTOR installs and places into operation will not
4 result in any damage to existing facilities, walls or other parts of adjacent, abutting or overhead buildings,
5 railroads, bridges, roadway, structures, surfaces, or cause any physical or mental injury to any person.

6 3 All provided Equipment is new.

7 B. System Warranty:

8 The CONTRACTOR shall provide a full System warranty on all System Equipment, Hardware
9 and Software beginning from the date of Go-Live through the end of the Operation and Maintenance
10 Phase hereinafter referred to as "System Warranty Period", warranting that the full System shall be as
11 set forth in the Scope of Work and Requirements. During the System Warranty Period, AUTHORITY shall
12 not be charged for any Maintenance or Support Services performed on the System, other than
13 Maintenance payments identified in the Price Proposal, or Work identified as excluded in the Scope of
14 Work and Requirements. Such excluded Services shall include Work related to Force Majeure events or
15 Extra Work requested by AUTHORITY, pursuant to Article 16, Changes/Extra Work. Notwithstanding the
16 foregoing, in the period after installation and prior to the commencement of the Operations and
17 Maintenance Phase, all Maintenance and Support Services shall also be at CONTRACTOR's sole
18 expense. Further, at all times during the Term, CONTRACTOR shall promptly repair or replace, at its
19 own cost or expense, including, the cost of removal, installation and transportation, any unit of Equipment,
20 Hardware, or Software, or part or component thereof, which proves defective or otherwise fails to comply
21 with Exhibit B, Scope of Work and Requirements, such that it complies with the Exhibit B, Scope of Work
22 and Requirements. All fees associated with restocking cancelled or returned orders shall be the
23 responsibility of CONTRACTOR. All defective Equipment replaced by CONTRACTOR shall become the
24 property of CONTRACTOR.

25 C. Software Warranties:

26 CONTRACTOR warrants that the Software needed to operate the System shall be as set forth

1 in the Scope of Work and Requirements, and that commencing upon Go-Live, and for the Term, the
2 Software and each module or component and function thereof shall:

- 3 1. be free from defects in materials and workmanship under normal use;
- 4 2. remain in good working order, be free from viruses; trap doors; disabling devices;
5 Trojan horses; disabling codes; back doors; time bombs; drop-dead devices; worms, and any other type
6 of malicious or damaging code or other technology or means which has the ability to interfere with the
7 use of the System by AUTHORITY or its designees, or permit access to AUTHORITY's computing
8 systems without its knowledge or contrary to its system connectivity policies or procedures;
- 9 3. not interfere with toll collection;
- 10 4. operate and function fully, properly and in conformity with the warranties in this
11 Agreement, and
- 12 5. operate fully and correctly in the operating environment identified in the Scope of
13 Work and Requirements, including by means of the full and correct performance of the Software, and all
14 Updates, Enhancements, or new releases of the Software, on or in connection with the Equipment, any
15 Updates, Enhancements, or new releases to such Equipment, and any other Software used by or in
16 connection with any such Equipment;
- 17 6. be fully compatible and Interface completely and effectively with the Equipment,
18 including other Software programs provided to AUTHORITY hereunder, such that the Software and other
19 Equipment combined will perform and continuously attain the standards identified in the Scope of Work
20 and Requirements, and
- 21 7. accurately direct the Operation of the System, as required by the Scope of Work
22 and Requirements, and the descriptions, specifications and documentation set forth therein and herein.

23 D. Software Maintenance Services.

24 During the Term, CONTRACTOR shall, at its own cost and expense, provide
25 Maintenance and Software Support Services to keep the Software in good working order and free from
26 defects such that the System shall perform in accordance with this Agreement, including Scope of Work

1 and Requirements.

2 1. The CONTRACTOR shall provide technical support and shall, at its own cost and
3 expense, timely remedy any failure, malfunction, defect or non-conformity in Software, in accordance with
4 Scope of Work and Requirements.

5 2. CONTRACTOR shall provide AUTHORITY the most current release of all
6 Software available on the date of delivery of the System Software to maintain optimum performance
7 pursuant to this Agreement.

8 3. CONTRACTOR shall promptly provide Notice to AUTHORITY in writing of any
9 defects or malfunctions in the Software, regardless of the source of information. CONTRACTOR shall
10 promptly correct all defects or malfunctions in the Software or documentation discovered and shall
11 promptly provide AUTHORITY with corrected copies of same, without additional charge. If Software can
12 only be corrected in conjunction with additional or revised Hardware, CONTRACTOR shall provide such
13 Hardware to AUTHORITY, and the cost of such Hardware shall be borne by CONTRACTOR, and not be
14 reimbursable by AUTHORITY.

15 1) No Updates or Enhancements shall adversely affect the performance of the
16 System, in whole or in part, or result in any failure to meet any Requirements of the Scope of Work and
17 Requirements.

18 2) The CONTRACTOR shall ensure continued satisfactory performance by the
19 current operating system of the Software in accordance with all provisions of this Article 28.

20
21 3) In the event that the Software does not satisfy the conditions of performance set
22 forth in the Scope of Work and Requirements, the CONTRACTOR is obligated to promptly repair or
23 replace such Software at the CONTRACTOR's sole cost and expense or, if expressly agreed to in writing
24 by AUTHORITY, provide different Equipment or Software, and perform Services required to attain the
25 performance Requirements set forth in the Scope of Work and Requirements.

26 4) In the event of any defect in the media upon which any tangible portions of the

Software are provided, the CONTRACTOR shall provide AUTHORITY with a new copy of the Software.

5) Without releasing the CONTRACTOR from its obligations for warranty (during an applicable warranty period), support or Maintenance of the Software, AUTHORITY shall have the right to use and maintain versions of the Software provided by the CONTRACTOR which are one or more levels behind the most current version of such Software and to refuse to install any Updates or Enhancements if, in AUTHORITY's discretion, installation of such Updates or Enhancements would interfere with its Operations. The CONTRACTOR shall not, however, be responsible or liable for the effect of any error or defect in the version of the Software then in use by AUTHORITY that occurs after the CONTRACTOR has both (i) offered, by written notice to AUTHORITY, a suitable correction (by way of Update, Enhancement or otherwise) of such error or defect and (ii) provided AUTHORITY a reasonable opportunity to implement such existing correction, provided that the CONTRACTOR establishes that neither the implementation nor the use of such correction would limit, interfere with, adversely affect, or materially alter the interoperability, functionality or quality of the System.

6) All provisions of this Article 28, referring or relating to obligations to be performed pursuant to an applicable warranty period that extends beyond the Term, shall survive the expiration, cancellation, or termination of this Agreement.

D. Third-Party Warranties. CONTRACTOR shall assign to AUTHORITY, and AUTHORITY shall have the benefit of, any and all Subcontractors' and Suppliers' warranties and representations with respect to the System and Services provided hereunder. The CONTRACTOR's agreements with subcontractors, suppliers and any other third parties shall require that such parties (a) consent to the assignment of such warranties and representations to AUTHORITY, (b) agree to the enforcement of such warranties and representations by AUTHORITY in its own name, and (c) furnish to AUTHORITY, the warranties set forth herein. The CONTRACTOR shall obtain Maintenance agreements for third-party Software. CONTRACTOR shall secure such Maintenance agreements for the same duration and upon the same terms and conditions as the Maintenance provisions between the CONTRACTOR and AUTHORITY. At AUTHORITY's request, CONTRACTOR shall provide supporting documentation which

1 confirms that these warranties are enforceable in AUTHORITY's name.

2 E. Data Accuracy. The CONTRACTOR acknowledges and understands that the data and/or
3 information it collects, processes and/or provides to AUTHORITY will be relied upon by
4 AUTHORITY and other persons or entities that are now or will in the future be under
5 Agreement with AUTHORITY in accordance with the Scope of Work and Requirements.
6 Should information derived and provided by CONTRACTOR be inaccurate and cause AUTHORITY to
7 incur damages or additional expenses, AUTHORITY shall notify CONTRACTOR and the CONTRACTOR
8 shall immediately place any applicable insurance carrier on Notice of a potential claim. This provision
9 shall survive termination of this Agreement, and the CONTRACTOR agrees to waive any applicable
10 limitation periods consistent with enforcement of this provision.

11 F. Neither Final Acceptance of the Implementation Phase of the System and Services or
12 payment therefor, nor any provision in this Agreement, nor partial or entire use of the System and Services
13 by AUTHORITY shall constitute Final Acceptance of the Implementation Phase of the Agreement and
14 Services not performed in accordance with this Agreement or relieve the CONTRACTOR of liability for
15 any express or implied warranties or responsibility for faulty materials or workmanship.

16 G. The obligations set forth in this Article 27 shall be in addition to any other warranty obligations
17 set forth in this Agreement. The provisions of this Article shall survive the expiration or earlier termination
18 of this Agreement.

19 **ARTICLE 29. CONTRACTOR WARRANTIES**

20 A. CONTRACTOR warrants that it is fully experience and properly qualified, licensed,
21 equipped, organized and financed to perform all the Services.

22 B. CONTRACTOR warrants that all Services will be provided in accordance with this
23 Agreement.

24 C. CONTRACTOR warrants that (1) all Services performed and all Equipment,
25 Software, Hardware and other material provided under this Agreement by CONTRACTOR or any of its
26 Subcontractors or Suppliers conforms to the requirements herein and is free of any defects; and (2)

Equipment and Hardware furnished by CONTRACTOR or any of its Subcontractors or Suppliers at any tier, shall be of modern design, in good working condition and fit for use of its intended purpose. For any Equipment or Hardware purchased within 12 months of the end of the Term, such warranty shall continue for a period of one (1) year from the end of the Term.

ARTICLE 30. DEFECTS/FAILURE

A. Upon discovery of any defect or failure in the Software, Equipment or Hardware, CONTRACTOR shall promptly provide AUTHORITY Notice thereof and repair or replace same at its sole cost and expense. If expressly agreed to in writing by AUTHORITY, CONTRACTOR may provide different Software, Equipment or Hardware. In the event of any defect in the media upon which any tangible portions of the Software are provided, the CONTRACTOR shall provide AUTHORITY with a new copy of the Software.

. In addition, CONTRACTOR shall remedy at its own expense any damage to AUTHORITY owned or controlled real or personal property, when that damage arises out of such defects.

B. In the event AUTHORITY determines there is a defect or failure in the Software, Equipment or Hardware or damage to AUTHORITY property, AUTHORITY shall notify CONTRACTOR in writing within a reasonable time after the discovery of same. CONTRACTOR has seven Calendar Days from receipt of Notice from AUTHORITY to respond and indicate how CONTRACTOR will remedy the failure, defect, or damage. If AUTHORITY is not satisfied with CONTRACTOR'S proposed remedy, CONTRACTOR and AUTHORITY shall, within three Business Days, meet and mutually agree when and how CONTRACTOR shall remedy such violation. In the case of an emergency requiring immediate corrective action, CONTRACTOR shall implement such action necessary to remedy the defect, failure or damage as required by AUTHORITY.

C. Should CONTRACTOR fail to remedy any failure, defect or damage within a reasonable time to the reasonable satisfaction of AUTHORITY, AUTHORITY shall have the right with its own forces or other contractors, to replace, repair or otherwise remedy such failure, defect or damage at CONTRACTOR's expense. In addition, CONTRACTOR shall be liable for all damages arising out its

1 failure to promptly remedy the defect, failure or damage.

2 F. All Subcontractors, manufacturers, and Suppliers' warranties, expressed or
3 implied, respecting any Services, Equipment, Software or Hardware furnished hereunder, shall, at the
4 direction of AUTHORITY, be enforced by CONTRACTOR for the benefit of AUTHORITY.

5 G. If directed by AUTHORITY, CONTRACTOR shall require any such warranties to
6 be executed in writing to AUTHORITY.

7 H. Unless the defect, failure of damage is caused by the negligence or willful conduct
8 of CONTRACTOR or its Subcontractors or Suppliers, CONTRACTOR shall not be liable for the repair or
9 replacement of any Equipment, Hardware or Software furnished by AUTHORITY.

10 I. The obligations and remedies specified in this Article XX shall not limit
11 AUTHORITY's rights under the Inspection and Acceptance clause of this Agreement with respect to latent
12 defects, gross mistakes or fraud.

13 **ARTICLE 31. COORDINATION WITH OTHER CONTRACTORS**

14 A. During the course of this Agreement, AUTHORITY may undertake or award other
15 agreements for additional work, including but not limited to separate agreements with different
16 CONTRACTORS, including the Design-Build Contractor for the 405 Improvement Project related to the
17 Scope of Work and Requirements. It is critical that close coordination with interfacing contractors occurs
18 throughout the Term. CONTRACTOR shall fully cooperate with AUTHORITY and the parties to all other
19 contracts and carefully integrate and schedule its own Services with said contractors. CONTRACTOR
20 shall not commit or permit any act by persons under its control, which will interfere with the performance
21 of work by any other such contractor or by AUTHORITY.

22 B. Additional Coordination and Cooperation Requirements. It is anticipated that work by one
23 or more CONTRACTOR(s) of the AUTHORITY and/or the California Department of Transportation
24 (Caltrans), may be in progress adjacent to or within the limits of this Project during progress of the Work
25 on this Agreement. The CONTRACTOR shall work closely with AUTHORITY and any other
26 CONTRACTOR(s) who will be working for AUTHORITY and/or Caltrans for the purpose of coordinating

any activity which may affect both CONTRACTOR(s). Examples of this Work include but are not limited to installation of toll equipment, equipment testing, power and conduit installation and maintenance, and protection of traffic.

C. Should problems in coordination with other CONTRACTOR(s) occur the CONTRACTOR shall make AUTHORITY aware of these problems immediately and shall take steps to address the problems and mitigate any delays or additional costs. CONTRACTOR shall not commit or permit any act that will interfere with the performance of Work by any other CONTRACTOR, by AUTHORITY or Caltrans.

D. CONTRACTOR shall cooperate with all other CONTRACTOR(s) or forces performing construction or work of any other nature within or adjacent to the limits of the Work specified in order to avoid any delay or hindrance to the other CONTRACTOR(s) or forces. AUTHORITY reserves the right to perform other or additional Work at or near the site (including material sources) at any time, by the use of other forces.

E. CONTRACTOR shall be responsible to other contractor(s) for all damage to work, to persons or property caused by CONTRACTOR, its Subcontractor(s), or its Suppliers, and losses caused by unnecessary delays or failure to finish the Work within the time specified for completion. Any damage to Work, persons or property of CONTRACTOR by other contractors shall be the responsibility of other contractor(s) and CONTRACTOR shall have no claim against AUTHORITY.

F. CONTRACTOR's Responsibility for Design. Upon Approval of the Design, including toll related civil infrastructure design, by the CONTRACTOR, CONTRACTOR shall assume responsibility for the Design to the extent that if the civil work is installed as designed and the System does not meet the Performance Requirements of this Agreement, the CONTRACTOR shall be responsible for the costs of redesign, civil rework and additional Equipment costs and any other costs associated with the sub-standard performance.

/

ARTICLE 32. INSPECTION OF SITE

CONTRACTOR acknowledges that it has investigated and satisfied itself as to the conditions affecting the work including, but not restricted to, those bearing upon transportation, disposal, handling and storage of materials, availability of labor, water, electric power and roads and uncertainties of weather, river stages, tides or similar physical conditions at the site, the conformation and conditions of the ground, the character of equipment and facilities needed preliminary to and during prosecution of the work. CONTRACTOR further acknowledges that it has satisfied itself as to the character, quality and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done by AUTHORITY, as well as from information presented by the drawings and specifications made a part of this Agreement. Any failure by CONTRACTOR to acquaint itself with the available information will not relieve it from responsibility for the difficulty or cost of successfully performing the work. AUTHORITY assumes no responsibility for any conclusions or interpretations made by CONTRACTOR on the basis of the information made available by AUTHORITY.

ARTICLE 33. REQUIREMENTS FOR REGISTRATION OF DESIGNERS

All design and engineering work furnished by CONTRACTOR shall be performed by or under the supervision of persons licensed to practice architecture, engineering or surveying (as applicable) in the State of California, by personnel who are careful, skilled, experienced and competent in their respective trades or professions, who are professionally qualified to perform the work in accordance with the contract documents and who shall assume professional responsibility for the accuracy and completeness of the design documents and construction documents prepared or checked by them.

ARTICLE 34. SEISMIC SAFETY REQUIREMENTS

CONTRACTOR agrees to ensure that all Work performed under this Agreement including work performed by a Subcontractor is in compliance with the standards required by the Seismic Safety Regulations.

/

ARTICLE 35. ASSIGNMENTS AND SUBCONTRACTS

A. Neither this Agreement nor any interest herein nor claim hereunder may be assigned by CONTRACTOR either voluntarily or by operation of law, nor may all or any part of this Agreement be subcontracted by CONTRACTOR, without the prior written consent of AUTHORITY. Consent by AUTHORITY shall not be deemed to relieve CONTRACTOR of its obligations to comply fully with all terms and conditions of this Agreement.

B. AUTHORITY hereby consents to CONTRACTOR's subcontracting portions of the Scope of Work and Requirements to the parties identified below with their subcontract amounts described below. CONTRACTOR shall include in the subcontract agreement the stipulation that CONTRACTOR, not AUTHORITY, is solely responsible for payment to the Subcontractor for the amounts owing and that the Subcontractor shall have no claim, and shall take no action, against AUTHORITY, its officers, directors, employees or sureties for nonpayment by CONTRACTOR.

/

<u>Subcontractor Name/Addresses</u>	<u>Subcontractor Function</u>	<u>Subcontractor Amount</u>
		.00
		.00
		.00

ARTICLE 36. CONFLICT OF INTEREST

A. CONTRACTOR agrees to avoid organizational conflicts of interest. An organizational conflict of interest means that due to other activities, relationships or contracts, CONTRACTOR is unable, or potentially unable to render impartial assistance or advice to AUTHORITY; CONTRACTOR's objectivity in performing the work identified in the Scope of Work is or might be otherwise impaired; or CONTRACTOR has an unfair competitive advantage. CONTRACTOR is obligated to fully disclose to AUTHORITY in writing Conflict of Interest issues as soon as they are known to CONTRACTOR. CONTRACTOR is obligated to fully disclose to AUTHORITY in writing

1 Conflict of Interest issues as soon as they are known to CONTRACTOR. All disclosures must be
2 submitted in writing to AUTHORITY pursuant to the Notice provision herein. This disclosure
3 requirement is for the entire term of this Agreement.

4 B. CONTRACTOR shall disclose any financial, business, or other relationship with
5 AUTHORITY that may have an impact upon the outcome of this Agreement, or any ensuing AUTHORITY
6 construction project. CONTRACTOR shall also list current clients who may have a financial interest in
7 the outcome of this Agreement, or any ensuing Authority construction project, which will follow.

8 C. CONTRACTOR hereby certifies that it does not now have, nor shall it acquire any financial
9 or business interest that would conflict with the performance of services under this Agreement.

10 **ARTICLE 37. PROHIBITION**

11 A. CONTRACTOR, including all Subcontractors (at any tier), regardless of the level of
12 service provided by said Subcontractor(s), awarded this Agreement is prohibited from participation (at
13 any tier) on the contract of the Design-Build delivery team for the 405 Improvement Project.
14 Conversely, no member of the Design-Build delivery team for the 405 Improvement Project will be
15 permitted to participate as a member of the CONTRACTOR's team including all Subcontractors (at
16 any tier).

17 B. The firm, including all subcontractors (at any tier), regardless of the level of service
18 provided by said subcontractor(s), awarded the program management services contract for the
19 Highway Delivery Department, may not submit a proposal to this procurement.

20 C. The firm, including all subcontractors (at any tier), regardless of the level of service
21 provided by said subcontractor(s), awarded the program management consultant contract for this 405
22 improvement project, may not submit a proposal to this procurement.

23 D. The firm, including all subcontractors (at any tier), regardless of the level of service
24 provided by said subcontractor(s), awarded the construction management consultant contract for this
25 405 improvement project, may not submit a proposal to this procurement.

26 F. The evaluation of team composition with regards to conflicts of interest will be done on

a case-by-case basis.

ARTICLE 38. CODE OF CONDUCT

CONTRACTOR agrees to comply with AUTHORITY's Code of Conduct as it relates to Third-Party contracts, which is hereby referenced and by this reference is incorporated herein. CONTRACTOR agrees to include these requirements in all of its subcontracts.

ARTICLE 39. HEALTH AND SAFETY REQUIREMENTS

CONTRACTOR shall comply with all the requirements set forth in Exhibit H, titled "Level 3 HEALTH, SAFETY and ENVIRONMENTAL SPECIFICATIONS." As used therein, "CONTRACTOR" shall mean "CONTRACTOR," and "Subcontractor" shall mean "Sub-contractor."

ARTICLE 40. CONTRACTOR PURCHASED EQUIPMENT

A. Prior authorization, in writing, by AUTHORITY's Project Manager shall be required before CONSULTANT enters into any unbudgeted purchase order, or subcontract exceeding \$5,000.00 for supplies and/or equipment. CONSULTANT shall provide an evaluation of the necessity or desirability of incurring such costs.

B. For purchase of any item, service or consulting work not covered in CONSULTANT's Cost Proposal and exceeding \$5,000.00, three (3) competitive quotations must be submitted with the request, or the absence of bidding (sole source) must be adequately justified.

C. Any equipment purchased as a result of this Agreement is subject to the following: "CONSULTANT shall maintain an inventory of all nonexpendable property. Nonexpendable property is defined as having a useful life of at least two years and an acquisition cost of \$5,000.00 or more. If the purchased equipment needs replacement and is sold or traded in, AUTHORITY shall receive a proper refund or credit at the conclusion of this Agreement, or if the Agreement is terminated, CONSULTANT may either keep the equipment and credit AUTHORITY in an amount equal to the its fair market value, or sell such equipment at the best price obtainable at a public or private sale, in accordance with established AUTHORITY; and credit AUTHORITY in an amount equal to the sale price. If CONSULTANT elects to keep the equipment, fair market value shall be determined at

CONSULTANT's expense, on the basis of a competent independent appraisal of such equipment. Appraisals shall be obtained from an appraiser mutually agreeable to by AUTHORITY and CONSULTANT. If CONSULTANT is determined to sell the equipment, the terms and conditions of such sale must be approved in advance by AUTHORITY." CFR, Title 49, Part 18 requires a credit to Federal funds when participating equipment with a fair market value greater than \$5,000.00 is credited to the project.

D. All subcontracts entered into as a result of this Agreement shall contain all of the provisions of this Article.

ARTICLE 41. OWNERSHIP OF REPORTS AND DOCUMENTS

A. The originals of all letters, documents, reports and other products and data produced under this Agreement shall be delivered to, and become the property of AUTHORITY. Copies may be made for CONTRACTOR's records but shall not be furnished to others without written authorization from AUTHORITY. Such deliverables shall be deemed works made for hire and all rights in copyright therein shall be retained by AUTHORITY.

B. All ideas, memoranda, specifications, plans, manufacturing, procedures, drawings, descriptions, and all other written information submitted to CONTRACTOR in connection with the performance of this Agreement shall not, without prior written approval of AUTHORITY, be used for any purposes other than the performance under this Agreement, nor be disclosed to an entity not connected with the performance of the project. CONTRACTOR shall comply with AUTHORITY's policies regarding such material. Nothing furnished to CONTRACTOR, which is otherwise known to CONTRACTOR or is or becomes generally known to the related industry shall be deemed confidential. CONTRACTOR shall not use AUTHORITY's name, photographs of the project, or any other publicity pertaining to the project in any professional publication, magazine, trade paper, newspaper, seminar or other medium without the express written consent of AUTHORITY.

C. No copies, sketches, computer graphics or graphs, including graphic artwork, are to be released by CONTRACTOR to any other person or agency except after prior written approval by

1 AUTHORITY, except as necessary for the performance of services under this Agreement. All press
2 releases, including graphic display information to be published in newspapers, magazines, etc., are to be
3 handled only by AUTHORITY unless otherwise agreed to by CONTRACTOR and AUTHORITY.

4 ***THE FOLLOWING FEDERAL PROVISIONS SHALL APPLY ONLY TO THE PORTION OF***
5 ***WORK UNDER THIS AGREEMENT THAT IS FEDERALLY-FUNDED***

6 ***(405 IMPLEMENTATION PHASE)***

7 **ARTICLE 42. AUDIT AND INSPECTION OF RECORDS**

8 A. For the purpose of determining compliance with the Public Contract Code 10115, et seq.
9 and Title 21, California Code of Regulations, Chapter 21, Section 2500 et seq., when applicable and other
10 matters connected with the performance of the contract pursuant to Government Code 8546.7;
11 CONTRACTOR, Subcontractors, and AUTHORITY shall maintain and make available for inspection all
12 books, documents, papers, accounting records, and other evidence pertaining to the performance of the
13 Agreement, including but not limited to, the costs of administering the Agreement. All parties shall make
14 such materials available at their respective offices at all reasonable times during the Agreement period
15 and for four (4) years from the date of final payment under the Agreement. The State of California, State
16 Auditor, AUTHORITY, FHWA, their duly authorized representative or other agents of AUTHORITY or any
17 duly representative of the Federal Government shall have access to any books, records, payroll
18 documents, facilities and documents of CONTRACTOR and its certified public accountants (CPA) work
19 papers that are pertinent to the Agreement and indirect cost rate (ICR) for audit, examinations, excerpts,
20 and transactions, and copies thereof shall be furnished if requested.

21 B. CONTRACTOR shall maintain such books, records, data and documents in accordance
22 with generally accepted accounting principles and the CFR, Title 48, Chapter 1, Part 31 of the Federal
23 Acquisition Regulation System (FAR) and shall clearly identify and make such items readily accessible
24 to such parties during CONTRACTOR's performance hereunder.

25 C. AUTHORITY's right to audit books and records directly related to this Agreement shall
26 also extend to all first-tier subcontractors performing work identified in Article 36, Assignments and

Subcontracts, of this Agreement, and such language must be included in CONTRACTOR's agreements with its Subcontractors.

ARTICLE 43. CONTRACT WORK HOURS AND SAFETY STANDARDS

CONTRACTOR agrees to comply with the Federal Contract Work Hours and Safety Standards (40 U.S.C. Sections 3701, *et seq.* as supplemented by 29 CFR Part 5).

A. Overtime requirements: CONTRACTOR, and any Subcontractor contracting for any part of the Services which may require or involve the employment of laborers or mechanics, shall not require or permit any such laborer or mechanic in any workweek in which he or she is employed on such Services to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

B. Violation; liability for unpaid wages; liquidated damages: In the event of any violation of the clause set forth in paragraph (A) of this section CONTRACTOR and any Subcontractor responsible therefor shall be liable for the unpaid wages. In addition, CONTRACTOR and Subcontractor shall be liable to the United States for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (A) of this section, in the sum of ten (\$10) Dollars for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (A) of this section.

C. Withholding for unpaid wages and liquidated damages: AUTHORITY shall upon its own action or upon written request of an authorized representative of AUTHORITY of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by CONTRACTOR or Subcontractor under any such contract or any other Federal contract with CONTRACTOR, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by CONTRACTOR, such sums as may be determined to be necessary to satisfy any liabilities of

1 CONTRACTOR or Subcontractor for unpaid wages and liquidated damages as provided in the clause
2 set forth in paragraph (B) of this section.

3 D. Subcontracts: CONTRACTOR or Subcontractor shall insert in any subcontracts
4 the clauses set forth in paragraphs (A) through (D) of this section and also a clause requiring the
5 Subcontractors to include these clauses in any lower tier subcontracts. CONTRACTOR shall be
6 responsible for compliance by any Subcontractor or lower tier Subcontractor with the clauses set forth in
7 paragraphs (A) through (D) of this section.

8 **ARTICLE 44. GENERAL WAGE RATES AND DAVIS-BACON AND COPELAND ANTI-**
9 **KICKBACK ACTS**

10 A. Minimum Wages:

11 1. All laborers and mechanics employed by CONTRACTOR or Subcontractor at any tier
12 working on the construction site (or under the United States Housing Act of 1937 or under the Housing
13 Act of 1949 in the construction or development of the project), will be paid unconditionally and not less
14 often than once a week and without any subsequent deduction or rebate on any account (except such
15 payroll deductions as are permitted or required by federal, state or local law, regulation, ordinance, or
16 regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amounts
17 due at the time of payment computed at wage rates and per diem rate not less than the aggregate of the
18 highest of the two basic hourly rates and rates of payments, contributions or costs for any fringe benefits
19 contained in the current general prevailing wage rate(s) and per diem rate(s), established by the Director
20 of Industrial Relations of the State of California, (as set forth in the Labor Code of the State of California,
21 commencing at Section 1770, et. seq.), or as established by the Secretary of Labor (as set forth in Davis-
22 Bacon Act, 40 U.S.C. Sections 3141, et. seq. as supplemented by AUTHORITY of Labor regulations 29
23 CFR Part 5, and 18 U.S.C. Section 874), regardless of any contractual relationship which may be alleged
24 to exist between CONTRACTOR or Subcontractor and their respective mechanics, laborers,
25 journeypersons, workpersons, craft contract persons or apprentices. Copies of the current General
26 Prevailing Wage Determinations and Per Diem Rates are on file at AUTHORITY's offices and will be

1 made available to CONTRACTOR upon request. CONTRACTOR shall post a copy thereof at each job
2 site at which work hereunder is performed.

3 2. Contributions made or costs reasonably anticipated for bona fide fringe benefits
4 under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages
5 paid to such laborers or mechanics, subject to the provisions of paragraph (A)(5) of this section; also,
6 regular contributions made or costs incurred for more than a weekly period (but not less often than
7 quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be
8 constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid
9 the appropriate wage rate and fringe benefits on the wage determination for the classification of work
10 actually performed, without regard to skill, except as provided in 29 CFR Part 5.5(a)(4). Laborers or
11 mechanics performing work in more than one classification may be compensated at the rate specified for
12 each classification for the time actually worked therein: provided, that the employer's payroll records
13 accurately set forth the time spent in each classification in which work is performed. The wage
14 determination (including any additional classifications and wage rates conformed under paragraph (A)(2)
15 of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by CONTRACTOR
16 and Subcontractors at the site of the work in a prominent and accessible place where it can be easily
17 seen by the workers.

18 3.

19 a) AUTHORITY shall require that any class of laborers or mechanics,
20 including helpers, which is not listed in the wage determination and which is to be employed under the
21 contract shall be classified in conformance with the wage determination. AUTHORITY shall approve an
22 additional classification and wage rate and fringe benefits therefore only when the following criteria have
23 been met:

- 24 1. Except with respect to helpers as defined as 29 CFR 5.2(n)(4), the work to
25 be performed by the classification requested is not performed by a
26 classification in the wage determination; and

2. The classification is utilized in the area by the construction industry; and
 3. The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination; and
 4. With respect to helpers as defined in 29 CFR 5.2(n)(4), such a classification prevails in the area in which the work is performed.
- b) If CONTRACTOR and laborers and mechanics to be employed in the classification (if known), or their representatives, and AUTHORITY agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by AUTHORITY to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. AUTHORITY of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise AUTHORITY or will notify AUTHORITY within the 30-day period that additional time is necessary.
- c) In the event CONTRACTOR, laborers or mechanics to be employed in the classification or their representatives, and AUTHORITY do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), AUTHORITY shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise AUTHORITY or will notify AUTHORITY within the 30- day period that additional time is

necessary.

- d) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (A)(3) (B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

4. Whenever the minimum wage rate prescribed in this Agreement for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, CONTRACTOR shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

5. If CONTRACTOR does not make payments to a trustee or other third person, CONTRACTOR may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided, that the Secretary of Labor has found, upon the written request of the CONTRACTOR, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require CONTRACTOR to set aside in a separate account assets for the meeting of obligations under the plan or program.

6. AUTHORITY shall require that any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under this Agreement shall be classified in conformance with the wage determination. AUTHORITY shall approve an additional classification and wage rate and fringe benefits therefor only when the following criteria have been met:

1. The work to be performed by the classification requested is not performed by a classification in the wage determination; and
2. The classification is utilized in the area by the construction industry; and
3. The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

e) If CONTRACTOR and the laborers and mechanics to be employed in the classification (if known), or their representatives, and AUTHORITY agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by AUTHORITY to the Administrator of the Wage and Hour Division, Employment Standards Administration, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise AUTHORITY or will notify AUTHORITY within the 30-day period that additional time is necessary.

f) In the event CONTRACTOR, laborers or mechanics to be employed in the classification or their representatives, and AUTHORITY do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), AUTHORITY shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination with 30 days of receipt and so advise AUTHORITY or will notify AUTHORITY within the 30-day period that additional time is necessary.

g) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (A)(6) (B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

B. Withholding: AUTHORITY shall upon its own action or upon written request of an authorized representative of AUTHORITY of Labor withhold or cause to be withheld from CONTRACTOR

under this Agreement or any other Federal contract with CONTRACTOR, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by CONTRACTOR, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by CONTRACTOR or any subcontractor the full amount of wages required by this Agreement. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), all or part of the wages required by this Agreement, AUTHORITY may, after written notice to CONTRACTOR, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

C. Payrolls and basic records:

1. Payrolls and basic records relating thereto shall be maintained by CONTRACTOR during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, CONTRACTOR shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. CONTRACTORS employing apprentices or trainees under approved programs shall maintain written

evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

2.

a) CONTRACTOR shall submit weekly for each week in which any contract work is performed a copy of all payrolls to AUTHORITY for transmission to the Federal Transit Administration. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under section 5.5(a)(3)(i) of Regulations, 29 CFR Part 5. This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal Stock Number 029-005-00014-1), U.S. Government Printing Office, Washington, DC 20402. CONTRACTOR is responsible for the submission of copies of payrolls by all subcontractors.

b) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by CONTRACTOR or subcontractor or his or her agent who pays or supervises the payment of the persons employed under this Agreement and shall certify the following: under section 5.5(a)(3)(i) of Regulations, 29 CFR Part 5 and that such information is correct and complete;

1. That the payroll for the payroll period contains the information required to be maintained under section 5.5(a)(3)(i) of Regulations, 29 CFR Part 5 and that such information is correct and complete;

2. That each laborer or mechanic (including each helper, apprentice, and trainee) employed on Agreement during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly,

and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR Part 3;

3. That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

c) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (C)(2)(b) of this section.

d) The falsification of any of the above certifications may subject CONTRACTOR or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

3. CONTRACTOR or Subcontractor shall make the records required under 5.5(a)(3)(i) of Regulations, 29 CFR Part 5 available for inspection, copying, or transcription by authorized representatives of the Federal Transit Administration or AUTHORITY of Labor, and shall permit such representatives to interview employees during working hours on the job. If CONTRACTOR or Subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to CONTRACTOR, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR Part 5.12.

D. Apprentices and trainees:

1. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide

1 apprenticeship program registered with the U.S. AUTHORITY of Labor, Employment and Training
2 Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized
3 by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an
4 apprentice in such an apprenticeship program, who is not individually registered in the program, but who
5 has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where
6 appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of
7 apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio
8 permitted to the CONTRACTOR as to the entire work force under the registered program. Any worker
9 listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated
10 above, shall be paid not less than the applicable wage rate on the wage determination for the classification
11 of work actually performed. In addition, any apprentice performing work on the job site in excess of the
12 ratio permitted under the registered program shall be paid not less than the applicable wage rate on the
13 wage determination for the work actually performed. Where CONTRACTOR is performing construction
14 on a project in a locality other than that in which its program is registered, the ratios and wage rates
15 (expressed in percentages of the journeyman's hourly rate) specified in the CONTRACTOR'S or
16 Subcontractor's registered program shall be observed. Every apprentice must be paid at not less than
17 the rate specified in the registered program for the apprentice's level of progress, expressed as a
18 percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices
19 shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the
20 apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of
21 fringe benefits listed on the wage determination for the applicable classification. If the Administrator of
22 the Wage and Hour Division of the U.S. AUTHORITY of Labor determines that a different practice prevails
23 for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In
24 the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by
25 the Bureau, withdraws approval of an apprenticeship program, CONTRACTOR will no longer be
26 permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until

an acceptable program is approved.

2. Except as provided in 29 CFR Part 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. AUTHORITY of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the CONTRACTOR will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

3. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

E. Compliance with Copeland Act requirements: CONTRACTOR shall comply with

the requirements of 29 CFR Part 3, which are incorporated by reference in this contract.

F. Subcontracts: CONTRACTOR or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR Parts 5.5(a)(1) through (10) and such other clauses as the Federal Transit Administration may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. CONTRACTOR shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR Part 5.5.

G. Contract termination – debarment: A breach of the contract clauses in 29 CFR Part 5.5 may be grounds for termination of this Agreement, and for debarment as a CONTRACTOR and a subcontractor as provided in 29 CFR Part 5.12.

H. Compliance with Davis-Bacon and Related Act requirements: All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference.

I. Disputes concerning labor standards: Disputes arising out of the labor standards provisions of Agreement shall not be subject to the general disputes clause of this Agreement. Such disputes shall be resolved in accordance with the procedures of AUTHORITY of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between CONTRACTOR (or any of its subcontractors) and AUTHORITY, the U.S. AUTHORITY of Labor, or the employees or their representatives.

J. Certification of eligibility:

1. By entering into this contract, CONTRACTOR certifies that neither it (nor he or she) nor any person or firm who has an interest in CONTRACTOR'S firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR Part 5.12(a)(1).

2. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR Part

5.12(a)(1).

3. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. Section 1001.

K. In addition to the foregoing, CONTRACTOR agrees to comply with all other provisions of the Labor Code of the State of California.

L. This contract is subject to overview by the California Division of Labor Standard Compliance Monitoring Unit (CMU). The California AUTHORITY of Industrial Relations shall monitor and enforce compliance with applicable prevailing wage requirements for this contract. The reporting requirements and other information regarding the CMU may be found at <http://www.dir.ca.gov/PublicWorks/PublicWorksEnforcement.html>. CONTRACTOR is responsible for complying with all requirements of the CMU, including filing electronic payroll reports.

M. CONTRACTOR or subcontractor will not be awarded this Agreement for public work on a public works project unless registered with AUTHORITY of Industrial Relations pursuant to Labor Code Section 1725.5.

ARTICLE 45. PROHIBITION ON PROVIDING ADVOCACY SERVICES

CONTRACTOR and all Subcontractors performing work under this Agreement, shall be prohibited from concurrently representing or lobbying for any other party competing for a contract with AUTHORITY, either as a prime CONTRACTOR or Subcontractor. Failure to refrain from such representation may result in termination of this Agreement.

ARTICLE 46. FEDERAL, STATE AND LOCAL LAWS

CONTRACTOR warrants that in the performance of this Agreement, it shall comply with all applicable federal, state and local laws, statutes and ordinances and all lawful orders, rules and regulations promulgated thereunder.

ARTICLE 47. EQUAL EMPLOYMENT OPPORTUNITY

In connection with its performance under this Agreement, CONTRACTOR shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, age or national

origin. CONTRACTOR shall take affirmative action to ensure that applicants are employed, and that employees are treated during their employment, without regard to their race, religion, color, sex, age or national origin. Such actions shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship.

ARTICLE 48. CIVIL RIGHTS ASSURANCE

During the performance of this Agreement, CONTRACTOR, for itself, its assignees and successors in interest agree as follows:

A. Compliance with Regulations: CONTRACTOR shall comply with the Regulations relative to nondiscrimination in federally assisted programs of AUTHORITY (hereinafter, "DOT") Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this Agreement.

B. Nondiscrimination: CONTRACTOR, with regard to the work performed by it during the Agreement, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The CONTRACTOR shall not participate either directly or indirectly in the discrimination prohibited by Section 21.5 of the Regulations, including employment practices when the Agreement covers a program set forth in Appendix B of the Regulations.

C. Solicitations for Subcontracts, Including Procurement of Materials and Equipment: In all solicitations either by competitive bidding or negotiation made by the CONTRACTOR for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the CONTRACTOR of the CONTRACTOR's obligations under this Agreement and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.

D. Information and Reports: CONTRACTOR shall provide all information and reports

required by the Regulations or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information and its facilities as may be determined by AUTHORITY to be pertinent to ascertain compliance with such Regulations, orders and instructions. Where any information required of a CONTRACTOR is in the exclusive possession of another who fails or refuses to furnish this information the CONTRACTOR shall so certify to AUTHORITY as appropriate, and shall set forth what efforts it has made to obtain the information.

E. Sanctions for Noncompliance: In the event of the CONTRACTOR's noncompliance with nondiscrimination provisions of this Agreement, AUTHORITY shall impose Agreement sanctions as it may determine to be appropriate, including, but not limited to:

1. Withholding of payments to the CONTRACTOR under the Agreement until CONTRACTOR complies; and/or

2. Cancellation, termination, or suspension of the Agreement, in whole or in part.

F. Title VI of the Civil Rights Act: In determining the types of property or services to acquire, no person in the United States shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or otherwise be subjected to discrimination under any program or activity receiving Federal financial assistance in violation of Title VI of the Civil Rights Act of 1964, as amended, 42 U.S.C. Sections 2000d et seq. and DOT regulations, "Nondiscrimination in Federally Assisted Programs of AUTHORITY—Effectuation of Title VI of the Civil Rights Act of 1964," 49 CFR Part 21. In addition, FTA Circular 4702.1, "Title VI and Title VI-Dependent Guidelines for FTA Recipients," 05-13-07, provides FTA guidance and instructions for implementing DOT's Title VI regulations.

G. The Americans with Disabilities Act of 1990, as amended (ADA), 42 U.S.C. Sections 12101 et seq., prohibits discrimination against qualified individuals with disabilities in all programs, activities, and services of public entities, as well as imposes specific requirements on public and private providers of transportation.

H. Incorporation of Provisions: CONTRACTOR shall include the provisions of

1 paragraphs (A) through (H) in every subcontract, including procurements of materials and leases of
2 equipment, unless exempt by the Regulations, or directives issued pursuant thereto. The
3 CONTRACTOR shall take such action with respect to any subcontract or procurement as AUTHORITY
4 may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided,
5 however, that in the event a CONTRACTOR becomes involved in, or is threatened with, litigation with a
6 subcontractor or supplier as a result of such direction, the CONTRACTOR may request AUTHORITY to
7 enter into such litigation to protect the interests of AUTHORITY, and, in addition, the CONTRACTOR may
8 request the United States to enter into such litigation to protect the interests of the United States.

9 **ARTICLE 49. NOTICE OF LABOR DISPUTE**

10 Whenever CONTRACTOR has knowledge that any actual or potential labor dispute may delay
11 its performance under this Agreement, CONTRACTOR shall immediately notify and submit all relevant
12 information to AUTHORITY. CONTRACTOR shall insert the substance of this entire clause in any
13 subcontract hereunder as to which a labor dispute may delay performance under this Agreement.
14 However, any subcontractor need give notice and information only to its next higher-tier subcontractor.

15 **ARTICLE 50. CLEANING UP**

16 A. CONTRACTOR shall at all times keep the work area, including storage areas
17 used by it, free from accumulations of waste material or rubbish, and prior to completion of the work
18 remove any rubbish from AUTHORITY owned premises and all tools, scaffolding, equipment and
19 materials not the property of AUTHORITY. Upon completion of the construction, CONTRACTOR shall
20 leave the work and premises in a clean, neat and workmanlike condition satisfactory to AUTHORITY.

21 B. After completion of all work on the project, and before making application for
22 acceptance of the work, CONTRACTOR shall clean the work site, including all areas under the control of
23 AUTHORITY, that have been used by CONTRACTOR in connection with the work on the project and
24 remove all debris, surplus material and equipment, and all temporary facilities of whatever nature, unless
25 otherwise approved by AUTHORITY. Final acceptance of the work by AUTHORITY will be withheld until
26 CONTRACTOR has satisfactorily complied with the foregoing requirements for final cleanup of the project

1 site.

2 C. Full compensation for conforming to the provisions in this Article, not otherwise
3 provided for, shall be considered as included in price of this Agreement and no additional compensation
4 will be allowed therefore.

5 **ARTICLE 51. RACE-CONSCIOUS DBE CONTRACT PROVISIONS FOR DOT-ASSISTED**
6 **CONTRACTOR CONTRACTS**

7 At the time of contract execution, the CONTRACTOR committed to utilize DBE(s) in the
8 performance of this DOT-assisted contract, and further agrees to ensure that DBE subcontractors listed
9 on the Attachment entitled "DBE Participation Commitment Form D-1," perform work and/or supply
10 materials in accordance with original commitments, unless otherwise directed and/or approved by
11 AUTHORITY prior to the CONTRACTOR effectuating any changes to its race-conscious DBE
12 participation commitment(s). CONTRACTOR shall comply with all the requirements set forth in
13 Attachment "A" titled, "DBE CONTRACT PROVISIONS FOR FEDERALLY-ASSISTED CONTRACTS
14 WITH DISADVANTAGED BUSINESS ENTERPRISE (DBE) GOALS", which is attached to and, by this
15 reference, incorporated in and made a part of this Agreement.

16 **ARTICLE 52. DISADVANTAGED BUSINESS ENTERPRISE GOAL**

17 A. CONSULTANT hereby agrees to attain DBE participation in the amount of ____ (___%)
18 percent of the total Agreement amount. CONSULTANT shall enter into agreements for the services
19 identified in Attachment entitled "DBE Participation Information Form D-2".

20 B. CONSULTANT is required to comply with this goal for the duration of this Agreement.
21 CONSULTANT's failure to comply with the DBE participation provisions may result in:

22 1. Withholding of payment until such compliance is achieved or a waiver of the
23 provisions is provided by AUTHORITY;

24 2. The Agreement may be canceled, terminated or suspended in whole or in part.

25 C. Any substitution of subcontractors must be approved in writing by the AUTHORITY's
26 Contract Administrator in advance of assigning work to a substitute subcontractor. Form D-4 is attached

1 for use by CONSULTANT when requesting DBE subcontractor/supplier substitution or addition.

2 D. To ensure that all obligations under this Agreement are met, AUTHORITY will conduct
3 periodic reviews of the CONSULTANT's small DBE efforts during Agreement performance. The
4 CONSULTANT shall bring to the attention of AUTHORITY's Contract Administrator any situation in which
5 regularly scheduled payments are not made to DBE contractors, subcontractors or suppliers.

6 E. The CONSULTANT will be required to meet all reporting requirements related to
7 utilization, scope of work and dollar amount of the subcontracts. Forms D-5 and D-6 are attached for
8 convenience in reporting the required information regarding DBE monthly and final utilization,
9 respectively.

10 F. CONSULTANT, subcontractors and suppliers shall permit access to their books,
11 records, and accounts by the Contract Administrator, or a designated representative, for the purpose
12 of investigation to ascertain compliance with these specified requirements. Such records shall be
13 maintained in a fashion which is readily accessible to AUTHORITY, as described in Article 43,
14 Ownership of Reports and Documents, for a minimum of four (4) years from the date of final payment
15 by AUTHORITY.

16 **ARTICLE 53. PROHIBITED INTERESTS**

17 A. CONTRACTOR covenants that, for the term of this Agreement, no director,
18 member, officer or employee of AUTHORITY during his/her tenure in office or for one (1) year thereafter,
19 shall have any interest, direct or indirect, in this Agreement or the proceeds thereof.

20 B. No member of or delegate to, the Congress of the United States shall have any
21 interest, direct or indirect, in this Agreement or to the benefits thereof.

22 **ARTICLE 54. COVENANT AGAINST CONTINGENT FEES**

23 CONTRACTOR warrants that he/she has not employed or retained any company or person, other
24 than a bona fide employee working for the CONTRACTOR; to solicit or secure this Agreement; and that
25 he/she has not paid or agreed to pay any company or person other than a bona fide employee, any fee,
26 commission, percentage, brokerage fee, gift or any other consideration, contingent upon or resulting from

1 the award, or formation of this Agreement. For breach or violation of this warranty, AUTHORITY shall
2 have the right to annul this Agreement without liability, or at its discretion; to deduct from the Agreement
3 price or consideration, or otherwise recover the full amount of such fee, commission, percentage,
4 brokerage fee, gift, or contingent fee.

5 **ARTICLE 55. LOBBYING**

6 CONTRACTORS who apply or bid for an award of \$100,000 or more shall file the certification
7 required by 49 CFR part 20, "New Restrictions on Lobbying". Each tier certifies to the above that it will
8 not or has not used Federal appropriated funds to pay any person or organization for influencing or
9 attempting to influence an officer or employee of any agency, a member of Congress, officer or employee
10 of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract,
11 grant or any other award covered by 31 U.S.C. 1352. Each tier shall also disclose the name of any
12 registrant under the Lobbying Disclosure Act of 1995 who has made lobbying contacts on its behalf with
13 non-Federal funds with respect to that Federal contract, grant or award covered by 31 U.S.C. 1352. Such
14 disclosures are forwarded from tier to tier up to the recipient.

15 **ARTICLE 56. PRIVACY ACT**

16 CONTRACTOR shall comply with, and assures the compliance of its employees with, the
17 information restrictions and other applicable requirements of the Privacy Act of 1974, 5 U.S.C. §552a.
18 Among other things, CONTRACTOR agrees to obtain the express consent of the Federal Government
19 before the CONTRACTOR or its employees operate a system of records on behalf of the Federal
20 Government. CONTRACTOR understands that the requirements of the Privacy Act, including the civil
21 and criminal penalties for violation of that Act, apply to those individuals involved, and that failure to
22 comply with the terms of the Privacy Act may result in termination of the underlying Agreement.

23 **ARTICLE 57. INCORPORATION OF FEDERAL TERMS**

24 All contractual provisions required by United States Department of Transportation (USDOT),
25 including the Federal Highway Administration (FHWA), whether or not expressly set forth in this
26 document, are hereby incorporated by reference. Anything to the contrary herein notwithstanding, all

1 federally mandated terms shall be deemed to control in the event of a conflict with other provisions
2 contained in this Agreement. CONSULTANT shall not perform any act, fail to perform any act, or refuse
3 to comply with any requests, which would cause AUTHORITY to be in violation of the USDOT or FHWA
4 terms and conditions.

5 **ARTICLE 58. FEDERAL CHANGES**

6 CONTRACTOR shall at all times comply with all applicable FHWA regulations, policies,
7 procedures and directives, including without limitation those listed directly or by reference in the
8 agreement between AUTHORITY and FHWA , as they may be amended or promulgated from time to
9 time during this Agreement. CONTRACTOR's failure to comply shall constitute a material breach of
10 Agreement.

11 **ARTICLE 59. NO FEDERAL GOVERNMENT OBLIGATION TO THIRD PARTIES**

12 AUTHORITY and CONTRACTOR acknowledge and agree that, notwithstanding any
13 concurrence by the Federal Government in or approval of the solicitation or award of the underlying
14 Agreement, absent the express written consent by the Federal Government, the Federal Government is
15 not a party to this Agreement and shall not be subject to any obligations or liabilities to AUTHORITY,
16 CONTRACTOR, or any other party (whether or not a party to this Agreement) pertaining to any matter
17 resulting from the underlying Agreement. CONTRACTOR agrees to include these requirements in all of
18 its subcontracts.

19 **ARTICLE 60. PROGRAM FRAUD AND FALSE OR FRAUDULENT STATEMENTS AND**
20 **RELATED ACTS**

21 A. CONTRACTOR acknowledges that the provisions of the Program Fraud Civil
22 Remedies Act of 1986, as amended, 31 U.S.C. §§3801 et seq. and U.S. DOT regulations, "Program
23 Fraud Civil Remedies," 49 C.F.R. Part 31, apply to its actions pertaining to this project. Accordingly, by
24 signing this Agreement, CONTRACTOR certifies or affirms the truthfulness and accuracy of any
25 statement it has made, it makes, it may make, or causes to be made, pertaining to the underlying
26 Agreement of the FTA assisted project for which this Agreement's work is being performed.

1 CONTRACTOR also acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent
2 claim, statement, submission, or certification, the Federal Government reserves the right to impose
3 penalties of the Program Fraud Civil Remedies Act of 1986 on the CONTRACTOR to the extent the
4 Federal Government deems appropriate.

5 B. CONTRACTOR also acknowledges that if it makes, or causes to be made, a false,
6 fictitious, or fraudulent claim, statement, submission, or certification to the Federal Government under an
7 agreement connected with a project that is financed in whole or part with Federal assistance awarded by
8 FTA under AUTHORITY of 49 U.S.C. §5307 et seq., the Government reserves the right to impose the
9 penalties of 18 U.S.C. §1001 and 49 U.S.C. §5307(n) (1) et seq. on the CONTRACTOR, to the extent
10 the Federal Government deems appropriate.

11 C. CONTRACTOR agrees to include this requirement in all of its subcontracts
12 entered into as a result of this Agreement.

13 **ARTICLE 61. RECYCLED PRODUCTS**

14 A. CONTRACTOR shall comply with all the requirements of Section 6002 of the
15 Resource Conservation and Recovery Act (RCRA), as amended (42 U.S.C. 6962), including but not
16 limited to the regulatory provisions of CFR, Title 40, Part 247, and Executive Order 12873, as they apply
17 to the procurement of the items designated in subpart B of CFR, Title 40, Part 247.

18 B. CONTRACTOR agrees to include this requirement in all of its subcontracts
19 entered into as a result of this Agreement.

20 **ARTICLE 62. ENERGY CONSERVATION REQUIREMENTS**

21 CONTRACTOR shall comply with mandatory standards and policies relating to energy efficiency,
22 which are contained in the state energy conservation plan issued in compliance with the Energy Policy
23 Conservation Act.

24 **ARTICLE 63. CLEAN AIR**

25 A. CONTRACTOR shall comply with all applicable standards, orders or regulations
26 issued pursuant to the Clean Air Act, as amended, 42 U.S.C. §§ 7401 et seq. CONSULTANT shall report

each violation to AUTHORITY, who will in turn, report each violation as required to assure notification to USDOT and the appropriate Environmental Protection Agency (EPA) Regional Office.

B. CONTRACTOR agrees to include this requirement in all of its subcontracts entered into as a result of this Agreement.

ARTICLE 64. CLEAN WATER REQUIREMENTS

A. CONTRACTOR shall comply with all applicable standards, orders or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 et seq. CONSULTANT shall report each violation to AUTHORITY and understands and agrees that the AUTHORITY will in turn, report each violation as required to assure notification to USDOT and appropriate EPA Regional Office.

B. CONTRACTOR agrees to include this requirement in all of its subcontracts entered into as a result of this Agreement.

ARTICLE 65. FLY AMERICA REQUIREMENT

CONTRACTOR agrees to comply with 49 U.S.C. 40118 (the "Fly America" Act) in accordance with the General Services Administration's regulations at 41 CFR Part 301-10, which provide that recipients and sub recipients of Federal funds and their CONTRACTORS are required to use U.S. Flag air carriers for the U.S. Government-financed international air travel and transportation of their personal effects or property, to the extent such service is available, unless travel by foreign air carrier is a matter of necessity, as defined by the Fly America Act. CONTRACTOR shall submit, if a foreign air carrier was used, an appropriate certification or memorandum adequately explaining why service by a U.S. carrier was not available or why it was necessary to use a foreign air carrier and shall, in any event, provide a certificate of compliance with the Fly America requirements. CONTRACTOR agrees to include the requirements of this section in all subcontracts that may involve international air transportation.

ARTICLE 66. DEBARMENT AND SUSPENSION CERTIFICATION

A. CONTRACTOR's signature affixed herein, shall constitute a certification under penalty of perjury under the laws of the State of California, that CONTRACTOR has complied with CFR Title 2, Part

180, "OMB Guidelines to Agencies on Government wide Debarment and Suspension (non-procurement)", which certifies that he/she or any person associated therewith in the capacity of owner, partner, director, officer, or manager, is not currently under suspension, debarment, voluntary exclusion, or determination of ineligibility by any federal agency; has not been suspended, debarred, voluntarily excluded, or determined ineligible by any federal agency within the past three (3) years; does not have a proposed debarment pending; and has not been indicted, convicted, or had a civil judgment rendered against it by a court of competent jurisdiction in any matter involving fraud or official misconduct within the past three (3) years. Any exceptions to this certification must be disclosed in writing to the AUTHORITY.

B. Exceptions will not necessarily result in denial of recommendation for award, but will be considered in determining CONTRACTOR responsibility. Disclosures must indicate to whom exceptions apply, initiating agency, and dates of action.

C. Exceptions to the Federal Government Excluded Parties List System maintained by the General Services Administration are to be determined by the Federal Highway Administration.

ARTICLE 67. BUY AMERICA

A. If this Agreement exceeds \$150,000, CONTRACTOR shall comply with the "Buy America" requirements of 49 U.S.C. Section 5323 and the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) Sections 1041(a) and 1048(a) and the regulations adopted pursuant thereto. In conformance with the law and regulations, all manufacturing processes for steel and iron materials furnished for incorporation into the work on this Project shall occur in the United States; with the exception that pig iron and processed, pelletized and reduced iron ore manufactured outside of the United States may be used in domestic manufacturing process for such steel and iron materials. The application of coatings, such as epoxy coating, galvanizing, painting, and other coating that protects or enhances the value of steel or iron materials shall be considered a manufacturing process subject to the "Buy America" requirements.

B. A Certificate of Compliance, conforming to the provisions of this Article shall be

furnished for steel and iron materials. The certificates, in addition to certifying that the materials comply with the specifications, shall specifically certify that all manufacturing processes for the materials occurred in the United States, except for the exceptions listed herein.

C. The requirements imposed by law and regulations do not prevent a minimal use of foreign steel and iron materials of the total combined cost of the materials used does not exceed one-tenth of one percent (0.1 %) of the total contract cost or \$2,500, whichever is greater. CONTRACTOR shall furnish AUTHORITY acceptable documentation of the quantity and value of the foreign steel and iron prior to incorporating the materials in the work.

D. CONTRACTOR shall ensure all Subcontractors comply with these requirements.

ARTICLE 68. FORCE MAJEURE

Either party shall be excused from performing its obligations under this Agreement during the time and to the extent that it is prevented from performing by an unforeseeable cause beyond its control, including but not limited to: any incidence of fire, flood; acts of God; commandeering of material, products, plants or facilities by the federal, state or local government; national fuel shortage; or a material act or omission by the other party; when satisfactory evidence of such cause is presented to the other party; and provided further that such nonperformance is unforeseeable, beyond the control and is not due to the fault or negligence of the party not performing.

/

/

/

/

/

/

/

/

/

1 /
2 /
3 /
4 /

5 This Agreement shall be made effective upon execution by both parties.

6 **IN WITNESS WHEREOF**, the parties hereto have caused this Agreement No. C-7-1911 to be
7 executed on the date first above written.

8 **CONTRACTOR**

ORANGE COUNTY TRANSPORTATION AUTHORITY

9
10 By: _____

By: _____

11 Darrell Johnson
12 Chief Executive Officer

13 APPROVED AS TO FORM:

14
15 By: _____

16 James M. Donich
17 General Counsel

18 APPROVED:

19
20 By: _____

21
22 Date: _____
23
24
25
26

**DISADVANTAGED BUSINESS ENTERPRISE (DBE) CONTRACT PROVISIONS
FEDERALLY FUNDED CONTRACTS WITH DBE GOALS**

I. DBE Participation

It is the Consultant's responsibility to be fully informed regarding the requirements of 49 CFR, Part 26 and the Orange County Transportation Authority's (Authority's) DBE program developed pursuant to these regulations. Particular attention is directed to the following:

- A. A DBE must be a small business firm defined pursuant to 13 CFR 121 and be certified through the California Unified Certification Program (CUCP).
- B. A certified DBE may participate as a prime consultant, subconsultant, joint venture partner, as a vendor of material or supplies, or as a trucking company.
- C. A DBE must perform a commercially useful function pursuant to 49 CFR 26.55 that is, a DBE firm must be responsible for the execution of a distinct element of the work and must carry out its responsibility by actually performing, managing and supervising the work.
- D. Consultant must not claim DBE participation as attained until the amount to be claimed is paid and fully adheres to DBE crediting provisions.

If the Consultant has committed to utilize DBE(s) in the performance of this DOT-assisted contract, the Consultant's submitted "DBE Participation Commitment Form" will be utilized to monitor Consultant's DBE commitments, unless otherwise directed and/or approved by the Authority prior to the Consultant effectuating any changes to its DBE participation commitment(s) (*Refer to Subsection H: "Performance of DBE Subconsultants"*).

Consultant must complete and submit all required DBE documentation to effectively capture all DBE utilization on the Authority's DOT-assisted contracts whether achieved race neutrally or race consciously. Even if a Consultant has not committed to utilize DBE(s) in the performance of this contract, the Consultant must execute and submit all required DBE forms and other related documentation as specified under this contract or as otherwise requested by the Authority. No changes to the Consultant's DBE Commitment must be made until proper protocols for review and approval of the Authority are rendered in writing.

To ensure full compliance with the requirements of 49 CFR, Part 26 and the Authority's DBE Program, the Consultant must:

- A. Take appropriate actions to ensure that it will continue to meet the DBE Commitment at the minimal level committed to at award or will satisfy the good faith efforts to meet the DBE Commitment, when change orders or other contract modifications alter the

dollar amount of the contract or the distribution of work. The Consultant must apply and report its DBE goal commitments against the total Contract Value, including any contract change orders and/or amendments.

II. DBE Policy and Applicability

In accordance with federal financial assistance agreements with the U.S. Department of Transportation (U.S. DOT), the Authority has adopted a Disadvantaged Business Enterprise (DBE) Policy and Program, in conformance with Title 49 CFR, Part 26, "Participation by Disadvantaged Business Enterprises in Department of Transportation Programs".

The project is subject to these stipulated regulations and the Authority's DBE program. In order to ensure that the Authority achieves its overall DBE Program goals and objectives, the Authority encourages the participation of DBEs as defined in 49 CFR, Part 26 in the performance of contracts financed in whole or in part with U.S. DOT funds. Pursuant to the intent of these Regulations, it is also the policy of the Authority to:

Fulfill the spirit and intent of the Federal DBE Program regulations published under U.S. DOT Title 49 CFR, Part 26, by ensuring that DBEs have equitable access to participate in all of Authority's DOT-assisted contracting opportunities.

- A. Ensure that DBEs can fairly compete for and perform on all DOT-assisted contracts and subcontracts.
- B. Ensure non-discrimination in the award and administration of Authority's DOT-assisted contracts.
- C. Create a level playing field on which DBEs can compete fairly for DOT-assisted contracts.
- D. Ensure that only firms that fully meet 49 CFR, Part 26 eligibility standards are permitted to participate as DBEs.
- E. Help remove barriers to the participation of DBEs in DOT-assisted contracts.
- F. Assist in the development of firms that can compete successfully in the marketplace outside the DBE Program.
- G. Consultant must not discriminate on the basis of race, color, national origin, or sex in the award and performance of subconsultant.

Any terms used in this section that are defined in 49 CFR, Part 26, or elsewhere in the Regulations, must have the meaning set forth in the Regulations. In the event of any conflicts or

inconsistencies between the Regulations and the Authority's DBE Program with respect to DOT-assisted contracts, the Regulations must prevail.

III. Authority's DBE Policy Implementation Directives

Pursuant to the provisions associated with federal regulation 49 CFR, Part 26, the Disadvantaged Business Enterprise (DBE) program exists to ensure participation, equitable competition, and assistance to participants in the USDOT DBE program. Accordingly, based on the Authority's analysis of its past utilization data, coupled with its examination of similar Agencies' Disparity Study and recent Goal Methodology findings the Authority has implemented the reinstatement of the DBE program utilizing both race-conscious and race-neutral means across the board as all protected groups participation have been affected using strictly race neutral means on its FTA-assisted contracts.

The Authority reinstates the use of contract goals and good faith efforts. Meeting the contract-specific goal by committing to utilize DBEs or documenting a bona fide good faith effort to do so, is a condition of award. Additionally, contract-specific goals are now specifically targeted at DBEs (*DBEs owned and controlled by Black Americans, Hispanic Americans, Asian-Pacific Americans, Native Americans, Asian-Pacific Americans, Sub-Continent Asian Americans, and Women*). In the event of a substitution, a DBE must be substituted with another DBE or documented adequate good faith efforts to do so must be made, in order to meet the contract goal and DBE contract requirements.

A. Definitions

The following definitions apply to the terms used in these provisions:

1. **"Disadvantaged Business Enterprise (DBE)"** means a small business concern:
(a) which is at least 51 percent owned by one or more socially and economically disadvantaged individuals or, in the case of any publicly-owned business, at least 51 percent of the stock of which is owned by one or more socially and economically disadvantaged individuals; and (b) whose management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who own it.
2. **"Small Business Concern"** means a small business as defined pursuant to Section 3 of the Small Business Act and relevant regulations promulgated pursuant thereto, except that a small business concern must not include any concern or group of concerns controlled by the same socially and economically disadvantaged individual or individuals which has annual average gross receipts in excess of \$19.57 million over the previous three fiscal years.
3. **"Socially and Economically Disadvantaged Individuals"** means those individuals who are citizens of the United States (or lawfully admitted permanent residents) and

who are Black Americans, Hispanic Americans, Native Americans, Asian-Pacific Americans, or Asian-Indian Americans, women and any other minorities or individuals found to be disadvantaged by the Small Business Administration pursuant to Section 8(a) of the Small Business Act, or by the Authority pursuant to 49 CFR part 26.65. Members of the following groups are presumed to be socially and economically disadvantaged:

- a) "Black Americans," which includes persons having origins in any of the Black racial groups of Africa;
 - b) "Hispanic Americans," which includes persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race;
 - c) "Native Americans," which includes persons who are American Indians, Eskimos, Aleuts, or Native Hawaiians;
 - d) "Asian-Pacific Americans," which includes persons whose origins are from Japan, China, Taiwan, Korea, Vietnam, Laos, Cambodia, the Philippines, Samoa, Guam, the U.S. Trust Territories of the Pacific, and the Northern Marianas;
 - e) "Asian-Indian Americans," which includes persons whose origins are from India, Pakistan, and Bangladesh; and
 - f) Women, regardless of ethnicity or race.
4. **"Owned and Controlled"** means a business: (a) which is at least 51 percent owned by one or more "Socially and Economically Disadvantaged Individuals" or, in the case of a publicly-owned business, at least 51 percent of the stock of which is owned by one or more "Socially and Economically Disadvantaged Individuals"; and (b) whose management and daily business operations are controlled by one or more such individuals.
5. **"Manufacturer"** means a firm that operates or maintains a factory or establishment that produces on the premises the materials or supplies obtained by the Consultant.
6. **"Regular Dealer"** means a firm that owns, operates or maintains a store, warehouse, or other establishment in which the materials or supplies required for the performance of the contract are bought, kept in stock, and regularly sold to the public in the usual course of business. The firm must engage in, as its principal business, and in its own name, the purchase and sale of the product in question. A regular dealer in such bulk items as steel, cement, gravel, stone and petroleum products need not keep such products in stock if it owns or operates distribution equipment.
7. **"Fraud"** includes a firm that does not meet the eligibility criteria of being a certified DBE and that attempts to participate in a DOT-assisted program as a DBE on the basis of false, fraudulent, or deceitful statements or representations or under

circumstances indicating a serious lack of business integrity or honesty. The Authority may take enforcement action under 49 CFR, Part 31, Program Fraud and Civil Remedies, against any participant in the DBE program whose conduct is subject to such action under 49 CFR, Part 31. The Authority may refer the case to the Department of Justice, for prosecution under 18 U.S.C. 1001 or other applicable provisions of law, any person who makes a false or fraudulent statement in connection with participation of a DBE in any DOT-assisted program or otherwise violates applicable Federal statutes.

8. ***"Other Socially and Economically Disadvantaged Individuals"*** means those individuals who are citizens of the United States (or lawfully admitted permanent residents) and who, on a case-by-case basis, are determined by Small Business Administration or a recognized California Unified Certification Program Certifying Agency to meet the social and economic disadvantage criteria described below.

B. "Social Disadvantage"

1. The individual's social disadvantage must stem from his/her color, national origin, gender, physical handicap, long-term residence in an environment isolated from the mainstream of American society, or other similar cause beyond the individual's control.
2. The individual must demonstrate that he/she has personally suffered social disadvantage.
3. The individual's social disadvantage must be rooted in treatment, which he/she has experienced in American society, not in other countries.
4. The individual's social disadvantage must be chronic, longstanding and substantial, not fleeting or insignificant.
5. The individual's social disadvantage must have negatively affected his/her entry into and/or advancement in the business world.
6. A determination of social disadvantage must be made before proceeding to make a determination of economic disadvantage.

C. "Economic Disadvantage"

1. The individual's ability to compete in the free enterprise system has been impaired due to diminished capital and credit opportunities, as compared to others in the same line of business and competitive market area that are not socially disadvantaged.
2. The following criteria will be considered when determining the degree of diminished

credit and capital opportunities of a person claiming social and economic disadvantage:

With respect to the individual:

- availability of financing bonding capability
- availability of outside equity capital
- available markets

With respect to the individual and the business concern:

- personal and business assets
- personal and business net worth
- personal and business income and profits

IV. Submission of DBE Information and Ongoing Reporting Requirements (Post-Award)

If there is a DBE goal on the contract, Consultant must complete and submit the following DBE exhibits (forms) consistent with Consultant DBE Goal Commitment within the specified timelines. Even if no DBE participation will be reported, the Consultant must execute and return the form:

- A. “Monthly DBE Subconsultant Commitment and Attainment Report Summary and Payment Verification ” (Form 103)

The purpose of this form is to ensure Consultant DBE commitments are attained, properly reported and credited in accordance with DBE crediting provisions based on the capacity the DBE performs the scope of work/service. This form further serves to collect DBE utilization data required under 49 CFR, Part 26.

The Consultant is required to complete and submit a Form 103 to the Authority by the 10th of each month until completion of the contract. The Consultant must submit its first Form 103 following the first month of contract activity. Upon completion of the contract, the Consultant must complete and submit a “Final: Monthly DBE Subconsultant Commitment and Attainment Report Summary and Payment Verification” (Form 103) to facilitate reporting and capturing actual DBE attainments at conclusion of the contract.

The Form 103 must include the following information:

1. General Contract Information – Including Contract Number and Name, Prime Consultant and the following:
 - a) Original Contract Amount
 - b) Running Total of Change Order Amount
 - c) Current Contract Amount
 - a) Amount Paid to Consultant during Month
 - b) Amount Paid to Consultant from Inception to Date

- c) DBE Contract Goal
- d) Total Dollar Amount of DBE Commitment
- e) DBE Commitment as Percentage of Current Contract Amount

2. Listed and/Proposed Consultant/Subconsultant Information – For All DBE participation being claimed either Race Neutrally or Race Consciously, regardless of tier:

- a) DBE Firm Name, Address, Phone Number, DBE Type of Operation, Certification Type and Certification Number.
- b) DBE Firm Contract Value Information:
Original contract amount, running total of change order amount, Current contract amount, Amount paid to Consultant during month and Amount paid to Consultant to date.

3. Consultant Assurance of Full Compliance with Prompt Payment Provisions

Consultant to sign the prompt payment assurance statement of compliance contained within the Form 103. Consultant is to further maintain and submit at the request of Authority a detailed running tally of related invoices submitted by DBE(s) and Non DBE(s), including dates of invoice submission, dates accepted and corresponding dates and amount of payments made. The Payment and Retention Reporting tally must also include:

DBE(s) and Non DBE(s) Invoice Number, Invoice Amount, Invoice Date, Prime Consultant's Invoice Number that incorporated the corresponding DBE and Non DBE invoice(s) for billing purposes, Date of Invoice submission to Authority, Date and amount Authority paid on Prime Consultant's Invoice. The report must also reflect a breakout of retention withheld (including retention as specified in subcontract agreement(s) and disputed invoice retention) and retention payments made, check number and date paid to DBE and Non DBE.

Consultant is advised not to report the participation of DBE(s) toward the Consultant's DBE attainment until the amount being claimed has been paid to the DBE. Verification of payments and/or a signed Verification of Payment by the applicable DBE or Non DBE must be submitted with Form 103 to authenticate reported payments.

4. DBE Subcontract Agreements

The Consultant must submit to the Authority copies of executed subcontracts and/or purchase orders (PO) for all DBE firms participating on the contract within ten working days of award. The Consultant must immediately notify the Authority in writing of any

problems it may have in obtaining the subcontract agreements from listed DBE firms within the specified time.

5. "Monthly DBE Trucking Verification" Form

Prior to the 10th of each month, the Consultant must submit documentation on the "Monthly DBE Trucking Verification" Form to the Authority showing the amount paid to DBE trucking companies. The Consultant must also obtain and submit documentation to the Authority showing the amount paid by DBE trucking companies to all firms, including owner-operators, for the leasing of trucks. If the DBE leases trucks from a non-DBE, the Contactor may count only the fee or commission the DBE receives as a result of the lease arrangement.

The Consultant must also obtain and submit documentation to the Authority showing the truck number, owner's name, California Highway Patrol CA number, and if applicable, the DBE certification number of the owner of the truck for all trucks used during that month.

6. "Final Report-Utilization of Disadvantaged Business Enterprises (DBE), First Tier Subconsultants"

Upon completion of the contract, a summary of these records must be prepared on the: "Final Report-Utilization of Disadvantaged Business Enterprises (DBE), First Tier Subconsultants" and certified correct by the Consultant or the Consultant's authorized representative, and must be furnished to the Engineer. The form must be furnished to the Authority within 90 days from the date of contract acceptance. The amount of \$10,000 will be withheld from payment until a satisfactory form is submitted.

7. "Disadvantaged Business Enterprises (DBE) Certification Status Change"

If a DBE Sub is decertified during the life of the project, the decertified Subconsultant must notify the Consultant in writing with the date of decertification. If a Subconsultant becomes a certified DBE during the life of the project, the Subconsultant must notify the Consultant in writing with the date of certification (Attach DBE certification/Decertification letter). The Consultant must furnish the written documentation to the AUTHORITY.

Upon completion of the contract, the "Disadvantaged Business Enterprises (DBE) Certification Status Change" must be signed and certified correct by the Consultant indicating the DBEs' existing certification status. If there are no changes, please indicate "No Changes". The certified form must be furnished to the Authority within 90 days from the date of contract acceptance.

V. DBE Eligibility and Commercially Useful Function Standards

A DBE must be certified at the time of Proposal submission:

1. A certified DBE must be a small business concern as defined pursuant to Section 3 of the U.S. Small Business Act and relevant regulations promulgated pursuant thereto.
2. A DBE may participate as a Prime Consultant, Subconsultant, joint venture partner with a Prime or Subconsultant, vendor of material or supplies, or as a trucking company.
3. A DBE joint venture partner must be responsible for specific contract items of work, or clearly defined portions thereof. Responsibility means actually performing, managing and supervising the work with its own forces. The DBE joint venture partner must share in the capital contribution, control, management, risks and profits of the joint venture commensurate with its ownership interest.
4. At time of proposal submission, DBEs must be certified by the California Unified Certification Program (CUCP). Listings of DBEs certified by the CUCP are available from the following sources:
 - a. The CUCP web site, which can be accessed at <http://www.californiaucp.com>; or the Caltrans "Civil Rights" web site at <http://www.dot.ca.gov/hq/bep>.
1. A DBE must perform a commercially useful function in accordance with 49 CFR 26.55 (i.e., must be responsible for the execution of a distinct element of the work and must carry out its responsibility by actually performing, managing and supervising the work). A DBE should perform at least thirty percent (30%) of the total cost of its contract with its own workforce to presume it is performing a commercially useful function.

VI. DBE Crediting Provisions

- A. When a DBE is proposed to participate in the contract, either as a Prime Consultant or Subconsultant, at any tier, only the value of the work proposed to be performed by the DBE with its own forces may be counted towards DBE participation. If the Consultant is a DBE joint venture participant, only the DBE proportionate interest in the joint venture must be counted.
1. If a DBE intends to subcontract part of the work of its subcontract to a lower-tier Subconsultant, the value of the subcontracted work may be counted toward DBE participation only if the Subconsultant is a certified DBE and actually performs the work with their own forces. Services subcontracted to a Non-DBE firm may not be

credited toward the Prime Consultant's DBE attainment.

2. Consultant is to calculate and credit participation by eligible DBE vendors of equipment, materials, and suppliers toward DBE attainment, as follows:
 - a) Sixty percent (60%) of expenditure(s) for equipment, materials and supplies required under the Contract, obtained from a regular dealer; or
 - b) One hundred percent (100%) of expenditure(s) for equipment, materials and supplies required under the Contract, obtained from a DBE manufacturer.
3. The following types of fees or commissions paid to DBE Subconsultants, Brokers, and Packers may be credited toward the prime Consultant's DBE attainment, provided that the fee or commission is reasonable, and not excessive, as compared with fees or commissions customarily allowed for similar work, including:
 - a) Fees and commissions charged for providing bona fide professional or technical services, or procurement of essential personnel, facilities, equipment, materials, or supplies required in the performance of the Contract;
 - b) Fees charged for delivery of material and supplies (excluding the cost of materials or supplies themselves) when the licensed hauler, trucker, or delivery service is not also the manufacturer of, or a regular dealer in, the material and supplies;
 - c) Fees and commissions charged for providing any insurance specifically required in the performance of the Contract.
4. Consultant may count the participation of DBE trucking companies toward DBE attainment, as follows:
 - a) The DBE must be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular contract.
 - b) The DBE must itself own and operate at least one fully licensed, insured, and operational truck used on the contract.
 - c) The DBE receives credit for the total value of the transportation services it provides on the contract using trucks it owns, insures, and operates using drivers it employs.
 - d) The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the contract.
 - e) The DBE may also lease trucks from a non-DBE firm, including an owner-operator. The DBE who leases trucks from a non-DBE is entitled to credit only for the fee or commission it receives as a result of the lease

arrangement. The DBE does not receive credit for the total value of the transportation services provided by the lessee, since these services are not provided by a DBE.

For purposes of this paragraph, a lease must indicate that the DBE has exclusive use of and control over the truck. This does not preclude the leased truck from working for others during the term of the lease with the consent of the DBE, so long as the lease gives the DBE absolute priority for use of the leased truck. Leased trucks must display the name and identification number of the DBE.

5. If the Consultant listed a non-certified 1st tier Subconsultant to perform work on this contract, and the non-certified Subconsultant subcontracts a part of its work or purchases materials and/or supplies from a lower tier DBE certified Subconsultant or Vendor, the value of work performed by the lower tier DBE firm's own forces can be counted toward DBE participation on the contract. If a DBE Consultant performs the installation of purchased materials and supplies they are eligible for full credit of the cost of the materials.

VII. Performance of DBE Subconsultants

DBEs must perform work or supply materials as listed in the "DBE Participation Commitment Form" specified under "*DBE Proposal Submission Requirements*" of these special provisions. Do not terminate a DBE listed Subconsultant for convenience and perform the work with your own forces or obtain materials from other sources without prior written authorization from the AUTHORITY.

The AUTHORITY grants authorization to use other forces or sources of materials for requests that show any of the following justifications (written approval from the AUTHORITY must be obtained prior to effectuating a substitution):

- A. Listed DBE fails or refuses to execute a written contract based on plans and specifications for the project.
- B. You stipulate a bond is a condition of executing the subcontract and the listed DBE fails to meet your bond requirements.
- C. Work requires a Consultants' license and listed DBE does not have a valid license under Consultants License Law.
- D. Listed DBE fails or refuses to perform the work or furnish the listed materials.
- E. Listed DBE's work is unsatisfactory and not in compliance with the contract.
- F. Listed DBE delays or disrupts the progress of the work.

G. Listed DBE becomes bankrupt or insolvent.

If a listed DBE Subconsultant is terminated, you must make good faith efforts to find another DBE Subconsultant to substitute for the original DBE. The substitute DBE must perform at least the same amount of work as the original DBE under the contract to the extent needed to meet the DBE goal.

The substitute DBE must be certified as a DBE at the time of request for substitution. The AUTHORITY does not pay for work or material unless it is performed or supplied by the listed DBE, unless the DBE is terminated in accordance with this section.

VIII. Additional DBE Subconsultants

In the event Consultant identifies additional DBE Subconsultants or suppliers not previously identified by Consultant for DBE participation under the contract, Consultant must notify the Authority by submitting "Request for Additional DBE Firm" to enable Consultant to capture all DBE participation. Consultant must also submit, for each DBE identified after contract execution, a written confirmation from the DBE acknowledging that it is participating in the contract for a specified value, including the corresponding scope of work (a subcontract agreement can serve in lieu of the written confirmation).

IX. DBE "Frauds" and "Fronts"

Only legitimate DBEs are eligible to participate as DBEs in the Authority's federally -assisted contracts. Proposers are cautioned against knowingly and willfully using "fronts." The use of "fronts" and "pass through" subcontracts to non-disadvantaged firms constitute criminal violations. Further, any indication of fraud, waste, abuse or mismanagement of Federal funds should be immediately reported to the Office of Inspector General, U.S. Department of Transportation at the toll-free hotline: (800) 424-9071; or to the following: 245 Murray Drive, Building 410, Washington, DC 20223; Telephone: (202) 406-570.

X. Consultant's Assurance Clause Regarding Non-Discrimination

In compliance with State and Federal anti-discrimination laws, the Consultant must affirm that they will not exclude or discriminate on the basis of race, color, national origin, or sex in consideration of contract award opportunities. Further, the Consultant must affirm that they will consider, and utilize Subconsultants and vendors, in a manner consistent with non-discrimination objectives.

XI. Prompt Payment Clause

Upon receipt of payment by Authority, Consultant agrees to promptly pay each Subconsultant for the satisfactory work performed under this Agreement, no later than seven

(7) calendar days. Consultant agrees further to return retainage payments to each Subconsultant within thirty (30) calendar days after the Subconsultant's work is satisfactorily completed. Authority reserves the right to request the appropriate documentation from Consultant showing payment has been made to the Subconsultants. Any delay or postponement of payment from the above referenced time frames may occur only for good cause following written approval by Authority.

In accordance with 49 CFR part 26.29 "Prompt Payment Provisions" (DBE Final Rule) the Authority will elect to utilize the following method to comply with the prompt payment of retainage requirement:

Hold retainage from the Consultant and provide for prompt and regular incremental acceptances of portions of the Consultant, pay retainage to prime Consultants based on these acceptances, and require a contract clause obligating the Consultant to pay all retainage owed to the Subconsultants for satisfactory completion of the accepted work within thirty (30) days after payment to the Consultant.

Failure to comply with this provision or delay in payment without prior written approval from Authority will constitute noncompliance, which may result in appropriate administrative sanctions, including, but not limited to a withhold of two (2%) percent of the invoice amount due per month for every month that payment is not made.

These prompt payment provisions must be incorporated in all subcontract agreements issued by Consultant under this Agreement. Each subcontract must require the Subconsultant to make payments to sub-Subconsultants and suppliers in a similar manner.

XII. Administrative Remedies and Enforcement

Consultant must fully comply with the DBE contract requirements, including the Authority's DBE Program and Title 49 CFR, Part 26 "Participation of Disadvantaged Businesses in Department of Transportation Financial Assistance Programs" and ensure that all Subconsultants regardless of tier are also fully compliant. Consultant's failure to comply constitutes a material breach of contract, wherein the Authority will impose all available administrative sanctions including payment withholdings, necessary to effectuate full compliance. In instances of identified non-compliance, a Cure Notice will be issued to the Consultant identifying the DBE non-compliance matter(s) and specifying the required course of action for remedy.

The Consultant must be given ten (10) working days from the date of the Cure Notice to remedy or to (1) File a written appeal accompanied with supporting documentation and/or (2) Request a hearing with the Authority to reconsider the Authority's DBE determination. Failure to respond within the ten (10) working day period must constitute a waiver of the Consultant's right to appeal. If the Consultant files an appeal, the Authority, must issue a written determination and/or set a hearing date within ten (10) working days of receipt of the

written appeal, as applicable. A final Determination will be issued within ten (10) working days after the hearing, as applicable.

If, after review of the Consultant's appeal, the Authority decides to uphold the decision to impose DBE administrative remedies on the Consultant, the written determination must state the specific remedy(s) to be imposed.

Failure to comply with the Cure Notice and/or to remedy the identified DBE non-compliance matter(s) is a material breach of contract and is subject to administrative remedies, including, withholding at minimum of two (2%) percent of the invoice amount due per month for every month that the identified non-compliance matter(s) is not remedied. Upon satisfactory compliance the Authority will release all withholdings.

In addition to administrative remedies defined in this section, the Authority is not precluded from invoking other contractual and/or legal remedies available under federal, state or local laws.

EXHIBIT F: MILESTONES FOR RELEASE OF RETENTION

Exhibit F

Milestones for Release of Retention

The release of retention withheld shall follow the guidelines outlined in Article 9 of the Agreement entitled "Payment."

The following agreed-upon milestones are tied to the CONTRACTOR's accomplishment of major milestones per the Exhibit B to the Agreement entitled "Scope of Work and Requirements."

Implementation Phase Retention Release Milestones

The milestones established for release of retention in the Implementation Phase are as follows:

1. Acceptance of Phase 1 for the SR-91, as further set forth in Article 9 Payment of the Agreement, and in Exhibit A, Scope of Work and Requirements. Retention released will include the sum of all retention held by the Authority for milestone payments for Phase 1 made in accordance with Exhibit D Payment Schedule.
2. Acceptance of Phase 2 for the I-405, as further set forth in Article 9 Payment of the Agreement, and in Exhibit A, Scope of Work and Requirements. Retention released will include the sum of all retention held for milestone payments for Phase 2 made in accordance with Exhibit D Payment Schedule.

Maintenance Phase Retention Release Milestones

The milestones established for release of retention in the Maintenance Phase are as follows:

Each year, upon the anniversary date of the commencement of the Maintenance Phase, AUTHORITY will release retention paid to CONTRACTOR for the previous Maintenance year's Maintenance Work. Retention released shall include the sum of all retention held

by AUTHORITY on all Maintenance payments made for the previous Maintenance Year, in accordance with Article 9 Payment of the Agreement, and Exhibit B, Scope of Work and Requirements, including monthly maintenance payments made in accordance with the CONTRACTOR's Price Proposal. Contractor must submit an invoice requesting such annual retention release, accompanied by the required bonds for the following Operations and Maintenance year.

EXHIBIT G: HEALTH, SAFETY AND ENVIRONMENTAL SPECIFICATIONS

LEVEL 3 HEALTH, SAFETY AND ENVIRONMENTAL SPECIFICATIONS

REQUIRED HSE SUBMITTAL SUMMARY

The contractor shall submit copies of the items listed below for contract scope work on OCTA projects and property. Copies shall be provided prior to contractor's mobilization onto OCTA projects and property. Contractor shall provide compliant written Health, Safety & Environmental (HSE) submittals within 30 days of the contract notice to proceed.

HSE submittals shall comply with the 1988 Drug Free Workplace Act, or the Department of Transportation (DOT), or the Federal Transportation Administration (FTA) requirements (according to OCTA procurement funding guidelines) and comply with the California Code of Regulations (CCR) Title 8 regulatory standards.

Contractor's established written programs/plans shall comply with CCR Title 8 regulatory standards. All HSE related programs/plans submitted to OCTA for acceptance shall be prepared and submitted by a qualified HSE professional who is recognized by an organization of industry standard (i.e., CSP, CIH, CHST, CHMM, etc.) and is experienced in developing compliant written HSE programs. The site safety HSE representative shall participate in the HSE submittal process.

1. Contractor shall provide a copy of Company's Injury Illness Prevention Program in accordance with CCR Title 8, Section 3203.
2. Contractor shall provide a copy of their Company HSE Policy/Procedure Manual, in compliance with CCR Title 8 Standards for awarded scope.
3. Contractor shall provide a copy of their Policy or Substance Abuse Prevention Program.
4. Contractor shall provide a copy of their Hazard Communication Program and MSDS Management Program in compliance with CCR Title 8, Section 5194, Hazard Communication Standard.
5. On-Site HSE Representative:
On Facility Modification Projects, The Contractor shall submit a resume of the designated on-site qualified HSE Representative. The HSE Representative shall possess a current certification from the Board of Certified Safety Professionals (BCSP), plus five (5) years construction or scope agreement HSE experience enforcing HSE compliance on heavy or industrial construction project sites, the last two years of which have been administering HSE in the construction or scope discipline for which the Contractor is contracting with the Authority. The designated HSE Representative shall participate in all HSE related submittals through completion of scope.

On Capital Programs, The Contractor's on-site qualified HSE Representative shall be a Certified Safety Professional (CSP) with current standing from the Board of Certified Safety Professionals (BCSP) or a Construction Health and Safety Technician (CHST) with current standing from the (BCSP) or a Certified Industrial Hygienist (CIH) with current standing from the American Board of Industrial

Hygiene (ABIH), or an equal professional HSE Certificate of standing from The National Examination Board in Occupational Safety and Health (NEBOSH), that is acceptable to the Authority. The Contractor's on-site HSE Representative(s) shall provide a resume and have a minimum of seven (7) years heavy construction experience in administering HSE programs on heavy construction project sites, the last two years of which have been administering HSE in the construction/scope discipline for which Contractor is contracting with the Authority.

6. A Detailed Site Specific HSE Work Implementation Plan:

This plan shall be prepared and submitted by a recognized HSE professional experienced in developing compliant written HSE programs. Indicate the methods and procedures, and include the sequence of tasks as listed on the project schedule, include the hazards, tools and equipment, and the safe work practices to mitigate the hazards in a format acceptable OCTA. Specify safety measures in accordance with applicable Cal/OSHA standards, South Coast Air Quality Management District (SCAQMD) rules, National Fire Protection Association (NFPA), National Electric Code (NEC), American National Standards Institute (ANSI) codes and regulations, job hazard analysis, policies, procedures, HSE training requirements and known and potential hazards of Contractor's scope. Plans shall be prepared as specified above, and may require if necessary a professional engineer licensed to practice in the state of California, when so required by the provisions of the California Board for Professional Engineer and Surveyors.

PART I – GENERAL

1.0 GENERAL HEALTH, SAFETY AND ENVIRONMENTAL REQUIREMENTS

- A. The Contractor, its subcontractors, suppliers, and employees have the obligation to comply with all Authority health, safety and environmental compliance department (HSEC) requirements of this safety specification, project site requirements, and bus yard safety rules, as well as all federal, state, and local regulations pertaining to scope of work or agreements with the Authority including California Department of Transportation safety requirements and special provisions. Additionally, manufacturer requirements are considered incorporated by reference, as applicable, to this scope of work.
- B. Observance of unsafe acts or conditions, serious violation of health and safety standards, non-conformance of Authority HSEC requirements, or disregard for the intent of these safety specifications to protect people and property, by Contractor may be reason for termination of scope or agreements with the Authority, at the sole discretion of the Authority.
- C. The Authority HSEC requirements, and references contained within this scope of work shall not be considered all-inclusive as to the hazards that might be encountered. Safe work practices shall be pre-planned and performed, and safe conditions shall be maintained during the course of this work scope.

- D. The Contractor shall specifically acknowledge that it has primary responsibility to prevent and correct all health, safety and environmental hazards for which it and its employees, or its subcontractors (and their employees) are responsible. The Contractor shall further acknowledge their expertise in recognition and prevention of hazards in the operations for which they are responsible, that the Authority may not have such expertise, and is relying upon the Contractor for such expertise. The Authority retains the right to notify the Contractor of potential hazards and request the Contractor to evaluate and, as necessary, to eliminate those hazards.
- E. The Contractor shall provide all necessary tools, equipment, and related safety protective devices to execute the scope of work in compliance with the Authority's HSEC requirements, CCR Title 8 Standards, and recognized safe work practices.
- F. The Contractor shall instruct all its employees, and all associated subcontractors under contract with the Contractor who works on Authority projects in the following; recognition, identification, and avoidance of unsafe acts and/or conditions applicable to its work.

PART II – SPECIFIC REQUIREMENTS

- 2.0 While these safety specifications are intended to promote safe work practices, Contractors are reminded of their obligation to comply with all federal (Code of Federal Regulations (CFR) Sections 1926 & 1910 Standards), state (CCR Title 8 Standards), local and municipal safety regulations, and Authority health, safety and environmental requirements applicable to their project scope. Failure to comply with these standards may be cause for termination of scope or agreements with the Authority, at the sole discretion of the Authority.

2.1 REQUIRED DOCUMENTATION / REPORTING REQUIREMENTS

The Contractor at a minimum shall provide the following documents to the Authority's Project Manager. Items A through E below shall be submitted and accepted by the Authority's Project Manager prior to Contractor mobilization. Item F upon each occurrence, and for items G through K, contractor shall verify the following documentation is in place, prior to and during contract scope and make the same available to the Authority upon request within 72 hours.

Contractor's established written programs/plans shall comply with CCR Title 8 regulatory standards. All new programs/plans shall be prepared and submitted by a qualified HSE professional who is recognized by an organization of industry standard (i.e., CSP, CIH, CHST, STS, CHMM, etc.) and is experienced in developing compliant written HSE programs. The site safety HSE representative shall participate in the scope submittal process.

- A. A Comprehensive Project Specific Health, Safety, and Environmental (HSE) Work Plan.
 - a. The Contractor shall develop a site project plan that may include, but is not limited to: Permits, Evacuation, Emergency Plan, Roles and

Responsibilities, Scope and Construction Activity Details, Constructability Review, Contractor Coordination Process, Safe Work Methods, Hazard Identification & Risk Control, First Aid and Injury Management, Emergency Procedures, Public Protection, Authority and Contractor Site Rules, Incident Reporting and Investigation, Specialized Work or Licensing, Training and Orientation Requirements, Chemical Management, and Subcontractor Management.

- b. A Detailed Site Specific HSE Implementation Plan: This plan shall be prepared and submitted by a recognized HSE professional (current BCSP Certification in good standing, i.e., CSP, CHST, OHST) experienced in developing compliant written HSE programs, acceptable to OCTA. Indicate the methods and procedures, and include the sequence of tasks as listed on the project schedule, include the hazards, tools and equipment, and the safe work practices to mitigate the hazards in a format acceptable OCTA. Specify safety measures in accordance with applicable Cal/OSHA standards, SCAQMD rules, NFPA, NEC, ANSI codes and regulations, job hazard analysis, policies, procedures, HSE training requirements and known and potential hazards of Contractor's scope. Plans shall be prepared as specified above, and may require if necessary a professional engineer licensed to practice in the state of California, when so required by the provisions of the California Board for Professional Engineer and Surveyors.
- B. Contractor shall provide a copy of their Company HSE Policy/Procedure Manual, in compliance with CCR Title 8 Standards for awarded scope.
- C. Contractor shall provide a copy of Company's Injury Illness Prevention Program in accordance with CCR Title 8, Section 3203.
- D. Contractor shall provide a copy of their Policy or Substance Abuse Prevention Program that complies with the 1988 Drug Free Workplace Act.
- E. Contractor shall provide the resume and qualifications/certifications of assigned project designated Onsite HSE Representative for this scope as identified in section 2.3 of this specification.
- F. Accident/Incident investigation report within 24 hours of event (immediate verbal notification to Authority Project Manager, followed by Written Report).

The following required documentation shall be provided to the Authority's Project Manager, upon Authority request, within 72 hours.

- G. A copy of Contractor weekly site safety inspection report with status of corrections, upon request, within 72 hours.
- H. Contractor shall provide a copy of the Contractors and subcontractors competent person list (submit to Authority Project Manager, upon Authority request, within 72 hours).

- I. Contractors and subcontractors training records for qualified equipment operators, electrical worker certification (NFPA 70E), confined space training, HAZWOPER training, and similar personnel safety training certificates as applicable to the agreement scope and as requested by the OCTA Project Manager and/or HSEC department, upon Authority request, within 72 hours and prior to starting or during the scope activity (submit to Project Manager).
- J. A monthly report that includes number of workers on project, a list of subcontractors, work hours (month, year to date, & project cumulative) of each contractor, labor designation, OSHA Recordable injuries and illnesses segregated by medical treatment cases, restricted workday cases, number of restricted days, lost workday cases, and number of lost work days, and recordable incident rate. Contractor shall provide to the Authority, upon request, within 72 hours.

K. TRAINING DOCUMENTATION

To ensure that each employee is qualified to perform their assigned work, when applicable to scope work, Contractor shall verify training documentation is in place, prior to and during contract scope, and make available to the Authority, upon request, within 72 hours. Training may be required by the Authority or CCR Title 8 Standards and required for activity on Authority's property and/or Authority projects. Contractor shall provide to Authority, upon request, within 72 hours.

2.2 HAZARD COMMUNICATION (CCR Title 8, Section 5194)

- A. Contractor shall comply with CCR Title 8, Section 5194 Hazard Communication Standard. Prior to chemical use on Authority property and/or project work areas the Contractor shall provide to the Authority Project Manager copies of Material Safety Data Sheet (MSDS) for all applicable products used, if any.
- B. All chemicals including paint, solvents, detergents and similar substances shall comply with SCAQMD Rules 103, 1113, and 1171.

2.3 DESIGNATED HEALTH, SAFETY, ENVIRONMENTAL (HSE) REPRESENTATIVE

- A. Before beginning on-site activities, the Contractor shall designate an On-site HSE Representative. This person shall be a Competent or Qualified Individual as defined by the Occupational, Safety, and Health Administration (OSHA), familiar with applicable CCR Title 8 Standards, and has the authority to affect changes in work procedures that may have associated cost, schedule and budget impacts.
- B. The Contractor's on-site qualified HSE Representative for all Authority projects is subject to acceptance by the Authority Project Manager and the HSEC Department Manager. All contact information of the On-site HSE Representative (name, phone, and fax and pager/cell phone number) shall be provided to the Authority Project Manager.

QUALIFICATIONS – On Capital Programs, the Contractor shall submit a resume of the full time, on-site qualified HSE Representative(s) who reports directly to the Contractor's Project Manager or Superintendent, and who is responsible for HSE oversight for field operations on the project no later than ten (10) days after receipt of Notice to Proceed, and prior to mobilization. The Contractor's On-site HSE Representative(s) shall have a minimum of seven (7) years heavy construction experience in administering HSE programs on heavy construction project sites, the last two years of which have been administering HSE in the construction discipline for which Contractor is contracting with the Authority. The Contractor's On-site HSE Representative shall be a Certified Safety Professional (CSP) with current standing from the Board of Certified Safety Professionals (BCSP), or a Construction Health and Safety Technician (CHST) with current standing from the BCSP or a Certified Industrial Hygienist (CIH) with current standing from the American Board of Industrial Hygiene (ABIH), or an equal professional HSE Certificate of standing from The National Examination Board in Occupational Safety and Health (NEBOSH), that is acceptable to the Authority. The Contractor's On-site HSE Representatives(s) shall be on site during all operational hours. The On-site HSE Representative(s) shall set up, carry forward and aggressively and effectively maintain the project specific safety program and IIPP covering all phases of the work. If at any time the Contractor wishes to replace their On-site HSE Representative(s), the Contractor must provide written notice thirty (30) days prior to change of personnel to the Authority. The Contractor shall take all precautions and follow all procedures for the safety of, and shall provide all protection to prevent injury to, all persons involved in any way in the scope work and all other persons, including, without limitation, the employees, agents, guests, visitors, invitees and licensees of the Authority who may be involved. This requirement applies continuously and is not limited to normal working hours. The designated HSE Representative shall participate in all HSE related submittals. The Authority reserves the right to allow for an exception to modify these minimum qualification requirements for unforeseen circumstances, at the sole discretion of the Authority Project Manager and HSEC Department Manager.

On Facility Modification Projects, the Contractor shall submit a resume of the full time qualified on-site HSE Representative who reports directly to the Contractor's Project Manager or Superintendent, and who is responsible for safety oversight for field operations on the project no later than ten (10) days after receipt of Notice to Proceed, and prior to mobilization. The Contractor's On-Site HSE Representative shall hold a current certification from the BCSP, plus five (5) years construction or scope HSE experience enforcing HSE compliance on heavy construction or industrial construction project sites, the last two years of which have been administering HSE in the construction or scope discipline for which Contractor is contracting with the Authority. The Contractor's On-site HSE Representative(s) shall be on site during all operational hours. The designated HSE Representative shall participate in all HSE related submittals. The Authority reserves the right to allow for an exception and to modify these minimum qualification requirements for unforeseen circumstances, at the sole discretion of the Authority Project Manager and HSEC Department Manager.

1. Capital Programs may include, but are not limited to, projects involving demolition and construction of; heavy construction, rail projects, highway projects, parking lots and structures, fuel stations, building construction, facility modifications, bus base construction, EPA/DTSC remediation, AQMD air or soil monitoring, fuel tank removal or modification, major bus base modifications, handling potential hazardous waste projects, and similar projects as deemed a Capital Program at the sole discretion by the Authority.
 2. Facility Modification Projects may include, but are not limited to, projects involving minor demolition and construction or improvement projects for transportation centers, bus base sites and/or building modifications, equipment and/or building upgrades, and similar projects as deemed a Facility Modification Project at the sole discretion by the Authority.
 3. Competent Individual means an individual who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees and/or property, and who has authorization to take prompt corrective measures to eliminate them.
 4. Qualified Individual means an individual who by possession of a recognized degree, certificate, certification or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his/her ability to solve or resolve problems relating to the subject matter, the work, or the project.
- C. The Contractor shall designate a Competent Individual for each task, as required by Cal-OSHA standards or laws. The task Competent Individual shall be responsible for the prevention of accidents. If the Authority or any public agency with jurisdiction notifies the Contractor of any claimed dangerous condition at the site that is within the Contractor's care, custody or control, the Contractor shall take immediate action to rectify the condition at no additional cost to the Authority. The Contractor shall be responsible for the payment of all fines levied against the Authority for deficiencies relating to the Contractor's supervision or conduct and/or control of the scope agreement.
- D. On Facility Modification Projects, the Authority Project Manager reserves the right to require the Contractor to provide one additional full-time safety representative with qualifications as identified in section 2.3 (C), above whenever the number of individuals from the Contractor, its subcontractors, suppliers, and vendors meets or exceeds 15 workers, there are multiple scope work sites, or as warranted by the scope of work at the sole discretion by the Authority.
- E. On Capital Programs, the Authority's Project Manager reserves the right to require the Contractor to provide one additional full-time safety representative with qualifications as identified in item 2.3 (C) above whenever the number of individuals from the Contractor, its subcontractors, suppliers, and vendors meets or exceeds 50 workers, or is warranted by the scope of work.

2.4 SITE HSE ORIENTATION

The Contractor shall conduct and document a project site safety orientation for all Contractor personnel, subcontractors, suppliers, vendors, and new employees assigned to the project prior to performing any work on Authority projects, a copy of the HSE orientation attendance list shall be provided to the Authority Project Manager. The safety orientation, at a minimum, shall include, as applicable, Personal Protection Equipment (PPE) requirements, eye protection, ANSI class 2 reflective vests, designated smoking, eating, and parking areas, traffic speed limit and routing, cell phone policy, and barricade requirements. When required by scope, additional orientation shall include fall protection, energy isolation lock-out/tag-out (LOTO), confined space, hot work permit, security requirements, and similar project safety requirements.

2.5 INCIDENT NOTIFICATION AND INVESTIGATION

A. The Authority shall be promptly notified of any of the following types of incidents:

1. Damage to Authority property (or incidents involving third party property damage);
2. Reportable and/or recordable injuries (as defined by the U. S. Occupational Safety and Health Administration);
3. Incidents impacting the environment, i.e. spills or releases on Authority property.

B. Notifications shall be made to Authority representatives, employees and/or agents. This includes incidents occurring to contractors, vendors, visitors, or members of the general public that arise from the performance of Authority contract work. An initial immediate verbal notification, followed by a written incident investigation report shall be submitted to Authority's Project Manager within 24 hours of the incident.

A final written incident investigative report shall be submitted within seven (7) calendar days, and include the following information. The current status of anyone injured, photos of the incident area, detailed description of what happened, the contributing factors that led to the incident occurrence, a copy of the company policy or procedure associated with the incident and evaluation of effectiveness, copy of the task planning documentation, and the corrective action initiated to prevent recurrence. This information shall be considered the minimum elements required for a comprehensive incident report acceptable to OCTA.

C. A Serious Injury, Serious Incident, OSHA Recordable Injury / Illness, or Significant Near Miss shall require a formal incident review at the discretion of the Authority's Project Manager. The incident review shall be conducted within seven (7) calendar days of the incident. This review shall require a senior executive from the Contractors' organization to participate in the presentation. The serious incident presentation shall include action taken for the welfare of

the injured, a status report of the injured, causation factors leading to the incident, a root cause analysis, and a detailed recovery plan that identifies corrective actions to prevent a similar incident, and actions to enhance safety awareness.

1. Serious Injury: includes an injury or illness to one or more employees, occurring in a place of employment or in connection with any employment, which requires inpatient hospitalization for a period in excess of twenty-four hours for other than medical observation, or in which an employee suffers the loss of any member of the body, or suffers any serious degree of physical disfigurement.
2. Serious Incident: includes property damage of \$500.00 or more, an incident requiring emergency services (local fire, paramedics and ambulance response), news media or OCTA media relations response, and/or incidents involving other agencies (Cal/OSHA, EPA, AQMD, DTSC, etc.) notification or representation.
3. OSHA Recordable Injury / Illness: includes an injury / illness resulting in medical treatment beyond First Aid, an injury / illness which requires restricted duty, or an injury / illness resulting in days away from work.
4. Significant Near Miss Incident: includes incidents where no property was damaged and no personal injury sustained, but where, given a slight shift in time or position, damage and/or injury easily could have occurred.

2.6 REGULAR INSPECTIONS & THIRD PARTY INSPECTIONS

- A. Frequent and regular inspections of the project jobsite shall be made by the Contractor's On-site HSE Representative, or another Competent Individual designated by the Contractor. Unsafe acts and/or conditions noted during inspections shall be corrected immediately.
- B. The Contractor is advised that representatives of regulatory agencies (i.e., CAL-OSHA, EPA, SCAQMD, etc.), upon proper identification, are entitled to access onto Authority property and projects. The Authority Project Manager shall be notified of their arrival as soon as possible.

2.7 ENVIRONMENTAL REQUIREMENTS

- A. The Contractor shall comply with Federal, State, county, municipal, and other local laws and regulations pertaining to the environment, including noise, aesthetics, air quality, water quality, contaminated soils, hazardous waste, storm water, and resources of archaeological significance. Expense of compliance with these laws and regulations is considered included in the agreement. Contractor shall provide water used for dust control, or for pre-wetting areas to be paved, as required; no payment will be made by OCTA for this water.
- B. The Contractor shall prevent pollution of storm drains, rivers, streams, irrigation ditches, and reservoirs with sediment or other harmful materials. Fuels, oils,

- bitumen, calcium chloride, cement, or other contaminants that would contribute to water pollution shall not be dumped into or placed where they will leach into storm drains, rivers, streams, irrigation ditches, or reservoirs. If operating equipment in streambeds or in and around open waters, protect the quality of ground water, wetlands, and surface waters.
- C. The Contractor shall protect adjacent properties and water resources from erosion and sediment damage throughout the duration of the contract. Contractor shall comply with applicable NPDES permits and Storm Water Pollution Prevention Plan (SWPPP) requirements.
- D. Contractor shall comply with all applicable EPA, Cal EPA, Cal Recycle, DTSC, SCAQMD, local, state, county and city standards, rules and regulations for hazardous and special waste handling, recycling and/ disposal. At a minimum, Contractor shall ensure compliance where applicable with SCAQMD Rule 1166, CCR Title 8, Section 5192, 29 CFR Subpart 1910.120, 49 CFR Part 172, Subpart H, 40 CFR Subpart 265.16 and CCR Title 22 Section 6625.16. Contractor shall provide OCTA a schedule of all hazardous waste and special or industrial waste disposal dates in advance of transport date. Only authorized OCTA personnel shall sign manifests for OCTA generated wastes. Contractor shall ensure that only current registered transporters are used for disposal of hazardous waste and industrial wastes. The Contractor shall obtain approval from OCTA for the disposal site locations in advance of scheduled transport date.
- E. If the Contractor encounters on the site material reasonably believed to be asbestos, polychlorinated biphenyl (PCB) or other Hazardous Substance (as defined in California Health and Safety Code, and all regulations pursuant thereto) which has not been rendered harmless, the Contractor shall immediately stop work in that area affected and report the condition to the Authority in writing. The work in the affected area shall not thereafter be resumed except by written agreement of the Authority and Contractor if in fact the material is asbestos or polychlorinated biphenyl (PCB) or other hazardous substance and has not been rendered harmless. The work in the affected area shall be resumed in the absence of asbestos or polychlorinated biphenyl (PCB) or other hazardous substance, or when it has been rendered harmless, by written agreement of the Authority and the Contractor, or in accordance with a final determination by an Environmental Consultant employed by the Authority.
- F. The Contractor shall not permit any hazardous substances to be brought onto or stored at the Project Site or used in the construction of the work, except for specified materials and commonly used construction materials for which there are no reasonable substitutes. All such materials shall be handled in accordance with all manufacturers' guidelines, warnings and recommendations and in full compliance with all applicable laws. All notices required to be given with respect to such materials shall be given by the Contractor. The Contractor shall not intentionally release or dispose of hazardous substances at the Project Site or into the soil, drains, surface or ground water, or air, nor shall the Contractor allow any Sub-Contractor, subcontractor or supplier or any other person for whose acts the Contractor or any subcontractor, vendor or supplier may be liable, to do so. For purposes of Contract Documents, "hazardous

substance” means any substance or material which has been determined or during the time of performance of the work is determined to be capable of posing a risk of injury to health, safety, property or the environment by any federal, state or local governmental authority.

2.8 VEHICLE AND ROADWAY SAFETY REQUIREMENTS

- A. The Contractor shall ensure that all Contractor vehicles, including those of its subcontractors, suppliers, vendors and employees are parked in designated parking areas, are identified by company name and/or logo, and comply with traffic routes, and posted traffic signs in areas other than the employee parking lots.
- B. Personal vehicles belonging to Contractor employees shall not be parked on the traveled way or shoulders including any section closed to public traffic, or areas of the community that may cause interference or complaints
- C. The Contractor shall comply with California Department of Transportation safety requirements and special provisions when working on highway projects.
- D. The Contractor shall conform to American Traffic Safety Services Association (Quality Standard for Work Zone Control Devices 1992).

2.9 LANGUAGE REQUIREMENTS

For safety reasons, the Contractor shall ensure employees that do not read, or understand English, shall be within visual and hearing range of a bilingual supervisor or responsible designee at all times when on the Authority property or projects.

2.10 PERSONAL PROTECTIVE EQUIPMENT AND CLOTHING

Contractors, and all associated subcontractors, vendors and suppliers are required to provide their own personal protective equipment (PPE), including eye, head, foot, and hand protection, respirators, reflective safety vests, and all other PPE required to perform their work safely on Authority projects.

- A. RESPIRATORS (CCR Title 8, Section 5144) - The required documentation for training and respirator use shall be provided to the Authority’s Project Manager upon request within 72 hours. All compliance documentation as required by CCR Title 8, Section 5144, Respiratory Protective Equipment.
- B. EYE PROTECTION – The Authority requires eye protection on construction projects and work areas that meet ANSI Z-87.1 Standards.
- C. BUS BASE – Minimum PPE required includes but is not limited to; Eye protection, class 2 reflective vest, steel toe or construction type footwear that meets ANSI Z41 1991 are recommended.

- D. CONSTRUCTION PROJECTS - Minimum PPE required includes but is not limited to; hard hat, eye protection, hand protection, class 2 reflective vest, safety toe footwear that meets ANSI Z41 1991 are recommended.
- E. HARD HATS: Approved hard hat that meet ANSI Z89. 1 (latest revision). Hard hats should be affixed with the company/agency logo and/or name. The bill shall be worn forward. Metal hard hats and cowboy style are forbidden on Authority projects.
- F. FOOTWEAR: Enclosed leather that covers the ankles, such as a construction type boot. Employees shall not wear casual dress shoes, open toe, sneakers, sandals, canvas-type shoes, or other shoes that have thin soles or heels that are higher than normal in construction work areas. Safety toe footwear that meets ANSI Z41 1991 are recommended on construction sites and in operating facilities.
- G. CLOTHING/SHIRTS: minimum or waist length shirts with sleeves (4" minimum).
- H. CLOTHING/TROUSERS: Cover the entire leg. If flare-legged trousers are worn, the trouser bottoms must be tied to prevent catching. No sweat pants, or trousers with holes.

2.11 AERIAL DEVICES (CCR Title 8, Section 3648)

Aerial devices are defined in CCR Title 8 as any vehicle-mounted or self-propelled device, telescoping extensible or articulating, or both, which is primarily designed to position personnel. If aerial devices are to be used, the required documentation in CCR Title 8, Section 3648 shall be provided to the Authority's Project Manager, upon request, within 72 hours.

2.12 CONFINED SPACE ENTRY (CCR Title 8, Section 5157)

Before any employee will be allowed to enter a confined space, the required documentation as required by CCR Title 8, Section 5157 shall be provided to the Authority's Project Manager, upon request, within 72 hours.

- A. RECOMMENDED: a copy of the most recent calibration record for each air monitoring unit, 3-gas monitor or "sniffer" to be used by the Entry Supervisor prior to entering permit-required confined spaces.

2.13 CRANES

- A. Crane activity shall comply with 29 CFR 1926.550, CCR Title 8 Standards, manufacture's recommendations and requirements, applicable American Society of Mechanical Engineers (ASME), and ANSI Standards. In addition, Contractor shall comply with the following requirements: Prior to using mobile cranes, the Contractor shall provide to the Authority Project Manager, items I,

2 & 3 of the following documentation a minimum of seven (7) days prior to activity, and item 4 on each day of crane activity.

1. Cranes require a submittal of the annual certification, and copy of the cranes most recent quarterly inspection.
 2. A copy of each crane operator's qualification (NCCCO or equivalent) of company-authorized crane operators that have been properly trained in the equipment's use and limitations. Operator certification as required by CCR Title 8, Section 5006.1.
 3. A rigging plan is required for all lifts. Critical lifts require an engineered plan designed by a registered professional engineer licensed in the State of California.
 4. Contractor shall provide the name and qualifications of each "Qualified Rigger" as defined by OSHA.
 5. Rigging scope activity shall comply with 29 CFR Subparts 1926.250, 1929.753 and CCR Title 8 Standards.
 6. All rigging equipment shall be free from defects, in good operating condition and maintained in a safe condition.
 7. Rigging equipment shall be inspected by a designated, competent employee prior to initial use on the project, prior to each use, and documented inspections performed regularly. Records shall be kept on jobsite of each of these inspections by contractor and be made available to the Authority upon request within 72 hours.
 8. Only one (1) sling eye should be in a hook, for multiple slings a shackle shall be used to prevent separation of slings, and prevent stress on weak points of the hook.
 9. Contractor shall prepare a documented daily crane inspection report.
- B. Pick and carry with rubber tired cranes is forbidden on Authority projects.

C. Engineered Critical Lifts

A critical lift is established where any one of the following conditions are created:

1. Where in the crane's current configuration at any point during the lift, a gross load weight exceeds 75% of the capacity of the crane.
2. A gross weight equal to, or greater than 10 tons.
3. Lifts over buildings, equipment, public roadways, structures, or power lines.

4. A single lift where two or more cranes are used, including tandem lifts and tailing cranes.
5. Lifts made in close proximity of power lines, as defined by CCR Title 8 voltage clearance specifications.
6. Lifts involving helicopters, and specialized or unique and complex rigging equipment.
7. Hoisting of suspended work platforms.
8. Static tower crane erection and dismantlement.
9. Making lifts below the ground level where the crane is positioned.
Note: Where the below the ground lift is minimal (evaluated by California registered professional engineer), a critical lift plan may not be required.

D. Critical Lift Plan

Where a critical lift will be performed, a written critical lift plan shall be submitted to the Authority Project Manager prior to commencing with the lift. The written plan shall include the following:

1. Crane manufacturer, capacity, and all specifications for the configuration to be used for the lift.
2. Load chart data for the crane to be used to make the lift. Total calculated weight of the load to be lifted including all rigging and other deductions consistent with the manufacturer's load chart.
3. Engineering data shall be provided on the hook assembly (manufacturer's certification or independent laboratory testing and load testing within the past 60 days), below-the hook rigging, and all specialized below-the-hook lifting devices.
4. Diagrams of the lift that provides geometrical conditions of the load, rigging, and all crane positions during the lift. The drawing shall provide the following:
 - A. Locations of all components to be lifted prior, during and after the lift is completed.
 - B. Radius points.
 - C. Swing patterns.

- D. In the event that the lift must be aborted, positions where the load may be safely landed.
 - E. Areas where any personnel, public, and vehicles must be evacuated during the lift.
- 5. Potential ground loading for each point of contact by the crane in selected locations in which the crane will perform the critical lift.
 - 6. Soil and subsurface data and information pertaining to the location on which the crane used for the critical lift will be positioned. This information shall be procured from an authoritative source such as a geotechnical engineer or a professional civil engineer registered in the state of California.

Note: *This information may be available from the Authority for selected locations on some projects.*

- 7. An engineer shall use the data provided in #5 and #6 above to verify and confirm the following:
 - A. That the soil and subsurface conditions are capable of supporting all loads imposed during the critical lift.
 - B. That the designs of cribbing and other supports used under the crane load points are appropriate to safely transfer such loads.
- 8. Signature and stamp on the plan by a California registered professional engineer, evidencing review of the plan as meeting the requirements that all loads and load information and calculations contained in the plan are approved, acceptable and safe to perform.
- 9. Operator qualifications.
- 10. Method by which communication will be provided to the crane operator. (Designated signal person, two-way radio, hard wire phone system, etc.).
- 11. A critical lift hazard analysis which identifies the particular hazards (including weather, wind, obstructions, etc.) associated with the lift and the means and methods to reduce, mitigate, or eliminate the hazards.
- 12. Emergency action plan.
- 13. Documentation of lift and pre-job meeting shall be conducted by Contractor's Project Manager.

The written plan shall be submitted 7 days prior to any critical lift for review by the Authority Project Manager and the Authority HSEC department. No critical lifts shall be conducted prior to such review.

E. OVERHEAD CRANES

Before using the Authority overhead cranes, each Contractor shall designate a limited number of employees to attend a training session on the use and limitations of overhead cranes with designated Authority personnel.

2.14 DEMOLITION OPERATIONS (CCR Title 8, Section 1734)

Before starting demolition activities the required documentation shall be provided to the Authority's Project Manager, upon request, within 72 hours. Contractor shall provide all compliance documentation as required by CCR Title 8 Article 31.

- A. The Contractor shall be responsible for visiting and examining the project site to assess and personally determine the extent of demolition, associated work, debris removal, disposal and general work to be done under this section.
- B. The Contractor shall take possession of all demolished materials, except as noted otherwise in the Contract Documents, and be responsible for disposing of them in accordance with applicable laws and regulations. On-site burning or burial of demolition materials will not be permitted.
- C. Provide continuous noise and dust abatement as required, preventing disturbances and nuisances to the public, workers, and the occupants of adjacent premises and the surrounding areas. Dampen areas affected by demolition operation as necessary to prevent dust nuisance.
- D. Site demolition plan: Indicate methods, procedures, equipment, and structures to be employed. Specify safety measures in accordance with applicable codes including signs, barriers, and temporary walkways. Plans shall be prepared by a qualified person (CSP, CIH, CHST, CHMM, etc.), or as necessary by a professional engineer licensed to practice in the State of California, when so required by the provisions of the California Board for Professional Engineer and Surveyors.
- E. Equipment, haul routes, and disposal sites to be used in the demolition and disposal work. Copy of manifests showing delivery of disposed materials in accordance with the plan and permit conditions. Certification that all demolished materials removed from the site have been disposed of in accordance with applicable laws and regulations.

2.15 EXCAVATION OPERATIONS (CCR Title 8, Section 1541)

Before starting excavation activities more than 5 feet deep into which people shall enter, the required documentation shall be provided to the Authority's Project Manager, upon request, within 72 hours. All compliance documentation shall comply with the following CCR Title 8, Section 1541 requirements:

- A. A copy of the Contractor's Excavation Permit.
- B. Attention is directed to the applicable sections of the Labor Code concerning trench excavation safety plans, "Trench Safety." Excavation for any trench 5 feet or more in depth shall not begin until the Contractor has received approval from the Engineer of the Contractor's detailed plan for worker protection from the hazards of caving ground during the excavation of that trench and any design calculations used in the preparation of the detailed plan. Excavations 20 feet or greater shall be engineered and plan stamped by a California registered professional engineer.
- C. The detailed plan shall show the details of the design of shoring, bracing, sloping or other provisions to be made for worker protection during the excavation. No plan shall allow the use of shoring, sloping or a protective system less effective than that required by the Construction Safety Orders of the Division of Occupational Safety and Health. If the plan complies with the shoring system standards established by the Construction Safety Orders, the plan shall be submitted at least five (5) days before the Contractor intends to begin excavation for the trench.
- D. Excavations and trenches shall be inspected by a "Competent Person" daily and after every rainfall to determine if they are safe. Daily inspections shall be recorded. Documentation is to be kept on site and available for review upon request.
- E. Excavations are considered class 'C' soil unless documented testing in accordance with 29 CFR Subpart P, Section 1926.650 and CCR Title 8 Standards supports a class 'B' soil classification and is confirmed and stamped by a California registered professional engineer. In no case will excavations be classified as class 'A' soil.

2.16 FALL PROTECTION (CCR Title 8, Sections 1669-1671)

The following standards are required when performing work on Authority property. The required documentation shall be provided to the Authority's Project Manager, upon request, within 72 hours.

- A. Fall protection is required for workers exposed to falls in excess of six (6) feet.
- B. When conventional fall protections methods are impractical or create a greater hazard, a written plan in conformance with CCR Title 8, Article 24, shall be submitted to the Authority a minimum of seven (7) days in advance of the scheduled activity.

2.17 FORKLIFTS, BACKHOES AND OTHER INDUSTRIAL TRACTORS (CCR Title 8, Section 3664)

CCR Title 8 defines backhoes as "industrial tractors". All compliance documentation shall be provided as required by CCR Title 8, Section 3664. The following required documentation shall be provided to the Authority's Project Manager, upon request, within 72 hours:

- A. A copy of each operator's certificate or a list of company-authorized industrial tractor operators that have been properly trained in the equipment's use and limitations. Please state which equipment, and model each operator has been authorized to operate (i.e. forklifts, backhoe, bulldozer, front-end loader, etc.).

2.18 ELECTRICAL OPERATIONS

HIGH VOLTAGE (CCR Title 8, Sections 2700-2974)

Any work on electrical equipment defined by OSHA as high-voltage, at or above 600 volts, requires specialized training certifications and personal protective equipment. Before any high-voltage work commences, the Authority Project Manager must be notified and must provide approval. The following required NFPA 70E certification and a certificate of training from a recognized organization of a two day high voltage safety training course shall be provided to the Authority's Project Manager, upon request, within 72 hours:

- A. A list of the name(s) of the company-designated high voltage Qualified Electrical Worker(s)

LOW VOLTAGE (CCR Title 8, Sections 2299-2599)

Only qualified persons shall work on electrical equipment or systems.

- A. Electrical Certification of Training: Contractor employees working on or around electrical panels, wiring, motors, electrical energy sources or similar electrical devices shall have attended a NFPA 70E, Electrical Safety Course and provide to the OCTA Project Manager a copy of employees' NFPA 70E qualification certificate of training for each employee assigned to electrical tasks on OCTA property or projects.

2.19 POWDER-ACTUATED TOOLS (CCR Title 8, Section 1685)

Before using tools such as "Hilti guns" or other powder-actuated tools, the following required documentation shall be provided to the Authority's Project Manager, upon request, within 72 hours.

- A. A copy of each qualified person's valid operator card.

2.20 SCAFFOLDS (CCR Title 8, Sections 1635.1-1677)

Scaffold erection shall be in compliance with CCR Title 8 Standards. All compliance documentation shall be provided as required by CCR Title 8, Sections 1635.1-1677. In addition, the Contractor shall comply with the following additional requirements.

- A. All scaffolds on Authority project shall be inspected by a competent person qualified for scaffolds in accordance with CCR Title 8 Standards.

- B. Contractor shall arrange for a third party inspection, at least quarterly, by a credentialed professional (insurance carrier, scaffold manufacturer representative, or similar) in addition to the contractors daily self inspections.
- C. A proper scaffold inspection and tagging system shall be maintained identifying compliance status (Example: Green/safe, Yellow/modified-fall protection required, Red/unsafe-do not use).
- D. Contractor shall have a fall protection plan that meets CCR Title 8 Standards for scaffold erectors, an erection/dismantling plan shall be submitted to Authority Project Manager for review prior to start of activity.
- E. Scaffold erection/dismantling shall install handrails beginning on the first level above ground erected, and erectors shall plan erection and dismantling in a manner to maximize handrail protection and minimize employees at unprotected areas.

2.21 WARNING SIGNS AND DEVICES

Signs, signals, and/or barricades shall be visible at all times when and where a hazard exists. Overhead tasks, roofing tasks, excavations, roadwork activity, demolition work, and other recognized hazards shall have guardrail protection, warning barricades, or similar protective measures acceptable to the Authority's Project Manager. Signs, signals, and/or barricades shall be removed when the hazard no longer exists.

2.22 STEEL ERECTION

Steel Erection scope activity shall comply with 29 CFR Subpart R, Section 1926.750, and CCR Title 8 Standards. In addition to OSHA Standards, Contractor shall comply with the following requirements.

- A. Erection planning should incorporate installation methods using aerial devices (man-lifts) and elevated work platforms (scissor lift) to minimize fall hazards of climbing steel where possible. A detailed written job safety analysis (JSA) shall identify installation methods, equipment, and control methods to minimize potential fall hazards.
- B. The Contractor shall not allow any employee to walk the steel unprotected from falls. Contractor employees must be tied-off and "coon" the beam until safety cables are provided to which employees shall use 100% tie-off protection. Two lanyards are required to ensure 100% tie-off protection.
- C. A safe means of access to the level being worked shall be planned. Climbing and sliding down columns are not considered safe access and are forbidden on Authority projects.
- D. A qualified rigger shall inspect the rigging prior to each shift and each lift.

- E. Multiple lift rigging (Christmas Treeing) lifts are forbidden on Authority property and controlled projects.

2.23 AUDITS

- A. The Authority may make periodic patrols of the project site as a part of its normal security and safety program. The Contractor shall not be relieved of its aforesaid responsibilities and the Authority shall not assume same, nor shall it be deemed to have assumed, any responsibility otherwise imposed upon the Contractor, as a result of safety patrols by the Authority.
- B. The Authority may audit the Contractor's safety program for HSE compliance at various intervals of the project, at the sole discretion of the Authority. Elements may include, but are not limited to: OSHA injury & illness records and logs, Job Safety Analysis and safety plans, equipment operator licenses and training records, incident reports, meeting minutes, engineered plans, safety meeting records, crane and rigging plans, equipment inspection records, qualifications of and interviews with key Contractor management personnel, and other similar information. The Contractor shall support and cooperate with these audits at no additional compensation or schedule impacts with this contract.

2.24 RAILWAY SAFETY PRECAUTIONS

- A. Work on operating railways shall be in compliance with 49 CFR, Part 214, CCR Title 8 Standards, and the Southern California Regional Rail Authority (SCRRA).
- B. New construction rail projects require that all employers and contractors are responsible to assure employees are trained and understand on-track safety procedures, and follow roadway worker rules identified in 49 CFR, Part 214, CCR Title 8, SCRRA, the California Department of Transportation (CalTrans), and OCTA HSE Construction Management Requirements (i.e., item E references).
- C. Minimum PPE for workers include hard hat, safety glasses, orange (i.e., rail company approved color) class 2 reflective vest, safety toe footwear that meets ANSI Z41 1991 (lace-up type over the ankle) and hearing protection (on person and worn as necessary).

2.25 FINES

The Contractor shall be responsible for the payment of all fines levied against the Authority for HSE violations arising from or related to activities over which Contractor has responsibility per the contract.

2.26 COMPLIANCE COSTS

Compliance with Health, Safety and Environmental Compliance identified in these aforementioned Authority Safety Specifications shall be at the expense of the Contractor, and included in Bid Documents to the Authority for the Contractor's scope. The Authority shall incur no additional cost or schedule impacts by Contractor, for compliance with California Construction Safety Orders, CCR Title 8 Standards, Federal OSHA Standards, and the Authority Safety Specifications for the protection of persons and property.

2.27 REFERENCES

- A. CCR Title 8 Standards (Cal/OSHA)
- B. CFR Including 1910 and 1926 Standards
- C. NFPA, NEC, ANSI, NIOSH Standards
- D. USACE Construction Quality Management Manual (EM-385-1-1)
- E. Construction Industry Institute (CII)
- F. OCTA Construction Management Procedures Manual
- G. OCTA Yard Safety Rules

END OF DOCUMENT

Level 3 HSE Specifications

Revision 9, 8/28/2015

1008403.1

FORM A: PROPOSER'S QUESTIONS FORM

Proposer’s Questions Form

Question No.	Page	Section	Section Description	Proposer’s Question	OCTA Response
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					

FORM B: CAMPAIGN CONTRIBUTION DISCLOSURE FORM

CAMPAIGN CONTRIBUTION DISCLOSURE FORM

Information Sheet

ORANGE COUNTY TRANSPORTATION AUTHORITY

The attached Campaign Contribution Disclosure Form must be completed by applicants for, or persons who are the subject of, any proceeding involving a license, permit, or other entitlement for use pending before the Board of Directors of the OCTA or any of its affiliated agencies. (Please see next page for definitions of these terms.)

IMPORTANT NOTICE

Basic Provisions of Government Code Section 84308

- A. If you are an applicant for, or the subject of, any proceeding involving a license, permit, or other entitlement for use, you are prohibited from making a campaign contribution of more than \$250 to any board member or his or her alternate. This prohibition begins on the date your application is filed or the proceeding is otherwise initiated, and the prohibition ends three months after a final decision is rendered by the Board of Directors. In addition, no board member or alternate may solicit or accept a campaign contribution of more than \$250 from you during this period.
- B. These prohibitions also apply to your agents, and, if you are a closely held corporation, to your majority shareholder as well. These prohibitions also apply to your subcontractor(s), joint venturer(s), and partner(s) in this proceeding. Also included are parent companies and subsidiary companies directed and controlled by you, and political action committees directed and controlled by you.
- C. You must file the attached disclosure form and disclose whether you or your agent(s) have in the aggregate contributed more than \$250 to any board member or his or her alternate during the 12-month period preceding the filing of the application or the initiation of the proceeding.
- D. If you or your agent have in the aggregate contributed more than \$250 to any individual board member or his/or her alternate during the 12 months preceding the decision on the application or proceeding, that board member or alternate must disqualify himself or herself from the decision. However, disqualification is not required if the board member or alternate returns the campaign contribution within 30 days from the time the director knows, or should have known, about both the contribution and the fact that you are a party in the proceeding. The Campaign Contribution Disclosure Form should be completed and filed with your proposal, or with the first written document you file or submit after the proceeding commences.

1. A proceeding involving "a license, permit, or other entitlement for use" includes all business, professional, trade and land use licenses and permits, and all other entitlements for use, including all entitlements for land use, all contracts (other than competitively bid, labor or personal employment contracts), and all franchises.
2. Your "agent" is someone who represents you in connection with a proceeding involving a license, permit or other entitlement for use. If an individual acting as an agent is also acting in his or her capacity as an employee or member of a law, architectural, engineering, consulting firm, or similar business entity, both the business entity and the individual are "agents."
3. To determine whether a campaign contribution of more than \$250 has been made by you, campaign contributions made by you within the preceding 12 months must be aggregated with those made by your agent within the preceding 12 months or the period of the agency, whichever is shorter. Contributions made by your majority shareholder (if a closely held corporation), your subcontractor(s), your joint venturer(s), and your partner(s) in this proceeding must also be included as part of the aggregation. Campaign contributions made to different directors or their alternates are not aggregated.
4. A list of the members and alternates of the Board of Directors is attached.

This notice summarizes the major requirements of Government Code Section 84308 of the Political Reform Act and California Code of Regulations, Title 2 Sections 18438-18438.8.

**ORANGE COUNTY TRANSPORTATION AUTHORITY
CAMPAIGN CONTRIBUTION DISCLOSURE FORM**

RFP Number: _____ RFP Title: _____

To be completed only if campaign contributions have been made in the preceding 12 months.

Prime Contractor Firm Name: _____

Contributor or Contributor Firm's Name: _____

Contributor or Contributor Firm's Address: _____

Is Contributor:

- | | | |
|---|---------|---------|
| <input type="radio"/> the Prime Contractor | Yes____ | No ____ |
| <input type="radio"/> Subcontractor | Yes____ | No ____ |
| <input type="radio"/> Agent/Lobbyist hired by Prime
to represent the Prime in this RFP | Yes____ | No ____ |

Note: Under the State of California Government Code section 84308 and California Code of Regulations, Title 2, Section 18438, campaign contributions made by the Prime Contractor and the Prime Contractor's agent/lobbyist who is representing the Prime Contractor in this RFP must be aggregated together to determine the total campaign contribution made by the Prime Contractor.

Board Member(s) to whom you and/or agent/lobbyist made campaign contributions and the dates of contribution(s) in the preceding 12 months. Each date must include the exact month, day, and year of the contribution.

Name of Board Member: _____

Name of Contributor: _____

Date(s): _____

Amount(s): _____

Name of Board Member: _____

Name of Contributor: _____

Date(s): _____

Amount(s): _____

Date: _____

Signature of Contributor

**ORANGE COUNTY TRANSPORTATION AUTHORITY
AND AFFILIATED AGENCIES**

Board of Directors

Michael Hennessey, Chairman

Lisa A. Bartlett, Vice Chair

Laurie Davies, Director

Barbara Delgleize, Director

Andrew Do, Director

Lori Donchak, Director

Steve Jones, Director

Mark A. Murphy, Director

Richard Murphy, Director

Al Murray, Director

Shawn Nelson, Director

Miguel Pulido, Director

Tim Shaw, Director

Todd Spitzer, Director

Michelle Steel, Director

Tom Tait, Director

Greg Winterbottom, Director

FORM C: STATUS OF PAST AND PRESENT CONTRACTS

STATUS OF PAST AND PRESENT CONTRACTS

On the form provided below, Offeror shall list the status of past and present contracts where the firm has either provided services as a prime vendor or a subcontractor during the past five (5) years in which the contract has been the subject of or may be involved in litigation with the contracting authority. This includes, but is not limited to, claims, settlement agreements, arbitrations, administrative proceedings, and investigations arising out of the contract.

A separate form must be completed for each contract. Offeror shall provide an accurate contact name and telephone number for each contract and indicate the term of the contract and the original contract value. Offeror shall also provide a brief summary and the current status of the litigation, claims, settlement agreements, arbitrations, administrative proceedings, or investigations. If the contract was terminated, list the reason for termination.

Offeror shall have an ongoing obligation to update the Authority with any changes to the identified contracts and any new litigation, claims, settlement agreements, arbitrations, administrative proceedings, or investigations that arise subsequent to the submission of Offeror's proposal. Each form must be signed by an officer of the Offeror confirming that the information provided is true and accurate.

Project city/agency/other:	
Contact Name:	Phone:
Project Award Date:	Original Contract Value:
Term of Contract:	
(1) Litigation, claims, settlements, arbitrations, or investigations associated with contract:	
(2) Summary and Status of contract:	
(3) Summary and Status of action identified in (1):	
(4) Reason for termination, if applicable:	

By signing this Form entitled "Status of Past and Present Contracts," I am affirming that all of the information provided is true and accurate.

Name

Date

Title

Last Rev. 08/26/2015

**FORM D: DISADVANTAGED BUSINESS ENTERPRISE (DBE) PROGRAM
AND FORMS**

DISADVANTAGED BUSINESS ENTERPRISE REQUIREMENTS AND INSTRUCTIONS

1. TERMS AS USED IN THIS DOCUMENT

- The term “Disadvantaged Business Enterprise” or “DBE” means a for-profit small business concern owned and controlled by a socially and economically disadvantaged person(s) as defined in Title 49, Part 26.5, Code of Federal Regulations (CFR), and is one of the following groups:
 1. Black American
 2. Hispanic American
 3. Native American
 4. Asian-Pacific American
 5. Subcontinent Asian American
 6. Women
- The term “bidder” also means “proposer” or “offeror.”
- The term “Agreement” also means “Contract.”
- Agency also means the local entity entering into this contract with the Contractor or Consultant.
- The term “Small Business” or “SB” is as defined in 49 CFR 26.65.

2. AUTHORITY AND RESPONSIBILITY

- A. DBEs and other small businesses are strongly encouraged to participate in the performance of Agreements financed in whole or in part with federal funds (See 49 CFR 26, “Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs”). The Offeror should ensure that DBEs and other small businesses have the opportunity to participate in the performance of the work that is the subject of this solicitation and should take all necessary and reasonable steps for this assurance. The Offeror shall not discriminate on the basis of race, color, national origin, or sex in the award and performance of subcontracts.
- B. Offerors are encouraged to use services offered by financial institutions owned and controlled by DBEs.

3. SUBMISSION OF DBE INFORMATION

“Form D-1 Local Agency Consultant DBE (Consultant Proposal) Commitment”

A “Local Agency Consultant DBE (Consultant Contract) Proposal Commitment” form shall be included with the Request for Proposal. The purpose of the form is to track the proposers progress towards meeting the Contract Goal. This form

collects information on all DBEs towards meeting the contract goal. Even if no DBE participation will be reported, the Offeror must execute and return the form.

“Form D-2 Local Agency Consultant DBE (Consultant Contract) Commitment”

A “Local Agency Consultant DBE (Consultant Contract) Contract Commitment” form shall be included with the Request for Proposal. The purpose of the form is to collect data required under 49 CFR 26. This form collects information on all DBEs. Even if no DBE participation will be reported, the successful Offeror must execute and return the form.

“Form D-3 Bidders List”

The U.S. Department of Transportation (DOT) requires the Authority to create and maintain a “Bidders List” containing information about all firms (DBE and non-DBE) that bid, propose or quote on the Authority’s DOT-assisted contracts, in accordance with 49 CFR Part 26.11, for use in the Authority’s overall annual DBE goal-setting process. Therefore, the Offeror shall provide the requested information for every firm who submitted a bid, proposal or quote, including the primary Offeror, whether successful or unsuccessful in their attempt to obtain a contract:

- a. Firm name;
- b. Firm address;
- c. Firm’s status as a DBE or non-DBE;
- d. Age of the firm;
- e. Type of services provided by the firm; and
- f. Range of annual gross receipts for the last year.

The “Bidders List” information must be submitted on ***Exhibit H-3*** and should be included with the proposal submittal; however, in the event that the referenced Exhibit is not included, the Exhibit shall be submitted to the Authority no later than 48 hours following proposal submission due date and timeline for the Offeror to be deemed responsive.

“Form D-5 DBE Substitution/Termination Request Form”

This form must be used by the CONTRACTOR, if during the Term of the Agreement, the need arises to substitute or terminate a DBE Subcontractor or Supplier.

“Form D-6 Request for Additional DBE Subcontractor/ Sub consultant/ Supplier Form”

This form must be used by the CONTRACTOR, if during the Term of the Agreement, the need arises to add a DBE Subcontractor or Supplier.

“Form D-7 Monthly Race-Conscious DBE Subcontractors Paid Report Summary and Payment Verification (Form 103)”

This form must be submitted to AUTHORITY by the CONTRACTOR, monthly, whether or not any payments were made to a DBE Subcontractor or Supplier, during the previous month.

“Form D-8 Final Report - Utilization of Disadvantaged Business Enterprises, First-Tier Subcontractors Form”

This form must be submitted to AUTHORITY by the CONTRACTOR, at the conclusion of the Agreement Term to show the final utilization of DBEs during the Term.

4. DBE PARTICIPATION GENERAL INFORMATION

It is the Offeror's responsibility to be fully informed regarding the requirements of 49 CFR, Part 26, and the Department's (California Department of Transportation) DBE program developed pursuant to the regulations. Particular attention is directed to the following:

- A. A DBE must be a small business firm defined pursuant to 13 CFR 121 and be certified through the California Unified Certification Program (CUCP).
- B. A certified DBE may participate as a prime contractor, subcontractor, joint venture partner, as a vendor of material or supplies, or as a trucking company.
- C. A DBE bidder, not bidding as a joint venture with a non-DBE, will be required to document one or a combination of the following:
 - 1. The bidder is a DBE and will meet the goal by performing work with its own forces.
 - 2. The bidder will meet the goal through work performed by DBE subcontractors, suppliers or trucking companies.
 - 3. The bidder, prior to bidding, made adequate good faith efforts to meet the goal.

- D. A DBE joint venture partner must be responsible for specific contract items of work or clearly defined portions thereof. Responsibility means actually performing, managing and supervising the work with its own forces. The DBE joint venture partner must share in the capital contribution, control, management, risks and profits of the joint venture commensurate with its ownership interest.
- E. A DBE must perform a commercially useful function pursuant to 49 CFR 26.55; that is, a DBE firm must be responsible for the execution of a distinct element of the work and must carry out its responsibility by actually performing, managing and supervising the work.
- F. The bidder (prime contractor) shall list only one subcontractor for each portion of work as defined in their bid/proposal and all DBE subcontractors should be listed in the bid/cost proposal list of subcontractors.
- G. An Offeror who is a certified DBE is eligible to claim all of the work in the Agreement toward the DBE participation except that portion of the work to be performed by non-DBE subcontractors.

5. RESOURCES

- A. The CUCP database includes the certified DBEs from all certifying agencies participating in the CUCP. If you believe a firm is certified that cannot be located on the database, please contact the Caltrans Office of Certification toll free number 1-866-810-6346 for assistance. Bidder/Proposer may call (916) 440-0539 for web or download assistance.
- B. Access the CUCP database from the Department of Transportation, Civil Rights, Business Enterprise Program website at: <http://www.dot.ca.gov/hq/bep/>.
 - Click on the link in the left menu titled Find a Certified Firm
 - Click on Query Form link, located in the first sentence
 - Click on Certified DBE's (UCP) located on the first line in the center of the page
 - Click on Click To Access DBE Query Form
 - Searches can be performed by one or more criteria
 - Follow instructions on the screen
 - "Start Search," "Requery," "Civil Rights Home," and "Caltrans Home" links are located at the bottom of the query form
- C. How to Obtain a List of Certified DBEs without Internet Access

DBE Directory: If you do not have Internet access, Caltrans also publishes a directory of certified DBE firms extracted from the on-line database. A copy of the directory of certified DBEs may be ordered from the Caltrans Division of Procurement and Contracts/Material and

Distribution Branch/Publication Unit, 1900 Royal Oaks Drive, Sacramento, CA 95815, Telephone: (916) 445-3520.

6. MATERIALS OR SUPPLIES PURCHASED FROM DBES COUNT TOWARDS DBE CREDIT AND PURCHASES WILL COUNT TOWARDS THE DBE GOAL UNDER THE FOLLOWING CONDITIONS:

- A. If the materials or supplies are obtained from a DBE manufacturer, count one hundred percent of the cost of the materials or supplies. A DBE manufacturer is a firm that operates or maintains a factory, or establishment that produces on the premises, the materials, supplies, articles, or equipment required under the Agreement and of the general character described by the specifications.
- B. If the materials or supplies are purchased from a DBE regular dealer, count sixty percent of the cost of the materials or supplies. A DBE regular dealer is a firm that owns, operates or maintains a store, warehouse, or other establishment in which the materials, supplies, articles or equipment of the general character described by the specifications and required under the Agreement are bought, kept in stock, and regularly sold or leased to the public in the usual course of business. To be a DBE regular dealer, the firm must be an established, regular business that engages, as its principal business and under its own name, in the purchase and sale or lease of the products in question. A person may be a DBE regular dealer in such bulk items as petroleum products, steel, cement, gravel, stone or asphalt without owning, operating or maintaining a place of business provided in this section.
- C. If the person both owns and operates distribution equipment for the products, any supplementing of regular dealers' own distribution equipment shall be by a long-term lease agreement and not an ad hoc or Agreement-by -Agreement basis. Packagers, brokers, manufacturers' representatives, or other persons who arrange or expedite transactions are not DBE regular dealers within the meaning of this section.
- D. Materials or supplies purchased from a DBE, which is neither a manufacturer nor a regular dealer, will be limited to the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, or fees or transportation charges for the delivery of materials or supplies required on the job site, provided the fees are reasonable and not excessive as compared with fees charged for similar services.

7. FOR DBE TRUCKING COMPANIES: CREDIT FOR DBES WILL COUNT TOWARDS DBE CREDIT, UNDER THE FOLLOWING CONDITIONS:

- A. The DBE must be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular Agreement, and there cannot be a contrived arrangement for the purpose of meeting the DBE goal.
- B. The DBE must itself own and operate at least one fully licensed, insured and operational truck used on the Agreement.

- C. The DBE receives credit for the total value of the transportation services it provides on the Agreement using trucks it owns, insures, and operates using drivers it employs.
- D. The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the Agreement
- E. The DBE may also lease trucks from a non-DBE firm, including an owner-operator. The DBE who leases trucks from a non-DBE is entitled to credit only for the fee or commission it receives as a result of the lease arrangement. The DBE does not receive credit for the total value of the transportation services provided by the lessee, since these services are not provided by the DBE.
- F. For the purposes of this Section D, a lease must indicate that the DBE has exclusive use and control over the truck. This does not preclude the leased truck from working for others during the term of the lease with the consent of the DBE, as long as the lease gives the DBE absolute priority for use of the leased truck. Leased trucks must display the name and identification number of the DBE.

EXHIBIT 10-01 CONSULTANT PROPOSAL DBE COMMITMENT

1. Local Agency: _____ 2. Contract DBE Goal: _____
3. Project Description: _____
4. Project Location: _____
5. Consultant's Name: _____ 6. Prime Certified DBE: ☐

7. Description of Work, Service, or Materials Supplied	8. DBE Certification Number	9. DBE Contact Information	10. DBE %
Local Agency to Complete this Section		11. TOTAL CLAIMED DBE PARTICIPATION	%
17. Local Agency Contract Number: _____ 18. Federal-Aid Project Number: _____ 19. Proposed Contract Execution Date: _____ Local Agency certifies that all DBE certifications are valid and information on this form is complete and accurate.			
20. Local Agency Representative's Signature _____ 22. Local Agency Representative's Name _____ 24. Local Agency Representative's Title _____		21. Date _____ 23. Phone _____ IMPORTANT: Identify all DBE firms being claimed for credit, regardless of tier. Written confirmation of each listed DBE is required. 12. Preparer's Signature _____ 14. Preparer's Name _____ 16. Preparer's Title _____ 13. Date _____ 15. Phone _____	

DISTRIBUTION: Original – Included with consultant's proposal to local agency.

INSTRUCTIONS – CONSULTANT PROPOSAL DBE COMMITMENT**CONSULTANT SECTION**

- 1. Local Agency** - Enter the name of the local or regional agency that is funding the contract.
- 2. Contract DBE Goal** - Enter the contract DBE goal percentage as it appears on the project advertisement.
- 3. Project Description** - Enter the project description as it appears on the project advertisement (Bridge Rehab, Seismic Rehab, Overlay, Widening, etc.).
- 4. Project Location** - Enter the project location as it appears on the project advertisement.
- 5. Consultant's Name** - Enter the consultant's firm name.
- 6. Prime Certified DBE** - Check box if prime contractor is a certified DBE.
- 7. Description of Work, Services, or Materials Supplied** - Enter description of work, services, or materials to be provided. Indicate all work to be performed by DBEs including work performed by the prime consultant's own forces, if the prime is a DBE. If 100% of the item is not to be performed or furnished by the DBE, describe the exact portion to be performed or furnished by the DBE. See LAPM Chapter 9 to determine how to count the participation of DBE firms.
- 8. DBE Certification Number** - Enter the DBE's Certification Identification Number. All DBEs must be certified on the date bids are opened.
- 9. DBE Contact Information** - Enter the name, address, and phone number of all DBE subcontracted consultants. Also, enter the prime consultant's name and phone number, if the prime is a DBE.
- 10. DBE %** - Percent participation of work to be performed or service provided by a DBE. Include the prime consultant if the prime is a DBE. See LAPM Chapter 9 for how to count full/partial participation.
- 11. Total Claimed DBE Participation %** - Enter the total DBE participation claimed. If the total % claimed is less than item "Contract DBE Goal," an adequately documented Good Faith Effort (GFE) is required (see Exhibit 15-H DBE Information - Good Faith Efforts of the LAPM).
- 12. Preparer's Signature** - The person completing the DBE commitment form on behalf of the consultant's firm must sign their name.
- 13. Date** - Enter the date the DBE commitment form is signed by the consultant's preparer.
- 14. Preparer's Name** - Enter the name of the person preparing and signing the consultant's DBE commitment form.
- 15. Phone** - Enter the area code and phone number of the person signing the consultant's DBE commitment form.
- 16. Preparer's Title** - Enter the position/title of the person signing the consultant's DBE commitment form.

LOCAL AGENCY SECTION

- 17. Local Agency Contract Number** - Enter the Local Agency contract number or identifier.
- 18. Federal-Aid Project Number** - Enter the Federal-Aid Project Number.
- 19. Proposed Contract Execution Date** - Enter the proposed contract execution date.
- 20. Local Agency Representative's Signature** - The person completing this section of the form for the Local Agency must sign their name to certify that the information in this and the Consultant Section of this form is complete and accurate.
- 21. Date** - Enter the date the DBE commitment form is signed by the Local Agency Representative.
- 22. Local Agency Representative's Name** - Enter the name of the Local Agency Representative certifying the consultant's DBE commitment form.
- 23. Phone** - Enter the area code and phone number of the person signing the consultant's DBE commitment form.
- 24. Local Agency Representative Title** - Enter the position/title of the Local Agency Representative certifying the consultant's DBE commitment form.

EXHIBIT 10-O2 CONSULTANT CONTRACT DBE COMMITMENT

1. Local Agency: _____ 2. Contract DBE Goal: _____
3. Project Description: _____
4. Project Location: _____
5. Consultant's Name: _____ 6. Prime Certified DBE: ☐ 7. Total Contract Award Amount: _____
8. Total Dollar Amount for ALL Subconsultants: _____ 9. Total Number of ALL Subconsultants: _____

10. Description of Work, Service, or Materials Supplied	11. DBE Certification Number	12. DBE Contact Information	13. DBE Dollar Amount
Local Agency to Complete this Section 20. Local Agency Contract Number: _____ 21. Federal-Aid Project Number: _____ 22. Contract Execution Date: _____ Local Agency certifies that all DBE certifications are valid and information on this form is complete and accurate. 23. Local Agency Representative's Signature _____ 24. Date _____ 25. Local Agency Representative's Name _____ 26. Phone _____ 27. Local Agency Representative's Title _____		14. TOTAL CLAIMED DBE PARTICIPATION IMPORTANT: Identify all DBE firms being claimed for credit, regardless of tier. Written confirmation of each listed DBE is required. 15. Preparer's Signature _____ 16. Date _____ 17. Preparer's Name _____ 18. Phone _____ 19. Preparer's Title _____	\$ _____ % _____

DISTRIBUTION: 1. Original – Local Agency
 2. Copy – Caltrans District Local Assistance Engineer (DLAE). Failure to submit to DLAE within 30 days of contract execution may result in de-obligation of federal funds on contract.

ADA Notice: For individuals with sensory disabilities, this document is available in alternate formats. For information call (916) 654-6410 or TDD (916) 654-3880 or write Records and Forms Management, 1120 N Street, MS-89, Sacramento, CA 95814.

INSTRUCTIONS – CONSULTANT CONTRACT DBE COMMITMENT**CONSULTANT SECTION**

- 1. Local Agency** - Enter the name of the local or regional agency that is funding the contract.
- 2. Contract DBE Goal** - Enter the contract DBE goal percentage as it appears on the project advertisement.
- 3. Project Description** - Enter the project description as it appears on the project advertisement (Bridge Rehab, Seismic Rehab, Overlay, Widening, etc).
- 4. Project Location** - Enter the project location as it appears on the project advertisement.
- 5. Consultant's Name** - Enter the consultant's firm name.
- 6. Prime Certified DBE** - Check box if prime contractor is a certified DBE.
- 7. Total Contract Award Amount** - Enter the total contract award dollar amount for the prime consultant.
- 8. Total Dollar Amount for ALL Subconsultants** - Enter the total dollar amount for all subcontracted consultants. SUM = (DBEs + all Non-DBEs). Do not include the prime consultant information in this count.
- 9. Total number of ALL subconsultants** - Enter the total number of all subcontracted consultants. SUM = (DBEs + all Non-DBEs). Do not include the prime consultant information in this count.
- 10. Description of Work, Services, or Materials Supplied** - Enter description of work, services, or materials to be provided. Indicate all work to be performed by DBEs including work performed by the prime consultant's own forces, if the prime is a DBE. If 100% of the item is not to be performed or furnished by the DBE, describe the exact portion to be performed or furnished by the DBE. See LAPM Chapter 9 to determine how to count the participation of DBE firms.
- 11. DBE Certification Number** - Enter the DBE's Certification Identification Number. All DBEs must be certified on the date bids are opened.
- 12. DBE Contact Information** - Enter the name, address, and phone number of all DBE subcontracted consultants. Also, enter the prime consultant's name and phone number, if the prime is a DBE.
- 13. DBE Dollar Amount** - Enter the subcontracted dollar amount of the work to be performed or service to be provided. Include the prime consultant if the prime is a DBE. See LAPM Chapter 9 for how to count full/partial participation.
- 14. Total Claimed DBE Participation - \$:** Enter the total dollar amounts entered in the "DBE Dollar Amount" column. **%:** Enter the total DBE participation claimed ("Total Participation Dollars Claimed" divided by item "Total Contract Award Amount"). If the total % claimed is less than item "Contract DBE Goal," an adequately documented Good Faith Effort (GFE) is required (see Exhibit 15-H DBE Information - Good Faith Efforts of the LAPM).
- 15. Preparer's Signature** - The person completing the DBE commitment form on behalf of the consultant's firm must sign their name.
- 16. Date** - Enter the date the DBE commitment form is signed by the consultant's preparer.
- 17. Preparer's Name** - Enter the name of the person preparing and signing the consultant's DBE commitment form.
- 18. Phone** - Enter the area code and phone number of the person signing the consultant's DBE commitment form.
- 19. Preparer's Title** - Enter the position/title of the person signing the consultant's DBE commitment form.

LOCAL AGENCY SECTION

- 20. Local Agency Contract Number** - Enter the Local Agency contract number or identifier.
- 21. Federal-Aid Project Number** - Enter the Federal-Aid Project Number.
- 22. Contract Execution Date** - Enter the date the contract was executed.
- 23. Local Agency Representative's Signature** - The person completing this section of the form for the Local Agency must sign their name to certify that the information in this and the Consultant Section of this form is complete and accurate.
- 24. Date** - Enter the date the DBE commitment form is signed by the Local Agency Representative.
- 25. Local Agency Representative's Name** - Enter the name of the Local Agency Representative certifying the consultant's DBE commitment form.
- 26. Phone** - Enter the area code and phone number of the person signing the consultant's DBE commitment form.
- 27. Local Agency Representative Title** - Enter the position/title of the Local Agency Representative certifying the consultant's DBE commitment form.

BIDDERS LIST

Proposer: _____

RFP No.: _____

The Department of Transportation requires the AUTHORITY to create and maintain a "Bidders List" containing information about all firms (DBE and Non-DBE) that bid, propose or quote on the Authority's DOT-assisted contracts, in accordance with 49 CFR Part 26.11. The "Bidders List" is intended to be a count of all firms that are participating, or attempting to participate, on DOT-assisted contracts, whether successful or unsuccessful in their attempt to obtain a contract.

The Proposer is to complete all requested information for every firm who submitted a bid, proposal or quote, including the primary Proposer, and submit this information at the time of proposal submission, or as otherwise specified in the solicitation. The AUTHORITY will utilize this information to assist in the AUTHORITY's overall DBE goal-setting process.

Prime Proposer's Information:

Name of Prime's Firm:	Phone: ()
Firm Address:	Fax: ()
	E-mail:
	Type of work/services/materials provided:
Number of years in business:	
Contact Person:	Title:
Is the firm currently certified as a DBE under 49 CFR Part 26? Yes <input type="checkbox"/> No <input type="checkbox"/>	Check the box below for your firm's annual gross receipts last year:
DBE Certification Eligibility (place an "X"): ___ African American ___ Asian Pacific American ___ Native American ___ Woman ___ Hispanic American ___ Subcontinent Asian American ___ Other	<input type="checkbox"/> Less than \$1 million
	<input type="checkbox"/> Less than \$5 million
	<input type="checkbox"/> Less than \$10 million
	<input type="checkbox"/> Less than \$15 million
	<input type="checkbox"/> More than \$15 million

Provide the following information for every firm (DBE and non-DBE) that submitted proposal or quote on this DOT-assisted project, whether successful or unsuccessful in their attempt to obtain a contract:

Firm Name:	Phone: ()
Firm Address:	Fax: ()
	E-mail:
	Type of work/services/materials provided:
Number of years in business:	

**RFP 7-1911
FORM D-3**

Contact Person:	Title:
Is the firm currently certified as a DBE under 49 CFR Part 26? Yes <input type="checkbox"/> No <input type="checkbox"/>	Check the box below for your firm's annual gross receipts last year:
DBE Certification Eligibility (place an "X"): ___ African American ___ Asian Pacific American ___ Native American ___ Woman ___ Hispanic American ___ Subcontinent Asian American ___ Other	<input type="checkbox"/> Less than \$1 million
	<input type="checkbox"/> Less than \$5 million
	<input type="checkbox"/> Less than \$10 million
	<input type="checkbox"/> Less than \$15 million
	<input type="checkbox"/> More than \$15 million

Firm Name:	Phone: ()
Firm Address:	Fax: ()
	E-mail:
	Type of work/services/materials provided:
Number of years in business:	
Contact Person:	Title:
Is the firm currently certified as a DBE under 49 CFR Part 26? Yes <input type="checkbox"/> No <input type="checkbox"/>	Check the box below for your firm's annual gross receipts last year:
DBE Certification Eligibility (place an "X"): ___ African American ___ Asian Pacific American ___ Native American ___ Woman ___ Hispanic American ___ Subcontinent Asian American ___ Other	<input type="checkbox"/> Less than \$1 million
	<input type="checkbox"/> Less than \$5 million
	<input type="checkbox"/> Less than \$10 million
	<input type="checkbox"/> Less than \$15 million
	<input type="checkbox"/> More than \$15 million

If necessary, this "Bidders List" form can be duplicated to include all firms (DBE and non-DBE) that have submitted a bid, proposal or quote on this DOT-assisted project, whether successful or unsuccessful in their attempt to obtain a contract.

Failure of the Proposer to submit the required "Bidders List" form may deem the Proposer non-responsive.

- B. Solicitation Effort Documentation; the names and dates of written notices sent to certified DBEs soliciting bids for this project and the dates and methods used to following up initial solicitations to determine with certainty whether the DBEs were interested (please attach all copies of solicitation, telephone records, fax confirmations, etc.), amount of DBEs to repond, the DBE firms were provided information about the contract (location of project, contract number, bid date, items of work made available and contact information) in the Invitation to bid from the Bidder, the Bidder solicited through all reasonable means (e.g. attendance at pre-bid meetings, advertising and/or written notices) the interest of all certified DBEs who have the capability to perform the work of the contract, Bidder to provide proof of aforementioned items, and DBE's in the market area for the work identified in 'Item A' as follows:

Names of DBEs Solicited Methods and Dates	Date of Initial Solicitation	Follow Up

- C. Rejected DBE Bid Documentation; the names, addresses, phone numbers, and amount of rejected DBE firms, the reasons for the Bidder's rejection of the DBE firms, the firms selected and accepted for that work (please attach all copies of quotes from the firms involved) and the price difference for each DBE if the selected firms is not a DBE, include an explanation of quote(s) rejected.

Names, addresses and phone numbers of rejected DBEs and the reasons for the Bidder's rejection of the DBEs as follows:

Names, addresses and phone numbers of firms selected for the work

- D. Publication Efforts Made to Advertise the Projects to Solicit DBE Participation; names and dates of each publication in which a request for DBE participation for this project was placed by the Bidder (please attach copies of advertisements or proof of publications). (Please note: If IFB due date is extended, Bidder is to re-advertise new bid due date.)

Publications	Dates of Advertisement

- E. Agencies, Organizations, or Groups contacted to provide assistance in Contracting, Recruiting, and Using DBEs; the names of agencies, organizations or groups contacted to provide assistance in contacting, recruiting and using DBE firms (please attach copies of requests to agencies and any responses received), as follows:

- F. Efforts to Provide Information About the Plans, Specifications, and Contract Requirements; efforts made to assist interested DBEs in obtaining necessary materials, or related assistance or services, Bidder to provide evidence of effort.

- G. Assistance with Lines of Credit, Insurance, and/or other Services; efforts made to assist interested DBEs in obtaining bonding, lines of credit or insurance, and any technical assistance or information related to the plans, specifications and requirements for the work which was provided to DBEs, Bidder to provide a list of any assistance provided to prospective and bided DBEs:

- H. Additional Data to Support a Demonstration of Good Faith Efforts; (for additional data please use additional sheets as necessary):

NOTE: USE ADDITIONAL SHEETS OF PAPER IF NECESSARY.

DBE SUBSTITUTION/TERMINATION REQUEST FORM

REQUEST DATE:	PRIME CONTRACTOR:
PROJECT:	CONTRACT NUMBER:

LISTED OR PREVIOUSLY APPROVED DBE SUBCONTRACTOR:			
ORIGINAL CONTRACT VALUE:		INDICATE DBE STATUS: [] SB [] DBE [] UDBE [] NON SB/DBE/UDBE	
SUBCONTRACTOR REPRESENTATIVE:		PHONE NUMBER:	
ITEM NUMBER	WORK DESCRIPTION	DOLLAR AMOUNT COMPLETED	DOLLAR AMOUNT REMAINING
		\$	\$
		\$	\$
		\$	\$
		\$	\$
		\$	\$

PROPOSED SUBCONTRACTOR:			
ORIGINAL CONTRACT VALUE:		INDICATE DBE STATUS: [] SB [] DBE [] UDBE [] NON SB/DBE/UDBE	
SUBCONTRACTOR REPRESENTATIVE:		PHONE NUMBER:	
ITEM NUMBER	WORK DESCRIPTION	DOLLAR AMOUNT COMMITTED	
		\$	
		\$	
		\$	
		\$	
		\$	

INDICATE REASON FOR SUBSTITUTION (REFER TO PAGE 2 FOR SUBSTITUTION BASIS):
--

INDICATE ALL SUPPORTING DOCUMENTATION PROVIDED:

	PROOF OF DBE CERTIFICATION FOR PROPOSED FIRM
	WRITTEN CONFIRMATION OF WORK AND AMOUNT (QUOTE) OR PROPOSED SUBCONTRACT AGREEMENT SIGNED BY PROPOSED FIRM
	CONSENT OR ACKNOWLEDGMENT OF RELEASE FROM SUBSTITUTED FIRM
	DBE GOOD FAITH EFFORTS DOCUMENTATION
	OTHER:

PRIME CONTRACTOR REPRESENTATIVE/TITLE:	PHONE NUMBER:
--	---------------

INTERNAL AUTHORITY USE ONLY

REMARKS:

AUTHORITY APPROVAL(S):

INITIAL REVIEW AND APPROVAL BY:	DATE:
APPROVAL BY DIRECTOR OF CONTRACTS AND COMPLIANCE:	DATE:

REASONS FOR SUBSTITUTION/TERMINATION OF A DBE

The Contractor must first obtain the written consent of the Authority before any Contractor can act on the substitution of the DBE and must provide copies of the new or amended subcontracts. The Authority requires that a Contractor, or its subcontractor(s), make good faith efforts to replace a DBE that is terminated or has otherwise failed to complete its work on a contract with another certified DBE, to the same extent needed to meet the overall or individual contract specific DBE goal, as established. Before requesting the Authority's consent for the proposed substitution or termination, the Contractor must give written notice of the proposal, including the reason for the request, to the DBE with a copy to the Authority. The DBE must be given five (5) days to respond. The notice period may be reduced if required by public necessity (e.g., safety).

1. The listed DBE subcontractor failed or refused to execute the written subcontract.
2. The listed DBE subcontractor failed or refused to perform the work of its subcontract consistent with normal industry standards; good cause does not exist where failure or refusal to perform the work of the subcontract results from bad faith or discriminatory action of the Contractor.
3. The listed DBE subcontractor failed or refused to meet reasonable, nondiscriminatory bond requirements.
4. The listed DBE subcontractor is bankrupt, insolvent, or exhibits credit unworthiness.
5. The listed DBE subcontractor is ineligible to work because of suspension and debarment proceedings.
6. The listed DBE subcontractor is not a responsible subcontractor.
7. The listed DBE subcontractor voluntarily withdraws from the project and provides written notice of its withdrawal.
8. The listed DBE subcontractor is ineligible to receive DBE credit for the type of work required.
9. The owner of the listed DBE subcontractor dies or becomes disabled and is unable to complete its work.
10. Other documented good cause that compels the substitution or termination of the listed DBE subcontractor. Enter reason(s) under remarks.



ORANGE COUNTY TRANSPORTATION AUTHORITY

REQUEST FOR ADDITIONAL DBE SUBCONTRACTOR/SUBCONSULTANT/SUPPLIER FIRM

Request for additional DBE(s) shall be in accordance with the Contract specifications and is subject to approval by the Authority. The Prime Contractor/Consultant shall provide Authority with the information requested below upon identification of any DBE subcontractor/subconsultant/supplier firm not previously listed to perform under the Contract. The Prime Contractor/Consultant shall also provide a written confirmation from the DBE that it is participating in the contract for a specified value, including the corresponding scope of work (a subcontract agreement can serve in lieu of the written confirmation).

Contract No.:		Contract Name:	
Prime Contractor/Consultant:			
Business Address:			
Please provide the following information for the proposed additional DBE subcontractor/subconsultant/supplier firm:			
DBE Firm Name:		DBE Certification Number:	
Business Address:			
Contact Person:	Phone Number: ()	Email Address:	
Description of Work (Scope):			
Related DBE NAICS Code(s):		Proposed DBE Subcontract Value:	
Copy of DBE Certification Letter attached (Required)? <input type="checkbox"/> Yes <input type="checkbox"/> No			

Prime Contractor/Consultant Representative Signature

Title

Business Phone Number

Date

FOR AUTHORITY USE ONLY:

Date Request Received: _____ Approve Request for Additional DBE? ☐ Yes ☐ No

If no, please state reason: _____

Reviewed by: _____ Title: _____

Signature: _____ Date: _____


MONTHLY RACE-CONSCIOUS DBE SUBCONTRACTORS PAID REPORT SUMMARY AND PAYMENT VERIFICATION (Form 103)

Reporting Period (month): _____, 20 ____

Contract/Project Number: _____ Report Number: _____ Report prepared by: _____
 Project Name: _____ Original Contract Award Amount: _____ Title: _____
 Contract Award Date: _____ Current Contract Value: _____ Report reviewed by: _____
 Prime Name: _____ % of Project Complete: _____ Signature: _____
 Address: _____ OCTA Payment This Month: _____ Title: _____
 Telephone Number: () _____ Total \$ Paid to Prime to date: _____ Date of Last Progress Payment rec'd from OCTA: _____
 Contract DBE Goal: ____ % (% of total Contract) Total \$ Paid to DBEs this Reporting Period: _____
 Prime's DBE Commitment: ____ % Total \$ Paid to DBEs to date: _____ DBE Goal Attainment to date: ____ %

DBE SUB CONTRACTORS	Dollar Amount Paid This Month	Dollar Amount Paid to Date	Type of Work Performed (Scope)	Original Dollar Amount Committed to DBE at Contract Award	\$ +/- resulting from Change Order Activity	% of Work Completed	FOR AUTHORITY] USE ONLY
Name:							
Address:							
City, State, Zip Code:							
Telephone Number: ()							
Subcontractor ↑ Broker ↑							
Supplier: Regular Dealer ↑ or Manufacturer ↑							
Attach verification of payment							
Name:							
Address:							
City, State, Zip Code:							
Telephone Number: ()							
Subcontractor ↑ Broker ↑							
Supplier: Regular Dealer ↑ or Manufacturer ↑							
Attach verification of payment							
Name:							
Address:							
City, State, Zip Code:							
Telephone Number: ()							
Subcontractor ↑ Broker ↑							
Supplier: Regular Dealer ↑ or Manufacturer ↑							
Attach verification of payment							

Comments/Issues and/or documented Good Faith Efforts performed during this reporting period: _____

REP 7-1911
FORM D-8

List all first-tier subcontractors/subconsultants and DBEs regardless of tier whether or not the firms were originally listed for goal credit. If actual DBE utilization (or item of work) was different than that approved at the time of award, provide comments on an additional page. List actual amount paid to each entity. If no subcontractors/subconsultants were used on the contract, indicate on the form.

17. Contractor/Consultant Representative's Signature	18. Contractor/Consultant Representative's Name	19. Phone	20. Date
I CERTIFY THAT THE CONTRACTING RECORDS AND ON-SITE PERFORMANCE OF THE DBE(S) HAS BEEN MONITORED			
21. Local Agency Representative's Signature	22. Local Agency Representative's Name	23. Phone	24. Date

ADA NOTICE: For individuals with sensory disabilities, this document is available in alternate formats. For information, call (916) 445-1233, Local Assistance Procedures Manual TTY 711, or write to Records and Forms Management, 1120 N Street, MS-89, Sacramento, CA 95814.

INSTRUCTIONS – FINAL REPORT-UTILIZATION OF DISADVANTAGED BUSINESS ENTERPRISES (DBE) AND FIRST-TIER SUBCONTRACTORS

- 1. Local Agency Contract Number** - Enter the Local Agency contract number or identifier.
- 2. Federal-Aid Project Number** - Enter the Federal-Aid Project Number.
- 3. Local Agency** - Enter the name of the local or regional agency that is funding the contract.
- 4. Contract Completion Date** - Enter the date the contract was completed.
- 5. Contractor/Consultant** - Enter the contractor/consultant's firm name.
- 6. Business Address** - Enter the contractor/consultant's business address.
- 7. Final Contract Amount** - Enter the total final amount for the contract.
- 8. Contract Item Number** - Enter contract item for work, services, or materials supplied provided. Not applicable for consultant contracts.
- 9. Description of Work, Services, or Materials Supplied** - Enter description of work, services, or materials provided. Indicate all work to be performed by DBEs including work performed by the prime contractor/consultant's own forces, if the prime is a DBE. If 100% of the item is not to be performed or furnished by the DBE, describe the exact portion to be performed or furnished by the DBE. See LAPM Chapter 9 to determine how to count the participation of DBE firms.
- 10. Company Name and Business Address** - Enter the name, address, and phone number of all subcontracted contractors/consultants. Also, enter the prime contractor/consultant's name and phone number, if the prime is a DBE.
- 11. DBE Certification Number** - Enter the DBE's Certification Identification Number. Leave blank if subcontractor is not a DBE.
- 12. Contract Payments** - Enter the subcontracted dollar amount of the work performed or service provided. Include the prime contractor/consultant if the prime is a DBE. The Non-DBE column is used to enter the dollar value of work performed by firms that are not certified DBE or for work after a DBE becomes decertified.
- 13. Date Work Completed** - Enter the date the subcontractor/subconsultant's item work was completed.
- 14. Date of Final Payment** - Enter the date when the prime contractor/consultant made the final payment to the subcontractor/subconsultant for the portion of work listed as being completed.
- 15. Original DBE Commitment Amount** - Enter the "Total Claimed DBE Participation Dollars" from Exhibits 15-G or 10-O2 for the contract.
- 16. Total** - Enter the sum of the "Contract Payments" Non-DBE and DBE columns.
- 17. Contractor/Consultant Representative's Signature** - The person completing the form on behalf of the contractor/consultant's firm must sign their name.
- 18. Contractor/Consultant Representative's Name** - Enter the name of the person preparing and signing the form.
- 19. Phone** - Enter the area code and telephone number of the person signing the form.
- 20. Date** - Enter the date the form is signed by the contractor's preparer.
- 21. Local Agency Representative's Signature** - A Local Agency Representative must sign their name to certify that the contracting records and on-site performance of the DBE(s) has been monitored.
- 22. Local Agency Representative's Name** - Enter the name of the Local Agency Representative signing the form.
- 23. Phone** - Enter the area code and telephone number of the person signing the form.
- 24. Date** - Enter the date the form is signed by the Local Agency Representative.

FORM E: RESTRICTIONS ON LOBBYING CERTIFICATION

CERTIFICATION
LIMITATION ON PAYMENTS TO INFLUENCE CERTAIN
FEDERAL TRANSACTIONS

A. DEFINITIONS

1. Authority, as used in this clause, means the Orange County Transportation Authority, acting on behalf of the Orange County Transit District.
2. Covered Federal action, as used in this clause, means any of the following Federal actions:
 - a. The awarding of any Federal contract.
 - b. The making of any Federal grant.
 - c. The making of any Federal loan.
 - d. The entering into of any cooperative agreement.
 - e. The extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
3. Indian tribe and tribal organization, as used in this clause, have the meaning provided in Section 450b of the Indian self-determination and Education Assistance Act (25 U.S.C. 450) and include Alaskan Natives.
4. Influencing or attempting to influence, as used in this clause, means making, with the intent to influence, any communication to or appearance before an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any covered Federal action.
5. Local government, as used in this clause, means a unit of government in a State and, if chartered, established, or otherwise were recognized by a State for the performance of a governmental duty, including a local public authority, a special district, an intrastate district, a council of governments, a sponsor group representative organization, and any other instrumentality of a local government.
6. Officer or employee of an agency, as used in this clause, includes the following individuals who are employed by an agency:
 - a. An individual who is appointed to a position in the Government under title 5, United States code, including a position under a temporary appointment.
 - b. A member of the uniformed services, as defined in the subsection

101(3), Title 37, United States Code.

- c. A special Government employee, as defined in Section 202, Title 18, United States Code.
 - d. An individual who is a member of a Federal advisory committee, as defined by the Federal Advisory Committee Act, Title 5, United States Code, Appendix section 3.
- 7. Person, as used in this clause, means an individual, corporation, company, association, authority, firm, partnership, society, State, and local government, regardless of whether such entity is operated for profit, or not for profit. This term excludes an Indian tribe, tribal organization or any other Indian organization with respect to expenditures specifically permitted by other Federal law.
 - 8. Reasonable compensation, as used in this clause, means with respect to a regularly employed officer or employee of any person, compensation that is consistent with the normal compensation for such officer or employee for work that is not furnished to, not funded by, or not furnished in cooperation with the Federal Government.
 - 9. Reasonable payment, as used in this clause means, with respect to professional and other technical services, a payment in an amount that is consistent with the amount normally paid for such services in the private sector.
 - 10. Recipient, as used in this clause, includes the CONSULTANT and all subcontractors. This term excludes an Indian tribe, tribal organization, or any other Indian organization with respect to expenditures specifically permitted by other Federal law.
 - 11. Regularly employed, as used in this clause, means, with respect to an officer or employee of a person requesting or receiving by such person for at least 130 working days within one year immediately preceding the date of the submission that initiates agency consideration of such person for receipt of such contract. An officer or employee who is employed by such person for less than 130 working days within one year immediately preceding the date of the submission that initiates agency consideration of such person shall be considered to be regularly employed as soon as he or she is employed by such person for 130 working days.
 - 12. State, as used in this clause, means a State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, a territory or possession of the United States, an agency or instrumentality of a State, and a multi-State regional or interstate entity having governmental duties and powers.

B. PROHIBITIONS

1. Section 1352 of Title 31, United States Code, among other things, prohibits a recipient of a Federal contract, grant, loan or cooperative agreement from using appropriated funds to pay any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any of the following covered Federal actions: the awarding of any Federal contract; the making of any Federal grant; the making of any Federal loan; the entering into of any cooperative agreement; or, the modification of any Federal contract, grant, loan, or cooperative agreement.
2. The Act also requires consultant to furnish a disclosure if any funds other than Federal appropriated funds (including profit or fee received under a covered Federal transaction) have been paid, or will be paid, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with a Federal contract, grant, loan or cooperative agreement.
3. The prohibitions of the Act do not apply under the following conditions:
 - a. Agency and legislative liaison by own employees.
 - (1) The prohibition on the use of appropriated funds, in subparagraph C.1. of this clause, does not apply in the case of payment of reasonable compensation made to an officer or employee of a person requesting or receiving a covered Federal action if the payment is for agency and legislative liaison activities not directly related to a covered Federal action.
 - (2) For purposes of paragraph C.3.a.(1) of this clause, providing any information specifically requested by an agency or Congress is permitted at any time.
 - (3) The following agency and legislative liaison activities are permitted any time where they are not related to a specific solicitation for any covered Federal action:

Discussing with an agency (including individual demonstrations) the qualities and characteristics of the person's products or services, conditions or terms of sale, and service capabilities.

Technical discussions and other activities regarding the

application of adaptation of the person's products or services for an agency's use.

- (4) The following agency and legislative liaison activities are permitted where they are prior to formal solicitation of any covered Federal action:

Providing any information not specifically requested but necessary for an agency to make an informed decision about initiation of a covered Federal action;

Technical discussions regarding the preparation of an unsolicited proposal prior to its official submission; and,

Capability presentations by persons seeking awards from an agency pursuant to the provisions of the Small Business Act, as amended by Public Law 95-507, and subsequent amendments.

- (5) Only those services expressly authorized by paragraph C.3.a.(1) of this clause are permitted under this clause.

b. Professional and technical services

- (1) The prohibition on the use of appropriated funds, in subparagraph C.1. of this clause, does not apply in the case of:

A payment of reasonable compensation made to an officer or employee of a person requesting or receiving a covered Federal action or an extension, continuation, renewal, amendment, or modification of covered Federal action, if payment is for professional or technical services rendered directly in the preparation, submission, or negotiation of any bid, proposal, or application for that Federal action or for meeting requirements imposed by or pursuant to law as condition for receiving that Federal action.

Any reasonable payment to a person, other than an officer or employee of a person requesting or receiving a covered Federal action or an extension, continuation, renewal, amendment, or modification of a covered Federal action if the payment is for professional or technical services rendered directly in the preparation, submission or negotiation of any bid, proposal, or application or that Federal action or for meeting requirements imposed by or pursuant to law as a condition for receiving that Federal action. Persons other than officers or employees of a person requesting or receiving a covered Federal action include contractors and trade associations.

- (2) For purposes of paragraph C.3.a.(1) of this clause, professional and technical services shall be limited to advise and analysis directly applying any professional or technical discipline. For example, drafting of a legal document accompanying a bid or proposal is allowable. Similarly, technical advice provided by an engineer on the performance or operational capability of a piece of equipment rendered directly in the negotiation of a contract is allowable. However, communications with the intent to influence made by a professional (such as a licensed lawyer) or a technical person (such as a licensed accountant) are not allowable under this section unless they provide advice and analysis directly applying their professional or technical expertise and unless the advice or analysis is rendered directly and solely in the preparation, submission, or negotiation of a covered Federal action. Thus, for example, communications with the intent to influence made by a lawyer that do not provide legal advice or analysis directly and solely related to the legal aspects of his or her client's proposal, but generally advocate one proposal over another are not allowable under this section because the lawyer is not providing professional legal services. Similarly, communications with the intent to influence made by an engineer providing an engineering analysis prior to the preparation or submission of a bid or proposal are not allowable under this section since the engineer is providing technical services but not directly in the preparation, submission, or negotiation of a covered Federal action.
- (3) Requirements imposed by or pursuant to law as a condition for receiving a covered Federal award include those required by law or regulation and any other requirements in the actual award documents.
- (4) Only those services expressly authorized by paragraph C.3.a.(1) and (2) of this clause are permitted under this clause.
- (5) The reporting requirements of FAR 3.803(a) shall not apply with respect to payments of reasonable compensation made to regularly employed officers or employees of a person.

c. Disclosure

- (1) The consultant who requests or receives from an agency a Federal contract shall file with that agency a disclosure form OMB standard form LLL, Disclosure of Lobbying Activities, (Attachment to the bid package) if such person has made or had agreed to made any payment using non appropriated funds (to include profits from any covered Federal action), which

would be prohibited under subparagraph B.1. of this clause, if paid for with appropriated funds.

- (2) The consultant shall file a disclosure form at the end of each calendar quarter in which there occurs any event that materially affects the accuracy of the information contained in any disclosure form previously filed by such person under subparagraph II.A. of this clause. An event that materially affects the accuracy of the information reported includes:

A cumulative increase of \$25,000 or more in the amount paid or expected to be paid for influencing or attempting to influence a covered Federal action; or

A change in the person(s) or individual(s) influencing or attempting to influence a covered Federal action; or

A change in the officer(s), employee(s), or Member(s) contacted to influence or attempt to influence a covered Federal action.

- (3) The consultant shall require the submittal of a certification, and if required, a disclosure form by any person who requests or receives any subcontract exceeding \$100,000 under the Federal contract.
- (4) All subcontractor disclosure forms (but not certifications) shall be forwarded from tier to tier until received by the prime consultant. The prime consultant shall submit all disclosures to the District at the end of the calendar quarter in which the disclosure form is submitted by the subcontractor. Each subcontractor certification shall be retained in the subcontract file of the awarding consultant.

d. Agreement

The consultant agrees not to make any payment prohibited by this clause.

e. Penalties

- (1) Any person who makes an expenditure prohibited under paragraph a) of this clause or who fails to file or amend the disclosure form to be filed or amended by paragraph d) of this clause shall be subject to civil penalties as provided for by 31 U.S.C. 1352. An imposition of a civil penalty does not prevent the Government from seeking any other remedy that may be applicable.

- (2) Consultants may rely without liability on the representation made by their subcontractors in the certification and disclosure forms.

f. Cost Allowability:

Nothing in this clause is to be interpreted to make allowable or reasonable any costs, which will otherwise be unallowable or unreasonable. Conversely, costs made specifically unallowable by the requirements in this clause will not be made allowable under any other provisions.

**CERTIFICATION OF
RESTRICTIONS ON LOBBYING**

I, _____, hereby certify on behalf (name of offeror) of
_____ that:
(Firm name)

1. No Federal appropriated funds have been paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
2. If any funds, other than Federal appropriated funds, have been paid or will be paid to any person for making lobbying contacts to an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit the attached Standard Form-LLL, "Disclosure of Lobbying Activities", in accordance with its instructions.
3. The undersigned shall require that the language of this certification be included in all subcontracts, and that all subcontractors shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance is placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

The Bidder, _____, certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Bidder understands and agrees that the provisions of 31 U.S.C. 3801, et seq. apply to this certification and disclosure, if any.

Executed this _____ day of _____, 201____

By _____
(Signature of authorized official)

(Title of authorized official)

DISCLOSURE OF LOBBYING ACTIVITIESComplete this form to disclose lobbying activities pursuant to 31 U.S.C. 1352
(See reverse for public burden disclosure.)

1. Type of Federal Action: <input type="checkbox"/> a. contract <input type="checkbox"/> b. grant <input type="checkbox"/> c. cooperative agreement <input type="checkbox"/> d. loan <input type="checkbox"/> e. loan guarantee <input type="checkbox"/> f. loan insurance	2. Status of Federal Action: <input type="checkbox"/> a. bid/offer application <input type="checkbox"/> b. initial award <input type="checkbox"/> c. post-award	3. Report Type: <input type="checkbox"/> a. initial filing <input type="checkbox"/> b. material changes For Material Change Only: year _____ quarter _____ date of last report _____
4. Name and Address of Reporting Entity: <input type="checkbox"/> Prime <input type="checkbox"/> Subawardee Tier _____, if known: Congressional District, if known:	5. If Reporting Entity in No. 4 is Subawardee, Enter Name and Address of Prime: Congressional District, if known:	
6. Federal Department/Agency:	7. Federal Program Name/Description: CFDA number, if applicable: _____	
8. Federal Action Number, if known:	9. Award Amount, if known: \$	
10. a. Name and Address of Lobbying Entity (if individual, last name, first name, MI)	b. Individuals Performing Services (including address if different from No 10a) (last name, first name, MI):	
(attach Continuation Sheet(s) SF - LLL - A if necessary)		
11. Amount of Payment (check all that apply): \$ _____ <input type="checkbox"/> actual <input type="checkbox"/> planned	13. Type of Payment (check all that apply): <input type="checkbox"/> a. retainer <input type="checkbox"/> b. one-time fee <input type="checkbox"/> c. commission <input type="checkbox"/> d. contingent fee <input type="checkbox"/> e. deferred <input type="checkbox"/> f. other specify: _____	
12. Forum of Payment (check all that apply): <input type="checkbox"/> a. cash <input type="checkbox"/> b. in-kind; specify nature: _____ value: _____		
14. Brief Description of Services Performed or to be Performed and Date(s) of Service, including officer(s), employee(s) or Member(s) contracted for Payment indicated in Item, 11: (attach Continuation Sheet(s) SF-LLL-A if necessary)		
15. Continuation Sheet(s) SF-LLL-A attached: <input type="checkbox"/> Yes <input type="checkbox"/> No		
16. Information requested through this form is authorized by Code 31 U.S.C. Section 1352. This disclosure of lobbying activities is a material representation of fact upon which reliance was placed by the tier above when this transaction was made or entered into. This disclosure is required pursuant to 31 U.S.C. 1352. This information will be reported to the Congress semi-annually and will be available for public inspection. Any person who fails to file the required disclosure shall be subject to a civil penalty of not less than \$10,000.00 and not more than \$100,000.00 for each such failure.		
Signature: _____ Print name: _____ Title: _____ Telephone No: _____ Date: _____		Authorized for Local Reproduction Standard Form - LLL
Federal Use Only		

**INSTRUCTIONS FOR COMPLETION OF SF-LLL DISCLOSURE OF LOBBYING
ACTIVITIES**

This DISCLOSURE FORMS SHALL BE COMPLETED BY the reporting entity, whether Subawardee or prime Federal recipient, at the initiation or receipt of a covered Federal action, or a material change to a previous filing, pursuant to title 31 U.S.C. section 1352. The filing of a form is required for each payment or agreement to make payment to any lobbying entity for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with a covered Federal action. Use the SF-LLL-A Continuation Sheet for additional information if the space on the form is inadequate. Complete all items that apply for both the initial filing and material change report. Refer to the implementing guidance published by the Office of Management and Budget for additional information.

1. Identify the type of covered Federal action for which lobbying activity is and/or has been secured to influence the outcome of a covered Federal action.
2. Identify the status of the covered Federal action.
3. Identify the appropriate classification of this report. If this is a follow-up report caused by a material change to the information previously reported, enter the year and quarter in which the change occurred. Enter the date of the last previously submitted report by this reporting entity for this covered Federal action.
4. Enter the full name, address, city, state and zip code of the reporting entity. Include Congressional District, if known. Check the appropriate classification of the reporting entity that designates if it is, or expects to be a prime or subaward recipient. Identify the tier of the subawardee e.g., the first subawardee of the prime is the first tier. Subawards include but are not limited to subcontracts, subgrants and contract awards under grants.
5. If the organization filing the report in item 4 checks "Subawardee" then enter the full name, address city, state, and zip code of the prime Federal recipient. Include Congressional District.
6. Enter the name of the Federal agency making the award or loan commitment. Include at least one organizational level below agency, name if known. For example, Department of Transportation, United State Coast Guard.
7. Enter the Federal program name for description of the covered Federal action (item 1). If known, enter the full Catalog of Federal Domestic Assistance (CFDA) number for grants, cooperative agreements, loans, and loan commitments.
8. Enter the most appropriate Federal identifying number available for the Federal action identified in item 1 (e.g. Request for Proposal (RFP) number, Invitation for Bid (IFB) number, grant announcement number, the contract, grant, or loan award number, the application/ proposal control number assigned by the Federal agency). Include prefixes, e.g., "RFP DE-90-001."
9. For a covered Federal action where there has been an award or loan commitment by the Federal agency, enter the Federal amount of the award/loan commitment for the prime entity identified in item 4 or 5.
10. (a) Enter the full name, address, city, state, and zip code of the lobbying entity engaged by the reporting entity identified in item 4 to influence the covered Federal action.

(b) Enter the full names of the individual(s) performing services, and include full address if different from 10 (a.). Enter Last Name, First Name, and Middle Initial (MI).
11. Enter the amount of compensation paid or reasonably expected to be paid by the reporting entity (item 4) to the lobbying entity (item 10). Indicate whether the payment has been made (actual) or will be made (planned). Check all boxes that apply. If this is a material change report, enter the cumulative amount of payment made or planned to be made.
12. Check the appropriate box (es). Check all boxes that apply. If payment is made through an in-kind contribution, specify the nature and value of the in-kind payment.
13. Check the appropriate box (es). Check all boxes that apply. If other, specify nature.
14. Provide a specific and detailed description of the services that the lobbyist has performed, or will be expected to perform, and the date(s) of any services rendered. Include all preparatory and related activity, not just time spent in actual contact with Federal officials. Identify the Federal official(s) or employee(s) contacted or the officer(s), employee(s), or Member(s) of Congress that were contacted.
15. Check whether or not a SF-LLL-A Continuation Sheet(s) is attached.
16. The certifying official shall sign and date the form, print his/her name, title, and telephone number.

Public reporting burden for this collection of information is estimated to average 30 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to the Office of Management and Budget Paperwork Reduction Project (0348-0446), Washington, D.C. 20503.

DISCLOSURE OF LOBBYING ACTIVITIES CONTINUATION SHEET

Reporting Entity: _____ Page _____ of _____

Authorized for Local Reproduction

FORM F: CERTIFICATION OF CONSULTANT COMMISSION AND FEES

CERTIFICATION OF CONSULTANT, COMMISSIONS & FEES

I HEREBY CERTIFY that I am the _____, and duly authorized representative of the firm of _____, whose address is _____, and that, except as hereby expressly stated, neither I nor the above firm that I represent have:

- (a) employed or retained for a commission, percentage, brokerage, contingent fee, or other consideration, any firm or person (other than a bona fide employee working solely for me or the above consultant) to solicit or secure this contract; nor
- (b) agreed, as an express or implied condition for obtaining this contract, to employ or retain the services of any firm or person in connection with carrying out the contract; nor
- (c) paid, or agreed to pay, to any firm, organization or person (other than a bona fide employee working solely for me or the above consultant) any fee, contribution, donation, or consideration of any kind, for or in connection with, procuring or carrying out this contract.

I acknowledge that this Certificate is to be made available to the California Department of Transportation (Caltrans) in connection with this contract involving participation of federal-aid highway funds, and is subject to applicable state and federal laws, both criminal and civil.

(Date)

(Signature)

FORM G: PROPOSAL EXCEPTIONS AND/OR DEVIATIONS

PROPOSAL EXCEPTIONS AND/OR DEVIATIONS

The following form shall be completed for each technical and/or contractual exception or deviation that is submitted by Offeror for review and consideration by Authority. The exception and/or deviation must be clearly stated along with the rationale for requesting the exception and/or deviation. If no technical or contractual exceptions or deviations are submitted as part of the original proposal, Offerors are deemed to have accepted Authority's technical requirements and contractual terms and conditions set forth in the Scope of Work (Exhibit A) and Proposed Agreement (Exhibit C). Offerors will not be allowed to submit this form or any contractual exceptions and/or deviation after the proposal submittal date identified in the RFP. Exceptions and/or deviations submitted after the proposal submittal date will not be reviewed by Authority.

Offeror: _____

RFP No.: _____ RFP Title: _____

Deviation or Exception No. : _____

Check one:

- Scope of Work (Technical) _____
- Proposed Agreement (Contractual) _____

Reference Section/Exhibit: _____ Page/Article No. _____

Complete Description of Deviation or Exception:

Rationale for Requesting Deviation or Exception:

Area Below Reserved for Authority Use Only:

FORM H: SURETY COMMITMENT LETTER

SURETY COMMITMENT LETTER

TO: Agency Name

We have reviewed the proposal of _____
(Proposer)

(Address)

for the [RFP Title] for which Proposals will be received on: _____ (Proposal Due Date)
and wish to advise that should this Proposal of the Proposer be accepted and the Contract
awarded to, such Proposer, this company agrees to become the surety and provide the Payment
and Performance Bonds required by the Contract for both the Implementation and Operations
and Maintenance Phases. Such bonds will be in the amounts identified in the Price Proposal as
referenced in the RFP Section I-4.1 Notification of Awards with terms of the bonds as also
provided in that section.

We are duly authorized to do business in the State of [State Name].

Surety Company/Address:

(Authorized Signature)

ATTEST:

[Attach Power of Attorney]

(Corporate Seal, if any. If no seal, write "No Seal" across this place and sign.)

FORM I: ESCROW AGREEMENT

FORM OF INTELLECTUAL PROPERTY ESCROW AGREEMENT

Account Number _____

This Intellectual Property Escrow Agreement ("Agreement") is effective _____, 201_ among _____, a _____ corporation ("IP Escrow Agent"), _____, a _____ corporation ("Depositor"), and the Orange County Transportation Authority, a public entity of the State of California ("OCTA"), who collectively may be referred to in this Agreement as the parties ("Parties").

A. Depositor and OCTA have entered or will enter into a Toll Services Contract (the "Contract"). Unless the context otherwise requires, capitalized terms used in this Agreement have the meanings given in the Contract.

B. Under the Contract, Depositor has granted OCTA licenses to use certain intellectual property, software and supporting materials, and Depositor will from time to time modify, add to, refine, substitute, revise, enhance, update, revise, upgrade and/or correct such software and supporting materials and will submit these updated software development documents on an ongoing basis as the same occur, but at a minimum with each monthly invoice for (a) the D&D Work during the Delivery Phase, (b) Total O&M Price during the O&M Term or (c) compensation for Software maintenance services during the Software Maintenance Option Period, if any.

C. Depositor has agreed in the Contract to deposit into escrow with IP Escrow Agent the Intellectual Property and IP Materials including, without limitation, related documentation of Software required to be delivered as part of the Toll Services and during any Software Maintenance Option Period, if any, including Software Source Code in ASCII format, on industry standard media and source code listings in human readable form of the Software as well as paper and electronic copies of the functional specifications and design specifications, code and documentation for tests used by Depositor to verify Software behavior, and user and technical documentation (all of which, together with modifications, additions, enhancements, updates, revisions, upgrades and corrections thereto and thereof, and all other supplementary deposits under Section 1.1 below, being collectively referred to in this Agreement as the "Software Source Code").

D. Depositor and/or its Software suppliers desire to avoid disclosure and release of the Software Source Code except under certain limited circumstances.

E. The availability of the Intellectual Property (including without limitation Software Source Code) to OCTA is critical to OCTA's business and, therefore, OCTA needs access to the Software Source Code under certain limited circumstances.

F. Depositor and OCTA desire to establish an escrow with IP Escrow Agent to provide for the retention, administration and controlled access of the Intellectual Property (including without limitation Software Source Code).

G. IP Escrow Agent has consented to act as IP Escrow Agent and to receive and hold the current version and any future versions of the Intellectual Property and IP Materials (including without limitation Software Source Code).

H. The parties desire this Agreement to be supplementary to the Contract pursuant to 11 United States Bankruptcy Code, Section 365(n)(1)(B).

NOW, THEREFORE, Depositor and OCTA hereby engage IP Escrow Agent to serve as IP Escrow Agent for the Intellectual Property and IP Materials, IP Escrow Agent hereby accepts such engagement, and the Parties hereby agree to the establishment and administration of an escrow for the Intellectual Property (including without limitation Software Source Code), on the following terms and conditions.

SOURCE CODE ESCROW AGREEMENT

SECTION 1. DEPOSITS

1.1. Obligation to Make Deposits.

(a) Immediately upon execution of this Agreement, Depositor shall deposit Pre-Existing Contractor Intellectual Property and Third Party Intellectual Property (with the exception of the COTS Software that is listed in Exhibit 18) to be used in connection with the Toll Services with IP Escrow Agent.

(b) Based on invoices for Payment Milestones, Depositor shall deposit the then current version of the Project Intellectual Property reflecting modifications and enhancements to such Pre-Existing Contractor Intellectual Property or Third Party Intellectual Property under development by Depositor with the IP Escrow Agent. Depositor shall be required to submit updated IP Materials reflecting the then current version of the Project Intellectual Property with each invoice.

(c) Not later than the date a Notice of TCS Acceptance is issued by OCTA, Depositor shall deposit with IP Escrow Agent the then current approved and accepted version of the Project Intellectual Property that has been developed for Toll Services.

(d) If during any calendar month after the date a Notice of TCS Acceptance is issued by OCTA, Depositor completes and installs in or for the Toll Services any modification, addition, enhancement, update, revision, upgrade or correction of or to any of the escrowed Software Source Code, it shall deposit with IP Escrow Agent, within 30 days after the end of such calendar month, each such modification, addition, enhancement, update, revision, upgrade and correction, and a modified Attachment A identifying the same. Similarly, if Depositor identifies any additional Intellectual Property or IP Materials to be deposited pursuant to Article 24.D. of the Contract, it shall deposit with IP Escrow Agent such along with a modified Attachment A identifying the same within 30 days following the end of the calendar quarter in which such identification is made.

(e) Each deposit under subsection (d) above shall be added to the existing deposit. Each deposit under subsections (b) or (c) above shall be listed on a modified Attachment A and Depositor shall sign each modified Attachment A. Attachment A and each modified Attachment A shall be held and maintained separately within the escrow account. IP Escrow Agent shall create an independent record which documents the activity for Attachment A and each modified Attachment A. The processing of all deposits under this Section 1.1 shall be in accordance with Sections 1.2 through 1.6 below.

(f) Notwithstanding any other provision of this Agreement, Depositor shall have no obligation to deposit with the IP Escrow Agent any Software Source Code for Off-the-Shelf Software.

1.2. Identification of Tangible Media. Prior to each delivery of the IP Materials to IP Escrow Agent, Depositor shall conspicuously label for identification each document, magnetic tape, disk, or other tangible media upon which the Intellectual Property are written or stored. Additionally, with each delivery Depositor shall complete Attachment A to this Agreement or a modified Attachment A by listing each such tangible media by the item label description, the type of media and the quantity, and the identity of the owner of the Intellectual Property (whether Depositor or a Software Supplier). Depositor shall sign each Attachment A or modified Attachment A and deliver it to IP Escrow Agent with the IP Materials. Such signature shall constitute Depositor's representation and warranty that Attachment A is true, accurate and complete. Unless and until Depositor makes the initial deposit with IP Escrow Agent, IP Escrow Agent shall have no obligation with respect to this Agreement, except the obligation to notify the parties regarding the status of the account as required in Section 2.2 below.

1.3. Deposit Inspection. Within three Business Days after IP Escrow Agent receives IP Materials and Attachment A or a modified Attachment A, IP Escrow Agent shall conduct a deposit inspection by visually matching the labeling of the tangible media containing the Source Code to the item descriptions and quantity listed on Attachment A or modified Attachment A. In addition to the deposit inspection, OCTA may elect to cause a verification of the Intellectual Property (specifically including Software Source Code) at any time in accordance with Section 1.6 below.

1.4. Acceptance of Deposit. Immediately upon completion of each deposit inspection, if IP Escrow Agent determines that the labeling of the tangible media matches the item descriptions and quantity on Attachment A or the modified Attachment A, IP Escrow Agent shall date and sign Attachment A or the modified Attachment A and mail a copy thereof to Depositor and OCTA. Immediately upon completion of each deposit inspection, if IP Escrow Agent determines that the labeling does not match the item descriptions or quantity on Attachment A or the modified Attachment A, IP Escrow Agent shall (a) note the discrepancies in writing on Attachment A or the modified Attachment A; (b) date and sign Attachment A or the modified Attachment A with the exceptions noted; and (c) mail a copy of Attachment A or the modified Attachment A to Depositor and OCTA. IP Escrow Agent's acceptance of the deposit occurs upon the signing of Attachment A or the modified Attachment A by IP Escrow Agent. Delivery of the signed Attachment A or the modified Attachment A to OCTA is OCTA's notice that the Software Source Code have been received and accepted by IP Escrow Agent.

1.5. Depositor's Representations. Depositor represents and warrants to OCTA as follows:

- (a) Depositor lawfully possesses all of the IP Materials and the Intellectual Property contained therein as deposited with IP Escrow Agent;
- (b) With respect to all of the IP Materials and the Intellectual Property contained therein, Depositor has the right and authority to grant to IP Escrow Agent and OCTA the rights as provided in this Agreement;
- (c) The IP Materials and the Intellectual Property contained therein are not subject to any lien or other encumbrance;

(d) The IP Materials and the Intellectual Property contained therein consist of the proprietary technology and other materials identified either in the Contract or Attachment A, as applicable; and

e. The IP Materials are readable and useable in their current form or, if any portion of the IP Materials and the Intellectual Property contained therein is encrypted, the decryption tools and decryption keys have also been deposited.

1.6. Verification. OCTA may, at OCTA's expense, cause a verification of any IP Materials (specifically including Software Source Code). OCTA shall notify Depositor and IP Escrow Agent of OCTA's request for verification. Depositor shall have the right to be present at the verification. A verification determines, in different levels of detail, the accuracy, completeness, sufficiency and quality of the IP Materials. If a verification is elected after the IP Materials have been delivered to IP Escrow Agent, then only IP Escrow Agent, or at IP Escrow Agent's or OCTA's election an independent person or company selected and supervised by IP Escrow Agent or OCTA, may perform the verification. If OCTA elects to have an independent person or company perform the verifications, its election and selection shall prevail over any such election by IP Escrow Agent. The verification shall be conducted in accordance with the verification procedures specified in the completed form of Attachment A accompanying Depositor's deposit of the relevant IP Materials with IP Escrow Agent. Such verification shall determine the relevance, completeness, currency, accuracy and functionality of the IP Materials and the Intellectual Property contained therein and, specifically as to Software Source Code, whether the deposit is complete. If IP Escrow Agent or a person or company it selects performs the verification, IP Escrow Agent shall deliver to OCTA a written report detailing the verification not later than 30 days after OCTA delivers Notice requesting such verification. Any verification shall take place either at IP Escrow Agent's location or an agreed upon location during IP Escrow Agent's regular business hours. If OCTA elects to have an independent person or company perform the verification, then such entity shall adhere to the confidentiality requirements of the Contract. If IP Escrow Agent or the independent person performing the verification determine that the verification procedures specified in the completed Attachment A are insufficient to enable verification of the relevant IP Materials and the Intellectual Property contained therein, then upon the request of Escrow Holder or OCTA, Depositor shall cooperate in good faith to supplement and/or modify the verification procedures as necessary and appropriate to facilitate such verification.

1.7. Removal of IP Materials. The IP Materials and the Intellectual Property contained therein may be removed and/or exchanged only on written instructions signed by both the Depositor and OCTA, or as otherwise provided in this Agreement.

1.8. Inspection. OCTA and Depositor shall be entitled, during normal business hours, to inspect, under the supervision of an officer of IP Escrow Agent and at IP Escrow Agent's facilities, the physical and technical status and condition of the IP Materials and the Intellectual Property contained therein. The party undertaking the inspection shall provide Notice of the pending inspection to the other party, five Business Days prior to the scheduled date of the inspection. The party receiving the notice shall have the right to be present at the inspection, but such presence is not a condition precedent to the inspecting party's right to proceed with inspection.

SECTION 2. CONFIDENTIALITY AND RECORD KEEPING

2.1. Confidentiality. IP Escrow Agent shall maintain the IP Materials and the Intellectual Property contained therein in a secure, environmentally safe, fireproofed vault or locked facility which is accessible only to authorized representatives of IP Escrow Agent. IP Escrow Agent shall

have the obligation to reasonably protect the confidentiality of the Intellectual Property. Except as provided in this Agreement, IP Escrow Agent shall not disclose, transfer, make available or use the Intellectual Property or any IP Materials. IP Escrow Agent shall not disclose the content of this Agreement to any third party. If IP Escrow Agent receives a subpoena or any other order from a court or other judicial tribunal pertaining to the disclosure or release of the IP Materials and the Intellectual Property contained therein, IP Escrow Agent shall immediately notify the other Parties unless prohibited by law. It shall be the responsibility of Depositor and/or OCTA to challenge any such order; provided, however, that IP Escrow Agent does not waive its rights to present its position with respect to any such order. IP Escrow Agent shall not be required to disobey any order from a court or other judicial tribunal. (See Section 7.5 below for notices of requested orders.)

2.2. Status Reports. IP Escrow Agent shall issue to Depositor and OCTA a report profiling the account history at least semi-annually. IP Escrow Agent may provide copies of the account history pertaining to this Agreement upon the request of any other Party.

2.3. Audit Rights. During the term of this Agreement, Depositor and OCTA may each inspect the written records of IP Escrow Agent pertaining to this Agreement. Any inspection shall be held during normal business hours and following reasonable prior Notice.

SECTION 3. TITLE TO IP MATERIALS

3.1 Title to IP Materials. Title to the IP Materials which embody Intellectual Property is vested in OCTA pursuant to Article 24 of the Contract, but is subject to the provisions of this Agreement on access to and release of such IP Materials.

3.2 Disclaimer. Depositor and IP Escrow Agent hereby disclaim and relinquish any title to or ownership of the IP Materials which embody Intellectual Property. Without limiting the foregoing, IP Escrow Agent hereby disclaims and relinquishes any title to or ownership of Software Source Code deposited with IP Escrow Agent under this Agreement.

SECTION 4. RELEASE OF DEPOSIT

4.1. Release Conditions. As used in this Agreement, "Release Condition" shall mean any of the following:

- (a) Bankruptcy, reorganization, arrangement, insolvency or liquidation proceedings, proceedings under Title 7 of the United States Code, as amended, or other proceedings for relief under any bankruptcy law or similar law for the relief of debtors are instituted by or against Depositor, or by or against any owner of Third Party Intellectual Property (other than bankruptcy proceedings instituted by Depositor or any owner of Third Party Intellectual Property against third parties), and, if instituted against Depositor or any owner of Third Party Intellectual Property, are allowed against Depositor or any owner of Third Party Intellectual Property or are consented to or are not dismissed, terminated or otherwise nullified within 60 calendar days after such institution;
- (b) A custodian, trustee or receiver is appointed for Depositor or any owner of Third Party Intellectual Property or any substantial part of its assets;
- (c) Depositor or any owner of Third Party Intellectual Property makes or attempts to make an assignment for the benefit of creditors;

- (d) Depositor or any owner of Third Party Intellectual Property generally fails to pay its debts when they are due or admits of its inability to pay its debts;
- (e) Depositor or any owner of Third Party Intellectual Property fails to provide necessary and commercially feasible updates and maintenance releases, or otherwise is in material breach of its software development and/or support obligations under the Contract;
- (f) The Contract is terminated in whole pursuant to its terms because of an "Event of Default";
- (g) Depositor or any owner of Third Party Intellectual Property ceases to do business in the ordinary course or is unwilling or unable to perform its obligations under the Contract; or
- (h) Depositor does not continue to provide updates and maintenance releases, or otherwise breaches its software maintenance and/or support obligations under the Software Maintenance Option during the Software Maintenance Option Period.

4.2. Filing For Release. If OCTA believes in good faith that a Release Condition has occurred, OCTA may provide to IP Escrow Agent Notice of the occurrence of the Release Condition and a request for the release of the IP Materials and incorporated Intellectual Property. If the Release Condition pertains only to an owner of Third Party Intellectual Property, OCTA's Notice shall so indicate. Immediately upon receipt of such Notice, IP Escrow Agent shall provide a copy of the Notice to Depositor by commercial express mail.

4.3. Contrary Instructions. From the date IP Escrow Agent mails the Notice requesting release of the IP Materials and incorporated Intellectual Property, Depositor shall have ten days to deliver to IP Escrow Agent contrary instructions ("Contrary Instructions"). Contrary Instructions shall mean the written representations and warranties, without qualification, exception or condition, by an authorized officer or authorized delegate of Depositor that (a) the person signing for Depositor is an authorized officer or authorized delegate of Depositor and (b) a Release Condition has not occurred or has been cured. Immediately upon receipt of Contrary Instructions within such ten day period, IP Escrow Agent shall send a copy to OCTA by commercial express mail. Additionally, IP Escrow Agent shall provide Notice to Depositor and OCTA that there is a dispute to be resolved pursuant to Section 7.3 of this Agreement. Subject to Section 5.2 of this Agreement, IP Escrow Agent shall continue to store the IP Materials and Intellectual Property without release pending (i) instructions from Depositor and OCTA; (ii) dispute resolution pursuant to Section 7.3; or (iii) order of a court. Contrary Instructions received after such ten day period shall be automatically null and void, shall have no force or effect, and shall be disregarded by IP Escrow Agent.

4.4. Release of Deposit.

- (a) If IP Escrow Agent does not receive Contrary Instructions from the Depositor within such ten day period, IP Escrow Agent is authorized to, and shall, immediately release the IP Materials and incorporated Intellectual Property to OCTA. If the Release Condition pertains only to an owner of Third Party Intellectual Property, then IP Escrow Agent shall only release the IP Materials that (a) are identified on Attachment A as owned by such owner of Third Party Intellectual Property or (b) lacks identification of ownership on Attachment A. Any copying expense will be chargeable to Depositor. This Agreement

shall terminate upon the release of all the IP Materials and incorporated Intellectual Property held by IP Escrow Agent.

(b) IP Escrow Agent shall promptly release all or any part of the IP Materials and incorporated Intellectual Property at any time and from time to time upon receipt of Notice signed by both Depositor and OCTA.

(c) IP Escrow Agent shall also release the IP Materials and incorporated Intellectual Property to OCTA at any time as directed or ordered by an arbitration award, by a final judgment of a court of competent jurisdiction, or by other final dispute resolution pursuant to Section 7.3. If OCTA provides to IP Escrow Agent a written opinion of counsel for OCTA to the effect that such award, judgment or resolution is final and not appealable, IP Escrow Agent shall proceed with release in accordance with the award, judgment or resolution and may rely on such legal opinion.

4.5. Right to Use Following Release. Upon release of the IP Materials in accordance with this Section 4, OCTA shall have the right and license to use the released Intellectual Property as provided in the Contract. OCTA shall be obligated to maintain the confidentiality of the released Intellectual Property as provided in the Contract.

SECTION 5. TERM AND TERMINATION

5.1. Term of Agreement. The term of this Agreement shall continue in effect unless and until this Agreement is terminated in accordance with the terms of this Section 5. This Agreement shall be terminated in the event (a) Depositor and OCTA jointly instruct IP Escrow Agent in writing that the Agreement is terminated; or (b) IP Escrow Agent provides Notice to Depositor and OCTA that the Agreement is terminated for nonpayment in accordance with Section 5.2 or by resignation in accordance with Section 5.3. If the IP Materials and incorporated Intellectual Property are subject to another escrow agreement with IP Escrow Agent, IP Escrow Agent reserves the right, after the initial one year term, to adjust the anniversary date of this Agreement to match the then prevailing anniversary date of such other escrow arrangements.

5.2. Termination for Nonpayment. In the event fees owed to IP Escrow Agent are not paid when due, IP Escrow Agent shall provide Notice of delinquency to all Parties. Any Party shall have the right to make the payment to IP Escrow Agent to cure the default. If the past due payment is not received in full by IP Escrow Agent within one month of the date of such Notice, then IP Escrow Agent shall have the right to terminate this Agreement at any time thereafter by sending Notice of termination to all Parties. IP Escrow Agent shall have no obligation to take any action under this Agreement so long as any undisputed payment due to IP Escrow Agent remains unpaid and delinquent, except action to hold and safeguard the IP Materials and transfer or dispose of the IP Materials following termination as provided in this Section 5.

5.3. Termination by Resignation. IP Escrow Agent may terminate this Agreement, for any reason, by providing Depositor and OCTA with 90-days' Notice of its intent to terminate this Agreement. Within the 90-day period, the Depositor and OCTA shall use diligent efforts to enter into a substantially similar agreement with another entity willing and able to perform the functions of IP Escrow Agent under this Agreement and shall provide IP Escrow Agent with Notice including instructions authorizing IP Escrow Agent to forward the IP Materials and incorporated Intellectual Property to another escrow company and/or agent or other designated recipient. IP Escrow Agent shall transfer and dispose of the IP Materials in accordance with any such Notice. If IP Escrow Agent does not receive said Notice within 90 days of the date of IP Escrow Agent's termination

Notice, then IP Escrow Agent shall have no obligation to take any action under this Agreement, except action to hold and safeguard the Intellectual Property and transfer or dispose of IP Materials following termination as provided in this Section 5.

5.4. Disposition of IP Materials Upon Termination. Upon termination of this Agreement, IP Escrow Agent shall destroy, return, or otherwise deliver the IP Materials in accordance with Depositor's and OCTA's Notice. If there is no such Notice, IP Escrow Agent may, commence legal action interpleading Depositor and OCTA, deposit the IP Materials with the court in such action and otherwise handle and dispose of the IP Materials in accordance with court order. In no event shall IP Escrow Agent have the right to destroy the IP Materials or return them to Depositor absent written instructions to such effect or final order of a court of competent jurisdiction.

5.5. Survival of Terms Following Termination. Upon termination of this Agreement, the following provisions of this Agreement shall survive:

- (a) Depositor's representations and warranties (Section 1.5);
- (b) The obligations of safekeeping and confidentiality with respect to the IP Materials and incorporated Intellectual Property set forth in Section 2.1;
- (c) The rights granted in the sections entitled Right to Transfer Upon Release (Section 3.3) and Right to Use Following Release (Section 4.5), if a release of the IP Materials has occurred prior to termination;
- (d) The obligation to pay IP Escrow Agent any fees and expenses due;
- (e) The obligations of IP Escrow Agent under Section 5.4;
- (f) The provisions of Section 7;
- (g) Any provisions in this Agreement which specifically state they survive the termination of this Agreement; and
- (h) All other provisions which by their inherent character or express terms should survive termination of this Agreement, the expiration of the Contract.

SECTION 6. IP ESCROW AGENT'S FEES

6.1. Fee Payment and Schedule. IP Escrow Agent is entitled to be paid its standard fees and expenses applicable to the services provided, which shall be the responsibility of OCTA. IP Escrow Agent shall notify OCTA at least 60 days prior to any increase in fees. For any service not listed on IP Escrow Agent's standard fee schedule, IP Escrow Agent shall provide a quote prior to rendering the service, if requested.

6.2. Payment Terms. Fees are due 30 days after receipt of an invoice from IP Escrow Agent detailing the services performed and setting forth fees therefor consistent with the then applicable fee schedule. IP Escrow Agent may deliver invoices not more frequently than monthly. Except for action to hold and safeguard the Intellectual Property and transfer or dispose of the IP Materials following termination as provided in this Section 6, IP Escrow Agent shall not be required

to perform any service whenever any undisputed outstanding balance owed to IP Escrow Agent is not paid when due.

SECTION 7. LIABILITY AND DISPUTES

7.1. Right to Rely on Instructions. IP Escrow Agent may act in reliance upon any instruction, instrument, or signature reasonably believed by IP Escrow Agent to be genuine. Except with respect to a Contrary Instruction that lacks the representation set forth in Section 4.3(a), IP Escrow Agent may assume that any employee of a party to this Agreement who gives any Notice, request, or instruction has the authority to do so. IP Escrow Agent shall not be required to inquire into the truth or evaluate the merit of any statement or representation contained in any Notice, request or instruction. IP Escrow Agent shall not be responsible for failure to act as a result of causes beyond the reasonable control of IP Escrow Agent.

7.2. Indemnification. Depositor and OCTA each agree to indemnify, defend and hold harmless IP Escrow Agent from any and all Claims and Losses in connection with this escrow arrangement except to the extent such Liabilities were caused by the negligence or willful misconduct of IP Escrow Agent or its breach of this Agreement.

7.3. Dispute Resolution. Any dispute, controversy, claim or difference arising out of, or in connection with, or resulting from this Agreement, its application or interpretation, a breach thereof, or a Contrary Instruction issued hereunder, which cannot be settled amicably by the Parties, shall be subject to resolution in accordance with the dispute resolution provisions of the Contract. IP Escrow Agent agrees to be bound by any such final resolution. Notwithstanding the foregoing, any suit in interpleader brought by IP Escrow Agent under Section 5.4 shall not be by arbitration and may be brought by IP Escrow Agent in any court having jurisdiction.

7.4. Controlling Law. This Agreement shall be governed by and construed in accordance with the law of the State, without regard to conflict of law principles. The venue of any court, judicial or referee proceeding under this Contract shall be in Orange County, California, unless changed by the judicial officer.

7.5. Notice of Requested Order. If any Party intends to obtain an order from the arbitrator or any court of competent jurisdiction which may direct IP Escrow Agent to take, or refrain from taking, any action, that Party shall:

- (a) Give IP Escrow Agent at least two Business Days' prior Notice of the hearing; and
- (b) Ensure that IP Escrow Agent not be required to deliver the original (as opposed to a copy) of the IP Materials if IP Escrow Agent may need to retain the original in its possession to fulfill any of its other duties under this Agreement.

SECTION 8. GENERAL PROVISIONS

8.1. IP Escrow Agent Representation. IP Escrow Agent represents and warrants to OCTA and Depositor that (a) to the best knowledge of IP Escrow Agent neither it nor any of its personnel has been the subject of any investigation or been convicted or indicted for commission of any crime involving misconduct, corruption, bribery or fraud in connection with any public contract in the State of California, or any other jurisdiction, except as has been specifically disclosed in writing to OCTA and Depositor, and (b) should any such conviction or indictment be obtained or any such investigation commenced prior to the expiration of the term hereof, regardless of the date of the occurrence giving rise to the subject matter of such conviction, indictment or investigation, IP Escrow Agent will immediately disclose it in writing to OCTA and Depositor.

8.2. Entire Agreement. This Agreement (including all Exhibits to this Agreement) contain the entire understanding of the parties with respect to the subject matter of this Agreement and supersede all prior agreements, understandings, statements, representations and negotiations between the parties with respect to their subject matter. IP Escrow Agent is not a party to the Contract between Depositor and OCTA and has no knowledge of any of the terms or provisions of the Contract. IP Escrow Agent's only obligations to Depositor or OCTA are as set forth in this Agreement. No amendment or modification of this Agreement shall be valid or binding unless signed by all the parties, except that Attachment A need not be signed by OCTA and Attachment B need not be signed.

8.3. This Contract contain the entire understanding of the parties with respect to the subject matter hereof and supersede all prior agreements, understandings, statements, representations and negotiations between the parties with respect to their subject matter.

8.4. Notices. All notices, invoices, payments, deposits and other documents and communications under this Agreement shall be sent as provided in Article 11 of the Contract and given to the parties at the addresses specified in the attached Attachment B. It shall be the responsibility of the parties to notify each other as provided in this Section in the event of a change of address. The parties shall have the right to rely on the last known address of the other parties.

8.5. Severability. In the event any provision of this Agreement is found to be invalid, voidable or unenforceable, the parties agree that unless it materially affects the entire intent and purpose of this Agreement, such invalidity, voidability or unenforceability shall affect neither the validity of this Agreement nor the remaining provisions herein, and the provision in question shall be deemed to be replaced with a valid and enforceable provision most closely reflecting the intent and purpose of the original provision.

8.6. Successors. This Agreement shall be binding upon and shall inure to the benefit of the successors and assigns of the Parties. However, IP Escrow Agent shall have no right to assign this Agreement or delegate its duties hereunder without the prior written consent of Depositor and OCTA; and IP Escrow Agent shall have no obligation in performing this Agreement to recognize any successor or assign of Depositor or OCTA unless IP Escrow Agent receives unambiguous and authoritative written evidence of the change of Parties.

8.7. Regulations. Depositor and OCTA are responsible for and warrant compliance with all applicable laws, rules and regulations, including but not limited to customs laws, import, export, and re-export laws and government regulations of any country from or to which the Intellectual Property may be delivered in accordance with the provisions of this Agreement.

8.8. Liability. No member, officer, or employee of OCTA, Depositor or IP Escrow Agent shall be liable personally hereunder or by reason hereof.

8.9. Counterparts. This Agreement may be executed in any number of counterparts and by the different parties on different counterparts, each of which, when executed, shall be deemed an original, but all of which, taken together, shall constitute one and the same Agreement.

[signatures on next page]

IN WITNESS WHEREOF, the parties, intending to be legally bound, have executed this Source Code Escrow Agreement as of the date first written above.

DEPOSITOR:

By: _____
Name: _____
Title: _____

IP ESCROW AGENT:

By: _____
Name: _____
Title: _____

OCTA

**ORANGE COUNTY TRANSPORTATION
AUTHORITY**

By: _____
Name: _____
Title: _____

APPROVED AS TO FORM:

By:

ATTACHMENT A

DESCRIPTION OF ESCROWED MATERIAL

Depositor Company Name: _____

Account Number _____

Product name _____ Version _____
(Product Name will appear as the Exhibit 1 Name on Account History report)

Owner of Product _____
(Name, address, tel. no., e-mail address)

SOURCE CODE DESCRIPTION:

Quantity	Media Type & Size	Label Description of Each Separate Item
_____	Disk 3.5" or _____	
_____	DAT tape _____mm	
_____	CD-ROM	
_____	Data cartridge tape _____	
_____	TK 70 or _____ tape	
_____	Magnetic tape _____	
_____	Documentation	
_____	Other _____	

PRODUCT DESCRIPTION:

Environment _____

SOURCE CODE INFORMATION:

Is the media or are any of the files encrypted? Yes / No If yes, please include any passwords and the decryption tools.

Encryption tool name _____ Version _____

Hardware required _____

Software required _____

SOURCE CODE VERIFICATION PROCEDURES:

[Insert in space below or provide as separate attachment]

Other required information _____

I certify for **Depositor** that the above described **IP Escrow Agent** has inspected and accepted IP Materials have been transmitted to _____ the above materials (any exceptions are noted above):

Signature: _____ Signature: _____

Print Name: _____ Print Name: _____

Date: _____ Date Accepted: _____

Exhibit A#: _____

Send materials to: IP Escrow Agent, _____ (____) _____

ATTACHMENT B

DESIGNATED CONTACT

Account Number _____
Notices, deposit material returns and
communications to Depositor should be
addressed to:

Invoices to Depositor pursuant to Section 4.4(a)
should be addressed to:

Company Name: _____

Address: _____

Designated Contact: _____

Telephone: (____) _____

Facsimile: (____) _____

E-mail: _____ Email: _____

Verification Contact: _____

Notices and communications to OCTA should be
addressed to:

Company Name: _____

Address _____

Designated Contact: _____

Telephone: (____) _____

Facsimile: (____) _____

E-mail: _____

Requests from Depositor or OCTA to change the designated contact should be given in writing by the
designated contact or an authorized employee of Depositor or OCTA.

Contracts, IP Materials and Intellectual Property,
notices, invoice inquiries and fee remittances to IP
Escrow Agent should be addressed to:

_____ Date: _____

Telephone: (____) _____

Facsimile: (____) _____

E-mail: _____

FORM J: PERFORMANCE BOND

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS:

That we, _____
hereinafter referred to as "Contractor", as principal, and _____
as surety, are held and firmly bound unto the Orange County Transportation Authority,
State of California, in the sum _____
Dollars, (\$ _____), lawful money of the United States of America,
for the payment of which sum, well and truly to be made, we bind ourselves, jointly and
severally, firmly by these presents.

The condition of the foregoing obligation is such that,

WHEREAS, said Contractor has been awarded and is about to enter into the annexed
Agreement with the Orange County Transportation Authority for the _____, at the
_____ as specified in said Agreement, and is required to give this bond in
connection with the _____ execution thereof;

NOW THEREFORE, if the said Contractor shall well and truly do and perform all of the
covenants and obligations of said Agreement on his part to be done and performed at the
times and in the manner specified herein, then this obligation shall be null and void,
otherwise it shall be and remain in full force and effect; and in the event said Contractor
fails to fully perform all requirements in accordance with the terms and conditions of said
Agreement, then surety shall enforce performance by the Contractor or shall pay the
Orange County Transportation Authority for the same in an amount not exceeding the
amount specified in this bond; and, further, if in the event suit is brought upon this bond
then said surety shall pay the Orange County Transportation Authority for reasonable
attorneys' fees to be fixed by the court;

PROVIDED, that any changes in the work to be done, or the material to be furnished,
whether or not made pursuant to the terms of said contract, shall not in any way release
either the Contractor or the surety there under, nor shall any extensions of time granted
under the provisions of said contract release either the Contractor or the surety, and
notice of such changes or extensions of the contract is hereby waived by the surety.

WITNESS our hands this _____ day of _____, 201_.

(SEAL)

(Contractor)
By _____

Approved:

(Title)

(SEAL)

(Surety)
By _____

FORM K: PAYMENT BOND

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS:

That we, _____
hereinafter referred to as "Contractor", as principal, and _____
as surety, are held and firmly bound unto the Orange County Transportation Authority,
State of California, in the sum _____
Dollars, (\$_____), lawful money of the United States of America, for
the payment of which sum, well and truly to be made, we bind ourselves, jointly and
severally, firmly by these presents.

The Condition of the foregoing obligation is such that,

WHEREAS, said Contractor has been awarded and is about to enter into the annexed Agreement with the ORANGE COUNTY TRANSPORTATION AUTHORITY for the "FEDERAL PUBLIC WORKS FHWA" as specified in said Agreement, and is required under the terms of said Agreement to give this bond in connection with the execution thereof;

NOW, THEREFORE, if said Contractor or a subcontractor fails to pay any of the persons named in Section 9100 of the Civil Code of the State of California, or amounts due under the Unemployment Insurance Code with respect to work or labor performed under the contract, or for any amounts required to be deducted, withheld and paid over to the Employment Development Department from the wages of employees of said Contractor and subcontractors pursuant to Section 13020 of the Unemployment Insurance Code with respect to such work and labor, then said surety will pay for the same, in an amount not exceeding the sum specified in this bond, and also, in case suit is brought upon this bond, a reasonable attorney's fee, to be fixed by the court. This bond shall inure to the benefit of all persons named in Section 9100 of the Civil Code of the State of California so as to give a right of action to such persons or their assigns in any suit brought upon this bond. This bond shall be subject to and include all of the provisions of Title 3 of Part 64 of Division 4 of the Civil Code of California relating to Payment Bond for Public Works, including but not confined to, Civil Code Sections 8150 – 8154, inclusive and Sections 9550 - 9566, inclusive.

PROVIDED, that any changes in the work to be done or the material to be furnished, whether or not made pursuant to the terms of said contract, shall not in any way release either the Contractor or the surety thereunder, nor shall any extensions of time granted under the provisions of said contract release either the Contractor or the surety, and notice of such alterations or extensions of the contract is hereby waived by the surety.

PAYMENT BOND, PAGE 2

WITNESS our hands this _____ day of _____, 201____.

(SEAL)

(Contractor)

By _____

(Title)

Approved:

(Surety)

(SEAL)

By _____

FORM L: OPERATIONS AND MAINTENANCE BOND

FORM OF OPERATIONS AND MAINTENANCE PERFORMANCE BOND

Agreement No. _____

Bond No. _____

KNOW ALL WHO SHALL SEE THESE PRESENTS:

THAT WHEREAS, The Orange County Transportation Authority, a public entity of the State of California ("AUTHORITY"), has awarded _____, a corporation organized under the laws of _____ ("Principal") an Agreement to design, implement, operate and maintain a toll collection system ("Toll Services") for the I-405 Express Lanes and the 91 Express Lanes;

AND WHEREAS, Principal and AUTHORITY have entered into a Toll Services Agreement bearing the date of _____ ("Agreement") to provide Toll Services in accordance with the terms of the Agreement;

AND WHEREAS, it is one of the conditions to achieving TCS Acceptance under the Agreement that these presents shall be executed;

NOW THEREFORE, We the undersigned Principal and _____ (the "Surety" or "Co-Sureties"), an admitted surety insurer in the State of California, are firmly bound and held unto AUTHORITY, in the amount of _____ Dollars (\$_____) ("Bonded Sum") good and lawful money of the United States of America for the payment whereof, well and truly to be paid to AUTHORITY, we bind ourselves, our heirs, successors, executors, administrators, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THE FOREGOING OBLIGATION IS SUCH THAT:

1. The Agreement is incorporated by reference in this Bond.
2. Unless the context otherwise requires, capitalized terms used but not separately defined in this Bond have the meaning given to them in the Agreement.
3. If Principal or its heirs, successors, executors, administrators or assigns shall in all things stand to and abide by and well and truly keep, perform and complete all covenants, conditions, agreements, obligations and work under the Agreement, including any and all amendments, supplements, and alterations made to the Agreement as therein provided, on Principal's part to be kept and performed at the time and in the manner therein specified, and shall indemnify, defend and save harmless AUTHORITY and all other Indemnified Parties, as therein stipulated, then this obligation shall become null and void; otherwise it shall remain in full force and effect. In case suit is brought upon this Bond, the Surety (or Co-Sureties) will pay reasonable attorney's fee to be fixed by the court.
4. The obligations covered by this Bond specifically include the performance of each and every obligation of Principal under the Agreement with respect to the O&M Work (including the Software Maintenance where AUTHORITY exercises the Software Maintenance Option),

including its liability for Liquidated Damages and warranties as specified in the Agreement, but not to exceed the Bonded Sum.

5. The Surety (or Co-Sureties) agree(s) that no change, extension of time, alterations, additions, omissions or other modifications of the terms of the Agreement, or in the work to be performed with respect to the O&M Work, or in the specifications or plans, or any change or modification of any terms of payment or extension of time for any payment pertaining or relating to the Agreement, or any rescission or attempted rescission of the Agreement or this Bond, or any conditions precedent or subsequent in this Bond attempting to limit the right of recovery of AUTHORITY seeking to recover from this Bond, or any fraud practiced by any other person other than AUTHORITY seeking to recover from this Bond, shall in any way affect its obligations on this Bond, and it does hereby waive notice of such changes, extension of time, alterations, additions, omissions or other modifications.

6. The Surety (or Co-Sureties) agree(s) that payments made to contractors and suppliers to satisfy claims on the payment bond do not reduce the Surety's legal obligations under this Bond. Payments made to contractors or suppliers under any agreement where the Surety has arranged for completion of the work to satisfy this Bond will not be considered payment bond claims.

7. Whenever Principal shall be, and is declared by AUTHORITY to be, in default under the Agreement, provided that AUTHORITY is not then in material default thereunder, the Surety (or Co-Sureties) shall promptly:

(a) remedy such default, or

(b) complete the work covered by this Bond in accordance with the terms and conditions of the Agreement, or

(c) select a contractor or contractors to complete all work covered by this Bond in accordance with the terms and conditions of the Agreement then in effect, using a contractor or contractors approved by AUTHORITY (provided, however, that the Surety may not select Principal or any affiliate of Principal to complete the work for and on behalf of the Surety without AUTHORITY's express written consent, in its sole discretion), arrange for a contract meeting the requirements of the Agreement between such contractor or contractors and AUTHORITY, and make available as work progresses (even though there should be a default or a succession of defaults under such contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the unpaid balance of the Agreement Price; but not exceeding, including other costs and damages for which Surety (or Co-Sureties) is (are) liable hereunder, the Bonded Sum.

8. If Surety does not proceed as provided in Paragraph 6 of this Bond with reasonable promptness, Surety shall be deemed to be in default on this Bond fifteen (15) days after receipt of an additional Notice from the AUTHORITY to Surety demanding that Surety perform its obligations under this Bond, and AUTHORITY shall be entitled to enforce any remedy available to AUTHORITY.

9. The guarantees contained in this Bond shall survive O&M Work required to be performed during the O&M Term with respect to those obligations of Principal which survive the O&M Term.

10. **[Use in case of multiple or co-sureties]** The Co-Sureties agree to empower a single representative with authority to act on behalf of all of the Co-Sureties with respect to this Bond, so that AUTHORITY will have no obligation to deal with multiple sureties hereunder. All correspondence from AUTHORITY to the Co-Sureties and all claims under this Bond shall be sent to such designated representative. The designated representative may be changed only by delivery of Notice (by personal delivery or by certified mail, return receipt requested) to AUTHORITY designating a single new representative, signed by all of the Co-Sureties. The initial representative shall be _____.

IN WITNESS WHEREOF, we have hereunto set our hands and seals on this at _____
_____ on this _____ day of _____, A.D., 20__.

PRINCIPAL:

By: _____
Name:
Title:

Surety (full legal name):

Address:

By: _____

[Note: If more than one surety, then add appropriate number of lines to signature block.]

[Note: The bond shall be signed by authorized persons. Where such persons are signing in a representative capacity (e.g., an attorney-in-fact), but is not a member of the firm, partnership, or joint venture, or an officer of the legal entity involved, evidence of authority to sign must be furnished and a Power of Attorney attached.]

CALIFORNIA ALL PURPOSE ACKNOWLEDGEMENT

STATE OF CALIFORNIA)
) ss.
COUNTY OF)

On _____ before me, _____, a notary public, personally appeared _____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

(AFFIX NOTARIAL SEAL)

NOTARY PUBLIC

EXHIBIT L

FORM OF OPERATIONS AND MAINTENANCE PAYMENT BOND

Agreement No. _____

Bond No. _____

KNOW ALL WHO SHALL SEE THESE PRESENTS:

THAT WHEREAS, The Orange County Transportation Authority, a public entity of the State of California ("AUTHORITY"), has awarded to _____, a corporation organized under the laws of _____ ("Principal") an Agreement to design, implement, operate and maintain a toll collection system ("Toll Services") for the I-405 Express Lanes and the 91 Express Lanes;

AND WHEREAS, Principal and AUTHORITY have entered into a Toll Services Agreement ("Agreement") bearing the date of _____ to complete the Toll Services in accordance with the terms of the Agreement;

AND WHEREAS, it is one of the conditions to achieving TCS Acceptance under the Agreement that these presents shall be executed;

NOW THEREFORE, We the undersigned Principal and _____ (the "Surety" or "Co-Sureties"), an admitted surety insurer in the State of California, are firmly bound and held unto AUTHORITY, in the sum of _____ Dollars (\$_____) ("Bonded Sum") good and lawful money of the United States of America for the payment whereof, well and truly to be paid to AUTHORITY, we bind ourselves, our heirs, successors, executors, administrators, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THE FOREGOING OBLIGATION IS SUCH THAT:

1. The Agreement is incorporated by reference in this Bond. Unless the context otherwise requires, capitalized terms used but not separately defined in this Bond have the meaning given to them in the Agreement.

2. If Principal, its Subcontractors, hires, successors, executors, administrators or assigns shall fail to pay:

(a) any of the persons named in Civil Code section 9100 involved in performance of the O&M Work as provided for under the Agreement;

(b) any amounts due under the Unemployment Insurance Code with respect to the O&M Work;

(c) any amounts required to be deducted, withheld and paid over to 1302 Franchise Tax Board from the wages of employees of the Principal and its Subcontractor pursuant to Revenue and Taxation Code Section 18662 et seq. with respect to such labor; or

(d) anyone required to be paid by law

then Surety shall pay for the same in an amount not to exceed the Bonded Sum; otherwise this obligation shall be null and void; otherwise it shall remain in full force and effect. In case suit is brought upon this Bond, the Surety (or Co-Sureties) will pay reasonable attorney's fee to be fixed by the court.

3. This Bond shall inure to the benefit of any of the persons named in Civil Code Section 9100 or anyone required to be paid by law under the Agreement so as to give a right of action to such persons or their assigns in any suit brought upon this Bond.

4. This Bond covers all of Principal's payment obligations under the Agreement for the O&M Work (including the Software Maintenance where AUTHORITY exercises the Software Maintenance Option), as set forth in the Agreement

5. The Surety (or Co-Sureties) agree(s) that no change, extension of time, alterations, additions, omissions or other modifications of the terms of the Agreement, or in the work to be performed with respect to the O&M Work, or in the specifications or plans, or any change or modification of any terms of payment or extension of time for any payment pertaining or relating to the Agreement, or any rescission or attempted rescission of the Agreement or this Bond, or any conditions precedent or subsequent in this Bond attempting to limit the right of recovery of AUTHORITY seeking to recover from this Bond, or any fraud practiced by any other person other AUTHORITY seeking to recover from this Bond, shall in any way affect its obligations on this Bond, and it hereby waives notice of such changes, extension of time, alterations, additions, omissions or other modifications.

6. **[Use in case of multiple or co-sureties]** The Co-Sureties agree to empower a single representative with authority to act on behalf of all of the Co-Sureties with respect to this Bond, so that AUTHORITY will have no obligation to deal with multiple sureties hereunder. All correspondence from AUTHORITY to the Co-Sureties and all claims under this Bond shall be sent to such designated representative. The designated representative may be changed only by delivery of Notice (by personal delivery or by certified mail, return receipt requested) to AUTHORITY designating a single new representative, signed by all of the Co-Sureties. The initial representative shall be _____.

7. This bond shall inure to the benefit of the persons named in Civil Code section 9100 so as to give a right of action to such persons and their assigns in any suit brought upon this bond.

IN WITNESS WHEREOF, we have hereunto set our hands and seals on this at _____
_____ on this _____ day of _____, A.D., 20__.

PRINCIPAL:

_____.

By: _____
Name: _____
Title: _____

Surety (full legal name):

Address:

By: _____

[Note: If more than one surety, then add appropriate number of lines to signature block.]

[Note: The bond shall be signed by authorized persons. Where such persons are signing in a representative capacity (e.g., an attorney-in-fact), but is not a member of the firm, partnership, or joint venture, or an officer of the legal entity involved, evidence of authority must be furnished and a Power of Attorney attached.]

FORM M: IRAN CONTRACTING CERTIFICATION

IRAN CONTRACTING CERTIFICATION

Section 2200 *et seq.* of the California Public Contract Code prohibits a person from submitting a proposal for a contract with a public entity for goods and services of \$1,000,000 or more if that person is identified on a list created by the Department of General Services (DGS) pursuant to Section 2203(b) of the California Public Contract Code. The list will include persons providing goods or services of \$20,000,000 or more in the energy sector of Iran and financial institutions that extend \$20,000,000 or more in credit to a person that will use the credit to provide goods or services in the energy sector in Iran. DGS is required to provide notification to each person that it intends to include on the list at least 90 days before adding the person to the list.

In accordance with Section 2204 of the California Public Contract Code, the undersigned hereby certifies that

1. It is not identified on a list created pursuant to Section 2203(b) of the California Public Contract Code as a person engaging in investment activities in Iran described in Section 2202.5(a), or as a person described in Section 2202.5(b), as applicable; or
2. It is on such a list but has received permission pursuant to Section 2203(c) or (d) to submit a proposal in response to the Request for Proposals to Design and Construct the I-405 Improvement Project issued by Orange County Transportation Authority.

Note: Providing a false certification may result in civil penalties and sanctions.

Date: _____

Entity: _____

Signature: _____

Title: _____

(This Exhibit is required from the Prime only.)

FORM N: BUY AMERICA CERTIFICATION

OFFEROR'S CERTIFICATE
REGARDING
"BUY AMERICA" REQUIREMENTS
FOR
STEEL, IRON, OR MANUFACTURED PRODUCTS

In order to demonstrate compliance with the Buy America Requirements if the bid is for a contract greater than one hundred and fifty thousand dollars (\$150,000), Offeror shall complete only one of the two statements below:

The	
	Firm name/principal
hereby certifies that it will comply with the requirements of 49 U.S.C. Section 5323(j)(1), and the applicable regulations in 49 CFR Part 661.	
	Signature
	Name
	Title
	Date

Or:

The	
	Firm name/principal
hereby certifies that it cannot comply with the requirements of 49 U.S.C. Section 5323(j), but it may qualify for an exception to the requirement pursuant to 49 U.S.C. Section 5323(j)(2), as amended, and the applicable regulations in 49 CFR Part 661.7.	
	Signature
	Name
	Title
	Date

Rev Date: 8/14/17

FORM O: RECENT CLIENT LIST

Recent Client List

[illegible]

FORM P: REFERENCE FORMS

Reference Forms Part 1

Proposer shall use this attachment to clearly demonstrate how Proposer meets the minimum qualification requirements for Proposals with regard to Proposer project experience. Each reference provided may be contacted by OCTA. Copy this form as needed to comply with the requirements outlined in the RFP for the Implementation and Maintenance Phase minimum qualifications.

Proposer's Name:

Please check off which qualifications requirement this reference is intended to address (you may check more than one box to cover multiple requirements as long as the explanation below is sufficiently detailed).



Implementation



Maintenance

Reference Company/Agency Name:	
Address:	
City:	State: Zip Code:
Phone Number:	Fax Number:
Project Manager Reference:	
E-mail:	
Alternate Reference*:	
Phone Number:	Fax Number:
E-mail:	
Alternate Reference Role on Reference Project:	
*Must be completed in addition to the Project Manager reference	
Proposer's role on project and years of participation (mm/dd/yy to mm/dd/yy):	

Project location, scope, cost, start / end dates:

Description of project functions and operations including size:

Relevant hardware, software and systems used:

Comparison to OCTA requirements:

Installed System or Maintenance documented performance, as applicable:

Reference Forms Part 2

Offeror shall use this form to clearly show how Proposer meets the requirements set forth in the RFP for Key Personnel members. References must be provided from an outside agency or company and shall not be an internal Proposer reference. Each reference provided may be contacted to determine the respondent's ability to meet the Proposal requirements. Copy this form as needed to comply with the requirements of the RFP and the number of references cited.

Key Project Team Member

**Proposed
Position**

Reference Company Name:	
Address:	
City:	State: Zip Code:
Phone Number:	Fax Number:
Project Manager:	
E-mail:	
Number of total years' experience of Key Personnel team member in similar role to one proposed for OCTA:	
Reference Project:	
Key Personnel team member role on reference project, including dates of participation and job description:	
Description of reference project location, scope, cost, start / end dates, etc.:	
Operational functionality and size of operations (accounts, transactions; notices...)	
Key Personnel team member's major contributions and highlights:	
Key personnel involved and role who are also proposed on OCTA's project:	

FORM Q: LIST OF SUBCONTRACTORS

List of Subcontractors

Please duplicate this page as necessary to provide the requested information.

	SUBCONTRACTOR	SUBCONTRACTOR	SUBCONTRACTOR
Legal Name of Company			
Company Contact Name			
Company Address			
City, State, Zip Code			
Company Telephone No.			
Company Fax Number			
Company E-mail address			
Legal Name of Principal(s)			
Address of Principal(s)			
City, State, Zip Code			
Telephone No. of Principal(s)			
Fax Number of Principal(s)			
E-mail address of Principal(s)			
Corporate Number (if applicable)			
License Number (if applicable)			
Status of License (if applicable)			
Work to be Performed			
Committed Dollar Amount of Total Work			
Committed Percentage of Total Work			

By: _____
President or Vice President

Signature: (1) _____

Attest: _____
Secretary (or Assistant Secretary)

Signature: (2) _____

(Affix Corporate Seal)

EXHIBIT B: SCOPE OF WORK AND REQUIRMENTS

EXHIBIT B

SCOPE OF WORK AND REQUIREMENTS

Toll Lanes System Integrator Services for the I-405 Express Lanes and 91 Express Lanes

August 22, 2017

Ver. 0.6

TABLE OF CONTENTS

1	INTRODUCTION.....	1
1.1	OCTA EXPRESS LANE PROJECTS	1
1.1.1	91 Express Lanes	1
1.1.2	I-405 Express Lanes	4
1.1.3	Future Express Lanes.....	5
1.1.4	Planned OCTA Express Lanes Toll Procurements.....	5
1.2	OCTA EXPRESS LANES ELECTRONIC TOLL AND TRAFFIC MANAGEMENT (ETTM)	6
1.2.1	Project Overview.....	6
1.2.2	Roadside Systems.....	7
1.2.3	Roadway Support Systems.....	8
1.2.4	Communications	9
1.2.5	Project Phases.....	9
1.3	EXPRESS LANES OPERATIONS.....	11
1.4	EXPRESS LANES TOLL POLICY	12
1.5	GENERAL REQUIREMENTS	13
1.6	STAFFING AND KEY TEAM PERSONNEL	14
2	SCOPE OF WORK AND REQUIREMENTS	17
2.1	ETTM SYSTEM SCOPE OF WORK.....	17
2.2	ROADSIDE SYSTEM – FUNCTIONAL REQUIREMENTS	20
2.2.1	Hardware and Software General Requirements.....	20
2.2.2	Bill of Materials	24
2.2.3	Spare Parts and Support.....	24
2.2.4	ETTM Software.....	24
2.2.5	ETTM System Toll Facility and Lane Configurations	25
2.2.6	ETTM System Access Requirements.....	25
2.2.7	Roadside System Subsystems.....	26
2.2.8	ETTM Intelligent Transportation Systems (ITS).....	54
2.2.9	Corridor Server	56
2.2.10	Toll Equipment Building	57
2.2.11	Roadside Infrastructure.....	59
2.3	ROADWAY SUPPORT SYSTEM (RSS) – FUNCTIONAL REQUIREMENTS.....	63
2.3.1	Roadway Support Systems (RSS) – General Requirements.....	63
2.3.2	Roadway Support Systems (RSS) Hardware and Third-party Products	65
2.3.3	Roadway Support Systems (RSS) Printing	67
2.3.4	Roadway Support Systems (RSS) Uninterruptible Power Supply (UPS)	67
2.3.5	Image Server	68
2.3.6	Data Backup	68
2.3.7	Maintenance Access and Application Access	69
2.3.8	Roadway Support Systems (RSS) Software	71
2.3.9	Roadway Support Systems (RSS) Application Software	91
2.3.10	I-405 Express Lanes Traffic Simulator and Modeling	121
2.3.11	I-405 Express Lanes Advanced Traffic Management System	123
2.3.12	I-405 Express Lanes Toll Operation Center (TOC) Operations	125
2.3.13	Performance Requirements	125

2.4	91 EXPRESS LANES ELECTRONIC TOLL AND TRAFFIC MANAGEMENT SYSTEM	
	TRANSITIONS	132
2.4.1	91 Express Lanes Roadside System Installation and Transition – General Requirements	132
2.4.2	91 Express Lanes BOS System Transition – General Requirements	132
2.4.3	91 Express Lanes ETTM System Testing and Transition	133
2.4.4	91 Express Lanes ETTM Transition Plan – Roadside	134
2.4.5	91 Express Lanes Dismantle Unused ETTM Equipment	135
2.4.6	91 Express Lanes ETTM Transition Plan – BOS	135
2.5	ELECTRONIC TOLL AND TRAFFIC MANAGEMENT SYSTEM INSTALLATION REQUIREMENTS	
	136
2.5.1	Installation Program	136
2.5.2	Installation and Construction Coordination and Meetings	137
2.5.3	General Installation Requirements	138
2.5.4	Toll Operations Centers (TOC)	138
2.5.5	Compliance to Standards	140
2.5.6	ETTM System Installation Requirements – Roadside Systems	140
2.5.7	ETTM System Installation Requirements – Roadway Support Systems (RSS)	143
2.5.8	Installation Plan	145
2.5.9	Installation Checklist	146
2.5.10	Electrical Work	146
2.5.11	Work Standards and Requirements	147
2.5.12	Design and Documentation during Construction and Installation	148
2.6	ELECTRONIC TOLL AND TRAFFIC MANAGEMENT SYSTEM PROJECT REQUIREMENTS ...	149
2.6.1	Roadside System Project Management	149
2.6.2	End of Contract Transition	158
2.6.3	Software Design and Development Requirements	159
2.6.4	Documentation	163
2.6.5	Manual Requirements	184
2.6.6	Quality Assurance Program	189
2.6.7	Training	191
2.6.8	Cooperation with Other Contractors and Providers	196
2.6.9	Coordination with the Design-Builder and Other Civil Contractors	197
2.6.10	ETTM System Infrastructure Turnover – I-405 Express Lanes	201
2.6.11	Lane Closure and Traffic Control (Implementation Phase)	203
2.7	ROADSIDE SYSTEM TESTING REQUIREMENTS	209
2.7.1	Roadside System Testing Concept	209
2.7.2	General Testing Requirements	210
2.7.3	Master Test Plan	212
2.7.4	Testing Sequence and Logistics	213
2.7.5	Factory Acceptance Test (FAT)	214
2.7.6	Unit Testing (UT)	216
2.7.7	Onsite Installation Test (OIT)	217
2.7.8	Installation and Commissioning Test	220
2.7.9	New BOS Testing	221
2.7.10	ETTM System Operational and Acceptance Test	222
2.7.11	Project Acceptance	223

2.8	MAINTENANCE AND SOFTWARE SUPPORT SERVICES.....	224
2.8.1	Roadside Maintenance Services – General Requirements	224
2.8.2	Maintenance Responsibilities and Services	232
2.9	PERFORMANCE REQUIREMENTS – MAINTENANCE AND OPERATIONS.....	255
2.9.1	General Performance Requirements.....	255
2.9.2	ETTM System Performance Requirement Details	264
3	CONTRACT DELIVERABLES REQUIREMENTS LIST.....	281

1 INTRODUCTION

The Orange County Transportation Authority (“OCTA” and “Authority”) is developing an Express Lanes program which encompasses the existing 91 Express Lanes and the planned Interstate (I)-405 Express Lanes opening in 2023. The Express Lanes Electronic Toll and Traffic Management (ETTM) System Project (Project) is for the replacement of the existing 91 Express Lanes ETTM System and the implementation of a new ETTM System on the I-405 Express Lanes, as part of the I-405 Improvement Project. This Scope of Work includes the Project’s technical requirements to be performed by the toll systems integrator (Contractor).

The 91 Express Lanes ETTM System project will focus on replacing the existing ETTM System. To minimize disruption to the current toll operations, close coordination will be required with the existing 91 Express Lanes toll operator. Currently, the 91 Express Lanes provide a dual gantry configuration with median access to the roadside toll equipment and communication systems. The 91 Express Lanes Anaheim Administration building, located adjacent to the State Route (SR)-91 near Weir Canyon Road, provides office space for ETTM System staff and storage for spare parts. Currently the ETTM System is monitored from this location with support staff on site.

The I-405 Improvement Project includes adding a general purpose lane in each direction and adding an additional lane in each direction that will be combined with the existing HOV lanes to create the I-405 Express Lanes High-Occupancy Vehicle (HOV) I-405. The Design Build (DB) contract was awarded in November 2016 to OC 405 Partners (Design-Builder) with construction to start in early 2018. Close coordination will be required with the Design-Builder during the design and construction phases to ensure a timely opening of the I-405 Express Lanes. To support this effort, office space will be provided to Contractor at the I-405 Construction Field Office after Contractor has been identified. After the I-405 Express Lanes open, the Agreement operations and maintenance functions will need to be conducted out of the I-405 Express Lanes Toll Operations Center.

The existing Back Office System (BOS) and Customer Service Center (CSC) support the existing 91 Express Lanes (for both Authority and Riverside County Transportation Commission (“RCTC”). The existing BOS/CSC contract ends June 2021 and a new BOS/CSC procurement, separate from this procurement, will occur prior to opening the I-405 Express Lanes. The new BOS/CSC will support the future I-405 Express Lanes and may support both the Authority and RCTC 91 Express Lanes depending on Authority and RCTC joint approvals. The new 91 Express Lanes ETTM System will initially be in operation with the Existing BOS. Contractor will support the planned transition from the Existing BOS to the New BOS with Authority and/or other agencies.

All definitions and acronyms for this Scope of Work and Requirements are in Exhibit A.

1.1 OCTA Express Lanes Projects

1.1.1 91 Express Lanes

The 91 Express Lanes is a four-lane, 18-mile tolled facility built in the median of California's Riverside Freeway (SR-91) between the Costa Mesa Freeway (SR-55) in Anaheim and Interstate 15 (I-15) interchange in Riverside to serve the booming population traveling between Inland

Empire and Orange County, see Figure 1. The OCTA 91 Express Lanes were built in 1995 and the RCTC 91 Express Lanes recently opened in 2017.

Authority operates the 91 Express Lanes from SR-55 to the Orange County/Riverside County line. RCTC operates the 91 Express Lanes that extend from the Orange County/Riverside County line to the I-15 interchange in Corona.

The 91 Express Lanes include an all-electronic toll collection (ETC) system at freeway speeds which does not accept cash on the road and requires all drivers to have a FasTrak® Transponder to pay for the toll. There is no entry/exit except at the endpoints, so there is only a single bi-directional toll station in the middle of the 91 Express Lanes. Each Toll Zone consists of two tolled lanes for vehicles carrying two or fewer persons and one lane for vehicles carrying three or more persons. Vehicles on the 91 Express Lanes with three or more persons are required to access a dedicated HOV toll lane at the Toll Zones to receive free or discounted tolls.

Vehicles on the 91 Express Lanes with three or more persons can use the facility toll free (although they still are required to have a Transponder), except when traveling eastbound on Monday through Friday between the hours of 4:00 PM and 6:00 PM. During that peak time, 3+ drivers receive a 50 percent discount on the posted toll. The discount policy also applies to zero emission vehicles, motorcycles, vehicles with disabled plates and disabled veterans plates.

The existing BOS/CSC supports both the OCTA 91 Express Lanes and RCTC 91 Express Lanes and are managed by the same toll operator making the entire SR-91 Express Lanes a seamless facility to the user. Contractor shall coordinate with the Existing BOS Contractor, and at times RCTC, but it is not envisioned that Contractor will be providing services directly to RCTC.

Access Points provide access to the OCTA 91 Express Lanes to Single Occupancy Vehicle (SOV) and HOV vehicles. The following three points are provided:

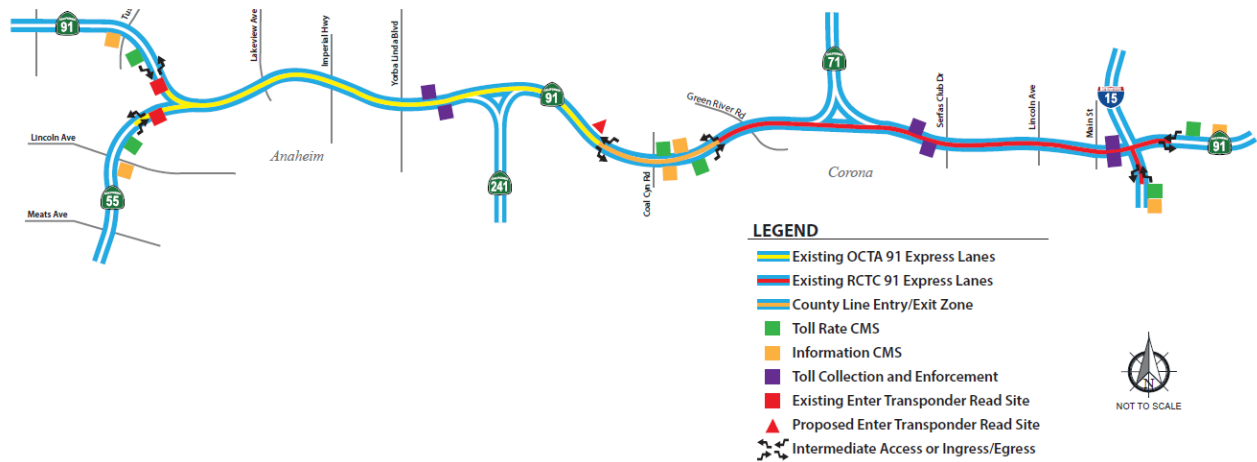
1. SR-91 eastbound west of the SR-55 junction, by a direct connector;
2. SR-55 northbound west of the SR-91 junction, by a direct connector; and
3. SR-91 westbound at the Orange/Riverside County line area, by an at-grade access.

Transition Areas are access points where Express Lanes begin or end. The OCTA 91 Express Lanes will begin and end at three locations:

1. On SR-91 at the Orange/Riverside County line area;
2. On SR-55 west at the SR-91 interchange; and
3. On SR-91 at the SR-55 interchange;

Contractor shall be aware that the Transportation Corridor Agencies (TCA) is proposing to add a direct connector linking SR-241 northbound to the eastbound 91 Express Lane and a direct connector linking the westbound 91 Express Lane to southbound SR-241. Both direct connectors would be configured to originate in the median of the 91 Express Lanes. While it is not anticipated that the SR-241 direct connectors would require changes to the ETTM System, it is anticipated Contractor will need to coordinate the 91 Express Lane operations with the SR-241 direct connect civil contractor.

Figure 1-1: 91 Express Lanes Conceptual Tolling Layout identifies the entry/exit and Toll Zone locations for the 91 Express Lanes and the RCTC Extension.

Figure 1-1. 91 Express Lanes Conceptual Tolling Layout

1.1.2 I-405 Express Lanes

The I-405 Improvement Project will add one general purpose lane in each direction on I-405 from Euclid Street to the I-605 interchange and add a tolled Express Lane in each direction of I-405 from SR-73 to SR-22 East. From SR-73 to I-605, the tolled Express Lane and the existing HOV lanes will be managed jointly as a tolled Express Lanes facility with two lanes in each direction. From SR-22 to I-605, the existing HOV lane and the second HOV lane that was completed in 2014 will become part of the tolled Express Lanes facility. The Express Lanes facility will be in the center of the freeway and be the leftmost lanes of travel in each direction.

The current intention is to open the I-405 Express Lanes with HOV2+ free during non-peak hours, retaining the flexibility to adjust to HOV3+ free with HOV2 tolled or discounted based on consideration of factors such as adjacent HOV/High-Occupancy Toll (HOT) facility occupancy requirements, available capacity after HOV2+ vehicles are allowed into the lanes, and revenue requirements to cover debt service, operations, and maintenance of the I-405 Express Lanes.

Operating the I-405 Express Lanes with HOV2+ free while maintaining speeds more than 55 miles per hour (mph) depends on HOV2+ volumes not exceeding Express Lanes capacity. The degraded condition of the HOV lanes within the Corridor in 2011 indicated that HOV lane demand is either very close to or exceeds the capacity of the single HOV lane in each direction.

Access Points will provide access to the Express Lanes to SOV and HOV vehicles. The following access points are provided:

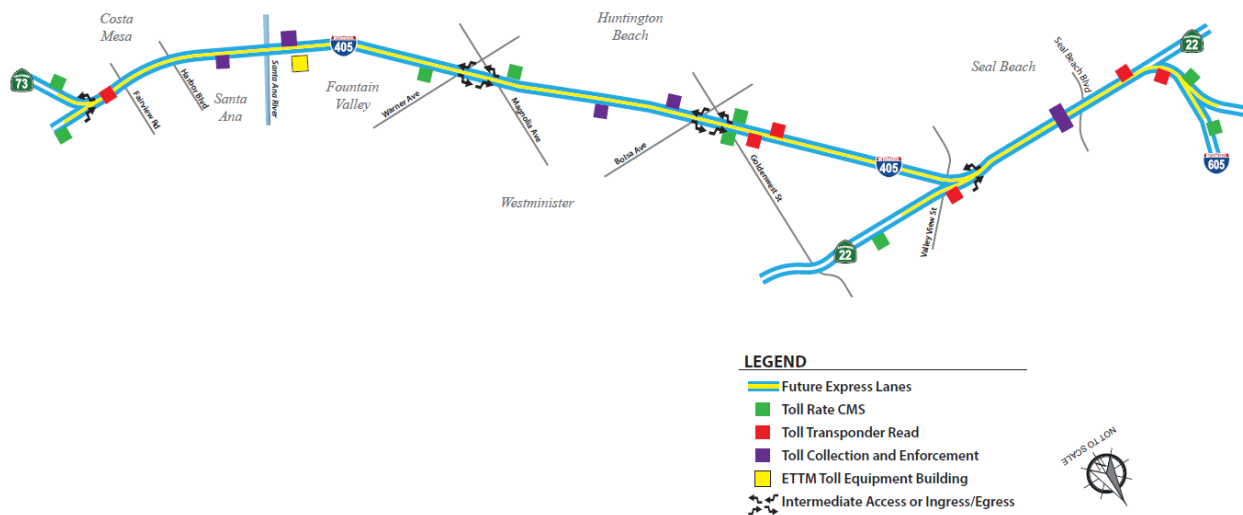
1. I-405 northbound south of the SR-73 junction, by an at-grade access;
2. I-405 northbound and southbound at the Magnolia Street/Warner Avenue area, by an at-grade access;
3. I-405 northbound and southbound at the Bolsa Avenue/Goldenwest Street area, by an at-grade access;
4. I-405 northbound from SR 22 westbound, by a direct connector;

Transition Areas are access points where Express Lanes begin or end. The Express Lanes will begin and end at five locations:

1. On SR-73 at the I-405 interchange;
2. On I-405 at the SR-73 interchange;
3. On SR-22 East at the I-405 interchange;
4. On I-605 at the I-405 interchange; and
5. On I-405 at the I-605 interchange.

Figure 1-2: I-405 Express Lanes Conceptual Tolling Layout identifies the entry/exit and Toll Zone locations.

Figure 1-2. I-405 Express Lanes Conceptual Tolling Layout



1.1.3 Future Express Lanes

Based on the options exercised throughout the Agreement, new Authority Express Lanes Corridors and Toll Zones may require Contractor to implement the ETTM System at Authority's direction and based on the pricing provided. It is assumed that the ETTM System Infrastructure will be designed to accommodate Contractor's Approved I-405 Express Lanes ETTM System. Any modifications to the design must be Approved by Authority. The pricing instructions provide guidance for ETTM System and ETTM System Infrastructure responsibilities between Contractor and the civil contractor.

1.1.4 Planned OCTA Express Lanes Toll Procurements

This procurement will be followed up by the BOS/CSC procurement. This by the BOS/CSC procurement will procure the BOS Contractor that will operate the future I-405 Express Lanes once they open in 2023 and may operate the current 91 Express Lanes.

Authority has established a preliminary timeline for the ETTM System and BOS/CSC procurements. This preliminary timeline is not intended to include all Project milestones, but is intended to present planned major milestones and to allow Contractor to have sufficient detail to develop a meaningful Preliminary Implementation Schedule.

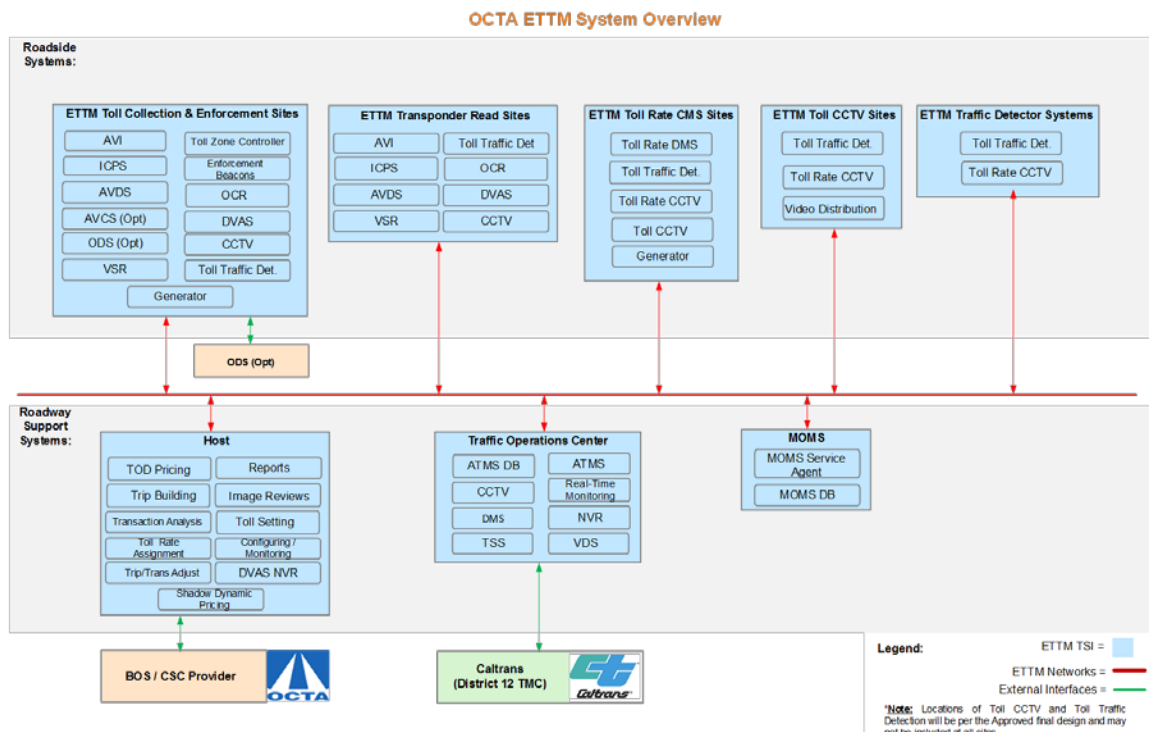
1.2 OCTA Express Lanes Electronic Toll and Traffic Management (ETTM)

1.2.1 Project Overview

The Electronic Toll and Traffic Management (ETTM) System will electronically collect all transactions and data needed for collecting toll revenue on the 91 Express Lanes and the I-405 Express Lanes. The Contractor will provide a Toll Operations Center (TOC) and staff to monitor the I-405 Express Lanes traffic conditions and react to incidents. In addition, the Contractor shall provide staff to perform manual image review services and maintenance of the ETTM System for both Express Lanes projects. Authority is seeking best-in-class and cost effective solutions for all aspects of toll services and operations. The ETTM System (**Figure 1-3: ETTM System Overview**) consists of the following Roadside Systems: ETTM Toll Collection and Enforcement, ETTM Transponder Read, I-405 ETTM Toll Rate CMS, ETTM Toll CCTV Camera, and ETTM Traffic Detection System Sites. Contractor will also be required to provide Roadway Support System (RSS) for the collection and processing of the transactions and data collected by the Roadside Systems. These RSS include a Host System (Host), Toll Operations Center (TOC) and Maintenance Online Management System (MOMS).

Authority is also interested in Occupancy Detection System (ODS) technology. The ODS would provide images and analytics to determine if the occupancy declared by the driver, either by driving through the self-declaration lane on the 91 Express Lanes or by enabling the Transponder Occupancy Setting on the I-405 Express Lanes, is accurate. This technology may be procured as part of the Project, or through a separate procurement. Contractor will be required to support the ODS interface, processing and correlation of the occupancy detected by the system to the toll transaction at selected ETTM Toll Collection and Enforcement Sites.

Figure 1-3. ETTM System Overview



1.2.2 Roadside Systems

Contractor will provide the systems and equipment located on or adjacent to the roadway that support the electronic collection of tolls, traffic management, and Express Lanes operations. Contractor will design, furnish, install, and maintain the Equipment, Hardware, and Software necessary for these various ETTM Sites.

91 Express Lanes - There will be five (5) Toll Zones, which includes three (3) ETTM Transponder Read Sites and two (2) ETTM Toll Collection and Enforcement Sites.

I-405 Express Lanes - There will be twelve (12) Toll Zones, which includes six (6) ETTM Transponder Read Sites and six (6) ETTM Toll Collection and Enforcement Sites.

The ETTMS Toll Collection and Enforcement Sites and ETTM Transponder Read Sites locations are provided in **Attachment 2: 91 EL ETTM System Information** and **Attachment 3: I-405 EL ETTM System Locations**.

1.2.2.1 ETTM Toll Collection and Enforcement Sites

Toll transactions will be collected along the Corridors at the ETTM Toll Collection and Enforcement Sites. These sites will be equipped to read both Transponders, license plates and provide additional enforcement technology. These site locations are adjacent to enforcement areas.

1.2.2.2 ETTM Transponder Read Sites

The ETTM Transponder Read Sites provide information regarding the “where” and “when” a vehicle enters or exits the Express Lanes. These sites are located just after the entry and exit points on the Express Lanes and will be equipped to read both Transponders and license plates.

1.2.2.3 Toll Rate CMS

For the I-405 Corridor project, Contractor will be responsible for the installation, oversight, management and maintenance of the Toll Rate CMSs. There are nine (9) Toll Rate CMS sites on the I-405 Express Lanes project, which include locations on SR-73, SR-22 and I-605. The full-color, full-matrix signs will display pricing and toll eligibility information and have a static sign portion affixed to the top that will be supplied by the Design-Builder to achieve MUTCD compliance.

The 91 Express Lanes Toll Rate CMS in Orange County were recently installed as part of the OCTA 91 Express Lanes Pavement Rehabilitation Project. These existing 91 Toll Rate CMSs are under a maintenance contract with RCTC in coordination with the Existing BOS. Contractor will not be responsible for maintaining the existing 91 Express Lanes Toll Rate CMSs, but will need to coordinate with the BOS if issues are identified.

1.2.2.4 ETTM CCTV Cameras

Contractor shall procure, install, test and maintain all ETTM CCTV cameras on the 91 Express Lanes and I-405 Express Lanes. Contractor will work with the Design-Builder to ensure full unobstructed coverage of the I-405 Express Lanes. The 91 Express Lanes will require the

replacement of the existing Toll CCTV cameras, excluding CCTV cameras used for monitoring CMS. Proposed locations and quantities for the Toll CCTV cameras are provided in **Attachment 2: 91 EL ETTM System Information** and **Attachment 3: I-405 EL ETTM System Locations**.

1.2.2.5 ETTM Traffic Detection System

Contractor shall install an ETTM Traffic Detection System (TDS) equipped with new vehicle detection equipment on the I-405 Express Lanes to track and record traffic data on the facility. The current 91 Express Lanes do not have a TDS and there are no plans to add one. Proposed locations and quantities for the TDS are provided in **Attachment 3: I-405 EL ETTM System Locations**.

1.2.3 Roadway Support Systems

The Roadway Support Systems (RSS) supports the ETTM Roadside Systems functions and includes the Host System, TOC, and MOMS as primary subsystems.

1.2.3.1 Host

Contractor shall procure, install, test and maintain a complete, functioning, state-of-the-art Host System to combine toll transactions to determine a vehicle's path through the Express Lanes and the toll amount to charge the user's account. A vehicle's Transponder and/or license plate image will be used to match individual toll transactions to create trip transactions. In cases where a license plate image review is required to properly identify a vehicle, Contractor will perform manual image review services to determine the license plate number.

Fully formed trip transactions will be automatically identified and sent to the 91 Express Lanes BOS for payment processing. The new ETTM System for the 91 Express Lanes will connect with the Existing BOS that supports both the 91 Express Lanes and RCTC 91 Extension. The BOS will provide the ETTM System with updated tag and license plate status files from regional toll agencies. Contractor shall ensure secure, mission-critical, high availability systems and disaster recovery to support the collections of toll revenue for both the 91 and I-405 Express Lanes.

1.2.3.2 MOMS

The Agreement shall provide a MOMS application for the ETTM System that provides a fully integrated maintenance and inventory control system. MOMS shall be capable of providing fully automated means of creating, tracking, updating and reporting ETTM health, alarms and failures for equipment, Software applications, network devices and connections, and interfaces. The application shall be capable of scheduling and tracking maintenance activities (routine, preventative and emergency), tracking tasks that are reoccurring or that need to be performed, generating work orders and notifying the appropriate staff assigned to task types. Contractor shall provide alarms, monitoring and tracking of access to the roadside cabinets and other secure locations, which includes server racks and cabinets at the client or remote locations.

1.2.3.3 Toll Operations Centers (TOCs)

A new I-405 Express Lanes TOC shall be established and operated by Contractor to monitor and report on traffic conditions on this facility 24/7. Contractor shall be responsible for furnishing and commissioning the I-405 Express Lanes TOC; installing, testing and maintaining an Advanced Traffic Management System (ATMS) for managing data and video from the I-405 Roadside

System; and for providing TOC staff to monitor and respond to changing traffic conditions. The ATMS will allow secondary sharing of video and data with third parties. The I-405 Express Lane TOC will be located at the OCTA Santa Ana Base 1 building at 4123-4199 MacArthur Boulevard, Santa Ana, CA. A separate OCTA contractor will build out this facility, and Contractor shall procure and install the Equipment, video wall, workstations, desks and other peripherals for TOC staff. All systems and equipment will be maintained by Contractor. The I-405 Express Lanes TOC will be staffed 24/7 to coordinate with Caltrans, roadside assistance, and other agencies to address changing conditions and incidents.

The existing 91 Express Lane TOC that supports both Authority and RCTC traffic operations will remain. Contractor shall be responsible for integrating the new 91 ETTM CCTV cameras installed on the 91 Express Lanes to the existing system. Contractor will be responsible to coordinate with the BOS related to 91 ETTM CCTV cameras and any identified issues, but Contractor will not be responsible for any additional functions related to the 91 Express Lanes TOC.

1.2.4 Communications

Managing multiple express lane Corridors requires a complex network of communications and interfaces for transferring data between the various toll and traffic systems. Contractor shall use and assume maintenance of the existing communications infrastructure of the ETTM System for the 91 Express Lanes. The Design-Builder will install the communications infrastructure for the I-405 Express Lanes Roadside Systems provided by Contractor. The existing Caltrans D12 Fiber Network can be utilized along with leased or installed communications to support the ETTM System operations for both 91 Express Lanes and I-405 Express Lanes. This includes support to the external interfaces, such as the Existing BOS, New BOS, and other transportation agencies.

During design, the communications interfaces will be developed by Contractor per the Scope and Requirements. Communications will be tested and operated in close coordination with the BOS and other transportation agencies. When the BOS/CSC is procured, Contractor will work with the selected New BOS Contractor to test and validate the 91 Express Lanes and the launch of the I-405 Express Lanes in 2023.

To better understand the responsibilities between the Authority and the other third party contractors (Design-Builder, other civil contractors, and BOS/CSC), see **Attachment 10 – I-405 EL ETTM System Responsibility Matrix - Design-Builder and TSI** and **Attachment 11 – 91 EL ETTM System Responsibility Matrix - Authority and TSI**

1.2.5 Project Phases

The Implementation Phase will include the following sub-phases, which could be concurrent:

- Design and Development;
- Testing;
- Installation and Commissioning;
- Transition;
- Training;
- Go-Live; and
- Post Go-Live Operational Acceptance Testing.

The Operations and Maintenance Phase commences upon the Go-Live Date and includes the following Operations and Maintenance Services:

- Toll Operations;
- System Maintenance; and
- Software Maintenance and warranty.

1.3 Express Lanes Operations

Consideration will be given to adopting operating/business rules, toll structure, and violation enforcement processes consistent for both OCTA Express Lanes.

Subject to change in the discretion of the Authority as provided in the Contract, other high level Express Lanes operating requirements include:

- Express Lanes operate 24 hours per day, 7 days per week. Enforcement approach uses a combination of manual and automated approaches with occupancy enforcement related to any HOV discounts enforced by visual CHP inspection.
- Large trucks (over 10,000 pounds) and towed trailers are prohibited.
- In service transit vehicles, emergency vehicles, and law enforcement vehicles use the Express Lanes free per the Authority Toll Policy.
- Transponder is required of all vehicles using the Express Lanes (support for Title 21, 6C and future national interoperability transponder standard).
- HOV3+ use the Express Lanes free at all times, with the exception of eastbound, Monday through Friday 4 to 6 p.m., 91 Express Lanes has a self-declaration lane where the I-405 Express Lanes will leverage switchable Transponders.
- For I-405 Express Lanes, HOV2s use the Express Lanes free during non-peak hours and pay the full toll during peak hours for the first 3.5 years of operation. Thereafter, HOV2s pay the full toll.
- Motorcycles and vehicles with disable or disabled veteran license plates are permitted to ride free in the I-405 Express Lanes during all hours.
- Clean air vehicles (CAV) with a Transponder are permitted to ride free or at a discount in the Express Lanes during all hours consistent with state law, which is subject to change, the Authority Toll Policy and any potential cap on the number of free CAV granted by the state.
- Prices displayed to motorists approaching entrances to the Express Lanes are guaranteed.
- For the I-405 Express Lanes, the I-605 and I-405 interchanges and I-405 at the SR-73 interchanges will be separately tolled using pricing to maintain the desired traffic splits.

The goal is for the 91 Express Lanes and I-405 Express Lanes to have similar policies, but there will be some differences between the two Express Lanes facilities which are identified in the detailed requirement sections of this Scope of Work and Requirements.

1.4 Express Lanes Toll Policy

In 2003, Authority adopted a Toll Policy for the 91 Express Lanes based on the concept of congestion management pricing. A similar policy will be adopted for the I-405 Express Lanes, ensuring a relatively consistent Toll Policy for both Express Lanes facilities.

The policy is designed to optimize traffic flow at free-flow speeds. To implement the Toll Policy, Authority monitors hourly traffic volumes. Tolls are adjusted when traffic volumes consistently reach a trigger point where traffic flow can become unstable. These are known as “super peak” hours. Given the capacity constraints during these hours, pricing is used to manage demand. Once an hourly toll is adjusted, it is frozen for a period of time, currently six months. This approach balances traffic engineering with good public policy. Other (non-super peak) toll prices are adjusted annually by inflation.

The Toll Policy goals are to:

- Provide customers a safe, reliable, predictable commute;
- Optimize throughput at free-flow speeds;
- Increase average vehicle occupancy;
- Balance capacity and demand, thereby serving both full-pay customers and carpoolers with three or more people who are offered discounted tolls; and
- Generate sufficient revenue to sustain the financial viability of the 91 and I-405 Express Lanes.

Further information on the Toll Policy can be found on the 91 Express Lanes website, http://www.octa.net/uploadedFiles/MainSite/Content/Express_Lanes/RevFinalTollPolicy7-30-03_v7.pdf.

1.5 General Requirements

1	Contractor shall provide all resources, personnel, Equipment, Hardware, Software and supplies necessary to perform the Services. Contractor shall provide the Services described herein in a competent and professional manner, in conformance with the highest industry standards, to the satisfaction of the Authority. The Authority shall be entitled to full and prompt cooperation by Contractor in all aspects of the Services. The Authority shall have the right to inspect the performance of such Services at any time, and Contractor shall fully and promptly cooperate with the Authority in the execution of such inspections.
2	Contractor recognizes the paramount importance of the successful operation of the System for which the Services are sought. Inasmuch as the Services are provided for the convenience and benefit of the public, Contractor acknowledges that the quality and timeliness of Contractor's Services are the essence of this Agreement.
3	If in order to provide the Services Contractor must make an external connection to the Authority's data communications infrastructure and/or access Authority information systems, Contractor shall in all respects comply with all the Authority policies and procedures regarding such connections and information systems access and undertake whatever actions are necessary in the discretion of the Authority to ensure such compliance. Contractor shall be responsible for all costs associated with ensuring that its own network security measures comply with all policies and procedures regarding external connections.

1.6 Staffing and Key Team Personnel

Contractor is responsible for maintaining and assigning a sufficient number of competent and qualified professionals to meet the terms and conditions of the Agreement and in accordance with the Approved Baseline Implementation Schedule.

4	Contractor shall maintain and assign a sufficient number of competent and qualified professionals with strong verbal and written communications skills to meet the terms and conditions of the Agreement.
5	Contractor shall ensure Key Personnel are readily accessible to Authority during Contractor's performance of this Agreement. All Key Personnel for this Project and are subject to the Approval, replacement and removal Requirements of Authority for Key Team Personnel as set forth in the Agreement.
6	<p>Key Personnel shall include a Project Principal responsible for overall management responsibility for the Agreement, and responsible for oversight of Contractor Project Manager and Contractor Project staff. The Project Principal shall be Contractor's point of contact for any escalated Project issues that cannot be resolved by Contractor Project Manager. The Project Principal shall meet or exceed the preferred minimum experience:</p> <ul style="list-style-type: none"> • Full-time employee of the Proposer or its parent company for at least one year at the time of Proposal submission; • Ten years' experience in the toll industry; • Five years of senior management responsibility for major projects in roadway toll systems; and • Senior management responsibility for at least one project of \$10 million or more in value.
7	<p>Key Personnel shall include a Contractor Project Manager responsible for the Day-to-Day Services, shall be Contractor's Day-to-Day contact person for all Project matters, and shall be responsible for the overall management and delivery of the Deliverables. The Contractor Project Manager shall meet or exceed the preferred minimum experience:</p> <ul style="list-style-type: none"> • Seven years' experience in the toll industry; • Five years' experience as a project manager in the toll industry; • Project Manager for at least one project of \$10 million or more in value; and • Project management certification such as PMP is desired.
8	<p>Key Personnel shall include a Deputy Project Manager responsible to support the Project Manager in delivery of the Services. The Deputy Project Manager shall meet or exceed the preferred minimum experience:</p> <ul style="list-style-type: none"> • Five years' experience in the toll industry on projects of similar scope to the Services on this Project;

9	<p>Key Personnel shall include a Quality Control/Assurance Manager responsible for consistent quality and adherence to the Approved QA/QC plan throughout the design, development, testing, and implementation. The Quality Control/Assurance Manager shall meet or exceed the preferred minimum experience:</p> <ul style="list-style-type: none"> • Five years as Quality Control/Assurance Manager on projects of a similar scope to the Services on this Project.
10	<p>Key Personnel shall include a Civil/Mechanical/Electrical Engineering Manager responsible for Contractor's civil, mechanical, and electrical engineering Services on the Project and shall ensure all documents that require a professional engineer (PE) approval are signed and sealed by a PE in the appropriate discipline with a State of California license. The Civil/Mechanical/Electrical Engineering Manager may also serve as the I-405 ETTM System Infrastructure Lead. The Civil/Mechanical/Electrical Engineering Manager shall meet or exceed the preferred minimum experience:</p> <ul style="list-style-type: none"> • Five years as Civil/Mechanical/Electrical Engineering Manager on projects of a similar scope to the Services on this Project.
11	<p>Key Personnel shall include a ETTM System Infrastructure Lead responsible for Contractor's civil, communications and electrical engineering inputs to the Design-Builder. The ETTM System Infrastructure Lead is responsible for coordination of all Design activities and for review and comment on all ETTM System Infrastructure Plans. The ETTM System Infrastructure Lead shall be colocated with the Design-Builder in the I-405 Construction Field Office from NTP1 until Approval of the ETTM System Infrastructure Design Plans. The ETTM System Infrastructure Lead may also serve as the Civil/Mechanical/Electrical Engineering Manager. The ETTM System Infrastructure Lead shall meet or exceed the preferred minimum experience:</p> <ul style="list-style-type: none"> • Five years as Engineering Lead on projects of a similar scope to the Services on this Project.
12	<p>Key Personnel shall include a System Design Engineer responsible for the design and development of the roadside toll system solution and shall be directly responsible for the team of Software, Hardware and systems engineers working on Contractor's solution. The System Design Engineer shall meet or exceed the preferred minimum experience:</p> <ul style="list-style-type: none"> • Five years as System Design Engineer on projects of a similar scope to the Services on this Project.
13	<p>Key Personnel shall include a Lead Test Engineer responsible for the planning, execution and reporting of the testing program. The Lead Test Engineer shall meet or exceed the preferred minimum experience:</p> <ul style="list-style-type: none"> • Two years as a Lead Test Engineer on projects of a similar scope to the Services on this Project.
14	<p>Key Personnel shall include an Installation and Commissioning Manager responsible for all installation and Commissioning Services for the Project. Installation and Commissioning Manager may also serve as the Operations and Maintenance Manager. The Installation and Commissioning Manager shall meet or exceed the preferred minimum experience:</p> <ul style="list-style-type: none"> • Five years of experience in the installation, of roadway toll systems, including lane and Host Systems, configuration of servers, systems and networks in a data center environment; and

	<ul style="list-style-type: none">• Two years' experience in a responsible installation role on projects of a similar scope to the Services on this Project.
15	<p>Key Personnel shall include an Operations and Maintenance Manager responsible for all of Contractor's operations and maintenance activities. The Operations and Maintenance Manager may also serve as the Installation and Commissioning Manager. The Operations and Maintenance Manager shall meet or exceed the preferred minimum experience:</p> <ul style="list-style-type: none">• Five years of experience in operating and maintaining roadway toll systems; and• Two years of experience as the maintenance manager of toll systems of a similar scope to the Services on this Project.
16	<p>Contractor shall assign Key Team Personnel to manage all aspects of the Services in a quality, timely, and effective manner, and shall work with Authority in a cohesive, seamless manner.</p>

2 SCOPE OF WORK AND REQUIREMENTS

The following subsections describe this Scope of Work and the Requirements for the ETTM System. These Requirements are numbered to track contractual obligations and any changes which may occur during the Project. Many of the requirements contain underlying lists of specific items and required database fields. The intent of these “including but not limited to” lists is to indicate to Contractor the intent and scope of the requirement. During design, the naming and number of items and fields will vary; however, all items and fields shall be addressed by the ETTM System unless Contractor is formally relieved of the requirement by Authority.

2.1 ETTM System Scope of Work

The Project includes the design, development, testing, and installation of a complete and integrated ETTM System that meets the requirements of the Express Lanes as specified in this Scope of Work. This includes the provision of an in-lane Roadside Systems with all required equipment and the RSS that transmit fully formed trips (requiring Contractor image processing and manual image review) to the BOS for processing. The Project also includes maintenance services on the installed system and any identified existing equipment on the 91 Express Lanes.

The 91 Express Lanes shall use the existing ETTM System Infrastructure as identified in **Attachment 1: Equipment for Re-Use** and I-405 Express Lanes shall use the ETTM System Infrastructure provided by the I-405 Design-Builder.

The quantities and locations of all sites are provided in the **Attachment 2: 91 EL ETTM System Information** and **Attachment 3: I-405 EL ETTM System Locations**.

The ETTM System and services which will be provided and maintained by the Contractor include but are not limited to the following:

- ETTM Toll Collection and Enforcement Sites, including but not limited to:
 - Automatic Vehicle Identification (AVI) System;
 - Image Capture and Processing System (ICPS);
 - Automatic Vehicle Detection (AVD) System;
 - Automatic Vehicle Classification (AVC) System (Optional);
 - Occupancy Detection System (ODS) (Optional);
 - Enforcement Beacon;
 - Optical Character Recognition (OCR) / Automatic License Plate Recognition (ALPR);
 - Vehicle Signature Recognition (VSR);
 - Digital Video Audit System (DVAS);
 - Toll closed circuit television (CCTV) cameras (per design to meet requirements);
 - Toll traffic detectors (per design to meet requirements);
 - Roadside toll cabinets (Primary cabinet is provided by Contractor and installed by the Design-Builder);
 - Individual toll equipment specific cabinets and conduits; and
 - Roadside UPS and Roadside Generator.
- ETTM Transponder Read Sites, including but not limited to:
 - Automatic Vehicle Identification (AVI) System;
 - Image Capture and Processing System (ICPS);

- Automatic Vehicle Detection (AVD) System;
- Automatic Vehicle Classification (AVC) System (Optional);
- Optical Character Recognition (OCR) / Automatic License Plate Recognition (ALPR);
- Vehicle Signature Recognition (VSR);
- Digital Video Audit System (DVAS);
- Toll CCTV cameras (per design to meet requirements);
- Toll traffic detectors (per design to meet requirements);
- Roadside toll cabinets (Primary cabinet is provided by Contractor and installed by the Design-Builder);
- Individual toll equipment specific cabinets and conduits; and
- Roadside UPS
- ETTM Toll Rate CMS Sites (I-405 EL only)
 - Toll Rate CMS;
 - Toll Rate CCTV cameras;
 - Toll CCTV cameras (per design to meet requirements);
 - Toll traffic detectors (per design to meet requirements);
 - Roadside toll cabinets (Primary cabinet is provided by Contractor and installed by the Design-Builder);
 - Individual toll equipment specific cabinets and conduits; and
 - Roadside UPS and Roadside Generator.
- ETTM Toll CCTV Camera Site
 - Toll CCTV cameras;
 - Toll traffic detectors (per design to meet requirements);
 - Video distribution;
 - Roadside toll cabinets (Primary cabinet is provided by Contractor and installed by the Design-Builder);
 - Individual toll equipment specific cabinets and conduits; and
 - Roadside UPS.
- ETTM Toll Traffic Detection System Site (I-405 EL only)
 - Toll traffic detectors;
 - Toll CCTV cameras (per design to meet requirements);
 - Roadside toll cabinets (Primary cabinet is provided by Contractor and installed by the Design-Builder);
 - Individual toll equipment specific cabinets and conduits; and
 - Roadside UPS.
- Roadway Support Systems
 - Time of Day (TOD) Pricing System;
 - Shadow Dynamic Pricing System;
 - Transaction Pre-processing and trip building;
 - Image/trip Review;
 - Trip/Transaction Adjustment;
 - Dashboard/Real-Time Monitoring;
 - Maintenance Online Management Systems (MOMS);

- Express Lane User Queries and Reports;
 - Advanced Traffic Management System (Optional);
 - Traffic Simulator and Modeling (I-405 Express Lanes only);
 - Digital Video Audit System; and
 - UPS and Generator.
- ETTM System Operations
 - Toll Operations Center (TOC) Operations
 - Manual Image Review Services
 - ETTM System Maintenance

In addition to providing, operating, and maintaining the systems and services listed above, the Contractor will also interface the ETTM System with the following entities/systems:

- 91 Express Lanes ATMS
- BOS
- Occupancy Detection System
- Existing Corridor servers (only during transition)
- 91 Express Lanes Toll Rate CMS (electronic file interface only)

During the Operations and Maintenance Phase, Contractor may be directed by Authority to facilitate the maintenance of the 91 Express Lanes CMSs. The CMSs will be under a third-party maintenance contract and Contractor's responsibility will be limited to contacting, coordination and oversight with regards to maintenance and repairs with the third-party.

The services procured under this Agreement **do not** include:

- A BOS and CSC Operations services. The required BOS and CSC Operations services will be provided under a separate contract; however, the vendor is expected to interface to the BOS and provide the necessary coordination with BOS and CSC operations vendor sufficient to properly integrate, test and operate the interface; and
- ETTM System Infrastructure, as defined in this Scope of Work and Requirements, will be retained and re-used on the 91 Express Lanes and provided and installed by the I-405 Express Lanes Design-Builder.

2.2 Roadside System – Functional Requirements

2.2.1 Hardware and Software General Requirements

17	All Hardware, Equipment, and Software supplied under this Agreement shall be new and certified to have a ten (10) year minimum service life and shall not be approaching end-of-life. Materials and products that have been previously used for development work or Contractor's internal testing, factory testing or items that have been salvaged or rebuilt shall not be permitted to be used in connection with this Agreement.
18	All components, supplies and materials furnished under this Agreement for the ETTM System shall be new, Commercial Off-the-Shelf (COTS) and field proven in revenue Operations.
19	All components procured, furnished, and installed by Contractor shall be available through multiple sources identified by Contractor and the names of such sources shall be included in the bill of materials (BOM) and readily available to Authority, unless otherwise Approved by Authority during Design.
20	All Hardware and Software provided under this Agreement shall be supported by their manufacturers, and shall be replaceable; Upgradeable; maintained; Updated; patched and secured throughout the Agreement Term.
21	Proof of purchase in the form of purchase orders, dated invoices and shipping bills shall be retained by Contractor and furnished to Authority in accordance with the terms and conditions of the Agreement.
22	All directory services provided as part of the ETTM System shall be dedicated to the ETTM System and not shared with other clients or part of Contractor's corporate IT infrastructure
23	All Roadside System Software shall meet Authority's most current technology standards; all such Software and Equipment shall meet the security standards set forth in Attachment 4: OCTA Information Security Policies.

2.2.1.1 Maintainability

24	The ETTM System Hardware shall be Designed with the following specifications:
	<ul style="list-style-type: none"> modular, replaceable and repairable components to allow for efficient Maintenance;
	<ul style="list-style-type: none"> all replacements shall be plug compatible with no changes required;
	<ul style="list-style-type: none"> all components that perform the same function shall be interchangeable;
	<ul style="list-style-type: none"> all zone controllers shall be Designed such that they are identical and interchangeable and can be configured to operate the specific number of lanes at each Toll Zone through the addition of Hardware pluggable modules and setting of appropriate Software parameters;
	<ul style="list-style-type: none"> where possible, all Equipment shall use TCP/IP network protocol to communicate with the zone controller;
	<ul style="list-style-type: none"> all expansion bus (for example PCIe) shall have a minimum two (2) spare slots per lane to support the addition of components;
	<ul style="list-style-type: none"> all network switches shall have a minimum two (2) spare jacks per lane to support the addition of components;

	<ul style="list-style-type: none"> all field wiring shall be terminated on screw lugs or connectors and all connectors shall be keyed or polarized to prevent incorrect connections;
	<ul style="list-style-type: none"> all wiring and connectors shall be labeled at each end with tape that is specified for the environmental conditions and strain relief shall be provided to protect the conductors;
	<ul style="list-style-type: none"> Contractor's electronic Design and installation shall prevent electrical disturbances, damage and noise in the electronics;
	<ul style="list-style-type: none"> Systems and field wiring that are exposed or susceptible to lightning and/or power surges and power loss shall be protected from damage;
	<ul style="list-style-type: none"> all individual lane Equipment shall be internally protected against over current and over voltage and under voltage;
	<ul style="list-style-type: none"> redundant power supplies shall be provided for all required internal DC voltages, and
	<ul style="list-style-type: none"> all Equipment shall be properly grounded to ensure the safety of Maintenance personnel.
25	Equipment mounting and installation Design shall support the Maintenance of Equipment from below on toll gantries as applicable to each Toll Zone.

2.2.1.2 Diagnostics

26	Maintenance personnel shall have easy access to components, and removal, testing, and replacement shall not require extensive effort or tools. All test points necessary to diagnose the Equipment while in operation shall be easily accessible and Light Emitting Diode (LED) indicators shall be provided to assist technicians in identifying and diagnosing problems.
27	Technicians shall have the ability to connect a laptop in accordance with security policies of the Express Lanes Program to troubleshoot the components. Technicians shall have secured and remote access to the device to monitor its status and to perform diagnostics when the lane is in operation. Contractor shall document such security policies in the Maintenance Plan.
28	For easy diagnostic and troubleshooting, all error and event logs shall be consolidated such that all events and errors associated to a transaction are in a single log. The consolidated error and event logs shall be retained online for a Configurable period of time and shall be easily accessible to the technicians.
29	The consolidated error and event logs shall also be transmitted to the Maintenance Online Management System (MOMS) at Configurable intervals of no more than an hour, and be available to Authorized User in viewable form. Search and filter capability shall be provided to display and review data in the consolidated log for up to ninety (90) Days of backlog.
30	All diagnostics performed on the Roadside System shall be recorded and automatically reported to the MOMS, including the technician ID, the time the Maintenance was performed, and all status and recovery messages.
31	All diagnostic Software and specialty tools required for support of Maintenance activities shall be supplied by Contractor and Authority shall have full rights and access as further defined in the Agreement to such diagnostic Software and specialty tools.

2.2.1.3 Customized Hardware

32	If customized components or controllers are used, Contractor shall provide detailed Documentation on the Design, production and testing of these units and shall provide usage rights to Authority. Documentation shall include electronic diagrams, component layouts and the detailed Bill of Material listing manufacturers/vendors. Contractor shall identify all customized components and controllers and indicate their plan to make them available to the Authority, including the option for placing the Documentation in escrow.
----	--

2.2.1.4 Equipment Cabinets/Enclosures

33	Contractor shall design and provide NEMA 4 stainless steel cabinets and enclosures to house all Equipment.
34	Contractor shall ensure that all Equipment controllers, electronics, devices, servers and associated communications Equipment that require air conditioning are hardened or installed in an environmentally controlled environment. Contractor shall be responsible for the provision and maintenance of the air conditioner units.
35	All cabinets shall be equipped with monitoring sensors (including humidity and temperature) and if environmental conditions inside the cabinets exceed the Configurable threshold, alarms shall be generated and reported to the MOMS. There shall be no loss of data in such conditions and the integrity of the System shall be maintained.
36	Contractor-provided cabinets and enclosures shall support the Hardware through the Agreement Term.

2.2.1.4.1 Equipment Cabinets/Enclosures – 91 Express Lanes

37	Contractor shall not re-use existing ETTM cabinets and enclosures.
38	Contractor shall provide and install all ETTM System required cabinets, enclosures and computer rack.
39	Contractor shall provide and install NEMA 4 stainless steel cabinets along with all associated foundation, straps and conduit.
40	The primary cabinet at each ETTM Toll Collection and Enforcement Site and ETTM Transponder Read Site shall be provided and installed by Contractor.

2.2.1.4.2 Equipment Cabinets/Enclosures – I-405 Express Lanes

41	Contractor shall provide and install all ETTM System required cabinets, enclosures and computer rack, except the primary roadside cabinet is to be provided by Contractor and installed by the Design-Builder.
42	Contractor shall provide and install NEMA 4 stainless steel cabinets along with all associated straps and conduit.
43	The primary cabinet at each ETTM Toll Collection and Enforcement Site, ETTM Transponder Read Site, and ETTM Toll Rate CMS Site shall be provided by Contractor and installed by the Design-Builder.

2.2.1.5 Environmental

44	The Equipment to be supplied will be installed in areas exposed to the range of climatic conditions found in California. In addition to the climatic conditions, the Equipment will also be subjected to harsh environmental factors normally found in the operation of a toll lane, such as, but not limited to, combustion motor vehicle emissions; industrial exhausts; industrial cleaners; fuel and car lubricants; Electromagnetic Interference (EMI) and Radio Frequency Interference (RFI), and vibrations. These conditions shall be taken into account in the Design and selection of Equipment used on this Project and Contractor shall ensure that the System works accurately and reliably in such environment.
45	Lane electronics, zone controllers, image capture and processing system (ICPS) controllers/servers, automatic vehicle detection (AVD) system and other components shall be able to operate in the enclosed environment of the roadside cabinets and enclosures.
46	All Hardware provided under this Agreement shall be corrosion resistant and remain corrosion resistant for the Agreement Term.
47	All lane Equipment and devices shall be Designed to handle heavy rain, fog/smog and mist-like conditions and there shall be no degradation in the System performance under such environmental conditions.
48	The lane Equipment and devices not in environmentally controlled conditions shall operate with no degradation of performance in ambient air temperature of twenty (20) to one hundred and fifty (150) degrees Fahrenheit, with and without direct sunlight, and relative humidity of five to one hundred percent (5% to 100%) for Equipment installed in an outside environment and five to ninety-five percent (5% to 95%) non-condensing for Equipment installed inside cabinets.
49	During the Implementation Phase, Contractor shall provide specification sheets that prove the lane device meet the environmental specifications given above.
50	All exposed Equipment, when in its fully assembled configuration, shall not be damaged, nor shall operational performance or expected lifetime be degraded. During the Implementation Phase, Contractor shall provide specifications for the Equipment for Authority Approval.

2.2.1.6 Assembly

51	All customized Hardware shall be assembled and tested in Contractor's fabrication/assembly facilities before being installed in the lane in accordance with Authority Approved Test Plan for customized Hardware. All chassis, attachments, and Hardware shall be fabricated with stainless steel, hot dipped galvanized or other materials resistant to salt exposure and corrosion.
52	All customized Hardware shall be identified and shall undergo a seventy-two (72) hour burn-in before they are installed in the lanes.
53	Customized Hardware assembly shall facilitate easy replacement of failed components in accordance with this Scope of Work and Requirements.

2.2.2 Bill of Materials

54	Contractor shall include the Bill of Materials (BOM) for all Equipment and Hardware supplied for the ETTM System. The second manufacturer source for all Equipment and Hardware shall be included with any exceptions noted and explained. During the Implementation Phase the BOM shall be finalized and all changes shall be subject to the Approval of Authority. A separate BOM shall be provided for the 91 Express Lanes and I-405 Express Lanes.
55	Prior to purchase of any Equipment and as part of its Design Contractor shall submit the final BOM to Authority for Approval. No Equipment shall be purchased by Contractor prior to Approval of the BOM and the Design, unless otherwise authorized in writing by Authority.
56	All Hardware and Software procured under this Scope of Work and Requirements shall be confirmed to be the latest model/version at the time of purchase with the, security, Maintenance and support Services as specified in this Scope of Work and Requirements.
57	Updates to the BOM shall be provided by Contractor whenever Equipment and Hardware changes occur and at a minimum on a semi-annual basis over the Agreement Term. All Equipment and Hardware changes shall be subject to the Approval of Authority.

2.2.3 Spare Parts and Support

58	Contractor shall be responsible for providing and maintaining spare parts inventory per the Approved Maintenance Plan during the Agreement Term.
59	The Roadside Systems procured, furnished, and installed under this Agreement shall allow Contractor to maintain and replace the Roadside Equipment and components for the Agreement Term. Contractor shall provide a spare parts list to Authority which includes recommended quantities for all spare parts for all Hardware supplied for the Roadside Systems for each year through the Agreement Term. A separate spare parts list shall be provided for the 91 Express Lanes and I-405 Express Lanes.
60	This Agreement includes the initial quantities of spare parts required for the operation of the ETTM System during the Operations and Maintenance Phase as recommended by Contractor. Costs for the replacement of spare parts shall be the responsibility of Contractor.
61	At the end of the Agreement Term, all spare parts inventory shall be turned over to Authority at one hundred percent (100%) inventory level. Contractor shall identify (via the MOMS) the warranty status for each piece of Hardware and warranty period remaining, if applicable.

2.2.4 ETTM Software

62	The operating System, database, other third-party Software, and ETTM Software procured, furnished, and installed by Contractor shall support real time Operations of the lane.
63	The operating systems shall have a clear and documented future Upgrade path and shall be supported until the end of the Agreement Term.

64	All ETTM Software developed, furnished, and installed under this Agreement shall be warranted against Software defects, security vulnerabilities and deficiencies for the Agreement Term.
----	---

2.2.5 ETTM System Toll Facility and Lane Configurations

65	The ETTM System shall support the current and future Express Lanes Corridors as described in this Scope of Work and Requirements.
66	The ETTM System shall support the lane configurations in Attachment 2: 91 EL ETTM System Information and Attachment 3: I-405 EL ETTM System Locations and dimensions detailed for each Express Lanes Corridor. Drawing packages for existing and new Express Lanes Corridors are provided in the Reference Documents.
67	Shoulder lane and travel lane widths will vary by Express Lanes Corridor and Toll Zone and are detailed in Attachment 2: 91 EL ETTM System Information and Attachment 3: I-405 EL ETTM System Locations . Travel lanes shall be equipped with the required toll collection subsystems to accommodate the variation in widths and road curvature. During the detailed Design period, Contractor shall make the required adjustments to the System Design to accommodate for variations in the actual lane widths and curvature.
68	The ETTM Systems shall be capable of detecting Transponders and capturing images of all vehicles traveling on the shoulder, as required to meet Performance Requirements.
69	Sensor layout and Toll Zone Design shall ensure that narrow shoulders have full coverage to correctly detect and process vehicles straddling the shoulders.

2.2.6 ETTM System Access Requirements

2.2.6.1 Hub/Cabinet/Enclosure Access

70	Contractor is responsible for the security of all Hardware and shall control access to the hubs, cabinets and enclosures.
71	All hubs, cabinets and enclosures, both old and new shall be equipped with locks. Contractor may rekey the existing locks on the cabinets or replace all locks on the existing cabinets with new locks.
72	Contractor shall supply all locks, establish the keying index system for all Equipment hubs, cabinets and enclosures and install these locks before installation. A key set shall be provided to Authority upon the completion of the installation check-off.
73	Contractor personnel shall use only assigned, individual keys and shall not share keys with any other individuals or make copies of any assigned keys. Contractor personnel shall immediately return all assigned keys to Authority upon request.
74	Access to all Equipment cabinets, hubs and enclosures shall be recorded automatically and reported to the MOMS. The data reported shall include, but not be limited to cabinet status; date; time of door open; time of door close, and any applicable alarm conditions.

2.2.6.2 Roadside System Software Security

75	Accounts for user access to the System shall require a strong password in accordance with password management standards in applicable Payment Card Industry-Data Security Standards (PCI-DSS) requirements. The access shall be role based and limited to the authorized Contractor staff and designated Authority personnel.
76	User access security permission control and access privileges for different levels shall be provided for the files, directories and application Software and shall be fully Configurable by a system administrator.
77	Remote access to the ETTM System shall be performed via secured VPN access and controlled through a central system with each user having a unique log-in.
78	User sign-on, access and access failures, both local and remote, to any element of the ETTM System shall be recorded and tracked for security audit proposes and reported to the MOMS. Security Software shall continuously and automatically monitor the ETTM System for unauthorized access; access violations shall be reported to the MOMS as a Priority 1 Alert.
79	Contractor shall develop the access levels, user roles and privileges matrix for the ETTM System during System Design with Authority's input and Approval. The ETTM System shall allow for additional changes to the access levels, user roles and the addition of personnel in a secure manner. Company domain and other proprietary access methods shall not be used in establishing user access roles.
80	A system level account shall be provided for Authority or designated third-party personnel to perform manual and/or automated "credentialed" scans.
81	Contractor shall not circumvent the Approved System security. All access to the System and Approved changes made shall be recorded, monitored, reviewed and audited. Specific requirements for this shall be developed by Contractor during System Design.
82	Authorized Users shall have access to the zone controller user access logs to audit the System access.
83	All user identifications and passwords for all field devices shall be stored in an encrypted method acceptable to Authority.
84	Upon cut-over of each Toll Zone, Contractor shall provide Authority the encrypted file/data of all usernames and passwords used in field equipment.

2.2.7 Roadside System Subsystems

85	All Roadside System subsystem and components shall be hot-swappable and capable of replacement while the Roadside System remains in operation.
----	--

2.2.7.1 Automatic Vehicle Identification (AVI) System

86	Contractor shall provide an AVI System comprised of multi-protocol readers, antennas and ancillary Equipment that is compliant with the Title 21, CTOC ISO 18000-6C, and National Interoperability (NIOP) chosen to meet Map 21 requirements.
87	Multi-protocol readers shall be capable of reading Title 21 and 6C concurrently.
88	At Authority direction, Contractor shall replace the Title 21 protocol with the National Interoperability protocol.

89	At Authority direction, Contractor shall support the transition of the current CTOC protocol (Title 21) to the National Interoperability protocol and such support shall include but not be limited to installation adjustments, configuration, tuning, testing, verifying compliance to new ISO 18000-6C protocol and National Interoperability protocol requirements including accuracy requirements and operating the AVI System in ISO 18000-6C and National Interoperability multi-protocol.
90	The AVI System shall detect and report the vehicle occupancy setting irrespective of the CTOC protocols implemented in compliance with the specific interface control documents (ICDs).
91	The AVI System shall provide security features that support prevention of Transponder fraud, including but not limited to: prevent cloning; authentication of Transponder data; security key management and functionality to disable/lock Transponders.
92	Contractor shall procure the antennas and the readers that meets this Scope of Work and Requirements.
93	Contractor shall furnish and install all other Hardware, cabling (including RF, communication, and power cables), connectors and associated mounting fixtures to form a fully functioning AVI System that meets this Scope of Work and Requirements.
94	Contractor shall be responsible for the RF read zone tuning, certification of the AVI System which could include any combination of the AVI protocols required in this Scope of Work and Requirements, and for integrating the AVI System into Contractor Design. Contractor is responsible for obtaining the services of the AVI vendor to certify that the lanes are tuned for all initially and subsequently installed AVI protocols to the AVI specifications. The third-party AVI Certification Report (if Contractor is not the direct provider of the AVI System) shall be submitted to Authority for RF tuning and installation. All AVI installation, configuration and tuning shall be in compliance with the AVI vendor Requirements.
95	Contractor is responsible for synchronizing all AVI readers that are at close proximity as required by the AVI vendor.
96	The AVI System shall provide full coverage at all areas of the AVI enabled ETTM Sites to only read and report Transponders on vehicles in the Express Lanes.
97	Contractor shall provide the required antenna quantity based on the final lane configuration.
98	The ETTM System integrated with the AVI System shall have the ability to process Transponders mounted on vehicles traveling in stop and go and bumper-to-bumper traffic (three feet spacing) and vehicles traveling at speeds of up to 100 mph.
99	The AVI System shall be able to read and report Transponders even if the AVD System is not functioning properly.
100	The AVI System shall be able to read the Transponder and report all CTOC toll compliant Interoperable Transponders on vehicles traveling through any area of the Toll Zone, including but not limited to center of lane, traversing lanes, straddling lanes, and straddling shoulder with no degradation of performance or interference.
101	Contractor AVI configuration and tuning shall ensure that Transponders on vehicles traveling the general purpose lanes are not reported. The System shall only read Transponders on vehicles traveling in the Express Lanes and correctly correlate those reads to their respective vehicles in their respective lanes in accordance with the Performance Requirements.

102	The AVI System shall buffer Transponder reads when it is unable to communicate to the zone controller for a minimum period of 120 hours and longer based on the maximum number of buffered reads that the AVI System can hold. When communications are restored, the buffered reads shall be reported to and processed by the zone controller.
103	If more than one Transponder is present in a vehicle, the AVI System shall have the ability to accurately read and report multiple Transponders that are compliant with the protocols defined and Approved by Authority. The order of precedence for reporting Transponders shall be in accordance with the Approved BOS ICD and Business Rules.
104	Contractor shall use the full capability of the selected AVI System to obtain AVI System status in accordance with the manufacturer specifications and report such status to the MOMS. Loss of communication to any element of the AVI System shall be immediately detected by the zone controller and reported to the MOMS. Contractor-provided monitoring logic shall specifically detect any AVI failures and generate alarms when failures are detected.
105	To support remote access to the AVI System, a user interface shall be provided so that Software lane tuning, diagnostics, configuration changes, and other remote support shall be available to Authority authorized personnel. Setup and configuration of the AVI System shall be achieved remotely and shall not require lane closure except for major lane tuning; when initially installed; AVI protocol changes are initiated, or when a reader or antenna is replaced.
106	The AVI System shall report its health to the zone controller and shall provide status when polled. Loss of communication to any element of the AVI System shall be immediately detected and reported. All health and failure status messages shall be transmitted and reported to the MOMS.

2.2.7.2 Automatic Vehicle Detection (AVD) System

107	Contractor shall analyze the site conditions and design, procure, furnish and install the required sensors and Hardware on all lanes at the specified Toll Zones as part of the AVD System that performs in accordance with Performance Requirements set forth in this Scope of Work and Requirements under all weather conditions.
108	The AVD System shall accurately detect vehicles traveling in stop and go and bumper-to-bumper traffic, vehicles traveling at speeds up to 100 mph and shall separate vehicles spaced as close as three (3) feet apart. Trailers will be detected as part of the towing vehicle transaction.
109	The AVD System shall detect the speed of the vehicle and report the speed to the zone controller as part of the vehicle transaction data.
110	Contractor shall ensure that there is full sensor coverage at all areas of the Toll Zone/lane and shoulder to accurately trigger the ICPS and detect and report vehicles traveling the shoulder and vehicles straddling lanes.
111	The AVD System shall provide vehicle event messages and signals, and vehicle location and speed data to the zone controller. Exception conditions processed by the AVD System shall be included in the transaction data.

112	The AVD System shall report its health to the zone controller and shall provide status when polled. Loss of communication to any element of the AVD System shall be immediately detected and reported. All health and failure status messages shall be transmitted and reported to the MOMS.
-----	--

2.2.7.2.1 Automatic Vehicle Detection (AVD) System – 91 Express Lanes

113	The AVD System shall provide a secondary sensor and Equipment. Should any element of the primary system fail or be degraded, the System shall determine the conditions that invoke the use of the secondary sensors and Equipment. The AVD System shall have adequate redundancy whereby a failure of a single sensor does not degrade lane operations or the ETTM System's capability to accurately associate Transponders, trigger the ICPS, capture images and process images.
-----	---

2.2.7.3 Automatic Vehicle Classification (AVC) System (Separately Priced Option)

The ETTM System shall support the implementation of an AVC System. The AVC System will be a provided by Contractor as a separately priced option which Authority will have the option to execute. If Authority exercises the option, the Contractor shall provide the AVC System in accordance with the following requirements:

114	Contractor shall design, procure, furnish and install the required sensors and Hardware on all lanes at the specified Toll Zones as part of the AVC System that performs in accordance with Performance Requirements set forth in this Scope of Work and Requirements under all weather conditions.
115	The AVC System shall accurately classify vehicles traveling in stop and go and bumper-to-bumper traffic, vehicles traveling at speeds up to 100 mph and shall separate vehicles spaced as close as three (3) feet apart.
116	The AVC System shall accurately classify vehicles according to the number of vehicle axles and vehicle profile while traveling through the Toll Zones. The final classification scheme shall be subject to Authority review and Approval.
117	The AVC System shall detect trailer hitches to ensure that vehicles with a trailer/tow are reported as one unit (axles combined).
118	The AVC System shall classify two-axle, delivery-type trucks as two-axle vehicles equivalent to a passenger car.
119	The AVC System shall provide a confidence level algorithm that appropriately assigns the likelihood the classification produced by the AVC System is correct.
120	The AVC System shall provide vehicle classification data to the zone controller. Exception conditions processed by the AVC System shall be included in the transaction data.
121	The AVC System shall report its health to the zone controller and shall provide status when polled. Loss of communication to any element of the AVC System shall be immediately detected and reported. All health and failure status messages shall be transmitted and reported to the MOMS.

2.2.7.4 Image Capture & Processing Systems (ICPS)

122	Contractor shall provide an ICPS solution that meets the Performance Requirements continuously 24/7 and under all light and climate conditions.
123	Contractor shall design, procure, furnish, and install an ICPS containing cameras in sealed enclosures, lighting, necessary image triggers, back-up triggers and the necessary camera controls, and ancillary Hardware and Software required to support the transaction matching, trip creation, and violation processing Requirements as set forth in this Scope of Work and Requirements.
124	Lights installed by Contractor in support of the cameras shall not distract motorists traveling in either direction in the Corridor. Contractor shall make no assumption of ambient light and the system shall function without any degradation regardless of the ambient light. Contractor shall take the current site conditions into consideration which includes structure shadows and sun glare when designing the illumination.
125	Camera control Software shall be provided to automatically adjust the cameras to accommodate varying light and weather conditions to maintain adequate brightness and contrast settings, with or without traffic, to ensure optimum license plate information capture under all conditions and time of Day.
126	Contractor shall install high-resolution rear ALPR camera(s) per lane and shoulder lane (if necessary) to provide image coverage and capture of the Toll Zone including during system failures and excessive glare conditions and meet the accuracy Requirements.
127	Contractor shall install rear overview cameras to provide back-up image capture during normal operations and individual camera failures, as well as excessive glare conditions. The rear ICPS solution shall be a high availability design so that images can be captured in the case of a camera and server failure. The overview rear camera shall provide a general view for the purpose of identifying the vehicle and shall be installed at a different location than the high-resolution ALPR cameras.
128	ALPR cameras shall have lenses that will enable adjustment (tuning) both directly and remotely of the field of view, focus and zoom to fully and optimally capture the rear of all vehicle types within the Toll Zone.
129	Contractor shall install high-resolution rear overview color camera per lane and shoulder lane (if necessary) to provide a full image of the vehicle in the lane. The overview camera image shall be used as a back-up to obtain the license plate data if the ALPR camera images are not available.
130	The System shall associate all images captured for a single vehicle to the vehicle transaction including multiple images from the rear camera; images from the rear overview camera; and all captured images for a vehicle straddling the lanes.
131	The ICPS shall capture and process vehicles traveling in stop and go and “bumper-to-bumper” traffic, vehicles traveling at speeds up to one hundred (100) miles per hour, and vehicles with separation as close as three (3) feet apart.
132	Contractor shall ensure that there is shoulder coverage and vehicles traveling through any area of the Toll Zone/lane, including but not limited to shoulder, center of lane, traversing lanes and straddling lanes, shall be accurately detected and their images captured and processed in accordance with the Business Rules.

133	The ICPS shall be Configurable whereby images shall be saved for all vehicles. The default configuration shall be to save images of vehicles to support transaction matching and trip creation.
134	The ICPS shall buffer images (retaining an image until its disposition is known) such that no image is lost in order to support multiple vehicles in the lane and in accordance with the Business Rules.
135	Contractor shall procure, furnish, and install the necessary redundant controllers/servers and high availability architecture to support the ICPS Equipment. Contractor shall provide robust, industrialized platforms and operating systems (PC's or workstation-type operating systems are not permitted) and the processor speed and memory shall be sufficient to process vehicles in real time to meet the speed and traffic volumes as specified in this Scope of Work and Requirements.
136	The ICPS servers shall be separate from the zone controller servers.
137	The controllers/servers shall support standalone operations and the roadside storage media shall be sized to hold a minimum of thirty (30) Days of images and data per lane at each of the Toll Zones under normal operating conditions.
138	When the storage capacity reaches a Configurable utilization percentage (for example 80%), a message shall be transmitted to the MOMS. Images shall be deleted only after it is confirmed/acknowledged that the images have been successfully transmitted to the RSS. Any deletion of images shall be automatic, without user intervention, and shall generate a message to be transmitted to the MOMS (Configurable).
139	The ICPS controllers/servers architecture shall have sufficient reliability and/or redundancy such that failure of a processor, the communications, board, power supply, disk or other critical unit does not result in loss of images and data.
140	In the event communications to the ICPS are lost or any ICPS Hardware becomes non-operational, Contractor Design shall ensure that no images and/or data are lost and that all images and associated data are transmitted to the RSS.
141	Contractor's Design shall guarantee transmission of the images and data from the Roadside System to the RSS and shall provide the capability to reconcile images to the transaction data.
142	The ICPS shall be capable of transferring images and associated data to the RSS in real-time or in batch mode depending on the ICPS solution and the location of the OCR/ALPR Software. The System shall provide one hundred percent (100%) reconciliation of all images captured and transferred.
143	The ICPS shall be capable of continuously performing diagnostics and reporting its health to the zone controller or the MOMS. Loss of communication to any element of the ICPS shall be immediately detected. All health, failure and recovery status messages shall be transmitted and reported to the MOMS.
144	The ICPS shall provide the capability of detecting image quality degradation in near real-time and generate alarms that are reported to MOMS when image quality impacts OCR/ALPR or manual image processing performance.
145	Contractor shall provide for adjusting and tuning the cameras remotely.

2.2.7.5 Optical Character Recognition (OCR)/Automatic License Plate Recognition (ALPR)

Contractor's OCR/ALPR solution can be at the camera level, ETTM Site level or Corridor level as long as it meets the functional and Performance Requirements of this Scope of Work and Requirements.

146	Contractor shall provide OCR/ALPR Software for determining the license plate data (number, jurisdiction and plate type) in accordance with the requirements specified in this Scope of Work and Requirements.
147	The System shall correctly identify the jurisdiction (state/province), plate type, special characters and stacked characters (where applicable), and accurately determine the license plate number.
148	Temporary CA license plates are pursuable, and the System shall correctly determine the license plate number, plate type and jurisdiction.
149	The System shall meet the OCR/ALPR Performance Requirements specified in this Scope of Work and Requirements for all standard and special license plates from States of California, Nevada, Arizona, Texas, Washington, and Utah.
150	The System shall meet the OCR/ALPR Performance Requirements specified in this Scope of Work and Requirements for an image set containing only the California "California Legacy License Plate" that has gold letters and a black background.
151	If a vehicle has two license plates or multiple rear images are captured for a vehicle, the region of interest (ROI) for all license plates shall be obtained and the license plate number from all plates shall be extracted and associated to the vehicle transaction. Vehicles with two rear license plates shall be identified in order to apply separate Business Rules for such transactions.
152	The captured license plate results shall include the confidence level for each character; confidence level for the jurisdiction, confidence level of the plate type and an overall confidence level.
153	Contractor shall provide the necessary Hardware to ensure there is no backlog in the processing of images for obtaining the license plate data (number, jurisdiction and plate type)
154	Contractor shall provide server redundancy whereby standby servers are available immediately and fully operational in the event of a failure.
155	The OCR/ALPR Software procured, furnished, and installed under this Agreement shall include Software that enhances and improves the accuracy and efficiency of the OCR/ALPR process especially as it relates to transaction matching and trip creation.
156	Manual image review of vehicle license plates without a valid Transponder shall be required if the associated confidence level is less than a Configurable threshold;
157	For those images that are identified for manual review, the ETTM System shall associate all images captured for a vehicle for a trip as it travels through each of the Toll Zones on a Corridor, assign them a unique identifier and transmit the images to the RSS for manual image review.

158	The images identified for the BOS license plate and violation processing shall include, at a minimum, the rear full compressed image(s) and the associated ROI images, and the overview image. Other images shall be made available upon request.
159	The image data shall include, but not be limited to: <ul style="list-style-type: none"> • transaction data; • license plate data, including license plate number, jurisdiction and plate type; • confidence level of the OCR results for individual characters and overall license plate number, and • confidence level of the license plate type and jurisdiction.
160	The ETTM System shall utilize OCR/ALPR results to filter license plates/images that match specified states and license plate types that are not processed per the Business Rules.
161	For audit and Maintenance purposes, authorized personnel shall have the capability to view all the images in real time on any device connected to the ETTM Communications Network and verify the OCR/ALPR or manual image processing performance.
162	Contractor shall measure, continuously track and report on performance of image review accuracy, productivity, reversed write-offs, and manual entries for individual and group comparisons.

2.2.7.6 Vehicle Signature Recognition (VSR)

163	Contractor's OCR/ALPR solution shall include VSR to improve the license plate data extraction performance and minimize manual image review, and return the license plate number, jurisdiction and plate type that is associated to the transaction.
164	The ETTM System shall provide the VSR confidence levels for the license plate number and jurisdiction for each image processed for downstream processing, filtering and reporting.
165	The ETTM System shall have the tools to monitor the VSR performance and to update and configure the Software to maintain and enhance the VSR performance.
166	The ETTM System shall validate all license plates in the VSR database for the first time by requiring each image to be reviewed a Configurable number of times by an image reviewer prior to being added into the VSR database. Every license plate in the VSR database shall have been validated before it is recorded in the VSR database.
167	The ETTM System shall automatically validate the VSR database at Configurable periods (for example in 180 Days) which will result in the vehicle image requiring manual image review even if established confidence level is achieved. Those images requiring revalidation shall be removed from the VSR database until such time they are validated again.
168	The ETTM System shall provide the capability to automatically correct and validate the VSR database when any error in the VSR determined license plate result is identified at any point in the downstream processes including during audit and dispute data obtained from the BOS through the Plate Correction List.

169	The ETTM System shall provide the capability to perform VSR on a Configurable percentage (up to one-hundred percent (100%)) of images and obtain the license plate number, jurisdiction and plate type based on the jurisdiction of the license plate, the plate type, and the confidence level of the OCR results (individual characters and entire license plate number).
170	The ETTM System shall utilize VSR results to filter license plates/images that match specified states and license plate types that are not processed per the Business Rules.
171	The VSR solution shall provide license plate results that meet the accuracies specified in this Scope of Work and Requirements.
172	The VSR solution shall be used by Contractor to support transaction matching and trip creation to meet the Performance Requirements of this Scope of Work and Requirements.

2.2.7.7 Clean Air Vehicles (CAV)

173	Contractor's ETTM System shall support the automated identification of the Clean Air Vehicles (CAV) that are provided discounts by Authority based on a Configurable hierarchy-based pricing of transactions and inputs including but not limited to: <ul style="list-style-type: none"> • BOS clean air status; • Tag Status File (clean air status); • California DMV clean air status; • Transponder setting; and • Account setting.
174	The ETTM System shall interface with the BOS as required to assign a CAV status to each transaction.
175	The ETMM System shall flag a CAV for manual image verification based on Authority Business Rules.
176	The ETTM System shall pass CAV information to the BOS, per the Approved ICD.
177	The ETTM System shall be Configurable to comply with current and future Clean Air Vehicle state and federal law and comply with all current and future FHWA directive.

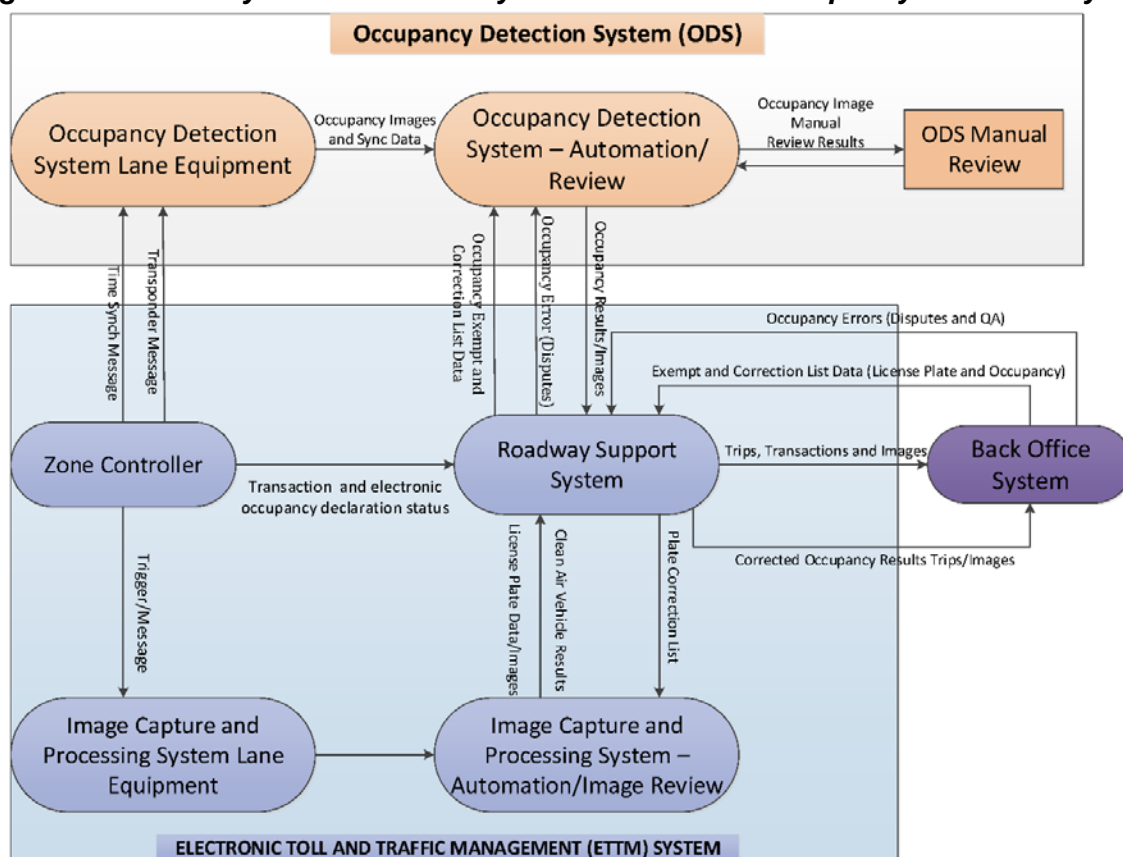
2.2.7.8 Occupancy Detection System (ODS) (Optionally Provided and Separately Priced)

Authority is interested in operating an ODS to deter misstated vehicle occupancy. The ETTM System shall support the implementation of an ODS. A proposer has the option to include or not include the ODS functionality as part of its proposal. If included, the ODS shall be a separately priced option which Authority will have the option to execute. If not included by the proposer or if the option is not executed by Authority, Contractor shall, if directed by Authority, integrate with an Authority selected third-party vendor during either the Implementation Phase or Operations and Maintenance Phase.

178	The ODS shall be a fully automated system to detect and report the number of occupants in each vehicle in the ETTM Toll Collection and Enforcement Sites.
179	Contractor's zone controller and the ETTM System shall interface to the ODS for the synchronization of the systems and transmission of occupancy detection results.

180	The ETTM System shall associate all images, data and ODS results to the transaction and record such information along with the transaction data. Such information shall be made available during the occupancy violation audit review process.
181	The ETTM System shall poll the status of the ODS and all communications, health and failure status messages shall be reported to the MOMS.
182	The MOMS shall be capable of continuously receiving diagnostics and health reports from the ODS.

Figure 5-1. Roadway Toll Collection System Interface to Occupancy Detection System



2.2.7.8.1 Occupancy Detection System (ODS) – Contractor-Provided Option

Prior to Authority's decision to execute the option and implement the ODS and prior to any ODS related payment, Contractor shall provide an ODS concept of operations, proof of concept plan and conduct a proof of concept test. The location of the testing will most likely be the 91 Express Lanes ETTM Toll Collections and Enforcement Site, but will be determined in discretion of Authority. Based on the result of the testing and other factors Authority deems appropriate in its discretion, Authority will decide whether to execute the option.

183	Upon Authority direction, Contractor shall design and provide an ODS for the Express Lanes. Contractor shall prepare an ODS concept of operations and proof of concept test plan for Authority Approval, at no additional cost to Authority.
184	Upon Authority direction, Contractor shall install the ODS at a single ETTM Toll Collection and Enforcement Site determined by Authority and conduct a proof of concept test. After the testing, Contractor shall provide a comprehensive report, at no additional cost to Authority.
185	The ODS shall be capable of accurately detecting and reporting the number of occupants of each vehicle passing through the ETTM Toll Collection and Enforcement Sites. The ODS shall be capable of differentiating between vehicles carrying 1, 2, and 3+ total vehicle occupants.
186	Contractor shall integrate the ODS with the ETTM System and interface to the BOS System to address all functionality and interfaces shown in Figure 5-1: Roadway Toll Collection System Interface to Occupancy Detection System , which notes the required interfaces and files exchange between the different systems.
187	Contractor shall be responsible for providing MOT for the installation and testing of the ODS, at no additional cost to Authority.
188	The ODS shall provide a confidence level algorithm that appropriately assigns the likelihood the occupancy detected by the ODS is correct.
189	The ODS shall interface with the RSS and support the verification and toll rate adjustments of each transaction.
190	The ODS shall be capable of automatically adjusting the toll rate for transactions when the declared occupancy is different from occupancy detected by the ODS, per the Business Rules.
191	The ODS shall interface with the BOS and include both a primary viewer and a quality control viewer for image review.
192	The ODS shall redact facial images in conformance with the California Streets and Highway Code § 31490. Contractor shall provide Authorized Users the ability to view unredacted images.

2.2.7.8.2 Occupancy Detection System (ODS) and BOS (ODS-Related) - ETTM Integration Only Option

Contractor shall, if directed by Authority, integrate with an Authority selected third-party vendor during either the Implementation Phase or Operations and Maintenance Phase. In addition, Contractor shall interface with the BOS (existing and new) to support the exchange of ODS related information. The anticipated exchanges of data, triggers, transitions and images between the ETTM System, the ODS and the BOS are shown in **Figure 5-1: Roadway Toll Collection System Interface to Occupancy Detection System**.

193	If directed by Authority, Contractor will be responsible for integrating the ODS into the ETTM System.
194	If directed by Authority, Contractor will be responsible for integrating with the BOS for the exchange of ODS-related information.

195	Contractor shall support the ODS vendor and the BOS with design of the ODS-related interfaces and processes to support the Approved ODS concept of operations.
196	Contractor shall support the ODS vendor during installation of the ODS during on-site integration testing, proof of concept testing and installation across the ETTM System.
197	Contractor shall support the ODS vendor in developing plans for and implementing MOT; however, the ODS vendor or Authority shall be responsible for all ODS related MOT.
198	Contractor shall integrate the ODS with the ETTM System in accordance with the ICD which will be developed by the ODS vendor in coordination with Contractor and the BOS Contractor.
199	The ODS provided by Authority will include all field Equipment, Software and applications and the results of the ODS will be transmitted to the ETTM System in accordance with this Scope of Work and Requirements.
200	The ODS Software will run on a separate server either at the ETTM Toll Collection and Enforcement Site or at the Corridor level provided by Authority and the results of the ODS will be transmitted to the ETTM System for integration and association to the transaction.
201	Upon acceptance of the ODS by Authority, the ODS vendor will provide the ODS equipment maintenance and support. All software support will also be performed by the ODS vendor.

2.2.7.9 Manual Image Review

202	Contractor shall provide manual image review as part of trip building process for all transactions that do not meet the required confidence levels.
203	Manual image review shall be required for: <ul style="list-style-type: none"> • All transactions that do not meet the required OCR/ALPR confidence level; • All Unpermitted Vehicles transactions; • All CAV transactions; and • All transactions where the declared vehicle occupancy does not match the vehicle occupancy detected by the ODS.
204	The ETTMS System shall be capable of queuing images by type (i.e. Unpermitted Vehicle, CAV, etc.) for manual image review and follow-on review by Authorized Users.
205	During the Implementation and Operations and Maintenance Phases, the Contractor shall work with the Existing and/or New BOS Contractor to update and test the ICD between the ETTM System and the BOS to support the differentiation, unique processing and transfer of different image types.

2.2.7.10 Toll Rate Changeable Message Sign

2.2.7.10.1 Toll Rate Changeable Message Sign – 91 Express Lanes

The 91 Express Lanes and RCTC 91 Express Lanes Toll Rate CMSs are jointly managed through an agreement between Authority and RCTC. It is not anticipated that Contractor will have an electronic interface directly with the signs or with any system that controls the signs. At some point during the Operations and Maintenance Phase, the Authority may direct Contractor to provide coordination of Toll Rate CMS maintenance with a third-party maintenance provider and the following requirements would apply.

206	In the event that an existing Toll Rate CMS is damaged or not functioning properly, Contactor shall provide initial maintenance response and coordinate the Toll Rate CMS maintenance with a third-party maintenance provider.
207	Contractor shall manage and oversee any Toll Rate CMS maintenance provided by a third-party maintenance provider.
208	Contractor's coordination, management, and oversight of Toll Rate CMS maintenance shall be provided at no additional cost.

2.2.7.10.2 Toll Rate Changeable Message Sign – I-405 Express Lanes

The Express Lanes will use full-matrix CMS modules/signs, integrated with and controlled by Contractor, to inform the motorists of the toll amount in effect on the Express Lanes so that motorists can choose their travel option.

209	Contractor shall design, procure, and install new Toll Rate CMSs and integrate them into the ETTM System. Toll Rate CMS are installed on the I-405 Express Lanes as shown in Attachment 3: I-405 EL ETTM System Locations .
210	The Toll Rate CMS shall be Daktronics Vanguard VF-2420-54X255-34-X full-color CMS as specified in Attachment 5: Toll Rate Changeable Message Sign (CMS) Specifications , or Approved equivalent.
211	The Toll Rate CMS shall support the display of toll amount for up to three (3) Configurable destinations and Express Lanes eligibility requirements on the -fourth row.
212	The Toll Rate CMS shall operate in temperatures from -30-deg F to +165-deg F and a humidity ramp of 0 to 99%, non-condensing.
213	The Toll Rate CMS shall include a high-intensity LED, full-color, full-matrix display capable of displaying four lines of text with a 13" minimum character height.
214	The Toll Rate CMS shall consist of 34 mm pixels.
215	The Toll Rate CMS sign intensity shall 12,400 candelas/m ² minimum.
216	The Toll Rate CMS shall operate on NTCIP communications protocol.
217	The Toll Rate CMS shall meet or exceed NEMA TS 4 Section 2 environmental requirements.
218	The Toll Rate CMS shall be sufficiently wide to display the text "HOV 3+ WITH FASTRAK FLEX NO TOLL" on a single line.
219	The Toll Rate CMS display area shall be a minimum of 5'-11" by 27'-7"
220	The Toll Rate CMS shall be capable of displaying MUTCD, Authority, and Caltrans approved text, graphical images, and shapes, which shall comply with applicable MUTCD and Caltrans standards.
221	The Toll Rate CMS shall support the display of text messages in English for the display of incident mode data, for example CONSTRUCTION AHEAD, CLOSED TO TRAFFIC and HOV ONLY in accordance with the Business Rules.
222	The Toll Rate CMS will include a relatively small static sign panel identifying the Express Lane. Design-Builder will Design and furnish the static sign panel to be affixed to the Toll Rate CMS. Contractor shall assemble and install the Toll Rate CMS.

223	Contractor shall coordinate the Toll Rate CMS Design with the Design-Builder. The Design-Builder is responsible for the design and installation of Toll Rate CMS support structure, Toll Rate CCTV camera mounting structure, and Toll CCTV camera mounting structure.
224	Contractor shall furnish and install the Toll Rate CMS assembly (LED panel and static sign panel), Toll Rate CCTV camera, and Toll CCTV cameras.
225	If the Toll Rate CMS is upstream of the Toll Zone where vehicle is detected, the System shall consider the travel time between the Toll Rate CMS location and the Toll Zone to determine and assign the toll that was displayed to the customer in accordance with the Business Rules.
226	Contractor shall provide a sign control system which, in normal operations, communicates with the Time-of-Day pricing system and controls the Toll Rate CMS display.
227	The Toll Rate CMS shall store default toll rates by time of Day (Configurable time periods in as low as 15 minute increments) Day of week, and individual holiday schedules that will be displayed on the Toll Rate CMS when communications to the sign control system is lost.
228	Authorized personnel shall have access to the Toll Rate CMS through a secure and Authorized User network interface to directly control the Toll Rate CMS manually and override system messages. When operating in manual override mode an alarm message shall be generated and sent to MOMS at Configurable intervals.
229	The status of the Toll Rate CMS and the data on the Toll Rate CMS shall be displayed on the RSS Dashboard/Operations monitoring screen in real-time.
230	Specified CCTV cameras will be identified as Toll Rate CCTV cameras that will monitor the Toll Rate CMS at each Toll Rate CMS location. These cameras shall be integrated into the ETTM System by Contractor to record the data displayed on the Toll Rate CMS upon every change in message and at Configurable intervals. The recorded frames shall be displayed on the Operations monitoring screen/Dashboards and available for review.
231	The Toll Rate CCTV camera frames shall be available for display on the Express Lanes Management Dashboard.
232	Loss of communications or failure of any component of the Toll Rate CMS, including the Toll Rate CCTV camera, shall be detected and reported to MOMS and be displayed on the Operations monitoring screen as a Priority 1 event. Toll Rate CMS failures shall include loss of power to the Toll Rate CMS and blank display.
233	The Toll Rate CMS and the Toll Rate CCTV cameras shall be synchronized to the same time source as the RSS.

2.2.7.11 Enforcement Beacons

2.2.7.11.1 Enforcement Beacons – 91 Express Lanes

Contractor shall procure, install, and integrate Enforcement Beacons for each of the six (6) Express Lanes (three (3) in each direction) at the ETTM Toll Collection and Enforcement Site. Enforcement Beacons shall be installed for viewing from both upstream and downstream of the ETTM Toll Collection and Enforcement Site. Currently the Enforcement Beacons are only on the downstream side of the gantry. The purpose of the Enforcement Beacon is to indicate, primarily to CHP, if the vehicle has a valid Transponder that has been read. The criteria for a Transponder

to be considered “valid” will be determined by Authority during the Implementation Phase based on information passed from the BOS.

234	Contractor shall furnish and install Enforcement Beacons over each lane and at each ETTM Toll Collection and Enforcement Site.
235	An Enforcement Beacon for each Express Lane shall be clearly visible to CHP officers from downstream of the ETTM Toll Collection and Enforcement Site allowing them to associate the Enforcement Beacon display to the vehicle in the ETTM Toll Collection and Enforcement Site.
236	An Enforcement Beacon for each Express Lane shall be clearly visible to upstream vehicles traveling in the Express Lanes approaching the ETTM Toll Collection and Enforcement Site allowing CHP to associate the Enforcement Beacon display to the vehicle ahead in the ETTM Toll Collection and Enforcement Site.
237	The Enforcement Beacons shall not be blocked from view by the second gantry, signage, Equipment, mounting hardware or any other obstruction.
238	The Enforcement Beacons that display downstream shall provide a different distinct color for each lane.
239	The Enforcement Beacons that display upstream shall comply with applicable MUTCD and Caltrans standards, shall be configured to not resemble normal traffic control devices.
240	The Enforcement Beacons that display downstream shall be placed in the same location as the existing Enforcement Beacons.
241	The diameter of the Enforcement Beacons shall be equal to or greater than the existing Enforcement Beacons.
242	The Enforcement Beacon provided by Contractor shall include an ambient light sensor that allows the intensity of the LED display to be adjusted for changing light conditions.
243	Loss or failure of the Enforcement Beacon light arrays shall be detected immediately by the zone controller and transmitted in real-time to the RSS to be reported to the MOMS.
244	Beacons shall operate in AVD degraded mode where vehicles are not being detected but Transponders are still being read.
245	All Enforcement Beacon designs shall comply with applicable MUTCD and Caltrans standards and must be Approved by Authority and Caltrans with particular regard for driver distraction.

2.2.7.11.2 Enforcement Beacons – I-405 Express Lanes

Contractor shall procure, install, and integrate Enforcement Beacons for each Express Lane at the ETTM Toll Collection and Enforcement Site. Enforcement Beacons shall be installed for viewing from both upstream and downstream of the ETTM Toll Collection and Enforcement Site. The purpose of the Enforcement Beacon is to indicate, primarily to CHP but also to drivers, if the vehicle has a valid Transponder that has been read and what the occupancy setting is. The criteria for a Transponder to be considered “valid” will be determined by Authority during the Implementation Phase based on information passed from the BOS.

For the I-405 Express Lanes, Authority is looking for innovative designs that can be clearly interpreted by the CHP officers and help deter miss-stating of occupancy by making Express Lanes drivers aware that their occupancy setting is being read. The indicator will need to clearly

designate between 1) no Transponder or Transponder not valid; 2) switch set to SOV; 3) switch set to 2 occupants, and 4) switch set to 3+ occupants.

Authority understands that some designs may require additional civil infrastructure.

246	Contractor shall furnish and install Enforcement Beacons over each Express Lane and at each ETTM Toll Collection and Enforcement Site.
247	An Enforcement Beacon for each Express Lane shall be clearly visible to CHP officers from downstream of the ETTM Toll Collection and Enforcement Site allowing them to associate the Enforcement Beacon display to the vehicle in the ETTM Toll Collection and Enforcement Site.
248	An Enforcement Beacon for each Express Lane shall be clearly visible to upstream vehicles traveling in the Express Lanes approaching the ETTM Toll Collection and Enforcement Site allowing CHP to associate the Enforcement Beacon display to the vehicle ahead in the ETTM Toll Collection and Enforcement Site.
249	The Enforcement Beacon indicators shall not be blocked from view, signage, Equipment, mounting hardware or any other obstruction.
250	The Enforcement Beacon provided by Contractor shall include an ambient light sensor that allows the intensity of the LED display to be adjusted for changing light conditions.
251	The ETTM System shall directly control the illumination of the Enforcement Beacon to allow for instant feedback to observers on vehicle Transponder Occupancy Setting.
252	Loss or failure of the Enforcement Beacon light arrays shall be detected immediately by the zone controller and transmitted in real-time to the RSS to be reported to the MOMS.
253	Beacons shall operate in AVD degraded mode where vehicles are not being detected but Transponders are still being read.
254	Contractor shall be responsible for any civil infrastructure required to mount the Enforcement Beacon, other than the toll gantry provided.
255	All Enforcement Beacon designs shall comply with applicable MUTCD and Caltrans standards and must be Approved by Authority and Caltrans with particular regard for driver distraction.

2.2.7.12 Toll Transaction History Access for Enforcement Purposes

Contractor shall provide CHP (or other Authorized Users) secure, URL-based toll transaction history. It is anticipated that the CHP officer will access the information via their existing in-vehicle computer immediately after stopping drivers that are suspected of violating the law on the Express Lanes. Via access to the ETTM System, after stopping a driver, the CHP officer may opt to retrieve the toll transaction history by either entering the license plate and/or the Transponder ID. The ETTM System will provide the toll transaction history in near real time. It is not anticipated that Contractor will provide any in-vehicle or on-person Equipment to be used by CHP in accessing this information.

256	The ETTM System shall provide secure, URL-based access to CHP (or other Authorized Users) for accessing Transponder-Based and/or Image-Based Transaction history per OCTA Policy and the Streets and Highway Code 31490. The CHP officer, using a secure login, shall be provided the most recent Configurable number of transactions displayed on the CHP in-vehicle computer including Transponder-Based Transactions within the last two (2) minutes.
257	When using the license plate number, the ETTM System shall provide both Image-Based violation transactions and Transponder-Based Transactions for the Transponder associated with the license plate entered.
258	At a minimum, transaction data shall include Corridor, Toll Zone, transaction date and time, Transponder ID, and Transponder Occupancy Setting.
259	The CHP will have direct walkie-talking or phone access to the TOC. As a secondary method, the TOC shall be capable of using the same functionality to access the information and pass it verbally to the officer.

2.2.7.13 Digital Video Audit System (DVAS)

260	Contractor shall provide Digital Video Audit System (DVAS) units at each ETTM Toll Collection and Enforcement Site and ETTM Transponder Read Site which will provide an integrated solution with the capability to investigate lane performance issues and support testing.
261	The DVAS shall include one high resolution color camera per Toll Zone providing full coverage and continuous video footage of the Toll Zone.
262	The DVAS shall encompass all Equipment and Software necessary to provide the audit capability described herein, including but not be limited to: <ul style="list-style-type: none"> digital cameras and any associated lenses, lighting and sensors; interface to the zone controllers to capture event data; storage media, and application to view real-time video and events and playback the information.
263	Every Toll Zone shall be wired to integrate the DVAS, and the zone controllers at each location shall integrate the DVAS units to support the requirements in this Scope of Work.
264	The DVAS cameras shall have pan-tilt-zoom (PTZ) functionality that allows Authorized Users to remotely control the camera. The DVAS cameras shall revert to the default settings that can be overridden by Authorized Users when no PTZ commands are received within a Configurable time. Alarm messages shall be reported to MOMS when remote controls or setting other than default are detected.
265	Clear, high quality video of each toll lane shall be provided in accordance with the ambient lighting and/or weather conditions at each Toll Zone.
266	The DVAS and audit data shall be independent of the transaction data stream provided to the ETTM System; however, the DVAS shall be integrated into Contractor's System and linked to the transaction to meet the requirement specified in this section.
267	Contractor shall provide Authorized Users the ability to access the DVAS through the ETTM System application or through a secure application using any Authority authorized workstation connected to Authority System network.

268	The DVAS shall provide the capability to monitor an overall image of the Toll Zone with the ability to see each lane and the vehicle traveling in that lane, and shall display detailed events for each lane as they occur in real-time.
269	At a minimum, the DVAS shall display the Corridor ID, Toll Zone, lane number, transaction number, transaction date and time, Transponder ID, Transponder Occupancy Setting and status, operational mode and payment method. The DVAS video and data shall be accessible in read-only mode; no changes or alterations to the video or data shall be allowed.
270	All detailed data obtained from various subsystems shall be displayed to assist auditors and Maintenance staff with the investigation of discrepancies and problems. The DVAS shall perform and display video and data in real-time and shall have the ability to playback events and data.
271	The DVAS shall also have the capacity to record and store up to ninety (90) Days (Configurable) of video and data to an electronic media for each DVAS camera. DVAS video and the corresponding data (event information and the transaction information) shall be saved together as a unit such that when it is moved to a different environment, the video can be replayed with the events being displayed (Configurable) outside the production environment as long as the DVAS replay Software is available.
272	As part of the Implementation Phase, Contractor and Authority shall determine the optimum location for the installation of the DVAS Equipment to allow for the complete monitoring of each toll lane. If Contractor cannot install the DVAS cameras on existing infrastructure or on supports installed by the Design-Builder, it shall be the responsibility of Contractor to install the necessary infrastructure.
273	MOMS message shall be generated if there is failure of any component of the DVAS.
274	The DVAS shall be time synchronized to the same source as the zone controllers and interface to the zone controller to obtain event data.
275	Identification on the screens shall allow the reviewers to clearly differentiate the lane under review and its associated event data.
276	Controls shall be provided to step forward and backward by frame and display of events shall be synchronized. All digitized video and corresponding event data shall be tightly synchronized and stored.

2.2.7.14 Uninterruptible Power Supply (UPS)

Utility power will be made available to Contractor at the Equipment cabinets at each ETTM Site location on each of the Corridors. For the designated ETTM Sites, Contractor shall provide Uninterruptible Power Supply (UPS).

277	All ETTM System Hardware and Equipment shall be on UPS. The UPS shall be supplied by Contractor.
278	At all applicable ETTM Sites, Contractor shall furnish and install an automatic transfer switch (ATS) at cabinet. Contractor shall interface with the ATS and the smart Power Distribution Units (PDUs) to manage the Roadside power distribution. Maintenance technicians shall have remote access to manage power to critical devices.

279	Contractor shall furnish and install an electronic interface to the UPS to monitor its UPS performance. The MOMS shall detect the status of the UPS and Alert technicians when the System is on UPS and prior to any graceful shutdown.
280	Software drivers shall be developed, furnished, and installed to acquire, display, store and report all parameters provided as outputs from the UPS.
281	The UPS shall support the ETTM Sites for a minimum of four (4) hours.
282	Prior to the UPS being expended (i.e. 5 minutes after utility power outage), the power will switch to the Roadside Generator, where applicable.
283	If no Roadside Generator is provided, the System shall initiate a graceful shutdown of the servers/computers.
284	When utility power is restored and Hardware/Equipment is no longer on the UPS a notification shall be reported to the MOMS.

2.2.7.14.1 Uninterruptible Power Supply (UPS) – 91 Express Lanes

285	The existing ETTM Site UPSs shall not be re-used and Contractor shall remove and coordinate delivery to Authority for disposal the existing UPSs at each ETTM Site.
286	Contractor shall be responsible for taking over the existing meters at each ETTM Site and shall size the power, meter, and UPS to meet the power requirements at each site.

2.2.7.14.2 Uninterruptible Power Supply (UPS) – I-405 Express Lanes

287	Contractor shall be responsible for providing ETTM Site power requirements to the Design-Builder. The Design-Builder will design and provide power to each ETTM Sites.
288	Contractor shall be responsible for taking over the new meters at each ETTM Site and shall size the UPS to meet the power requirements at each site.

2.2.7.15 Roadside Generators**2.2.7.15.1 Roadside Generators – 91 Express Lanes**

289	The existing Roadside Generator(s) shall be retained and re-used.
290	Contractor shall furnish and install a new electronic interface to the existing generators to monitor their performance. The MOMS shall detect the status of the generator and Alert technicians when the System is on/off the generator.

2.2.7.15.2 Roadside Generators – I-405 Express Lanes

291	Contractor shall provide Roadside Generators at each ETTM Toll Collection and Enforcement Site and ETTM Toll Rate CMS Site to supply continuous service in the event of a utility power loss.
292	The generators power supply shall be liquid propane (LP), liquefied natural gas (LNG), diesel, or other type as Approved by Authority.
293	The generator shall be capable of supplying Equipment with backup power within 5 minutes and maintain peak power draws until utility power is restored.
294	The generators shall be easily accessible to Maintenance technicians so that they can refuel the tanks in the event of extensive power outage.

295	Contractor shall secure the generators to prevent theft.
296	Contractor shall furnish and install an electronic interface to the generators to monitor their performance. The MOMS shall detect the status of the generator and Alert technicians when the System is on/off the generator.

2.2.7.16 Zone Controller**2.2.7.16.1 Zone Controller Hardware**

297	A fully redundant zone controller that is capable of supporting the Requirements in this Scope of Work and Requirements shall be designed, procured, furnished, and installed at each Toll Zone as identified in Attachment 2: 91 EL ETTM System Information and Attachment 3: I-405 EL ETTM System Locations . The zone controller shall be designed in a redundant configuration where there is a single primary zone controller with a “hot standby” secondary zone controller operating in parallel and capable of assuming processing control in the event the primary unit should fail (automatic failover), without requiring human intervention.
298	When any Hardware and/or process on the primary zone controller fails preventing it from processing vehicles and creating transactions, the secondary zone controller shall assume the functions of the primary zone controller. The failover from the primary zone controller to the secondary zone controller shall be transparent to the System operations and shall not require the restart of any subsystems. Only one zone controller at a time shall generate revenue transactions.
299	Alarm messages shall be generated and reported to the MOMS when such a failover event occurs. Contractor’s failover Design shall ensure that there is no loss of revenue or transactions when one of the zone controllers fails.
300	The System shall also provide Authorized Users the capability to manually and remotely switch the active zone controller to and from the primary zone controller to the secondary zone controller. All such events shall be recorded and transmitted to the MOMS.
301	The zone controllers shall be hardened, industrial grade servers and the processor speed and memory shall be sufficient to process vehicles in real time to meet the traffic speed and volumes as specified in this Scope of Work and Requirements. The current volumes are provided in Attachment 6: Current Traffic and Transaction Volumes by Facility .
302	Storage shall be sized to hold a minimum of thirty (30) Days of one hundred percent (100%) of transactions and event data for each lane at the Toll Zone supported by the zone controller.

2.2.7.16.2 Zone Controller Software

303	The zone controller Software shall interface to the various devices and subsystems for each of the lane configurations specified and perform all the functions as described in this Scope of Work and Requirements.
304	The zone controller located at each of the Toll Zones shall process all of the data obtained from the other subsystems and devices as described in this Scope of Work and Requirements to generate a transaction record for each vehicle passage through the Toll Zone/lane. The zone controller shall:

	<ul style="list-style-type: none"> manage the Transponder status list for Authority, all CTOC Interoperable agencies, and all National Interoperable Agencies used to validate the status of a Transponder received from the AVI System;
	<ul style="list-style-type: none"> use the data obtained from the AVI and AVD systems to assign the Transponder read to the correct vehicle and frame the vehicle transaction accurately;
	<ul style="list-style-type: none"> notify the ICPS to capture, if applicable, and process vehicle images in accordance with the Business Rules;
	<ul style="list-style-type: none"> transmit the transaction record to the RSS, including but not limited to the following data: vehicle detection data, Transponder data, Transponder Occupancy Setting data, Equipment status data, and all other pertinent information regarding the transaction;
	<ul style="list-style-type: none"> transmit to the MOMS all alarm messages relating to the health of each subsystem, including the health of the primary and secondary (redundant) zone controller. Recovery messages shall also be transmitted and reported;
	<ul style="list-style-type: none"> transmit vehicle event data and transaction data to the DVAS; and
	<ul style="list-style-type: none"> transmit to the RSS for further processing all other messages/events in accordance with Approved Interface Control Documents (ICDs).
305	The zone controller Software shall be Configurable and shall be able to support Authority Roadside operational needs without requiring changes to Software. The Configurable parameters shall be defined and documented during the Design process. All parameters shall have default values that shall be established during the Design process.
306	Contractor shall propose appropriate protocols and data structures to accomplish the communications required between various peripherals. These protocols and data structures shall be fully detailed and documented by Contractor during the Design process and Approved by Authority.
307	Guaranteed transmission protocols shall be used for all messages exchanged between systems, including but not limited to:
	<ul style="list-style-type: none"> zone controller;
	<ul style="list-style-type: none"> ICPS;
	<ul style="list-style-type: none"> ODS;
	<ul style="list-style-type: none"> AVI System;
	<ul style="list-style-type: none"> AVD System;
	<ul style="list-style-type: none"> RSS
	<ul style="list-style-type: none"> MOMS;
	<ul style="list-style-type: none"> DVAS, and
	<ul style="list-style-type: none"> Toll Rate CMS (I-405 EL only).

2.2.7.16.3 Zone Controller Start-Up

308	Upon start-up or initialization, the zone controller shall perform a self-diagnostics test to ensure full System Operations. Alarm messages shall be reported for all failure conditions and a notification of the diagnostic check completion shall be displayed on the MOMS monitoring screen. The failure of a critical system shall result in the Toll Zone operating under degraded Operations in accordance with the Business Rules.
309	Upon start-up, the zone controller shall verify with the RSS that it has the latest configuration files; Transponder status file; and any other files required to support the lane Operations. If the latest files are not present on the zone controller, it shall request the latest data from the RSS. If a zone controller is unable to get the latest files, an Alert shall be generated and sent to MOMS.

2.2.7.16.4 Zone Operations

When the Express Lanes are open to traffic and operating in Normal Mode, Single Occupant Vehicles (SOV) are required to pay a toll using a Transponder. High Occupancy Vehicles (HOV) can use the Express Lanes for free or at discounted toll rates when equipped with a Transponder. Vehicles not equipped with Transponders are processed as Image-Based Transactions. The I-405 Express Lane Corridors support HOV 2+ and HOV 3+ toll-free or discount toll travel based on the TOD pricing schedule and the Business Rules. The 91 Express Lanes use lane declaration only to determine declared occupancy. The selection of a particular HOV requirement shall depend on Authority policy decisions as well as on the operational characteristics of the Roadside. For example, on the I-405 Express Lanes, if demand cannot be adequately managed in an HOV2+ mode, then it will be necessary to raise the requirement to HOV3+. The HOV requirement may vary by Day of week (e.g. weekdays vs. weekends) and by time of Day (e.g. peak periods vs. off-peak periods) and by Corridor. For example, a specific Corridor may operate as HOV2+ during off-peak periods and as HOV3+ during peak periods.

310	The Roadside Systems shall support each Corridor operation as specified in this Scope of Work and the Business Rules.
311	<p>The ETTM System shall support the following modes of Operations:</p> <ul style="list-style-type: none"> • Normal Mode: All transactions shall be processed normally in an open mode in accordance with the Business Rules to be determined during the Implementation Phase; • Maintenance Mode: Transactions created in Maintenance mode are processed as normal transaction but are identified as Maintenance mode transactions and transmitted to the RSS. Transactions that occur during Maintenance mode are not reported as traffic or revenue transactions. • OPEN TO ALL: Initiated by Authorized Users whereby the Express Lanes are open to all traffic (potentially due to incidents in the general purpose lanes or special events). During OPEN TO ALL mode of operation, tolls are suspended. • CLOSED: Initiated by Authorized Users whereby the Express Lanes are closed to all traffic (potentially due to incidents in the Express Lanes or system maintenance). Transactions detected during closed mode of operation are processed in accordance with the Business Rules to be determined during the Implementation Phase.

	<ul style="list-style-type: none"> • HOV ONLY Mode: Initiated by Authorized Users whereby the Express Lanes will operate in HOV ONLY Mode (2+ or 3+). The ETTM System should be able to support modes of both "HOV2+ ONLY" and "HOV3+ ONLY." SOVs that enter the Express Lanes when it is in HOV ONLY mode shall be flagged and assessed tolls and fees based on the Business Rules.
312	In the event of a power interruption, the zone controller shall open in the operational mode it was in before it was powered down.
313	Authorized Users shall have the ability (local and remote) to configure the next operating mode and to gracefully shutdown the zone controller. Each time a mode change is requested an Alert message shall be sent to the MOMS.
314	When a lane is operating in a mode other than Normal Mode (to be finalized during Design), an Alert shall be generated and sent to MOMS at regular (Configurable) intervals.
315	The ETTM System shall support various modes of operation that are managed and initiated by Authorized Users through the RSS and automatically by the Systems. The management and initiation of each mode shall be available at a single, multiple, and all Segment(s) and entire Corridor.
316	Transactions shall be processed according to different Business Rules either at the Roadside Systems level or the RSS level based on the mode of operation and the Corridor. Contractor shall be responsible for ensuring that the Transponder-Based and Image-Based Transactions are processed according to the Business Rules and transmitted correctly to the RSS.

2.2.7.16.5 Transaction Processing

317	The zone controller shall detect and frame vehicles, assign the Transponder accurately to the correct vehicle and capture and process the image of the correct vehicle in accordance with the Business Rules and in accordance with the Performance Requirements specified in this Scope of Work and Requirements.
318	The zone controller shall incorporate logic that will prevent the incorrect assignment of Transponder reads from vehicles driving in the adjacent general traffic lanes and in the opposite direction of travel.
319	<p>The detailed transaction processing rules shall be defined and finalized during the Implementation Phase; however, the following basic rules shall apply:</p> <ul style="list-style-type: none"> • The zone controller shall properly associate multiple Transponder reads reported by the AVI System to the vehicle and report the Transponders in the transaction transmitted to the RSS; • any compatible, but non-interoperable Transponder reads shall be reported to the RSS as a miscellaneous transaction for statistical purposes only; • a minimum of one revenue bearing transaction shall be created for each vehicle that travels through the Toll Zone and the zone controller shall ensure that the transaction is complete prior to transmitting it to the RSS; • the zone controller shall be able to accurately identify, process, and track multiple vehicles in the Toll Zone;

	<ul style="list-style-type: none"> the zone controller shall ensure that duplicate Transponder transactions (same Transponder ID) are not reported from the same lane or Toll Zone within a Configurable period of time or consecutively;
	<ul style="list-style-type: none"> buffered Transponder reads that are transmitted to the zone controller shall not be assigned to a vehicle by the zone controller but shall be Flagged and reported to the RSS for further processing and vehicle assignment;
	<ul style="list-style-type: none"> the zone controller shall automatically synchronize with the various subsystems to ensure the events in the lane correspond to the transaction generated, and
	<ul style="list-style-type: none"> the System shall incorporate self-correcting logic to adjust for lane anomalies and event synchronization issues.
320	The transaction message details shall be defined and finalized during the Implementation Phase; however, the following basic rules shall apply:
	<ul style="list-style-type: none"> the Roadside System shall send transactions to the RSS for processing;
	<ul style="list-style-type: none"> the transaction message shall contain the data required by the BOS to process the Transponder-Based and Image-Based Transaction;
	<ul style="list-style-type: none"> the transaction message shall contain all data contained in the CTOC Interoperable, and the National Interoperable file specifications;
	<ul style="list-style-type: none"> each transaction shall contain, and be reported with, various vehicle data and Transponder data including Transponder Occupancy Setting;
	<ul style="list-style-type: none"> each transaction shall contain, and be reported with, various event times, including 'vehicle entry' time; 'ICPS trigger' time; 'Transponder read' time and 'vehicle exit' time that shall allow Transponder reads, images and transaction to be associated correctly with the vehicle; and
	<ul style="list-style-type: none"> the System shall assign a lane number to each transaction and report the lane in which the vehicle was detected.

2.2.7.16.6 Configuration Files

321	All parameters and settings required to run the zone controller application shall be maintained in configuration files. Access to configuration files required to support the zone controller Operations shall be controlled and access to these files shall be limited to authorized personnel.
322	The configuration files shall be maintained at the RSS for configuration and version control. All zone controllers shall have default configuration files that shall allow the lane to start-up automatically.
323	Authorized personnel shall be able to make changes to parameters and settings that are defined as Configurable in this Scope of Work and Requirements and in the Approved Design documents. Authorized personnel shall be able to make changes to the configuration files in the field. Changes to configuration files shall be recorded in the MOMS. All changes made to the configuration files in the field shall be synchronized to the master configuration file that is maintained at the RSS.
324	Each zone controller shall automatically back up its critical configuration files to a back-up server to be used to rebuild the master drive in the event of hard disk failures.

2.2.7.16.7 Zone Controller Interfaces – General Requirements

325	The zone controller shall interface to various devices and subsystems to transmit and obtain data and synchronize the time.
326	The zone controller shall provide checks on all data it receives from each of the devices and subsystems it interfaces to and generate alarm messages that are reported to the MOMS.

2.2.7.16.8 Interface to AVI System

327	The zone controller shall interface with the designated AVI System in accordance with the Approved ICD and transmit all data received from the AVI System to the RSS.
328	The zone controller shall have the capability to interface to multiple AVI System vendors and vendor products. At a minimum, these AVI interfaces include Kapsch, 3M, Neology, and TransCore multi-protocol readers.

2.2.7.16.9 Interface to AVD System

329	The zone controller shall interface with the AVD System to obtain vehicle events that shall permit accurate detection, tracking and processing of vehicles. Vehicle speed information shall also be obtained from the AVD System and reported as part of the vehicle transaction data reported to the RSS for potential use.
-----	--

2.2.7.16.10 Interface to AVC System (Optional)

330	The zone controller shall interface with the AVC System to obtain vehicle classification information and reported as part of the vehicle transaction data reported to the RSS for potential use.
-----	--

2.2.7.16.11 Interface to ICPS

331	The zone controller shall interface with the ICPS to capture and process images of vehicles in accordance with the Business Rules to be developed during the Implementation Phase. The vehicle data, OCR/ALPR results (if applicable) and images obtained from the ICPS shall be transmitted to the RSS to support Authority license plate and violation processing Requirements and BOS operations Requirements.
-----	---

2.2.7.16.12 Interface to Occupancy Detection System (ODS) (per Authority Selected Option)

332	The zone controller shall interface with the ODS to provide the vehicle message at a specified time when the vehicle is detected in the Toll Zone, and Transponder message when Transponder read is obtained. The ODS will capture and process images of vehicles and transmit the occupancy data in accordance with the Business Rules to be developed during the Implementation Phase.
333	If provided by a third-party the ODS ICD will be developed by the ODS vendor in coordination with Contractor.

2.2.7.16.13 Interface to Toll Rate Changeable Message Sign (CMS) – I-405 Express Lanes

334	The zone controller shall interface with the Toll Rate CMS for the transmission of toll rates as a back-up in the event communications from the Toll Rate CMS to RSS or the RSS is not functional.
-----	--

2.2.7.16.14 Interface to DVAS

335	The zone controller shall interface with the DVAS to transmit event data for display on the DVAS. The event data shall be based on the Toll Zone and shall include Transponder read data, ICPS data, and AVD messages received as the vehicle travels through the lane.
-----	---

2.2.7.16.15 Interface to UPS

336	The zone controller shall interface with the UPS to monitor the UPS performance. The MOMS shall detect the status of the UPS and Alert technicians when the System is on UPS.
-----	---

2.2.7.16.16 Interface to Roadside Generators

337	The zone controller shall interface with the Roadside Generator to monitor fuel level and operational status. The MOMS shall detect the status of the generators and Alert technicians when problems are detected.
-----	--

2.2.7.16.17 Interface to Enforcement Beacons

338	The zone controller shall interface with the Enforcement Beacon to display the status of the transaction (e.g., Transponder Occupancy Setting on the I-405). The interface specification shall be developed during System Design.
-----	---

2.2.7.16.18 Interface to Roadway Support Systems (RSS)

339	The zone controller shall interface with the RSS to transmit lane data and receive files, commands, messages and data required for lane Operations. Error detections and data validation checks shall be instituted at both systems to ensure incorrect or corrupt data is detected and is not inserted into the System.
340	The ETTM System shall institute automated methods to determine loss of communications between the zone controller and the RSS and any failure detected shall be reported to MOMS.
341	Receipt of all files and data shall be acknowledged and any failures in the transmission or detection of data errors shall be reported to the MOMS.
342	Contractor shall provide an automated means of synchronizing the zone controller and RSS messages in the event the zone controllers are replaced, if communications are down, or if data on the zone controller is not retrievable due to a catastrophic failure.

2.2.7.16.19 Transmitting Data

343	All messages generated at the zone controllers shall be transmitted to the RSS (e.g., Corridor server (if provided) or RSS) in real-time using a transport mechanism that performs error detection and correction to guarantee data transmission. All messages shall be uniquely identified and validated at the RSS to ensure there are no missing or duplicate messages.
344	The System shall support exception handling in accordance with the Business Rules Approved during the Implementation Phase. Alarms shall be generated and reported to the MOMS for all exceptions/errors.
345	All failed transactions and exceptions shall be identified and reported.
346	In the event of communication failures, the messages shall be stored on the zone controller until successful transmission is complete and verified.
347	All messages shall be confirmed as received by the RSS before they are Flagged for write-over.
348	The zone controller shall transmit to the RSS all data, including but not limited to those identified below:
	<ul style="list-style-type: none"> • all transaction messages generated in the lanes; • all alarm and status messages generated in the lanes; • all lane operational, communication status and self-health messages; • all events generated in the lanes that are displayed on the Roadside Operations monitoring screen or are required at the RSS, and • all events required by the DVAS for real-time review or playback.

2.2.7.16.20 Receiving Data

349	The zone controller shall support the Transponder Status List (TSL) and any other Interoperable Agency lists and shall have the capability to support every Interoperable Agency and its assigned Transponder number range as described in the CTOC/National Interoperability specifications.
350	The zone controller shall accept comprehensive (complete list once a Day) and incremental (changes updated on a Configurable interval, but not more frequently than every ten minutes) TSL in accordance with the established Business Rules and shall activate the lists upon receipt after validation of the files.
351	Contractor shall use an effective method to transmit the files (compress, encode, etc.), store the files and use the files such that the new list is available at the zone controllers within ten (10) minutes of the RSS receiving the new list. The format of the file shall be finalized during the Implementation Phase.
352	The RSS shall download historic toll rates, TOD toll rates, or the minimum tolls in accordance with the Business Rules as default toll rates for each Toll Zone to the zone controller for transmission to the Toll Rate CMS as a back-up to the RSS.
353	All configuration files and tables needed to support the lane Operations shall be downloaded to the zone controllers from the RSS upon confirmed change or at scheduled intervals and activated as required. Versions of the Configurable files on each zone controller shall be maintained, tracked, and recorded.

354	All zone controller Software shall be downloaded to the zone controllers from the RSS and versions on each zone controller shall be maintained, tracked, and recorded.
355	The Roadside System shall institute checks whereby it detects issues with the data it receives from the RSS, including but not limited to: <ul style="list-style-type: none"> • incorrect versions of the data received; • corrupted data received, and • missing files when a file was expected.
356	The System shall support exception handling in accordance with the Business Rules Approved during the Implementation Phase. Alarms shall be generated and reported to the MOMS for all exceptions/errors.

2.2.7.16.21 Monitor All Lane Equipment for Device Status

357	Each zone controller shall self-monitor the System health of internal components and all associated Equipment devices for status. All ETTM System components, including AVI System, AVD System, ODS and ICPS shall be continuously polled for status. The health of some digital devices shall be inferred from events.
358	The System shall generate a recovery message and restore its operational status if a device recovers after reporting a failure. Recovery messages shall be recorded against the original failure work order, shall be reported through the MOMS, and shall be available to authorized staff. Recovery messages shall not close the associated failure/work order but shall serve as supporting evidence of an Equipment recovery.
359	All alarm, health, and recovery messages shall be transmitted and reported to the MOMS.
360	If communications from the zone controller to any RSS is unavailable, an alarm message shall be generated and reported to the MOMS.
361	If the lane is operating in any mode other than normal mode an Alert message shall be generated at Configurable intervals and reported to the MOMS.

2.2.7.16.22 Diagnostics and Equipment Malfunction

362	The zone controller Software shall execute periodic diagnostic checks on internal processes, the Equipment and interfaces. Intelligent peripheral devices shall be interrogated for device status on a regular basis. A device's failure to respond to a status inquiry after a Configurable number of retries shall be regarded by the zone controller Software as an Equipment failure. All failures shall be detected and alarms generated and shall be reported to the MOMS.
363	At periodic intervals (Configurable), the zone controller shall verify with the RSS that it has the latest configuration files; Transponder status file; and any other files required to support the lane Operations. If the latest files are not present on the zone controller, it shall request the latest data from the RSS. If a zone controller is unable to get the latest files, an Alert shall be generated and sent to MOMS.
364	Diagnostic and self-checks shall take place in all modes of lane operation and the results shall be placed in the associated zone controller's consolidated log and easily accessible to the technicians. Sanity checks for fault conditions and validations shall be incorporated into the System. Detection of such conditions shall be reported to the MOMS.

365	Degraded modes of operation shall be supported based on the Business Rules developed during the Design process, and Approved by Authority. Contractor shall ensure the ETTM System continues to operate without loss of revenue or visible impact to the patron in the event that some components of the ETTM System fail and degraded mode Operations occur.
-----	---

2.2.7.16.23 Stand-alone Mode of Operation

366	When operating in stand-alone mode, the last files downloaded from the RSS shall be used for processing vehicles.
367	The zone controller shall have an available data port to permit onsite manual uploading of Software, TSL, or other pertinent data required for continued operation until communications with the RSS is re-established. Devices utilized to download the TSL to the lanes shall have the capability of synchronizing the current versions whereby a new TSL is updated on the device within an hour.
368	The System shall provide the capability for Authorized Users to download transactions from the zone controller and transfer such transactions to the RSS, and from the RSS to the BOS.
369	The System shall provide the capability for Authorized Users to download event/transaction data for manual and stand-alone playback of the DVAS.
370	Upon re-establishing communications with the RSS all back-logged messages, including manually transferred messages shall be transmitted and synchronized to the RSS without affecting the real time Operations or degrading the lane Operations.
371	Upon re-establishment of communications and successful transmission of all messages, a recovery message shall be transmitted to the MOMS.

2.2.8 ETTM Intelligent Transportation Systems (ITS)

Contractor shall install ETTM ITS Equipment along the Express Lanes to provide full coverage for monitoring and traffic detection. Power and communications will be provided by others.

2.2.8.1 ETTM Traffic Detection System (TDS) – I-405 Express Lanes

372	Contractor shall purchase, install and integrate TDS on the I-405 Express Lanes and general purpose lanes for measuring travel time, traffic volumes, traffic density and other data elements for reporting purposes as shown in Attachment 3: I-405 EL ETTM System Locations .
373	The TDS shall include all elements to provide a fully functional system including but not limited to, traffic detection sensors, controllers, adapters, network devices, junction boxes, connectors and cables.
374	All parameters that define the traffic detection data reported shall be Configurable and Authorized Users shall have the capability to remotely manage and configure the devices.
375	The TDS shall monitor traffic and provide real-time traffic data to support the management of the Corridor including but not limited to: <ul style="list-style-type: none"> The Shadow Dynamic Pricing System; ATMS input and traffic monitoring at the I-405 Express Lanes TOC, and

	<ul style="list-style-type: none"> Alerts and inputs Express Lanes Management Dashboard.
376	The TDS shall have the capability to monitor its status and report failure conditions and alarms to the MOMS.
377	The traffic detection provided by Contractor shall meet the Performance Requirements of this Scope of Work and Requirements.
378	Based on TDS requirements provided by Contractor, the Design-Builder shall design the TDS layout and install the traffic detection Equipment and cabinet/enclosure support structures. Contractor shall install all traffic detection devices and mounting adapters.

2.2.8.2 Toll Closed Circuit Television (CCTV) Cameras

379	Contractor shall purchase, install and integrate high resolution, IP-addressable color CCTV cameras to provide coverage of the Express Lanes and general purpose lanes in the Corridors.
380	CCTV cameras shall be capable of capturing high definition video of not less than 1080p resolution.
381	The CCTV camera mounting structures shall stabilize the CCTV camera and decrease the effects of vibration from sources prevalent in the Express Lanes environment.
382	The CCTV system shall include all elements to provide a fully functional system including but not limited to, cameras, servers, adapters, network devices, junction boxes, connectors and cables.
383	The CCTV cameras shall have pan-tilt-zoom (PTZ) functionality that allows Authorized Users to remotely control the camera via the Operations monitoring screen/Dashboards. The cameras shall revert to the default settings that can be overridden by Authorized Users when no PTZ commands are received within a Configurable time.
384	Alarm messages shall be reported to MOMS when remote controls or setting other than default are detected.
385	Authorized Users shall have the ability to individually setup and configure the cameras, and Configurable settings shall be available on a per-camera basis.
386	<p>The CCTV camera video feed shall be transmitted and accessible to various applications, per OCTA Policy and the Street and Highways Code 31490, including but not limited to:</p> <ul style="list-style-type: none"> remotely via the website to Authorized Users; Express Lanes Management Dashboard; The existing ATMS operated at the existing 91 Express Lanes TOC; I-405 Express Lanes TOC, and other TMCs at Authority's direction.
387	Authorized Users shall have the capability to record video streams and save the recorded video to long term storage for later playback.

2.2.8.2.1 Toll Closed Circuit Television (CCTV) Cameras – 91 Express Lanes

388	Contractor shall replace the existing 91 Express Lanes CCTV cameras to provide coverage of the Express Lanes and general purpose lanes in the Corridor as shown in Attachment 2: 91 EL ETTM System Information.
-----	--

389	The Toll CCTV cameras shall be located at the same locations as the existing Toll CCTV cameras and shall be mounted to the existing poles or other structures.
390	The Toll CCTV cameras shall feed to the existing 91 Express Lanes TOC system and maintain the current CCTV functionality provided by the existing ATMS.
391	The Toll CCTV camera video feed shall be transmitted and accessible to various applications including but not limited to:
	<ul style="list-style-type: none"> The existing ATMS operated at the existing 91 Express Lanes TOC and
392	<ul style="list-style-type: none"> I-405 Express Lanes TOC.

2.2.8.2.2 Toll Closed Circuit Television (CCTV) Cameras – I-405 Express Lanes

393	Contractor shall provide Toll CCTV cameras to provide coverage of the Express Lanes and general purpose lanes in the Corridor as shown in Attachment 3: I-405 EL ETTM System Locations .
394	Based on Toll CCTV camera requirements provided by Contractor, the Design-Builders shall design the Toll CCTV camera layout and install the Toll CCTV camera support structures. Contractor shall install all cameras and mounting adapters.
395	The Toll CCTV camera video feed shall be transmitted and accessible to various applications including but not limited to:
	<ul style="list-style-type: none"> the ATMS provided by Contractor at the I-405 Express Lanes TOC;

2.2.9 Corridor Server

The provision of a Corridor server is optional but if Contractor's solution includes a Corridor server, then the Requirements in this section shall be met. Contractor has the option to use the Corridor server as an image server as long as the Design complies with this Scope of Work and Requirements.

396	Contractor shall provide one or more Corridor servers if it is deemed necessary to meet the Requirements specified in this Scope of Work and Requirements. A Corridor server or set of servers can support multiple Toll Zones.
397	Contractor shall furnish and install a complete Hardware configuration for each Corridor server to support the availability, redundancy and Performance Requirements of this Agreement, including but not limited to:
	<ul style="list-style-type: none"> multiple processors;
	<ul style="list-style-type: none"> dual, redundant, hot-swappable power supplies;
	<ul style="list-style-type: none"> fault tolerant (RAID) storage devices; and
	<ul style="list-style-type: none"> backup library.
398	The Corridor server shall interface to the zone controller and shall serve as a store and forward server for transactions and messages.
399	The Corridor server shall be used as a back-up server for the transmission of the pricing data to the Toll Rate CMS.
400	Each Corridor server shall communicate with the primary RSS and be configured or automatically communicate with the Disaster Recovery (DR) System.

401	Each Corridor server shall be capable of storing transactions and images (if used as a local image server) from the Roadside Systems for a period of minimum thirty (30) Days, in the event of a communications failure.
402	The Corridor server shall be capable of operating in a stand-alone mode for a minimum of thirty (30) Days if communications to the RSS are down. When operating in stand-alone mode, the last files downloaded from the RSS shall be used for processing vehicles.
403	The Corridor server shall have an available data port to permit onsite manual uploading of Software, TSL, or other pertinent data required for continued lane operation until communications with the RSS are re-established. Devices utilized to download the TSL and rate tables (if applicable) to the Corridor server shall have the capability of synchronizing the current versions whereby a new TSL is updated on the device within an hour of receipt.
404	The System shall provide the capability for Authorized Users to download transactions from the Corridor server and transfer such transactions to the RSS.
405	Upon re-establishing communications with the RSS all back-logged messages, including manually transferred messages, shall be flagged and transmitted to the RSS without affecting the real time Operations or degrading the lane Operations.
406	Upon re-establishment of communications and successful transmission of all messages, a recovery message shall be transmitted to the MOMS.
407	Failure of any component of the Corridor server shall be detected and reported to the MOMS.

2.2.10 Toll Equipment Building

The provision of a Corridor server is optional but if Contractor's solution includes a Corridor server, then the Requirements in this section shall be met.

2.2.10.1 Toll Plaza Building – 91 Express Lanes

Contractor will have access to the existing Toll Plaza Buildings (TPB) located at the existing 91 Express Lanes ETTM Toll Collection and Enforcement Sites. Space within the TPBs will be provided to accommodate the Corridor servers, network equipment, UPS and other RSS. Contractor will be responsible for outfitting the TPB with the necessary services in conformance with this Scope of Work and Requirements.

2.2.10.2 Toll Equipment Building – I-405 Express Lanes

The Design-Builder shall design, furnish, and install an environmentally conditioned Toll Equipment Building (TEB) with a Heating, Ventilation, and Air Conditioning (HVAC) system that provides space to accommodate the Corridor servers, network equipment, UPS and other RSS. Contractor will be responsible for outfitting the TEB with the necessary services in conformance with this Scope of Work and Requirements.

408	Contractor shall coordinate with Authority and Design-Builder to determine the TEB location. The TEB is to be located near the communications hub where Contractor will provide data/communications service for ETTM Communications Network.
-----	--

409	Contractor will provide the Design-Builder Equipment space requirements and coordinate with the Design-Builder to determine the final size of the TEB. The TEB must contain sufficient space to accommodate the following:
	<ul style="list-style-type: none"> Contractor provided and installed Equipment racks
	<ul style="list-style-type: none"> Contractor designed, furnished, and installed a floor mounted fire suppression system per Appendix C of the National Fire Protection Association Standard on Clean Agent Fire Extinguishing Systems (NFPA-2001).
410	Contractor shall provide and install a TEB secure access system. The TEB secure access system must utilize an electronic key to authorize access and provide remote monitoring of all alarms for unauthorized entries into the TEB. The Design-Builder shall provide steel doors and frames for the TEB per Steel Door Institute Recommended Specifications for Standard Steel Doors and Frames (SDI-100).
411	Contractor shall coordinate the TEB communications service design and installation with the Design-Builder. The Design-Builder shall terminate the ETMM Communications Network fiber optic cable on a Contractor provided fiber panel within the TEB. Contractor shall provide conduits and cable runs from the fiber panel to the equipment racks.
412	Contractor shall coordinate the TEB power distribution system design and installation with the Design-Builder. The Design-Builder shall design furnish and install a TEB power distribution system that provides a dedicated service panel and individual circuit protection for the Equipment installed in the TEB. The TEB power distribution system shall include a Contractor furnished and installed automatic transfer switch and Contractor furnished and installed emergency generator located outside the building. Contractor shall provide conduits and power runs from the power panel to the equipment racks. The Design-Builder shall design, furnish, and install lightning protection and grounding systems in the TEB.
413	Contractor will design, furnish, and install an emergency generator that will provide power for all of the systems inside the TEB building, including exterior lighting and security camera systems. Coordinate with the location of the generator with the Design-Builder and Authority. Conduits from the generator to the TEB shall be provided by Design-Builder.
414	Contractor will design, furnish, and install a fire alarm system to monitor the TEB for heat and smoke emissions, and provide remote monitoring alarms upon activation of system.
415	Security cameras must provide for a 360-degree, unobstructed view of all sides of the TEB, including one displaying the TEB entrance door and surrounding maintenance parking area. Contractor will design the layout of the security camera system and will furnish and install the security cameras. The Design-Builder will design, furnish, and install foundations and poles for security cameras at the TEB. Contractor will furnish and install camera mounting adapters for the security cameras. Coordinate the security camera mounting details with Design-Builder to match the security camera mounting requirements.
416	The Design-Builder shall design, furnish, and install conduit, service cabinets, and pull boxes to provide electrical service and communications to the TEB for each security camera.

2.2.11 Roadside Infrastructure

Contractor will install Equipment on existing 91 Express Lanes ETTM System Infrastructure, I-405 Express Lanes ETTM System Infrastructure provided by the Design-Builder, and ETTM System Infrastructure provided by Contractor (91 Express Lanes and I-405 Express Lanes), in accordance with this Scope of Work and Requirements.

2.2.11.1 Toll Gantry

417	The horizontal alignment of the toll gantry shall be perpendicular to the travel lane(s).
418	Provision of all mounting brackets, arms, structures, and junction boxes to install and connect the equipment on the toll gantry is the responsibility of Contractor.

2.2.11.1.1 Toll Gantry – 91 Express Lanes

419	Contractor shall use the existing toll gantry infrastructure to mount all Equipment necessary to meet this Scope of Work and Requirements.
420	<p>The existing toll gantry infrastructure shall have the following Equipment weight restrictions:</p> <ul style="list-style-type: none"> The total weight of Equipment (both existing equipment and Contractor's Equipment) installed on the Toll Collection and Enforcement Site upstream gantry shall not exceed 750 lbs. The total weight of Equipment (both existing equipment and Contractor's Equipment) installed on the Toll Collection and Enforcement Site downstream gantry shall not exceed 900 lbs.
421	<ul style="list-style-type: none"> The total weight of Equipment installed on the Transponder Read Site eastbound gantry (single lane configuration) shall be submitted to Caltrans for review and approval.
422	<ul style="list-style-type: none"> The total weight of Equipment installed on the Transponder Read Site westbound gantry (single lane configuration) shall be submitted to Caltrans for review and approval.
423	Modifications to the existing toll gantry structures are prohibited, and it shall be the responsibility of Contractor to design the ETTM System to comply with the Equipment weight restrictions specified in this Scope of Work and Requirements.

2.2.11.1.2 Toll Gantry – I-405 Express Lanes

Toll gantry structures designed and installed by the Design-Builder shall be as specified in Caltrans *Standard Specifications* Section 56 (Overhead Sign Structures, Standards, and Poles).

424	Contractor's ETTM System shall work within the Design-Builder's toll gantry requirements and specifications.
425	Toll gantry structures shall support Equipment loads as determined by Contractor.
426	Contractor shall provide the Design-Builder information in regards to the toll gantry including weights, clearances, brackets, vibrations specifications, routing, etc. for the Design-Builder to design the toll gantry structure.
427	Contractor shall use the toll gantry infrastructure provided by the Design-Builder to mount all Equipment necessary to meet this Scope of Work and Requirements.

2.2.11.2 Conduits and Cable Trays

428	The Contactor shall be responsible for establishing conduit requirements from the Equipment cabinets to the Equipment.
-----	--

2.2.11.2.1 Conduits and Cable Trays - 91 Express Lanes

429	The Contactor shall be responsible for establishing conduit requirements from the Equipment cabinets to the Equipment.
430	Contractor may use the existing conduits and cable trays, however, the existing ETTM System operations and performance shall not be impacted during installation.
431	Provision of any additional conduits and cable trays to connect the ETTM System is the responsibility of Contractor.

2.2.11.2.2 Conduits and Cable Trays - I-405 Express Lanes

432	The Design-Builder shall design and install all below ground conduits as specified by Contractor. Contractor shall use the conduits and cable trays provided by the Design-Builder as specified by Contractor.
433	Contractor shall design and install all above ground conduits and cable trays.
434	Provision of any additional conduits and cable trays to connect the ETTM System not included in the Design-Builder's Design is the responsibility of Contractor.

2.2.11.3 Toll Zone Pavement

435	Contractor is responsible for the Design and installation of all elements of the ETTM System that is applied on or embedded into the pavement to achieve the required System Performance.
436	Contractor is responsible for repair, rehabilitation or replacement of the pavement due to any work performed in the lane by Contractor.

2.2.11.3.1 Toll Zone Pavement - 91 Express Lanes

437	Contractor shall design and install Toll Zone pavement as required to support the ETTM System.
438	All Toll Zone pavement shall be coordinated with Caltrans and shall comply with Caltrans standards.

2.2.11.3.2 Toll Zone Pavement - I-405 Express Lanes

439	Contractor shall provide the Design-Builder special Toll Zone pavement requirements for the Design-Builder to design the pavement.
-----	--

2.2.11.4 ETTM Communications Network

440	Contractor shall procure, furnish, install and test the communication network equipment required to connect all elements of the Roadside System to the RSS, TOC and the BOS.
-----	--

441	Network monitoring Software shall be procured, furnished, and installed on the RSS servers to monitor the System network status and communications, including the connection to the TOC and BOS. The Software shall specifically monitor network topology changes, network routing changes and network utilization on the fiber as well as leased lines.
442	All network alarms shall be reported to the MOMS. The network monitoring Software tool shall utilize the Simple Network Management Protocol (SNMP) to poll devices real time for status where possible.
443	Contractor shall provide network security at the RSS locations and shall comply with Attachment 4: OCTA Information Security Policies .
444	The LAN within a Toll Zone shall be connected by CAT6 (or higher) cabling. The LAN connections from the vault to the roadside Equipment may either be CAT6 or fiber-optic cable according to Contractor's design. Contractor shall be responsible for providing and obtaining the WAN connectivity from any primary RSS or DR System locations to BOS.
445	The Roadside System at the Toll Zones/Segment shall be connected and communicate to the primary RSS and DR System.
446	Contractor shall coordinate with Authority and the Caltrans regarding demarcation points between the onsite fiber network and Internet Service Providers (ISPs).
447	Contractor shall provide appropriate firewalls to completely separate Caltrans communications from ETTM communications if existing Caltrans D12 Fiber Network is utilized to support the ETTM System operations.
448	Contractor provided ETTM System and network architecture shall support the image, transaction and video throughput Requirements specified in this Scope of Work and Requirements.
449	Contractor is responsible for securing the connectivity from the DR System location to the TOC and BOS.

2.2.11.4.1 ETTM Communications Network– 91 Express Lanes

Authority owns and maintains fiber communications throughout the SR-91 Corridor connecting all Roadside Systems to the 91 Express Lanes TOC. The Roadside System is connected to the 91 Express Lanes TOC via fiber optic cable and a secondary laser point-to-point communications path as shown in **Attachment 7: Express Lanes Wide Area Network**. The existing 91 Express Lanes ETTM communications network (fiber backbone) shall remain; however, all communications equipment, including but not limited to switches, routers, and servers, shall be replaced.

450	All ETTM Systems at the roadside are connected to systems at the 91 Express Lanes Anaheim Administration building, including the TOC.
451	The existing ETTM Communications Network fiber optic cable shall be retained and re-used to the maximum extent possible.
452	Contractor's Design shall conform the existing ETTM Communications Network capacity. Contractor shall be responsible for any ETTM Communications Network improvements needed to operate the ETTM System, including but not limited to replacement of fiber optic cable, fiber optic cable splices, and networking equipment.

453	Contractor shall replace all ETTM Communications Network networking equipment, including but not limited to switches, routers, and servers.
454	Contractor shall replace the existing secondary laser point-to-point communications path and configure it with any new ETTM Communications Network Equipment. The replacement laser point-to-point communications devices shall be similar to the existing equipment and shall be submitted to Authority for review and approval.
455	Contractor shall test the existing ETTM Communications Network and make all repairs and replacements of connectivity devices required to meet the functional and Performance Requirements of this Scope of Work and Requirements.
456	Contractor shall provide communications connectivity between the Equipment and the ETTM Communications Network.
457	Contractor shall work with Authority in Designing the network communication interfaces between the ETTM System and the 91 Express Lanes TOC and the Existing BOS.

2.2.11.4.2 ETTM Communications Network– I-405 Express Lanes

The Design-Builder will design, furnish, and install a dedicated I-405 Express Lanes ETTM Communications Network infrastructure including conduit, fiber optic cable, splice vaults, pull boxes, vaults, foundations, service cabinets, electrical service, and appurtenances required to provide connectivity to all ETTM Sites. The Design-Builder will install conduit from a weather proof demarcation box to a connection with the nearest AT&T cable demarcation point near the I-405 / Euclid Avenue interchange. Contractor's ETTM Communications Network requirements are as follows.

458	Contractor shall provide all ETTM Communications Network Equipment, including switches and routers.
459	Contractor shall provide ETTM Communications Network connectivity. Contractor is responsible for establishing all required secure communications service connections between Roadside Systems and Caltrans communications network and a third-party communications service provider. Contractor shall establish communications service on behalf of Authority for billing directly to Authority.
460	Contractor shall provide communications connectivity between the Equipment and the ETTM Communications Network.

2.3 Roadway Support Systems (RSS) – Functional Requirements

Contractor's Roadway Support Systems (RSS) architecture shall have a fully, Configurable, high availability primary RSS and a DR System that meets the functional and Performance Requirements of this Scope of Work and Requirements. The RSS shall initially interface with the Existing BOS Contractor's 91 Express Lanes system and then transition to the New BOS Contractor's solution prior to the opening of the I-405 Express Lanes.

2.3.1 Roadway Support Systems (RSS) – General Requirements

461	Contractor's RSS architecture shall include a high-availability architecture for both the primary RSS and DR Systems that meets the functional and Performance Requirements of this Scope of Work and Requirements and is accessible to Authorized Users of Express Lanes System network. The DR System shall be a fully redundant and fully functional backup to the primary RSS.
462	The RSS shall support Contractor's ETTM System for the 91 Express Lanes and the I-405 Express Lanes. The System architecture shall be scalable and Configurable to support any additional Express Lanes Corridors that will be added in the region.
463	Contractor shall procure, furnish, and install all servers, third-party services, storage and communications Hardware needed to support Authority System and architecture provided by Contractor to meet this Scope of Work and Requirements.
464	Contractor shall provide innovative solutions related to infrastructure and platform that provides Authority technology and maintenance support services for the Agreement Term. The solution shall support future Upgrades to functionality and meet this Scope of Work and Requirements, including: <ul style="list-style-type: none"> dedicated primary RSS and infrastructure installed locally at Authority facilities or at a location Approved by Authority dedicated infrastructure for disaster recovery purposes installed at a geographically diverse location within the continental United States in a separate time zone or Approved by Authority; RSS primary Hardware and Software shall be dedicated to Authority; and the RSS shall be Designed and configured to be straightforwardly transitioned to Authority at the end of the Agreement Term.
465	The primary RSS and DR System configuration shall meet the Disaster Recovery and Performance Requirements guaranteeing availability as identified in this Scope of Work and Requirements.
466	The DR System shall be configured as a stand-by to allow Operations to continue in the event of a failure of the primary RSS, and be capable of being out into full production within four (4) hours.
467	The DR System shall perform all functions of the primary RSS as described in this Scope of Work and Requirements.
468	The DR System environment shall mirror the primary RSS in all Hardware and Software configurations, be kept up to date and be capable of performing all functions of the primary RSS as described in this Scope of Work.

469	Unless otherwise noted, all Hardware and Software procured under this Scope of Work and Requirements shall be confirmed to be the latest model and version at the time of purchase.
470	All computers, servers and Hardware procured, furnished, and installed under this Agreement shall have the most current and up-to-date virus, firewall, spam protection and other security Software that protects from virus attacks, intrusions and unauthorized access. Virus protection and other Software shall automatically obtain definition and security Updates according to a recommended (Configurable) Maintenance schedule.
471	All computers, servers and Hardware shall automatically generate an Alert that is reported to MOMS upon a failure to obtain the definition or security update. Virus protection and security Software Updates to workstations shall be automatic but Software Updates to servers shall be scheduled and deployed only upon Authority Approval. Such updates shall not impact the performance of the System.
472	The System shall detect intrusion attempts and prevent all unauthorized access and intrusions at all levels and report such events to the MOMS. Any attempted intrusions, intrusions, compromise or breach must be reported to Authority immediately once detected.
473	<p>Contractor shall provide the RSS Software in accordance with the Software License Agreement in the Agreement and the Software shall support the following general functions:</p> <ul style="list-style-type: none"> • communicate with all zone controllers in receiving transactions, alarms and other messages and transmitting TSLs, toll rate schedules (for backup), user identification lists (UIL), and configuration files as defined during Implementation Phase; • provide real-time roadside operations monitoring screens and Dashboards to assist operations, maintenance and supervisory staff in observing transaction and event data in real-time, including reviewing DVAS image/video and data; • provide the ability to remotely operate and control the lanes through real time screens; • interface to the ETTM ITS devices directly to obtain traffic data for Shadow Dynamic Pricing System; • provide the sign control system that interfaces to the Toll Rate CMS to manage the display of the toll amounts, operational message and override messages; • obtain the video feed from the Toll Rate CCTV cameras and provide access to the video from the Express Lanes Dashboards; • perform transaction processing, trip building, and fare determination based on the Corridor and trip classification; • interface with BOS to transmit images, transactions, trips transactions and correction for further processing and Toll Rate CCTV images, and receive TSL, exempt list, plate correction list, occupancy setting correction list, occupancy setting errors and other messages identified during Implementation Phase; • perform Maintenance management functions of the System, including alarm notification and tracking, Equipment inventory, Maintenance history and other Maintenance related functions, incorporated into the MOMS;

	<ul style="list-style-type: none"> provide an independent audit of successful receipt of all transactions and images from the zone controllers to the RSS;
	<ul style="list-style-type: none"> provide various management reports that assess the operational performance of the System and transaction/trip reconciliation reports as determined by Authority during Design;
	<ul style="list-style-type: none"> communicate with Corridor servers (if provided) in receiving transaction, alarm and other messages and transmitting TSLs, and UIL;
	<ul style="list-style-type: none"> communicate with the applicable image server(s) for tracking and reconciliation image transmission and transfer status, and
	<ul style="list-style-type: none"> provide the capability to enter or obtain employee information defined in the Implementation Phase such as employee ID, role and access privileges from Active Directory and, if required, to transmit the UIL to the zone controllers.
474	All RSS Software shall meet Authority's most current technology standards; all such Software and Equipment shall meet the security standards set forth in Attachment 4: OCTA Information Security Policies .

2.3.2 Roadway Support Systems (RSS) Hardware and Third-party Products

The Work under this section shall include all labor, materials, and support Services to complete the Design; fabrication; integration; delivery; testing, and Acceptance of the primary RSS and DR System Hardware and third-party Software in accordance with this Scope of Work and Requirements.

2.3.2.1 Roadway Support Systems (RSS) Hardware

475	Authority shall have ownership of all Hardware procured, furnished, and installed as part of the RSS and specified in the Agreement, including spares.
476	The RSS solution shall be dedicated for Authority and shall not be shared with other programs.
477	The RSS shall be located locally at an Authority or Authority Approved facility.
478	Contractor is responsible for obtaining all required licenses in the name of Authority. All licenses and media shall be provided to Authority for all Hardware.
479	Contractor shall furnish and install a complete, high availability, fault tolerant RSS Hardware configuration needed to support the Performance Requirements of this Agreement, including but not limited to:
	<ul style="list-style-type: none"> multi-processors;
	<ul style="list-style-type: none"> load-balanced;
	<ul style="list-style-type: none"> multiple network interface controllers (NICs) on the same subnet;
	<ul style="list-style-type: none"> dual, redundant, hot-swappable power supplies;
	<ul style="list-style-type: none"> storage devices, and
480	<ul style="list-style-type: none"> backup library.
	The RSS Hardware solution shall provide high-speed connectivity between all storage, databases, servers, and backup systems. The Hardware solution shall be scalable and provide for storage expansion and Upgrades.

481	The System Design and implementation shall ensure the ETTM System continues to operate without data loss even if any unit of the server configuration fails.
482	Contractor shall provide a test environment that is independent and separate of the production environment to support testing, including validation of new releases.
483	All components, supplies, Hardware and materials furnished under this Agreement shall be new, COTS and field proven.
484	The RSS server configuration, including all major Hardware elements, shall be of the latest Design and incorporate standard commercial products currently in production.
485	All components procured, furnished, and installed by Contractor shall be multi-sourced and readily available to Authority.
486	Proof of purchase in the form of dated invoice and shipping bills shall be retained and furnished to Authority in accordance with this Scope of Work and Requirements for all Hardware purchased by Contractor. The invoice and shipping bill shall list all the items included in the purchase. To the extent possible, Documentation shall be provided separately for the 91 Express Lanes and I-405 Express Lanes.
487	The RSS Hardware shall be supported for the duration of the Contact after the date of Operational Test Acceptance. During the life of the Agreement Contractor is responsible for ensuring the System is operational in accordance with the Performance Requirements.
488	Contractor shall use proven server configurations that support future Upgrades to processors, memory, storage, operating System, database, and other System components.

2.3.2.2 Roadway Support Systems (RSS) Third Party Software

489	Authority shall have ownership of all third-party Software and firmware procured, furnished, and installed as part of the RSS and specified in the Agreement.
490	Contractor is responsible for obtaining all required licenses in the name of Authority. All licenses and media shall be provided to Authority for all third-party Software and firmware. Contractor shall retain authorized copies (backups) for all Software media to use for periodic System Maintenance, Upgrades, or restore, as required.
491	Proof of purchase in the form of dated invoice and shipping bills shall be retained and furnished to Authority in accordance with this Scope of Work and Requirements for all third-party Software and firmware purchased by Contractor. The invoice and shipping bill shall list all the items included in the purchase. To the extent possible, Documentation shall be provided separately for the 91 Express Lanes and I-405 Express Lanes.
492	All third-party Software and Contractor Software shall be Hardware neutral and shall perform without intervention on any Hardware platform.
493	The operating System for the RSS servers shall be a proven, multi-tasking, multi-user system used widely throughout the United States for intensive database Operations and shall be compatible with the Relational Database Management System (RDBMS) and other tools employed.
494	The operating System shall fully utilize the high-availability RSS server architecture and shall support all peripherals defined in these specifications.
495	The operating System shall also support the proposed communications topology, DR System configuration, and Contractor's application Software.

496	Contractor shall provide and maintain supported versions of the operating System for the Agreement Term and all Upgrades of the RSS shall be Contractor responsibility. These Upgrades shall not impact System performance.
497	The operating System shall have a future Upgrade path and be supported for the Agreement Term and shall not be nearing end-of-support for at least three (3) years after end of the Agreement Term.
498	Contractor shall provide a highly reliable and secure RDBMS for the storage of images, video, transaction data, Image-Based Transaction data, audit data, and all other data, as applicable, for the retention period specified in this Scope of Work and Requirements.
499	Contractor shall provide the latest version of the RDBMS that is field-proven to operate in a transaction intensive environment.
500	The RDBMS architecture shall support the RSS functions for each of the Roadsides and allow Authorized Users seamless access to all data.
501	The RDBMS shall be compatible with the operating System and application Software, and shall support the DR System server architecture.
502	The RDBMS shall have an Upgrade path and shall support Upgrades to individual components including but not limited to operating System, application, memory, and processors.
503	The RDBMS shall have Maintenance and Upgrade Services from the third-party Software provider for the Agreement Term. For example, Microsoft Software Assurance or Oracle Software Update and License Support shall be required.
504	Contractor shall provide and maintain supported versions of the RDBMS for the Agreement Term and all Upgrades of the RSS RDBMS to the latest supported version shall be Contractor responsibility.
505	The RDBMS shall be supported by Contractor for the Agreement Term.
506	Contractor shall keep all Software instances throughout all environments at the same Software version, configuration and patch level.

2.3.3 Roadway Support Systems (RSS) Printing

Contractor will not be required to procure, furnish, and install any printers for Authority use as part of the RSS.

507	Contractor shall provide the capability so that Authority personnel have the ability to print from the RSS interface to any printer connected to Authority System network.
-----	--

2.3.4 Roadway Support Systems (RSS) Uninterruptible Power Supply (UPS)

508	All RSS Hardware and Equipment shall be on UPS supplied by Contractor and Contractor shall furnish and install an electronic interface between the RSS and the UPS to monitor the UPS performance. The MOMS shall detect the status of the UPS and Alert technicians when the System is on UPS.
509	Software drivers or interfaces shall be developed, furnished, and installed where required to acquire, display, store and report all parameters provided as outputs from the UPS. The interface shall be designed to provide support for TCP/IP, SNMP, and/or a web

	interface that can be used to configure and administer the UPS, as well as support email-based Alerting.
--	--

2.3.5 Image Server

Contractor's image processing solution shall meet the functional and Performance Requirements of this Scope of Work and Requirements. The Design shall support the transfer of images to the BOS in real-time and batch mode and prevent loss of images if there are communications or server issues. The receipt of images from the Roadside systems and their transmission to BOS shall be one-hundred percent reconcilable with zero loss of images. If Contractor's solution includes the provision for a central image server as part of the RSS, then the central image server shall be dedicated to Authority and located within the continental United States.

510	The image processing solution shall meet the Performance Requirements of this Scope of Work and Requirements and shall support, but not be limited to the following general functions:
	<ul style="list-style-type: none"> communicate with all of the roadside ICPS for the transmission, tracking, reconciliation and processing of all vehicle images;
	<ul style="list-style-type: none"> interface with Existing BOS for the processing and reconciliation of all vehicles images;
	<ul style="list-style-type: none"> support the transmission of images to the BOS without loss of any image in accordance with Approved ICD, and
	<ul style="list-style-type: none"> provide reconciliation reports as determined by Authority during Design and prove one-hundred percent reconciliation.

2.3.6 Data Backup

511	The RSS shall include data backup Software and Hardware that allows remote incremental and full back-up of data without manual intervention. Notification on the status of the backup process shall be transmitted to MOMS.
512	Contractor shall provide a solution for data backup storage. In the event of a catastrophic failure that results in the loss of data, Contractor shall provide the means to restore the data and reconfigure the servers without disruption to the Express Lanes Operations.
513	The backup Software shall be capable of displaying the backup data in a user-friendly and readable form as defined during the Implementation Phase.

2.3.6.1 Archive and Purge Control Mechanisms

514	Provide the capability for fully automated and Configurable archival and purging of data, images, video and files in accordance with Authority's data retention Requirements and Streets and Highways Code 31490.
515	Archival and purge routines shall be Configurable for each impacted data element, including but not limited to:
	<ul style="list-style-type: none"> data;
	<ul style="list-style-type: none"> images;
	<ul style="list-style-type: none"> video;

	<ul style="list-style-type: none"> • MOMS data; • third-party Software Updates; • error/System logs, and • interface files.
516	<p>Servers shall retain transaction and summarized data, images, MOMS data and error/System logs, in accordance with the retention procedures, including but not limited to:</p> <ul style="list-style-type: none"> • Transaction data shall be retained online for ninety (90) Days and then archived and purged if they are confirmed to have formed into trips; • compressed images associated with Transponder-Based Transactions shall be retained online thirty (30) Days and then archived and purged; • Image-Based Transactions and images (compressed image and region of interest) online for ninety (90) Days and then archived and purged; • trip data shall be retained online for six (6) months and then archived and purged; • traffic data shall be summarized and raw traffic retained online for ninety (90) Days and then archived and purged; • TOD pricing data shall be retained online for the Agreement Term; • Toll Rate CMS static video/frames shall be retained online for one (1) year and then archived and purged; • CCTV video, DVAS video, and other video shall be retained online for three (3) months, then archived for and additional nine (9) months, and then purged; • summarized data (transactions and traffic) shall be retained online for at least ten (10) years and then archived and purged; • ten (10) Days of transponder status lists shall be retained online and then archived and purged; • last two versions of the third-party Software Updates shall be retained online and then archived and purged; • Error/System logs shall be retained online on the System for ninety (90) Days and then archived and purged; • MOMS data shall be retained online for the Agreement Term, and • all other data as defined during the Implementation Phase shall be retained on the System for ninety (90) Days and then archived and purged.
517	The status of the archival process shall generate a message to be transmitted to MOMS. No record shall be deleted unless confirmed to be successfully archived.
518	The servers shall be sized to accommodate for the restoration of selected archived data (two months minimum).
519	Authorized Users shall be able to generate queries from the restored data.

2.3.7 Maintenance Access and Application Access

520	Technicians and authorized Authority staff shall have ability to access the System and application as applicable.
-----	---

2.3.7.1 Maintenance Access

521	Contractor shall procure, furnish, and install the required keyboards, video monitors, mouse(s), remote desktop applications, diagnostic tools, and KVM switches over IP to allow technicians to access all servers, controllers, computers, and devices in order to perform diagnostics.
522	Authorized technicians shall be able to access the System through a secure virtual private network (VPN) connection provided by Contractor and through any Authority authorized workstation connected to Authority System network.
523	All Maintenance Hardware and diagnostic Software and tools installed on the Roadside System and RSS shall comply with Express Lanes security Requirements.

2.3.7.2 Authority/Third-party Access

524	Authorized Authority staff, CSC operations staff and designated personnel shall be able to access the ETTM System through a secure virtual private network (VPN) connection provided by Contractor and through any Authority authorized workstation connected to Authority System network.
525	The RSS shall provide a browser-based Graphical User Interface (GUI) application accessible by any Authority authorized workstation connected to Authority System network.
526	Access to the application Software shall not require the installation of any Contractor supplied application Software on Authority authorized workstations and shall be accessible via External networks with via Secure VPN access. Based on the user's access privileges the appropriate menus shall be made available.
527	Provide the capability for Authorized Users (regardless of location and assuming connectivity) to access and monitor Express Lanes operations and data via an online portal, including but not limited to: <ul style="list-style-type: none"> Express Lanes Dashboard; MOMS Monitoring Dashboard; video feed from the CCTV and Toll Rate CCTV cameras; saved video feeds/frames from the Toll Rate CCTV cameras to support customer disputes; time-of-day pricing schedules and toll amounts displayed on the Toll Rate CMS at each location to support customer disputes; search transactions/trips to obtain transaction/trip details; review images and trips; perform audit checks on the license plate extraction/image review results; create/update the Plate Correction List that identified license plates that had an error; generate operations reports; perform Toll Rate CMS override, and perform transaction/trip adjustments.
528	Provide the capability for an Authorized User's ETTM System access to be based on user role and associated permission settings.

2.3.8 Roadway Support Systems (RSS) Software

The RSS Software shall support the functionality detailed in this section and shall meet Authority operational Requirements set forth in this Scope of Work and Requirements and Agreement for the Agreement Term.

2.3.8.1 Data Communications and Interface Requirements

529	Electronic interfaces are required to provide connectivity between the RSS and other interfacing systems for the exchange of data. Contractor shall work with Authority, the BOS Contractor and other external partners and third-party vendors/entities in the Designing; developing; documenting; testing and implementing of all required interfaces and portals.
530	Contractor shall coordinate with the BOS Contractor in developing the Interface Control Documents (ICDs) for the interface between the BOS and ETTM System. Contractor shall work with BOS Contractor to develop a data transfer process that meets this Scope of Work and Requirements.
531	Where an existing ICD does not exist, Contractor shall develop the documents, and where changes to existing ICDs are required, these documents shall be modified by Contractor during the Implementation Period as part of this Scope of Work based on Contractor solution. The ICDs shall include requirements for data format and transmission, criteria for acknowledgement and validation of transmitted data and procedures for recording and reconciliation, as appropriate for each interface. The Contractor shall implement the latest version of the ICDs at Go-Live and Contractor shall continue to update the ICDs for the Agreement Term.
532	Provide electronic automated interfaces to Roadside systems, BOSs and third-party vendors/entities and external partners required to meet the functional requirements.
533	Provide portals to Authorized Users required to meet the functional requirements.
534	Provide for guaranteed transmission of data for all interfaces and portals.
535	Provide real-time monitoring and Alerts of interface data transmissions and failures.
536	Provide for one hundred percent (100%) reconciliation of the transmitted data records and files.
537	Provide an integrated integration engine for all interfaces and portals with functionality, including but not limited to: <ul style="list-style-type: none"> • real-time Dashboard for managing and monitoring of interfaces; • workflow user interface for managing and monitoring steps within each interface; • status and history of executions; • comprehensive scheduling of file transmissions; • tools for viewing data and/or contents of files received via interfaces and portals (compressed or encrypted); • comprehensive reporting for inbound and outbound transmissions; • tight integration with the MOMS and notification of failed transmissions, and • manually execute a failed transmission.

538	Utilize secure file transmission protocols for the transfer of data and/or files via interfaces and portals.
539	Provide the capability to transmit and receive multiple files during each scheduled batch.
540	Provide the capability to transmit and receive multiple files in a Day.
541	Utilize file naming conventions that prevents the overwrite of data and/or files (for example include the date and time of transmission).
542	Utilize file handling and processing methods that provide complete audit trail of the data and/or file transfer process (for example files that are successfully processed are moved to a processed folder).
543	Validate records and identify errors in the received data and/or files, including but not limited to:
	<ul style="list-style-type: none"> • mandatory fields;
	<ul style="list-style-type: none"> • data formats;
	<ul style="list-style-type: none"> • data validity (for example Account number not found in the System);
	<ul style="list-style-type: none"> • duplicate files or records;
	<ul style="list-style-type: none"> • unexpected response;
	<ul style="list-style-type: none"> • checksum/record count verification;
	<ul style="list-style-type: none"> • incorrect status, and • incorrect change in state.
544	Provide Authorized Users a user interface to correct and re-initiate/re-transmit data and/or files.
545	Provide the capability to process re-transmitted data and/or files.
546	Provide the capability to transmit the error details to the transmitting entity.
547	Provide the capability to identify missing or partial records/transactions/images and request the transmission of such missing records/transactions/images.
548	Provide the means to identify interface issues by validating the file transmission process, including but not limited to:
	<ul style="list-style-type: none"> • creation and transmission of data and/or a file at the scheduled time even if there are no records to transmit;
	<ul style="list-style-type: none"> • determining if the data and/or file was transmitted or received at the scheduled time;
	<ul style="list-style-type: none"> • creation of Alerts to the MOMS if data and/or file was not created or received at the scheduled time;
	<ul style="list-style-type: none"> • creation of Alerts to the MOMS if received data and/or file was not acknowledged;
	<ul style="list-style-type: none"> • creation of Alerts to the MOMS if records in the received data and/or file had errors when processed;
	<ul style="list-style-type: none"> • provide details to the MOMS of each failed record; • creation of automated emails to the third-party when file has been successfully transmitted;

	<ul style="list-style-type: none"> • creation of automated emails to the third-party when third-party data and/or file had errors, and • creation of Alerts to the MOMS when response has not been received for individual records within the predefined duration.
549	Provide data and/or file transmission and reconciliation reports as described in these requirements.
550	Provide a Dashboard that tracks the progress of the file transmissions through each stage and their acknowledgements by the receiving entity, including but not limited to: <ul style="list-style-type: none"> • transactions eligible for transmission; • file and /or data created with file name; • file and/or data transmitted; • file and/or data received; • file and/or data accepted; • file and /or data rejected; • file and/or data re-transmitted; • number of records in the file and/or data set; • number of unique accounts, and • number of failed records.
551	Provide Authorized Users the configuration screen(s) to establish, update and modify the parameters related to file and/or data transmission for each interface.
552	Monitor the storage and backup capacity where files and/or data are deposited and send an Alert to the MOMS and third-party entities if allocated storage for those folders are near capacity (Configurable) or full.
553	Provide the tools to automatically manage the folders by archiving successfully processed data and/or files after a Configurable number of days.
554	Provide the tools to import data to reconcile file transmissions.
555	Conform to all existing ICDs if applicable and develop all new/missing ICDs.
556	The RSS shall communicate with various other systems for the transmission and receipt of toll collection data in accordance with Approved ICD.
557	All data; transactions; images; files, toll rate data, traffic data and messages transferred between all subsystems shall be guaranteed and have the required data validation protocols to confirm the accuracy and validity of data transfer.
558	The System shall support error detection and recovery process in accordance with the Business Rules Approved during the Implementation Phase. Alarms shall be generated and reported to the MOMS for all exceptions/errors.
559	Authorized Users shall have the capability to correct the errors and re-process the data without compromising System security.
560	The RSS shall support the interfaces specified in this Scope of Work including, but not limited to: <ul style="list-style-type: none"> • Interface to the zone controllers/Roadside Systems; • Interface to the existing Corridor servers until the completion of the transition;

	<ul style="list-style-type: none"> • ODS;
	<ul style="list-style-type: none"> • Interface to the Corridor servers (if provided);
	<ul style="list-style-type: none"> • Interface to the BOS;
	<ul style="list-style-type: none"> • Interface to the image server(s) (if provided);
	<ul style="list-style-type: none"> • Interface to the MOMS;
	<ul style="list-style-type: none"> • Interface to the traffic detection system;
	<ul style="list-style-type: none"> • Interface to the Toll Rate CMS (I-405 EL only), and
	<ul style="list-style-type: none"> • Interface to future System to support transition to new systems at the end of the Agreement Term.
561	The ETMM System shall provide the capability to interface to a third-party ATMS for managing and monitoring the CCTV cameras and display of traffic detector data. Contractor shall provide an interface that is compliant to NTCIP standards.

2.3.8.1.1 *Interface to the Zone Controllers/Roadside Systems*

562	The RSS shall support the interface to the zone controllers/Roadside Systems to transmit and receive toll collection data in real-time including, but not limited to:
	<ul style="list-style-type: none"> • transaction data;
	<ul style="list-style-type: none"> • ICPS images and data;
	<ul style="list-style-type: none"> • alarm messages;
	<ul style="list-style-type: none"> • remote Authorized User Operations;
	<ul style="list-style-type: none"> • TSL;
	<ul style="list-style-type: none"> • User Identification Lists (UIL);
	<ul style="list-style-type: none"> • Manual data entry into an electronic file for upload for the 91 Express Lanes;
	<ul style="list-style-type: none"> • Automated toll schedules and toll rates (back-up) for the I-405 Express Lanes, and
	<ul style="list-style-type: none"> • configuration files.

2.3.8.1.2 *Interface to the Occupancy Detection System (ODS) and BOS for ODS Information*

563	The RSS shall support the ODS provider in development of an ICD between the ETMM System and the ODS to exchange triggering, synchronization and occupancy detection results and images.
564	The ICD will be developed by the ODS vendor in coordination with Contractor. Figure 5-1: Roadway Toll Collection System Interface to Occupancy Detection System provides an overview of the anticipated ODS integration to the ETMM System.
565	The RSS shall support the BOS Contractor (existing and/or new) in development and or modifying of an ICD between the ETMM System and the BOS to exchange occupancy detection related information.
566	The ICD will be developed by the ODS vendor in coordination with Contractor. Figure 5-1: Roadway Toll Collection System Interface to Occupancy Detection System provides an overview of the anticipated ODS integration to the ETMM System.

2.3.8.1.3 Interface to the Corridor Servers (if Provided)

567	If Contractor's solution includes Corridor servers, the RSS shall interface to the Corridor servers to transmit and receive data and files described in the interface to the Zone Controllers/Roadside Systems section.
-----	---

2.3.8.1.4 Interface to the BOS

The RSS shall interface with the Existing BOS and a New BOS anticipated to be implemented during the Agreement Term, prior to the full implementation of the I-405 Express Lanes. The 91 Express Lanes RSS shall initially communicate with the Existing BOS. Once the Existing BOS is replaced with the New BOS, Contractor shall interface the 91 Express Lanes RSS and the I-405 Express Lanes RSS with the New BOS.

568	The RSS shall communicate with the BOS per the Approved Interface Control Document in real time and in batch mode for the transmission and receipt of toll collection data including, but not limited to:
	<ul style="list-style-type: none"> • Transaction and trip data upon creation of the pursuable trip, including disposition of the transactions/trip;
	<ul style="list-style-type: none"> • images and image review results for license-plate trips that include license plate number; jurisdiction and plate type (if applicable);
	<ul style="list-style-type: none"> • images and image review results for Transponder-Based trips that were not posted to a customer Account, for example due to insufficient funds on the Account;
	<ul style="list-style-type: none"> • Plate Correction List resulting from customer disputes and audit checks no less than every hour (Configurable);
	<ul style="list-style-type: none"> • Exempt List maintained at the BOS no less than every hour (Configurable);
	<ul style="list-style-type: none"> • Transponder Occupancy Setting Correction List resulting from customer disputes and audit checks no less than every hour (Configurable);
	<ul style="list-style-type: none"> • comprehensive TSL once a Day and incremental TSL Updates not less often than every ten (10) minutes (Configurable);
	<ul style="list-style-type: none"> • toll rate schedules and TOD pricing data to support customer disputes;
	<ul style="list-style-type: none"> • summary toll collection traffic and revenue data, and
	<ul style="list-style-type: none"> • all other data files needed for BOS transaction/trip processing.

2.3.8.1.5 Interface to the Image Server (if Provided)

569	If Contractor's solution includes an image server, the RSS shall interface with the image server to obtain reconciliation data related to receipt of images from the Roadside Systems and transmission of the images to the BOS.
-----	--

2.3.8.1.6 Interface to the Maintenance Online Management System (MOMS)

570	The RSS shall include or interface with the integrated MOMS to transmit alarms and RSS operational status including recovery messages and operational Alerts.
-----	---

2.3.8.1.7 Interface to the Traffic Detection System

571	The RSS shall interface to the traffic detection System to obtain traffic data required to support the Shadow Dynamic Pricing System and support Express Lanes operations.
-----	--

2.3.8.1.8 Interface to the Toll Rate CMS – I-405 Express Lanes

572	The RSS sign control System shall communicate with the Toll Rate CMS for accurate display and recording of the Toll Rate CMS display data including, but not limited to:
	<ul style="list-style-type: none"> • TOD pricing data that indicate the toll amounts to the specified destination;
	<ul style="list-style-type: none"> • manual override data;
	<ul style="list-style-type: none"> • Toll Rate CMS messages in incident mode based on the Business Rules;
	<ul style="list-style-type: none"> • confirmation of successful receipt of the data at the Toll Rate CMS;
	<ul style="list-style-type: none"> • receipt and creation of alarm when there are Toll Rate CMS or communication failures and
	<ul style="list-style-type: none"> • frequent polling of the Toll Rate CMS at Configurable intervals for the data displayed on the Toll Rate CMS.
573	The RSS sign control System shall display the changed toll amount and incident mode messages on the Toll Rate CMS within five (5) seconds of change in toll amount or initiation of incident mode.

2.3.8.2 Version Tracking Requirements

574	The RSS shall maintain records of all versions of the TSL; UIL; toll rate schedules; incident mode message; remote overrides; Configurable parameter changes; Business Rule modifications; third-party Software Updates; lane configuration files, and lane executable programs that it received and/or created as specified in the Archive and Purge Control Mechanisms section of these Requirements.
575	Receipt and transmission of files from and to the source/destination Systems, their version, time of receipt/transmission and processing status shall also be tracked to provide an audit trail of all changes.
576	The RSS shall maintain records of all the files it created and processed in accordance with the data retention requirements.
577	Reports and screens shall be made available to verify the versions and the file download status.
578	The System shall provide the capability to track the versions of lane executable programs installed at each Toll Zone location.

2.3.8.3 Diagnostics

579	The RSS shall provide self-diagnosis functions to detect and report on the status and functioning of the RSS Hardware devices, third-party Software, communications, processes, tasks, and Software applications, as defined in Authority Approved Design Document.
580	The RSS shall report all Hardware and Software failures detected to the MOMS.

2.3.8.4 Data Security

581	Contractor shall ensure that any transaction and user entered data records, once recorded into the System, cannot be deleted or changed.
582	Contractor shall protect all data from being corrupted by unauthorized changes, whether by system error, human error, or intentional alteration. Data shall only be modified by Authorized Users according to defined privileges and procedures. However, no data shall be deleted from the ETTM System in this process.
583	Data records and files shall only be appended to and not edited or deleted. If manual intervention is required to complete the audit and verification process, only Authorized Users shall be permitted to Flag a data record or file to ensure the integrity and provide a complete audit trail.
584	All System access/entry, logins, and modifications (for example, flagging actions) shall be recorded and unauthorized access shall be prevented and logged and reported to MOMS.
585	Data shall be protected from unauthorized disclosure. Access to systems shall be restricted to Authorized Users with privileges appropriate to the confidentiality of the data.
586	Data shall be prevented from being lost or becoming inaccessible. Authorized Users shall be able to gain access to information to which they are privileged whenever they are authorized to do so. Encrypted business computers shall be used. Unprotected personal computers shall not be used.
587	All Personally Identifiable Information (PII) data shall be protected in accordance with California state law and shall be encrypted within the ETTM System both while at rest (electronically stored in a database or electronically offline) and in transit (during transmission between ETTM System subsystems and external entities). Unless explicitly approved by Authority, Contractor shall otherwise keep all PII confidential and shall not disclose such information, except as required by California state law or where the express written consent of the customer is obtained by Authority.

2.3.8.5 Time Synchronization

588	The RSS server and subsystems shall be synchronized to a certified source Approved by Authority using standard network time protocol at Configurable intervals but at a minimum every five (5) minutes.
589	The zone controllers; AVI Systems; AVD Systems; ICPS; ODS servers; image server; OCR server; DVAS, and other servers needed to support this Scope of Work and Requirements shall be synchronized to a Contractor-provided primary network time protocol appliance within the RSS. Such appliance shall synchronize with the Authority's Network Time Protocol source or a Stratum 0 or 1 time source. Contractor shall also supply a secondary time source. Both the primary and secondary time synchronization sources shall be Approved by Authority.
590	If needed, synchronization messages shall be sent to devices that do not support off-the-shelf time synchronization Software.
591	The time synchronization technique shall prevent the possibility for duplicate or incorrect transaction time. The time synchronization precision format shall support fractional seconds (hh:mm:ss:000).

592	Alarm messages shall be generated when there are time synchronization failures and when time drifts are more than a Configurable threshold.
593	The ETTM System shall have the capability to handle daylight saving time changes.

2.3.8.6 Transaction Audit and Verification

It is critical that all messages and transactions from the zone controllers are transmitted to the RSS and a verification of this data transmission shall be performed by the System.

594	Contractor shall perform automatic audit and verification process that confirms all data transmissions between the zone controller and RSS are successful.
595	<p>The ETTM System shall perform an independent automatic audit and verification process that confirms the following including but not limited to:</p> <ul style="list-style-type: none"> • all vehicles traveling through the toll lane are detected and reported as transactions; • all transaction transmissions between the zone controller and RSS are successful; • all image transmission between the Roadside System, the RSS and BOS are successful; • all transactions are formed into trips; • all transactions and trips are successfully transmitted to the BOS, and • the System has the screens and reports to validate the audit trail.
596	If the validation process fails for any reason, failure messages shall be created and reported to the MOMS. If the audit process determines that vehicles, transactions or trips are missing, the missing information shall be identified and reported to the MOMS.
597	If the audit process is successful then the audit for the location for the Day shall be deemed "complete" and System shall track this status of the audit on reports.
598	Once the audit is "complete" the data reported for that Day from the lanes shall not change. Any condition that results in changes to the data shall be identified and Authorized Users Alerted.

2.3.8.7 Data Summarization

599	Traffic and transaction data shall be summarized for reporting purposes. Summarization date and status shall be recorded to provide an audit trail.
600	In the event additional data is received that changes the summary counts previously generated, then an alarm message shall be generated and the System shall automatically re-summarize the data until a Configurable period has lapsed after which the re-summarization shall be performed manually.

2.3.8.8 Data Warehouse

601	Contractor shall provide a replicated database environment independent and separate of the RSS production environment for reporting and analytics to which Authority shall have full access.
-----	--

602	Contractor shall provide validation that any and all data replicated between the production database(s) and the replicated database is complete and accurate.
603	The replicated database environment shall be updated with all non-sensitive data (production data excluding any PII related data) at a minimum once per Day.
604	Provide a schema architecture that is simple to understand so that Authorized Users familiar with query commands can effectively query data for export/input into common business intelligence tools for data reporting and analysis.

2.3.8.9 Interoperability

605	The Roadside System shall be Designed to accommodate future Interoperability such that it supports the inclusion of multiprotocol readers and Transponders. Contractor's solution shall allow for modifying and adapting the System Design to incorporate new readers and support the transition to the new Interoperable solution with limited interruptions to the revenue collection.
606	Contractor shall support the conversion to the CTOC ISO 18000-6C protocol as it is scheduled to become the CTOC compliant standard during the Agreement Term. The System shall continue to support Title-21 as well until the sunset period determined by CTOC and Authority.
607	Contractor shall support the conversion to National Interoperability if it becomes available during the Agreement Term.

2.3.8.10 Express Lanes Operations Management

2.3.8.10.1 Express Lanes Operational Goals

608	Contractor shall provide an ETTM System that supports each of the following operational goals for a specified Corridor:
	<ul style="list-style-type: none"> • Speed. The Express Lanes shall, at a minimum, achieve the following speed requirements: <ul style="list-style-type: none"> ○ The Express Lanes must maintain a minimum average operating speed of 55 mph ○ Vehicles must maintain this minimum average operating speed at least 90% of the time over a consecutive 180-Day period during morning or evening weekday peak hour periods (or both). • Density. The Express Lanes should maintain a level of service (LOS) of "D" or better during peak periods. LOS A-D, as defined by the Highway Capacity Manual, requires a density of less than 35 vehicles per lane per mile. This operational standard shall be achieved 85% of the time during peak periods. • Peak period travel time savings. The end-to-end travel time in the Express Lanes shall be less than the travel time in the general purpose (GP) lanes at least 90% of the time during peak periods. • Configurability. The standards identified above shall be Configurable by <i>Corridor</i> and <i>direction</i>. <ul style="list-style-type: none"> ○ The ETTM System shall be capable of supporting a minimum average operating speed that exceeds 55 mph.

	<ul style="list-style-type: none"> ○ The operational goals for traffic density shall be Configurable (either up or down) ○ The operational goals for performance (e.g. the percentage of time meeting the density and travel time savings goals) shall be Configurable
--	--

2.3.8.10.2 Toll Policy - 91 Express Lanes

609	Contractor shall provide a ETTM System that supports the following Toll Policy:
	<ul style="list-style-type: none"> • Time of Day. This is a form of variable tolling in which tolls vary by the time of Day according to a pre-established schedule. Hourly traffic volumes are continually monitored. Periodically, adjustments to the published toll schedule are triggered through increases and decreases in traffic demand and may move up or down.

2.3.8.10.3 Toll Policy - I-405 Express Lanes

610	Contractor shall provide a ETTM System that supports each of the following Toll Policies:
	<ul style="list-style-type: none"> • Time of Day. This is a form of variable tolling in which tolls vary by the time of Day according to a pre-established schedule. The tolls are set as the result of simulation testing, experience, and/or trial and error, and are designed to rise and fall according to observed peak travel patterns. The scheduled fares may be updated at frequent intervals after opening and then at more consistent pre-determined intervals as traffic stabilizes. • Shadow Dynamic Pricing. This is a form of dynamic tolling, which runs in the background, in which tolls fluctuate in real time in response to prevailing traffic conditions. Tolls vary in response to traffic operational conditions in both the Express Lanes and the general purpose lanes. The algorithm output will be used to inform the TOD pricing process.

2.3.8.10.4 Basis of Toll Adjustment - 91 Express Lanes

Contractor shall provide capability to adjust the TOD toll pricing based on Authority-provided TOD pricing information, similar to the existing 91 Express Lanes pricing concept.

611	The Implementation Phase will establish specific guidance for adjusting the TOD toll rate schedule in conjunction with Authority policy.
612	Contractor shall provide capability to adjust TOD toll pricing via an updated electronic file (Excel or simple file format) for uploading to the 91 Express Lane Toll Rate CMSs. The file type and format shall be determined during the Implementation Phase and shall be synchronized with the ETTM System toll rates.
613	Contractor shall coordinate the 91 Express Lanes ETTM System TOD toll rate schedule with the Authority's Approved toll rate schedule, including all changes to the schedule.

2.3.8.10.5 Basis of Toll Adjustment - I-405 Express Lanes

The I-405 Express Lanes pricing shall provide the capability to support multiple variable and dynamic pricing systems to run simultaneously. Contractor will develop a TOD pricing system that adjusts I-405 Express Lanes toll rates based on a TOD pricing schedule, similar to the existing 91 Express Lanes pricing concept. Contractor will also develop a Shadow Dynamic Pricing

System (DPS) to inform the Authority on routine updates to the TOD pricing schedules, through review of historical shadow tolling trends.

614	During the Implementation Phase the Contractor shall develop the logic for for adjusting toll rates via TOD pricing.
615	<p>Contractor shall provide a ETTM System that supports the following potential bases for adjusting toll rates:</p> <ul style="list-style-type: none"> • Speed in the Express Lanes. The average speed in the Express Lanes shall be a potential trigger for adjusting the tolls. The tolls shall be designed in part to achieve the average speed goals. • Speed differential. The value provided by the Express Lanes is related in part to the average speeds experienced in the parallel general purpose lanes. The greater the speed differential between the Express Lanes and the general purpose lanes (assuming that the Express Lanes are faster), the greater the relative value of the Express Lanes. The speed differential may therefore be used as a trigger for a toll adjustment in the Express Lanes. • Volume in the Express Lanes. Experience has shown that Express Lanes can readily accommodate 1400-1600 vehicles per hour per lane while maintaining near-free flow speeds. This value (or range of values) represents the effective capacity of the Express Lanes; its actual value will need to be confirmed via simulation and experience. The tolls in the Express Lanes may need to increase as the actual usage approaches this capacity. • Density in the Express Lanes. The Highway Capacity Manual defines level of service (LOS) in terms of density. One operational goal of the Express Lanes is to consistently maintain LOS D or better during peak periods. Therefore, traffic density (expressed in terms of vehicles per mile per lane, or vpmpl) may be used as a basis for adjusting the tolls in the Express Lanes. Tolls may need to increase as the density approaches the Configurable upper limit of 35 vpmpl. • Peak period travel time savings. One purpose of the Express Lanes is to provide a faster travel time (especially during peak periods) compared to the general purpose lanes. It will be important to monitor the difference in travel time and to adjust the toll in order to (a) take advantage of relative value of the Express Lanes (by charging drivers what they are worth), and (b) preserve the travel time benefit of the Express Lanes (by increasing the price in order to avert a breakdown in the Express Lanes). • Performance ratios. In order to ensure that the Express Lanes provide consistently superior performance compared to the general purpose lanes, the ETTM System should be configured to enable the attainment of selected performance ratios. This could include, for example, maintaining an Express Lanes density that is no greater than 80% of the density in the general purpose lanes, or maintaining an Express Lanes flow rate that is no greater than 75% of the flow rate in the general purpose lanes. • Density in the general purpose lanes. The Contractor shall monitor the density (and therefore the level of service) in the general purpose lanes in order to provide another means of evaluating whether the Express Lanes are providing superior service. Tolls may need to be adjusted in order to ensure that the density in the Express Lanes is lower than density in the general purpose lanes.

	<ul style="list-style-type: none"> • Speed in the general purpose lanes. The Contractor shall monitor the speeds in the general purpose lanes as an additional means of comparing the relative performance of the Express Lanes. Tolls should be adjusted to support conditions in which speeds in the Express Lanes are faster than speeds in the general purpose lanes for any given peak period time increment.
--	--

2.3.8.11 Shadow Dynamic Pricing System (DPS) - I-405 Express Lanes

Contractor shall also develop and use a Shadow Dynamic Pricing System (DPS) to inform Authority on routine updates to the TOD pricing schedules, through review of historical shadow tolling trends.

616	Contractor shall perform comprehensive toll rate setting analysis and reporting based on the data collected and produced by the Shadow DPS to inform Authority's routine updates to the TOD pricing schedules. Contractor shall conduct such analysis and reporting no less frequently than every 6 months during the Operations and Maintenance Phase. Contractor shall provide toll rate analysis and reporting at more frequent intervals (daily, weekly, monthly) as directed by Authority during the first 12 months following Go-Live.
-----	--

2.3.8.11.1 Shadow Dynamic Pricing System - General Requirements

617	Contractor shall provide a Shadow DPS that determines the per mile Shadow Toll Rate for each Segment in each direction of travel. Shadow Toll Rates shall indicate what the toll rate would be in any given interval, given the prevailing speeds and traffic volumes on the facility.
618	<p>The Shadow DPS shall provide sufficient user-Configurable parameters of sufficient detail to support multiple optimization strategies. For example, the parameters shall be able to support strategies relating to meet the following strategies:</p> <ul style="list-style-type: none"> • An "Adaptive Value Pricing" strategy that indicates the toll that should be assessed during any given interval based on the travel time savings provided by the Express Lanes. • A "Demand Management" strategy that indicates the toll that should be assessed during any given interval in order to manage usage of the Express Lanes, subject to the operational requirements established by Authority.
619	<p>Contractor shall provide a Shadow DPS that has the ability to implement the following methods of calculating dynamic pricing. The values selected for these rules shall be Configurable. Final identification of Business Rules shall be completed during the Implementation Phase.</p> <ul style="list-style-type: none"> • Minimum toll. The minimum toll shall apply in any mode in which some or all vehicles are assessed a toll. The price for tolled vehicles shall not go below this mark. The Shadow DPS shall provide the ability to implement this as a "minimum rate per mile" toll, a "minimum Segment" toll, and a "minimum trip" toll and these Configurable minimums may be different during peak and off-peak periods. • Maximum toll. The maximum toll shall apply in any mode in which some or all vehicles are assessed a toll. The price for tolled vehicles shall not go above this mark. The Shadow DPS shall provide the ability to implement this as a "maximum rate per mile" toll, a "maximum Segment" toll, and a "maximum trip" toll and these Configurable

	<p>maximums may be different during peak and off-peak periods. If traffic conditions in the Express Lanes continue to degrade when the “maximum toll” is in effect, then the Segment/Corridor may need to shift to “HOV ONLY” mode based on real-time conditions.</p>
	<ul style="list-style-type: none"> • Minimum toll increment and decrement. This represents the minimum amount by which a toll may change from one interval to the next. For example, a minimum toll increment of 10¢ would indicate that if the toll were to change at all from one interval to the next, it would need to change by at least 10¢. A minimum toll increment and decrement could be applied on either a per-mile basis, a per-Segment basis, or a per-trip basis. The Shadow DPS shall have both Configurable minimum increments and Configurable minimum decrements and these Configurable minimums may be different during peak and off-peak periods.
	<ul style="list-style-type: none"> • Maximum toll increment. This represents the maximum amount by which a toll may change from one interval to the next. It is meant to limit the volatility in toll rate changes. For example, a maximum toll increment of \$1.00 would indicate that the toll would not change by more than \$1.00 from one interval to the next. A minimum toll increment could be applied on either a per-mile basis, a per-Segment basis, or a per-trip basis. The DPS shall be able to accommodate distinct values for toll increases and toll decreases and these Configurable parameters may be different during peak and off-peak periods. In other words, the Shadow DPS shall be able to accommodate a condition in which the rate at which tolls <i>increase</i> is different from the rate at which tolls <i>decrease</i>.
	<ul style="list-style-type: none"> • Rounding increment. This represents the increment to which fares shall be rounded (e.g. to the nearest penny, nickel, dime, quarter, etc.). The Shadow DPS shall be able to accommodate distinct rounding increments for the rate per mile, rate per Segment, and rate per trip. Additionally, the Shadow DPS shall support distinct rounding increments for ETC toll rates and for image-based toll rates. The specific rounding method shall be determined during the Design process and specified in the Design Documentation.
	<ul style="list-style-type: none"> • Rate lock. The Shadow DPS shall enable the locking (or guaranteeing) of toll rates. This Business Rule assures drivers that the rate to be charged will be no greater than the rate that was posted on advanced signage prior to the driver’s decision to use the Express Lanes. The Shadow DPS shall support locking toll rates at the point of entry for the entire trip, ensuring that customers will pay no more than the trip rate that was in effect when the vehicle first entered the Express Lanes. The point of entry shall be defined during the Implementation Phase based on Contractor’s solution.
	<ul style="list-style-type: none"> • Exempt vehicles. In any of the modes of operation, certain vehicles may be designated for free travel. Exempt vehicles may include (but are not limited to) emergency vehicles, military vehicles, law enforcement, transit buses, and electric cars. A detailed list of exemptions shall be established in the Design process. Exempt vehicles that regularly use the facility (e.g. transit buses, electric cars, law enforcement) must request and acquire a non-revenue Transponder. Exempt vehicles that do not regularly use the facility (e.g. emergency vehicles, military vehicles) shall be identified through their license plates and flagged for addition to the Exempt List and not assessed a toll.

	<ul style="list-style-type: none"> • HOV Requirements. The Shadow DPS shall have the ability to accommodate different HOV Requirements (namely, HOV2+ and HOV3+) when the Segment/Corridor is operating in HOT mode, in HOV ONLY mode, or in a third mode in which the Business Rules allow for different toll rates depending on the vehicle's HOV status. These HOV Requirements shall have the flexibility to vary by time of Day (e.g. peak periods vs. off-peak periods) and by Corridor/direction.
	<ul style="list-style-type: none"> • Criteria for transitioning to HOV ONLY mode. Contractor shall enable Configurable criteria for transitioning from either Normal Mode of operation to HOV Only mode. Although the criteria will be defined in the Implementation Phase, they will likely have two elements: (1) the toll has reached the maximum rate and has remained there for a Configurable number of intervals, and (2) Express Lanes Operations (as defined by speed or density) remain at an unacceptable level with no trend of improvement.
	<ul style="list-style-type: none"> • Criteria for transitioning to "OPEN TO ALL" mode. Contractor shall enable Configurable criteria for transitioning to "Open to All" mode, in which one or more Express Lanes Segments are made available for all vehicles in a toll-free condition. Although the criteria will be defined in the Implementation Phase, they will likely have one or more of the following elements: (1) An incident in the general purpose lanes has degraded conditions so badly that immediate relief is needed; or (2) Law enforcement or public officials have identified an emergency condition that temporarily warrants the elimination of tolls in the Corridor.
	<ul style="list-style-type: none"> • Interval frequency. The intervals or special events define the frequency at which rates can change. The frequency shall be Configurable, generally as short as 1 minute and as long as 30 minutes, but may need to be more frequent or less frequent to efficiently manage demand.
	<ul style="list-style-type: none"> • Configurability. For all variables requiring configurability, the Shadow DPS shall support the ability to make them Configurable <i>by Corridor/direction</i> as well. For example, the Shadow DPS shall support a pricing system in which the maximum toll increment on the I-405 Express Lanes can be different based on direction of travel, subject to any policy-related restrictions.

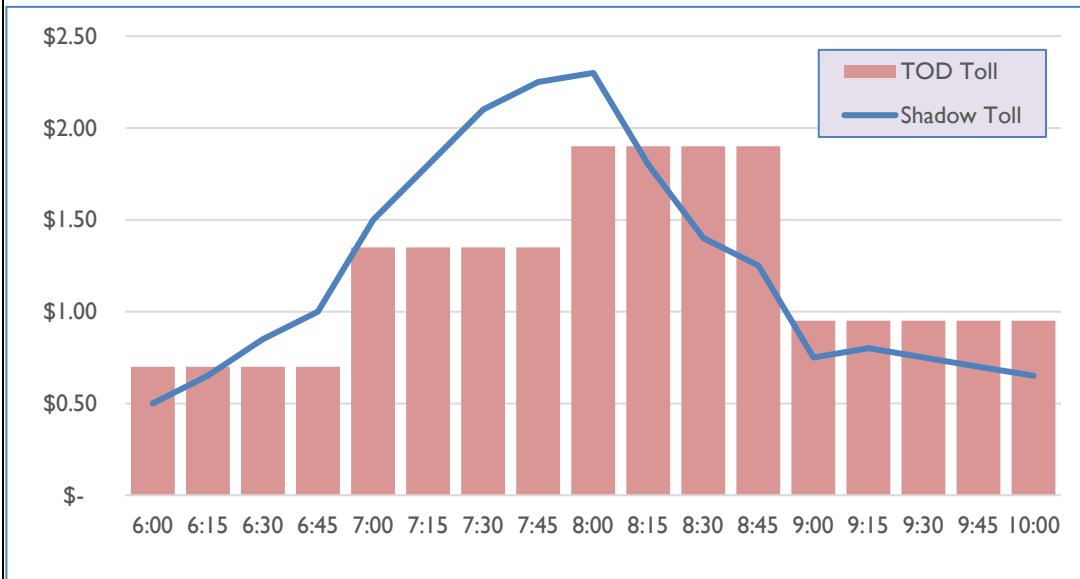
2.3.8.11.2 Shadow Dynamic Pricing System - Detailed Requirements

620	All of the Shadow DPS parameters and Business Rules used for performing the pricing algorithm shall be Configurable and flexible. Initial settings shall be determined during System Design. Tables shall be provided that (a) identify default values for all Configurable parameters, (b) provide reasonable ranges of values for all Configurable parameters, and (c) provide high-level information regarding the pricing implications of changing each parameter.
621	<p>The Shadow DPS shall establish and maintain various Configurable pricing drivers for each Corridor. Such conditions shall include but not be limited to:</p> <ul style="list-style-type: none"> • types of algorithms and when to activate the required algorithm; • the type of data to use for each algorithm (speed, volume, density, capacity, travel time); • the source of data for each algorithm parameter (Express Lanes data and general purpose lane data);

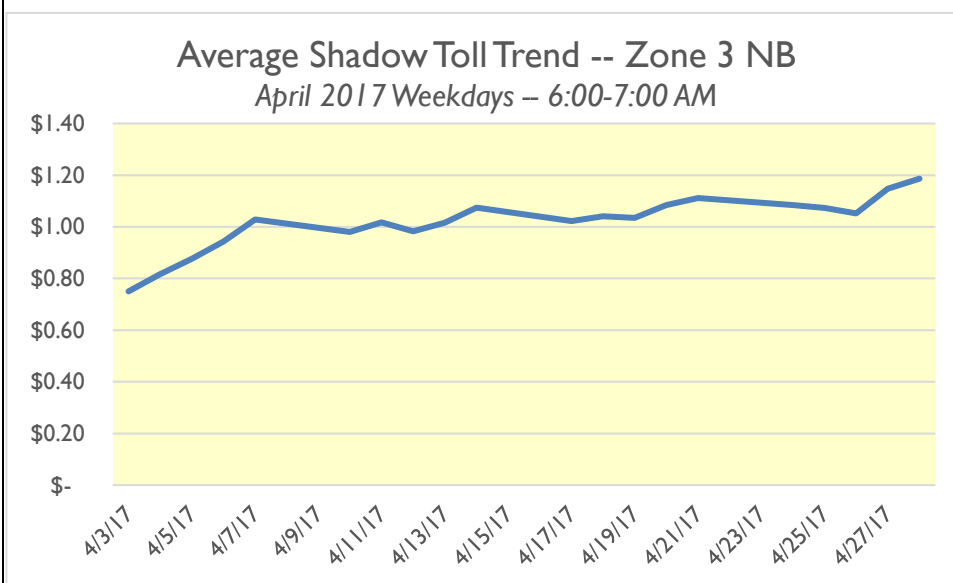
	<ul style="list-style-type: none"> the percentage and/or weight of data to use for each source and type; the parameters for going into and coming out of "HOV ONLY" Mode; the parameters for transitioning into and out of "OPEN TO ALL" Mode; the frequency of calculation (computed as often as determined most effective for determining price and managing traffic in the Corridor); the interval for data collection; any additional data required outside of the Segment, for example: <ul style="list-style-type: none"> downstream congestion of the subsequent Segment or Corridor; upstream congestion in a preceding Segment or Corridor; trigger for price increase (level of service thresholds, changes in density, changes in travel time, and changes in travel time savings in both Express and general purpose lanes); trigger for HOV ONLY Mode operation; and the percentage of data points needed to be sufficient to support the dynamic pricing calculation.
622	The Shadow DPS shall calculate Shadow Toll Rates in Configurable intervals. The minimum interval shall be one (1) minute and the maximum interval shall be sixty (60) minutes, with a default interval of five (5) minutes (Configurable).
623	The Shadow DPS shall provide a Configurable price protection whereby customers are charged the toll that is lower of the price in effect within a Configurable time period when the customer entered the Express Lanes. Such Configurable capability shall include a setting from the time a price/mode is displayed on the pricing sign to when it is enabled for the customer.
624	<p>The System shall provide the capability to establish various safeguards for Configurable minimum and maximum thresholds. This shall include but not limited to:</p> <ul style="list-style-type: none"> the minimum and maximum pricing increments per interval; minimum and maximum toll rate per mile; minimum and maximum trip fare by Corridor; minimum and maximum toll per payment type and payment method; minimum and maximum toll per Segment; and minimum and maximum toll by occupancy (i.e. HOV2+ is 50% of the SOV per-mile rate during peak periods)
625	The Shadow DPS shall also provide the capability of considering conditions in downstream Corridors (if applicable) when calculating the price at each entry point including the capability to determine how many downstream Segments should be included when calculating the price for each entry and their weightage.
626	The Shadow DPS shall provide the capability to support multiple dynamic pricing algorithms to run simultaneously per Corridor/direction with a default algorithm that will be used unless changed based on conditions or the Business Rules.

627	The Shadow DPS shall provide the capability to run one or more pricing algorithm configurations in the background to provide insight regarding how various pricing approaches would respond to various traffic conditions.
628	The Shadow DPS shall calculate the per mile toll rate, minimum and maximum charges, the travel time to specific locations on the Corridor, and the toll amount to specified locations for each entry Toll Zone. This information, along with the time of pricing calculation, the effective time of the pricing and unique pricing identifier is considered a pricing schedule and shall be saved.
629	Using the data from the traffic detectors installed on the Express Lanes, as well as data from traffic detectors installed in the general purpose lanes as part of this project, the System shall determine the travel time between various Segments of the Corridor. As a back-up, the travel times for the Corridor shall be determined from the Transponder read data, vehicle detection data and other available sources.
630	A user interface shall be provided that displays the results of the dynamic pricing including the values for all of the parameters that drive the algorithm. Tools shall be provided to analyze and compare the pricing results to the traffic conditions.
631	<p>A user interface shall provide the following information in real time, for each Toll Zone:</p> <ul style="list-style-type: none"> • The current density (and corresponding level of service) in the Express Lanes • The current average density (and corresponding level of service) in the parallel general purpose lanes • The current rate in effect via TOD pricing • The Shadow Toll Rate under a “Adaptive Value Pricing” pricing approach • The Shadow Toll Rate under a “Demand Management” pricing approach
632	The Shadow DPS shall have the capacity to generate reports and graphs that support the use of Shadow DPS in informing the TOD toll rate adjustment process. These reports shall include the following:

- A graph that compares the TOD price with the Shadow Toll Rates over time. These graphs shall be developed per Toll Zone per Day. The variable tolling system shall give the user the ability to select a specific Day, to select a range of dates, or to select a type of Day (e.g. weekdays vs. weekends). An example of what this graph could look like is provided below.



- A graph that illustrates how, for a given zone during a specific interval, the Shadow Toll Rate has changed over time. The graph shall have the capacity to draw from up to six (6) months of historical data. If the Shadow Toll Rate is trending upward, it suggests that it may be appropriate to implement an upward adjustment to the prevailing TOD price. An example of what this chart could look like is provided below:



633	The parameters underlying the Shadow DPS shall be calibrated once TOD pricing is implemented. The purpose of calibration is to understand the parameters that correspond with the observed relationships between pricing and Express Lanes usage.
634	Once the parameters are calibrated to existing conditions, Contractor, in conjunction with Authority, shall modify them as necessary to develop an “Adaptive Value Pricing” approach and a “Demand Management” pricing approach. The modification of these parameters may be achieved through usage of a microsimulation model.
635	Provide the capability to export the traffic data from the Express Lanes and general purpose lanes, toll rates, and other parameters for use as inputs to external traffic simulators (e.g. TransModeler, VISSIM).
636	Traffic and dynamic pricing data shall be transmitted to third parties and to BOS in a format to be defined and Approved during Implementation Phase.

2.3.8.12 Travel Time Determination

637	The RSS shall determine the Express Lanes and general purpose lanes travel times between various Segments of the Corridor no less often than sixty (60) seconds (Configurable).
638	The RSS shall calculate the travel time using the TDS installed by Contractor.

2.3.8.13 Transaction Pre-processing

639	The RSS shall ensure all transactions eligible for trip creation are pursuable and comply with the ICD specifications.
640	The RSS shall pre-process all transactions in accordance with the Approved Business Rules in order to filter incorrect/exception transactions that may result from Equipment failures and lane logic issues.
641	Transactions that should not be processed further at the BOS shall be identified, Flagged and filtered at the RSS and not transmitted to the BOS.
642	The RSS shall identify exceptions, anomalies and other conditions determined during the Implementation Phase in the event they have not been filtered at the zone controller, for example, same Transponder read within Configurable conditions.
643	In scenarios where multiple Transponders with valid status are reported, the System shall select one Transponder with valid status to be included the trip (per the Approved Business Rules) and transmitted to the BOS.
644	In cases where a Transponder read and an Image-Based Transaction are created for a vehicle (in case of buffered reads or lane logic issues) then the RSS shall perform the filtering based upon Configurable parameters Approved during the Implementation Phase. In case of buffered read transactions, the Transponder read time shall be used as the transaction time.
645	Alarm messages shall be created and reported to the MOMS in the event such exceptions identified in this section exceed a Configurable threshold.

2.3.8.14 Transaction Matching and Trip Creation

Contractor will send fully formed 91 Express Lanes trips to the Existing BOS and New BOS once in operation. Contractor will send fully formed I-405 Express Lanes trips to the New BOS only.

646	The RSS shall provide transaction matching and trip creation functionality for the Corridor to determine the fare amount to be charged. Transaction matching and trip creation shall be in accordance by Authority Business Rules and they shall vary by Corridor.
647	The System shall support the switchable ISO 18000-6C Transponder identification scheme. The RSS shall support the accurate creation of a customer's trip where the customer may switch the ISO 18000-6C setting mid trip.
648	<p>The System shall ensure that all data required to complete a customer trip are at the RSS, including but not limited to:</p> <ul style="list-style-type: none"> • all transactions from the Toll Zones in the customer direction of travel are transmitted to the RSS and Toll Zones are online and current; • license plate results are available and meet the required confidence level or manual image review is complete; and • a Configurable time has lapsed since the transaction was reported.
649	The RSS shall use the Transponder reads and the license plate data from each Toll Zone to determine the trip for each customer.
650	Trips shall be created for Authority specified payment types, for example currently trips are created for Transponder-Based and Image-Based Transactions and paying and toll free transactions.
651	Trips shall be Transponder-Based; Image-Based or a combination of image and Transponder.
652	The System shall use the license plate data and other characteristics of the vehicle (i.e. VSR) to match the vehicle's transaction at each Toll Zone and create a trip for the vehicle.
653	The System shall have the capability of utilizing customer Account information obtained from the CTOC files and the RSS to match the Transponder from a transaction to the license plates associated with that Account to create a trip in the event images/license plate data is missing from the transaction.
654	The RSS shall support the trip creation possibilities for Express Lanes Corridors where a trip can be made up of a single transaction or it can be made up of multiple transactions based on the number of Toll Zones a vehicle drove through during its trip. A transaction shall be used only once to create a trip.
655	Trip creation functionality shall be Configurable to allow transactions on the 91 Express Lanes or I-405 Express Lanes to be matched with transactions on a future intersecting Toll Facility (i.e. future SR-241 direct connectors).
656	The System shall constantly process the license plate results in real time against transactions that are Flagged for image review. If transactions are matched and a trip is created using images Flagged for review, then the System shall consider the image matched and remove the image from image review queue.
657	The System shall support default Business Rules for matching transactions where some components of the trip are missing and for handling exception conditions.

658	The System shall use Configurable logic to avoid splitting a customer trip into two or joining two separate trips into a single trip. Such logic includes but is not limited to:
	<ul style="list-style-type: none"> time taken to travel between individual and multiple Toll Zones;
	<ul style="list-style-type: none"> time taken to travel the Corridor, and travel time for each Segment.
659	The System shall create a trip for each Corridor in the event a customer traveled multiple Corridors.
660	The System shall provide an audit trail for tracking transactions to trips and provide one hundred percent reconciliation of the transactions to trips.
661	Transactions that are not matched per the Business Rules shall not be transmitted to the BOS.

2.3.8.15 Trip Classification

662	The System shall classify the trip based on the Business Rules using the data obtained from the following subsystems including but not limited to:
	<ul style="list-style-type: none"> roadside systems;
	<ul style="list-style-type: none"> ODS;
	<ul style="list-style-type: none"> CAV data, and
663	<ul style="list-style-type: none"> BOS
	The trip classification shall include but not limited to:
	<ul style="list-style-type: none"> transponder-based paying trip;
	<ul style="list-style-type: none"> transponder-based toll violation trip;
	<ul style="list-style-type: none"> transponder-based occupancy violation trip;
	<ul style="list-style-type: none"> transponder-based toll exempt/toll discount trip;
	<ul style="list-style-type: none"> transponder-based HOV ONLY violation trip;
	<ul style="list-style-type: none"> image-based paying trip (matched to customer account);
	<ul style="list-style-type: none"> image-based toll violation trip; and
	<ul style="list-style-type: none"> image-based toll exempt/toll discount trip

2.3.8.16 Fare Calculation

664	The RSS shall support fare calculation Business Rules by Corridor. Fares shall be determined in U.S. currency for the specified Corridor.
665	The System shall maintain a Configurable hierarchy that defines which Flag or status on the transaction takes precedence when creating and classifying the trip, and calculating the toll amount.
666	The RSS shall calculate the fare to be charged to the customer Account for the trip in accordance with the Business Rules, and including but not limited to:
	<ul style="list-style-type: none"> the Toll Zones traversed by the customer during travel on the Express Lanes;
	<ul style="list-style-type: none"> the Corridor;
	<ul style="list-style-type: none"> the Segment prices that were in effect at the time that the driver passed the Toll Rate CMS just upstream of the entry point to the Express Lanes;

	<ul style="list-style-type: none"> • Transponder Occupancy Setting; • occupancy status of each transaction as determined by ODS; • CAV data; • trip classification; • flags on the transaction; • the payment method (based on TSL) on each transaction, and • any minimum/maximum criteria established by Authority for each Corridor.
667	The rate calculation shall use travel time data (gathered from AVI sensors and/or roadside traffic detectors) to ensure that customers are charged a fare that is no greater than the fare that was posted on the Toll Rate CMS prior to entering the Express Lanes.
668	The fare due from a vehicle without a Transponder that is determined to be an Image-Based Transaction shall be in accordance with the Business Rules established by Authority during the Implementation Phase.
669	The HOV2+, HOV3+, and CAV fare shall be discounted a Configurable percentage of the SOV fare. This configuration shall be by Corridor.
670	The System shall confirm that the toll amount/toll rate determined by the pricing system matches the toll amount/toll rate displayed on the Toll Rate CMS for each destination. In the event of a discrepancy, the toll amount/toll rate displayed on the Toll Rate CMS shall be used and such transactions Flagged.
671	The System shall assess a default toll amount in accordance with the Business Rules if the toll amount/toll rate cannot be determined or if error conditions are detected.

2.3.8.16.1 Fare Calculation - 91 Express Lanes

672	The 91 Express Lanes use lane declaration only to determine declared occupancy. The RSS shall calculate the fare to be charged to the customer Account for the trip based on the lane declaration and the toll schedule in place at the time of the transaction.
-----	--

2.3.8.17 Trip Correction

673	The RSS shall use the occupancy results obtained from the ODS to re-classify a vehicle if the initial classification was incorrect based on the Configurable classification hierarchy, and correct the toll charged for the trip if applicable. The integrity of the original trip shall be maintained for audit purposes.
674	The corrected Transponder Occupancy Setting trip transaction and the back-up images shall be transmitted to the BOS.
675	The RSS shall also have the capability to handle trip re-classification and fare calculation if the occupancy results are obtained from the ODS prior to transmission of the trip transaction to the BOS.

2.3.9 Roadway Support Systems (RSS) Application Software

676	Contractor shall develop, furnish, and install a single GUI application Software for the ETTM System that supports all user functions for the RSS, including the MOMS, all Dashboard, image review, DVAS and reporting.
-----	---

677	The System shall provide role-based single sign on (login) capability for all RSS functionality.
678	Using a role-based login, the System shall provide Authorized Users with specific authority to perform functions within the System. An Authorized User could be Contractor or other designated Authority user.
679	Provide a browser-based application compatible with Authority Approved current version, or immediate prior Authority Approved version, releases of the following browsers, including but not limited to: <ul style="list-style-type: none"> • Microsoft Internet Explorer; • Microsoft Edge Browser; • Mozilla Firefox; • Google Chrome; • Apple Safari; • any other browser reaching five percent market penetration, as Approved by Authority and • smartphone/tablet/mobile browsers.
680	Based on the user's access privileges obtained from Active Directory the appropriate menus, screens, tabs, reports and other System functionality shall be made available.
681	Changes to the System data and System parameters shall be through screens and only Authorized Users shall have access to these screens.
682	All access to the application and changes to the data shall be recorded and tracked, and the System shall provide an audit trail for all data modifications and parameter changes.

2.3.9.1 Graphical User Interface (GUI) Requirements

The GUI Design must include accepted industry design standards for ease of readability, understanding and appropriate use of menu-driven operations, user customization and intuitive operation.

683	The GUI Design and development shall incorporate human factors and usability engineering and be optimized for speed, as well as provide the following controls, including but not limited to: <ul style="list-style-type: none"> • menus (such as pull down, popup, cascading, leveling, etc.); • windows (allowing for multiple windows within the application, such as to navigate back without having to re-enter information) • informational messages; • positive feedback; • provide warning and/or confirmation messages when appropriate as defined during the Implementation Phase • exception handling and error dialogs, including logging the error; • control icons, links and action buttons; • data entry fields, combo boxes, check boxes;
-----	--

	<ul style="list-style-type: none"> • provide the capability for the user to print screens • display (read-only) fields, and • general and context-specific help menus.
684	Data entry screens shall have Configurable mandatory fields that require data entry prior to continuing through the process.
685	Provide field-level validation (server-side enforced) and format verification upon exiting data fields applicable to pre-defined formats or standards, including but not limited to: <ul style="list-style-type: none"> • alpha-numeric; • date; • time; • special characters; • length; • lane and Toll Zone ID, and • Transponder numbers.
686	Provide other formatting masks (server-side enforced) as configured by the System administrator (visible to certain users but masked for other users), which can be applied to any other field in the GUI.
687	Provide field-level “tooltips” or other interactive help, Configurable by the System administrator, that provide specific guidance on any field presented, including but not limited to: <ul style="list-style-type: none"> • alpha-numeric fields; • date fields; • time fields; • special characters; • username and password; • length restrictions; • lane and location ID, and • Transponder fields.
688	Online help shall be provided for each screen, each editable field and each selectable option within each screen.

2.3.9.2 Screens and Report Access

689	Provide the capability to control all access rights through the assignment of user-roles.
690	Based on the access levels/role a user is assigned to the appropriate menus, screens, tabs, reports and all other required user information shall be displayed.
691	For some screens, certain access levels/roles may only be allowed to view the contents and not allowed to enter any data.
692	Provide Authority Authorized Users the capability to make changes to user roles. The System shall prevent the direct assignment of rights to a user, and all rights must flow from a user role.

2.3.9.3 User Management

User setup and management is a critical task since the user access levels/roles created through the System determines what privileges and access rights each user is granted.

693	Access to the zone controllers; RSS; the MOMS, and the image review shall be controlled through the user access privileges set up through the user management module.
694	Allow for full integration with Microsoft Active Directory (AD) or similar access system Approved by Authority so users are not required to enter separate passwords for system access (the System shall prompt users for their credentials and not allow pass-through authentication), and that all rules for password security (for example, characters or rotations) are enforced and passed between the network and the application.
695	Authorized Users shall have the capability to add new users into the System, to update/modify existing users, and to disable users.
696	The user identification data shall include the user name, job designation and identification number.
697	All users shall be assigned individual user IDs and an individual default password which they are required to change when first accessing the application.
698	Accounts for user access to the System shall require a strong password in accordance with password management standards in applicable PCI requirements . The access shall be role based and limited to the authorized Contractor staff and designated Authority personnel.
699	Access to all information on the ETTM System, including EDMS, shall be limited to designated Authority and Contractor personnel and shall be password controlled. User access security including sign-on facilities, access privileges, user role and different levels of access shall be provided for the application, database, files and directories and shall be fully user Configurable. Specific Requirements shall be developed during the System Design.
700	All user lane and application privileges shall be maintained at the RSS and transmitted to other systems for user validation.
701	Contractor shall develop the matrix of access levels/user roles and allowed privileges during System Design with Authority input and Approval. The System shall allow for addition and changes to the access levels/user roles and addition of personnel in a secure manner. Authorized Users shall have the ability to activate, deactivate, and terminate user's access to the System in accordance to Approved Business Rules.
702	The System shall generate a user identification list (UIL) that is transmitted to the zone controllers each time there is a change that impact toll collection Operations. It shall at a minimum contain the user ID, PIN and access level. All access to the lane System shall be validated against this list. The UIL shall become active upon receipt by the lane/zone controller.

2.3.9.4 Toll Rates and Schedule

703	The System shall provide Authorized Users the capability to create and manage TOD toll rates and schedules.
-----	---

704	At a minimum, capability shall be provided to establish toll rates based on Corridor, Segment, declared occupancy, and shall support TOD and holiday toll rates as defined during the Implementation Phase.
705	Authorized Users shall have the capability to pre-establish the effective date/time the toll rates will be enabled. The System shall permit Authority to schedule toll rates and changes in toll schedules in advance of the new rates becoming effective.
706	The toll rates shall be transmitted to the zone controllers and the Toll Rate CMS to support degraded modes of operation.
707	The System shall record and track the toll rate ID and toll schedule ID and their transmission status for audit purposes.

2.3.9.5 Toll Rate Changeable Message Sign Control System

708	The System shall provide the capability to define the destinations and operational modes to be displayed on the Toll Rate CMS by Corridor.
709	Authorized users shall have the capability to define the Corridor Operations schedule and based on the schedule or conditions that trigger a change in the Operational Mode, the Toll Rate CMS control system shall transmit the appropriate message to display on the Toll Rate CMS.
710	The sign control System shall interface with the Toll Rate CMS to obtain and display the toll amount on the Toll Rate CMS and to update toll amounts at Configurable intervals. The System shall confirm that the data is acknowledged by the Toll Rate CMS.
711	For audit and dispute purposes, the System shall capture multiple video frames of the Toll Rate CMS at the time the pricing data was acknowledged by the Toll Rate CMS.
712	Multiple Toll Rate CMSs shall be supported at an access location and the System shall institute logic that ensures the toll information is displayed at the correct time at each of the Toll Rate CMSs.
713	The System shall poll the Toll Rate CMS at frequent, Configurable and user-defined intervals to be determined during Design and shall obtain the data that is displayed on the Toll Rate CMS. Any variation in the displayed data to the expected data shall result in a potential increase the polling rate (to be determined during Design) and the creation of an alarm message to Operations and capture of the video frame when the variance is initially detected.
714	Any exceptions in the Toll Rate CMS displayed data shall be conveyed to the fare calculation module so that toll is charged based on Authority Business Rule for such conditions.
715	The System shall provide the capability to override the Toll Rate CMS and allow Authorized Users the ability to select default rates to be used, suspend toll rates or freeze toll rates for a selected period of time. The System shall ensure that when fares for specific Segments are overridden or frozen at one Toll Rate CMS, then these rates should simultaneously be distributed to all other Toll Rate CMSs that are displaying fares for the same trip(s).
716	The System shall support activating incident mode Operations for selected Segments of the Express Lanes. The Toll Rate CMS shall be synchronized such that the affected Toll Rate CMS display the correct incident mode.

717	Incident modes and operational conditions shall be triggered manually by Authorized Users. Manual incidents shall include CLOSED and OPEN TO ALL and Automatic mode of operation includes HOV ONLY and TOLLS IN EFFECT. The message displayed on the Toll Rate CMS under such conditions and their triggers shall be Configurable by Authorized Users and shall be displayed in English.
718	If the Toll Rate CMS loses connectivity to the ETTM Communications Network, the System shall enable a backup wireless communications link between the Toll Rate CMS and TOC.
719	The System shall support the automatic triggering of historic toll rates, TOD toll rates, or the minimum tolls as configured in accordance with the Business Rules for each destination when communication to the Toll Rate CMS is lost.

2.3.9.6 Transaction/trip Filters

2.3.9.6.1 Filters – General Requirements

Transactions/trips that Authority does not want to post to a customer Account or pursue as a violation shall be filtered at the RSS based on Authority Approved Business Rules and shall not be submitted to the BOS for processing.

Filters applied to transactions/trips can have the following effects on the transaction/trip:

- Closes a transaction/trip, preventing it from moving through the normal process flow;
- Delays processing of the transaction/trip until:
 - a Configurable time threshold is met;
 - the transaction/trip and associated images are reviewed.
- Queues the transactions/trips and images for special processing based on specific characteristics and criteria.

720	The RSS shall provide the capability to support filtering transactions/trips by a combination of filter criteria, including but not limited to:
	• Corridor;
	• direction of travel;
	• Toll Zone;
	• transaction/trip type (Transponder-Based Transaction or Image-Based Transaction);
	• transaction/trip classification (payment or toll free or occupancy violation)
	• Transponder status;
	• Transponder ID;
	• mode of lane operation (example Incident Mode);
	• flags on the transaction, for example Clean Air Vehicle flag and non-revenue flag;
	• license plate number;
	• license plate type;
	• Jurisdiction including Mexico;
	• date;

	<ul style="list-style-type: none"> time of Day, and workflow status.
721	Provide the capability to apply filters to each Corridor's transactions/trips based on Authority filter rules.
722	<p>Provide the capability to add new filters and maintain existing filters for each Roadside System by specifying, including but not limited to:</p> <ul style="list-style-type: none"> the filter criteria, such as license plate number and Jurisdiction; the disposition of filtered transactions/trips. The disposition determines what happens to the transactions/trips that meet the filter criteria. For example, such transactions/trips are identified as terminated or placed in a queue for review; where in the transaction/trip flow process the filter should be applied for a specific transaction such as prior to image review, prior to trip review, at any stage in the process, or prior to transmitting the transaction/trip to the BOS; the status of the transaction/trip when the filters are applied. For example, if the transaction/trip is in a terminal status then automatic filtering is not applied; the Alert conditions, for example, send an Operational Alert Notification to the MOMS when a high number of transactions/trips are filtered; the date range that the filter should apply, for example, infinitely until license plate/Transponder is removed from the filter list and the effective date the filtering should start for the selected license plate/transaction.
723	Provide the capability to configure the frequency of occurrence (number per period) for a specified filter category and condition that will trigger manual review; for example, if filtered license plates for a specified Jurisdiction exceeds the Configurable frequency then manual review and user action will be required.
724	<p>Support various actions for filtered transactions/trips, including but not limited to:</p> <ul style="list-style-type: none"> close the transaction/trip and prevent it from moving through the process flow, such as Image-Based Transactions/trips that match the Exempt List; place the transaction/trip in queue for a Configurable number of days, or until re-occurrence threshold is reached, such as occupancy violation and place the transaction/trip and associated images for review, such as Image-Based Transactions/trips that match the Plate Correction List.
725	Require all transactions/trips that are filtered have a disposition code and a reason code that identifies the filter applied in the user interface and reports.

2.3.9.6.2 Filters – Exempt List

The BOS maintains an Exempt List of license plates and Transponders for each Corridor and for the Express Lanes as a whole. The Express Lanes Exempt List contains those license plates and Transponders which shall be filtered on all Corridors. The Corridor-specific Exempt Lists contain those license plates which shall be filtered for that specific Corridor only. The Exempt List is transmitted to the RSS from the BOS. In addition, during the image review process an exempt plate/vehicle may be identified or flagged for addition to the Exempt List. The transaction/trip shall not be processed further if the license plate or Transponder on a transaction/trip is on the Exempt List and matches the exempt criteria.

726	Match, filter and process the license plates and Transponders in the transaction/trips against the Exempt List at any stage in the transaction flow process.
727	Check the license plate against the Exempt List each time a license plate number is modified and it is re-introduced into the process.

2.3.9.6.3 *Filters – Plate Correction List*

The BOS maintains and updates a Plate Correction List, which contains license plate numbers that have been problematic and require review and verification. Since a license plate can be problematic for one Corridor and not for another, a Plate Correction List is maintained for each Corridor. Images and Image-Based Transactions/trips that contain license plate numbers on the Plate Correction List for the Roadside the transaction/trip shall be filtered. and queued for separate processing. Review could result in the correction of the license plate number or rejection of the license plate number. The problematic license plates could be entered at the BOS by the Roadside operations staff or the CSC operations staff and it will be transmitted from the BOS.

728	Provide the capability to accept from the BOS a Plate Correction List that applies to images and Image-Based Transactions/trips for the Express Lanes.
729	Transmit the Plate Correction List to the ICPS to initiate re-validation of the VSR database.
730	Match and filter the license plates in the image and Image-Based Transactions/trips against the Plate Correction List.
731	Provide the capability to queue the filtered images and Image-Based Transactions/trips for review and corrective action.
732	Provide the capability to retrieve other transactions/trips that could potentially have errors and take corrective action (if needed) on the Image-Based Transactions/trips.
733	Support taking the following actions on the filtered transactions/trips, including but not limited to:
	<ul style="list-style-type: none"> • reject the image or transaction/trip;
	<ul style="list-style-type: none"> • correct the license plate data, and re-introduce the Image-Based Transaction/trip into the process flow; and
	<ul style="list-style-type: none"> • Flag the transaction/trip as approved for re-processing if no error was identified during review and no correction was necessary. Approved transactions/trips that require no correction will not be queued for Plate Correction List filtering again.

2.3.9.6.4 *Filters –Transponder Occupancy Setting Correction List*

734	Provide the capability to accept from the BOS the Transponder Occupancy Setting Correction List by Corridor by Toll Zone and for the Express Lanes.
735	Transmit the Transponder Occupancy Setting Correction List to the ODS.
736	Match and filter the Transponder ID numbers associated with transactions/trips against the Transponder Occupancy Setting Correction List.
737	Provide the capability to review these filtered transactions/trips including available video, images and occupancy detection results.

738	Provide the capability to change the occupancy status in the transaction/trip based on the results of the review and the data in the Transponder Occupancy Setting Correction List.
-----	---

2.3.9.6.5 *Transponder Occupancy Setting Errors*

739	Provide the capability to accept from the BOS the Transponder occupancy setting errors that are generated at the BOS from customer disputes
740	Transmit the Transponder Occupancy Setting Errors to the ODS.
741	Provide the capability to review Transponder Occupancy Setting Errors including available video, images and occupancy detection results.

2.3.9.7 *Image/trip Review and Processing Queue*

The image/trip review process shall be designed to meet the Performance Requirements specified in this Scope of Work and Requirements. Image enhancement tools shall provide image reviewers the capability to identify every human readable plate and comply with the Performance Requirements. The screens, enhancement tools and navigation methods shall be optimized for speed, reliability, and accuracy. The enhanced image that results from the manual review process, upon which the license plate determination is based, shall be saved for use in the downstream processes, in addition to the saving of the original unaltered image. Image disposition reasons shall be Configurable and shall cover all possible conditions upon which a disposition could be based.

742	Contractor shall deliver a fully integrated image review system and perform image review Services in order to provide fully formed trips which are ready for processing by the BOS.
743	<p>The RSS shall provide the capability to configure the conditions that results in images being queued for manual review, including but not limited to:</p> <ul style="list-style-type: none"> the license plate is from a Configurable list of Jurisdictions requiring manual review. images that do not meet the Configurable OCR confidence thresholds (by character and overall); images that do not meet the Configurable VSR confidence thresholds; the license plate is seen on the Roadside for the first time irrespective of the OCR confidence level; when the license plate has not been manually reviewed within a Configurable number of days of the last review; license plates can be configured to be reviewed 'always', and the license plate is on a Plate Correction List whereby it was Flagged to have an error.
744	<p>The RSS shall provide the capability to configure the conditions that results in trips being configured for review, including but not limited to:</p> <ul style="list-style-type: none"> trips where the OCR confidence is within a Configurable threshold; trips where the VSR confidence is within a Configurable threshold; trips where the image review went through a Configurable review cycle;

	<ul style="list-style-type: none"> unmatched transactions; Trips/transaction where system has identified anomalies, for example Transponder Occupancy Setting not the same on transactions in a trip; Transponder Occupancy Setting not matching the customer's electronic declaration and Clean Air Vehicle detection discrepancies. trips that have not been transmitted to the BOS; trips where the trip duration is above a Configurable threshold, and other conditions as defined during the Implementation Phase, for example customers who have multiple disputes related to incorrect trip creation.
745	The RSS shall provide the capability to configure the image review process based on Roadside whereby images from a specific Roadside can be configured for separate review process.
746	The RSS shall provide the capability to configure the image review process based on the status of the transaction/trip; for example, completed trips not transmitted to the BOS go through a trip review process whereas transactions go through the image review process.
747	The RSS shall provide the Configurable capability to queue images for separate manual image review based on OCR confidence range. This will provide the capability to queue low quality images for specialized image review.
748	The RSS shall provide the Configurable capability to queue images for separate manual image review based on anomalies identified, for example this will provide the capability to queue CAV transactions through different image review process.
749	The RSS shall provide the capability to categorize the image review process based on Jurisdiction and plate type whereby images that meet the specific Jurisdiction and plate type are queued for a specialized image review. The System shall support adding and modifying the Jurisdiction and plate type.
750	The RSS shall provide the capability to perform a manual review process that allows images to be automatically directed to specified review queue based on license plate characteristics or manual data entry, for example, if the OCR identifies a Mexico plate, it should automatically flow to special coding review.
751	The RSS shall provide the capability to configure the OCR and VSR thresholds such that license plates that meet the established criteria may by-pass image review and be eligible for transaction matching and trip creation.
752	The RSS shall automatically queue and present images for manual image review based on Configurable Approved Business Rules established whereby images that are identified as requiring manual review and queued for review First in First Out (FIFO) based on the transaction/trip time.
753	The RSS shall provide the capability to make available/group all images for the vehicle image being reviewed if the images are identified by the Roadside System to be part of the same trip. This will permit image reviewers to review all images associated to a vehicle and enter the license plate information more efficiently and accurately.
754	The RSS shall provide Authorized Users the capability to search for the specific images/trips for each type of review (license plate, CAV vehicles, trip) and review them.
755	The RSS shall provide Authorized Users the capability to review the Clean Air Vehicle database based on specified search criteria.

756	The RSS shall provide consistency in the image review user interface and presentation of images and data at all stages of the image review process, for example, all images associated to Image-Based Transaction/trip shall be made available at all image review stages.
757	The RSS image review functionality shall be optimized for operational efficiency whereby the image review process can be completed without the use of mouse clicks but by utilizing hot keys if the image review is performed on a workstation.
758	The RSS image review functionality shall be optimized for operational efficiency whereby the image review process can be completed using a tablet/touch screen.
759	The RSS shall provide the capability to configure the image review display screens whereby the System displays only those buttons, data and functions that are applicable to the specific review level, including but not limited to first review, secondary review, special reviews, supervisory review, and corrective reviews.
760	The RSS shall provide the capability, based on user role, to present the image reviewer the specific data set related to the transaction/trip to help identify trends and make an informed decision, including but not limited to, OCR jurisdiction and license plate confidence for character and jurisdiction; lane transaction/trip details; vehicle details; vehicle registration details (if available); image reject details, and number of times in review queue.
761	The RSS shall provide an image review workflow that results in Contractor meeting the Performance Requirements of this Scope of Work and Requirements.
762	Contractor shall be responsible for modifying the workflow and image review process if Contractor is unable to meet the Performance Requirements using the proposed solution.
763	The RSS shall provide image review enhancement tools, including but not limited to zoom image; crop ROI from the full image and save it for further processing and display as Approved by Authority; brighten image; invert image; darken image; switch primary and secondary images, and choose another image as the image of record. Image enhancement tools shall permit Contractor to meet the image review accuracy and Performance Requirements.
764	Image review functions provided by the RSS shall include the capability for users to: <ul style="list-style-type: none"> • accept OCR license plate data if it is displayed and determined to be correct (for image above a Configurable threshold); • enter license plate data and accept the image (for example in case of blind review); • identify a vehicle as Clean Air Vehicle; • identify a vehicle as Clean Air Vehicle that does not meet the criteria; • reject the image and enter the reject reason; • skip the image, and • Flag the image for supervisory review/action.
765	The RSS shall require that rejected images have a reject reason and the reject reason can be selected either during the first review or supervisory review.
766	The RSS shall provide the capability to define the Configurable number of reject reasons and maintain and modify the reject reasons.

767	The RSS shall provide the Configurable capability that may require all rejected images being queued for supervisory review.
768	The RSS shall require that at all times the license plate information is standardized within all subsystems as it relates to the Jurisdiction, plate number and plate type so that the license plate number includes the required pre-fix and suffix in compliance with each Jurisdiction's requirements. The standardization shall result in the license plate number format being the same regardless of where it is input including but not limited to CSRs via the application, OCR/VSR during the license plate extraction process, and image reviewers during the image review process.
769	The RSS shall provide the capability to track the rejected images, their reject reason codes and generate maintenance Alerts and reports to MOMS if rejected images are above a Configurable threshold for each lane for a Configurable period of time based on reason codes.
770	The RSS shall provide the capability to track the rejected images and generate Operational Alerts if rejected images are above a Configurable threshold for an image reviewer for a Configurable period based on reason codes.
771	The RSS shall provide the capability to track the temporary and fraudulent plates and identify frequent usage of temporary/ fraudulent plates.
772	To support trip review, the System shall present images and transaction data for all transactions associated to the trip. Only trips that are meet the Configurable parameters are presented for review. Users shall have the ability to accept the trip or select transactions that need to be removed from the trip.
773	The System shall re-process the results of the trip review process if the trip was not accepted by the User in accordance with Authority Approved Business Rules.
774	The RSS shall provide the capability to track and Alert operations if the image reviewer is entering the same value repeatedly over a Configurable period of time, or if the image reviewer is inputting data too quick for quality or too slow for performance.
775	Upon the completion of the license plate extraction process the RSS shall process the license plate through the applicable filters as described in this Scope of Work and Requirements.

2.3.9.8 *Review of Image/trip Review Results*

776	The RSS shall provide, via screens, the capability to search and view all stored information regarding images and transactions/trips based on the type of review, including but not limited to:
	<ul style="list-style-type: none"> • user ID;
	<ul style="list-style-type: none"> • license plate number;
	<ul style="list-style-type: none"> • partial license plate number (without the suffix/prefix);
	<ul style="list-style-type: none"> • Jurisdiction;
	<ul style="list-style-type: none"> • image disposition;
	<ul style="list-style-type: none"> • disposition reason;
	<ul style="list-style-type: none"> • transaction/trip type;
	<ul style="list-style-type: none"> • transaction/trip ID;

	• transaction/trip date and time;
	• image review queue;
	• transmission date and time;
	• OCR results;
	• OCR confidence level;
	• VSR results;
	• VSR confidence level;
	• CAV data review results;
	• Business Rule exceptions;
	• toll amount;
	• adjusted transaction/trips;
	• lane anomaly;
	• trip review results;
	• Corridor;
	• Toll Zone and
	• lane ID.

2.3.9.9 Image/trip Review Quality Assurance Process

777	The RSS shall provide the capability for an automated random selection of images/trips for audit and a manual selection of images using a GUI for audit based on specified selection criteria including by date time and transaction type. The images/trips selected for audit and all available license plate results and images shall be presented to the Authorized User for review (for example, all OCR results, occupancy detection results and manual image review results) through a GUI.
778	For images where the transaction is flagged for occupancy violation, the System shall present additional images, transaction data and additional layout and button as needed to streamline the occupancy validation process.
779	The Authorized User shall be provided the capability to enter the results of the assessment and corrections as needed for each image/transaction. Based on the audit performed the System shall automatically compute the error rates for images and trips, and reject rates by image reviewer (human and OCR) and location (Corridor, Toll Zone and lane).
780	For occupancy violations, the System shall calculate the ODS error rate for each class of occupant including false positives.
781	The plate errors identified through this quality assurance process shall be included in the Plate Correction List.
782	The occupancy errors identified through this quality assurance process shall be included in the Transponder Occupancy Setting Correction List.

2.3.9.10 Lane Operations Manual Override

When conditions in the Express Lanes require the lane operations to be changed, Authorized Users shall have the capability to change the operational mode of the Express Lanes.

783	The System shall provide Authorized Users the capability to remotely change the operational mode of the lane to handle incidents and other conditions as determined by Authority, including but not limited to:
	<ul style="list-style-type: none"> • open the Express Lanes to all traffic;
	<ul style="list-style-type: none"> • close the Express Lanes to traffic;
	<ul style="list-style-type: none"> • place the Express Lanes in HOV ONLY mode, and • place the Express Lanes in Maintenance mode.
784	Authorized Users shall have capability to select one or multiple criteria to which the mode change applies, including but not limited to:
	<ul style="list-style-type: none"> • Corridor;
	<ul style="list-style-type: none"> • direction of travel;
	<ul style="list-style-type: none"> • Segment, and • Toll Zone(s).
785	The System shall have the capability to configure the following Business Rules, including but not limited to:
	<ul style="list-style-type: none"> • impacted Toll Zones;
	<ul style="list-style-type: none"> • Impacted Toll Rate CMS;
	<ul style="list-style-type: none"> • Toll Rate CMS display, and • handling of transactions and trips that occur in these modes.
786	Authorized Users shall have the capability to revert the Express Lanes to normal mode at which time the Express Lanes pricing and travel times shall be managed by the TDS.
787	Upon initiation of a mode change, Alerts shall be generated every Configurable interval.
788	When the Operations of the Express Lanes change, the appropriate transaction processing rules shall be applied.

2.3.9.11 Adjustments and Waivers

Adjustments are processed in the RSS when conditions in the Express Lanes require tolls to be adjusted or waived. Identification of incidents in the Express Lanes shall be automatic or manual including for example:

- The System shall detect conditions that are Configurable, for example low speeds, high travel time or bad level of service (LOS) that requires adjustments and waivers of tolls.
- User shall search for transaction/trips that meets selected criteria.

The adjustment to the trips only happens if the trips have not been transmitted to the BOS for processing. Adjustments can be processed for single transactions or in bulk. An example of a bulk adjustment is waiving tolls on all trips for a specific Corridor or Segment during a specific time period, as would be the case when there is an incident mode. An audit trail will be maintained for all adjustments and the RSS shall have the capability to report on both the unadjusted transaction/trip amount and the adjusted transaction/trip amount.

2.3.9.12 Automatic Detection of Incidents

789	Provide Authorized Users the capability to Configure the conditions that could potentially require transaction/trip adjustments or waiver of toll. Such conditions shall include but not be limited to:
	<ul style="list-style-type: none"> • speeds below a Configurable threshold;
	<ul style="list-style-type: none"> • congestion level above a Configurable category or LOS below a Configurable level;
	<ul style="list-style-type: none"> • travel time above a Configurable threshold, and • travel time differential above a Configurable threshold.
790	The System shall suspend transmission of the trips/transactions to the BOS, and suspend transaction matching and trip creation based on the Business Rules when the Configured conditions occur. Suspension of the process shall generate alarm messages that are reported to MOMS.
791	Operational Alerts shall be generated when Configured conditions occur.
792	The System shall Flag transactions/trips that occur under the Configured conditions and queue them up for review and potential adjustment/waiver.

2.3.9.13 Manual Adjustments and Waivers

793	Provide Authorized Users the capability to make adjustments to transactions/trips while preserving the original transaction/trip, including the original transaction date and amount. Any adjustments shall be tied to, but not change, the original transaction.
794	Adjustment of all trips shall be performed before the trip is transmitted to the BOS.
795	Provide a transaction search and adjustment screen(s) where Authorized Users can enter the selection criteria, retrieve the transactions/trips and make bulk adjustments or waivers. This capability shall allow the selection of groups of transactions/trips to which the correction will apply and adjustment comments entered for the affected transactions/trips. The Authorized User shall be allowed to select/deselect specific transactions/trips within the group. For example, Authority may want all trips within two Segments between 5 AM and 6 AM to be waived due to an incident in the Express Lanes.
796	Provide the capability to adjust the entry and/or exit Toll Zones on a trip and automatically assign the correct toll amount for the adjusted trip.
797	Provide the capability to manually adjust the toll amount of a trip or a selection of trips without changing other attributes of the trip such as entry and/or exit location. User shall be able to select the default rate per mile, the minimum amount or the maximum amount in addition to manually entering an amount.
798	Provide the capability to waive the toll amount of a trip or a selection of trips without changing other attributes of the trip such as entry and/or exit location.
799	Provide the capability for approval of adjustments and waivers, for example prompt for a supervisor's password when any adjustment or waiver is initiated.
800	Process the adjusted transactions/trips through the safeguards instituted and in accordance with Authority Approved Business Rules.

2.3.9.14 Configurable Parameters

801	The System shall provide the ability for Authorized Users to modify the Configurable System parameters.
802	Any configuration change shall result in the creation of an audit trail and each change shall be identified by a unique identifier.
803	Changes to Configurable parameters can be scheduled to take effect immediately or at a scheduled time as determined by the user.
804	The System shall record and track all changes to Configurable parameters through version control for audit purposes.
805	When a new parameter takes effect, a notification shall be generated and reported to the MOMS.

2.3.9.15 Express Lanes User Queries and Reports – General Requirements

806	All data entered or generated in the System shall be retrievable through reports and screens.
807	Reports menu shall be organized by category of reports (i.e. transaction, performance, operational, financial, audit & reconciliation, etc.) and shall be intuitive to users and easily accessible based on user access.
808	All reports shall have the capability to be limited to 91 Express Lanes only, I-405 Express Lanes only or combined. The System Design shall provide for similar separation and selective combining for future Authority Express Lanes Corridors.
809	Data shall be summarized to improve report generation performance and to track changes in data for as-of-date reporting.
810	Report generation shall not impact the production system and a separate Data Warehouse shall be provided for ad-hoc reporting.
811	Reports shall be made available through the System on demand and on an ad-hoc basis; shall have various selection and sort criteria, and shall be intuitively Configurable with user selected criteria from drop down data elements as defined during Implementation Phase.
812	The location selection criteria shall include, but not be limited to Corridor; Toll Zone; Segment; lane, and direction of travel.
813	The date selection criteria shall include but not be limited to the ability to generate the same report by hour; Day; date range; weekly; monthly; yearly, year-to-date and user-defined range.
814	Data shall be presented as an accumulation or individually for the selected criteria. This capability shall be Configurable and applicable to individual Toll Zone and different transaction types whereby the user can choose the data to be presented as an accumulation of Toll Zones and/or payment types or as individual Toll Zones and/or payment types.
815	Reports developed shall allow Authority to audit and reconcile the transaction data and trips from Roadside to the transaction and trip data at the RSS and the BOS in accordance with this Scope of Work and Requirements.

816	Capability shall be provided to modify the report format to perform comparative analysis and statistical calculations.
817	Contractor shall provide ad-hoc reporting tool capabilities to Authorized Users to allow the creation and execution of custom reports, including but not limited to: <ul style="list-style-type: none"> • drag-and-drop field functionality; • drill down functionality; • filtering; • parameter prompting; • formula support; • grouping; • sorting, and • stored procedure and function support.
818	The ad-hoc reporting tool shall be COTS Software and be the latest version at the time of Acceptance testing and field-proven to operate in a transaction intensive environment.
819	The ad-hoc Software shall be compatible with operating System standards and shall be patched and Upgradeable to new versions of the Software and operating System.
820	Ad-hoc report templates created by Authorized Users shall be made available to all Authorized Users.
821	All reports shall show the status of the validation/audit process, as defined by Authority and other relevant statuses that indicate items, including but not limited to whether: <ul style="list-style-type: none"> • all data has been obtained from the lanes; • the data has been re-summarized; • correlation of transaction to trip; • the transactions/trips have been transmitted to the BOS, and • the report data is audited and complete.
822	The date and time of the last transaction processed shall be included in all applicable reports.
823	Once the audit process is completed for the Day, the data on reports for the Day shall not change unless data is re-summarized after Authority Approval.
824	All reports shall include individual totals, sub-totals, and grand-totals as appropriate and such totals shall be maintained when data is exported to other formats.
825	Reports shall have the capability to select the date type, including but not limited to: <ul style="list-style-type: none"> • revenue date; • transmission date; • as-of date; • process date; • transaction date, or • a combination thereof, as designated by Authority.

826	Reports shall use conditional formatting to identify exceptions and data that are outside the normal trend.
827	<p>All reports and screens shall have the capability to be printed or saved in various formats (both compressed and uncompressed), formats to be Approved during the Implementation Phase including but not limited to:</p> <ul style="list-style-type: none"> • Portable Document Format (PDF); • plain text format (TXT); • rich text format (RTF); • Microsoft Excel (2010 version and later); • delimiter-separated values; • hypertext markup language (HTML), and • extensible markup language (XML).
828	A report generation feature shall be available for configuration and shall permit an individual with permission to request selected reports for auto delivery by email or to a designated location according to a routine or custom-specific interval.
829	Selected reports shall be automatically generated and made available to authorized personnel at the start of the Day or at other appropriate time as designated or requested by Authority.
830	The System shall provide the capability to drill down all high-level reports/screens to the next level of detail all the way to the most basic level of detail available as required.
831	Authorized Users shall have the ability to display and review the ICPS images, Toll Rate CMS frames and DVAS video (if available) and event details associated with the selected transaction from the drilled down details.
832	Authorized Users shall have the ability to view the contents of files that are received by the RSS and transmitted by the RSS in a readable format. If files are compressed or encrypted, the necessary Software tools shall be provided to view their contents. If the user selects a specific file, the contents of the file shall be displayed and the user shall have the ability to save the contents as a .csv file and in a useable Excel format.
833	Where applicable, data shall also be presented in graph forms and chart types and the user shall be able to select presentation form from a variety of graphic styles. Report Designs shall be presented and finalized during the Implementation Phase.
834	Data shall be organized and summarized in a manner to allow for report generation within no more than ten (10) seconds for canned daily reports, and no more than thirty (30) seconds for canned weekly, monthly and annual reports, of a report generation request.
835	Additionally, after the deployment and implementation of the System but prior to Project Acceptance, the need may arise to create additional reports and modify implemented reports and Contractor shall support such additions and/or modifications. It is anticipated that no more than five (5) additional reports will be required.

2.3.9.15.1 Express Lanes Reports

The ETTM System shall provide reports to audit and reconcile the System and validate System performance. The report Design, templates, selection criteria and other report and graphing

requirements shall be defined and Approved by Authority during reports Implementation Phase and after iterative process described in this Scope of Work and Requirements.

836	At a minimum, Contractor shall provide a version of the existing reports developed during the Implementation Phase.
837	Traffic Reports: Provide traffic report by peak hour (user-selectable); 15 minute increments, hourly; daily; weekly; monthly and comparative traffic reports shall be provided that help Authority gauge congestion, mobility, travel times and throughput. Average travel time, average toll rate, and minimum and maximum toll rate shall be included in the traffic reports.
838	Average Lane Throughput Report - Traffic: This report shall display hourly Express Lanes and general purpose lanes traffic volumes for each lane grouped for each Segment and Toll Zone within the selected Corridor. Hourly traffic volumes shall be totaled by lane for the Day to calculate the average lane throughput.
839	Average Lane Throughput Report - Person: This report shall display hourly Express Lanes person throughput based on Transponder occupancy setting or ODS results for each lane grouped for each Segment and Toll Zone within the selected Corridor. Hourly person throughput shall be totaled by lane for the Day to calculate the average lane throughput.
840	Comparative performance reports. The following data should be summarized by 15-minute intervals, differentiating between the general purpose lanes and the Express Lanes: Average speeds; Average density; Full-length travel time. Reports shall have the ability to be broken down by Segment and by Corridor.
841	Toll Rate Graphs. The ETTM System shall be able to generate toll rate graphs for any given Day, showing the rates by interval for each Segment, in each direction.
842	Assessment of Operational Standards. In order to validate the Operational Performance of the Corridor the following reports shall be provided broken down by Corridor, by Segment, and direction that shows: <ul style="list-style-type: none"> the percentage of time during peak periods in which the average speed in the Express Lanes was greater than or equal to the operational goal (initially set at 55 mph). the percentage of time during peak periods in which density in the Express Lanes was less than or equal to the operational goal (initially set at 35 vehicles per mile per lane). the percentage of time during peak periods in which the full-length travel time in the Express Lanes was less than the full-length travel time in the general purpose lanes.
843	Counts and Percentages Report: This report shall display vehicle counts and percentages of each count grouped by payment type and payment method for example Transponder-based (SOV, HOV 2 and HOV 3+) and Image-based (occupancy violation, toll violation and other Image-Based Transaction types) for each Toll Zone. This is a daily report and is grouped by Toll Zone for the selected Corridor. This report shall drill down to the Counts and Percentages by Direction Report.

844	Counts and Percentages by Direction Report: This report shall display vehicle counts and percentages of each count grouped by payment type and payment method for example Transponder-based (SOV, HOV 2 and HOV 3+) and Image-based (occupancy violation and toll violation) counts and percentages for each Toll Zone. This is a daily report and is grouped by Toll Zone and direction for the selected Corridor.
845	Lane Traffic Counts and Statistics Reports: This report shall provide AM and PM traffic counts and statistics by hour for each Corridor and Toll Zone by payment type and payment method. The report shall also include AM and PM peak hour statistics and provide a grand total by payment type and payment method for all peak hour.
846	Market Penetration Report: This report shows traffic counts by payment type and trip classification, for AM/PM peak hours and includes the Transponder penetration percentage.
847	Speed Bin Reports: This report shows the traffic count information per lane by user-definable speed bins. This report is used by Operations staff to monitor traffic flows at various speeds.
848	Traffic Counts Report: This report shows traffic count information grouped by payment type for example Transponder-based and Image-based with breakdown by payment method and sub-totaled by Toll Zone.
849	Vehicle Count by Lane Mode Report: This report shall display Toll Zone, lane and detailed transaction information for vehicles that travel through a lane based on the date range, Corridor and lane mode.
850	Vehicles and Mileage Report: This report shows traffic counts for all payment methods for each payment type between Toll Zones, average travel time between Toll Zones and total distance traveled for the selected criteria. The report includes a summary page with traffic between Toll Zones and total miles traveled. Each summary shall be grouped by payment type for example Transponder-based and Image-based with breakdown by payment method.
851	Transaction Audit Report: This report shows the status of the transaction transmission from the zone controllers to the RSS, the audit status, the failed transactions, all exceptions, and missing transaction sequence numbers at each of the Toll Zones. The communication status between the zone controllers to all of the subsystems shall be displayed. The report shall also include the date the transactions were received at the RSS and the Days lagging. It also shows the transmission status of the transactions to the Existing BOS.
852	System Audit Trail Reports: Weekly and monthly reports shall be made available that show the modifications made by the users to system parameters and ability shall be provided to obtain the details of the modifications.
853	System Exceptions Report: The System Exceptions report shall display transactions that are considered exceptions, including but not limited to duplicate transactions; dual Transponders; RSS filtered transactions and non-interoperable Transponder reads. Exception handling errors and the disposition of these exceptions shall also be displayed along with the transaction.

854	Image Reconciliation Report: The Image Reconciliation report shall provide the ability to match transactions by type to images and to help identify missing images. These reports shall not only reconcile the actual images saved to what was expected but also verify that the images were successfully transmitted to the RSS for image review images were transmitted to the BOS for transactions/trips as required by the Business Rules.
855	Transactions Reconciliation Reports: Yearly, quarterly, monthly, weekly, and daily reports that show Transponder-Based and Image-Based Transaction transmission reconciliation for all of the Toll Zones. These reports shall validate that all of the Transponder-Based and Image-Based Transactions received from the lanes were posted to the RSS and transmitted to the BOS. Reports shall be available by transaction Day and transmit Day, and transmit Day reports shall show the files transmitted and acknowledged by the receiving system.
856	Fare Schedule Report: This report shall provide user-selectable criteria to include at a minimum, fare schedule, the rate per mile at each Segment and the toll amounts to the defined locations for each Toll Rate CMS. Information shall include when the schedule was generated, transmitted to each Toll Rate CMS, acknowledged by the Toll Rate CMS and made effective. Fare schedule exceptions shall be flagged and shall include overrides, defaults, incident mode operations and other anomalies.
857	Exceptions Report: This report shall be used to provide Operations and Maintenance staff with information regarding exceptions detected by the System with lane data to identify potential Hardware issues, Software issues or other System anomalies. The report shall include Express Lanes, the Corridor, Segment and Toll Zone and may be filtered by exception code. This report includes lane number, transactions date and time, lane status transaction number and a description of the exception.
858	Lane Operations Report: This operational report lists and summarizes vehicle transactions and Equipment messages that are generated in the lanes. This report is an audit tool that presents all lane activity for a specified location and desired transaction date and time period. Numerous selection and filter criteria shall be provided to help identify problems. Detailed information regarding the transaction and event shall be included.
859	Transponder Audit Report: This report verifies that Transponders are properly read at each roadside Toll Zone.
860	Toll Pricing Reports: These reports show the daily pricing data compared to traffic throughput; congestion and speed and shall include data from general purpose lanes for the selected intervals for the Day and any other traffic performance input into the pricing calculation as defined during the Implementation Phase.
861	Transaction Reports: Daily, weekly, monthly, quarterly, and yearly transactions and reports showing traffic payment type and payment method. Transaction reports shall be summarized and detailed: <ul style="list-style-type: none"> Transaction Summary Reports: These reports show daily, weekly, monthly, quarterly, yearly, and comparative transaction and revenue, by occupancy, payment type and payment method. Transaction and revenue reports shall be summarized and detailed. The summary data shall drill down to the Transaction Detail Report.

	<ul style="list-style-type: none"> Transaction Detail Report: The transaction details shall be provided in this report including lane status, Equipment status, transaction status and various lane flags. Users shall be able to access the bit descriptions in all cases where information is coded. The report shall be used to investigate discrepancies and issues.
862	Trip Matching Report: Such reports shall display the transactions that were generated at each Toll Zone and matched to create a trip. All unmatched transaction and exceptions shall be identified.
863	Transaction/trip Reconciliation Reports: Yearly, quarterly, monthly, weekly, and daily reports that show Transponder-Based and Image-Based Transaction/trip transmission reconciliation for all transaction generated at the Toll Zone, all trips created and all transaction/trips transmitted to the BOS. These reports shall validate that all of the Transponder-Based and Image-Based Transactions received from the lanes were posted to the RSS, were successfully matched and transmitted to the BOS unless the transaction/trip was filtered at the RSS based on Authority Approved Business Rules.
864	Accounting Revenue and Associate Traffic Report: This report shows expected revenue and traffic counts by Day for the payment types.
865	Executive Summary Traffic and Revenue Report: This report shows daily traffic counts and revenue amounts by revenue category, for example Transponder-Based and Image-Based by payment category, grouped by Corridor, peak/off-peak; weekday/weekend; selected Day totals, previous Day totals, percentage of increase/decrease and month to selected Day totals. This report is used to show the increase and/or decrease in traffic counts and revenue compared to the previous Days' totals using the breakdown by revenue types. Data in this report shall also be represented graphically to include selected Day traffic and revenue statistics; daily revenue and traffic comparisons by payment type and method including selected Day; previous Day; month to selected Day average and prior week Day.
866	Traffic and Revenue Comparison Report: This report shall provide a comparison of current year monthly traffic and revenue data with the previous year with percentage increase/decrease and includes selected Corridor. Similar to the traffic and revenue report above, the report includes a breakdown by payment category. The report is further divided into congestion and payment category, for example Transponder-Based and Image-Based by payment category, grouped by Corridor, peak/off-peak; weekday/weekend.
867	Transponder Status List Transmission Report: The TSL Transmission report shows the status of the TSL transmissions from the BOS to the RSS and to each of the zone controllers. Summary information related to the number of Transponders, time acknowledged by the zone controller and other data shall be provided to verify results and Performance Requirements. Time of receipt from the BOS, time of transmission to the zone controllers and the status of the transmission shall be displayed. Lanes not compliant to the Requirements shall be identified. A summary listing the Transponder changes (counts, and change %) for the Day from the prior Day shall be included to identify problems.

868	Image Transmission Summary Report: This operational report counts the number of images created in the lanes for a user defined image created date range and other criteria. Data displayed include the number of triggered, non-triggered and total images from the lanes and the date the images were received at the image server(s). For each received date, the total images, number of lag Days, the percentage of transactions received each Day and a cumulative percentage shall be included.
869	Image Transmission Detail Report: This operational report lists information on images from the lanes for a user defined lane created date. Capability shall be included to show image records where it took longer than a user defined number of hours for the image to arrive at the image server(s).
870	Image Processing Performance Report: The Image Processing Performance Report shall display OCR/ALPR and manual review performance statistics by Jurisdiction. Problematic lanes, toll locations and Jurisdictions shall be identified. The report shall also include a breakdown of the OCR/ALPR performance by confidence levels, if OCR/ALPR is used. The report selection criteria shall include at a minimum Jurisdiction, toll locations, lane and sortable by each selected criteria. The selected criteria shall be defined during the Implementation Phase.
871	Image/trip Review Quality Assurance Report: Image/trip Review Quality Assurance Report shall provide a summary of the number of images and trips that were queued for quality review by Day; the images and trips reviewed by the quality review staff; the results of the review; the number of days taken to complete the quality review process and the images and trips reviewed per Day. The System shall calculate the error rates for each type of review, including but not limited to; image, trip and occupancy. User shall have the ability to drill-down to detailed transaction/trip to obtain details of the transaction/trip and the image review results and performance.
872	System Exceptions Report: The System Exceptions report shall display transactions that are considered exceptions, including but not limited to duplicate transactions, RSS filtered trips/transactions, occupancy mismatch transactions and CAV mismatch transactions. Exception handling errors and the disposition of these exceptions shall also be displayed along with the transaction. Additional information may include but not limited to operational mode schedule, configuration parameters, incident/override.
873	System Audit Reports: Weekly and monthly reports shall be made available that show the user access data and modifications made and ability shall be provided to obtain the details of the modifications.
874	File Transfer Performance: This operational report lists files that have been created and sent from the RSS by component for either the created date range or sent date range selected by the user. Information displayed include, file information, created date and time, sent date and time and process time. This report verifies System compliance to Performance Requirements. File/data transmissions to the lanes shall include confirmation of successful delivery at each lane.

2.3.9.15.2 Monthly Performance Reports

875	The RSS shall automatically generate daily, weekly, and monthly performance reports as determined by Authority to measure compliance to the stated System and Maintenance Performance Requirements described in this Scope of Work and Requirements.
-----	--

876	The Performance reports shall identify performance metrics that are not met for the measuring period, and provide the capability to drill down to the individual failure events.
-----	--

2.3.9.16 Dashboards/Real-Time Monitoring

877	Contractor shall provide real-time Dashboards applications developed by the Contractor during the Implementation Phase to monitor the ETTM System in a pictorial and Dashboard view. The Dashboards shall include but not be limited to real-time monitoring of Toll Zone traffic, Maintenance data including device health, operational modes for the Toll Zones, Toll Rate CMS, incident modes/status and System performance monitoring. There should be at least one screen that includes monitoring data/Dashboard for all Corridors.
878	Real-time data, video and images shall have a Configurable refresh rate and such refreshes shall be automatic and seamless to the user.
879	Authorized Users shall have the capability to configure and customize their Dashboard to display the relevant data/graphs and video including layered presentations.
880	The Dashboard view shall be Configurable by Corridor and based on the Corridor the appropriate Dashboard shall be displayed.
881	All Dashboards shall have the capability to be limited to 91 Express Lanes only, I-405 Express Lanes only or combined. The System Design shall provide for similar separation and selective combining for future Authority Express Lanes Corridors.
882	Contractor shall provide Authorized Users the capability to view real time DVAS video and also playback recorded video via the Dashboard if the portable DVAS is connected to the System. The event/sensor data pertaining to the vehicle shall be displayed on the video.
883	Authorized Users shall have the capability to drill down to each lane to review and monitor detailed events as they occur for each transaction.
884	The real-time monitoring shall provide detailed real-time information about the AVI System performance, the AVD System performance, and the ICPS performance to assist in diagnosing and investigating problems. Data pertinent to traffic monitoring and Maintenance shall be displayed in real-time.
885	The Dashboard shall provide the capability to view and drill down to the following data including but not limited to: <ul style="list-style-type: none"> • individual traffic detectors; • full Corridor monitoring which has continuous, current monitoring information for Toll Zone, Segment, lane and traffic detector including Equipment status; • traffic data (speed, volume and density) on the Express Lanes and general purpose lanes with flexibility to compare trends; • travel time trends on the Express Lanes and general purpose lanes with flexibility to compare trends; • TOD pricing data for each Segment by selected intervals including indication of successful transmission to the Toll Rate CMS; • frames from the Toll Rate CCTV camera that help confirm the accuracy of the Toll Rate CMS display.

	<ul style="list-style-type: none"> camera video shall cycle through the individual cameras based on Configurable settings.
	<ul style="list-style-type: none"> transaction volumes and trends;
	<ul style="list-style-type: none"> System processing trends including transaction matching, trip creation and image processing, and
	<ul style="list-style-type: none"> Corridor performance trends which compares toll amounts to travel time; volume, speed and density/LOS.
886	The Toll Rate CCTV camera video shall be viewed through the Dashboard and Authorized Users. During initial setup, Authorized Users shall have the capability to remotely control the camera via the PTZ features but once the cameras are configured the PTZ shall be capable of being locked. The System shall provide the capability to save a clip of the video as needed.
887	The video from the CCTV cameras used for traffic monitoring shall be viewed through the Dashboard and Authorized Users shall have the capability to remotely control the camera via the PTZ features. The System shall provide the capability to save a clip of the video as needed.
888	Authorized Users shall have access to the detailed data and trending graphs directly from the pictorial and Dashboard view.
889	Critical events shall be made evident on monitoring screens (via use of different colors, pictures and audible Alerts) allowing for easy identification by an Authorized User.
890	Display various comparative transaction, pricing and revenue trends, and forecasts.
891	All Priority 1 MOMS alarms shall be displayed in color and shall be audible to direct attention to the failure. Operational Alerts shall also be displayed on the Dashboard.
892	If issue is observed in the Dashboard and no MOMS Alert is detected an Authorized User shall be able to initiate a MOMS work order from this interface

2.3.9.17 Maintenance Remote Operations

The System shall provide the capability for Authorized Users to remotely operate the Systems to support Authority.

2.3.9.17.1 Maintenance Remote Operations – I-405 Express Lanes

893	The System shall support remote operations, including but not limited to:
	<ul style="list-style-type: none"> remote Update of security patches and Software Updates;
	<ul style="list-style-type: none"> download TSL and License Plate File (CTOC or National Interoperable files) and toll rate schedules when there are issues;
	<ul style="list-style-type: none"> manage power distribution systems, and
	<ul style="list-style-type: none"> reboot the applicable subsystems.

2.3.9.17.2 Maintenance Remote Operations – 91 Express Lanes

894	The System shall support remote operations, including but not limited to:
	<ul style="list-style-type: none"> remote Update of security patches and Software Updates;

	<ul style="list-style-type: none"> • download TSL and License Plate File (CTOC or National Interoperable files);
	<ul style="list-style-type: none"> • manage power distribution systems, and
	<ul style="list-style-type: none"> • reboot the applicable subsystems.

2.3.9.18 Maintenance Online Management System (MOMS)

A Maintenance Online Management System (MOMS) shall be provided as part of the RSS to manage and report all maintenance and maintenance support activities of the ETTM System. MOMS is an all-encompassing term for the monitoring and management of the ETTM System issues; however, it can be an integrated compilation of multiple COTS or custom Software products, such as ancillary health monitoring Software and tools, collectively referred to as a single/integrated MOMS.

A MOMS consists of four (4) main elements:

1. A monitoring component (that could be made up of several integrated tools) that checks status of all equipment and system processes for failures;
2. A Work Order Management System which creates work orders for predictive, Preventive and corrective Maintenance tasks. This Configurable System also schedules the assignment of work orders to staff based on the work and on-call schedule and is efficient for the maintenance technicians to utilize in receiving, managing and closing work orders;
3. An Inventory Management System which tracks the equipment at the subcomponent level from purchase through installation to final disposal. The System tracks specific attributes for each individual subcomponent including the location, serial number, date acquired and date put in service and attributes for the type of subcomponent such as ordering lead time, manufacturer, warranty terms and predictive maintenance trigger and
4. A Reporting System which calculates and reports on sub-system availability, the response time, individual time to repair by event, Mean Time to Repair by technician, priority, location, time of Day, Day of week and type of work order. Reports will also provide the expected and actual MTBF for each subcomponent, spare parts re-order notification, history of any part and warranty repair issues. The reporting system shall have the capability to be limited to 91 Express Lanes only, I-405 Express Lanes only or combined.

2.3.9.18.1 MOMS General Requirements

895	Contractor shall provide a role-based MOMS that supports Maintenance operations for all Software and Hardware provided/implemented under this Agreement.
896	The MOMS shall provide the capability to incorporate new ETTM subsystems without changes to the MOMS database schema or application Software.
897	The MOMS application shall be capable of running on any computing device, including both desktop computers and mobile browsers, with native internet browser capability, and shall adhere to the same GUI requirements as the other parts of Contractor-provided System.
898	The MOMS shall provide the capability to uniquely identify the System elements that will be monitored and prevent duplicates (for example, a duplicate lane number within the same zone).
899	The MOMS shall prevent the creation of duplicate work orders for the same fault or failure.
900	The MOMS shall provide functionality that includes but is not limited to the following:

	<ul style="list-style-type: none"> • screens for configuring MOMS codes, rules and parameters;
	<ul style="list-style-type: none"> • receiving and monitoring status messages of all ETTM Hardware and Software (or a Configurable periodic polling for status);
	<ul style="list-style-type: none"> • detecting faults and providing automatic system workflow exception reporting for all items that are not running, not processing correctly or are hung in the system;
	<ul style="list-style-type: none"> • prioritization of failures and Alerts that is Configurable through priority and severity values;
	<ul style="list-style-type: none"> • Alert Authorized Users when prioritization configurations are changed;
	<ul style="list-style-type: none"> • is capable of work order manual entry (including via email) by Authorized Users;
	<ul style="list-style-type: none"> • database management system that allows for data recovery and flexibility in reporting the raw data for Ad-hoc reporting;
	<ul style="list-style-type: none"> • tracking Hardware and Software failures and service requests;
	<ul style="list-style-type: none"> • assigning priorities to work orders;
	<ul style="list-style-type: none"> • a function for scheduling of field technicians (shift schedule);
	<ul style="list-style-type: none"> • automatically notifying (Configurable by event) Maintenance personnel via text and email based on events;
	<ul style="list-style-type: none"> • assigning work orders to Maintenance personnel (Configurable by location, shift schedule, event type);
	<ul style="list-style-type: none"> • reassigning (manually) work orders to other Maintenance personnel;
	<ul style="list-style-type: none"> • escalating (automatically) work orders to other Maintenance personnel;
	<ul style="list-style-type: none"> • screens displaying all work orders including comprehensive filtering capabilities, such as but not limited to, for displaying all work orders assigned to a specific Maintenance personnel;
	<ul style="list-style-type: none"> • recording time of failure;
	<ul style="list-style-type: none"> • recording time of work order creation. Time of actual problem start may be manually recorded for manually-created work orders;
	<ul style="list-style-type: none"> • recording time of acknowledgement by Maintenance personnel. Recording of work order status changes and actions shall be automatic, but editable by Authorized Users;
	<ul style="list-style-type: none"> • recording time of acknowledgement by all subsequently assigned Maintenance personnel;
	<ul style="list-style-type: none"> • recording when permission for Lane Closure was Approved;
	<ul style="list-style-type: none"> • recording time of arrival at a work location;
	<ul style="list-style-type: none"> • recording time of repair;
	<ul style="list-style-type: none"> • recording time of Equipment and process recovery;
	<ul style="list-style-type: none"> • recording of all actions taken to resolve the issue (including notes, equipment replacement and escalations);
	<ul style="list-style-type: none"> • recording time of resolution of service calls;
	<ul style="list-style-type: none"> • work and resolution notes and comments to work orders;

	<ul style="list-style-type: none"> providing automatic Alert for work orders not acknowledged, not repaired, not closed out in specified time;
	<ul style="list-style-type: none"> tracking work order status (for example 'in work', 'closed', etc.);
	<ul style="list-style-type: none"> accepting and updating work orders via any computing device with native internet browser capability;
	<ul style="list-style-type: none"> calculate down time, acknowledgement time and repair time from the failure time on both work orders manually created by Maintenance staff and automatically generated by the system;
	<ul style="list-style-type: none"> record when a roadside cabinet is opened and closed;
	<ul style="list-style-type: none"> provide screens for exclusion of certain equipment from MTBF, MTTR and availability metrics; and
	<ul style="list-style-type: none"> scheduling of Preventive Maintenance through the MOMS that generates automatic work orders at the scheduled times.
901	<p>The MOMS shall monitor, Alert and generate work orders in real-time for all issues or failures, including but not limited to:</p> <ul style="list-style-type: none"> communications or non-response issues; file transmission issues; data exceptions such as transaction exceptions or missing images; Hardware issues for all Contractor-provided Hardware; Software issues or failures; database issues; issues with jobs, processes or data flows; communications network; security threats or intrusions detected; success/failure status messages (for example: backup, time synchronization, Software Updates and file downloads); low storage space for each subsystem (Configurable thresholds); CPU utilization (Configurable thresholds) and CPU temperature process control.
902	<p>The MOMS shall provide the capability to receive and track Authority initiated help desk tickets issued via email, phone, or text message.</p>
903	<p>All ancillary health monitoring Software and tools employed by Contractor (if any) shall be integrated and centralized with Contractor-provided MOMS.</p>
904	<p>The MOMS shall monitor, Alert and track in real-time unusual activity triggered by users and systems, including as a minimum:</p> <ul style="list-style-type: none"> Specified transaction type in a physical lane above a Configurable threshold; transaction exceptions above a Configurable threshold; rejected images above a Configurable threshold in a lane/camera; unmatched transactions above a Configurable threshold;

	<ul style="list-style-type: none"> • difference between daily transponder status file above Configurable threshold, and • other activities as determined during the Implementation Phase that are not normal in daily toll Operations.
905	The MOMS shall keep track of all changes to the MOMS configuration parameters via logging and audit trail.
906	Contractor shall make all MOMS screens available to Authority Authorized Users.
907	The MOMS shall allow for more than one (1) Maintenance personnel to be working simultaneously on the same work order.
908	The MOMS shall provide the capability for Authorized Users to review and comment on closed work orders up to a Configurable number of days after the work order has been closed.
909	The MOMS shall allow for throttling or suppression of Alerts for specific fault types that have been determined to be over-reported or false Alert.
910	The MOMS shall provide a knowledge base utility to assist Maintenance personnel in fault isolation, decision aids, checklists, and the like. The knowledge base shall be initially populated with relevant information from the maintenance manual materials.
911	The MOMS shall provide an electronic configuration management application that tracks all hardware and software changes to the ETTM System.

2.3.9.18.2 MOMS Diagnostics

912	<p>In order to ensure that all Roadside Systems are functional, all systems are operational, all processes are working and data transfers are successful, Authorized Users shall have access to MOMS screens that can verify the status of tolling locations, the System and various data transfers. Such functionality shall include, as a minimum:</p> <ul style="list-style-type: none"> • Toll Zone, Segments, Corridors and System status shown in a pictorial view; • drilldown by Toll Zone, Segment and device to the equipment level; • list view by work order or event/Alert generated by the various subsystems including comprehensive filtering capabilities; • selecting Toll Zone(s) and/or lane(s) and viewing lane "up" or "down" status; • selection of a pictorial representation of an error takes the Authorized User to the detailed event/Alert or work order; • examining any or all Equipment from any computer connected to Authority ETTM Communications Network; and • displaying the current real-time health status of the Roadside System sites with the ability to drill down to specific equipment and subsystems on the user's screen.
913	The Roadside System shall generate a MOMS Alert when the database replication interface to the RSS is unhealthy (as detected by the database management system).
914	The MOMS screen shall show date/time of last full and incremental update of TSL and License Plate File for each lane.
915	The MOMS shall provide Authorized Users the capability to re-initiate a TSL and License Plate File update to a lane in the event of failure.

916	Access to application error logs shall be provided to Authorized Users to assist in the problem investigation and resolution.
917	Access to troubleshooting diagnostic tools shall be provided to Authorized Users for each deployed subsystem.
918	MOMS Alert shall be issues if network connection to the sites, systems or interfaces are lost for a Configurable duration.

2.3.9.18.3 MOMS Inventory Management

The MOMS shall track all Contractor-provided Hardware (installed and spares), serialized or bulk, within the inventory management module.

919	The MOMS inventory management shall provide functionality, including but not be limited to:
	<ul style="list-style-type: none"> ordering;
	<ul style="list-style-type: none"> receiving;
	<ul style="list-style-type: none"> returned material authorizations (RMAs);
	<ul style="list-style-type: none"> shipping;
	<ul style="list-style-type: none"> parts management including add, update (including versioning), replace and scrap/dispose;
	<ul style="list-style-type: none"> bill of material management;
	<ul style="list-style-type: none"> location management;
	<ul style="list-style-type: none"> tracking of part movement between locations. Serialized parts shall be tracked individually, while bulk items shall be tracked at a count level;
	<ul style="list-style-type: none"> detailed inventory levels tracking (by part, location, on order, backorder);
	<ul style="list-style-type: none"> reorder functionality (automatic re-order notification, Configurable reorder levels and reorder amounts);
	<ul style="list-style-type: none"> vendor list and contact information;
	<ul style="list-style-type: none"> Supplier provided lead time/estimated delivery; and
	<ul style="list-style-type: none"> Maintenance, service agreements and warranty tracking.

2.3.9.18.4 MOMS Reports

920	All MOMS reports shall have the capability to be limited to 91 Express Lanes only, I-405 Express Lanes only or combined. The System Design shall provide for similar separation and selective combining for future Authority Express Lanes Corridors.
921	Contractor shall, as a minimum, provide the following MOMS reports:
	<ul style="list-style-type: none"> Work Orders (all details) for specified date/time range;
	<ul style="list-style-type: none"> Alert Details (all Alerts from lanes regardless of work orders) for specified date/time range;
	<ul style="list-style-type: none"> Field Inventory – installed serialized parts by location;
	<ul style="list-style-type: none"> Warehouse Inventory – available serialized and consumable parts by location;

	<ul style="list-style-type: none"> • Purchase request/purchase order – detailed records for all purchase requests and orders;
	<ul style="list-style-type: none"> • MOMS Configuration (Corridor/Toll Zone/lane and Corridor/Segment/device) – configured hierarchical structure within MOMS for Corridor, Toll Zone, lanes;
	<ul style="list-style-type: none"> • PM Schedule and Completion Status by Installed location and component;
	<ul style="list-style-type: none"> • Part and Supplier List- Suppliers by Part Type including contact info and supplier part number;
	<ul style="list-style-type: none"> • MTBF by Part Type for specified date/time range;
	<ul style="list-style-type: none"> • MTTR by Part Type and Corridor/Toll Zone for specified date/time range;
	<ul style="list-style-type: none"> • Travel Lane Availability by Corridor and Toll Zone and date/time range and
	<ul style="list-style-type: none"> • System and Maintenance Performance Reports;
	<ul style="list-style-type: none"> • an exceptions report summarizing all unusual or significant occurrences during the period;
	<ul style="list-style-type: none"> • trend analysis for repetitive failure;
	<ul style="list-style-type: none"> • Technician Schedule for specified date/time range.

2.3.10 I-405 Express Lanes Traffic Simulator and Modeling

Contractor shall provide a Traffic Simulator and Modeling (TS&M) application to emulate the traffic conditions on I-405 Express Lanes and general purpose lanes. The TS&M application serves the purpose of both testing and refining the Shadow DPS and TOD pricing before installation and regularly evaluating the Express Lanes pricing's effectiveness in managing traffic within the Express Lanes.

922	Contractor shall provide Traffic Simulator and Modeling (TS&M) application to emulate the traffic conditions on both the I-405 Express Lanes and general purpose lanes.
923	<p>The TS&M application shall allow for modeling the I-405 Express Lanes TOD pricing and the Shadow DPS. The TS&M shall provide Configurable parameters and functionality to model and test the effectiveness of the toll pricing. The TS&M shall serve the following purposes:</p> <ul style="list-style-type: none"> • provide simulated traffic for testing, assessing and validating ETTM System functionality and requirements during FAT; • model traffic volumes prior to Go-Live; • model pricing changes; and • and monitor demand management impacts to traffic volumes on the I-405 Express Lanes.
924	<p>The TS&M application shall provide a means for a more detailed assessment of the revenue-generating potential of the I-405 Express Lanes. The outcome of the simulation in terms of revenue generation can be used to:</p> <ul style="list-style-type: none"> • calibrate the model (by comparing to existing traffic conditions), and • provide insight regarding the balance between revenue generation and operational traffic volumes.

925	Contractor shall use the TS&M application to establish and assess changes to the toll rates for TOD pricing.
926	Initial demand management TOD pricing shall be supported via simulation which provides a method for identification of the appropriate values for these parameters.
927	Contractor shall develop the TS&M application using a COTS software package (i.e. Vissim, Paramics, TransModeler, etc.).
928	<p>The TS&M application shall encompass the following:</p> <ul style="list-style-type: none"> • The entirety of the I-405 Express Lanes limits; • All intermediate interchanges shall be modeled to the point of connection with cross roadways; • All interchange ramps from the point of connection to the I-405 Express Lanes and general purpose lanes to their point of connection with the crossing roadways (or one-half mile, whichever is shorter). The TS&M application need not incorporate any signalized or unsignalized intersections with crossing roadways; • All intermediate Express Lanes points of access, egress, and weave locations.
929	<p>Contractor shall model the following traffic scenarios:</p> <ul style="list-style-type: none"> • Scenario 1: Opening Year – Existing Conditions – Eastbound (EB) Peak • Scenario 2: Opening Year – Existing Conditions – Westbound (WB) Peak • Scenario 3: Opening Year – Express Lanes Operational – EB Peak • Scenario 4: Opening Year – Express Lanes Operational – WB Peak
930	Contractor shall calibrate the TS&M application to existing conditions prior to incorporating Express Lanes. The TS&M application shall be calibrated in such a way that average speeds through the Corridor, both end to end and between consecutive interchanges, are within 10% of current operating conditions.
931	The TS&M application for Scenarios 3 and 4 shall utilize the calibrated and Authority-Approved Scenario 1 and Scenario 2 models as a basis for model development.
932	The TS&M application shall include an array of virtual sensors that will perform the same function for the ETTM System, gathering data on speeds and volumes as required. The array of sensors should replicate what will be available within the Corridor. The TS&M application shall be capable of simulating the dynamic price-setting process based on traffic data inputs from multiple sources to simulate each TDS.
933	The TS&M application shall provide outputs that show the communicated rates to drivers at designated decision points, providing drivers with the information needed to make their decisions regarding whether to use the Express Lanes or general purpose lanes. The points at which toll rate information is communicated to drivers in the model shall correspond to specified locations at which Toll Rate CMS will communicate prices to the driving public.
934	The TS&M application shall be developed such that simulated drivers make route choice decisions based (in part) upon toll rate information communicated to drivers at key decision points. In other words, route choice shall be dynamic (influenced by pricing), not static.
935	The Shadow DPS programmed into the TS&M application shall reflect all key relevant policy-related decisions, including the minimum toll rate, the maximum toll rate (if

	applicable), the maximum allowable change in tolls, and other key variables that will be pertinent to the capacity to manage traffic and generate revenue.
936	The TS&M application shall employ the same user interface and reporting capabilities as the ATMS.
937	The TS&M application shall emulate live operations to the maximum practical extent.
938	Contractor shall model, test, and optimize the Shadow DPS within the TS&M application. It is anticipated that this effort will involve several iterations in which various combinations of the Shadow DPS's Configurable parameters will be refined to fine-tune the performance of the Express Lanes.
939	Contractor shall prepare and submit the modeling and testing outputs to Authority for review and Approval prior to Go-Live, including: <ul style="list-style-type: none"> • Assessment whether the Shadow DPS logic proposed by Contractor has been properly coded into the TS&M application; • Assessment whether Shadow DPS and TOD pricing is effectively meeting Authority's requirements for managing traffic operations on I-405 Express Lanes; • Assessment to the extent to which the Shadow DPS and TOD pricing is able to meet the most recent revenue forecasts provided for the facility.
940	Contractor shall use the TS&M application to gather operational information to inform Authority of expected traffic conditions for the I-405 Express Lanes and general purpose lanes prior to Go-Live.
941	Contractor shall develop and update the TS&M application with actual data gathered from the field in order to calibrate the model and to employ it as a tool for informing future pricing decisions.
942	Contractor shall monitor and refine the model after Go-Live in order to calibrate to actual traffic and revenue conditions. The model shall be refined on a monthly basis for twelve months following Go-Live, or until Approved by Authority, whichever comes first.
943	Contractor shall annually calibrate and update the TS&M application to accurately reflect traffic conditions and revenue generation as follows: <ul style="list-style-type: none"> • Prior to Go-Live, an "existing conditions" version of the TS&M application shall be calibrated in such a way that travel times and speeds along the Corridor, both end to end and between consecutive interchanges, are within 10% of current operating conditions. • After Go-Live, the TS&M application shall be refined such that (a) express lane traffic volumes and speeds are within 10% of tolled operating conditions, and (b) systemwide toll revenue is within 10% of actual revenue collected.

2.3.11 I-405 Express Lanes Advanced Traffic Management System

Contractor shall provide an ATMS widely used for traffic management and operations or a Contractor developed application integrated into the RSS that performs the functions of the ATMS. The I-405 ATMS shall integrate to the I-405 ETTM System and allow I-405 Express Lanes TOC Operations staff to monitor the traffic conditions. Dashboards provided shall display the traffic detector data and operations staff shall have full control over CCTV video. The ATMS shall project CCTV video, and allow ATMS screens to be projected, on the video wall. Supplied workstation monitors shall be capable of viewing and controlling all ETTM CCTV cameras. The

ATMS video system shall provide 24/7 IP digital recording capabilities for all cameras. Video wall display sufficient for displaying 27 traffic video cameras, 9 Toll Rate CMS video cameras and supporting additional video feeds from CCTV cameras monitoring field equipment and security feeds.

944	Contractor shall provide a secure web-based ATMS product that is compliant to the latest NTCIP requirements to support real-time monitoring of the Express Lanes network traffic and CCTV cameras.
945	The ATMS shall provide the capability to display video feeds from multiple Corridors and sources, including but not limited to: <ul style="list-style-type: none"> • CCTV cameras installed on the Corridors to monitor traffic; • Toll Rate CCTV cameras; • Security cameras installed at the Toll Zones, and • DVAS cameras when connected.
946	CCTV cameras are controlled by the I-405 Express Lane TOC using the ATMS, however, Authorized Users can request for secondary control of the camera. The ATMS shall provide the I-405 Express Lane TOC with Primary control at all times and prevent secondary control by Authorized Users or others requesting it.
947	Authorized Users shall have access the application from any device (workstations, laptops, tablets) connected to the web and shall be supported by the browsers listed in this Scope of Work and Requirements.
948	Authorized Users shall have the capability to view multiple Dashboards and be visibly Alerted of operational conditions that require immediate attention. All display of colors shall be in compliance with standard traffic operations.
949	Dashboards provided shall allow Authorized Users to view the operational status of the Express Lanes network and drill into each of the Corridors, Segments, Toll Zones, lanes and to the individual device.
950	Authorized Users shall have the ability to maintain and manage their profile allowing them to Configure the display templates including but not limited to presentation of the Dashboards, Alert conditions, Alert management, and enhancement tools.
951	Traffic and Operational Reports and Graphs shall be provided that allows operations to view trends, evaluate traffic conditions and analyze traffic patterns. Capability shall be provided to export the report data into standard formats listed in this Scope of Work and Requirements.
952	The ATMS shall record the beginning and ending times of all Lane Closures.
953	Failure of the ATMS shall be detected and reports to MOMS.
954	The ATMS shall provide the TOC Operations staff with direct control of the pan/tilt/zoom (PTZ) features of all CCTV cameras to scan and observe activity.
955	The video system shall provide users the ability to view and control all permitted applications from any workstation connected to the system.
956	The video system shall provide dynamic scaling and display placement of content on the LCD wall displays and other LCD monitors.

957	The video system shall be capable of placing any input video source at any location on the LCD wall displays or other LCD monitors.
958	The video system shall have a video capture and recording capability.
959	The video system shall provide 24/7 IP digital recording capabilities for all cameras with a minimum of 14 Days' storage capacity and video indexing.
960	The video system shall have the following video recorder capabilities: <ul style="list-style-type: none"> Record and playback simultaneously. Export segments of recordings to standard non-proprietary video formats compatible and playable on universal video players. Identity and export specific time periods and locations to various video formats.

2.3.12 I-405 Express Lanes Toll Operation Center (TOC) Operations

961	Contractor shall staff the I-405 Express Lanes TOC 24 hours a day, 7 days a week.
962	Contractor shall Design, install, commission and operate the I-405 Express Lanes TOC to achieve the following functions: <ul style="list-style-type: none"> Monitor and control all Equipment, Roadside Systems, and RSS, as part of the ETTM System implementation; and Monitor traffic conditions through the full Project limits, responding to accidents and/or incidents, as required, both within the Express Lanes, and the general purpose lanes, per the Approved Operations Plan.

2.3.13 Performance Requirements

Contractor shall provide an ETTM System that is designed to meet the accuracy, performance and throughput requirements set forth in this Scope of Work and Requirements. The testing logistics required to prove adherence to these requirements shall be detailed in the Master Test Plan and the test procedures as set forth in this Scope of Work and Requirements. The sample size for each requirement shall be the greater of $N = \log(1 - C) / \log(A)$; or 20,000 transactions for the Operational Acceptance Test; where:

- * N = Number in the sample
- * C = Confidence level
- * A = Accuracy

A value of 80% shall be used for the confidence level. Accuracy and confidence levels are expressed as decimals.

2.3.13.1 General Performance Requirements

963	Contractor shall provide an ETTM System that meets the accuracy requirements described below. Contractor shall validate System compliance to the Performance Requirements by collecting data to the required sample size in live traffic operations as described below for each requirement.
964	Data collection shall include the use of live traffic and controlled vehicles intermingled with live traffic emulating normal operations as specified below for each requirement.

965	Prior to the start of testing the System shall be confirmed and certified by the Contactor to be fully operational, compliant to this Scope of Work and Requirements and ready for testing.
966	Transactions and trips that fail to meet the requirements shall be reviewed and audited and anomalies investigated.

2.3.13.2 Vehicle Detection and Transaction Framing**2.3.13.2.1 Transponder Capture Rate**

967	A Transponder mounted in accordance with the manufacturer mounting instructions shall be captured by the AVI System under all conditions within the Design specification described in this Scope of Work and Requirements with an accuracy of 99.97 percent (no more than three (3) missed reads or incorrect captures in ten thousand (10,000) equipped vehicle passages).
968	This requirement applies to all Corridors and Toll Zones based upon the Transponder mix collected during the testing period for the given sample size. Testing shall require the use of controlled vehicles with known "good" Transponders intermixing with live traffic to create the required sample size.

2.3.13.2.2 Transponder Reporting Accuracy

969	For all transactions classified to have a successful 'read' of the Transponder data by the AVI System, the AVI System shall report all required data fields to the zone controller with 99.999% accuracy under all conditions within the Design specification described in this Scope of Work and Requirements. Testing shall require the use of Transponder reads collected during live traffic operations.
-----	--

2.3.13.2.3 Vehicle Detection Accuracy

970	The zone controller shall detect and report all vehicles traveling through the Toll Zone with an accuracy of 99.99% under all conditions within the Design specification described in this Scope of Work and Requirements. Testing shall require the use of vehicle data collected during live traffic operations.
-----	--

2.3.13.2.4 Transponder Association Accuracy

971	Every Transponder that is reported to the zone controller shall be assigned to the correct vehicle with an accuracy of 99.95% under all conditions within the Design specification described in this Scope of Work and Requirements. Testing shall require the use of controlled vehicles intermixing with live traffic.
-----	--

2.3.13.2.5 Image Capture and Reporting Accuracy

972	The ICPS shall capture and report all vehicle images to the zone controller as defined in Authority Business Rules with an accuracy of 99.95% under all conditions within the Design specification described in this Scope of Work and Requirements. Testing shall require the use of vehicle data collected during live traffic operations.
-----	--

2.3.13.2.6 Image Association Accuracy

973	The System shall correctly associate 100% of all captured images to the correct vehicle as defined in Authority Business Rules with an accuracy of 99.95% under all conditions within the Design specification described in this Scope of Work and Requirements. Testing shall require the use of vehicle data collected during live traffic operations.
-----	--

2.3.13.2.7 License Plate Extraction Automation Accuracy

974	The System shall perform automated license extraction on at least 70% of the captured images to obtain the license plate, Jurisdictions and plate type with 99.95% accuracy for all standard and special plates for the States of California, Nevada, Arizona, Illinois, Texas, Washington, and Utah. Testing shall require the use of vehicle data collected during live traffic operations.
-----	---

2.3.13.2.8 Overall Image Accuracy

975	Contractor shall provide an accurate automated and manual review process which result in the extraction of the license plate, plate type, and Jurisdiction with an accuracy of 99.95% on all Image-Based Transactions that are included in the calculation, as defined below** and are human readable. Testing shall require the use of vehicle data collected during live traffic operations.
-----	--

2.3.13.2.9 **License Plates Excluded from the Overall Image Accuracy Calculations

976	A plate shall be considered excluded from the Overall Image Accuracy calculation only when:
	<ul style="list-style-type: none"> the vehicle has no plate;
	<ul style="list-style-type: none"> plate is not in the normal camera field of view because it is not mounted in accordance with State laws;
	<ul style="list-style-type: none"> the plate is damaged so that numbers/letters are not human readable.
977	A license plate is not considered excluded when plate characters are infringed upon by a license plate frame and license plate characters are human readable.

2.3.13.2.10 Accuracy of Rejection and Categorization of Rejected Image

978	Contractor shall provide an ETTM System that correctly rejects images and categorizes rejected images with an accuracy of 99.75% for all images reviewed (images reviewed through the manual review process).
-----	---

2.3.13.3 Image and Transaction Processing**2.3.13.3.1 Transaction Processing and Transmission Requirements**

979	All transactions generated by the zone controllers in accordance with the above accuracy requirements and Authority Business Rules shall be reported and transmitted to the RSS with an accuracy of 100% under all conditions within the Design specification described in this Scope of Work and Requirements. Testing shall require the use of vehicle data collected during live traffic operations.
-----	---

2.3.13.3.2 False Read Processing

980	The false read processing (example cross lane reads, general purpose reads and duplicate reads) shall be less than 0.001% of the Transponder-Based Transactions under all conditions within the Design specification described in this Scope of Work and Requirements. Testing shall require the use of vehicle data collected during live traffic operations and test results will be verified by System queries, monitoring the trip creation and BOS reported issues for accurate Account posting.
-----	---

2.3.13.3.3 Image Processing and Transmission Requirements

981	All images/data from the Roadside System captured and saved in accordance with the above accuracy requirements and Authority Business Rules shall be transmitted to the RSS with an accuracy of 100% under all conditions within the Design specification described in this Scope of Work and Requirements. Testing shall require the use of vehicle data collected during live traffic operations.
-----	---

2.3.13.4 Trip Management Accuracy

982	All Transponder-Based Transactions and Image-Based Transactions generated with the above accuracy requirements shall be assembled into Trip Transactions under all conditions within the Design specification described in this Scope of Work and Requirements and Authority Business Rules with an accuracy of 99.995%. Testing shall require the use of vehicle data collected during live traffic operations.
983	All Transponder-Based Transactions, Image-Based Transactions, associated images, and Trip Transactions created with the above accuracy requirements at the RSS shall be transmitted to the BOS with an accuracy of 100%.
984	All Trip Transaction corrections generated at the RSS shall be transmitted to the BOS with an accuracy of 100%.

2.3.13.5 Audit and Reconciliation Requirements

985	100% of the transactions, images generated in the lanes and 100% of the trips created at the RSS shall be auditable and reconcilable through System Reports and the final assembly of a transaction to a trip, and the final transmission status of the transaction/trip to the BOS shall be tracked and reported.
-----	--

2.3.13.6 Vehicle Throughput Requirements

986	The Roadside System shall process at minimum 2,400 vehicles per hour per lane at vehicle speeds of 0 to 100 mph.
-----	--

2.3.13.7 Mean Time Between Failure (MTBF)

987	The ETTM System shall be required to meet specific minimum duration without failure requirements for components and subsystems in continuous operation. This duration requirement is defined as the MTBF. Contractor shall provide all third-party MTBF data on individual components used in the System.
988	MTBF requirements for all components of the Roadside System shall meet the MTBF as specified below in Table 2-1: MTBF Requirements .

Table 2-1: MTBF Requirements

Component or Subsystem	MTBF (hours)
Zone Controller	30,000 hours
Automatic Vehicle Identification (AVI) System	30,000 hours
Automatic Vehicle Detection (AVD) System	20,000 hours
Image Capture Processing System (ICPS)	30,000 hours

989	The reliability of the System components shall be calculated based on the following MTBF calculation:
-----	---

$$\text{MTBF} = \frac{\text{\# of components/subsystems} \times \text{test period (hours)}}{\text{\# of Chargeable Failures}}$$

Chargeable Failures are defined in this Scope of Work and Requirements.

2.3.13.8 Availability

990	Contractor shall meet availability requirements specified in Table 2-2: Availability Requirements for the following elements of the ETTM System:
-----	---

Table 2-2: Availability Requirements

Availability Requirements (Monthly)	
Express Lanes (Each Lane)	99.90%
Core Roadway Support System	99.95%

991	The availability requirements shall be separately calculated and applied as follows:
-----	--

	<ul style="list-style-type: none"> An available lane is defined as the overall in-lanes system with all of its subsystems properly functioning and available to collect revenue and send required transactions and images to the RSS.
	<ul style="list-style-type: none"> An available RSS is defined as those critical functions of the RSS functioning and operating and in compliance with the Performance Requirements, including interface to the all systems as specified in this Scope of Work and Requirement; license plate extraction; transaction matching and trip assembly; DPS; RSS application; Reporting; MOMS and data posting. The RSS shall be considered unavailable (System downtime) if the RSS is severely degraded causing loss of functionality; causing application errors for multiple users; interfaces are not operational, and preventing access to operations staff and users.
992	<p>Availability shall be calculated based on the following calculation:</p> $\text{Availability} = 100\% - [\text{Hours Downtime} / (\# \text{ of Days in time period measured} * 24)]$

2.3.13.9 Chargeable and Non-Chargeable Failures

For purposes of calculating MTBF and Availability Performance Requirements for testing, as detailed above, and for Maintenance performance, chargeable and Non-Chargeable Failures are defined as follows:

2.3.13.9.1 Chargeable Failures

993	Chargeable Failures include any failures that are not specifically identified as Non-Chargeable Failures, including, but not limited to, the following:
	<ul style="list-style-type: none"> A malfunction which prevents the RSS component (Hardware or Software) from performing its designated function, when used and operated under its intended operational and environmental conditions as detailed in this Scope of Work and Requirements.
	<ul style="list-style-type: none"> System downtime caused by Upgrades, Updates and Software releases to RSS Software and environment not authorized by Authority.
	<ul style="list-style-type: none"> A malfunction that poses a threat to the safety of the RSS components, customers, employees or others.
	<ul style="list-style-type: none"> An occurrence where data is not successfully transmitted between the Roadside Systems and the RSS and images from the lanes to the RSS.
	<ul style="list-style-type: none"> A failure of Equipment or Software that allows data loss to occur on the ETTM System.
	<ul style="list-style-type: none"> A failure of Equipment or Software that allows revenue loss to occur on the ETTM System that is not already accounted for as a separate performance failure.
	<ul style="list-style-type: none"> Software anomalies and bugs that affect the performance and operation of the ETTM System.
	<ul style="list-style-type: none"> Shutdown or unavailability of the ETTM System unless specifically directed by Authority for reasons not under the control of Contractor.

	<ul style="list-style-type: none"> • Failure to properly register or report a transaction.
	<ul style="list-style-type: none"> • Failure to properly reconcile the ETTM System.
	<ul style="list-style-type: none"> • Failure to electronically send or receive transaction information.
	<ul style="list-style-type: none"> • Failure to generate the reports required to reconcile and audit the System.

2.3.13.9.2 *Non-Chargeable Failures*

994	Non-Chargeable Failures shall include:
	<ul style="list-style-type: none"> • Force Majeure, as defined in the Agreement;
	<ul style="list-style-type: none"> • vandalism;
	<ul style="list-style-type: none"> • failure of a test facility or test instrumentation;
	<ul style="list-style-type: none"> • ETTM System component failures caused by environmental or operating conditions outside of this Scope of Work and Requirements;
	<ul style="list-style-type: none"> • normal operating adjustments as allowed in the Test Procedure or Maintenance Plan, as applicable, and
	<ul style="list-style-type: none"> • failures where Authority has Approved to waive a Chargeable Failure in advance and
	<ul style="list-style-type: none"> • failures that are customer or Authority user induced, or are caused by a Third-Party Service Provider not under Contractor's control as determined by Authority.

2.4 91 Express Lanes Electronic Toll and Traffic Management System Transitions

Contractor shall install the new ETTM System and assist Authority and the Existing BOS Contractor in transitioning from the current ETTM systems to the new ETTM System. Once in operation, Contractor shall assist with the design, testing and transition from the Existing BOS Contractor to a New BOS Contractor, to be procured under separate contract.

2.4.1 91 Express Lanes Roadside System Installation and Transition – General Requirements

995	Contractor shall commence installation activities on the 91 Express Lanes only after Authority Approval of the Transition Plan.
996	The installation of the new ETTM System and its transition to revenue collection shall not adversely impact the Operations of the existing ETTM System beyond the levels stated and detailed in the Installation Plan and/or the Transition Plan. It is Contractor's responsibility to make sure there is sufficient infrastructure (space, power, etc.) to support both systems to the maximum extent possible and in accordance to the plans.
997	Contractor may be allowed to decommission parts of the existing ETTM System to provide gantry space for the new Equipment. Any such steps shall be clearly detailed in the Installation Plan and/or Transition Plan and subject to Authority review and approval. It is the intention of Authority to continue to collect tolls using the existing system until the new system is ready for final cutover.
998	Contractor shall provide additional conduits and mounting structures as needed for the installation of the new Equipment. Temporary ancillaries may be used as detailed in the Installation Plan and Transition Plan.
999	Final cutover of toll collection shall include the cessation of toll collection through the existing ETTM System and commencement of toll collection and enforcement through the new ETTM System. Contractor shall plan the final cutover to minimize impact on toll collection (e.g. schedule overnight when traffic is minimal).
1000	Transition of any ETTM Toll CCTV Camera Sites from existing to new configurations shall be coordinated to minimize downtime. New ITS Equipment shall be integrated with the existing 91 Express Lanes ATMS prior to placement in operational position.
1001	Contractor's implementation process shall accommodate all onsite testing as detailed in Section 2.7.
1002	Contractor shall be responsible for scheduling the required Lane Closures during the Roadside System installation and transition as Approved by Authority and otherwise provided in the Contract.

2.4.2 91 Express Lanes BOS System Transition – General Requirements

1003	Contractor shall commence any transitions activities from the Existing BOS to the New BOS only after Authority approval, and in coordination with the New BOS Contractor.
1004	Contractor shall plan the transition to the New BOS such that no information received, processed, stored, or archived in the ETTM System shall be lost, or become unavailable per the Approved plans and procedures.

1005	Contractor shall plan the transition to the New BOS to minimize disruption to toll collection and overall Operations of the existing 91 Express Lanes.
1006	Contractor shall test and certify all communication lines, physical and logical, between the existing 91 Express Lanes ETTM System and the New BOS prior to commencement of transition.
1007	Contractor shall support the New BOS Contractor with testing of the New BOS prior to the final transition and cutover, so long as this support does not impact existing Operations and system performance.
1008	Contractor shall test all ETTM System functions when integrated with the New BOS prior to final cutover and disconnection of the interfaces to the Existing BOS.

2.4.3 91 Express Lanes ETTM System Testing and Transition

1009	Contractor shall complete ETTM System testing in accordance with the Section 2.7 and all applicable individual test plans.
1010	Upon the successful completion of the FAT, Contractor will be authorized to begin installation of the ETTM System in accordance with the Approved Master Test Plan and Onsite Installation Test (OIT) Plan.
1011	<p>The OIT shall be conducted for all installed Equipment and the functions of the ETTM System shall be verified, including but not limited to:</p> <ul style="list-style-type: none"> the MOMS shall be configured and tested including inventory recorded; technicians scheduled, and notifications set up; the DVAS shall be installed and validated and Authorized Authority personnel shall have access to the DVAS; all associated TDS locations shall be installed and tested, and all associated CCTV locations shall be installed and tested.
1012	<p>As part of the OIT, Contractor shall exercise and demonstrate the functionality of the new Toll Collection and Enforcement System and the exchange of transactions, images, data and files, including but not limited to:</p> <ul style="list-style-type: none"> the Existing BOS; the new Roadside Systems, and the Advanced Traffic Management System.
1013	Upon the Approval of the OIT, Contractor will be given the authorization to process to final cutover, replacing the existing Corridor server and Commission the RSS in revenue collection in accordance with the Approved Baseline Implementation Schedule and Transition Plan.
1014	After each site is transitioned to the new ETTM System, Contractor shall monitor and maintain the Equipment and systems and the entire ETTM System until and through the Operations and Maintenance Phase.
1015	<p>In order to ensure a seamless transition, the following activities shall take place:</p> <ul style="list-style-type: none"> upon Approval to proceed with installations and transitions, Contractor shall coordinate with the Existing BOS Contractor and install Equipment at each site, and conduct a Commissioning test at each site;

	<ul style="list-style-type: none"> the MOMS shall be configured for Go-Live; inventory recorded; technicians scheduled, and notifications set up;
	<ul style="list-style-type: none"> the DVAS shall be installed and validated and Authorized Users shall have access to the DVAS; and
	<ul style="list-style-type: none"> an end-to-end test shall be conducted in the RSS and BOS to validate the flow of transactions and images from the Roadside System to the BOS.
1016	All Equipment shall be configured and tuned to their optimal performance prior to the start of the Operational Test. The Operational Test shall not commence until Contractor meets the Operational Test entry criteria.
1017	Contractor shall decommission each ETTM Site and coordinate disposal of all existing equipment with Authority in accordance with Approved decommissioning plan. Contractor shall be responsible for the following tasks, including but not limited to: <ul style="list-style-type: none"> the removal of all existing equipment, mounting arms, cabinets and enclosures and coordinate their disposal; coordinate with the Existing ETTM Contractor (or Authority, as applicable) prior to the removal of any equipment; verify that all data and/or images has been transferred and is secured; erase all data from all storage devices, pending Authority approval; and securely destroy all storage devices and dispose of all equipment safely in accordance with applicable laws and regulations.

2.4.4 91 Express Lanes ETTM Transition Plan – Roadside

1018	Contractor shall provide a 91 Express Lanes ETTM Transition Plan for Authority Approval, covering the two Roadside implementations, and addresses the transition of the Roadside and RSS into revenue collection, replacing the existing ETTM system.
1019	The Transition Plan shall address all critical transition elements and activities associated with the installation and implementation of the Roadway System, including the Roadside Systems; RSS, and interfaces to the Existing BOS, existing roadway systems, Caltrans and the existing ATMS.
1020	The Transition Plan shall address the integration and interface of the RSS to the Existing BOS.
1021	The Transition Plan shall address, by location, the transition from the current toll collection equipment to new toll collection Operations. All temporary changes and modifications to the infrastructure to accommodate the transition shall be described.
1022	If data on existing RSS required as part of the transition process, the details of the migration or duplication shall be included in the Transition Plan.
1023	The Transition Plan shall address Contractor's plan for decommissioning of the existing equipment and their disposal.
1024	The Transition Plan shall, at a minimum, include the installation, OIT, Commissioning, revenue collection and Acceptance of the new ETTM System.
1025	The Transition Plan shall describe Contractor's approach to use the existing ETTM System Infrastructure at the ETTM Sites, including installation that will have minimal impact on current Operations.

1026	The Transition Plan shall detail the temporary processes implemented to support the transition of the ETTM Sites and concurrent operations of new and existing ETTM Systems, including eventual replacement process and decommissioning on the existing system.
1027	The Transition Plan shall clearly identify all points of coordination or reliance on third-party Deliverables.
1028	The Transition Plan shall detail plans for testing and uploading of fully formed transactions to the BOS, including the methodology for transferring any functionality from the Existing BOS to the ETTM System – for example providing fully formed and priced transactions.
1029	All ETTM System transition activities shall be coordinated with Authority and the Existing BOS Contractor and Approved by Authority in order to minimize interference with on-going and continuing Maintenance and operational Requirements.

2.4.5 91 Express Lanes Dismantle Unused ETTM Equipment

1030	Contractor shall coordinate with Authority and dismantle all unused existing equipment at the 91 Express Lanes ETTM Sites following the transition and commissioning of the new ETTM System.
1031	Contractor shall be responsible for coordinating with Authority the disposal of dismantled equipment, and shall comply with applicable environmental and safety requirements as it relates to the handling of hazardous materials.

2.4.6 91 Express Lanes ETTM Transition Plan – BOS

1032	Contractor shall provide a 91 Express Lanes ETTM Transition Plan for Authority Approval, covering the integration of the ETTM System with the New BOS, to be procured and commissioned in 2022.
1033	The Transition Plan shall address all critical transition elements and activities associated with the integration and operations of the ETTM System, including the Roadside Systems; RSS, toll collection processes and real-time traffic operations of the 91 Express Lanes.
1034	The Transition Plan shall address the integration and interface of the RSS to the New BOS.
1035	The Transition Plan shall address the transition of the operating Equipment to the New BOS and toll collection Operations. All temporary changes and modifications to infrastructure or any other Equipment to accommodate the transition shall be described.
1036	The Transition Plan shall include any changes, temporary or permanent, required in the RSS before, during, and after the transition.
1037	Any temporary processes implemented to support the transition of the ETTM System and concurrent operations shall be documented in detail in the Transition Plan including removal or decommissioning of existing system, components, and interfaces.
1038	All points of coordination or reliance on third-party Deliverable shall be clearly identified in the Transition Plan.
1039	All ETTM Transition activities shall be coordinated with Authority, the Existing BOS Contractor, the New BOS Contractor and Approved by Authority in order to minimize interference with on-going and continuing Maintenance and operational Requirements.

2.5 Electronic Toll and Traffic Management System Installation Requirements

This section details the Requirements for the installation of the new ETTM System. Unless Approved by Authority, no System installation at any ETTM Site or in any facility shall occur prior to the satisfactory Approval of Installation Design and the FAT.

2.5.1 Installation Program

Contractor shall prepare and submit an Installation Program to Authority for review and approval that addresses all aspects of the installation of the ETTM System, including all installation Design, submissions, and coordination.

1040	Contractor is responsible for the Design, procurement, installation, cabling, configuration, check-off, and testing of all Hardware, Equipment, communications, Software and fixtures provided by Contractor as part of the ETTM System at each ETTM Site.
1041	At ETTM Sites where Contractor is integrating existing equipment into the ETTM System, Contractor's Services will include, in addition to the above for new equipment, verification of operational status of existing equipment. Contractor shall report to Authority if any equipment is found to be not fully operational.
1042	In the event Contractor decides to re-use existing conduits and junction boxes, Contractor is responsible for ensuring that such elements are in their fully operational condition and will meet this Scope of Work and Requirements for the Agreement Term. If these elements are currently in use, Contractor shall employ due care as to not damage existing cables or impact existing Operations.
1043	Contractor shall ensure that Contractor's installation activities do not interrupt or interfere with the existing Operations without prior permission from Authority.
1044	Contractor shall familiarize with MUTCD requirements and shall coordinate all lane closure activities with Authority staff and/or consultants overseeing construction/installation/testing, Design-BUILDER, other civil contractors, the 91 Express Lanes BOS Contractor, CHP, and Caltrans, as applicable.
1045	Contractor shall install and tune the all Equipment to vendor specifications, to meet performance measures specified, and in compliance with Authority Interoperable Agency requirements.
1046	Contractor shall be responsible for providing secure work areas and shall protect all equipment and materials from theft and vandalism during the Implementation Phase.

2.5.1.1 Installation Program – 91 Express Lanes

1047	Other than for Disaster Recovery for the 91 Express Lanes, Contractor shall install the ETTM System servers and Hardware in Contractor-provided cabinets and in existing facilities as provided by Authority, including the two 91 Express Lanes Toll Plaza Buildings.
1048	Contractor shall work with Authority and the Existing BOS Contractor to test the fiber WAN and the connections between the Roadside and the RSS locations, as applicable. Testing shall include expected traffic loads and all types of production operation data.

2.5.1.2 Installation Program – I-405 Express Lanes

1049	Other than for Disaster Recovery for the I-405 Express Lane, Contractor shall install the ETMM System servers and Hardware in Contractor-provided cabinets and the Design-Builder-provided I-405 Express Lanes Toll Equipment Building (TEB), as provided by Authority through the DB contract.
1050	Contractor shall work with Authority, Caltrans, and the Design-Builder to test the fiber WAN and the connections between the Roadside and the RSS locations, as applicable. Testing shall include expected traffic loads and all types of production operation data.

2.5.2 Installation and Construction Coordination and Meetings

During the Project Design, development and installation periods there shall be a series of meetings between Contractor and the Existing BOS Contractor and the Design-Builder. As the two Corridors have separate implementation periods, requirements and constraints, it is expected the meetings will be separate. During these meetings it shall be required that Authority be represented to clearly define and develop the installation Requirements, methodology, timetables, test Plans, roles, and contingency Plans. Contractor is responsible for coordinating and scheduling all meetings necessary to complete the Implementation Phase of the Project.

1051	Contractor shall schedule, manage and attend weekly installation meetings during the Implementation Phases of the Project and report on progress of the installation. Contractor shall identify and communicate any issues regarding System construction and installation immediately upon discovery to the 91 Express Lanes BOS Contractor or Design-Builder and Authority.
1052	Contractor shall ensure that the appropriate personnel are present at these meetings who can represent Contractor's interest and provide the information necessary in a meaningful manner.
1053	Prior to the meeting, Contractor shall update the installation schedule based on the construction schedule and all changes shall be identified.
1054	Contractor shall prepare and distribute a meeting agenda at least forty-eight (48) hours prior to the scheduled meeting. The meeting agenda shall consist of those items pertaining to the installation and schedule for the previous and current week's installation efforts and for an agreed to "look ahead" period. The meeting agenda should include any potential risk items identified and corresponding mitigation efforts.
1055	It is Contractor's responsibility to make sure all issues that arose during the installation activity for the week are addressed and resolved or is scheduled for resolution.
1056	At these meetings, Contractor shall also be prepared to address any issues or questions raised by the 91 Express Lanes BOS Contractor, Design-Builder, other Contractors, and Authority.
1057	Contractor shall document the meeting discussions and distribute the meeting minutes within one Day to everyone from the team invited to the meeting. It shall be up to the recipients of the meeting minutes to distribute to other interested parties. Contractor shall also record and maintain an action items list that tracks all installation related issues.

2.5.3 General Installation Requirements

1058	Contractor shall be responsible for procurement, installation, cabling, termination configuration, testing, and check-off of all Equipment and Software required meeting this Scope of Work and Requirements.
1059	Procurement, installation, configuration, and testing of local area communications Equipment and connection to Contractor installed network Equipment shall be the responsibility of Contractor as further set forth in this Scope of Work and Requirements.
1060	Contractor shall be responsible for procurement, installation, configuration, and testing of all appropriate RSS servers, Equipment and Software required by the ETTM System at Authority provided locations (i.e. 91 Express Lanes TOC and I-405 Express Lanes TOC) and validating communications to its interfacing systems shall be the responsibility of Contractor as further set forth in this Scope of Work and Requirements.

2.5.3.1 General Installation Requirements – 91 Express Lanes

1061	Contractor shall install all appropriate Roadside servers and Equipment.
1062	Contractor shall be responsible for taking over the existing electrical meters at each ETTM Site and shall size the ETTM System's power requirements at each ETTM Site. Contractor shall be responsible for any changes in power requirements, including coordination with utility provider and replacement of wiring.

2.5.3.2 General Installation Requirements – I-405 Express Lanes

1063	Contractor shall install all appropriate Roadside servers and Equipment, except where stipulated that Contractor shall provide Equipment to be installed by the Design-Builder.
------	---

2.5.4 Toll Operations Centers (TOC)**2.5.4.1 91 Express Lanes Toll Operations Center**

1064	The current 91 Express Lanes TOC is staffed and operated by the Existing BOS Contractor, and operations will remain in their current or modified form until, at least, the termination of the existing BOS/CSC contract on June 30, 2021. Contractor shall install and integrate any required system in the existing 91 Express Lanes TOC in collaboration with the Existing BOS Contractor.
1065	Contractor shall provide a center-to-center communications connection for the display of I-405 Express Lane ATMS data on the 91 Express Lane TOC video wall, including Toll CCTV camera video and TDS data.

2.5.4.2 I-405 Express Lanes Toll Operations Center

1066	Contractor shall commission a TOC for the I-405 Express Lanes in a facility provided by Authority. The facility includes a space for the TOC as well as an adjacent equipment/server room. The space shall include wall space for at least twelve (12) 55" displays, and there is a false ceiling connecting it with the adjacent equipment/server room. The equipment/server room can accommodate 3 standard server racks.
------	---

1067	Contractor shall procure, install, configure, and test all I-405 Express Lanes TOC components including video wall, Traffic Operator workstations, communications equipment, and any peripheral equipment and components required to facilitate traffic and toll collection Operations as further set forth in this Scope of Work and Requirements.
1068	<p>Contractor shall Design, install, and commission the I-405 Express Lanes TOC to achieve the following functions:</p> <ul style="list-style-type: none"> • Workstations and video monitors shall provide access to real-time traffic data, camera video feeds and any other supporting information required by TOC Operators. • The video wall display shall be Configurable and able to display various combinations of Toll CCTV camera video feeds, Toll Rate CCTV camera video feeds, TDS maps and data, and Operational status. • The video wall display shall be sufficiently large to simultaneously display three 55" (48" x 27") CCTV camera feeds, eighteen 27.5" (24" x 13.5") CCTV camera feeds, six 27.5" (24" x 13.5") Toll Rate CCTV camera feeds, and one 48" x 81" Corridor map showing traffic conditions as well as various overlay ATMS data and user selected data. The video wall shall be capable of cycling TCS CCTV camera and Toll Rate CMS camera video feeds.
1069	<p>Contractor is responsible to procure, commission and maintain communication systems (internal and external) and services required to operate the TOC. These include phone, internet, data connection to the Roadside, link to DR location, and any other link required. Options for external communications can be any one, or combination, of the following:</p> <ul style="list-style-type: none"> • Dedicated landline circuit; • Wireless; and • Microwave point-to-point/multipoint.
1070	Contractor shall provide and submit a I-405 TOC Design Requirements Document to Authority for Approval no later than 180 Days after NTP1. The I-405 TOC Design Requirements Document shall include specific requirements for the I-405 TOC space (e.g. electrical supply, HVAC etc.). Contractor is prohibited from modifying major building elements (e.g. walls) and must forward any such requests to Authority, which shall be granted or denied in Authority's sole discretion. Contractor is allowed to add support elements such as raised floors, platforms, electrical ducting, and to add holes and openings within the existing structure to facilitate the installation and operation of the TOC systems.
1071	Contractor shall provide all equipment and configuration Services required to establish the interface between the I-405 Express Lanes TOC and the New BOS, procured through a separate contract by Authority, as further set forth in this Scope of Work and Requirements.
1072	Contractor shall provide capability and all equipment necessary to share CCTV camera video between the I-405 Express Lanes TOC and other transportation agencies, as further set forth in this Scope of Work and Requirements.
1073	Contractor shall provide a center-to-center communications connection for the display of 91 Express Lane ATMS data on the I-405 Express Lane TOC video wall, including Toll CCTV camera video.

2.5.5 Compliance to Standards

Contractor shall adhere to all installation standards, applicable laws, ordinances and codes as required.

1074	Contractor shall meet all electrical codes, traffic control, seismic considerations, calibration, configuration, and environmental Requirements of and including but not limited to:
	<ul style="list-style-type: none"> • Equipment manufacturer's;
	<ul style="list-style-type: none"> • NEC;
	<ul style="list-style-type: none"> • UL standards;
	<ul style="list-style-type: none"> • Authority;
	<ul style="list-style-type: none"> • Caltrans (TEES);
	<ul style="list-style-type: none"> • FHWA;
	<ul style="list-style-type: none"> • MUTCD;
	<ul style="list-style-type: none"> • IEEE (Institute of Electrical and Electronics Engineers);
	<ul style="list-style-type: none"> • OSHA Requirements, and
	<ul style="list-style-type: none"> • any local authorities having jurisdiction.
1075	Contractor shall adhere to latest Caltrans Standard Plans which complies with the Sixth edition of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals. Contractor shall also comply with Caltrans Standard Drawings Specification, Encroachment Permits for all Contractor work on the Corridors.
1076	Contractor shall be responsible for all costs associated with any permits, plan reviews, and inspections related to ETTM System work.
1077	It shall also be Contractor's responsibility to prepare all Documentation required to install and adhere to the proper installation standards, law, ordinance, or codes.
1078	Contractor shall procure Services of Subcontractors qualified to work in this industry. If a vendor's component requires a vendor approved installer, Contractor shall use an approved component installer, including qualified vendor staff.

2.5.6 ETTM System Installation Requirements – Roadside Systems

1079	The Contractor's installation responsibilities for the Roadside Systems shall include but not be limited to the following, unless otherwise specified in the sub-sections below. Scope that is not defined but is deemed necessary to facilitate full operation and performance of the ETTM System as detailed in this Scope of Work and Requirements, shall be considered as part of the Agreement.
	<ul style="list-style-type: none"> • furnish new HVACs, and equipment cabinets, and external generators will be provided by Contractor, where existing generators are not re-used. Contractor shall furnish and install clean, uninterruptible power to all Equipment on the overhead structures/toll gantries, in cabinets and in the Equipment vaults.
	<ul style="list-style-type: none"> • furnish and install clean, uninterruptible power to all Equipment on the overhead structures/toll gantries and in Contractor-provided roadside cabinets.

	<ul style="list-style-type: none"> furnish and install all connecting conduit from wire ways and conduits provided and installed by others and/or stub conduits to the Equipment. The Design-Builder will install the conduits from the Equipment vaults to the demarcation point on the overhead structures/toll gantries.
	<ul style="list-style-type: none"> furnish and install separate ground wires for the ETTM System, surge protection devices (SPD), junction boxes, pull boxes, conduits, and other such items as required by the installation standards and Requirements.
	<ul style="list-style-type: none"> furnish and install all wiring for all Roadside System Equipment and connections to the Equipment racks in the vaults and/or to the roadside cabinets. This includes the proper termination of all power, communication, and RF cables and/or wiring (copper or fiber optic) required to connect the individual components into a fully operational System as specified in the Design Documentation.
	<ul style="list-style-type: none"> furnish and install all Equipment racks required for the in-lane System electronics in the vault.
	<ul style="list-style-type: none"> furnish and install all controller computers and other servers (Hardware and Software) into the Equipment racks and test the connection between the controllers and the RSS.
	<ul style="list-style-type: none"> furnish and install any additional servers (if required) in the Equipment racks, including Software, and test their respective connection to site controllers and the RSS.
	<ul style="list-style-type: none"> furnish and install all electronics and other devices in their respective Equipment racks as required to provide a fully operational ETTM System.
	<ul style="list-style-type: none"> furnish and install all Equipment mounting brackets or support structures for the installation of all Equipment on the mounting arms on overhead structures/toll gantries.
	<ul style="list-style-type: none"> furnish and install the AVD System Equipment, including in-pavement sensors and overhead mounted Equipment and controllers as specified in the Design Documentation. Includes all Authority Approved materials, Equipment and supplies required for saw-cutting, wiring and sealing of wires in the Roadside.
	<ul style="list-style-type: none"> Furnish and install the AVI System Equipment, including antennas, readers, related Equipment, cables, and any support brackets required. All AVI mounting Hardware, junction boxes, and cables shall be procured and supplied by Contractor.
	<ul style="list-style-type: none"> furnish and install the ICPS Equipment, including cameras, ICPS illumination, and any video Equipment, sensors, Software, controllers/servers, or specialty Equipment associated with the ICPS.
	<ul style="list-style-type: none"> validate all cable, wire and fiber terminations via a test process to ensure that the cable is connected to the correct location on each end and that the cable/wire/fiber is properly terminated.
	<ul style="list-style-type: none"> power up and provide a field check out/installation Acceptance test of all systems, to be witnessed and Approved by Authority. Provide the completed installation checklist as described in this Scope of Work and Requirements.
	<ul style="list-style-type: none"> furnish, install, calibrate and test the DVAS cameras and Equipment.
	<ul style="list-style-type: none"> integrate, calibrate and test the toll-related ETTM ITS elements

	<ul style="list-style-type: none"> furnish, install, configure and test all other items, materials, and Equipment to complete installation in accordance with the Agreement.
--	---

2.5.6.1 ETTM Installation Requirements – Roadside Systems - 91 Express Lanes

1080	Contractor shall install the ETTM System at the two (2) existing ETTM Toll Collection and Enforcement Sites. The sites currently support a toll collection and enforcement system which utilizes a dual gantry configuration.
1081	Contractor-provided ETTM System is permitted to utilize the existing gantries at the ETTM Toll Collection and Enforcement Sites, however the existing system shall not be decommissioned for that purpose. Contractor's approach may include removal from service of subsystems of the existing ETTM System to create space for installation on Contractor-provided ETTM System, so long as the AVI functionality on the existing system is not impacted until the final stages of the new system installation.
1082	The three (3) ETTM Transponder Read Sites shall be re-built to the final configuration and performance as outlined in Section 2.2. Any existing Equipment currently installed at those sites shall be dismantled and disposed of.
1083	All cameras in the existing ETTM Toll CCTV Camera Sites shall be replaced with new CCTV cameras as outlined in Section 2.2 and integrated with the existing ATMS operated by the Existing BOS Contractor. Support structures, conduits and junction boxes, and in-pavement traffic detectors at these sites are allowed to be re-used. Equipment supporting the traffic detectors may be re-used if it can integrate into the ATMS. All other ancillary components are to be removed and disposed of.
1084	All ETTM Toll Traffic Detector Sites shall be integrated into the existing ATMS. Any equipment replacement required to facilitate this shall be performed by Contractor.
1085	Toll Rate CMSs on the 91 Express Lanes do not require replacement or upgrade. Contractor shall not be required to integrate ETTM Toll Rate CMS Sites into the ATMS.

2.5.6.2 ETTM Installation Requirements – Roadside Systems - I-405 Express Lanes

1086	Contractor shall install the ETTM System at the six (6) ETTM Toll Collection and Enforcement Sites. Contractor shall install all Equipment and configuration items as defined in this Scope of Work and Requirements with the exception of the primary roadside cabinet. This cabinet shall be provided to the Design-Builder for installation.
1087	Contractor shall design, furnish, and install Equipment at the six (6) ETTM Transponder Read Sites. Contractor shall install all Equipment and configuration items as defined in this Scope of Work and Requirements with the exception of the primary roadside cabinet. This cabinet shall be provided to the Design-Builder for installation.
1088	Contractor shall design, furnish, and install Equipment at the nine (9) ETTM Toll Rate CMS Sites. Contractor shall install all Equipment and configuration items as defined in this Scope of Work and Requirements with the exception of the primary roadside cabinet. This cabinet shall be provided to the Design-Builder for installation.

1089	Contractor shall design, furnish, and install Equipment at 29 ETTM Toll CCTV Camera Sites and 51 ETTM Traffic Detection System Sites. The location of the sites shall be determined by the Design-Builder to comply with camera coverage (full facility coverage) and traffic detection (every 0.5 mile) requirements. Contractor shall install all Equipment and configuration items as defined in this Scope of Work and Requirements with the exception of the primary roadside cabinet. This cabinet shall be provided to the Design-Builder for installation.
1090	Contractor shall provide a design for any specialized arm, bracket, plate and any other ancillary used for mounting Equipment on any above-grade support structure to the Design-Builder. The Design-Builder will furnish and install the mounting items as part of the support structure installation.
1091	Contractor shall install power distribution (including breakers and panels), UPS, generator, fire suppression and security system in the TEB facility. Some Contractor-provided equipment may be installed by the Design-Builder, as outlined in Attachment 10: I-405 EL ETTM System Responsibility Matrix – Design-Builder and TSI and this Scope of Work and Requirements.
1092	Utility power shall be provided to all ETTM Sites by the Design-Builder. This will include all cabling and related infrastructure up to and including, the primary roadside cabinet in each site. The Design-Builder shall terminate power supply cables in the primary roadside cabinet on Contractor-provided termination panels.
1093	The ETTM Communications Network between all ETTM Sites (including the TEB) shall be provided by the Design-Builder. This will include fibers and all related infrastructure up to, and including, the primary roadside cabinet in each site. Contractor shall terminate fibers in the primary roadside cabinet on Contractor-provided termination panels.
1094	The Design-Builder shall notify Contractor a minimum of 120 Days in advance of all scheduled Design-Builder-provided ETTM System infrastructure construction and installation activities that require Contractor-provided equipment or coordination.
1095	Contractor shall coordinate with the Design-Builder any in-pavement installation within the Express Lanes roadway. Contractor shall be notified by the Design-Builder at least 60 Days prior to paving of Express Lanes roadway.
1096	Any Contractor-provided equipment that is to be installed by the Design-Builder (e.g. cabinets) shall be provided to the Design-Builder no more than 42 Days after receiving notification from the Design-Builder about a pick-up date for the equipment. Delivery of the equipment shall be at a location within a 25-mile radius of the project.
1097	Contractor shall be able to commence installations only after ETTM Sites have been turned-over to Contractor. All ETTM Sites shall be turned-over to Contractor from the Design-Builder after issuance of a "Certificate of ETTM System Infrastructure Turnover" by Authority.

2.5.7 ETTM System Installation Requirements – Roadway Support Systems (RSS)

Contractor is responsible for installation of all Equipment associated with the RSS and Operations at the primary RSS and Disaster Recovery (DR) locations identified in this Scope of Work and Requirements.

1098	Contractor shall install all RSS, including Host servers, TOC, and MOMS at the primary RSS and DR locations specified in this Scope of Work and Requirements and Approved by Authority.
1099	All servers, storage devices, communications Equipment, and other RSS Hardware shall be installed in the designated locations as prescribed in the drawings submitted by Contractor and Approved by Authority.
1100	Contractor is responsible for the following activities, including but not limited to: <ul style="list-style-type: none"> • furnish, install, configure and test the necessary servers in accordance with the Approved Design documents; • furnish, install and test the storage units and back-up devices; • furnish, install and test the network Equipment at the primary RSS and DR locations; • validate communications to the network Equipment at the vaults; • establish and validate communications from the RSS to all controllers at all ETTM Sites; • establish and validate communications from the RSS to the BOS. This applies both to the Existing BOS as well as the New BOS to be procured by Authority through separate procurement; • furnish, install and validate third-party Software and Contractor Software on all servers and Equipment required to support the RSS; • furnish, install, configure and test all servers and Equipment for correct point-to-point installation, proper connectivity, acceptable termination of all cables and successful communications linkage; • Configure the RSS support interfaces as defined in the Approved ICDs, and • furnish, install, configure and test all other items, materials, Equipment and Software required to complete installation of a fully functional RSS in accordance with the Agreement.

2.5.7.1 ETTM System Installation Requirements – RSS - 91 Express Lanes

1101	Contractor shall coordinate all RSS installations and testing of the LAN/WAN and interfaces to new or existing systems with Authority and the Existing BOS Contractor, as applicable.
1102	Contractor-provided RSS installations shall not require the removal of existing operational Equipment from any Authority facility/location, prior to decommissioning of such Equipment, following the transition of the ETTM System to the RSS.

2.5.7.2 ETTM System Installation Requirements – RSS - I-405 Express Lanes

1103	Contractor shall coordinate all new RSS installations and testing of the LAN/WAN and interfaces to new or existing systems with Authority and the New BOS Contractor, as applicable.
------	--

1104	In the case the existing Host and MOMS commissioned during the 91 Express Lanes ETTM System implementation are to be used for the I-405 Express Lanes ETTM System, any installation, modification, or integration tasks planned shall be coordinated with the BOS Contractor (future or existing, whichever applies).
------	---

2.5.8 Installation Plan

Contractor shall submit an Installation Plan that identifies its approach to installation and drawing package submissions, and covers the major elements of the installation, including coordination with relevant Contractors and existing systems.

1105	Contractor shall develop an Installation Plan for each ETTM Site that documents all installation related activities for the Project. The Installation Plan shall be the master document from which the elements of the System shall be installed.
1106	<p>The Installation Plan shall include and define, at a minimum, the following items:</p> <ul style="list-style-type: none"> • The installation schedule detailing all activities, shifts and resources for the installation of the ETTM System, including third-party and Contractor activities. Once the Baseline Implementation Schedule is Approved by Authority, Updates during the installation periods identifying all schedule changes and Work progress in the form of percentage completions shall be submitted to Authority for Approval; • The minimum resource allocation requirement for any installation phase and segment; • How Contractor manages delivery and staging of the Equipment to be installed, including any staging, installation and testing performed at Contractor or third-party facilities and their subsequent delivery and installation at the ETTM Sites; • The coordination between Contractor and any other contractor, including Design-BUILDER, service utility providers for establishment of electrical and phone services for supporting the operation of all ETTM System locations as necessary; • Transportation Management Plan (TMP) in accordance with Caltrans standards, including all MOT design for Lane Closures of Express Lanes, general purpose lanes, and ramps and connectors; • Coordination of Lane Closures with Authority or Design-BUILDER for each phase of the Project; • Coordination with Authority or Design-BUILDER for the installation of cabinets and generators, as applicable; • The Civil Site Acceptance Checklist to be used to inspect the Design-BUILDER's work; • The Communications Network Acceptance Checklist to be used to inspect the Design-BUILDER's work; • All Upgrades and changes required at each ETTM Site prior to installation to make sure the infrastructure meets the requirements of the Agreement and the System, unless previously coordinated or provided via an Authority-contracted civil contractor.

	<ul style="list-style-type: none"> • Coordination activities as applicable with other third-party entities for the various interfaces;
	<ul style="list-style-type: none"> • Testing of Contractor-provided WAN communications for connection to RSS and the BOS and ensuring that the network capacity is adequate;
	<ul style="list-style-type: none"> • Quality Control, Quality Assurance, inspection, and testing processes including validation of Contractor installation is per the installation drawings;
	<ul style="list-style-type: none"> • The order in which Equipment items are to be installed with estimated durations;
	<ul style="list-style-type: none"> • Special or unique installation Requirements;
	<ul style="list-style-type: none"> • A detailed component list and a description of how each item version number and serial number shall be recorded for each installation and configuration into the MOMS;
	<ul style="list-style-type: none"> • Organization Chart defining Key Team Personnel, roles and responsibilities and contact information. All Subcontractors shall be identified, and
	<ul style="list-style-type: none"> • Contingency Plan.

2.5.9 Installation Checklist

1107	Contractor shall develop an installation checklist that tracks the progress and completion of all ETTM System, installation activities for the ETTM System installation and the primary RSS and DR System facilities installation.
1108	The checklist shall be the document detailing those items required for the installation crew and technical team to complete the installation process for all Equipment and components, including terminations, connections, configurations, and installation crew/technical team that completed the installation.
1109	A copy of the checklist signed and approved by Contractor, attesting to the completeness of the installation, shall be provided to Authority after the completion of the installation activities for each site, for both Roadside and support facilities.
1110	Contractor shall conduct a final inspection of all installations and certify the installation Work.
1111	Authority reserves the right to obtain the services of a certified engineer to witness Contractor inspection and conduct an independent inspection. Contractor shall coordinate and support such inspections at each applicable site.
1112	The checklist shall identify all non-conformances, discrepancies and exceptions and Contractor shall be responsible for all corrections.
1113	The checklist shall document all changes identified during the installation process and all such changes shall be Approved by Authority.

2.5.10 Electrical Work

1114	Electrical Work to be performed under this Agreement shall include, but not be limited to the following general items of Work:
	<ul style="list-style-type: none"> • Provide and install surge protection devices as required to protect the all ETTM Systems and electronics.

	<ul style="list-style-type: none"> Install junction boxes and terminate new cable and conduit attachment devices, where applicable.
	<ul style="list-style-type: none"> Bond all conduits, manhole frames, and other conductive items to the grounding System in conformance with the NEC.
1115	All electrical Work shall be performed in accordance with the applicable regulations and Approved by Authority. Appropriate NEC compliance shall be adhered to with all electrical articles for installation pertaining to wiring, enclosures, and other electrical Equipment in hazardous locations. UL labels shall be provided for all electrical panel boards, enclosures, and accessories.
1116	Contractor shall verify that provided power feeds at each ETTM Site are appropriate for use with Contractor-provided Equipment. Electrical load calculations for each ETTM Site shall be submitted to Authority prior to installation.
1117	All electrical Equipment must be inspected prior to installation for defects that could damage the Equipment or harm personnel. Any Equipment found to have defects shall not be installed but shall instead be replaced with a fully functioning replacement.
1118	All electrical Equipment shall be properly grounded for safety. Equipment shall be furnished with grounding pads or grounding lugs. All ground connections shall be cleaned immediately prior to connection and protected from corrosion or rust if exposed to the elements.
1119	Contractor shall provide all grounding material required for installation and all installations shall be in compliance with the applicable standards and manufacturer's specifications.
1120	Contractor shall employ measures to prevent theft of cables during non-work hours, including securing junction boxes with locking mechanisms and properly labeling cables and junction boxes with cable types (e.g. fiber, aluminum, if applicable).

2.5.11 Work Standards and Requirements

1121	The System Equipment installation shall be performed to an Approved set of Plans, which has previously been submitted and Approved by Authority.
1122	Contractor shall provide Project management and oversight of all Work performed. At all times when installation Work is taking place, Contractor shall have an individual designated site manager onsite to supervise the installation.
1123	Contractor shall install the Equipment using experienced and knowledgeable personnel. For example, journeyman electricians shall terminate all cables, wiring, or fiber optic cables.
1124	All tools such as crimpers, fiber optic termination tools, and test Equipment shall have been properly calibrated prior to being used.
1125	Contractor shall provide a safe environment for the installation process in accordance with all applicable local, State and federal requirements, as well as any Authority policies. Examples include but are not limited to the following: <ul style="list-style-type: none"> safety harnesses shall be included and employed on all lifts, and the personnel trained on their use; hard hats and safety vest shall be worn in all construction areas;

	<ul style="list-style-type: none"> safety toe shoes shall be worn in construction areas and around active Roadsides while performing installation processes;
	<ul style="list-style-type: none"> Contractor issued identification badges shall be worn at all times; and
	<ul style="list-style-type: none"> regular safety meetings shall be scheduled to review safety procedures.

2.5.12 Design and Documentation during Construction and Installation

2.5.12.1 Engineering Design

1126	Contractor shall secure the services of a fully-qualified engineering design firm(s) for the purpose of performing any necessary infrastructure related Engineering Design (civil, structural, electrical, mechanical, and architectural) and the preparation of related plans and Documentation under the Agreement for any Design that impacts life safety.
1127	All Design Work shall be performed under the direct supervision of a Licensed Engineer of the appropriate discipline in the State of California. All design professionals shall be licensed and authorized to practice in the State of California.
1128	If the Engineering Design effort is performed by Contractor, Contractor shall submit Documentation showing that Contractor has met the required qualifications described in this section.
1129	All services provided under this Scope of Work shall meet or exceed the Project Standards as defined in Attachment 9: OCTA Project Standards .

2.5.12.2 Installation Design and Drawings

1130	Contractor's civil, mechanical, and electrical engineering installation drawings shall require a professional engineer (PE) approval and signature and shall be sealed by a PE in the appropriate discipline with a State of California license.
1131	Contractor shall submit shop drawings detailing the installation Design that shall be used onsite for installation Work. Detailed drawings shall be provided for each site where Equipment procured and supplied under the Agreement shall be installed.
1132	Contractor shall submit the following Design drawings as part of the drawing package in accordance with Authority submission Requirements for each ETTM Site where Equipment is installed, including but not limited to:
	<ul style="list-style-type: none"> detailed installation drawing for each piece of Equipment;
	<ul style="list-style-type: none"> detailed drawing showing the Equipment mounting brackets and details of their installation to the mounting arm;
	<ul style="list-style-type: none"> details related to the range of Equipment adjustments;
	<ul style="list-style-type: none"> detailed electrical schematics;
	<ul style="list-style-type: none"> power panel schedules;
	<ul style="list-style-type: none"> all junction boxes and panels;
	<ul style="list-style-type: none"> detailed Equipment rack layout and interconnections drawings;
	<ul style="list-style-type: none"> detailed communications layout;
	<ul style="list-style-type: none"> detailed conduit layout for power and communications;
	<ul style="list-style-type: none"> power and communications cabling schedules and

	<ul style="list-style-type: none"> pavement installation details for in-pavement sensor installations.
1133	Contractor shall use only the latest Approved drawing version for installation.
1134	During installation, Contractor shall maintain a red line version of the drawing package that is submitted to Authority upon the completion of the installation.
1135	Documentation shall include memos denoting changes or modification to Requirements.
1136	Contractor shall submit detailed component level network drawings showing all WAN, LAN and VLAN connections, including connection to the Roadside Systems, the RSS, the BOS, the TOCs, and other transportation agencies as determined during the Implementation Phase.
1137	Contractor shall utilize a predefined range of IP addresses provided by Authority and an IP schematic shall be submitted that shows all the IP addresses for all Contractor supplied Equipment on the network.
1138	Contractor shall submit detailed component level primary and DR server configuration instructions, including storage device mirroring, back-up devices and configuration, and network configuration and testing.
1139	Contractor shall submit detailed instructions on the installation and configuration of the operating System, database, third-party Software, and application Software on the servers as customized for Authority.
1140	All testing required to verify successful installation and operation shall also be documented.

2.5.12.3 As-Built Drawings/Documents

1141	Contractor shall update the latest drawings with red-lines as changes are incorporated during the installation and check-out process. At the completion of the installation of the ETTM System, Contractor shall gather all red line drawings into a single package.
1142	The red line drawings shall be verified and then incorporated into a final As-Built Drawing package. This final As-Built Drawing package shall include installation detail drawings, wiring diagrams, any mechanical drawings design or modified, manufacture's cable recommendations with detailed specifications, block diagrams, assembly diagrams, shop drawings and sketches, and other drawing types that may have been used to install the Roadside System.
1143	All other Documentation used regarding the installation shall be also be finalized and submitted as part of the As-Built Drawing Submittal ninety (90) Days after the last ETTM Site has been commissioned. This requirement shall apply separately to the 91 Express Lanes and the I-405 Express Lanes.

2.6 Electronic Toll and Traffic Management System Project Requirements

2.6.1 Roadside System Project Management

Contractor shall develop and employ a Project Management Plan (PMP) in accordance with Project Management Institute (PMI) Project Management Body of Knowledge (PMBOK) latest edition that is sufficiently detailed to enable Authority to review and confirm that Contractor has the necessary management, staff, and controls in place to meet the terms and conditions of the Agreement.

2.6.1.1 Program Management and Project Management Plan

The PMP describes how Contractor shall deliver, implement and manage the Project, including staffing, scheduling and communication procedures for controlling all correspondence, Submittals, and other communications between Contractor and Authority, as well as communications with other third-party entities. The PMP shall be in accordance with system engineering methodology wherever applicable.

1144	Contractor shall submit a complete PMP in a format acceptable to Authority for Approval thirty (30) Days after NTP1 as required in this Scope of Work and Requirements.
1145	<p>The PMP shall include, but is not limited to:</p> <ul style="list-style-type: none"> • Project Services and key Deliverables, tracked using a numbered Contract Deliverables Requirements List (CDRL); • a description of the staff management and organization of the Project, an organization chart, identification of Key Team Personnel and their associated responsibilities, and identification of the resources to be used in fulfilling the Requirements of the Contract; • a description of the Project planning, documenting and reporting methods to be utilized, both for use within Contractor's staff and externally with Authority; • approach to issue management, including communication, escalation and resolution of Project issues with Authority; • approach to communication management, including meeting schedules and team meetings; • the detailed Baseline Implementation Schedule, detailing all activities for the Implementation Phase, including third-parties and Subcontractors. • a description of the process for reporting and tracking the Approved Baseline Implementation Schedule and Project performance; • a description of the ETTM System Design and coordination process with Authority and Existing BOS Contractor during the Implementation Phase; • approach to change control management, consistent with terms and conditions of the Agreement, including a description of the process for documenting and submitting change requests, the Approval process and how the change control management approach shall be integrated into day-to-day Project management; • approach to document control, including utilizing Authority-provided electronic document management system (EDMS) that is accessible to the project team by username and password Software (Authority shall have the capability to download documents using this Software) and tools Authority will use and have access to via the Web; • approach to risk management; • approach to Quality Assurance and Quality Control; • approach to coordination with BOS Contractors; • approach to subcontractor management, including how issues with subcontractors will be resolved in a timely manner;

	<ul style="list-style-type: none"> • approach to procurement management;
	<ul style="list-style-type: none"> • documenting the invoice submission; invoice backup information; verification, and Approval process; including separate invoicing for the 91 Express Lanes and the I-405 Express Lanes;
	<ul style="list-style-type: none"> • a section with all Approved Project forms;
	<ul style="list-style-type: none"> • approach to Project Closeout; and
	<ul style="list-style-type: none"> • an emergency contact list as described further below.
1146	Contractor shall provide as a part of the PMP and then maintain a current emergency contact list for Authority use at all times for handling emergencies and escalations. The emergency contact list shall name Contractor's points of contact in order of preference, and shall include, at a minimum, Contractor's Project Principal, Project Manager, Deputy Project Manager and other relevant ETTM System support staff. The purpose of the emergency contact list is to ensure Contractor can be reached outside normal working hours to address urgent matters.
1147	Contractor shall obtain from Authority and then maintain and keep current an Authority emergency contact list at all times for notifying Authority in case of an emergency. The emergency contact list shall name primary and secondary (multiple secondary contacts as applicable) Authority's points of contact for each anticipated event or emergency.
1148	Contractor shall identify the tools and products used to manage the Project and the internal controls instituted by Contractor to guarantee successful delivery of the Project.
1149	Contractor shall develop and submit the communication procedures to Authority for review and Approval that address the following, including but not limited to:
	<ul style="list-style-type: none"> • Correspondence: correspondence shall be identified as to originator and designated receiver;
	<ul style="list-style-type: none"> • Document control: tracking of document versions and changes;
	<ul style="list-style-type: none"> • Invoices: all invoices shall be submitted with accompanying backup information in accordance with the Agreement's Payment Article;
	<ul style="list-style-type: none"> • Submittals: all Submittals shall be delivered as an enclosure to Contractor's Submittal letter. Each Submittal letter shall be limited to a single subject or item. Contractor's letter shall identify the Agreement number, Agreement name and subject of the Submittal; and
	<ul style="list-style-type: none"> • Agreement number and Agreement name: all items of correspondence, invoices, Submittals and Documentation shall contain the Agreement number and the designated Agreement name.

2.6.1.2 Monthly Report and Progress Meeting During the Implementation Phase

Monthly Project reports and progress meetings shall enable Authority and Contractor to monitor the status, progress, and quality of the Work performed on the Project and to take proactive steps to ensure successful delivery of the Project.

1150	Contractor shall provide and maintain a schedule for monthly progress meetings (in addition to periodic meetings such as Design/installation meetings during the active Design/installation periods) at a location designated by Authority. The meeting shall be scheduled no later than the 15th Day of the month immediately following the month under review.
1151	No less than seven (7) Days prior to the meeting, Contractor shall submit a draft monthly progress report to Authority for the period covering the previous month. Authority shall review and comment on the progress report prior to the meeting.
1152	The format of the monthly progress report shall be agreed upon as one of the initial Project tasks upon NTP1 and shall be incorporated by Contractor into the Project Management Plan.
1153	Contractor shall manage, facilitate and conduct the meetings in accordance with the agreed to format.
1154	<p>The monthly progress report includes but is not limited to:</p> <ul style="list-style-type: none"> • a summary outlining progress and status, and percentage of Work performed for each task as compared to planned activities in the Approved Baseline Implementation Schedule. Comments shall be included where appropriate. The summary should be a Dashboard-style report and shall identify status of key milestones; • an analysis of all critical path tasks, potential risks associated with the tasks and proposed contingency/work around plans to circumvent or mitigate delays to the Project; • identification of any Approved changes to Approved milestone dates and Approved Baseline Implementation Schedule, clearly noting the details and identifying the Agreement Amendment; • discussion of schedule compliance and an updated Baseline Implementation Schedule showing current status against the Approved Baseline Implementation Schedule; • construction/installation coordination status; • a risk log that tracks the status of all outstanding risks that need decision/resolution; • an updated action items list that tracks the status of all outstanding Deliverables (CDRL), activities and issues that need decision/resolution; • open payment requests, if applicable. For the Implementation Phase, payment requests must identify the payment milestone, number and dollar amount. Payments requests shall be made for completed and Approved milestone payments only. For Operations and Maintenance Phase, progress report shall include the invoice based on the Approved monthly Performance Report package. • a list of Approved and pending change requests (Contractor and Authority initiated) and their status; • the previous monthly final meeting minutes; and • a six (6) week look-ahead schedule; and

	<ul style="list-style-type: none"> • budget status and outlook for Authority Approved project milestones and work authorizations.
1155	No more than seven (7) Days after the meeting, Contractor shall submit the draft meeting minutes for Authority's review and Approval.

2.6.1.3 Project Meetings

1156	In addition to the Monthly Project Reports and Progress Meeting, weekly or bi-weekly Project status meetings, as applicable and Approved by Authority, and other regularly scheduled installation and ad-hoc Project meetings shall be required during the course of the Project to address specific Deliverables, work items, maintenance procedures and issues as they arise. The meetings shall include Authority, Caltrans (I-405 EL all meetings, 91 EL if necessary), the Design-Builder (I-405 EL only), and the BOS Contractor as required based on meeting content.
1157	Contractor shall perform the following tasks related to all meetings, including but not limited to:
	<ul style="list-style-type: none"> • develop and coordinate the Project meeting schedule;
	<ul style="list-style-type: none"> • manage, facilitate and conduct the meetings;
	<ul style="list-style-type: none"> • distribute Notices of Project meetings in accordance with document control Requirements;
	<ul style="list-style-type: none"> • prepare the agenda in coordination with Authority and distribute at least two (2) Days prior to the meeting;
	<ul style="list-style-type: none"> • attend the meeting with all required staff in attendance;
	<ul style="list-style-type: none"> • prepare minutes of the meeting and forward them to Authority within seven (7) Days after the Day of the meeting and
	<ul style="list-style-type: none"> • maintain an action item list for each type of meeting, identifying issues that need to be resolved at the Project level.

2.6.1.4 Baseline Implementation Schedule

The Baseline Implementation Schedule is a comprehensive list of Project milestones, activities and Deliverables, with planned start and finish dates, including a detailed Work Breakdown Structure (WBS) that identifies Project tasks down to the work package level and the activities required to complete the Work package Deliverables.

1158	Contractor shall provide and maintain a detailed Baseline Implementation Schedule for the Project for the ETTM System in Microsoft Project format (Project 2010 or Approved equivalent) that lists all Project activities and tasks for all Phases of the Project, including but not limited to:
	<ul style="list-style-type: none"> • planning;
	<ul style="list-style-type: none"> • design;
	<ul style="list-style-type: none"> • development;
	<ul style="list-style-type: none"> • Hardware and Software acquisition;
	<ul style="list-style-type: none"> • Documentation;

	<ul style="list-style-type: none"> • testing; • installation; • transition and • deployment and Acceptance of the System at the various tolling locations.
1159	The Baseline Implementation Schedule shall include coordination with the Design-Builder (I-405 EL only), Third-Party Service Providers, Business Partners and Authority and shall clearly document all interfacing tasks.
1160	The Baseline Implementation Schedule shall identify all milestones and tasks, starting with the NTP1 through the date of Acceptance for each Project phase. Sufficient information shall be shown on the Baseline Implementation Schedule to enable proper control and monitoring of the task and subtasks in this Scope of Work and Requirements.
1161	The Baseline Implementation Schedule shall be organized in accordance with the Work Breakdown Structure (WBS). Each Baseline Implementation Schedule activity shall be mapped to one and only one of the WBS elements.
1162	A unique identification number shall be used for each Project Implementation Schedule activity. Changes to activity IDs shall not be permitted. Consistent activity identification numbers, textual descriptions, and codes in all Baseline Implementation Schedule Submittals shall be used, in a way acceptable to Authority. Each Baseline Implementation Schedule Submittal shall be clearly identified. Resubmissions of Baseline Implementation Schedules shall use the same revision number as the original submission individually identified by a sequential appended letter (A, B, etc.), as an indication of a revised version.
1163	The Baseline Implementation Schedule shall be resource loaded, shall include all draft submissions and review cycles and shall include all tasks required of Authority and other third parties with critical tasks.
1164	The Baseline Implementation Schedule shall identify all critical path tasks and dependencies between tasks and shall be used to manage the Project. There shall be at least one continuous critical path in the Baseline Implementation Schedule, using the longest path definition that starts at the earliest occurring schedule activity in the network and ends at the latest occurring schedule activity in the network.
1165	The Baseline Implementation Schedule shall clearly define significant interaction points with Authority, Design-Builder, other civil contractors, and other entities such as Subcontractors, vendors and Suppliers, Caltrans, utilities, and local agencies.
1166	The Baseline Implementation Schedule shall clearly and uniquely define each activity description so Implementation Phase Work is readily identifiable and the progress on each activity can be readily verified without measuring.
1167	The Baseline Implementation Schedule shall use the retained logic method of calculating the critical path and show the order in which Contractor proposes to carry out the Implementation Phase Work with logical links between Implementation Phase Work activities and Design-Builder interfaces.
1168	The Baseline Implementation Schedule shall use schedule milestones to define significant contractual events, such as NTPs; Completion Deadlines; completion of Implementation Phase Work (by ETTM System Infrastructure Turnover area); and coordination points with outside entities.

1169	The Baseline Implementation Schedule shall include activities for design and design reviews that are broken down into sufficient detail that they may be monitored. Include third party reviews and Design-Builder reviews.
1170	The Baseline Implementation Schedule shall include interface milestones to denote the transition of work from one contractor to another. Contractor activities that relate to Design-Builder activities shall be preceded and/or followed by an interface milestone. This interface milestone shall be used to link Design-Builder activities to Contractor activities. Contractor shall work with Design-Builder to define interface milestones.
1171	The Baseline Implementation Schedule shall be submitted in a format acceptable to Authority for Approval fifteen (15) Days after NTP1 and shall be developed based on the Preliminary Implementation Schedule included in the Agreement, subject to changes Approved by Authority.
1172	Contractor shall update progress against the Baseline Implementation Schedule on a monthly basis, as identified in the Requirements for the monthly progress report. Reports shall include a compare of the last month's schedule to the current month's updated schedule. The date of the schedule shall be the last Day of the reporting month.
1173	Contractor shall use the Baseline Implementation Schedule as the basis for all subsequent schedules and updates throughout the duration of the Project.
1174	Contractor shall obtain Approval from Authority for any and all changes to the Approved Baseline Implementation Schedule and associated milestones in accordance with the Agreement.

2.6.1.5 Document Control

Document control is an integral part of Authority's proactive project management process for all Authority projects. Contractor shall provide and utilize an electronic document management system (EDMS) to submit, track, and manage all Project-related documents and drawings.

2.6.1.5.1 Electronic Document Management System (EDMS)

1175	Contractor shall provide and utilize an EDMS to track and manage all Project-related documents and drawings. The EDMS shall not be a proprietary system and shall be compatible with Authority's current EDMS. Contractor shall work with Authority to ensure that Contractor's EDMS is compatible with Authority's EDMS and processes are compatible. Contractor's EDMS is subject to Authority review and approval.
1176	Contractor shall establish a EDMS no later than 30 Days after NTP1 and shall maintain the EDMS throughout the Agreement Term.
1177	Contractor shall submit a file structure and index for the electronic documents for Authority review and approval. Online instructions and procedures for use of the EDMS shall also be provided and submitted for Authority review and approval. The file structure, index and online instructions shall be updated and kept current throughout the Agreement Term.
1178	Authority and Authorized Users shall be able to access the EDMS.
1179	Contractor shall provide training and EDMS support to Authority and other Authorized Users who require access to the EDMS, including all reviewers of project documents. If applicable, the Contractor shall provide all licenses for Authority use of the EDMS.

1180	The EDMS shall ensure that all incoming and outgoing Project-related Documentation is electronically and physically accounted for and filed.
1181	Each document shall be properly titled (per an agreed upon naming convention), date updated, numbered by revision and version and shall incorporate signature blocks for authorship and approvals.
1182	All Documentation regarding the Roadside System Equipment and RSS Equipment installation shall be maintained by Contractor. All drawings and other such Documentation shall be made accessible to Authority for review on a periodic basis as Approved by Authority. Contractor shall identify and track the status of all Deliverables/Submittals on the Project via the use of a Contract Deliverables Requirements List (CDRL) maintained by Contractor.
1183	Contractor shall maintain all non-conformance reports (NCR) submitted by Authority and document the correction and resolution of all issues identified.

2.6.1.5.2 Document Submittal and Review

1184	Contractor and Authority shall use the EDMS to track, electronically manage, exchange, and store all Documentation, drawings, technical reports, specifications, calculations, control of materials, meeting minutes, correspondence to and from Authority, and other Project-related documents. Contractor shall also establish document routing, filing, control, and retrieval methods that are compatible with Authority's EDMS. Document control, storage, and retrieval methods shall include the use of both hard copies and electronic records.
1185	Contractor shall be required to submit certain Deliverables and Documentation to the Design-Builder and review Design-Builder's deliverables. Contractor shall use Design-Builder's EDMS (Aconex) to exchange all Deliverables, Documentation, drawings, and other Project-related documents with Design-Builder. Contractor shall comment using Design-Builder's deliverable review form for each Design-Builder deliverable.
1186	Contractor shall submit Deliverables to Authority in accordance with the Approved Baseline Implementation Schedule. If a Deliverable is submitted on a date other than that shown on the Approved Baseline Implementation Schedule (either prior to or after Submittal date shown in Approved Baseline Implementation Schedule), Contractor shall notify Authority of the updated Submittal date at least 14 Days prior to submitting the Deliverable.
1187	Contractor may request an informal over the shoulder Deliverable review meeting in advance of any Submittal. The purpose of informal over the shoulder Deliverable review meetings is for Contractor to introduce their proposed approach and get feedback from the Authority to expedite reviews. Conducting an over the shoulder Deliverable review meeting does not relieve Authority of any review durations as defined herein.

1188	Contractor shall provide a Customer Review Form (CRF) with each submitted document. Authority shall populate the CRF and provide Contractor with written comments on all submitted documents. Contractor shall respond in writing to all comments through the CRF. Contractor may schedule and conduct meetings to clarify and resolve any remaining questions and issues concerning the comments and responses provided. Contractor shall prepare a revised version of the document for Approval by Authority. The Submittal document shall not be considered Approved until all written comments are addressed to the satisfaction of the Authority in their sole discretion. Such lack of Approval shall be considered a rejection until such time as the comments are fully resolved.
1189	Authority may reject any Submittal where information submitted is considered, by Authority, in its sole discretion, insufficient to conduct a proper review or actions arising from the review require significant revisions or otherwise not in accordance with the Agreement. Contractor shall be responsible for making necessary corrections to the Submittal and resubmitting it to Authority.
1190	For documents containing less than 100 pages, Authority shall have 30 Days after receipt of the Submittal, to Approve, comment or reject the Submittal. For the System Detailed Design Document, Requirements Traceability Matrix, and other documents containing 100 or more pages, Authority shall have 45 Days after receipt of the Submittal, to Approve, comment or reject the Submittal. The process shall continue until the Submittal is Approved by Authority.
1191	If a Deliverable is submitted to Authority without 14 Days notice, Authority shall have 7 additional Days after receipt of the Submittal to Approve, comment, or reject the Submittal.
1192	Authority may request supplemental supporting information to any Submittal under review. Contractor shall supply such information in the form and within the timeframe requested by Authority. Authority may reject a Submittal if supplemental supporting information requested by Authority is not provided by Contractor.

2.6.1.5.3 Document Review Constraints

Documents shall be submitted for review by Authority per **Table 2-3: Submittal Constraints**.

Table 2-3: Submittal Constraints

Deliverable	Allowable number of Submittals per week	Total number of Submittals allowed in the aggregate pending review at any given time
System Detailed Design Document	1	1
Requirements Traceability Matrix	1	
All Other Deliverables	2	2

2.6.1.5.4 Document Control Work Plan

1193	Contractor shall prepare and submit a Document Control Work Plan to Authority for review and obtain Approval no later than 30 Days after NTP1. The Document Control Work Plan shall describe how documents are named, tracked, submitted, routed and reviewed and shall include the following, at a minimum:
------	--

	<ul style="list-style-type: none"> • File structure and relationship with the WBS;
	<ul style="list-style-type: none"> • Naming convention and resubmittal naming convention;
	<ul style="list-style-type: none"> • EDMS procedures, including incorporation of documents into the EDMS, document deletion procedures, and EDMS backup and recovery;
	<ul style="list-style-type: none"> • Flow charts depicting the routing and processing of documents;
	<ul style="list-style-type: none"> • Persons involved in document control and their responsibilities;
	<ul style="list-style-type: none"> • The handling and filing of hard copy documents;
	<ul style="list-style-type: none"> • Comment log; and
	<ul style="list-style-type: none"> • Submittal log in EDMS.

2.6.1.5.5 Document Delivery

1194	Prior to Project Acceptance, Contractor shall deliver a full and complete backup of the EDMS to Authority. This backup shall include all files in electronic format.
1195	Annually, and as part of the Annual Certification testing, Contractor shall deliver a full and complete backup of the EDMS to Authority.
1196	Contractor shall prepare and submit Deliverables which shall, at a minimum, comply with the following:
	<ul style="list-style-type: none"> • All Deliverable documents shall be submitted in the EDMS;
	<ul style="list-style-type: none"> • All Deliverable documents shall be submitted in the native editable format (i.e. Microsoft, pdf, etc.);
	<ul style="list-style-type: none"> • Contractor shall submit all Deliverable documents in the English language. All Deliverable documents shall be maintained in formats found in the Microsoft Office suite;
	<ul style="list-style-type: none"> • Documents may be combined with pre-approval from Authority;
	<ul style="list-style-type: none"> • All documents shall include a title block that states the version number, required reviewers, date submitted, and approval status;
	<ul style="list-style-type: none"> • Each resubmittal shall include an Authority comment review log filled out with how Contractor addressed Authority's comments;
	<ul style="list-style-type: none"> • All updated submissions of a document also shall include a red-lined version showing all revisions to the document since the last submission;
	<ul style="list-style-type: none"> • Contractor shall maintain a Deliverable tracking list that includes provisions for submissions, review of comments, resubmissions and final approval; and
	<ul style="list-style-type: none"> • Contractor is responsible for submitting as many drafts as necessary to resolve Authority comments.

2.6.2 End of Contract Transition

Contractor acknowledges that the Services it provides under the terms of the Agreement are vital to the successful operation of the ETTM System and that said Services shall be continued without interruption. Upon expiration or termination of the Agreement by any of the parties, a successor may be responsible for providing these Services. Contractor agrees to exercise its best efforts and cooperation to affect an orderly and efficient transition to a successor.

1197	Contractor shall develop an End of Contract Transition Plan describing the nature and extent of transition Services required.
1198	The End of Contract Transition Plan and dates for transferring responsibilities for each division/element of Work shall be submitted to Authority within 180 Days of Authority's Acceptance of the ETTM System. Upon completion of Authority's review, both parties shall meet and resolve any additional Requirements/differences.
1199	The End of Contract Transition Plan is considered a living document; Contractor shall amend and submit changes to the End of Contract Transition Plan for approval by Authority as changes occur to the ETTM System.
1200	During the transition from Contractor to another Contractor, and upon Authority's written Notice, Contractor shall provide transition Services for a period of one year, or until all transition activities are completed, as defined by Authority and as further set forth in the Special Conditions of the Agreement.
1201	Contractor shall update the End of Contract Transition Plan with the successor within 90 Days of notification of the successor.
1202	Contractor shall provide sufficient experienced personnel in each division/element of Work during the entire transition period to ensure that the quality of Services are maintained at the levels required by this Agreement.
1203	Contractor shall provide sufficient staff to help the successor maintain the continuity and consistency of the Services required by the Agreement.
1204	Contractor shall provide the necessary Software and Systems support Services to assist the successor Contractor in setting up the systems, transferring of appropriate licenses and third-party Software, and transition of all ETTM System data required to sustain uninterrupted service in areas in which Contractor is responsible for the Work.
1205	Contractor shall support Authority during the procurement process by updating all system Documentation and providing new Documentation as required that details the current system.
1206	Contractor shall make all necessary provisions for transferring any leases or sub-leases held by Contractor to Authority, including without limitation, all keys; security codes and other codes and other facility access information or devices.
1207	Contractor shall make all other records, documents, data and Software (including cloud-based, if applicable) which is licensed to Authority and pertaining to the Services rendered for this Agreement available within thirty (30) Days upon written Notice or as otherwise provided in the executed License Agreement.
1208	Contractor shall make all operational records, documents, data, Systems, specialty tools, spares and Equipment, and facilities (including cloud-based, if applicable) required to support and maintain Day-to-Day Services being rendered under this Agreement available before the date of such termination, suspension, or expiration.

2.6.3 Software Design and Development Requirements

To ensure the Design Requirements for the ETTM System are fully understood by Authority and Contractor, a series of Requirements and Design review steps are specified following a sequential Design process. The Agreement Conformed Scope of Work and Requirements Document (CSWRD) shall be the basis for Contractor to develop a Requirements Traceability Matrix (RTM).

The RTM shall allow for verification that each of the Requirements in the CSWRD have been addressed in the Design and documented in the System Detailed Design Document (SDDD) and the Master Test Plan (MTP) and its test procedures. The RTM shall be the basis for all Design, development and testing efforts and Documentation to be developed by Contractor.

1209	Contractor shall establish and maintain a Software Design and development program to ensure compliance with this Scope of Work and Requirements.
1210	Contractor shall employ appropriate techniques and methodologies to develop the ETM System Requirements and ensure compliance with the Business Rules for the Project.
1211	Prior to conducting any workshops, Requirements reviews, focus group meetings or Design reviews, Contractor shall develop the necessary Documentation for Authority to review and shall submit the Documentation for review no less than fourteen (14) Days prior to such meetings.

2.6.3.1 System Requirements Review (SRR)

Contractor shall conduct a series of System Requirements Review meetings with Authority (the BOS Contractor shall attend as required based on meeting content) to validate all Requirements and ensure Contractor's understanding of the Requirements.

1212	Contractor shall manage, facilitate, and conduct a series of System Requirements review meetings with Authority to outline how this Scope of Work and Requirements shall be met. The outcome of these meetings shall be a Requirements Traceability Matrix (RTM) that shall be used to validate each Requirement against a Design item(s), Design Documentation and testing procedure(s).
1213	Contractor shall present lane logic, transaction framing rules, trip construction and pricing rules of the solution.

2.6.3.2 Business Rules Development

Contractor shall conduct a series of Business Rules workshops with Authority and the BOS Contractor to develop and update the Business Rules document. Contractor shall be responsible for making updates to the Business Rules which pertain to ETM System; however, Authority will maintain ownership of the Business Rules Document. The Business Rules will be presented in a narrative format describing each Business Rule and the Business Rules will include enough granularity to clearly identify rules and constraints which govern business operations.

1214	Contractor shall manage, facilitate, and conduct Business Rules review workshops with Authority for each Roadside Project phase to modify the Business Rules for the ETM System, including the Roadside System and the RSS, against the current baseline.
1215	the Business Rules workshops can occur concurrent to the System Requirements reviews and shall be an iterative process.
1216	the Business Rules review workshops shall include Contractor and Authority staff who will provide expertise on the current and future business operations.
1217	Contractor shall conduct a minimum of three Business Rules workshops.
1218	Contractor shall utilize the current Business Rules as a baseline and facilitate discussions to verify and update the Business Rules to reflect current business functions.

1219	The Business Rules shall include enough granularity to clearly identify rules and constraints which govern business operations.
1220	The iterative series of workshops and demonstrations shall continue until the above Business Rules Requirements are satisfied and the Business Rules are Approved by Authority.
1221	Contractor shall provide Business Rules utilized at other AET Facilities and Express Lanes Toll Facilities; however, they shall be tailored to meet Authority's Requirements and shall comply with this Scope of Work and Requirements.
1222	Contractor shall track the design, development and testing of the Business Rules through the RTM.
1223	Contractor shall proof all Business Rules against the system requirements

2.6.3.3 Use Cases Workshops

Contractor shall conduct a series of use case workshops with Authority and BOS Contractor to develop use cases. The outcome of these meetings shall be a series of use case documents that shall be used in conjunction with the Business Rules and test procedures to validate the Requirements.

1224	Contractor shall manage, facilitate and conduct a minimum of three use case workshops with Authority to develop the use cases that shall be used in conjunction with test procedures to validate this Scope of Work and Requirements have been met.
1225	The iterative series of workshops and demonstrations shall continue until the above use case Requirements are satisfied and the use cases are Approved by Authority.

2.6.3.4 System Detailed Design Review Meetings and Workshops

Based on the RTM and Business Rules documents, Contractor shall design the ETTM System and submit a preliminary design document for Authority to review and provide comments. Contractor shall then conduct a series of design meetings and workshops with Authority and the BOS Contractor to address the comments and to create the SDDD, defining how the System Design shall meet the Requirements. Upon the Submittal of an updated SDDD another review cycle shall take place.

1226	the Business Rules document and the RTM shall be used to develop the System Design and the SDDD.
1227	Contractor shall schedule design meetings with Authority to review and fully understand the Design Requirements.
1228	Contractor shall manage, facilitate and conduct the workshops and meetings.
1229	Contractor shall support a phased design process to support the anticipated phased implementation of the ETTM System on Authority Roadsides. The Design process shall accommodate for the changes in technology that is inevitable given the duration of the Project.
1230	Contractor shall demonstrate pre-production working products (such as, beta versions) during the design review process, and stakeholders shall be walked through the workflow, utilizing screens and data flow diagrams.

1231	Contractor shall explain how the System Design meets the RTM, the Business Rules and this Scope of Work and Requirements.
1232	Contractor shall conduct as many meetings and submission review cycles as deemed necessary by Authority to address all design issues to Authority's satisfaction.

2.6.3.5 Reports Design Workshops

Contractor shall conduct a series of workshops with Authority and the BOS Contractor (as needed) to facilitate the design of the ETTM System reports required by Authority.

1233	Contractor shall manage, facilitate, and conduct a minimum of three reports design workshops.
1234	One report design workshop shall be designated for the development of reporting monthly and annual system certification KPI results.
1235	The reports design process shall be iterative and Contractor shall conduct multiple workshops with Authority's stakeholders sufficient to obtain Authority's informed input. Contractor shall bring its subject matter experts (SMEs) to the workshops, including as example, maintenance and finance/accounting staff, as appropriate for the report type(s) being reviewed during the meeting. The iterative series of workshops and demonstrations shall continue until the above reports Requirements are satisfied and the reports are Approved by Authority.
1236	Subject matter experts shall provide a means for fully explaining each report, its intended purpose, columns, fields and components and its connection with other reconciling and validating reports.
1237	Upon receiving feedback from Authority, Contractor shall develop/modify the reports and submit the updated reports for review.
1238	The modified and new reports shall be demonstrated to Authority using accurate and reconciled data. Reports that are expected to reconcile to one another shall be demonstrated together.

2.6.3.6 Software Walkthroughs

The intent of the Software walkthrough is to provide an overall status on Contractor's Software development progress to ensure Contractor is on track to deliver the Project on schedule and to obtain Authority's feedback on the direction of the development prior to the full rollout of the Software. Lastly it allows Authority to observe the ETTM System in operation. Unlike Software detailed design reviews, these walkthroughs shall demonstrate actual transactions/trips in a test environment.

1239	Contractor shall manage, facilitate and conduct the walkthroughs.
1240	Contractor shall conduct a series of Software walkthroughs including product demonstrations to solicit input from Authority during the development of the ETTM System. Contractor shall segment each meeting by functional area and schedule each walkthrough meeting to align with the participants' availability. No less than four (4), four (4) hour meetings will be conducted; however, if more meetings are required Contractor shall conduct as many meetings as necessary to cover all Software.

1241	Prior to the Software walkthrough, Contractor shall develop and submit the use cases that shall be demonstrated to Authority for review and Approval. Real transactions/trips and images from each of Authority's Roadways shall be utilized for the walkthrough. The walkthrough shall follow the process flow and emulate normal Operations.
1242	The product shall be demonstrated in a test environment that allows data to flow as it will in the final integrated System.
1243	The Software walkthrough shall demonstrate to Authority that the developed Software product meets this Scope of Work and Requirements.
1244	Comments and feedback provided during the Software walkthrough shall be documented and resolved by Contractor and the resolution shall be Approved by Authority.
1245	Contractor shall be responsible for identifying and correcting any Software issues or defects in its Design or product that impact Contractor's ability to deliver the ETTM System that meets this Scope of Work and Requirements. This shall apply to issues or defects found during or after Software walkthrough or in the subsequent testing and Implementation. Any such changes to address these issues shall be Approved by Authority in writing.

2.6.4 Documentation

Contractor is required to provide Documentation, including but not limited to Documentation for Hardware; Software; Requirements; Business Rules; Design; testing; installation and Maintenance, both Contractor-developed Documentation and third-party Documentation. Contractor's Documentation Requirements and Documentation schedule shall be as set out in Contractor's Approved Project Management Plan and Contractor's Approved Baseline Implementation Schedule, in accordance with this Scope of Work and Requirements. All Documentation provided under this Agreement shall meet the Requirements described below.

1246	Contractor shall prepare and submit all Documentation to Authority for review and approval in accordance with the Approved Baseline Implementation Schedule.
1247	Each document shall be properly titled, date updated, numbered by revision, revision history, and version, and shall incorporate signature blocks for authorship and Approvals.
1248	Contractor shall utilize acceptable standards agreed upon by Contractor and Authority when updating documents and submitting revisions.
1249	All Documentation submitted by Contractor under this Agreement shall be accurate and comply with the terms and conditions of the Agreement.
1250	A table of contents, for all Documentation that includes multiple pages and/or multiple sections, shall be submitted by Contractor to Authority for review and comment prior to the submission of the preliminary draft as part of the Deliverables Expectation Document.
1251	The Deliverables Expectation Document shall include all subsections and a summary narrative for each section describing the assumptions and approach.
1252	Contractor shall submit preliminary draft and final draft documents to Authority for review and comment, followed by 100 percent complete documents that incorporate all Authority's review comments.

1253	Authority shall have the right to require additional interim drafts from Contractor at no additional cost should the draft Documentation submitted not be of adequate quality, have missing or incorrect information or if it does not satisfactorily address Authority's review comments.
1254	Contractor shall submit two (2) hard copies and the electronic version of all Contractor developed Documentation for Authority review and Approval unless directed by Authority. Acceptable electronic formats are Microsoft Office 2010 Suite (or higher), unsecured and indexed Portable Document Format (PDF), Excel (as appropriate), and professional CAD applications for Contractor-prepared Documentation.
1255	Contractor shall update Documentation as changes occur through the Implementation Phase and the Operations and Maintenance Phase. All changes shall be submitted to Authority for Approval. Contractor shall maintain a document Submittals list on the Authority-provided EDMS identifying all versions of documents, the date submitted, the nature of changes and identify what changes are within the Documentation.
1256	The Documentation package for all Submittals as applicable shall include all required CDs or USB drives with applicable Software to install, operate and maintain the System/Deliverable/document being supplied.
1257	All Documentation submitted by Contractor under this Agreement shall be the property of Authority and shall not be marked with "Proprietary", "Confidential" or other limiting designation unless agreed to by Authority.

2.6.4.1 Requirements Traceability Matrix (RTM)

1258	Upon completion of the System Requirements review process Contractor shall develop and submit an RTM to Authority for Approval that details all the technical and functional Requirements for the ETTM System.
1259	Contractor shall develop and submit an RTM that identifies each Requirement and where it is addressed in the design and testing, including but not limited to: <ul style="list-style-type: none"> • listing and multiple levels of categorization (e.g., functional, interfaces, Modules, etc.) of all Requirements; • identification of the source of all Requirements; • identification of the design section of the SDDD that addresses the Requirement; • identification of the test procedures that address the Requirement; • identification of the test method to validate the Requirement (e.g., via inspection, demonstration, analysis, test) and • identification of any Business Rules associated with each Requirement.
1260	The RTM shall build on the specifications documented in the CSWRD and shall capture all user needs identified during the Requirements review process.
1261	During the design and development of the Software, Contractor shall update the RTM to reflect any changes to the Requirements that have been Approved by Authority through the project's change control management process.
1262	During Design and testing, the RTM shall be used to verify the System compliance to this Scope of Work and Requirements.

1263	Upon Approval of the RTM, this document shall be the basis for functional verification of Design, development and testing.
------	--

2.6.4.2 Business Rules Document

As an outcome of the Business Rules workshops, Contractor shall provide a Business Rules Document.

1264	Contractor shall submit a Business Rules Document (leveraged from a current baseline provided by Authority) to Authority for Approval that includes but is not limited to: <ul style="list-style-type: none"> • detailed Business Rules for all aspects of the ETTM System, including policies and processes developed by Contractor and Approved by Authority; • detailed description of all System Configurable options, ranges and thresholds (Configurable within the System or Configurable by Authorized User) for each Business Rule (if applicable); • categorization of all Business Rules, providing indication for the source of the Business Rule; • cross-referencing of all Business Rules to the underlying Requirements, SDDD; and • System and operational impacts of each Business Rule.
1265	Contractor shall provide updates to the Business Rules document to Authority and/or the BOS Contractor for the remainder of the Agreement Term with any changes to the ETTM System.

2.6.4.3 System Detailed Design Document (SDDD)

Contractor shall submit a SDDD to the Authority for the Design and Implementation of 91 Express Lanes ETTM System. Contractor shall submit revised SDDD to the Authority for the Design and Implementation of I-405 Express Lanes ETTM System, if applicable.

1266	Contractor shall engage with the Design-Builder immediately upon NTP1 to develop Roadside System Design plans in coordination with the Design-Builder's I-405 ETTM System Infrastructure Design.
1267	Contractor shall develop and submit a SDDD to Authority for Approval that describes the design specifications of all Hardware and Software provided as part of the ETTM System to meet this Scope of Work and Requirements. The SDDD shall demonstrate that Contractor understands the functional, technical and Performance Requirements of the ETTM System and has the processes, Hardware and Software design in place to provide a high-quality and reliable product that meets this Scope of Work and Requirements.
1268	The SDDD shall be clear, well-written and organized, as well as clearly differentiate and document differences between the 91 Express Lanes and the I-405 Express Lanes in all areas;
1269	The SDDD shall include the use of diagrams, figures, tables and examples, and it shall apply to all environments, including production, Data Warehouse, Disaster Recovery, training, testing, and post Go-Live manual and Authority issued help desk tickets (issued by email, phone, or text message) to the MOMS.
1270	The SDDD shall include but not be limited to:

	<ul style="list-style-type: none"> physical and logical diagrams that identifies such items as, but not limited to: the systems, how they're linked, where they're located, interfaces, etc.;
	<ul style="list-style-type: none"> System architecture (cloud-based architecture, if applicable), including equipment layout diagrams;
	<ul style="list-style-type: none"> in-lane Equipment layout for each ETTM Site type,
	<ul style="list-style-type: none"> physical connections and interfaces to the ETTM System Infrastructure;
	<ul style="list-style-type: none"> placement of the Equipment on the toll gantry;
	<ul style="list-style-type: none"> lane layout electrical and logic diagrams;
	<ul style="list-style-type: none"> Shadow dynamic pricing algorithm details including handling of various traffic scenarios and failures;
	<ul style="list-style-type: none"> methodology, logic, process flows and confidence level thresholds (for license plate number, jurisdiction and license plate type) related to automated OCR/ALPR image processing and manual image review, including image review screens;
	<ul style="list-style-type: none"> Dashboard layouts and design;
	<ul style="list-style-type: none"> details on the interface to the Toll Rate CMS and handling of failures;
	<ul style="list-style-type: none"> the Requirements for all peripheral device interfaces and control;
	<ul style="list-style-type: none"> Roadside server design, including sizing and processing calculations;
	<ul style="list-style-type: none"> storage system design, including sizing and processing calculations;
	<ul style="list-style-type: none"> data backup Systems design, including sizing and processing calculations;
	<ul style="list-style-type: none"> network sizing and design details including IP scheme;
	<ul style="list-style-type: none"> cabinet/hub/Equipment rack layout and interconnections;
	<ul style="list-style-type: none"> cabinet/hub/Equipment rack space Requirements;
	<ul style="list-style-type: none"> UPS sizing information detailing all Equipment on the UPS(s) and their total power Requirements;
	<ul style="list-style-type: none"> high System availability design, including servers, storage, network, database and application;
	<ul style="list-style-type: none"> Disaster Recovery design, including servers, storage, secondary RSS, network, database, data resiliency and application;
	<ul style="list-style-type: none"> Hardware dependencies and inter-dependencies;
	<ul style="list-style-type: none"> detailed primary and Disaster Recovery locations rack and server placement Design;
	<ul style="list-style-type: none"> detailed infrastructure Software design,
	<ul style="list-style-type: none"> detailed operating systems design;
	<ul style="list-style-type: none"> detailed peripherals configurations, including Requirements for all peripheral device interfaces and control;
	<ul style="list-style-type: none"> all internal System interfaces;
	<ul style="list-style-type: none"> all custom developed Software;
	<ul style="list-style-type: none"> all Software provided by Contractor or a third-party;
	<ul style="list-style-type: none"> Software dependencies and inter-dependencies;

	<ul style="list-style-type: none"> detailed database design, schema and data modeling, including sizing and processing calculations;
	<ul style="list-style-type: none"> Entity Relationship Diagram (ERD):
	<ul style="list-style-type: none"> data flow diagrams, state diagrams and data queues;
	<ul style="list-style-type: none"> Module level descriptions and interaction among various Modules;
	<ul style="list-style-type: none"> detailed description to the Module and/or process level for all of the functions according to the functional Requirements of the System;
	<ul style="list-style-type: none"> lane logic and vehicle framing design and rules with illustrations;
	<ul style="list-style-type: none"> degraded mode of Operations and impacts of failures on System Operations;
	<ul style="list-style-type: none"> transaction audit and pre-processing;
	<ul style="list-style-type: none"> transaction processing design, including sizing and processing calculations;
	<ul style="list-style-type: none"> detailed interface specifications between all Software components;
	<ul style="list-style-type: none"> Design of all System interfaces (both sides of the interface), including electronic interface to the RSS and BOS.
	<ul style="list-style-type: none"> detailed data management design and processes, including summarization, archiving and purging;
	<ul style="list-style-type: none"> all user interfaces (including reports and screen formats);
	<ul style="list-style-type: none"> System data dictionaries;
	<ul style="list-style-type: none"> application performance monitoring design;
	<ul style="list-style-type: none"> access/identity security methodology;
	<ul style="list-style-type: none"> Access Control and Security Monitoring System layout and interconnections;
	<ul style="list-style-type: none"> environmental specifications;
	<ul style="list-style-type: none"> specification sheets for all Equipment;
	<ul style="list-style-type: none"> complete Bill of Materials, including Hardware, Software and support/Maintenance agreements, and
	<ul style="list-style-type: none"> A logical division and an index of all contents within the SDDD.
1271	Upon the completion of the Software development, and prior to the start of the Roadside System formal testing, Contractor shall submit the final updated SDDD that includes all changes/clarifications made during the Software development and testing phases.

2.6.4.4 ETTM System Installation Design Package

Contractor shall submit an ETTM System Installation Design Package to the Authority for the Design and Implementation of 91 Express Lanes ETTM System. Contractor shall submit revised ETTM System Installation Design Package to the Authority for the Design and Implementation of I-405 Express Lanes ETTM System, if applicable.

1272	Contractor shall submit an ETTM System Installation Design Package to Authority for Approval.
------	---

1273	Generally speaking, Contractor's design Submittals will not be required to be signed / sealed by a licensed engineer. However, should Contractor provide custom manufactured infrastructure that is structural in nature or other structure(s) or appurtenances (e.g. Equipment mounting brackets, Equipment arms, etc.) that have the potential to impact life safety Contractor shall secure the services of a fully-qualified engineering design firm(s) licensed in California for the purpose of performing engineering design and the preparation of related Plans and Documentation under the Agreement.
1274	Contractor shall develop a half-size (11" by 17") set of drawings providing sufficient and accurate detail to install the System components.
1275	In addition, the drawing shall contain notes and other detail defining specific processes that cannot be graphically depicted. The notes shall also be used to delineate specifications, tolerances, special conditions, or any other factor required to install and integrate a fully functional System.
1276	<p>The drawings shall include but not be limited to the following:</p> <ul style="list-style-type: none"> • lane geometry and dimensions of actual size and placement of all Roadside Equipment; • details on all existing equipment, conduits, junction boxes and panels that will be re-used clearly identifying any temporary installations; • Equipment bracket mounting detail to the mounting arm; • specifications and tolerances; • conduit and cable schedule showing all conduits, cables and wires used for each ETTM Site; • placement of in-road components; • size and depth of loop cuts; • loop tolerances (induction, resistance, impedance, Q factor); • any specific infrastructure limitations (i.e. proximity of rebar); • any specific requirement of how the loop cable is placed into the cuts; • all homeruns from loops; • any cable twist requirements for loop homeruns; • placement of overhead sensors; • details describing termination process for each termination; • lightning and surge suppression system; • a graphical diagram of the network connectivity and data flow; • detailed interconnection diagrams for all Systems; • detailed electrical schematics, and • detailed communications layout.

2.6.4.5 Roadway Support Systems (RSS) Installation Design Documentation

Contractor shall submit a RSS Installation Design Documentation to the Authority for the Design and Implementation of 91 Express Lanes ETTM System. Contractor shall submit revised RSS

Installation Design Documentation to the Authority for the Design and Implementation of I-405 Express Lanes ETTM System, if applicable.

1277	Contractor shall submit RSS Installation Design Documentation to Authority for Approval.
1278	Contractor shall develop a half-size set of drawings (11" by 17") providing sufficient and accurate detail to install the System components.
1279	<p>The drawings shall include but not be limited to the following:</p> <ul style="list-style-type: none"> • detailed interconnection diagrams for all Systems; • detailed electrical schematics; • detailed communications layout; • UPS sizing specifications; • Equipment rack layout, including power panels and connection to the UPS; • a detailed diagram of the network connectivity, including IP scheme; • server set-up and configuration; • other RSS Hardware installation and connections and • floor loading calculations.
1280	Contractor shall provide the installation requirements for the Equipment, including all related Plans and documents. Contractor shall certify the installation requirements provided as accurate and appropriate for its intended purpose, to the satisfaction and Approval of Authority.
1281	Contractor shall submit server room drawings that show the location of the Equipment racks for all RSS Equipment at the primary facility. The layout of the server components, storage devices and communication Equipment inside the cabinets shall be clearly presented with actual measurements shown.
1282	Contractor shall submit server room drawings that show the location of the Equipment racks for all RSS Equipment at the Disaster Recovery location. The layout of the server components, storage devices and communication Equipment inside the cabinets shall be clearly presented with actual measurements shown.
1283	Contractor shall submit UPS sizing information for the primary and Disaster Recovery locations, detailing all Equipment on the UPS and their power specifications.
1284	Contractor shall submit detailed network drawings showing all WAN, LAN and VLAN connections, including all interface connections and IP addresses for all Equipment on the network.
1285	Contractor shall submit detailed server configuration instructions, including the configuration of storage devices, back-up devices and network connectivity.

2.6.4.6 Quality Assurance Plan

The Quality Assurance (QA) Plan shall include how to address errors (quality-related events) and how to make improvements before an error occurs (continuous quality improvement).

1286	Contractor shall develop and submit a QA Plan to Authority for Approval that details Contractor's QA Program in a concise manner customized to this project, and clearly describing the processes Contractor shall follow.
------	--

1287	The QA Plan shall include Contractor's QA Program through design; development; production; purchasing; testing; installation; Commissioning; transition and Acceptance of all Hardware and Software provided under this Agreement.
1288	<p>The QA Plan shall describe the Quality Assurance procedures and methodology for the Project, including but not limited to:</p> <ul style="list-style-type: none"> • quality management and organizational structure; • System design; • Software development; • installation including engineering installation sign-off; • data migration and transition; • Equipment purchase, delivery and validation; • inspection and verification for in-process, final assembly, unit tests and System testing; • configuration management; • change management and change control process, including recommended forms and processes for change management; • description of system and tools used for configuration management during both implementation and maintenance; • training and safety; • quality management documentation; • quality review and verification and • reporting and metrics.
1289	The QA Plan shall be submitted for Approval by Authority 65 Days after NTP1.

2.6.4.7 Software Development Plan (SDP)

1290	<p>Contractor shall develop and submit a Software Development Plan (SDP) to Authority for Approval that includes but is not limited to:</p> <ul style="list-style-type: none"> • Documentation of the Software development approach to the application architecture, behavior, architecture, business processes, security and data structures; • approach System design and Development given the Roadside System Project phasing; • development resources and responsibilities, such as Software developers, system engineers, security engineers, test engineers, Quality Assurance and Quality Control personnel, configuration management administrator, Documentation specialists and Project management staff; • describe natural segregation of development areas or teams, such as development of user interfaces, development of reports, development of the functionality and development of interfaces; • Software development standards;
------	---

	<ul style="list-style-type: none"> • security standards;
	<ul style="list-style-type: none"> • Software development methodology, such as use cases, modeling and other development tools;
	<ul style="list-style-type: none"> • Software development language strategy, platforms and technologies related to both development and Software Maintenance;
	<ul style="list-style-type: none"> • description of the Software Development Life-Cycle and Maintenance;
	<ul style="list-style-type: none"> • approach to segregation of environments (development, testing and deployment) and the number of environments;
	<ul style="list-style-type: none"> • Maintenance of standard and baseline codes and management of major releases;
	<ul style="list-style-type: none"> • gap analysis of baseline code to Contractor Requirements;
	<ul style="list-style-type: none"> • development problem reporting, defect tracking and remediation;
	<ul style="list-style-type: none"> • code reviews and code development standards;
	<ul style="list-style-type: none"> • source control;
	<ul style="list-style-type: none"> • informal and internal testing methodology;
	<ul style="list-style-type: none"> • regression testing and security and vulnerability testing;
	<ul style="list-style-type: none"> • development and integration approach for the major functional modules;
	<ul style="list-style-type: none"> • Software Quality Control processes;
	<ul style="list-style-type: none"> • Software end-user Documentation review and usability;
	<ul style="list-style-type: none"> • development Documentation;
	<ul style="list-style-type: none"> • technical Software code Documentation and standards for all code;
	<ul style="list-style-type: none"> • Software configuration and change management approach and standards, including recommended forms and processes for change management;
	<ul style="list-style-type: none"> • description of system and tools used for configuration management during both implementation and maintenance;
	<ul style="list-style-type: none"> • samples of detailed Software Documentation for both external and in-line Documentation;
	<ul style="list-style-type: none"> • Software deployment approach, release management and validation and
	<ul style="list-style-type: none"> • detailed Documentation of the development environment, including enough information that the environment could be completely replicated.

2.6.4.8 Disaster Recovery Plan

The Disaster Recovery Plan (DRP) shall be a comprehensive, documented statement of actions to be taken before, during and after a disaster to protect and recover the information technology data, assets and facilities of the ETTM System.

1291	Contractor shall develop, test, and submit a DRP to Authority for Approval and subsequent DR Procedures that describe the approach, as well as activities and procedures that take place in the event of a disaster for each element of the ETTM System.
1292	Contractor shall coordinate the development and testing of the DRP and DR Procedures with the BOS Contractor.

1293	The DRP shall document Contractor's approach to recovering from a disaster, including but not limited to:
	<ul style="list-style-type: none"> Define what constitutes a disaster and severity levels and timeframes to address each disaster (e.g., earthquake, flood, electrical outage, general loss of access to building, etc.);
	<ul style="list-style-type: none"> assessment of disaster risks;
	<ul style="list-style-type: none"> mitigation of disaster risks;
	<ul style="list-style-type: none"> preparations in the event of a disaster;
	<ul style="list-style-type: none"> disaster declaration and DR process to invoke;
	<ul style="list-style-type: none"> organization chart illustrating DR team members, roles and responsibilities;
	<ul style="list-style-type: none"> notification contact list, including contact information;
	<ul style="list-style-type: none"> notification protocol;
	<ul style="list-style-type: none"> sites and Equipment for DR, presented in a diagram format;
	<ul style="list-style-type: none"> DR process initiation and completion checklist;
	<ul style="list-style-type: none"> Software and data replication processes;
	<ul style="list-style-type: none"> detailed logistical processes for activation of DR site and systems;
	<ul style="list-style-type: none"> detailed technical processes for activation of DR site and systems;
	<ul style="list-style-type: none"> detailed procedures for failover and failback of the RSS including a check list for ensuring that it failed over and failed back properly;
	<ul style="list-style-type: none"> detailed operational functions for activation of DR site and
	<ul style="list-style-type: none"> detailed technical processes for reactivation of primary site (or moving to a new primary site if the original primary site is destroyed) for systems and coordination with Authority and BOS Contractor.
1294	The DRP shall be tested and updated by Contractor annually.
1295	The Disaster Recovery location shall be at a secondary location which meets the specifications outlined in the Agreement.
1296	The DRP shall include a Business Continuity Plan (BCP) that details Contractor's approach to accommodating the staffing capabilities, alternative locations, equipment, systems, network, applications and data components required to ensure the continuity and resumption of critical ETTM System processes.
1297	The BCP shall include but not be limited to:
	<ul style="list-style-type: none"> recovery point objective (RPO) maximum acceptable amount of data loss for all critical ETTM System Services after an unplanned data-loss incident;
	<ul style="list-style-type: none"> recovery time objective (RTO) maximum acceptable amount of time for restoring a critical ETTM System Services and regaining access to data after an unplanned disruption;
	<ul style="list-style-type: none"> level of service (LOS) the combination of throughput and functionality required to sustain ETTM System business Operations;
	<ul style="list-style-type: none"> detailed description of how site and System security shall be maintained to ensure continued compliance with security Requirements; and

	<ul style="list-style-type: none"> • response plan in the event of a security breach or cyber-attack at the roadside network, or either RSS sites in accordance with Authority Information Technology Services policies and standards.
1298	Changes to the BCP shall be reflected in the Plan within thirty (30) Days of Approval. Contractor shall distribute the BCP to Authority and BOS Contractor.
1299	Contractor shall coordinate with the BOS Contractor to ensure that the BOS, the DRP and the BCP will work to efficiently support Authority's continued operations.
1300	The BCP shall be submitted for Approval by Authority as a part of the DRP in accordance with the Approved Baseline Implementaton Schedule.
1301	Contractor shall participate in the annual Business Continuity testing with the BOS Contractor.

2.6.4.9 Master Test Plan (MTP) and Test Procedures

Contractor shall develop and submit a comprehensive testing plan that describes the different test phases, Contractor's testing concepts and approach and the administration of each test. The Master Test Plan (MTP) outlines the scope and testing concepts to be used to validate the ETTM System compliance to this Scope of Work and Requirements, including integration to the BOS, external entities and Interoperable Agencies, compliance to all standards and migration and transition of the ETTM System.

1302	Contractor shall develop and submit an MTP to Authority' for Approval that details the testing methodology utilized by Contractor to demonstrate that the ETTM System satisfies the requirements of this Scope of Work.
1303	<p>The MTP shall cover testing of all aspects of the ETTM System and shall describe all test phases, scope and procedures to validate the ETTM System compliance to the Requirements, including but not limited to:</p> <ul style="list-style-type: none"> • overall approach to testing; • approach for each test; • detailed schedule for each test, identifying each test activity and resource; • methodology for testing the Performance Requirements and sample size for each phase of testing; • approach for how data sets for each test are created including data needed to simulate logical days and cycles; • Software test automation tools utilized for each test; • purpose, scope, location, system environment, and duration of each test; • approach to validating all System Requirements through the testing methodology; • approach to validating all System Business Rules through the testing methodology; • describe the entry and exit criteria for each test; • document the severity and Priority descriptions and levels for each test; • include a detailed schedule for each test identifying each test activity and resource; • describe the methodology for testing the Performance Requirements and sample size for each phase of testing;

	<ul style="list-style-type: none"> describe the methodology for load testing;
	<ul style="list-style-type: none"> describe the purpose; scope; duration; System resources, and human resources for all tests identified in this Scope of Work and Requirements;
	<ul style="list-style-type: none"> approach to validating all reporting Requirements;
	<ul style="list-style-type: none"> approach to end-to-end testing, validation and Reconciliation;
	<ul style="list-style-type: none"> approach to data migration testing, compliance to standards, correction of defects and Software release;
	<ul style="list-style-type: none"> log testing to ensure the appropriate level of information logging is occurring, particularly when exceptions occur. The MTP needs to identify which tests validate the logging Requirements;
	<ul style="list-style-type: none"> end-to-end testing to ensure processes, transactions/trips and their interaction are tested through their final stages or disposition;
	<ul style="list-style-type: none"> approach to interface testing to BOS, Interoperable Agencies and Third-Party Service Providers and Business Partners;
	<ul style="list-style-type: none"> system performance and adherence to Performance Requirements;
	<ul style="list-style-type: none"> redundancy/failover aspects;
	<ul style="list-style-type: none"> DR aspects;
	<ul style="list-style-type: none"> cross-channel testing to ensure testing is not only performed for each interface individually, but also that testing is performed across each interface to ensure consistent presentation and processing;
	<ul style="list-style-type: none"> describe the entry and exit criteria for each test;
	<ul style="list-style-type: none"> document the severity and priority descriptions and levels for each test;
	<ul style="list-style-type: none"> document how defects shall be triaged; tracked; reported; resolved, and retested, including tools used to document defects, and
	<ul style="list-style-type: none"> a set of regression test procedures that shall be exercised each time Software changes are made after the Approval of the FAT.
1304	Contractor shall provide a detailed Test Plan for Authority's Approval for each testing phase outlined in the Requirements and Approved MTP, including but not limited to:
	<ul style="list-style-type: none"> test logistics including test vehicles; drivers and test Equipment;
	<ul style="list-style-type: none"> inventory of test cases for manual tests and/or test scripts for automated tests;
	<ul style="list-style-type: none"> test entry and exit criteria;
	<ul style="list-style-type: none"> test preparation;
	<ul style="list-style-type: none"> test data creation;
	<ul style="list-style-type: none"> periodic status meetings;
	<ul style="list-style-type: none"> All necessary facilities; materials and supplies as applicable;
	<ul style="list-style-type: none"> all necessary personnel and
	<ul style="list-style-type: none"> all necessary Hardware and Software.
1305	Contractor shall provide test cases for Authority's Approval for each testing phase outlined in the Requirements and Approved MTP, including but not limited to:
	<ul style="list-style-type: none"> test case ID;

	<ul style="list-style-type: none"> • test case description; • related requirements; • assumptions; • test data (variables and their values); • steps to be executed; • expected results; • actual results; • pass/fail; and • comments.
1306	Authority's Approval of any aspect of testing shall not relieve Contractor of its responsibility to meet the full terms and conditions of the Agreement.
1307	Contractor shall update the RTM linking every Requirement to a set of test cases to demonstrate the Requirement has been satisfied and which test satisfied the Requirement.

2.6.4.10 Health and Safety Plan

1308	Contractor shall develop, implement, and maintain a comprehensive task-specific written Health and Safety Plan and shall fully describe in the Health and Safety Plan the Contractor's policies, plans, training programs, worksite controls, incident response plans and enforcement for the health and safety of personnel involved in the Services and the general public affected by the Services during the Agreement Term.
1309	The Health and Safety Plan shall be consistent with the insurance requirements for the Services.
1310	<p>Contractor shall develop and submit the Health and Safety Plan to Authority for Approval that documents Contractor's approach to health and safety as set forth in this Scope of Work and Requirements, include but not be limited to:</p> <ul style="list-style-type: none"> • describe the participation of safety personnel in all Work activities; • describe Contractor's plan to comply with Design-Builder's safety and security procedures; • delineate administrative responsibilities for implementing the safety program; • identify responsibilities and accountability; • identify safety professionals or managers covering all Services; • describe the process of conducting safety orientation for all employees; • describe the Contractor's drug policy, including the policy at the Site and any pre-job Site and post-incident drug testing to satisfy Agreement insurance requirements. Provide policy for promoting a safe, drug and alcohol abuse-free workplace. The policy must be consistent, fair, manageable, and subject to audit. Allow for disciplinary action or termination for an employee reporting for performance of the Services under the influence of alcohol or a prohibited substance or possession of a prohibited substance; • describe employee health and safety training requirements;

	<ul style="list-style-type: none"> describe safety inspection procedures of Work areas, materials, and equipment to ensure compliance with the safety program, methods of record keeping, and correction of deficiencies;
	<ul style="list-style-type: none"> describe incident and emergency response procedures for all potential incident types and locations, including response capabilities, evacuation and egress, responsibilities for reporting and investigating incidents, exposures, contingency plans, and the maintenance of safety-related logs;
	<ul style="list-style-type: none"> describe incident reporting procedures;
	<ul style="list-style-type: none"> describe Contractor's Site control policy and plans for maintaining Site cleanup, on-Site first aid facilities or medical clinic and safe access;
	<ul style="list-style-type: none"> identify public safety requirements (e.g., fencing, signs, barricades);
	<ul style="list-style-type: none"> describe Contractor's hazard communication program;
	<ul style="list-style-type: none"> describe Contractor's method of tracking open safety issues;
	<ul style="list-style-type: none"> describe hazard analysis, tracking, reduction of risk, logs, and mapping procedures;
	<ul style="list-style-type: none"> describe personal protective equipment (PPE) requirements and policy; and
	<ul style="list-style-type: none"> describe safety procedures for Contractor's employees working around and handling hazardous materials.
1311	<p>The Health and Safety Plan shall clearly establish the specific chain of command and specify the lines of authority, responsibility, and communication with regard to safety compliance activities. The Health and Safety Plan shall specify which onsite personnel have the authority to stop onsite activities when unanticipated and/or uncontrolled hazards are recognized and also address those personnel with the authority to restart Site activities after the previously unrecognized hazards have been controlled. The Contractor Project Manager and Operations and Maintenance Manager shall be responsible for safety, health, and environmental performance. The Health and Safety Plan shall specifically define the safety responsibilities of each level of supervision.</p>
1312	<p>Contractor shall establish standard operating procedures to guide employees in safe Work practices. Contractor shall train and provide instruction to all employees, including managers and supervisors, on general and job-specific safety and health practices. Workplace safety and health training practices must include, at a minimum, the following:</p> <ul style="list-style-type: none"> measures for reporting any unsafe conditions, Work practices, and injuries; use of appropriate clothing, including gloves, footwear, and PPE; information about chemical hazards to which employees could be exposed and other hazard communication program information; availability of toilet, hand-washing, and drinking water facilities; and provisions for medical services and first aid, including emergency procedures.

1313	The Health and Safety Plan shall provide safety and health policies and procedures that clearly communicate and are understood by all employees, and that require all employees use safe Work practices; follow all safety directives, policies, and procedures; and play an active role in maintaining a safe Work environment. Managers and supervisors will enforce the rules fairly and uniformly. The Health and Safety Plan shall provide, and Contractor shall implement, a disciplinary policy for all employees who fail to comply with safe and healthful work practices.
1314	The Health and Safety Plan shall include emergency action procedures for each identified potential emergency, notification requirements, and training, and shall identify those individuals responsible for implementing the procedures in the event that the emergency is realized. The potential for an emergency (fire, explosion, chemical release, etc.) exists on all Sites or areas where the Work is being performed. The emergency action procedures must identify the various response activities necessary to minimize the dangers and confusion associated with an emergency. The emergency action procedures must address fire, explosions hazardous materials, natural disasters, and civil disruptions.
1315	The Health and Safety Plan shall include a section describing the policies and procedures to be implemented to protect employees, the public, property, equipment, and Services supplies.
1316	<p>As part of the Health and Safety Plan, Contractor shall an Office Safety Plan to Authority for review and Approval. The Office Safety Plan shall describe Contractor's policies, plans, training programs, emergency response plans and enforcement of safety throughout the Operations and Maintenance Phase. The Office Safety Plan shall include at a minimum the following information:</p> <ul style="list-style-type: none"> • standard procedures to guide employees in safe Work practices; • description of the process of conducting safety orientation for all employees; • employee training requirements; • drug policy, including the policy at the Site and any pre-employment and post-incident drug testing; • consistency with the Contract insurance requirements and any other applicable Contract requirements; • description of accident prevention plans; and • emergency management and evacuation procedures.
1317	<p>As part of the Health and Safety Plan, Contractor shall a Roadside Safety Plan to Authority for review and Approval. The Roadside Safety Plan shall comply with all applicable Governmental Rules and best management practices for any roadside maintenance and operations activities performed by Contractor. The Roadside Safety Plan shall include the following, at a minimum:</p> <ul style="list-style-type: none"> • Standard Operating Procedures to guide employees in safe work practices; • demonstration of consistency with Agreement insurance requirements and any other applicable Contract requirements; • participation of safety personnel and competent persons in all roadside maintenance activities; • employee training requirements and description of the safety orientation process;

	<ul style="list-style-type: none"> incident reporting procedures and method of tracking safety issues;
	<ul style="list-style-type: none"> method of identifying and tracking safety hazards;
	<ul style="list-style-type: none"> identification of any public safety requirements;
	<ul style="list-style-type: none"> cell phone safety;
	<ul style="list-style-type: none"> required safety training and certification processes;
	<ul style="list-style-type: none"> drug policy, including the policy at the roadside site and any pre-employment and post-incident drug testing; and
	<ul style="list-style-type: none"> personal protective equipment requirements.

2.6.4.11 Maintenance Plan

Contractor shall submit a Maintenance Plan comprised on the plans listed below that describe how Contractor plans to perform Maintenance of the ETTM System in accordance with the terms and conditions of the Agreement. Contractor shall have appropriate Documentation available to all Operations and Maintenance personnel, as required to perform their respective duties.

2.6.4.11.1 System Maintenance Plan

1318	Contractor shall develop and submit the System Maintenance Plan to Authority for Approval that defines the approach to services, staffing and resources to fulfill the System Maintenance Requirements. Contractor shall identify Contractor's maintenance responsibilities and shall include but not be limited to:
	<ul style="list-style-type: none"> organizational structure, organizational chart and job descriptions and responsibilities;
	<ul style="list-style-type: none"> staffing Plan;
	<ul style="list-style-type: none"> approach to training;
	<ul style="list-style-type: none"> detailed System monitoring Requirements;
	<ul style="list-style-type: none"> staff schedule and locations;
	<ul style="list-style-type: none"> third-party system support agreements overview;
	<ul style="list-style-type: none"> schedule of all System Maintenance activities, including Preventive Maintenance and anticipated Enhancement releases;
	<ul style="list-style-type: none"> description of all System Maintenance related communication methods;
	<ul style="list-style-type: none"> Maintenance procedures, communication protocols and approval processes for System Upgrades, Software deployments, scheduled Preventive Maintenance activities, change management and scheduled downtime;
	<ul style="list-style-type: none"> Maintenance procedures and communications protocols for unscheduled downtime;
	<ul style="list-style-type: none"> communication protocol for coordination with Interoperable Agencies, Third-Party Service Providers, Business Partners, Authority, and others, as directed by Authority;
	<ul style="list-style-type: none"> communication protocol for coordination with Authority's other toll system vendors;
	<ul style="list-style-type: none"> trouble reporting processes, notification protocols for issues and failures, and maintenance reporting processes;

	<ul style="list-style-type: none"> • prioritization, response, escalation, and repair processes;
	<ul style="list-style-type: none"> • spare parts quantities, Software warranty tracking, and returned material processes;
	<ul style="list-style-type: none"> • monitoring the MOMS Dashboard;
	<ul style="list-style-type: none"> • monitoring Maintenance performance for compliance with Performance Requirements;
	<ul style="list-style-type: none"> • sample Maintenance reports and reporting processes;
	<ul style="list-style-type: none"> • safety procedures and personal protective equipment;
	<ul style="list-style-type: none"> • processes for supporting internal and external audits;
	<ul style="list-style-type: none"> • security policies, including remote access, laptop access, etc.
	<ul style="list-style-type: none"> • system intrusion monitoring and safeguards;
	<ul style="list-style-type: none"> • equipment replacement/refresh schedule;
	<ul style="list-style-type: none"> • Upgrades to third-party Software and tools;
	<ul style="list-style-type: none"> • process in place to meet Maintenance Performance Requirements;
	<ul style="list-style-type: none"> • Traffic Management Plan; and
	<ul style="list-style-type: none"> • Annual System Certification Plan.

2.6.4.11.2 Software Maintenance and Warranty Plan

1319	Contractor shall develop and submit a Software Maintenance and Warranty Plan that defines the approach to services, staffing and resources to fulfill the Software Maintenance and warranty provisions as set forth in the Agreement, including but not limited to:
	<ul style="list-style-type: none"> • organizational structure, organizational chart and job descriptions and responsibilities;
	<ul style="list-style-type: none"> • staffing Plan;
	<ul style="list-style-type: none"> • approach to staffing and training;
	<ul style="list-style-type: none"> • approach to receiving and prioritizing Software defects (bugs);
	<ul style="list-style-type: none"> • reporting, categorization, prioritization, and disposition of Software defects;
	<ul style="list-style-type: none"> • coverage and personnel locations;
	<ul style="list-style-type: none"> • all Software Maintenance related communication methods;
	<ul style="list-style-type: none"> • Maintenance procedures, communication protocols and approval processes for Software Upgrades, scheduled Maintenance activities, change management and scheduled downtime;
	<ul style="list-style-type: none"> • Documented change control procedures;
	<ul style="list-style-type: none"> • Maintenance procedures and communications protocols for unscheduled downtime;
	<ul style="list-style-type: none"> • trouble reporting processes;
	<ul style="list-style-type: none"> • escalation processes;
	<ul style="list-style-type: none"> • sample Maintenance reports;

	<ul style="list-style-type: none"> • Software Updates and testing to comply with Interoperable Agencies' specification changes, and third-party interface changes;
	<ul style="list-style-type: none"> • Software and security Updates, remediation and testing to be compliant to PCI and Authority Audit Requirements and
	<ul style="list-style-type: none"> • process in place to meet Maintenance Performance Requirements.

2.6.4.12 Operations Plan

1320	Contractor shall develop and submit an Operations Plan to Authority for Approval that documents Contractor's approach to all aspects of the operations of the ETTM System in as set forth in this Scope of Work and Requirements, include but not be limited to:
	<ul style="list-style-type: none"> • identification of each Service and activity to be provided;
	<ul style="list-style-type: none"> • details for performing the Operations and Maintenance Phase Services (staffing levels, equipment lists, supplies list, use of Subcontractors, other service contracts, etc.);
	<ul style="list-style-type: none"> • description of how Performance Requirements are monitored, attained and maintained in accordance with the QA Plan;
	<ul style="list-style-type: none"> • description of how business emergencies (including higher level of expected phone calls, degraded mode) will be addressed including notification, coordination with BOS, manual work-arounds, back-up procedures and emergency approvals;
	<ul style="list-style-type: none"> • general guidelines and organization of Standard Operating Procedures (SOPs), and training manuals;
	<ul style="list-style-type: none"> • report structures, schedules, and deliverables;
	<ul style="list-style-type: none"> • coordination with Authority;
	<ul style="list-style-type: none"> • pre-Go-Live schedule;
	<ul style="list-style-type: none"> • Go-Live checklist;
	<ul style="list-style-type: none"> • ramp up plan;
	<ul style="list-style-type: none"> • identification of efficiencies and process for implementation;
	<ul style="list-style-type: none"> • management commitment to ongoing service;
	<ul style="list-style-type: none"> • adjustment of staffing levels based on increases or decreases in the volume of manual image reviews, maintenance work, etc; and
	<ul style="list-style-type: none"> • QA/QC and continuous improvement processes
1321	As part of the Operations Plan, Contactor shall submit written Standard Operating Procedures (SOPs) to Authority for Approval. The SOPs shall detail all procedures necessary for administration and operations of the ETTM System. SOPs shall be organized to include, at a minimum, the following:
	<ul style="list-style-type: none"> • ETTM System administration and support;
	<ul style="list-style-type: none"> • ETTM System Maintenance;
	<ul style="list-style-type: none"> • BOS interface, human interaction and issue resolution;
	<ul style="list-style-type: none"> • trip building;
	<ul style="list-style-type: none"> • manual image review and

	<ul style="list-style-type: none"> • TOC Operations
1322	Contractor shall update the SOPs annually throughout the Operations and Maintenance Phase or more frequently as necessary to reflect any changes to the procedures and Business Rules. Contractor shall keep a running list of changes to SOPs. Annual updates to the SOPs shall be reviewed and Approved by Authority.
1323	As part of the Operations Plan, Contractor shall prepare and submit an Incident Management Plan to Authority for review and Approval. The Incident Management Plan shall be designed to assist in providing timely, safe and effective management of and response to vehicle accidents and other significant incidents that occur in the Express Lanes or affect the operation of the ETTM System. The Incident Management Plan shall, at a minimum, account for varying incident scenarios and include solutions and strategies for each scenario. The Incident Management Plan shall clearly define roles and responsibilities along with procedures, and timeframes. The Incident Management Plan shall be developed through workshops, coordinated by Contractor, with Caltrans, CHP, local first responders and other interested stakeholders. The Incident Management Plan will clearly define the actions to be taken for incidents: changing the messages on the Toll Rate CMS, coordination of updates to the customer website, coordinating Toll Rate CMS and other CMS messages with Caltrans, CHP and the Freeway Service Patrol. The Incident Management Plan shall address the steps taken to restore full operations, report on the incident including gathering information about any third parties that have caused or contributed a loss in toll revenue and/or damage to the facility or Equipment.
1324	As part of the Operations Plan, Contractor shall prepare and submit an Express Lanes Performance Monitoring Plan to Authority for review and Approval. The Express Lanes Performance Monitoring Plan shall identify Contractor's procedures for monitoring speeds, throughput and traffic flow and shall describe, at a minimum, how Contractor will manage unanticipated events. Average hourly speeds and volumes shall be plotted throughout the day relative to the minimum allowed speed. The Express Lanes Performance Monitoring Plan shall enumerate the various types of reporting that will be provided on a monthly, quarterly and annual basis that includes trends on: traffic volumes, speeds, travel times, HOV 3+ usage, incidents, toll rate variations, and anticipated revenue collection compared to latest forecasted traffic and revenue estimates.
1325	As part of the Operations Plan, Contractor shall prepare and submit a KPI Reporting and Management Plan to Authority for review and Approval. The KPI Reporting and Management Plan shall describe how Contractor shall monitor, calculate, audit, report and handle KPIs. The KPI Reporting and Management Plan shall detail how the daily, weekly, and monthly indicators are measured and reported. The KPI Reporting and Management Plan shall include, at a minimum, strategies for mitigation where KPIs are not being met and remediation measures for meeting KPIs.

2.6.4.13 Training Plan

Contractor shall provide a train-the-trainer program to educate Authority, the BOS Contractor, and others on the ETTM System and operations. Contractor is responsible for providing a Training Plan that describes the approach to training activities. The Training Plan shall include all aspects related to training, including details of all training techniques, schedule, training materials, and all activities required for initial training prior to Go-Live and remedial training after Go-Live.

1326	Contractor shall develop and submit a Training Plan to Authority for Approval.
1327	The Training Plan shall describe the plan for a train-the-trainer program for BOS Contractor and other Authority-designated individuals and shall outline the required operational/Maintenance and System knowledge for each position to be gained from the training.
1328	For each position/user type, the plan shall include a training instructor guide, training manual and other materials to be used in training. The Training Plan also shall include a schedule for follow-up training and continuing education for staff.
1329	The Training Plan shall provide a plan for cross-training staff from other areas of Operations or management for peak period, emergency or temporary assignments to provide for staff redundancy. The Training Plan also shall include the training schedule for regular staff training and continuing education/training.
1330	Contractor shall submit a Training Plan that shall address the following areas including but not limited to: <ul style="list-style-type: none"> • overall description of the training program; • training techniques; • training delivery schedule; • names and descriptions of each training class; • purpose of each training class; • who should attend the class; • qualification requirements for trainer; • minimum qualifications for personnel attending the class; • duration of the class; • training materials, including syllabus, schedule, training goals, manuals, guides, other support materials and techniques to be used; • data preparation, such as users and test transactions/trips; • required Equipment and • facility requirements.
1331	Courses shall be limited to a maximum of eight (8) hours per Day.
1332	The Training Plan shall consider the need for Authority to maintain existing operations on existing systems while training existing operations staff on Contractor's System; Contractor shall hold multiple sessions of each training Module such that some Authority staff can attend training while others are handling existing operations.
1333	Contractor shall be responsible for maintaining a training database baseline and supporting data files that can be restored at the beginning of each training session.
1334	The Training Plan and training materials shall be updated if the system is modified after installation.
1335	Contractor shall be responsible for providing training for any changes in the system.
1336	Contractor shall be responsible for providing remedial training as needed to ensure that staff are knowledgeable about the Program.

2.6.4.14 Third-Party Documentation

Third-party Documentation includes standard commercial Documentation for third-party provided Hardware, Software, Services and materials.

1337	Contractor shall provide and maintain standard, commercially available, updated Documentation for third-party provided Hardware, Software, Services and materials provided under this Agreement. This set of third-party Documentations shall be available upon request.
1338	An electronic copy of all third-party Commercial Off-the-Shelf (COTS) Hardware and Software installation and user manuals, with updates, shall be provided to Authority. Acceptable electronic formats are Microsoft Office 2010 Suite or higher, unsecured Portable Document Format (PDF) and professional CAD applications.
1339	Contractor shall provide one (1) hard copy of all Hardware and Software installation and user manuals for custom-developed (non-COTS) third-party products and services.

2.6.4.14.1 Third-Party Software Documentation

1340	Contractor shall provide third-party Software Documentation, including but not limited to: <ul style="list-style-type: none"> • all user manuals; • programmer's reference manuals; • warranty Documentation; • installation manuals; • Interface documents; • Maintenance manuals and • any other information required to utilize the Software, such as the operating System, utilities, programming languages, application Software and communications Software.
1341	The third-party Software Documentation shall be provided by Contractor in a standard and organized format, with appropriate labels, tabs and cross references to allow Authority to easily access and reference information on each Software component on the System.

2.6.4.14.2 Third-Party Hardware Documentation

1342	Contractor shall provide third-party Hardware Documentation, including but not limited to: <ul style="list-style-type: none"> • all technical manuals; • operator's guides; • installation guides; • warranty Documentation; • Hardware reference manuals; • available options and versions; • catalogs, components and • illustrated parts lists.
------	--

1343	Contractor shall provide all third-party Hardware Documentation in a standard and organized format, with appropriate labels, tabs and cross references to allow Authority to easily access and reference Hardware information on each Equipment component.
1344	Third-party Hardware Documentation shall include sufficient detail to describe the configuration of the Hardware as it was installed by Contractor for the ETTM System.

2.6.5 Manual Requirements

Various manuals shall be provided as described below to allow Authority to understand the Operations of the ETTM System, including the Roadside System and RSS. New manuals developed under this Agreement that are not standard commercial catalogs or manuals, shall meet the Requirements set forth in this section.

1345	Contractor shall submit the Project manuals to Authority for review and Approval in accordance with the Approved Baseline Implementation Schedule.
1346	Whenever possible, all data shall be printed on 8-1/2" x 11" sheets; foldouts shall be 11" x 17".
1347	Each manual shall include, but not be limited to: <ul style="list-style-type: none"> • a title sheet; • revision history; • table of contents; • list of illustrations (if applicable); • list of reference drawings and Exhibits (if applicable) and • a parts list (if applicable).
1348	All manuals shall have a consistent look and feel and shall be professionally written and presented in clear and organized fashion.
1349	All manuals prepared for Authority under this Agreement shall be produced, or editable, using Microsoft Office 2010 Suite (or higher). In addition, electronic copies of manuals shall be provided in native file format and unsecured and indexed PDF, if requested by Authority.
1350	Any special Software required to produce scalable typefaces or other graphs shall be provided by Contractor as part of the Documentation for the manuals.
1351	All manuals shall be submitted and Approved as a condition of Go-Live.

2.6.5.1 Manual Submissions and Quantities

1352	Contractor shall submit one (1) hard copy of each of the manuals listed below.
1353	Contractor shall submit electronic copies of all manuals in the Authority-provided EDMS.
1354	Contractor shall be responsible for producing an additional quantity of the manuals for Contractor's use, sufficient to fulfill Contractor's Requirements under the Agreement.
1355	Contractor shall submit the draft and final manuals described below for Authority's review and comment, in accordance with the Approved Project Implementation schedule. All final versions of manuals shall be provided and Approved before Go-Live.

2.6.5.2 Manuals to be Submitted**2.6.5.2.1 ETTM System Maintenance Manual**

1356	Contractor shall develop and submit an ETTM System Maintenance Manual prepared for properly trained technical personnel (including Authority personnel) assigned to the Maintenance of the Hardware and Software installed under this Agreement. The Maintenance Manual shall be based on and consistent with the Maintenance Plan.
1357	<p>The ETTM System Maintenance Manual shall document information required to support Roadside Maintenance and repair activities, including but not limited to:</p> <ul style="list-style-type: none"> • lane Equipment layout for each ETTM Site type; • schematics and layouts of the Hardware in the lane cabinets, Equipment racks and the interconnection diagrams; • parts lists required to service each piece of Hardware installed under this Contract; • general and detailed description and concepts of lane Operations and functions; • detailed lane monitoring activities, specialty tools and schedule; • detailed Software monitoring activities and troubleshooting procedures; • Maintenance instructions to repair and replace parts and modules; • mechanical functions and installation of all Hardware; • listing of all event and error logs; • testing and basic troubleshooting procedures and • Preventative, pervasive and corrective Maintenance procedures.
1358	<p>The ETTM System Maintenance Manual shall document information required to support RSS monitoring, including but not limited to:</p> <ul style="list-style-type: none"> • all Dashboards, monitoring screens, notifications and data that needs to be checked; • listing of all jobs/process, their dependencies and their schedule; • listing of all folders and directories that need to be checked; • details related to the activity that needs to be checked; • frequency of the validations; • actions to take when results are not as expected; • notification and escalation process; • basic troubleshooting procedures, and • creation of work orders in MOMS.
1359	The ETTM System Maintenance Manual shall provide a description about the tools and Software for personnel to record the monitoring activity and instructions to use the tools/Software.
1360	<p>The ETTM System Maintenance Manual shall document information required to support RSS Maintenance and repair activities including but not limited to:</p> <ul style="list-style-type: none"> • detailed Hardware Maintenance activities and schedule; • detailed database Maintenance activities and schedule;

	<ul style="list-style-type: none"> • detailed Software monitoring activities and schedule; • detailed monitoring procedures for file transfers and exception handling; • detailed procedures and processes for all Maintenance activities; • detailed procedures for backup, archiving and purging of data; • detailed procedures for testing DR systems; • detailed schedule for desktop and peripheral Preventive Maintenance activities; • detailed schedule for all Preventive Maintenance activities; • technical contact lists for all external interfaces and Authority staff; • technical contact lists for Hardware and Software providers and • details and copies of all third-party System support agreements.
1361	Standard service manuals for commercial products used for the equipment shall be acceptable if they contain sufficient information to properly service the equipment.
1362	Large-size logic diagrams and mechanical assembly diagrams do not have to be reduced or incorporated into the manuals if these drawings are provided with the manuals and presented in a useable and durable form.
1363	Photographic Documentation of Equipment with appropriate labels and call-outs are satisfactory if they contain sufficient information to properly identify components, parts and features.

2.6.5.2.2 *Reconciliation and Audit Manual*

1364	The Reconciliation and Audit Manual shall detail all procedures used to reconcile the System and audit the toll collection Operations.
1365	The reconciliation of electronic transactions and revenue within the System and reconciliation of transactions to the BOS shall be fully described.
1366	Investigation of variances, discrepancies and exceptions processing shall be described.
1367	A detailed description of the screens, reports, and functions shall be provided that will allow a qualified auditor to access, understand and work with the all financial aspects of the System.
1368	A complete description of all audit procedures and a non-technical description of the screens, reports, and functions shall be provided.
1369	The manual shall contain illustrations and pictorial diagrams to demonstrate the step-by-step Operations required for performing the audit and reconciliation functions.
1370	The manual shall contain Quality Control and audit procedures to ensure Systems, Maintenance, and Operations meet the Performance Requirements.
1371	Samples of all reports shall be included in an attachment to the manual with any specific instructions that may be applicable to a given report. Reports included in the Submittal shall have correct and accurate data and this manual shall be used to train the auditors to validate the System.

2.6.5.2.3 Roadway Support Systems (RSS) Administrators Manual

1372	Contractor shall provide an RSS Administration Manual that serves as a guide to the overall management and administration of the RSS and shall include:
	<ul style="list-style-type: none"> description of the programs and processes that need to be monitored to ensure that the System is operational;
	<ul style="list-style-type: none"> procedures for validating tasks, processes and jobs have successfully completed, and errors and exceptions encountered;
	<ul style="list-style-type: none"> procedures for validating the successful transfer and receipt of files for all interfaces, including RSS and BOS;
	<ul style="list-style-type: none"> a listing of all the error codes, their meaning and potential associated problems shall be included in the manual, with a step by step guide to troubleshooting and correcting the problem, including any specialty tools and/or Software currently in use to debug, validate and correct the problem;
	<ul style="list-style-type: none"> all database Design, and database Maintenance activities required to keep the System operational shall also be clearly documented, including the scheduling of such activities;
	<ul style="list-style-type: none"> detailed procedures for backup, archiving and purging data;
	<ul style="list-style-type: none"> detailed schedule for all Preventive Maintenance activities;
	<ul style="list-style-type: none"> technical contact lists for Hardware and Software providers;
	<ul style="list-style-type: none"> detailed procedures for monitoring System security;
	<ul style="list-style-type: none"> details and copies of all third-party System support agreements;
	<ul style="list-style-type: none"> ad-hoc reporting tools and use of the tools to generate ad-hoc reports shall be documented, and
	<ul style="list-style-type: none"> details of monitoring tools supplied by Contractor to include but not be limited to Roadside and MOMS Dashboards and MOMS.

2.6.5.2.4 ETTM System User Manual

Contractor shall develop and provide a comprehensive set of System Documentation and user manuals for the ETTM System users. At a minimum, the Documentation shall include all user and training manuals, screen layouts, reports definitions and data flow diagrams.

1373	Contractor shall develop and submit ETTM System User Manuals to be used by Authority staff to operate the ETTM System and for training purposes.
1374	Contractor shall develop a separate manual for each job category that details all the processes, procedures and policies developed by Contractor and Approved by Authority required to fulfill the Requirements of each specific job description.
1375	The manual shall include screen images detailing the step-by-step activities that need to be completed in order to fulfill a specific functionality.
1376	The manual shall not include any information that could jeopardize the integrity of toll collection Operations or the ETTM System.
1377	Each User Manual shall include but not be limited to:
	<ul style="list-style-type: none"> step-by-step actions to take to complete an operation;

	<ul style="list-style-type: none"> screen images detailing the step-by-step activities needed to fulfill a specific functionality;
	<ul style="list-style-type: none"> flowcharts to provide Authority staff a clear understanding of the workflow;
	<ul style="list-style-type: none"> all screens, reports and data fields, clearly explained using sample formats applicable to the RSS; and
	<ul style="list-style-type: none"> samples of all reports, included in the manual or as an attachment to the manual, with any specific instructions that may apply to a given report.

2.6.5.3 As-Built Documentation

Prior to Authority Acceptance of each Corridor, Contractor shall provide Documentation of each Corridor. Within 90 Days of Go-Live, Contractor shall provide As-Built Documentation that documents the final Roadside System Design and implementation.

2.6.5.3.1 System Detailed Design Document

1378	After the Approval of the Operational and Acceptance Test for each Roadside System and prior to Authority Acceptance of the ETTM System, Contractor shall submit the As-Built SDDD that includes all Software and Hardware changes made during the System development, implementation, and testing phases.
1379	Contractor shall submit two (2) hard copies in addition to the electronic version of the As-Built SDDD.

2.6.5.3.2 As-Built Drawings

1380	Contractor shall provide to Authority a complete set of As-Built Drawings which shall be delivered as two (2) full-size and five (5) half-size complete sets of prints, and shall deliver the same in electronic format for all Equipment installed and furnished under this Agreement.
1381	As material changes are made to the System Contractor shall update the As-Built Drawings to reflect the current status.
1382	The sets shall include, but not be limited to:
	<ul style="list-style-type: none"> all schematics;
	<ul style="list-style-type: none"> logic diagrams;
	<ul style="list-style-type: none"> layouts;
	<ul style="list-style-type: none"> wiring diagrams;
	<ul style="list-style-type: none"> interconnection diagrams;
	<ul style="list-style-type: none"> all attachment Hardware details;
	<ul style="list-style-type: none"> installation diagrams;
	<ul style="list-style-type: none"> cable schedule;
	<ul style="list-style-type: none"> Interface details;
	<ul style="list-style-type: none"> facility installation details and
	<ul style="list-style-type: none"> network diagrams, so as to provide a complete record of the As-Built status of the Equipment.

1383	All drawing revisions to standard commercial assemblies or components of the Equipment shall be included in the As-Built Drawing set.
1384	All As-Built Drawings shall contain a table of contents that shall include a listing of all drawings with headings for drawing number, drawing title, revisions number and date, and the type of material list, wiring diagram, wire list, specification control drawing, or similar categories.
1385	Contractor shall update the latest drawings with red lines as changes are incorporated during the installation process. At the completion of the installation, Contractor shall gather all red line drawings.
1386	The red line drawings shall be verified and incorporated into a final As-Built Drawing package. This final As-Built Drawing package shall include all updated installation drawings, shop drawings and sketches, Plans and other drawing types that were used to install the Roadside System.
1387	All other Documentation used regarding the installation also shall be finalized and submitted as part of the As-Built Drawing Submittal.

2.6.6 Quality Assurance Program

Contractor shall establish and maintain an effective Quality Assurance (QA) program on all aspects of the Project to ensure compliance with the Agreement. This Quality Assurance Plan shall detail the process and procedures instituted by Contractor to ensure the QA program is in place.

1388	Contractor shall establish and maintain an effective Quality Assurance (QA) program that ensures adequate quality throughout all areas of Project performance.
1389	All supplies and Services under this Agreement, whether manufactured or performed within Contractor's facilities or at any other source, shall be controlled by Contractor at all points necessary to ensure conformance to the terms and conditions of the Agreement.
1390	Purchase, delivery, verification, testing and assembly of Equipment, Hardware and Software conducted within Contractor's facilities and onsite shall be controlled completely by Contractor.
1391	Delivery, verification, testing and assembly of servers and network Equipment conducted within Contractor's facilities shall be controlled completely by Contractor.
1392	The QA program shall provide for the prevention and early detection of discrepancies and for timely and positive corrective action.
1393	The QA program shall include effective Quality Control of purchased materials and Subcontracted Work.
1394	Contractor shall make objective evidence of quality conformance readily available to Authority, and Authority shall have the right to review and verify Contractor's compliance to the process.

2.6.6.1 Records

1395	Contractor shall maintain records or data essential to providing objective evidence of quality until the expiration of the Agreement and these records shall be made available to Authority upon request.
------	---

1396	Quality-related records and data shall include but not be limited to:
	• inspection and test results;
	• records of Subcontractor QA programs;
	• cost records pertinent to Acceptance of nonconforming material;
	• inspection check-off of Constructor work;
	• change request Documentation;
	• Design reviews and walkthroughs and
	• results of internal and Contractor audits.
1397	Records shall be maintained in a manner that allows for easy access and analysis of the status of the overall QA Program.

2.6.6.2 Control of Purchase

1398	Contractor shall be responsible for ensuring that all supplies, components, developmental tools, assemblies, subassemblies, and Services procured from Subcontractors and vendors conform to the technical requirements and Agreement.
1399	Contractor shall have a Quality Control process in place for tracking and handling non-conforming Equipment and products.
1400	Contractor's responsibility includes the establishment of procedures for the selection of qualified Suppliers. In selecting qualified Suppliers, Contractor shall ensure that the Subcontractors and vendors control the quality of the supplies and Services provided.

2.6.6.3 Handling, Storage and Delivery

1401	Contractor shall document the approach to assembly of the Equipment, including the location where Equipment and Systems are assembled.
1402	Contractor's QA Program shall provide for adequate and documented handling, storage, preservation, packaging, and shipping instructions to protect the quality of products.
1403	All Authority assets shall be tracked and entered into the MOMS inventory and the location of each asset shall be recorded. The assets shall have a phone number where they can reach Contractor if they have questions about the Equipment.
1404	Contractor shall identify and bring to Authority's attention any unique or special requirements applicable to procured items. In addition, these special requirements should be noted in the bill of materials, purchase orders or other appropriate Documentation.
1405	Contractor shall provide all procurement documents to Authority upon request.

2.6.6.4 Inspection at Subcontractor-Vendor Facilities

1406	Authority reserves the right to inspect, at the source, supplies or Services not fabricated or performed within Contractor's facility.
1407	Authority's inspection shall not constitute Acceptance, nor shall it in any way replace Contractor's inspection activity or relieve Contractor of the responsibility to furnish an acceptable end product.

2.6.6.5 Access to/Inspection of Contractor's Facilities

1408	Authority reserves the right to inspect Contractor's facilities unannounced. Access to Contractor's facilities shall be limited to normal business hours, unless arrangements with Contractor have been made in advance.
1409	Authority reserves the right to inspect, at the source, supplies or services not manufactured or performed within Contractor's facility.
1410	Authority's access to Contractor's facilities shall be restricted to those portions of the facilities and personnel involved with or who are otherwise performing Work under this Agreement.
1411	Authority's inspection shall not constitute Acceptance or Approval, nor shall it in any way replace Contractor's inspection activity or relieve Contractor of the responsibility to furnish an acceptable end product.

2.6.7 Training

Contractor shall provide comprehensive training for all aspects of the ETTM System, including but not limited to the Operations, System monitoring, problem detection and resolution, reconciliation and audit, and Maintenance of the ETTM System. The training program will recognize and incorporate the plan for Authority to operate the ETTM System. As such Authority staff will be fully trained to successfully perform all aspects of the toll collection Operations. Training shall be delivered to Authority's personnel and Contractor's personnel. Training shall be ongoing throughout the entire Agreement Term.

Contractor shall provide "Train the Trainer" classes to enable Contractor to deliver training to its resources. Contractor shall train Contractor's designated trainers on an Approved, periodic basis, and whenever new functionality is made available in the ETTM System.

2.6.7.1 Overview of Training Program

1412	Contractor shall be solely responsible for supplying all items necessary, including but not limited to training Documentation, Software, Hardware and any other Equipment required to complete the delivery of the training program.
1413	Contractor's program shall include but not be limited to instruction, models/devices, manuals, diagrams and component manuals and catalogs as required.
1414	Where practical and useful, Contractor's training shall be hands on and use actual Hardware and Software in the training environment.
1415	Contractor shall produce all training materials, documents and manuals in hard copies sufficient to provide one (1) copy to each student. Additionally, one (1) reproducible set of the latest documentation shall be provided in electronic form to be used and printed for future training sessions.
1416	Authority shall have the right to attend any training sessions, to be provided all training materials and to make recordings and copies of all training program materials for their use in training new employees.
1417	Contractor shall obtain releases from all employees/Subcontractors to allow unlimited, royalty free use and copies of PII compliant recordings and provide the same to Authority upon request.

1418	Training must be conducted by an experienced training manager with at least five (5) years of experience developing a training curriculum and conducting training.
------	--

2.6.7.2 Training Requirements

1419	Contractor shall provide the training courses listed below for Authority's personnel in accordance with the Approved Training Plan, including but not limited to the provision of all training manuals (including Contractor-provided manuals or relevant portions thereof), guides, training aids, as well as student and instructor work books accompanying the courses listed in the sections below.
1420	Authority may require additional courses be offered or additional personnel be provided training. Contractor shall accommodate these requests to the extent possible with onsite personnel and Documentation that is readily available.
1421	Lane level training shall include toll collection training and an overview of toll collection Operations and lane peripherals and creation of transaction data and their flow through the System.
1422	All RSS training shall include a review and description of each of the appropriate RSS processes and procedures with actual RSS Software. All students shall have their own workstation and interact directly with the training environment.

2.6.7.2.1 System Operation Overview

1423	Contractor shall provide a System operation overview training course for Authority's management personnel who require a general understanding of all aspects of the operation, including but not limited to personnel from senior management, procurement, information technology, marketing and public information.
1424	The System Operations training shall include an overview of all aspects of the ETTM System including System architecture, roadside devices, lane Operations, security access and monitoring, RSS Operations, DVAS, MOMS, System Operations, TOD pricing, Occupancy Violation Verification, trip review Verification interface to the BOS network, and any other operational area of the ETTM System.
1425	System Operation Overview training will be conducted in one session with a class size of up to fifteen (15) people, for a minimum of four (4) hours.

2.6.7.2.2 Audit and Reconciliation and Roadway Support Systems (RSS) Operations

1426	Contractor shall provide an audit and reconciliation training course for Authority's Operations and auditing staff to understand all aspects of the operation, particularly those related to audit and reconciliation.
1427	Training shall include step-by-step description of the use of the System application to perform the audit and reconciliation functions.
1428	Course shall include training all personnel who require a detailed understanding of the Operations of the RSS and how to access and view information and reports from the System on items such as status, alarms, performance, transactions and revenue.
1429	Audit and reconciliation and Operations training will be conducted in one (1) session with a class size of up to five (5) people, for a minimum of four (4) hours.

2.6.7.2.3 BOS/CSC Operations

1430	The BOS/CSC Operations training shall be attended by BOS Contractor staff responsible for all Day-to-Day customer service operations and customer interactions. Authority staff may also attend these class sessions. The training shall include instruction, review and description of the processes and procedures relating to BOS/CSC operations activities to ensure that BOS Contractor's staff are able to review ETTM System information normally related to a customer disputes.
1431	Real traffic data and images shall be setup in a training database and sufficient workstations for each training participant shall be used to create real-life examples to reinforce the training activity.
1432	Participants shall be trained on scenarios which may occur on the Express Lanes that could result in customer dispute, including but not limited to, tolls charged for the customer trip; Clean Air Vehicle tolls; operational mode of the lane, and occupancy identification.
1433	Multiple sessions of this course, at varying times to accommodate different shifts, will be required with a class size of up to 12 (twelve) people with a minimum of four (4) hours per training class.

2.6.7.2.4 Image Review Operations

1434	The image review Operations training shall be attended by Contractor staff responsible for the manual image review and verification of compliance with Performance Requirements, including image review clerks, supervisors, and QA staff. BOS Contractor's staff will also attend these class sessions. The training shall include instruction, review and description of the processes and procedures relating to image review Operations activities to ensure that image review Performance Requirements are met.
1435	Real traffic data and images shall be setup in a training database and sufficient workstations for each training participant shall be used to create real-life examples to reinforce the training activity.
1436	Participants shall be trained on image review and trip review verification.
1437	Multiple sessions of this course, at varying times to accommodate different shifts, will be required with a class size of up to 12 (twelve) people with a minimum of eight (8) hours per training class.

2.6.7.2.5 ETTM System Maintenance

1438	To be attended by all Maintenance personnel and Authority staff who require a detailed understanding of the Maintenance and troubleshooting for the ETTM System, including the Roadside System and RSS (DVAS, MOMS, central image servers, etc.). Training shall be a combination of class room and on the job training (OJT).
1439	ETTM System Maintenance training will be conducted in two (2) sessions with a class size of up to eight (8) people, for a minimum of forty (40) hours per session.

2.6.7.2.6 System Monitoring and Roadway Support Systems (RSS) Administration

1440	Contractor shall provide a System Monitoring and Administration training course for all personnel who require a detailed understanding of the System monitoring functions and management and administration of the interfaces, Software, database, applications, configurations and architecture of the RSS.
1441	Contractor shall provide various training programs that include but are not limited to: <ul style="list-style-type: none"> • an in-depth explanation of the System Operations, including all interfaces, file/data transfers and interconnections; • functions of the monitoring and tools used to manage monitoring tasks; • functions of the DVAS; • functions of the MOMS; • functions of the ATMS; • trip building logic and process; • RSS logs, error logs and processing of exceptions; • System dataflow and workflow queues; • explanation of the Dashboard data and analysis; • special use and monitoring tools and • queries and reports.
1442	System monitoring and RSS Administration training will be conducted in one (1) session with a class size of up to five (5) people, for a minimum of eight (8) hours.
1443	Contractor shall ensure the System monitoring staff are properly trained in the Requirements of monitoring the ETTM System and its uninterrupted Operations.
1444	Contractor shall provide a minimum of one (1) weeks of classroom and on-the-job training (OJT) to all personnel in their respective area of responsibility before such personnel are assigned monitoring duties.
1445	Contractor shall provide Documentation this initial training has been successfully completed.
1446	All System monitoring personnel shall attend the training sessions. Authority's technical staff also shall attend all training sessions.
1447	Contractor shall keep accurate training records on all Maintenance and Software support services personnel. Authority shall be permitted to review and verify Maintenance and Software support services personnel qualifications and training records at any time. Evidence of completion of training by Contractor personnel shall be provided to Authority upon request.

2.6.7.3 Training Facilities

1448	Contractor shall deliver training at the Authority facilities at a location to be determined in Orange County.
------	--

2.6.7.4 Scheduling and Preparation for Training

1449	It shall be Contractor's responsibility to provide sufficient notice to Authority on the types of training it shall provide and work with Authority on the timing for each training session. Authority shall identify a list of participants that Contractor shall notify to schedule their participation in the training.
1450	Contractor shall perform all scheduling activities and shall make every attempt necessary to accommodate the maximum number of persons for each training session given scheduling conflicts. Contractor shall provide sufficient notice to allow participants a reasonable lead time.
1451	Contractor shall notify Authority of the range of dates for training sessions at the ETTM System and shall provide a minimum two (2) weeks' notice to allow participants a reasonable lead time. Authority shall Approve the training schedule.

2.6.7.5 Training Materials

1452	Draft copies of all training materials shall be submitted by Contractor to Authority for review, comment and Approval, prior to final printing of quantities required for training.
1453	Authority shall have the right to require additional interim drafts at no additional cost should draft training materials submitted not be of adequate quality or have missing or incorrect information.
1454	For each course described in the section above, Contractor shall provide the materials listed below.

2.6.7.5.1 Instructor Guides

1455	Contractor shall provide an instructor guide for each training course. The guide shall include the following elements:
	<ul style="list-style-type: none"> • course agenda;
	<ul style="list-style-type: none"> • course objective;
	<ul style="list-style-type: none"> • procedures for managing training session;
	<ul style="list-style-type: none"> • resource and facilities required, including laptops, power and communications requirements;
	<ul style="list-style-type: none"> • detailed lesson plans;
	<ul style="list-style-type: none"> • a description of training aids and items to aid in on the job performance (e.g., where applicable, pocket guides or reference sheets);
	<ul style="list-style-type: none"> • test to be administered to assure satisfactory completion;
	<ul style="list-style-type: none"> • instructions for using any audio-visual support Equipment or materials and • student survey to obtain feedback on the training sessions and the training materials.

2.6.7.5.2 Training Aids/Devices

1456	Contractor shall provide training aids such as mock-ups, scale models, overhead displays, video demonstrations, and simulations as are necessary to successfully complete the course agenda and meet the course objective.
1457	Contractor shall provide a way for all trained personnel to access training documents, aids and tips in an online, electronic format for ongoing reference.

2.6.7.5.3 Student Workbook

1458	For each course, Contractor shall provide a student workbook, including but not limited to: <ul style="list-style-type: none"> • course agenda; • course objectives; • schedule of sessions; • copies of all overheads and visuals and • lesson outlines and summaries.
1459	Contractor shall supplement the material provided in the student workbook with additional material (as necessary), such as operations and user manuals. If such material is used, appropriate cross-references shall be included in the student workbook to identify the complete set of training materials provided to the student.

2.6.7.6 Training Room Set-up and Software Installation

1460	Contractor shall be responsible for loading all Software required to conduct training on the classroom computers (provided by the BOS Contractor).
1461	Contractor shall ensure that the Software is operating as expected on each of the classroom computers.
1462	Contractor shall ensure appropriate communications, such a voice and data, are in place.

2.6.8 Cooperation with Other Contractors and Providers

1463	Contractor shall cooperate to the fullest extent with other Contractors (91 Express Lanes), BOS Contractor, ETTM Contractor, Authority, and Third-Party Service Providers and Business Partners to ensure the ETTM System Implementation and Maintenance and Software Support Services do not conflict with or cause any interruption in capability or service or safety issues to the traveling public, customers, Authority, or existing operations.
1464	Contractor shall cooperate with external parties, as directed by Authority, to support any activity related to the ETTM System Implementation, including but not limited to: <ul style="list-style-type: none"> • Authority; • other Interoperable Agencies, states, and parties, as directed by Authority; • law enforcement; • auditors and • all Third-Party Service Providers and Business Partners.

1465	Contractor shall cooperate with and immediately notify Authority (via Authority-provided distribution list) regarding any customer complaints and System issues identified in the Express Lanes or facilities that come to Contractor's attention during the course of Implementation, Testing or Maintenance and Software Support Services.
------	--

2.6.9 Coordination with the Design-Builder and Other Civil Contractors

Contractor shall coordinate all design, installation, testing, and maintenance activities with Authority, Design-Builder, any other civil contractors, and Caltrans to ensure all Equipment specifications are addressed in the design and installation of all new or updated roadway infrastructure. In addition, Contractor shall coordinate with any other civil contractors who may be working within or adjacent to the Project area during the Agreement Term.

2.6.9.1 Coordination with the Design-Builder – I-405 Express Lanes

Contractor's coordination with Design-Builder is critical to the success of the project. To that end, this section includes specific requirements related to the Design, review, installation, and inspection of the ETTM Infrastructure provided by the Design-Builder.

1466	Design-Builder is responsible for the design and construction of certain ETTM System Infrastructure, as identified in Attachment 10: I-405 EL ETTM System Responsibility Matrix – Design-Builder and TSI , including the overhead structures/toll gantries, toll equipment pads, vaults, junction boxes, conduit, power, communications, lightning protection, and Contractor shall coordinate closely with Design-Builder.
1467	Contractor shall meet with Authority and Design-Builder to review and discuss civil and structural plans and specifications to ensure the Contractor's complete understanding of the proposed Design-Builder work.
1468	Contractor shall participate in regular meetings with Design-Builder and provide comments on the civil design, construction, and maintenance of traffic required for the Implementation Phase as required by Authority. Contractor shall participate in design reviews, tolling task force meetings, and over the shoulder reviews. Contractor shall update design documents, the Baseline Implementation Schedule, and the Installation Plan, as necessary.
1469	Contractor shall coordinate with the Design-Builder to jointly conduct informal over the shoulder reviews so that the Contractor can check for concept, level of detail, design criteria, and patent flaws during the design process.
1470	Contractor shall submit an ETTM System Infrastructure Design Requirements Document to Authority for review and Approval no later than 90 Days after NTP1. Contractor shall include, at a minimum, the following in the ETTM System Infrastructure Design Requirements Document: <ul style="list-style-type: none"> Requirements in regard to the overhead structures/toll gantries including weights, clearance, cantilevers, brackets, vibration specifications, routing, etc. for Design-Builder to design; Requirements for locations of Equipment to be mounted on the overhead structures/toll gantries; details for location and sizes for all roadside cabinets;

	<ul style="list-style-type: none"> specifications for the roadside cabinet pads and foundations to be designed, provided, and installed by Design-Builder;
	<ul style="list-style-type: none"> Requirements for power and communication for all Roadside Systems and ITS systems to be designed, provided, and installed by Design-Builder;
	<ul style="list-style-type: none"> specific requirements for Equipment lightning protection and grounding to be provided by Design-Builder;
	<ul style="list-style-type: none"> Requirements and locations for lighting in vicinity of each Toll Zone to be provided by Design-Builder;
	<ul style="list-style-type: none"> Requirements for UPS and generator and related infrastructure needs for the Roadside System;
	<ul style="list-style-type: none"> Requirements for special pavement at toll gantry areas, if any, to be provided by Design-Builder;
	<ul style="list-style-type: none"> power/communication and location requirements for Toll Rate CMS and associated roadside cabinet;
	<ul style="list-style-type: none"> power/communication and location requirements for the CCTV camera system;
	<ul style="list-style-type: none"> power/communication and location requirements for the TDS;
	<ul style="list-style-type: none"> Requirements of the of ETTM Communications Network; and
	<ul style="list-style-type: none"> any other specific requirements for operations of the ETTM System.
1471	Contractor shall be responsible for ensuring that the locations, positions, installation, connections and other elements of Contractor inputs identified on the ETTM System Infrastructure Design Requirements Document provided by Contractor, for all Contractor and Authority provided Equipment, whether in-roadway, structure/toll gantry mounted, in the Equipment vault or otherwise located are accurate and correct.
1472	The installation Requirements included in the ETTM System Infrastructure Design Requirements Document shall include acceptable tolerances for the System Equipment, including all related plans and documents. The Design-Builder shall rely on the installation Requirements provided by Contractor to Design and construct the overhead structures/toll gantries for the System Equipment to function as intended, and Contractor shall be fully responsible for the accuracy of its installation Requirements.
1473	Contractor shall revise and resubmit the ETTM System Infrastructure Design Requirements Document within 14 days of receiving Authority comments.
1474	The installation Requirements included in the ETTM System Infrastructure Design Requirements Document shall be consistent with those provided in Contractor's Proposal and shall accommodate the Design provided to support the required lane configurations.
1475	Contractor shall certify the installation Requirements included in the ETTM System Infrastructure Design Requirements Document are accurate and appropriate for its intended purpose to the satisfaction and Approval of Authority.
1476	Contractor shall participate in the Design and installation of the ETTM System Infrastructure on the roadways, including but not limited to: <ul style="list-style-type: none"> provide an ETTM System Infrastructure Design Requirements Document; provide Contractor-furnished materials for the Design-Builder to install;

	<ul style="list-style-type: none"> support and supply all information requested by the Design-Builder in the form of request for information (RFI);
	<ul style="list-style-type: none"> review all Design-Builder provided drawings with respect to the ETTM System;
	<ul style="list-style-type: none"> Approve all aspects of such drawings related to the ETTM System; and
	<ul style="list-style-type: none"> ensure the ETTM System Infrastructure provided by the Design-Builder will meet the Requirements set forth in this Scope of Work and Requirements are met with regard to such Design.
1477	Contractor shall review and provide written comments on drawings and specifications submitted by Design-Builder within 21 days of receipt. Lack of comments from Contractor after 21 days shall imply Contractor's approval of Design-Builder's drawings and specifications.
1478	Before Design-Builder may submit to Authority any Release for Construction Plans that includes design elements for the ETTM System Infrastructure, Contractor shall issue certification for ETTM System Infrastructure for Release for Construction. Contractor shall certify in writing that all previously provided review comments have been adequately addressed and resolved within 5 days of receipt of Release for Construction Plans.
1479	Contractor shall ensure that the installed ETTM System Infrastructure, roadway, infrastructure, structures/toll gantries, vaults, and communications meet the Requirements provided by Contractor and shall certify in writing such installed work with regard to the Design provided.
1480	Contractor shall cooperate with Authority, Caltrans, and Design-Builder to minimize required number of Lane Closures and to maximize the use of other scheduled Lane Closures. Contractor shall transmit all Lane Closure requests to Authority for Approval.
1481	Contractor shall provide certain materials to Design-Builder to install, as identified in this Scope of Work and Requirements and Attachment 10: I-405 EL ETTM System Responsibility Matrix – Design-Builder and TSI . Design-Builder will provide Contractor notice a minimum of 120 Days in advance of all scheduled Design-Builder ETTM System Infrastructure construction and installation activities requiring Contractor furnished materials and/or coordination. Design-Builder will also provide Contractor notice 60 Days in advance of actual paving of the Express lanes at the ETTM Sites.
1482	Contractor shall have Contractor-provided materials to be installed by Design-Builder available for pick-up 42 Days after receipt of notice from Design-Builder. Contractor-provided materials shall be available for pick-up at Contractor's facility located within a 25-mile radius of the Project.
1483	Contractor, in conjunction with Authority, shall inspect work completed by Design-Builder and promptly report to Authority any discrepancies or defects in such construction of which Contractor has knowledge that would render the Design-Builder work unsuitable for proper installation and execution of the ETTM System by Contractor as described in this Scope of Work and Requirements.
1484	Contractor shall create and use a Civil Site Acceptance Checklist to verify that civil infrastructure elements at Equipment locations where Contractor will install Equipment are suitable for proper execution of the Implementation Phase Services. The checklist shall include at a minimum:
	<ul style="list-style-type: none"> toll gantry;

	<ul style="list-style-type: none"> • roadside cabinet pad; • roadside cabinets; • conduits; • pull boxes; • pull ropes; • CCTV and TDS poles; • roadway pavement; • transformers; • disconnects and electrical panels; and • TEB
1485	For each ETTM Site, Contractor shall submit a completed Civil Site Acceptance Checklist to Authority with a courtesy copy to Design-Builder, initialing every element inspected. Contractor shall immediately provide Notice to Authority of any deficiency found during the inspection, including identification of any items that would render Design-Builder work unsuitable for proper installation and execution of the ETTM System by Contractor as described in this Scope of Work and Requirements and prevent Contractor's scheduled work at an ETTM Site.
1486	Upon successful completion of the Civil Site Acceptance Checklist, Contractor shall provide its written certification that there are no deficiencies in the subject ETTM Site and that the Design-Builder work at such location is suitable for Contractor's performance of the Implementation Phase Services at such location, and shall submit the completed Civil Site Acceptance Checklist to Authority. Delivery of such certification shall constitute Contractor's acceptance of the condition of the relevant Design-Builder work as suitable for Contractor's performance of the Implementation Phase Services at such location.
1487	Contractor shall prepare and use a Communications Network Acceptance Checklist to verify that the ETTM Communications Network provided by Design-Builder is suitable for proper execution of the ETTM System. Contractor shall be responsible for conducting field inspections at the same time Authority conducts their field inspection.
1488	Contractor shall submit the completed Communication Network Acceptance Checklist to Authority with a courtesy copy to Design-Builder. Contractor shall immediately provide Notice to Authority of any deficiency found during the inspection, including identification of any items that would render Design-Builder work unsuitable for proper installation and execution of the ETTM System by Contractor as described in this Scope of Work and Requirements and prevent Contractor's scheduled work at an ETTM Site.
1489	Upon successful completion of the Communication Network Acceptance Checklist, Contractor shall provide written certification that there are no deficiencies in the ETTM Communication Network. Such certification shall constitute Contractor's acceptance of the Design-Builder work related to the ETTM Communication Network. Contractor shall be responsible for monitoring and maintaining the ETTM Communications Network after the turnover of the entire Project from Design-Builder until end of the Agreement Term.

2.6.9.2 Coordination with Other Civil Contractors

1490	Contractor shall interface with other civil contractors who may be directly supporting the Project or working within or adjacent to the Project area during the Agreement Term, as part of this Project or other projects, including but not limited to:
	<ul style="list-style-type: none"> • 91 Express Lanes;
	<ul style="list-style-type: none"> • 91 Express Lanes TOC;
	<ul style="list-style-type: none"> • I-405 Express Lanes;
	<ul style="list-style-type: none"> • I-405 Express Lanes TOC; and
	<ul style="list-style-type: none"> • I-405 Express Lanes TOC (initial build-out)
1491	Contractor shall coordinate with other civil contractors to ensure that all improvements adequately support or maintain the functions of the ETTM System and Operations.
1492	Contractor shall coordinate with civil contractors, as appropriate, to provide input, design requirements, design review, and comment on any design which may impact the ETTM System; such as power, communications, paving, TOC support infrastructure, and any other information necessary associated with ETTM System.
1493	Contractor shall coordinate the Operations and Maintenance Phase Services with an civil contractors who may be working within or adjacent to the Project and whose operations may impact the Contractor's Operations and Maintenance Phase Services.

2.6.10 ETTM System Infrastructure Turnover – I-405 Express Lanes

As part of Design-BUILDER's work, Design-BUILDER will design and construct certain civil infrastructure (ETTM System Infrastructure) required for the ETTM System per **Attachment 10: I-405 EL ETTM System Responsibility Matrix – Design-BUILDER and TSI**. To facilitate this coordination, Design-BUILDER will complete sections of the I-405 Express Lanes for ETTM System Infrastructure Turnover to the Contractor.

Design-BUILDER shall turnover ETTM Sites to Contractor in four (4) Toll Site Sets. Each Toll Site Set consists of one or more ETTM Toll Collection and Enforcement Sites and certain Equipment and Infrastructure required for Contractor to install the ETTM System. The Design-BUILDER will determine which ETTM Sites shall comprise each Toll Site Set.

The initial set of ETTM Sites (Toll Site Set 1) will include at least one of each ETTM Site type and multiple ETTM Toll CCTV Camera / ETTM Traffic Detection System Sites as well as the completed ETTM Toll Equipment Building and the ETTM Communications Network required for communication between the sites, Caltrans, Authority and the Contractor. Toll Site Set 1 will represent a completely operational tolling segment (i.e. ETTM Toll Rate CMS Site, the corresponding ETTM Toll Collection and Enforcement Site, a downstream ETTM Transponder Read Site, and all ETTM Toll CCTV Camera / ETTM Traffic Detection System Sites within that segment).

The second set of ETTM Sites (Toll Site Set 2) will include at least two ETTM Toll Collection and Enforcement Sites; at least two ETTM Transponder Read Sites; at least four ETTM Toll Rate CMS Sites; at least one-third ($\geq 1/3$) of the remaining ETTM Toll CCTV Camera Sites; and at least one-third ($\geq 1/3$) of the remaining ETTM Traffic Detection System Sites.

The third set of ETTM Sites (Toll Site Set 3) will include at least two ETTM Toll Collection and Enforcement Sites; at least two ETTM Transponder Read Sites; at least three ETTM Toll Rate CMS Sites; at least one-half ($\geq 1/2$) of the remaining ETTM Toll CCTV Camera Sites; and at least one-half ($\geq 1/2$) of the remaining ETTM Traffic Detection System Sites.

The fourth set of ETTM Sites (Toll Site Set 4) shall include all Roadside System sites not included in Toll Site Sets 1 through 3.

1494	Contractor shall coordinate the performance of the Work with the work to be performed by the Design-Builder.
1495	Design-Builder will give Authority and Contractor at least 30 Days prior written notification of the date on which Design-Builder anticipates that it will achieve ETTM System Infrastructure Turnover for the first Toll Site Set and not less than 45 Days' prior written Notice for subsequent Toll Site Sets. Within 15 Days after receipt of notification for the first Toll Site Set and within 30 Days after receipt of notification for subsequent Toll Site Sets, Contractor shall inspect the Toll Site Set and submit a written list of outstanding items, if any, to be corrected by the Design-Builder.
1496	After Design-Builder has completed all outstanding items, Design-Builder will provide Authority and Contractor a written notification requesting re-inspection. Upon receipt of Design-Builder's request for re-inspection, Contractor shall have 15 Days to conduct such additional inspections, surveys and/or testing as they deem necessary to certify that the Design-Builder has achieved ETTM System Infrastructure Turnover. Within 15 Days after receipt of notification, Contractor shall inspect the Toll Site Set and submit a written list of outstanding items, if any, to be corrected by the Design-Builder.
1497	Contractor and Authority shall promptly meet and confer to evaluate the outstanding items list within 15 Days after receipt of Design-Builder's notification requesting re-inspection. Failure of Contractor to provide notification of any outstanding items, and to deliver the Certificate of ETTM System Infrastructure Turnover within 15 Days of Design-Builder notification requesting re-inspection, shall constitute Contractor's confirmation that ETTM System Infrastructure Turnover has occurred and that Contractor has accepted the ETTM System Infrastructure.
1498	If additional items are identified during the inspection that require correction, the process of developing a correction list, performing corrective work, and re-inspection will be repeated until Authority determines that all prerequisites to ETTM System Infrastructure Turnover have been met for the relevant Toll Site Set. Authority and Contractor shall promptly execute a written Certificate of ETTM System Infrastructure Turnover following the determination that the conditions to ETTM System Infrastructure Turnover have been met for the Toll Site Set.
1499	During the period following ETTM System Infrastructure Turnover of the first Toll Site Set, Contractor shall coordinate with Design-Builder with respect to design, installation, inspection, testing, and commissioning of the ETTM System. Contractor shall promptly notify Design-Builder and Authority of any non-conforming work identified during this period and provide access to the Design-Builder to correct such non-conforming work.
1500	Regardless of when the actual ETTM System Infrastructure Turnover Dates occur, Contractor shall complete its Implementation Phase Work in the following durations for the applicable Toll Site Sets:

	<ul style="list-style-type: none"> • Toll Site Set 1: 260 Days;
	<ul style="list-style-type: none"> • Toll Site Set 2: 200 Days;
	<ul style="list-style-type: none"> • Toll Site Set 3: 150 Days;
	<ul style="list-style-type: none"> • Toll Site Set 4: 110 Days;
1501	Commencing on the applicable ETTM System Infrastructure Turnover Date, Contractor shall have primary access and priority for Lane Closures in each Toll Site Set. Contractor shall provide Design-Builder with reasonable access to such Toll Site Set areas, and shall coordinate with Design-Builder and allow Design-Builder to complete punch list work and any other work that Design-Builder is required to undertake as part of the Design Build work.
1502	<p>If Contractor requires access to any part of the site prior to any ETTM System Infrastructure Turnover Date, Contractor shall:</p> <ul style="list-style-type: none"> • Provide Design-Builder and Authority with at least 72 hours prior written Notice of Contractor's need to access the site, and coordinate and cooperate with Design-Builder so as not to interfere with or adversely impact performance of the Design-Builder's work; • Obtain an encroachment permit rider providing Contractor with access to the site and comply with the requirements of such permit rider; • Comply with Contractor's safety and security procedures; • Comply with Design-Builder's safety and security procedures and request Design-Builder's directions as to access to and occupancy of such areas; and • Leave the site in the same or better condition that exists at the time of accessing such area.

2.6.11 Lane Closure and Traffic Control (Implementation Phase)

Contractor will provide all maintenance of traffic (MOT) activities associated with completing Contractor Work on the 91 Express Lanes during the Implementation Phase. All Lane Closures shall be coordinated with the Authority and BOS Contractor and Lane Closure schedules shall be submitted to Authority in advance for Approval.

MOT on the I-405 Express Lanes shall be performed by the Design-Builder during the Implementation Phase only, in coordination with Contractor.

2.6.11.1 Lane Closure and Traffic Control (Implementation Phase) – 91 Express Lanes

1503	Contractor shall provide all MOT for the Work performed during the Implementation Phase. Contractor shall develop as a part of the Installation Plan, a Transportation Management Plan (TMP) in accordance with Caltrans standards for Approval by Authority. The Installation Plan shall include all design for MOT, including all planned Lane Closures of Express Lanes, general purpose lanes, and ramps and connectors.
1504	Contractor shall submit a Lane Closure Schedule as part of the Installation Plan showing the locations and times of the proposed Lane Closures. The Lane Closure Schedule shall be submitted in the format requested by Authority, and must be made in accordance with this Scope of Work and Requirements.

1505	Lane Closure Schedules submitted to Authority with incomplete or inaccurate information will be rejected and returned for correction and resubmittal. Contractor will be notified by Authority of disapproved closures or closures that require coordination with other parties as a condition of approval.
1506	Contractor shall adhere to the Approved Installation Plan when setting up, working under MOT and restoring lanes to traffic. All Lane Closures shall also be coordinated with Authority, Caltrans (if necessary) and the TOC.
1507	Contractor shall develop, implement, and maintain a TMP that lays out the strategies for managing the work zone impacts of the Work and submit to Authority for review and approval. The TMP must follow the guidelines in the latest version of the Caltrans' Transportation Management Plan Guidelines. The TMP is considered a living document; Contractor shall amend and submit changes to the TMP for approval by Authority and Caltrans (if necessary) as changes occur in the MOT strategies proposed by Contractor.
1508	TMP compliance and implementation is the responsibility of the Contractor. Authority and Caltrans will monitor and evaluate TMP activities during the course of the Work. Authority may suspend all or part of the Contractor's operations for failure to implement and comply with TMP elements, or failure to correct unsafe traffic conditions within 24 hours after such notification is given in writing to Contractor. If Contractor does not promptly take appropriate action to bring the errors into compliance or to correct unsafe traffic conditions, Authority may proceed with corrective action against Contractor.
1509	Roadside Equipment installation shall be scheduled to minimize traffic delay during the installation process. Contractor shall make every effort to schedule Work around peak traffic movement times unless such Work can be performed without impact to traffic.
1510	The Maintenance Manager shall be present during Lane Closures.
1511	<p>The 91 Express Lanes are completely closed to all vehicular traffic every third Sunday, weather permitting, between 6:00am and 12:00 pm for maintenance by Caltrans. Contractor is encouraged to coordinate installation with Caltrans regularly scheduled Lane Closures. Contractor's Lane Closure responsibility is as follows:</p> <ul style="list-style-type: none"> • If Work is scheduled with Caltrans roadway maintenance activities, Contractor will not be responsible for paying for Lane Closure MOT and enforcement costs. • If Work is not scheduled with Caltrans roadway maintenance activities, Contractor shall be responsible for providing and paying for all Lane Closure MOT and coordinate and pay for any enforcement costs.
1512	Closures of Express Lanes are permitted to facilitate the Work during the Implementation Phase. All Permitted Lane Closures shall be as specified in Table 2-4: Permitted Lane Closures of 91 Express Lanes (Implementation Phase) .
1513	Closures of general purpose lanes to facilitate the Work during the Implementation Phase must be coordinated with Authority and Caltrans. Any Lane Closure of general purpose lanes must be Approved in advance by Authority and Caltrans. Approved closures of general purpose lanes will be considered Permitted Lane Closures.
1514	Contractor shall submit to the Authority for Approval written notice of a Permitted Lane Closure of an Express Lane(s) for review and Approval no later than seven (7) Days prior to the Permitted Lane Closure of any Express Lane.

1515	Closures involving work (temporary barrier placement and paving Operations) that will reduce horizontal clearances, traveled way inclusive of shoulders, to two (2) lanes or less shall be submitted to the Authority for Approval not less than twenty-five (25) Days and not more than one hundred and twenty-five (125) Days before the anticipated start of Operations.
1516	Contractor shall submit to the Authority and Caltrans written request for a Permitted Lane Closure of a general purpose lane(s) for review and Approval no later than seven (7) Days prior to the Permitted Lane Closure of any general purpose lane.
1517	Lane Closure Schedule Amendments, including adding additional closures, shall be submitted by 12:00 p.m. to Authority, in writing, at least three (3) Business Days in advance of a planned closure. Approval of Closure Schedule Amendments will be at the discretion of Authority. Authority shall be notified of cancelled closures two (2) Business Days before the date of the closure. Closures that are cancelled due to unsuitable weather may be rescheduled at the discretion of Authority.
1518	Contractor shall notify the Authority immediately, as soon as Contractor knows that a Permitted Lane Closure will be late in reopening. In the event that a Permitted Lane Closure does not reopen on time, Authority and Caltrans shall not authorize any further Lane Closures until Contractor submits to Authority a corrective action plan to avoid recurrences.
1519	Authority shall have the right to suspend the Work and cancel any previously Approved Lane Closure requests for failure to reopen to public traffic a Permitted Lane Closure within the windows specified in Table 2-4: Permitted Lane Closures of 91 Express Lanes (Implementation Phase) or otherwise Approved by Authority.
1520	Lane closures of Express Lanes and general purpose lanes shall not be allowed: <ul style="list-style-type: none"> • on Easter weekend; • on Mother's Day weekend; • on Father's Day weekend; • on Memorial Day weekend; • on Fourth of July weekend; • on Labor Day weekend; • between the Wednesday before Thanksgiving until the Monday following Thanksgiving; and • on any other Holidays.
1521	Contractor shall coordinate with Authority and Caltrans and local agencies to identify any special events and restrict Lane Closures accordingly.
1522	Unpermitted Lane Closures are prohibited and shall be subject to Authority Liquidated Damages in accordance with Article 18, Liquidated Damages/Lane Rental Fees, of the Agreement. Upon discovery of any Unpermitted Lane Closure, Authority will deliver Contractor a Notice of Unpermitted Lane Closure, and shall assess against Contractor the applicable Liquidated Damages, calculated in accordance with Article 18, Liquidated Damages/Lane Rental Fees, of the Agreement. Contractor shall pay Authority such Liquidated Damages within 24 hours after all applicable lanes reopen to public traffic.

1523	Authority will assess against Contractor the applicable Liquidated Damages in accordance with Article 18, Liquidated Damages/Lane Rental Fees, of the Agreement for failure to utilize a requested Lane Closure or cancellation of a requested Lane Closure less than 72 hours before the date and time that the requested Lane Closure is scheduled to commence.
1524	Contractor, however, may request Lane Closures outside of the Permitted Lane Closure windows. Contractor shall submit such requests in writing to Authority no later than fourteen (14) Days prior to Contractor's requested date for the Lane Closure, together with a revised TMP. Such requests and revised TMPs shall be subject to review and approval by Authority and Caltrans (if necessary). Written requests for Lane Closures outside the times set forth in the Lane Requirement Charts shall, at a minimum include the following: <ul style="list-style-type: none"> • Justification for the Lane Closure; • Proposed time periods and hours; • Proposed location(s); and • Proposed calendar duration.
1525	Any Work involving removal/relocation of Equipment (both existing equipment and Contractor's Equipment) (loosening or removal of nuts/screws, cables, connectors etc.) shall be done with appropriate Lane Closures during time periods specified in Table 2-4: Permitted Lane Closures of 91 Express Lanes , unless otherwise Approved by Authority in its sole discretion.
1526	The 91 Express Lanes shall be properly closed before any Work begins in the 91 Express Lanes. All workers and equipment must be cleared from the 91 Express Lanes before they are reopened.
1527	Contractor shall record the beginning and ending times of all Lane Closures in the ATMS.
1528	All Lane Closures during the Implementation Phase shall conform to the Caltrans Encroachment Permit, as shown in Attachment 13 – 91 EL Encroachment Permit . Contractor shall obtain a rider under such encroachment permit.
1529	Permitted Lane Closure windows for the 91 Express Lanes, unless otherwise Approved by Authority in its sole discretion, shall be as specified in Table 2-4: Permitted Lane Closures of 91 Express Lanes .

Table 2-4: Permitted Lane Closures of 91 Express Lanes (Implementation Phase)

<i>Direction/Period</i>	<i>Hours During Which Closures Permitted</i>
Eastbound weekday (Sunday from 11:00 p.m. to Friday at 5:00 a.m.)	11:00 p.m. to 5:00 a.m.
Eastbound weekend (Friday 11:00 p.m. to Sunday at 5:00 a.m.)	11:00 p.m. to 5:00 a.m.
Westbound weekday (Sunday from 9:00 p.m. to Friday at 4:00 a.m.)	9:00 p.m. to 4:00 a.m.
Westbound weekend (Friday at 10:00 p.m. to Sunday at 5:00 a.m.)	10:00 p.m. to 5:00 a.m.

2.6.11.2 Lane Closure and Traffic Control (Implementation Phase) – I-405 Express Lanes

1530	Contractor shall coordinate Lane Closures and traffic control with the Design-Builder during the Implementation Phase only.
1531	Contractor shall be permitted to work at multiple ETTM Sites concurrently as agreed upon between Contractor, Design-Builder, Authority, and Caltrans.
1532	The Design-Builder shall provide MOT and work zone for installation, testing, and commissioning from 500 feet upstream to 200 feet downstream of each ETTM Site. All closures provided will include the inside shoulder, the Express Lanes, and the left most general purpose lane.
1533	The Design-Builder shall provide access to/from the work zone at the extreme ends of the Lane Closure;
1534	<p>The Design-Builder shall provide MOT and Contractor shall complete the ETTM installation within the Lane Closure timeframes and closure durations as follows:</p> <ul style="list-style-type: none"> • Per each ETTM Toll Collection and Enforcement Site: three consecutive Lane Closures (i.e. nightlight closures for three consecutive nights). • Per each ETTM Transponder Read Site: two consecutive Lane Closures • ETTM Toll Rate CMS Sites (Mainline): two consecutive Lane Closures • ETTM Toll Rate CMS Sites (Ramp): two consecutive Lane Closures • If access to the roadside cabinets, generators, and equipment is not available due to the configurations of the roadway and/or abnormal traffic conditions, the Design-Builder will provide up to two consecutive Days of outside shoulder/lane closure per site.
1535	<p>The Design-Builder shall provide MOT and Contractor shall complete the Onsite Installation Test (OIT) within the Lane Closure timeframes and closure durations as follows:</p> <ul style="list-style-type: none"> • Per each ETTM Toll Collection and Enforcement Site: four consecutive Lane Closures • If access to the roadside cabinets, generators, and equipment is not available due to the configurations of the roadway and/or abnormal traffic conditions, the Design-Builder will provide concurrent outside Lane Closures to provide access and work area at the roadside cabinets, generators, and Equipment during testing.
1536	<p>The Design-Builder shall provide MOT and Contractor shall complete the Installation and Commissioning Test within the Lane Closure timeframes and closure durations as follows:</p> <ul style="list-style-type: none"> • Per each ETTM Toll Collection and Enforcement Site: two consecutive Lane Closures • Per each ETTM Transponder Read Site: two consecutive Lane Closures • ETTM Toll Rate CMS Sites (Mainline): two consecutive Lane Closures • ETTM Toll Rate CMS Sites (Ramp): one Lane Closure • If access to the roadside cabinets, generators, and equipment is not available due to the configurations of the roadway and/or abnormal traffic conditions, the Design-Builder will provide concurrent outside Lane Closures to provide access and work area at the roadside cabinets, generators, and Equipment during testing.

1537	Lane Closures for ETTM Toll CCTV Camera and ETTM Traffic Detection System installation will follow Caltrans standard closure process and durations for installation of CCTV cameras and roadside traffic detectors.
1538	Contractor shall provide seven (7) Days' notice to the Design-Builder for any unscheduled Lane Closure.
1539	Lane Closure windows for the I-405 Express Lanes, unless otherwise Approved by Authority and Caltrans, are reflected in Attachment 12: I-405 EL Lane Requirement Charts .
1540	All Lane Closures during the Implementation Phase shall conform to the Caltrans Encroachment Permit, as shown in Attachment 14 – I-405 EL Encroachment Permit . Contractor shall obtain a rider under such encroachment permit.

2.6.11.3 Contingency Plan

1541	A detailed contingency Plan shall be prepared for reopening closures to public traffic. A general contingency Plan shall be included in the Installation Plan; however, a site specific contingency Plan shall be submitted to Authority before Work at the job site begins.
1542	The contingency Plan shall contain a current emergency contact list for Authority's use at all times for handling emergencies and escalations. The emergency contact list shall name primary and secondary (multiple secondary contacts as applicable) points of contact for each anticipated emergency type. The emergency contact list shall name Contractor's preferred points of contact, in order of precedence and shall include, at a minimum, Contractor Project Manager, deputy Project manager, installation manager, technical manager, technology manager, and other support staff. The purpose of the emergency contact list is to ensure Contractor can be reached outside normal working hours to address urgent matters.

2.7 Roadside System Testing Requirements

2.7.1 Roadside System Testing Concept

Authority is planning a phased approach to deploying the ETTM System on Express Lanes with the implementation of the 91 Express Lanes occurring first and the implementation of the I-405 Express Lanes occurring later. Given the extended duration of the Project, and the potential differences in the 91 Express Lanes and I-405 Express Lanes Roadside System solutions, Contractor shall conduct the following tests when each Roadside System is implemented.

This section describes Contractor's responsibilities for carrying out and reporting the results of various functional and performance tests of the ETTM System and its major components as they are being developed, demonstrated, deployed, and operated. This includes all phases of testing including the Software, Hardware, Equipment, network connections, interfaces. The testing program shall ensure that the RSS Roadway functions according to the requirements and KPIs prescribed in the Agreement, these TPs and the FDD.

Contractor shall plan for, perform, monitor, and document all tests required to prove the design and acceptability of the ETTM System, including all elements, subsystems, and the system as a whole, furnished under this Work. Contractor shall furnish Equipment that meets the criteria specified for all tests. Testing shall not commence until all design affecting the respective equipment and relevant to the stage of the design has been Approved by Authority, and Authority has Approved all related testing procedures. The testing shall be provided for all Equipment.

Given the extended duration of the Project, and the potential differences in the various Roadside System solutions, Contractor shall prepare a detailed plan for testing all Hardware, Software and full integration of the ETTM and Roadway Support Systems. The test plan will be developed to confirm that the documented functional requirements, the System Design Documentation, and the other documents within the Agreement are met by the equipment and/or roadside system operations.

Contractor shall be responsible for developing comprehensive test plans and test scripts to ensure that the system development meets all of the RSS requirements documented during detailed design and contained in the Agreement. The test plans and scripts will be reviewed and Approved by Authority.

The test plans and scripts shall be closely adhered to during each phase of equipment and system testing. At the completion of each test phase, Contractor shall submit final test results to Authority for final Approval. Authority will review the test results.

The test plan and subsequent testing activities will be developed and executed for different phases. Each test phase will commence only upon the successful completion of the previous phase.

The test phases shall be conducted by Contractor as presented below:

1543	Various tests (outlined for reference immediately below and with detailed Requirements in subsequent sections) shall be prepared and conducted by Contractor on all Roadsides, including but not limited to:
	<ul style="list-style-type: none"> • Factory Acceptance Test (FAT) for RSS and Roadside Systems;

	• Onsite Installation Test (OIT)
	• 91 Express Lanes;
	○ Unit Testing
	○ Onsite Installation and Commissioning Test;
	○ Operational and Acceptance test;
	• I-405 Express Lanes and
	○ Unit Testing
	○ Installation and Commissioning Test;
	○ Operational and Acceptance test;
	• Additional Express Lanes Corridors during Operations and Maintenance Phase (Optional).
	○ Installation and Commissioning Test;
	○ Operational and Acceptance test;

2.7.2 General Testing Requirements

The Requirements described in this section detail the labor, materials, facility, and support Services necessary to test the Roadside Systems and RSS and its interface to the BOS.

Contractor shall keep the Requirements Trace Matrix updated to reflect all testing, clearly tracing requirements to test phases and test scripts. Contractor shall submit each test plan to Authority in advance for review and Approval. Contractor shall obtain Authority Approval of test plans prior to testing. Contractor's Quality Manager shall review Contractor readiness to commence each phase of testing.

Authority reserves the right to recommend ad hoc testing of any variety of vehicle types or equipment failures not included in the relevant Individual Test Plan. Ad hoc tests may be added before or during actual testing. Ad-hoc testing will be kept to a minimum and is intended to further review items that arise in scheduled testing.

Contractor shall work with Authority to schedule tests so that Authority staff, consultants and partners may observe all testing.

Contractor shall include statistically significant and mutually agreeable test data sufficient in size and variety of types to fully test all requirements of the Roadside System and RSS.

Acceptance of the RSS is dependent on tests demonstrating that the ETTM System performs in a manner meeting or surpassing all requirements and the KPIs.

Within 21 Days of the completion of each individual test, Contractor shall provide for Authority review and Approval a test report containing results of each test script, a summary of the test results, a list of failed items, planned regression test schedule and punch list items. Contractor shall maintain all test results, notes, and observations. Test reports shall be signed and certified by the TSI's Quality Manager. Test reports shall pay special attention to any test cases where a

failure occurred and how it was resolved. Together with results, any re-testing, regression testing, procedure modifications, Software fixes and document changes (if required) shall be detailed.

If testing or operations identifies defects in the system after the system goes live (is in use by actual customers), Contractor shall go through code release procedures described and Approved in the Quality Assurance Plan to fix the issue. Contractor shall never change the production system without prior Approval of Authority.

Contractor shall prepare and conduct tests that validate adherence to the Requirements that guided its Design and development, compliance to Approved Design and Business Rules and demonstrate the ETTM System functionality.

1544	Contractor shall be responsible for all aspects of testing performed as part of the Agreement and to provide all necessary resources and facilities to conduct all tests including but not limited to:
	• test support personnel;
	• vehicles and drivers;
	• test facilities;
	• test Equipment, tools and safety devices;
	• test schedule and test sequence;
	• coordination with Authority and existing system integrators;
	• coordination of Lane Closures and MOT, and
1545	• conducting the test.
	Contractor shall to the extent possible, develop and use specialized automated testing Software to, including but not limited to:
	• create test scripts;
	• control the automated testing;
	• exercise all conditions, configurations and scenarios;
	• conduct performance testing;
	• conduct security testing;
	• conduct regression testing;
	• compare actual test outcomes to expected outcomes;
	• test reporting;
	• conduct load testing;
	• conduct user interface testing;
	• conduct stress testing;
	• WAN / LAN traffic testing;
	• conduct sustained operational testing and
	• conduct sustained burn-in testing.

1546	Prior to the start of testing the System shall be confirmed to be fully operational and ready for testing. Transactions that fail to meet the Requirements shall be reviewed and audited and anomalies investigated.
1547	Contractor shall provide a defect tracking system, accessible by Authority, to document and track all defects identified as part of ETTM System testing and any subsequent actions taken to correct and retest those defects.
1548	<p>The defect tracking system shall be capable of the following, including but not limited to:</p> <ul style="list-style-type: none"> • rating (severity) defects; • categorizing defects; • prioritizing defects; • logging the date/time the defect was reported; • subsystems and test cases impacted by the defect; • the user who reported the defect; • the erroneous behavior; • the details on how to reproduce the defect; • the developers who worked on the defect and corrective action taken; • date the defect was corrected and formally re-tested; • life-cycle tracking and • reporting.
1549	<p>The sample size for each requirement shall be the greater of $N = \log(1 - C) / \log(A)$; or 20,000 transactions for the Operations test; where:</p> <ul style="list-style-type: none"> * N = Number in the sample * C = Confidence level * A = Accuracy <p>A value of 95% shall be used for the confidence level. Accuracy and confidence levels are expressed as decimals.</p>

2.7.3 Master Test Plan

1550	Contractor shall provide to Authority, for review, comment and final Approval a Master Test Plan that outlines the scope and testing concepts to be used to validate the ETTM System compliance to this Scope of Work and Requirements and integration to the existing roadway systems and the BOS.
1551	The Master Test Plan provides a system-wide framework for testing activities by integrating functional, system, and performance testing of RSS components, subsystems, interfaces, and the overall Roadway System.
1552	The Approved Master Test Plan shall be used as the basis for the detailed test procedures that shall be submitted to Authority for review and Approval.
1553	The Master Test Plan shall cover all aspects of the ETTM System Roadside and RSS testing from initial development through deployment, Roadside System Acceptance and Project Acceptance as defined in the Approved Master Test Plan document.

1554	Contractor shall provide a Master Test Plan describing in detail the key features of the overall testing program for review and Approval by Authority. At a minimum, the Master Test Plan shall address testing approaches and schedule, KPIs, data collection and sampling methods, test entry criteria, test exit criteria, testing conditions, equipment requirements, testing locations, reporting of results and procedures for tracking and retesting failed test steps. The Master Test Plan shall, at a minimum, include the following:
	<ul style="list-style-type: none"> • The schedule and high level plan for each phase of testing;
	<ul style="list-style-type: none"> • Description of strategies for isolating test data from production data, coordinating interface testing, using simulated data, and retesting;
	<ul style="list-style-type: none"> • The Requirements Traceability Matrix (RTM) indicating when and how each requirement will be tested in the Individual Test Plans;
	<ul style="list-style-type: none"> • The plan for test vehicles including the number and type of vehicles, Transponders required, and any special/customized or legacy license plates needed for testing; and
	<ul style="list-style-type: none"> • All aspects of ETTM System testing.

2.7.4 Testing Sequence and Logistics

Contractor shall provide complete Individual Test Plans for review and Approval by Authority. Contractor must receive written Approval from Authority prior to the beginning of any test.

Contractor shall update each version of any test plan to incorporate or respond to Authority comments on the previous version. Each Individual Test Plan shall undergo the following review phases:

- 1) Test plan outline – allow 15 Days for Authority review and comment;
- 2) Detailed test plan – first submission – allow 21 Days for Authority review and comment;
- 3) Detailed test plan – second submission – allow 21 Days for Authority review and comment;
- 4) Detailed test plan – final version – Contractor shall submit a final detailed test plan in accordance with the Approved Baseline Implementation Schedule for approval by Authority; and
- 5) Test Report - 15 Days after completion of individual test.

1555	Individual Test Plans shall describe the scope, approach, resources, and schedule of intended testing activities, including test items, the features to be tested, the testing procedures and set of execution conditions, predicted results, and any risks requiring contingency planning.
	Individual Test Plans shall include an updated RTM indicating which requirements are tested in that individual test and shall also include all test scripts to be used.
	Contractor shall obtain Approval from Authority and shall have met the entry conditions prior to start of each test, including but not limited to: <ul style="list-style-type: none"> • Approval of all predecessor tests; • Approved test procedures for each individual test;

	<ul style="list-style-type: none"> • Approved test schedule; • successful closeout of all outstanding pre-test issues; • successful dry run testing with results provided to Authority; • Submittal of the latest Approved version of the RTM showing test validation against the Requirements and • confirmation that both the site(s) and System are ready for testing.
1556	After the completion of each test, Contractor shall submit for Authority's review and Approval a test report that documents the results of the test.
1557	<p>The test report shall address the following, including but not limited to:</p> <ul style="list-style-type: none"> • the test summary; • the results of each test case; • any anomalies and issues identified; • the corrective action/resolution of each item; • the test data; • calculations and back-up data supporting compliance to Requirements; • comments provided by Authority and • the results of any re-tests necessary to successfully complete each testing phase
1558	Authority shall participate in the testing and witness of each test. Authority shall have full access to the test data and results of the test.
1559	Testing will not be considered complete by Authority until all anomalies and "punch-list" items are closed-out, and the final test report is Approved by Authority.
1560	<p>Testing shall occur in the following order, subject to Authority's Approval of the final Master Test Plan and shall include the following tests for each facility transition at a minimum:</p> <ul style="list-style-type: none"> • FAT; • OIT; (also may be referred to as Site Acceptance Test) • Installation and Commissioning Test and • Operational and Acceptance Test

2.7.5 Factory Acceptance Test (FAT)

1561	A separate and distinct FAT shall be conducted by Contractor for each solution configuration required by each of the respective Projects (91 Express Lanes and I-405 Express Lanes) and schedule.
1562	The FAT shall take place in the continental United States.
1563	The FAT shall be conducted by Contractor at Contractor's facility in actual lanes with the complete test ETTM System in accordance with the Approved MTP, detailed testing procedures and Approved Baseline Implementation Schedule.
1564	The test configuration shall be representative of Contractor's AET Facility and Express Lanes solutions for each lane configuration as required by each of the respective Projects.
1565	The FAT shall be conducted by Contractor to verify that all functional elements of the ETTM System are in conformance with this Scope of Work and Requirements.

1566	Upon the successful completion of the FAT exit criteria and Approval of the FAT by Authority, Contractor shall be given the authorization to move forward to the OIT at the selected ETTM Sites.
1567	<p>The FAT shall validate that the Roadside System Hardware meets this Scope of Work and Requirements including but not limited to:</p> <ul style="list-style-type: none"> • 72-hour burn-in testing for customized and assembled Hardware; • certification of Hardware compliance to environmental Requirements;
1568	<ul style="list-style-type: none"> • environmental testing of the Toll Rate CMS including dust, vibration, water, high/low temperatures, salt, fog, corrosion, and humidity;
1569	<ul style="list-style-type: none"> • for COTS equipment that is to be installed inside a building, cut sheets or other manufacturer provided documentation showing environmental operating limits or requirements will be provided to Authority;
1570	<ul style="list-style-type: none"> • for equipment being manufactured specifically for this Project that are not COTS equipment, Contractor will provide Authority with Certifications or certified test results for the equipment that is to be installed outside or in any other non-environmentally controlled location; and
1571	<ul style="list-style-type: none"> • manufacturers certification is a document or documents that identify the environmental and operating tolerances within which the equipment is warranted to operate.
1572	The FAT may be scheduled in phases with the final phase including tests for the complete integrated system. The FAT shall include testing of the AVI subsystem to operate in dual protocol mode, i.e. Title 21 and 6C.
1573	<p>Contractor shall use traffic simulation Software or other mutually agreed upon traffic data sets to create necessary traffic data and use it to perform tests including:</p> <ul style="list-style-type: none"> • Volume stress test; • Full exercise of all reports; and • Pricing algorithms. <p>Contractor shall use a dual lane configuration for FAT testing. OIT (Onsite Installation Test) shall not begin until FAT tests are successfully completed and the test reports are Approved by Authority. Testing shall be directly observed by Authority.</p>
1574	<p>The FAT shall validate that the Roadside System meets this Scope of Work and Requirements including but not limited to:</p> <ul style="list-style-type: none"> • accurate assignment and proper framing of each vehicle through various traffic conditions and test scenarios; • accurate capture of images and association of Transponders and images to the correct vehicles; • accurate classification of vehicles, assessment of fare and processing of the transaction; • compliance to accuracy Requirements; • all exception processing Requirements; • correct application of Business Rules; • degraded mode scenarios;

	<ul style="list-style-type: none"> all device failure conditions;
	<ul style="list-style-type: none"> rush-hour traffic scenarios;
	<ul style="list-style-type: none"> redundancy;
	<ul style="list-style-type: none"> mobile enforcement Requirements;
	<ul style="list-style-type: none"> DVAS capabilities;
	<ul style="list-style-type: none"> throughput and load testing using simulated data;
	<ul style="list-style-type: none"> interface to the RSS, and
	<ul style="list-style-type: none"> transaction and image reconciliation.
1575	The FAT shall validate that the RSS meets this Scope of Work and Requirements including but not limited to:
	<ul style="list-style-type: none"> user interface and compliance to user interface standards;
	<ul style="list-style-type: none"> facility Dashboard and monitoring;
	<ul style="list-style-type: none"> Roadside Dashboards;
	<ul style="list-style-type: none"> RSS functions;
	<ul style="list-style-type: none"> Image review capabilities;
	<ul style="list-style-type: none"> DVAS capabilities;
	<ul style="list-style-type: none"> MOMS;
	<ul style="list-style-type: none"> transaction audit;
	<ul style="list-style-type: none"> correct application of Business Rules;
	<ul style="list-style-type: none"> System performance;
	<ul style="list-style-type: none"> reporting;
	<ul style="list-style-type: none"> redundancy;
	<ul style="list-style-type: none"> System loading;
	<ul style="list-style-type: none"> compliance of RSS interface to Approved ICDs and
	<ul style="list-style-type: none"> OCR/ALPR (if applicable).

2.7.6 Unit Testing (UT)

1576	Unit Testing: The intent of unit testing, which will be conducted at Contractor's facility, is to allow Contractor to conclusively represent that the RSS equipment, subsystems, and overall system complies with the system functional requirements.
1577	Unit testing should be successfully completed prior to commencement of on-site equipment installation, system integration, and field testing. Equipment and/or system failures that are encountered during performance of the unit tests will be resolved, retested, and acknowledged as being resolved by Contractor.
1578	Unit testing is the culmination of the design, development, fabrication, and pretest of the RSS system equipment, subsystems, and overall system. Performance of unit testing may be witnessed by Authority.
1579	Unit Testing shall be performed on the ETTM System as follows:
	<ul style="list-style-type: none"> Roadside System

	<ul style="list-style-type: none"> • I-405 Express Lane Toll Rate CMSs
	<ul style="list-style-type: none"> – Equipment environmental testing or manufacturer's certification for exterior installed equipment and cabinets.
	<ul style="list-style-type: none"> – Unit testing to consist of inspection of all components and bench testing of completed assemblies. Burn-in may be conducted to ensure that a device or system functions properly prior to installation.
	<ul style="list-style-type: none"> – First article inspection and testing of a complete sign assembly.
	<ul style="list-style-type: none"> • CCTV System
	<ul style="list-style-type: none"> – Equipment environmental testing or manufacturer's certification for exterior – installed equipment and cabinets.
	<ul style="list-style-type: none"> – Unit testing to consist of inspection of all components and bench testing of completed assemblies.
	<ul style="list-style-type: none"> • ETTM Communications Network
	<ul style="list-style-type: none"> – Equipment environmental testing or manufacturer's certification for exterior installed equipment and cabinets.
	<ul style="list-style-type: none"> – Unit testing to consist of inspection of all components and bench testing of completed assemblies.

2.7.7 Onsite Installation Test (OIT)

1580	The OIT shall be conducted by Contractor for each lane configuration, including successful installation of the RSS, at the onsite locations identified by Authority in accordance with the Approved MTP, detailed testing procedures and Approved Baseline Implementation Schedule.
1581	The OIT shall verify the full functionality of the ETTM System and its compliance with this Scope of Work and Requirements and the Approved Design in a controlled, onsite environment using transactions created during both live Operations and when lanes are closed to traffic.
1582	The Express Lanes OIT shall verify the full functionality of Contractor's Approved solution for its compliance with this Scope of Work and Requirements and the Approved Design in a controlled, onsite environment using transactions created during live traffic Operations and when lanes are closed to traffic. All aspects of the Express Lanes functionality shall be testing including but not limited to: lane Operations, Toll Rate CMS control, and TOD pricing.
1583	The testing shall not interfere with the existing Authority System.
1584	Before the commencement of OIT, all Equipment and Software that are required under the Agreement shall be in place, in a production environment and configured for revenue Operations. The ETTM System interfaces to the BOS shall be connected to the respective test environments as Approved by Authority. Contactor shall install and integrate all TOC Equipment and systems, including video walls.

1585	In order to test the full functionality of the MOMS and System monitoring during OIT, all Equipment shall be entered into the System prior to the start of OIT and the MOMS shall be configured for full Operations.
1586	Contractor shall test the vehicle throughput and speed Requirements and generate sufficient transactions to prove the System can process transactions accurately and meet the Performance Requirements.
1587	The OIT shall be performed under differing light conditions including bright sun light, dawn, dusk, and nighttime.
1588	Performance Requirements shall be verified using a sample size Approved by Authority.
1589	<p>The OIT shall validate that the ETTM System meets this Scope of Work and Requirements including but not limited to:</p> <ul style="list-style-type: none"> • Operations of in-lane Equipment and their ability to report failures to the MOMS including the UPS; • normal and exception processing using multi-vehicle traffic; • multi-lane multi-vehicle traffic conditions such as rush-hour traffic (bumper to bumper), vehicle straddling/changing lanes/merging; • accurate assignment and proper framing of each vehicle; • accurate capture and correct association of Transponders, images and trip build to the correct vehicle; • accurate classification of vehicles, assessment of fare and processing of the transaction; • transaction processing during Equipment failures, and degraded modes of operation; • Performance Requirements using live traffic and controlled vehicles; • redundancy; • receive and process comprehensive and incremental TSL, enforcement notification list and toll rate schedules; • DVAS functionality; • security access; • TOC functionality; • Interoperability using Interoperable test accounts; • lane Business Rules; • interface to the RSS; • Collect traffic data from the Entrance Readers, and • interface to the BOS.
1590	An Audit of the lanes shall be conducted using live traffic to verify that the ETTM System is processing vehicles accurately and transactions can be reconciled in the System using the Approved audit tools.
1591	The OIT shall validate that the RSS meets this Scope of Work and Requirements including but not limited to:

	<ul style="list-style-type: none"> functionality of the RSS and MOMS Dashboards shall be verified as it applies to transactions, alarm and failure monitoring;
	<ul style="list-style-type: none"> all failure conditions;
	<ul style="list-style-type: none"> user interfaces and toll collection management functions;
	<ul style="list-style-type: none"> Business Rules;
	<ul style="list-style-type: none"> reconciliation of transactions and revenue;
	<ul style="list-style-type: none"> RSS reports;
	<ul style="list-style-type: none"> Ad-hoc reporting capability;
	<ul style="list-style-type: none"> accuracy of Performance Reports;
	<ul style="list-style-type: none"> interface to the facility server (if applicable);
	<ul style="list-style-type: none"> interface to the BOS including reconciliation;
	<ul style="list-style-type: none"> interface to the Roadside systems;
	<ul style="list-style-type: none"> conformance with performance, load and stress test Requirements;
	<ul style="list-style-type: none"> security Requirements;
	<ul style="list-style-type: none"> System backup Requirements;
	<ul style="list-style-type: none"> archival and purging Requirements;
	<ul style="list-style-type: none"> MOMS asset management; failure notification; work order tracking and performance reporting;
	<ul style="list-style-type: none"> RSS high availability Requirements and
	<ul style="list-style-type: none"> RSS DR Requirements.
1592	As part of the OIT, an end-to-end testing shall be conducted that validates the following functionality, including but not limited to:
	<ul style="list-style-type: none"> System's ability to process and post transactions to the RSS and on to the BOS;
	<ul style="list-style-type: none"> The successful transfer of images from the Roadside Systems to the RSS, image review and on to the BOS;
	<ul style="list-style-type: none"> Various transaction posting scenarios that verifies the transaction processing, transaction posting, disposition and reconciliation per the Business Rules, and
	<ul style="list-style-type: none"> the ETTM System is configured for Go-Live.

2.7.7.1 Onsite Installation Test (OIT) – 91 Express Lanes

1593	The Contractor shall compare ETTM Toll Collection and Enforcement Site transaction data to data provided by the Authority and the Existing BOS Contractor from the existing 91 Express Lanes, including but not limited to:
	<ul style="list-style-type: none"> number of transactions by lane;
	<ul style="list-style-type: none"> transponder to vehicle assignments;
	<ul style="list-style-type: none"> vehicle classifications (if option selected);
	<ul style="list-style-type: none"> all automated OCR/ALPR license plate data, and
	<ul style="list-style-type: none"> all transactional data fields that will be sent to the BOS in compliance with the ICD.

1594	The Contractor shall use the associated DVAS images to resolve and report on discrepancies between the ETTM Toll Collection and Enforcement Site transactional data and the existing 91 Express Lanes transactional data.
1595	At a minimum, the Contractor shall compare and report on the ETTM Toll Collection and Enforcement Site transactional data and the data from the existing 91 Express Lanes for one (1) continuous 24-hour period per lane.
1596	Prior to Approval of OIT, the Contractor shall resolve any discrepancies between the ETTM Toll Collection and Enforcement Site transactional data and the existing 91 Express Lanes System transactional data.

2.7.8 Installation and Commissioning Test

1597	Contractor shall have conducted inspection and signed off on the ETTM System Infrastructure on the I-405 in accordance with the Agreement prior to the ETTM Site Commissioning Test. The Commissioning Test is intended to test all ETTM System and Roadside System functionality on the I-405 Express Lanes and 91 Express Lanes.
1598	<p>The ETTM Site Commissioning Test shall include ensuring that the RSS can meet all requirements when faced with multiple Equipment sites. The ETTM Site Commissioning Test shall include using vehicles to create actual transactions in many different configurations. The test shall, at a minimum, include:</p> <ul style="list-style-type: none"> • Correct trip building and toll rate assignment; • Exception processing; • Toll rate corrections; • Incident reporting; • Accounting and audit functionality; and • Failure conditions.
1599	<p>The ETTM Site Commissioning Test shall test functionality that could not be tested in previous tests or that has changed as a result of the complete installation of the entire Roadside System. The ETTM Site Commissioning Test will include actual vehicles driving to create transactions in many combinations. It will also include transactions created in various failure modes. The ETTM Site Commissioning Test plan shall, at a minimum, include:</p> <ul style="list-style-type: none"> • Posted trip price tested from live driver reports; • Live traffic data capture and transaction assembly; • Pricing for the entire I-405 Express Lanes; • Trip building for both transponder-based and image-based trips; • Toll rate setting and overrides; • Reports across multiple Zones; • Building of files to send to the BOS; and • Ad-hoc report capacity.
1600	The ETTM Site Commissioning Test, at a minimum, shall:

	<ul style="list-style-type: none"> Complete full testing of all system functionality, from the Roadside System through the RSS to the BOS;
	<ul style="list-style-type: none"> Demonstrate that transaction files, correction files and all other required communications can be successfully sent to the BOS and that the reconciliation files and all other required communications from the BOS can be successfully received by the ETTM System;
	<ul style="list-style-type: none"> Demonstrate that these files are complete and accurate;
	<ul style="list-style-type: none"> Demonstrate that the reconciliation data is properly stored in the database and reflected on all reports;
	<ul style="list-style-type: none"> Test all other interfaces with the ETTM System, including the RSS and MOMS; and
	<ul style="list-style-type: none"> Demonstrate that TOCs operators and CSRs can properly access the required screens and data and not access unauthorized portions of the system.
1601	The Installation and Commissioning Test shall be conducted by Contractor on each Toll Zone as a part of Contractor's Roadside System installation in accordance with the Approved MTP, detailed testing procedures and Approved Baseline Implementation Schedule.
1602	The Installation and Commissioning Test shall validate the functionality and operational status of the lanes including installation and configuration of all Equipment and Software. The lane Operations shall be verified end-to-end upon the completion of the installation checkout prior to opening the toll lanes and Equipment sites for revenue collection.
1603	During the Installation and Commissioning Test every piece of in-lane Equipment and its interface to the lane/zone controller shall be verified to be fully operational. The lane/zone controller, its interface to the RSS and the security access system shall be validated to ensure that the interfaces are in place and the ETTM System is ready for revenue collection.
1604	An Installation and Commissioning Test shall be conducted on the RSS and shall include the interfaces to the BOS. All data identified for migration shall be migrated to the RSS in accordance the data migration plan. Contractor shall support the possible Commissioning of the RSS prior to the Commissioning of the Roadside System.
1605	A Commissioning test shall be conducted on the RSS and shall include the image server(s) if applicable and the interfaces to the BOS.

2.7.8.1 Installation and Commissioning Test – 91 Express Lanes

1606	91 Express Lanes Go-Live shall not begin until the test results from the 91 Express Lanes Commissioning Test have been Approved by Authority. 91 Express Lanes Commissioning Testing shall be directly observed by Authority.
------	---

2.7.9 New BOS Testing

1607	As part of implementation of the New BOS, Contractor shall participate in the development of test plans and the testing of the New BOS as necessary to fully test the New BOS and new ICD.
------	--

1608	Any required ETTM System functionality not implemented with the Existing BOS shall be implemented and tested with the New BOS, including required changes to and testing of the ICD.
------	--

2.7.10 ETTM System Operational and Acceptance Test

1609	The ETTM System Operational and Acceptance Test shall be conducted by Contractor at each phase under this Project in accordance with the Approved MTP, detailed testing procedures and Approved Baseline Implementation Schedule after all lanes have been Commissioned in revenue collection.
1610	For ETTM System testing, Contractor shall develop Individual Test Plans for each of the major tests including: <ul style="list-style-type: none"> • ETTM Disaster Recovery and Back-Up Test; • ETTM Operations Test; and • ETTM Acceptance Test.
1611	Contractor shall conduct a complete test of the disaster recovery back-up equipment and plans. The plan for this test shall include instructions for mimicking several disaster and failure scenarios, which Contractor will outline in its Disaster Recovery Plan.
1612	Testers shall follow the procedures outlined in the Disaster Recovery Plan to determine whether both the System and the Disaster Recovery Plan allow Authority to continue operations and recover all data. The Disaster Recovery and Back-Up Test shall include both fail over to disaster recovery and back to normal operations.
1613	It is a condition of Go-Live that the test results from the disaster recovery and back-up testing have been Approved by Authority. Testing shall be directly observed by Authority.
1614	The ETTM System Operational and Acceptance Test shall be conducted for each Roadside at each ETTM Site upon authorization by Authority to commence such testing. The ETTM System shall be observed in live revenue Operations by Contractor and Authority for a minimum of two (2) monthly audit cycles.
1615	The objective of the Roadside System Operational and Acceptance Test is to ensure that the ETTM Software and Hardware functions over the test period with limited manual intervention in live Operations. It is intended to confirm that the Roadside System and the network are sized, tuned and configured correctly and data is processed without interruption or errors.
1616	The ETTM Operational and Acceptance Test shall validate the interface of the ETTM System to the BOS, and reconcile the transactions and images end-to-end.
1617	During the test period, System accuracy, performance of the System and Operations shall be validated including: <ul style="list-style-type: none"> • all System accuracy Requirements specified in the Agreement using representative sample size for each facility under test; • all Maintenance Performance Requirements; • all System Performance Requirements; • one 24-hour individual vehicle audits and two 2-hour peak period individual vehicle audits shall be performed for each lane at each ETTM Toll Collections and Enforcement Sites and ETTM Transponder Read Sites;

	<ul style="list-style-type: none"> • transaction processing in accordance with Authority Business Rules; • correct classification of vehicles and assignment of toll; and • monitoring of all interfaces for the accurate transfer and processing of all records.
1618	System reliability and auditability shall be verified manually and through tools and reports provided in the System.
1619	Dashboards and reports shall be verified daily for accuracy and reconciled to Operations and interface files. All exceptions shall be investigated. Queries and detailed reports shall be generated to validate the daily, weekly, monthly, yearly and comparative reports and compared to reports.
1620	The alarms displayed on the MOMS and all interface status notification shall be verified to be accurate.
1621	The sample size of the accuracy test shall be adjusted to make sure a representative sampling of transactions from each lane is included in the sample size. The sample size shall be statistically high to ensure that data collected from each lane is representative of all traffic conditions and vehicle types and covers all environmental and light conditions.
1622	Failure of the Roadside System to meet a Performance Requirement shall result in the restart of that particular test until such time the accuracy Requirements are met.
1623	The ETTM System Operational and Acceptance Test shall be repeated until Authority is satisfied that the ETTM System meets the terms and conditions of the Agreement as set forth in the Agreement at each Roadside.

2.7.11 Project Acceptance

1624	Upon the successful completion of ETTM System Operational and Acceptance Test for the ETTM System, the closure of all punch-list items and completion and submission of all Agreement required documents as set forth in the Agreement, Contractor shall be given the Project Acceptance as described in the Agreement.
------	---

2.8 Maintenance and Software Support Services

The Requirements described in this section detail the Hardware Maintenance and Software and Administrative Support Services Requirements for the Roadside System including any existing equipment integrated into Contractor's solution. The Hardware Maintenance and Software and Administrative Support Services ("Maintenance") include:

1. Hardware Maintenance Services for the Equipment, infrastructure and Hardware;
2. Network Maintenance Services for the Roadside Systems;
3. ETTM ITS Maintenance;
4. Toll Facility Maintenance;
5. TOD Pricing;
6. Shadow Dynamic Pricing;
7. ETTM System Server and Database Administration Services, and
8. Software Support Services for the ETTM System.

Contractor shall provide all Maintenance activities associated with the Maintenance and Software Support Services throughout the Agreement Term as further set forth in this Scope of Work and Requirements and in the Agreement.

2.8.1 Roadside Maintenance Services – General Requirements

1625	Hardware, Software and System Maintenance Services shall be for a period from Acceptance of the ETTM System through the end of Agreement Term (including extensions) as further set forth in the Agreement with full warranties as further set forth therein.
1626	Contractor shall be responsible for supporting and maintaining the ETTM System for any time period in which the System is installed, Commissioned and placed into revenue service but has not passed required testing. The Maintenance of the Roadside System provided under this Agreement prior to Acceptance is not included in the term of the Maintenance and Software Support Services. Contractor shall coordinate all Maintenance activities with Authority during this period.
1627	Contractor shall provide the latest Software License and associated Escrow as further set forth in the Agreement.
1628	In the Operations and Maintenance Phase, Maintenance shall include all Services required to maintain the System, including Hardware, Equipment, Software and components at required performance levels. Authority shall not be charged any additional amounts beyond those included in the Approved Price Proposal for all Services related to Maintenance; notwithstanding the foregoing, Force Majeure events shall be as set forth in the Agreement.
1629	Contractor is responsible for the provision and maintenance of all equipment, devices, and vehicles required to perform the maintenance of all Equipment and assigned infrastructure, including but not limited to:
	<ul style="list-style-type: none"> • maintenance truck;
	<ul style="list-style-type: none"> • bucket truck;
	<ul style="list-style-type: none"> • maintenance tools

1630	All Equipment mounting Hardware and brackets provided as a part of this Scope of Work and Requirements shall be included under Maintenance Services and as such shall be warranted for the life of the Project.
1631	Contractor shall provide Roadside System Maintenance Services and Operations.
1632	Contractor shall provide one hundred (100) percent of ETTM ITS and LAN Maintenance Services
1633	Contractor shall provide one hundred (100) percent of RSS Hardware, Software, Database and System Administration Maintenance Services including operating System and Software security Updates in coordination with Authority.
1634	The Services and Work performed under the Agreement are considered PII and highly confidential and Contractor personnel and ETTM System shall at all times comply with Authority security policy and any State and Federal law or policy.
1635	User sign-on, access and access failures, both local and remote, to any element of the ETTM System shall be recorded and tracked for security audit proposes and reported to the MOMS. Security Software shall continuously and automatically monitor the System for unauthorized access; access violations shall be reported to the MOMS as Priority 1 Alert. These reports shall be provided to Authority within twelve (12) hours of discovery.
1636	A system level account shall be provided for Authority security systems to perform "credentialed" scans. Additionally, Authority can request Contractor to perform any scans and ensuing reports through the Agreement Term.
1637	Contractor shall perform scans and provide reports upon a request from Authority for the life of the Agreement.
1638	Contractor shall not circumvent the Approved System security. All access to the System and Approved changes made shall be recorded, monitored, reviewed and audited. Specific requirements for this shall be developed by Contractor during System Design.

2.8.1.1 Warranty Program

1639	Contractor shall be responsible for the development, implementation and administration of a warranty program for all Hardware, Contractor developed Software and third-party Software as further set forth in the Agreement.
1640	Contractor shall maintain warranty records and service agreements for all Hardware including existing Hardware re-used by Contractor and third-party Software, and shall review and implement Software Upgrades and available patch reports to keep the Roadside System current per the Approved QA Plan and as further set forth in the Agreement, Terms and Conditions.

2.8.1.2 Detailed Maintenance Requirements

The Maintenance Services shall include monitoring; preventive; pervasive; corrective; security related and emergency Maintenance Services and all Upgrades and Updates to be performed on all elements of the Roadside System.

1641	Detailed assignments of Levels to incident types shall be in accordance with the Requirements and shall be defined and Approved during the Implementation Phase of the Project.
------	---

1642	Contractor shall monitor MOMS work orders and initiate corrective actions to meet Requirements for response to Maintenance events and incidents that are under Contractor's responsibility.
1643	As part of the Maintenance and Software Support Services, Contractor shall develop and test Software as required, both systematically and field testing to accommodate corrective actions, changes to Business Rules or configurations. Scope shall include provision of evidence packages detailing the planned changes for Authority's review and Approval, including installation of new Software and confirmation of successful installation per the Approved QA Plan.

2.8.1.2.1 Maintenance Requirements – Level 1

The functions listed in this section are categorized as Level 1 Maintenance tasks.

1644	All Maintenance incidents, activities and monitoring shall include but are not limited to:
	<ul style="list-style-type: none"> monitoring the Roadside System for failures and alarms, and confirm a MOMS work order has been created for each failure as defined
	<ul style="list-style-type: none"> acknowledging and responding to work orders assigned to Contractor;
	<ul style="list-style-type: none"> creation and assignment of a work order in MOMS if a work order has not been created;
	<ul style="list-style-type: none"> performing the necessary Maintenance and closing the MOMS work order upon confirmation that the failure has been successfully corrected;
	<ul style="list-style-type: none"> monitoring and Maintenance of the production, data warehouse and test environments;
	<ul style="list-style-type: none"> Updates to Operating System and Software infrastructure in the production, data warehouse and test environments;
	<ul style="list-style-type: none"> Performing Preventive Maintenance in accordance with Approved Maintenance Plan.
	<ul style="list-style-type: none"> general Equipment and Hardware Maintenance, replacement and spare parts inventory in MOMS;
	<ul style="list-style-type: none"> general inspection and Maintenance of Roadside Infrastructure;
	<ul style="list-style-type: none"> Equipment and Hardware monitoring, Updates and general Maintenance and troubleshooting including diagnostic checks;
	<ul style="list-style-type: none"> ongoing monitoring, Updates, Maintenance tasks related to roadside subsystems, Operations, controllers, servers and storage systems;
	<ul style="list-style-type: none"> proactively addressing potential server and storage System Hardware issues;
	<ul style="list-style-type: none"> Address and resolve third-party Software issues (OS, third-party, peripheral and infrastructure Software);
	<ul style="list-style-type: none"> backup System monitoring (verification of successful backups), maintaining (applying Updates when needed) and managing (backup media rotation, offsite storage, etc.);
	<ul style="list-style-type: none"> monitoring, Updating, Upgrading and general Maintenance and troubleshooting of LAN communications and associated devices;

	<ul style="list-style-type: none"> • monitoring, Updating, Upgrading and general Maintenance and troubleshooting of WAN communications and associated devices;
	<ul style="list-style-type: none"> • deployment of Roadside Systems Software to the production data warehouse and test environments;
	<ul style="list-style-type: none"> • maintaining the ongoing relationship (support and Maintenance agreements) with third-party vendors and
	<ul style="list-style-type: none"> • performing Software licensing renewals.
1645	Contractor shall perform all System administrative functions at regular intervals if not automated and recording and tracking such activities as Preventive Maintenance work orders through MOMS.
1646	Contractor shall perform continuous monitoring of Roadside System Operations to verify System is functional; security posture is adequate; processes are being executed as scheduled; files are transmitted as specified, and System is operating to Agreement Performance Requirements.
1647	Contractor shall perform manually retrieval of data from the zone controllers and download of TSL and License Plate File in the event of extended communications failure.
1648	Contractor shall perform re-establishing or re-installing Roadside System files, programs and parameters, as required, following a failure or damage to the System and returning lanes to fully operational condition.
1649	Contractor shall perform Disaster Recovery (DR) procedures as needed and return lanes and RSS to fully operational condition when DR is initiated.
1650	Contractor shall continuously monitoring OCR/ALPR performance and performing OCR/ALPR Updates as required to support license plate changes.
1651	Contractor shall analyze anomalies and periodic, daily and weekly trends to identify problems and initiating investigation and subsequent correction.
1652	Contractor shall actively monitor system performance and recommend changes or improvements as technology or new methods becomes available that will create measurable improvements and/or efficiencies for both technology and operations.

2.8.1.2.2 Maintenance Requirements – Level 2

Level 2 Maintenance tasks shall be performed as described below.

1653	Level 2 Maintenance shall include but not be limited to the following:
	<ul style="list-style-type: none"> • Work orders and Alerts assigned to Contractor as defined during the Implementation Phase.
	<ul style="list-style-type: none"> • development of defect fixes, security fixes, performance fixes and corrections to the Software and Applications as identified during audits;
	<ul style="list-style-type: none"> • Updates to all Software drivers to meet any new standard Operating System Upgrades as they become available;
	<ul style="list-style-type: none"> • Software changes required to accommodate changes to Business Rule, parameter changes, lane configurations and minor updates to existing ICDs;
	<ul style="list-style-type: none"> • source code Maintenance;
	<ul style="list-style-type: none"> • perform internal testing prior to releasing fixes to production;

	<ul style="list-style-type: none"> perform field testing prior to releasing fixes to production;
	<ul style="list-style-type: none"> ongoing Software Maintenance and warranty as set-forth in the Agreement;
	<ul style="list-style-type: none"> change management and configuration management tasks prior to Software and Hardware changes and
	<ul style="list-style-type: none"> any Level 1 escalated issue.

2.8.1.3 Updates and Upgrades

1654	Contractor shall provide in electronic format all patches, Updates, and Upgrades made to the System Software.
1655	Contractor shall provide all Software modifications, Updates, and Upgrades required to Maintain and support the Roadway System in conformance with the Requirements and to mitigate system security threats. The following items are examples of items that shall be included in the Maintenance Services and shall not be considered Enhancements paid for by Authority: Equipment version changes; configuration or parameter changes; minor changes to Software or code, such as changes to the existing ICDs; third-party Hardware and Software Updates and Upgrades, Software modifications required to ensure Roadway System is compliant to latest standards (for example PCI DSS) and security patches, and changes for Contractor's benefit that improve Contractor's ability and efficiency to maintain and support the Roadway System.

2.8.1.4 Enhancements

1656	Enhancements shall be proposed by Contractor or requested of Contractor in accordance with the Agreement Modification process as set forth in the Agreement. Examples of Enhancements include: accommodating major changes to standards and statutes and regulations not otherwise anticipated, but excluding Updates to PCI DSS; Interoperability Equipment changes, or the addition of new Equipment or functionality providing demonstrable benefits in performance, costs or productivity to Authority.
------	---

2.8.1.5 Software Deployment

Contractor shall provide a reliable, repeatable, and easy-to-deploy method to update the ETTM Software and RSS Software in all lanes and environments as applicable.

1657	Contractor shall employ and apply industry standards for enterprise-grade Software deployment and shall provide Software Updates via easy-to-use executable installer files or similar.
1658	Contractor shall provide a wizard-like method so all aspects of the Software update process are encapsulated in a single automated installation package, avoiding requiring separate manual processes.
1659	Contractor shall provide an automated means for the installation to be verified ensuring that the version installed includes all appropriate Software elements (such as executable files, configuration files, components, libraries and registry entries) in place.
1660	Contractor shall provide full logging of the installation process so issues can be investigated.

1661	Contractor shall provide a seamless rollback feature as part of the Software installer that will automatically reverse the installation and restore its original version in the event a fatal error is encountered during the installation process.
------	---

2.8.1.6 Maintenance Priorities, Response and Repair Times

1662	Response and repair time is defined as the combined time from when failure occurred or problem was reported to when the repair or correction of the failure occurred; the period of time beginning when the failure occurred (failure time) and ending when the fault condition is corrected and returned to normal Operations.
1663	Response and repair times for every Maintenance event shall be recorded in the MOMS and reported and such reports shall be provided to Authority in accordance with the reporting Requirements of this Scope of Work and Requirements.
1664	Contractor shall post a weekly schedule staff or a pool of staff to respond to and correct any issues. Contractor provided staff or a pool of staff provided by the Contractor shall be trained and educated in maintaining and servicing the ETTM System to meet the Performance Requirements outlined in this Scope of Work and Requirements.
1665	Response to calls and repair times shall be determined by Priority as described below. Contractor failure to meet the response and repair time criteria described below shall result in monthly fee adjustments.
1666	Regardless of coverage, onsite or on-call service, acknowledgement of receipt of notification of a Maintenance issue or human acknowledgment of a failure shall not exceed thirty (30) minutes after the failure notification was recorded or problem was reported.
1667	The Priority of failures shall be defined during the Implementation Phase. Time to respond and complete repair are determined by Priority and is defined as below.
1668	Priority 1: Defined as any malfunction or fault that results in the immediate loss of revenue; security breach; closure of lanes outside of Authority lane closure Requirements; hazard to personnel or driving public; loss of audit data; loss of redundancy in any redundant System components; loss of any high availability components; loss of functionality that impacts Interoperable Agencies or failure that negatively impacts the Roadside or RSS Operations.
	<ul style="list-style-type: none"> For Roadside Maintenance, this Priority shall have a two (2) hour time to respond and complete repair.
	<ul style="list-style-type: none"> For RSS Maintenance, this Priority shall have a four (4) hour time to respond and complete repair.
1669	Priority 2: Defined as any malfunction or fault that degrades the System performance but not the operational ability of the System. It includes, but is not limited to inaccurate reporting, inability to reconcile revenue or loss of System functionality that impacts access to data.
	<ul style="list-style-type: none"> For Roadside Maintenance, this Priority shall have a four (4) hour time to respond and complete repair.
	<ul style="list-style-type: none"> For RSS Maintenance, this Priority shall have an eight (8) hour time to respond and complete repair.

1670	Priority 3: Defined as any action or event that has the potential to result in a malfunction or degrading of the System performance but has not impacted performance and is not anticipated to immediately impact performance.
	<ul style="list-style-type: none"> For Roadside Systems Maintenance, this Priority shall have a twenty-four (24) hour time to respond and complete repair.
	<ul style="list-style-type: none"> For RSS Maintenance, this Priority shall have a forty-eight (48) hour time to respond and complete repair.
1671	Outages and tasks performed under the Approved Preventive Maintenance period shall be defined as Priority 4. The System shall be available and fully operational within the Approved time schedule for such activities and upon completion of the Preventive Maintenance period. Delays and problems associated with not completing scheduled Preventive Maintenance within the window specified may be included in the Performance Requirement Calculations. Any failures generated or resulting from Preventive Maintenance activities shall be accounted for as Priorities 1, 2 or 3 and be addressed in accordance with these Requirements.

2.8.1.7 Notifications

1672	The entry of a problem (either by the System or an Authorized User) into the MOMS or the presence of a failure notification shall constitute the start of the acknowledgment time for purposes of measuring Contractor's acknowledgment time and response/repair time.
1673	<p>For purposes of measurement of performance and for the development of Maintenance policy and procedures, notification of System malfunctions, problems and discrepancies may be provided to Contractor in four (4) different methods, summarized below.</p> <ul style="list-style-type: none"> Verbal notification: Defined as an in-person notification or telephone call to Contractor's designated Maintenance personnel. In all cases, the first conversation with, or notification of Contractor shall signify the start of the response time for purposes of measuring Contractor's response time. All verbal notifications shall be recorded in MOMS by Contractor. Written notification: Defined as a written description of a problem or condition, typically provided by Authority. Written notification could be faxed, texted, or emailed to Contractor by a customer or user. The time of receipt of fax, message or email shall signify the start of the response time for purposes of measuring Contractor's response time. All written notifications shall be recorded in MOMS by Contractor. MOMS notification: Defined as an automatic notification through the MOMS identifying a problem within the Roadside System that is the Maintenance responsibility of Contractor and sending out an automatic work order message by email or text to a Contractor's Maintenance staff to respond to the failure. In addition to Contractor notification, the work order shall be posted on the MOMS and available via reports. The presence of a MOMS notification in the System shall constitute the start of the response time for purposes of measuring Contractor's response time. Generation of Alert: Defined as an automatic creation of an Alert identifying a problem within the Roadside System that is the Maintenance responsibility of Contractor. The generation of the automatic Alert in the System shall constitute the start of the response time for purposes of measuring Contractor's response time.

2.8.1.8 Recording of Maintenance Activities

1674	Contractor and Authority shall utilize the MOMS for initiating the work orders. MOMS shall be utilized for recording and tracking all Maintenance and Software Support Services performed on the Roadside System. All Equipment provided under this Agreement shall be tracked through MOMS from the purchase to their disposal.
1675	In all cases Contractor is responsible for logging all reported Maintenance activities into the MOMS. Contractor shall also be responsible for documenting all information and issues related to a failure condition, including all actions taken to complete the correction into the MOMS.
1676	The work order shall contain as much information as possible in order for persons other than the technician or his supervisor to reasonably determine the fault, when it was worked on, the corrective action and any other information pertaining to the individual Maintenance event, including replacement of parts.
1677	All performance metrics shall be recorded and tracked through the MOMS and compliance to Performance Requirements shall be validated using MOMS reports.
1678	It is Contractor's responsibility to ensure that its Maintenance staff has real time access to the MOMS and that all the required connections are established and ongoing to ensure that the Maintenance staff has secure remote access Approved by Authority. Maintenance staff shall be trained in the use of the MOMS.

2.8.1.9 Audits

1679	Contractor shall completely support Authority in any audit activity relating to the ETTM System or Operations. In addition, Contractor shall conduct audits in accordance with Contractor's Quality Assurance Program. All deficiencies identified through the Audit process shall be successfully corrected by Contractor. These audits may include, but are not limited to the following:
	<ul style="list-style-type: none"> • internal control procedures;
	<ul style="list-style-type: none"> • revenue/transaction reporting;
	<ul style="list-style-type: none"> • financial audit and
	<ul style="list-style-type: none"> • ETTM System processing and performance.

2.8.1.10 Security Certification

1680	Contractor shall perform monthly penetration and vulnerability tests that are scheduled in the MOMS, as well as every time a new Software release is deployed or new network Equipment is added or replaced to evaluate the security risk to the ETTM System and identifying potential vulnerabilities.
1681	Contractor is responsible for correcting all ETTM System security deficiencies at Contractor's cost and ensuring there are no security risks.

2.8.1.11 Cooperation with Other Vendors and Providers

1682	Contractor shall cooperate to the fullest extent with other Contractors and third-party vendors in order to ensure that the ETTM System Operation and Maintenance do not conflict with or cause any deterrent in capability or service to the traveling public, customers, or Authority.
------	--

2.8.2 Maintenance Responsibilities and Services

This section details Contractor's responsibilities for providing Maintenance Services and associated communications during this time period, including but not limited to:

- Roadside Equipment and Infrastructure Maintenance;
- ETTM Hardware Maintenance (servers, storage, network switches, firewalls, routers, etc.);
- ETTM ITS Maintenance;
- Toll Facility Maintenance;
- network administration;
- System administration;
- database administration;
- Software support services;
- monitoring services;
- System security and
- Preventive maintenance.

In delivering the Maintenance Services, Contractor shall perform the following Services, including but not limited to:

- onsite support of the RSS and Roadside Systems;
- onsite support of the ETTM System
- well documented Maintenance schedules and processes;
- Authority Approval and onsite supervision for all Maintenance Work;
- coordination with Authority and other affected agencies as needed on all lane work;
- coordination with Authority and Caltrans on all Lane Closures;
- Contractor-provided Maintenance of Traffic (MOT) for all Lane Closures, utilizing regularly scheduled maintenance as much as possible;
- change and configuration management;
- complete around-the-clock Maintenance of the System;
- ongoing participation with Authority's staff and involvement in meetings and processes and
- provision of an ample spare parts inventory to meet all Performance Requirements.

2.8.2.1 ETTM Hardware Maintenance and Software Support Services

The Requirements in this section describe Hardware Maintenance and Software Support Services.

1683	Contractor shall inspect, monitor, test, troubleshoot and repair all cables; wiring; conduits; cable trays; terminations; all in-lane System electronics and controllers; all network equipment; all re-used equipment; of the Roadside System including, but not be limited to:
------	--

	<ul style="list-style-type: none"> perform routine diagnostics on all in-lane peripherals.
	<ul style="list-style-type: none"> perform routine diagnostics on all in-lane subsystems.
	<ul style="list-style-type: none"> perform Inspection and Maintenance of environmental control devices, UPS, and generators.
	<ul style="list-style-type: none"> perform Inspection and Maintenance of racks, cabinets, vaults, and general supporting infrastructure.
	<ul style="list-style-type: none"> perform monitoring and Maintenance of the Roadside System Software processes, Operations, and interfaces to the RSS and to the BOS.
	<ul style="list-style-type: none"> perform monitoring real-time Roadside Operations screens and Dashboards and responding to issues.
1684	Contractor shall perform analysis of real-time, daily and weekly trends to identify problems, including but not limited to:
	<ul style="list-style-type: none"> high number of transactions without Transponder;
	<ul style="list-style-type: none"> high number of trips with a mix of Transponder-Based and Image-Based Transactions;
	<ul style="list-style-type: none"> high number of Class Mismatch transactions;
	<ul style="list-style-type: none"> abnormal changes in traffic counts;
	<ul style="list-style-type: none"> high number of exceptions or unusual occurrences;
	<ul style="list-style-type: none"> transaction exceptions;
	<ul style="list-style-type: none"> high number of invalid Transponder transactions;
	<ul style="list-style-type: none"> abnormal changes in Transponder counts and status changes and
	<ul style="list-style-type: none"> high number of rejected images.

2.8.2.2 Monitoring and System Administration Services

The Requirements in this section describe the Monitoring and System Administration Services.

1685	All System administrative functions, if not automated, shall be performed by Contractor at regular intervals as part of the Preventive Maintenance Services according to the Approved Maintenance Plan to ensure System performance is optimized. All such System administrative functions shall be scheduled as Preventive Maintenance work orders through MOMS and tracked.
1686	Continuous monitoring of System Operations shall be performed by Contractor in conjunction with Authority to verify System is functional; security posture is adequate; processes are being executed as scheduled; files are transmitted as specified, and System is operating to Agreement Performance Requirements.
1687	Continuous monitoring of Operations including but not be limited to:
	<ul style="list-style-type: none"> confirming and verifying receipt of all the MOMS messages and Alerts;
	<ul style="list-style-type: none"> verifying the MOMS is receiving and processing System events and reporting the correct status;
	<ul style="list-style-type: none"> evaluating sample transactions data for exception;
	<ul style="list-style-type: none"> confirming data and image transmission to the RSS;

	<ul style="list-style-type: none"> • verifying processes, programs and scheduled jobs are successful; • reviewing comparative reports to identify System degradation; • confirming successful transfer of Transponder status list to the lanes; • reviewing OCR/ALPR or manual image processing results and poor quality images; • monitoring the DVAS video and event data; • verifying security access cameras are operational; • reviewing sample images from each ALPR camera; • validating Toll Rate CMS displays are correct; • monitoring traffic detectors (if applicable); • correcting performance issues identified; • evaluating storage requirements; • verify time synchronization is occurring as configured and System clocks are not drifting beyond acceptable threshold and • reviewing error logs and Alerts.
1688	Provide continuous 24/7 System administration services coverage on the RSS to ensure that it is performing and will continue to perform at a satisfactory level.
1689	<p>System administration services shall include monitoring and corrective action to ensure System performance is in accordance with this Scope of Work and Requirements. This shall include but is not limited to:</p> <ul style="list-style-type: none"> • monitoring RSS Hardware at the primary and secondary locations including servers; storage devices and backup systems; • verifying processes, programs, and scheduled jobs are successful; • all transactions and images are successfully transmitted to the receiving Systems; • all messages described in the ICD are being successfully exchanged between the ETTM System, and BOS; • confirm applications are functional and available to Authorized Users; • all scheduled reports are successfully generated and available to Authorized Users; • all processes are functioning and data and images are moving successfully though the queues; • all third-party interfaces are functioning and successfully exchanging files; • scheduling of preventive, corrective and predictive Maintenance activities; • any daily, weekly, or periodic Maintenance required to maintain the System at required performance levels (for example: indexing and tuning databases; archiving and purging in accordance with Authority's retention policy); • maintaining and updating records of all Maintenance events and activities in the MOMS;

	<ul style="list-style-type: none"> third-party Software or firmware Upgrades in conjunction with Authority, as required and to be compliant to security Requirements including but not limited to performing security Software Upgrades, database Upgrades and operating System Upgrades;
	<ul style="list-style-type: none"> contact with Authority, Operations and Contractors regarding System issues, performance, security posture, Software Release and Maintenance scheduling;
	<ul style="list-style-type: none"> Approved manual actions, adjustments and Updates to the System data based on predefined criteria to correct issues and as Authorized by Authority;
	<ul style="list-style-type: none"> re-establishment or re-installation of System files, programs and parameters, as required, following a failure or damage to the System;
	<ul style="list-style-type: none"> monitoring of error logs and System logs;
	<ul style="list-style-type: none"> Maintenance of up-to-date Software backups (all System Software and data);
	<ul style="list-style-type: none"> installation of new Software and confirmation of successful installation;
	<ul style="list-style-type: none"> verify time synchronization is occurring as configured and System clocks are not drifting beyond acceptable threshold;
	<ul style="list-style-type: none"> assisting Authority staff as requested by Authority;
	<ul style="list-style-type: none"> troubleshooting Roadside System issues;
	<ul style="list-style-type: none"> creation of Ad-hoc reports requested by Authority;
	<ul style="list-style-type: none"> generation of queries as requested by Authority, and
	<ul style="list-style-type: none"> analysis of data as requested by Authority.
1690	<p>Maintenance and Software Support Services shall include monitoring and corrective action to ensure System performance is in accordance with this Scope of Work and Requirements, to include database management and operation. This shall include, but is not limited to:</p>
	<ul style="list-style-type: none"> investigation and analysis of errors and exceptions and taking corrective action including correcting the problem and reprocessing the data;
	<ul style="list-style-type: none"> monitoring of notifications, and initiating corrective actions on application programs to meet Requirements;
	<ul style="list-style-type: none"> Updates to the ETTM System and application to support Upgrades to Hardware or third-party Software;
	<ul style="list-style-type: none"> Updates and Upgrades to the ETTM System and application to support all changes to Business Rules and ETTM System Configurable parameters, and deploy changes in production;
	<ul style="list-style-type: none"> participate in Interoperability meetings as requested by Authority.
	<ul style="list-style-type: none"> Updates and Upgrades to the ETTM System and application to support minor changes to Authority Interoperable Agency and National Interoperability ICD;
	<ul style="list-style-type: none"> Updates to the ETTM System and application to support the addition of new Interoperable Agencies;
	<ul style="list-style-type: none"> Updates to the ETTM System and application to support changes to continue its compliance to updated security Requirements;
	<ul style="list-style-type: none"> Updates to the ETTM System and application to correct security deficiencies, and

	<ul style="list-style-type: none"> Updates to the ETTM System and application to support legislative and statutory changes.
1691	Contractor shall perform OCR/ALPR Updates as required to support license plate changes for California plates and the license plates from the States of California, Nevada, Arizona, Illinois, Texas, Washington, and Utah.
1692	Contractor shall monitor all network Alerts and alarms, as well as detect intrusion attempts and prevent intrusions.
1693	Contractor shall Upgrade and Update the network security and provide the required Software and monitoring tools to ensure the ETTM System is always in compliance with the most recent penetration and vulnerability test Requirements.
1694	For the 91 Express Lanes, with each change to the toll rate schedule, Contractor shall provide an updated electronic file (Excel or simple file format) for uploading to the 91 Express Lane Toll Rate CMSs. The file type and format shall be determined during the Implementation Phase and shall be synchronized with the ETTM System toll rates.

2.8.2.3 Express Lanes – Post-Deployment Evaluation

1695	<p>Following deployment of the DPS, the ETTM System shall support extensive reporting, testing and evaluation of the Express Lanes performance to provide Authority with critical information to enable adjustment of configurable parameters (if necessary) to achieve operational and revenue goals. To support this, the ETTM System should be designed to generate the following reports on demand, drawing on data extending back for up to 13 months:</p> <ul style="list-style-type: none"> Comparative performance reports summarized by 15-minute intervals, differentiating between the general purpose lanes and the Express Lanes, by Corridor, by Segment and including, average speeds, average density, full Corridor-length travel time; Toll rate graphs for any given day, showing the rates by interval for each Segment, in each direction.
1696	<p>Assessment of operational standards for 91 Express Lanes. In order to inform Authority of the extent to which these goals are achieved on a day-to-day basis, the ETTM System shall generate the following reports broken down by direction:</p> <ul style="list-style-type: none"> the percentage of time during peak periods in which the average speed in the Express Lanes was greater than or equal to the configurable operational goal (for example, 55 mph); the percentage of time during peak periods in which density in the Express Lanes was less than or equal to the configurable operational goal (for example, 35 vehicles per mile per lane); and the percentage of time during peak periods in which the full-length travel time in the Express Lanes was less than the full-length travel time in the general purpose lanes.
1697	Assessment of operational standards for I-405 Express Lanes. In order to inform Authority of the extent to which these goals are achieved on a day-to-day basis, the ETTM System shall generate the following reports broken down by Corridor, by Segment, and by direction:

	<ul style="list-style-type: none"> the percentage of time during peak periods in which the average speed in the Express Lanes was greater than or equal to the configurable operational goal (for example, 55 mph);
	<ul style="list-style-type: none"> the percentage of time during peak periods in which density in the Express Lanes was less than or equal to the configurable operational goal (for example, 35 vehicles per mile per lane) and
	<ul style="list-style-type: none"> The occurrence of HOV ONLY mode with details on time of occurrence, duration, speed and travel time in Express Lanes and general purpose lanes, and if incidents affect the HOV ONLY time.
	<ul style="list-style-type: none"> the percentage of time during peak periods in which the full-length travel time in the Express Lanes was less than the full-length travel time in the general purpose lanes.

2.8.2.4 Interoperability Requirements

1698	Contractor shall support the following Authority Interoperable Agencies and National Interoperability activities as required by Authority. Activities include but are not limited to:
	<ul style="list-style-type: none"> support CTOC and National Interoperability Agency testing as requested;
	<ul style="list-style-type: none"> support substantial changes to the System to meet major modifications to Authority Interoperable Agencies and National Interoperability specifications, and
	<ul style="list-style-type: none"> be compliant with the latest published Authority Interoperable Agencies and National Interoperable specifications for the duration of the Agreement.

2.8.2.5 Updates to Maintenance Plan and Other Maintenance Related Documentation

1699	Contractor shall periodically update the Maintenance Plan and other Maintenance Documentation to reflect any changes to the policies or procedures developed by Contractor and Approved by Authority for the ETTM Maintenance Services. The Maintenance Plan shall be updated and submitted for review and Approval on an annual basis. However, sections of the Maintenance Plan or its appendices shall be submitted for review and Approval as the changes are identified. A version update sheet shall be included with the Maintenance Plan, and the Maintenance Plan on file shall have the most recent version from the configuration management database. A final Submittal of the Maintenance Plan and other Maintenance Documentation shall be provided at the end of the Agreement Term.
1700	Contractor shall provide in electronic format all patches and Updates made to the System Software (third-party and Contractor) after Acceptance.

2.8.2.6 Types of Maintenance

2.8.2.6.1 Preventive Maintenance

1701	Contractor shall provide and perform onsite Preventive Maintenance on the Roadside System Hardware, RSS Hardware, Contractor LAN /WAN communications Equipment and Software in accordance with the Approved Maintenance Plan.
------	---

1702	Contractor shall inspect all Contractor installed Equipment, both major components and support components (fans, cables, connectors, cabinets, Equipment racks, storage units) that constitute the Roadside System and shall make such repairs; cleaning; adjustments, and replacements of components as necessary to maintain the Equipment in normal operating condition in accordance with the Approved Maintenance Plan.
1703	In addition to required ongoing Contractor monitoring, the servers and data processing units shall be periodically checked by Contractor to verify that storage space is not reaching limits, disks are not fragmented or damaged, Software being used is of latest version per the configuration management and data is being processed and transferred in an appropriate manner.
1704	Transaction and image processing volumes and times shall be monitored by Contractor and Systems optimized for performance with Authority Approval.
1705	Report generation times, System access times, and System response time shall be monitored by Contractor to ensure performance meets the Contractual Requirements.
1706	Contractor shall include all Equipment and Systems as part of the Preventive Maintenance in accordance with the original Equipment manufacturer's guidelines. Any variations or exceptions shall be noted by Contractor and Approved in advance by Authority.
1707	Preventive Maintenance shall be performed by Contractor during the normal working hours when Maintenance technicians are scheduled to be onsite. Authority Approved diagnostic aids, tools and Equipment to perform Preventive Maintenance Equipment analysis shall be provided by Contractor, as necessary.
1708	Preventive Maintenance requiring lane closure shall be scheduled by Contractor for off-peak travel periods; evenings; Saturdays, and Sundays and coordinated with Authority and Caltrans, if necessary, so that the Work shall not interfere with normal traffic flow, unless otherwise Approved by Authority.
1709	Contractor shall provide a Preventive Maintenance schedule, to be Approved by Authority, as part of the Maintenance Plan. The schedule shall detail the Preventive Maintenance to be performed on each Equipment item and System. The schedule shall provide a description of the Work to be performed, expected duration and the frequency.
1710	The Preventive Maintenance schedule shall be entered by Contractor into the MOMS and work orders shall be automatically created to Alert Contractor staff of required Preventive Maintenance. Failure of Contractor to perform required Preventive Maintenance in accordance with the Approved schedule shall result in monthly fee adjustments, as specified below in the Maintenance Performance Requirements.

2.8.2.6.2 **Corrective Maintenance**

1711	All Work performed by Contractor to correct problems to meet this Scope of Work and Requirements or Software defects shall be considered as corrective Maintenance. Such problems include but are not limited to:
	<ul style="list-style-type: none"> • failure of subsystem functions;
	<ul style="list-style-type: none"> • problems identified by the users, including the Caltrans, and customers;
	<ul style="list-style-type: none"> • interface issues;
	<ul style="list-style-type: none"> • failure of processes and programs;
	<ul style="list-style-type: none"> • data reconciliation issues;

	<ul style="list-style-type: none"> • report issues; • application failures; • ETTM System network issues; • inadequate security posture; • degraded System or component performance, and • non-conforming availability or Mean Time Between Failures (MTBF).
1712	Authority shall be notified before any corrective Maintenance is performed.
1713	Notwithstanding the foregoing, for repeated failure of Equipment, components, or Systems, Contractor shall undertake an investigation. If the problem is determined by Authority to be a Pervasive Defect, Contractor shall be responsible for resolution as set forth in the Agreement.

2.8.2.7 Maintenance Coverage

1714	Contractor shall provide continuous (24/7) coverage for all monitoring and Maintenance-related activities sufficient to meet this Scope of Work and Requirements.
------	---

2.8.2.8 Spare Parts**2.8.2.8.1 91 Express Lanes Spare Parts**

Contractor shall access to storage area at the 91 Express Lanes Anaheim Administration building for Contractor's use.

1715	Contractor shall be responsible for the inventory of all spare parts at the storage facility and shall be insured in this regard as set forth in the Agreement. Contractor shall account for all spare parts and shall provide safeguards against theft, damage, or loss of the spare parts.
1716	Contractor shall ensure that the spare parts have been tested and deployment ready. Spare should be labeled with the test date.
1717	Contractor shall ensure that only spare parts and Equipment required to service the ETTM System are stored at this facility and shall only be used for Authority.

2.8.2.8.2 I-405 Express Lanes Spare Parts

Contractor shall provide a storage location for Contractor's use for the storage of the Roadside System spare parts unless provided by Authority.

1718	Contractor shall be responsible for the inventory of all spare parts at the storage facility and shall be insured in this regard as set forth in the Agreement. Contractor shall account for all spare parts and shall provide safeguards against theft, damage, or loss of the spare parts.
1719	Contractor shall ensure that the spare parts have been tested and deployment ready. Spare should be labeled with the test date.
1720	The spares facility and storage area shall be secured and connected to an up-to-date security network System with alarm notification monitored by Contractor. Further, it is

	required that Authority shall have full and unrestricted access to the Maintenance and or storage facility.
1721	Contractor shall ensure that only spare parts and Equipment required to service the ETTM System are stored at this facility and shall only be used for Authority.

2.8.2.8.3 Spare Parts Inventory Management

1722	Contractor shall be responsible for the Maintenance of an adequate spare parts inventory during the Agreement Term. Contractor is responsible for monitoring and identifying the existing spare parts inventory, ordering spare parts as required, and proposing the quantity needed to maintain the required performance.
1723	Contractor shall, on a quarterly basis, update and recommend a spare part quantity to be maintained in order to support the ETTM System functionality and operational readiness.
1724	Contractor shall notify Authority if a spare part is to reach the Manufacturers/Suppliers end of life cycle or support prior to the end of the Agreement.
1725	Contractor shall be responsible for purchasing and replenishing spare parts inventories to the levels required to meet the Performance Requirements. Contractor's failure to purchase or replenish the spare parts or consumables to levels necessary to meet the Performance Requirements is not an excusable failure and will not relieve Contractor from Performance Requirements or any associated liquidated or actual damages resulting from the non-performance.
1726	During the Agreement Term, Contractor shall be responsible for purchasing all spare parts and miscellaneous repair items and consumable materials necessary to maintain the ETTM System at the performance levels specified in the Agreement.

2.8.2.8.4 Spare Part Inventory and Tracking

1727	Contractor shall be responsible for recording the inventory into the MOMS, monitoring the inventory quantity and ensuring that the inventory is maintained to the levels required.
1728	Contractor shall keep accurate records of all parts entering and leaving inventory including but not limited to: time and date part was dispensed, and the location within the ETTM System where the part was dispatched and used.
1729	Contractor shall also be responsible for tracking of all warranty replacement for Contractor provided Equipment through returned material authorization (RMA) process. If the replaced part is under warranty, the part shall be immediately replaced with a new part. If the replaced part is out of warranty, Contractor shall make every effort to repair the replaced item to a usable status and place the part back into spares inventory.
1730	If Contractor is unable to repair the part, a new part shall be purchased and placed into spares inventory. The details of the repair efforts, including problem; status; inventory, and repair disposition shall be included in the MOMS inventory and repair database.

2.8.2.8.5 Procurement and Control of Spare Parts

1731	Thirty (30) Days prior to installing the first Toll Zone, Contractor shall have purchased and have available the agreed upon inventory of spare parts.
------	--

1732	The spare parts shall be purchased on behalf of Authority and shall be owned by Authority and located onsite in a manner to ensure that Authority receives the maximum benefit from any warranties associated with the spare parts.
1733	Contractor shall ensure that all spare parts, Equipment and other Authority owned property located on Contractor's property or in Contractor controlled space shall not be subject to any risk of being confiscated, claimed, attached, withheld by a landlord, creditor, or similar risk.
1734	Contractor shall label/tag all Equipment identifying it as the property of the Express Lanes with the Authority phone number, an Authority specific control number, barcode, and link to Contractor provided database for tracking. All spare parts and consumables shall be maintained by Contractor free and clear of any liens and encumbrances of any kind. Authority shall have the right to inspect the spares and consumables inventory upon request.
1735	Provide the capability to enter new inventory items to MOMS via several methods, including but not limited to:
	<ul style="list-style-type: none"> manually;
	<ul style="list-style-type: none"> file upload and
	<ul style="list-style-type: none"> barcode (scanner).
1736	Any spare parts that are lost or damaged due to the negligence, intentional act, or omission of Contractor or its employees, Subcontractors, agents, or invitees shall be replaced by Contractor at its sole cost.
1737	Authority may elect to assume responsibility at any time for storage of spare parts, and Contractor shall deliver all spare parts to Authority for storage after receipt of reasonable Notice from Authority.

2.8.2.8.6 Spare Parts Availability

1738	Contractor shall maintain the required physical inventory of agreed to spare parts in accordance with the Agreement.
------	--

2.8.2.9 Repair Depot

1739	Contractor shall be responsible for providing and staffing a repair depot for the return and repair of ETTM System components.
1740	Contractor shall be responsible for repairing failed ETTM System components and returning them to the spare parts inventory.
1741	Failed components shall be tracked by Contractor utilizing MOMS, including final resolution. Component tracking shall include but not limited to the following: receipt, repair date/information, replace reason, date of return.
1742	Contractor shall indicate the details of the repairs performed on any components. This shall include but not be limited to boards and connectors replaced.

1743	If the replaced part is under warranty, the part shall be immediately replaced with a new or manufacturer refurbished part by Contractor. If the replaced part is out of warranty, Contractor shall make every effort to repair the replaced item to a usable status and place the part back into spares inventory. Except for Pervasive Defects, for out of warranty components, Contractor shall document why the component could not be repaired and advise Authority that a new spare must be ordered.
------	--

2.8.2.10 Annual System Certification

At the end of Year 1 Maintenance, and annually thereafter, Contractor shall conduct a System wide Certification that shall include tuning of the lanes, Maintenance of the servers and database, and general System check-out. Upon the completion of the System-wide Certification, Contractor shall conduct a Certification test similar to the ETTM System Operational and Acceptance Test for a duration sufficient to collect the requisite sample size to validate System Performance Requirements. Discrepancies under the control of Contractor shall be corrected by Contractor at no additional charge to Authority.

1744	For measuring Contractor's performance against the key performance indicators that are measured during the Annual Certification, test results available no later than 30 Days after the end of Year 1 Maintenance and every subsequent year on the same date shall be used to determine compliance. Any performance measures where Contractor cannot demonstrate compliance shall be subject to the designated amount of the adjustment to the Monthly Fee.
1745	The Annual Certification test shall be similar in approach to the System Acceptance Test and shall be conducted for a duration sufficient to collect the requisite sample size to validate that System Requirements are being met.
1746	Contractor shall include the Annual System Certification Plan in the Maintenance Plan and it shall include a checklist of all the certifications and updates to be performed, including but not limited to: <ul style="list-style-type: none"> • Disaster Recovery testing; • updates to Project Documentation; • updates to Project contact information, and • updates to emergency contact list.
1747	A sample size of 10,000 shall be used to validate each accuracy requirement. Data shall be collected from all lanes at each Toll Zone and lane.
1748	DVAS recordings shall be performed for a two-hour period in each lane at each Toll Zone and compared to the transactions to validate vehicle detection accuracy.
1749	A hundred percent (100%) end-to-end audit of the System shall be performed for a seven (7) Day period to validate transaction and reconciliation Requirements.
1750	A Certification report shall be submitted to Authority for Approval documenting the results of the annual Certification.

2.8.2.11 Emergency Response Management

Contractor shall have an Emergency Response Management Plan Approved by Authority and Contractor shall follow the procedures set forth in this Plan when an emergency situation is invoked.

1751	Contractor shall develop and follow an Emergency Response Management Plan Approved by Authority.
1752	Contractor shall immediately respond to any emergency situation and repair the System, as notified by Authority or otherwise, that may arise that has already or could potentially damage the Roadside System. Contractor shall be prepared to put forth all necessary resources to divert or correct an emergency condition.
1753	The Emergency Response Management Plan shall address how Contractor will handle emergencies in accordance with the policies and procedures established by Authority, including but not limited to the following emergency conditions:
	<ul style="list-style-type: none"> • weather related;
	<ul style="list-style-type: none"> • vehicle accident;
	<ul style="list-style-type: none"> • conditions that invoke the DRP;
	<ul style="list-style-type: none"> • third-party (power outage or communication failure);
	<ul style="list-style-type: none"> • vandalism that causes parts of the Roadside System to be inoperable and
	<ul style="list-style-type: none"> • detection of security breaches, discovered vulnerabilities and activities that pose a security threat to the ETTM System;

2.8.2.12 Roadway Support Systems (RSS) Disaster Recovery

1754	Contractor shall perform DR procedures in accordance with the Approved DRP in the event of a disaster and return the RSS to a fully operational condition.
1755	Contractor shall test the DR procedures on a yearly basis during the Agreement Term to validate that they are functioning per the Design. Authority shall witness the test and Contractor shall provide a report outlining the test, test results and any anomalies encountered for Authority's review and Approval.
1756	Contractor shall address any issues encountered from the yearly DR testing.

2.8.2.13 Incident and Revenue Loss Reporting

1757	Contractor shall immediately notify Authority of any incident or event whereby the potential or actual loss of revenue occurred or could potentially occur. Contractor shall take immediate action to rectify the condition and return the Roadside System to normal functioning.
1758	A Monthly Incident Report shall be provided by Contractor that includes a breakdown of lost transaction data and revenue by Roadside for each incident. If the condition is determined to be due to the fault of Contractor, damages shall be assessed in accordance with the Agreement.

2.8.2.14 Maintenance Staffing, Materials and Training**2.8.2.14.1 Maintenance Staffing Requirements**

1759	<p>Contractor shall be responsible for maintaining an adequate level of technical staff to perform Maintenance and Software Support Services on the Roadside System. Contractor shall ensure that sufficient staffing is available to cover all Maintenance activities identified in this Scope of Work and Requirements at all times including but not limited to during the following periods:</p> <ul style="list-style-type: none"> weekends; holidays; personnel on vacation/sick time; after regular scheduled Work hours (on call), and unexpected emergency or crisis.
1760	<p>Contractor shall provide personnel to perform the following functions. It shall be Contractor's responsibility to staff at appropriate levels to meet the Requirements, using the Maintenance Plan as the guideline for staffing levels and full job descriptions:</p> <ul style="list-style-type: none"> Management: Contractor's Maintenance Management responsibilities include all Maintenance Management business dealings with Contractor Project Manager. Responsibilities include single point of contact for all Work related issues, including System problems, material issues, or Contractor personnel issues. Maintenance Management responsibilities also include ensuring that Systems are properly functioning and that the Maintenance and repair Work are properly performed and documented. Monitoring Staff: The monitoring functions shall include the support for the monitoring of the System Operations, ensuring that systems are properly functioning, operating the Authority TOC, and conducting image review. Additionally, the monitoring staff shall coordinate with Authority in confirming the Maintenance and repair Work are properly performed. Field Supervision: The Field Supervisory functions include being responsible for the day-to-day Operations of the technicians, ensuring that all required Work is accomplished properly and efficiently. Maintenance Technical Staff: Responsibilities include responding to Maintenance activities, Alerts and work orders and for field level Preventive Maintenance. Maintenance technicians shall be qualified to troubleshoot Maintenance problems and identify the source of the problem. Network Engineering: Network Administration shall include the configuration and Maintenance of the network systems and communications network. Database Administration: Database administration shall include management of the servers and databases. The database administration shall cover all aspects of the System database and ensuring the database is optimized for peak performance. The responsibilities include the configuration and operation of the System database and generation of database queries as requested by Authority and other support personnel.

	<ul style="list-style-type: none"> • Systems Engineering: Responsibilities include the configuration and monitoring of all System processing and verification that all Operations and processes are occurring as scheduled. All MOMS alarms relating to process failures shall be investigated and resolved by the System engineering staff. Systems engineering responsibilities also include ensuring the proper configuration of all servers and coordinating all server Maintenance. System engineering responsibilities also include identifying issues, communicating with the System Software personnel and coordinating resolution of the problem. All user-related problems (application Software) shall also be handled by the System engineering personnel.
	<ul style="list-style-type: none"> • Software Technical Staff: Responsibilities include responding to Maintenance activities, Alerts and work orders and resolution of Software problems. Software technical staff shall be qualified to troubleshoot Maintenance problems, identify the source of the problem and correct the problem.
	<ul style="list-style-type: none"> • Administrative Staff: Responsibilities include support of Contractor's Maintenance organization for the performance of Maintenance functions and provision of adequate phone and administrative support at the Maintenance management facility.

2.8.2.14.2 Tools and Materials

1761	Contractor shall provide all test Equipment and tools and support; including but not limited to monitoring tools; smart phones; laptops, and any other items required for the Maintenance and Software Support staff to perform their Maintenance activities. All such devices shall have adequate and up-to-date security Software and be Approved by Authority before they are used on the ETTM Communications Network. All required test Equipment, tools and Software tools shall be on site (as required) and in adequate supply, with all required personnel trained on their use.
------	--

2.8.2.14.3 Training Program

1762	Contractor shall ensure that Maintenance and Software services staff is properly trained for Requirements of maintaining the System. Contractor shall provide a minimum of two (2) weeks of classroom and On the Job Training (OJT) to all personnel in their respective area of responsibility before such personnel are assigned Maintenance duties.
1763	Contractor shall provide personally identifiable information (PII) training to all personnel Approved to work on the Project who have access to secure and personal information.
1764	Contractor shall provide trained qualified technical staff to support the Maintenance and Software Support Services described in this Scope of Work and Requirements. It is Contractor's sole responsibility to develop training necessary to successfully perform all of the Maintenance actions required to keep the System operational.
1765	Contractor shall complete all required training and Certifications prior to performing actual Maintenance and Software Support Services within a revenue collection environment. In the event changes or modifications are made to the System Equipment or configuration, supplemental training shall be accomplished prior to the actual service date for the changes or modifications.

1766	Training shall include Contractor's safety standards and guidelines and applicable Authority policies and procedures.
1767	Contractor shall provide Documentation to the Authority that this initial training has been successfully completed.
1768	<p>Various training programs Contractor shall institute shall include, but not be limited to, the following:</p> <ul style="list-style-type: none"> • a thorough understanding and operating knowledge of the MOMS is required of all Maintenance personnel; • an in depth understanding of the Roadside System and Operations, including all Equipment, Software, interfaces, file transfers and interconnections; • use of Maintenance Documentation such as Maintenance manuals; drawings; vendor manuals, and parts list; • functions of the System monitoring tools used to manage the System monitoring tasks; • Preventive Maintenance of all Systems and sub-systems; • troubleshooting; diagnostics; repair, testing, and Maintenance follow up; • System logs, errors logs, and processing of exceptions; • System dataflow and workflow queues; • review of the Dashboard data and analysis; • discussion on the areas of responsibility; • special use Maintenance and monitoring tools and • queries and reports.
1769	All System Maintenance and Software Support personnel shall attend the appropriate training sessions. Authority staff shall be notified of and invited to attend any or all training sessions two (2) weeks in advance of the training.
1770	All System Maintenance and Software Support personnel shall be trained on scheduling, work assignments, escalation process, transportation requirements and communications;
1771	Contractor shall provide training offered by vendors and original Equipment manufacturer (OEM) for Roadside System components where available and required to properly operate, maintain, test and repair such Equipment and Software.

2.8.2.14.4 Training Materials and Ongoing Education

1772	Training material shall consist of Maintenance manuals, vendor manuals and any other Documentation that provides for the efficient and effective Maintenance of the System and its components.
1773	Contractor shall hold regular meetings with Authority technical personnel to update Maintenance procedures, bring proposed System changes to the attention of the technical staff and discuss Maintenance issues identified in the field. Contractor shall provide Authority with the meeting schedule so that the appropriate Authority staff can attend these meetings.

1774	Authority shall have the right to make recordings and copies of all training program materials. Contractor shall provide releases from all employees/Contractors to allow unlimited, royalty free use and copies of recordings.
------	---

2.8.2.14.5 System Documentation

1775	Contractor shall have appropriate System Documentation available to all Maintenance and Software Support personnel as required to perform their respective duties.
1776	Contractor shall update the System Documentation to reflect any changes to the System Approved by Authority. A version update sheet shall be included with the System Documentation, and the Documentation on file shall have the most recent version from the configuration management database. A complete submission of the System Documentation shall be made every two (2) years that reflects all Approved changes to-date.

2.8.2.14.6 Training Records

1777	Contractor shall keep accurate training records on all Contractor and Authority Maintenance personnel. Authority shall be permitted to audit Maintenance personnel qualifications and training records at any time. Evidence of completion of training by Contractor and Authority Maintenance personnel shall be provided to Authority upon request.
------	---

2.8.2.15 Safety

1778	Contractor is solely and completely responsible for safety conditions on the Site. Safety practices will not be limited to normal business hours or other time constraints. All Contractor employees and Subcontractors at all tiers must comply with the Health and Safety Plan and Governmental Rules as required in accordance with California Occupational Health and Safety Act of 1973.
1779	Contractor shall take all reasonable precautions and be solely responsible for the safety of, and shall provide protection to prevent damage, injury, or loss to, all persons throughout the Agreement Term and shall comply with all health and safety requirements under applicable Governmental Rules.
1780	The ETTM System and operational and maintenance processes must be designed and implemented in a manner that promotes the safety and security of persons and property. Contractor shall perform safety and health work in accordance with all applicable Governmental Rules and Project Standards listed in this Scope of Work and Requirements, including the Caltrans Safety Manual, 2009 and otherwise in accordance with the Agreement.
1781	Contractor shall adhere to all applicable safety standards and guidelines for working on or around energized Equipment and in a Maintenance environment, including but not limited to the following: <ul style="list-style-type: none"> • Authority safety procedures and guidelines; • Caltrans safety procedures and guidelines; • OSHA (Occupational Safety and Health Administration);

	<ul style="list-style-type: none"> • NEMA (National Electrical Manufacturers Association);
	<ul style="list-style-type: none"> • NEC (National Electrical Code);
	<ul style="list-style-type: none"> • FHWA (Federal Highway Administration), and
	<ul style="list-style-type: none"> • any other local, State, or Federal ordinance, procedure, or guideline that provides for a safe operation and working environment.

2.8.2.16 Security

1782	All Contractor personnel shall be subject to appropriate security and background checks to the satisfaction of Authority. Contractor shall obtain written Approval from Authority for all service personnel and each Contractor personnel shall be required to sign an acceptable use agreement.
1783	Contractor's personnel shall be issued Authority identification badges and shall wear such identification badges at all times when on Authority property. Use of such identification badges for purposes other than Work associated with the Agreement will result in termination of the employee from the Agreement and possible other legal or disciplinary action.
1784	Visitors to the Contractor's facilities on Authority property shall register with Authority and be issued a temporary visitor badge. Contractor shall ensure all visitors complete a sign in sheet which will identify date/time/purpose/visitor/escort.
1785	The Services and Work performed under the Agreement are considered PII and confidential and Contractor personnel and the ETTM System shall at all times comply with applicable current computer and data industry standards with regard to data and information security.
1786	Authority will identify and designate a primary point of contact for Contractor. Under most circumstances, Contractor will limit communication with Authority authorized staff and to Authority's designated point of contact unless otherwise directed by Authority.
1787	Discussion by Contractor of any Services or Work performed under the Agreement with the media, in oral presentations, in written publications, or in any other form, not related to this Agreement shall be Approved in advance by Authority.

2.8.2.17 Lane Closures and Traffic Control (O&M Phase)

Contractor will provide all maintenance of traffic (MOT) associated with completing the Work on the 91 Express Lanes and I-405 Express Lanes during the Operations and Maintenance Phase. All Lane Closures shall be coordinated with the Authority and BOS Contractor and Lane Closure schedules shall be submitted to Authority in advance for Approval.

1788	Contractor shall provide all MOT for the Work performed during the Operations and Maintenance Phase. Contractor shall include in the Maintenance Plan a Transportation Management Plan (TMP) in accordance with Caltrans standards for Approval by Authority. The TMP shall include all maintenance schedules and MOT design for all planned Lane Closures of Express Lanes, general purpose lanes, and ramps and connectors.
------	---

1789	Contractor shall adhere to the Approved TMP when setting up, working under MOT and restoring lanes to traffic. All Lane Closures shall also be coordinated with Authority, Caltrans (if necessary) and the TOC.
1790	Contractor shall develop, implement, and maintain a TMP that lays out the strategies for managing the work zone impacts of the Work and submit to Authority for review and approval. The TMP must follow the guidelines in the latest version of the Caltrans' Transportation Management Plan Guidelines. The TMP is considered a living document; Contractor shall amend and submit changes to the TMP for approval by Authority and Caltrans as changes occur in the MOT strategies proposed by Contractor.
1791	TMP compliance and implementation is the responsibility of Contractor. Authority and Caltrans will monitor and evaluate TMP activities during the course of the Work. Authority may suspend all or part of Contractor's operations for failure to implement and comply with TMP elements, or failure to correct unsafe traffic conditions within 24 hours after such notification is given in writing to Contractor. If Contractor does not promptly take appropriate action to bring the errors into compliance or to correct unsafe traffic conditions, Authority may proceed with corrective action against Contractor.
1792	Closures of Express Lanes are permitted to facilitate the Work during the Operations and Maintenance Phases. All Permitted Lane Closures shall be as specified in Table 2-5: Permitted Lane Closures of 91 Express Lanes (O&M Phase) and Table 2-6: Permitted Lane Closures of I-405 Express Lanes (O&M Phase) .
1793	Closures of general purpose lanes to facilitate the Work during the Operations and Maintenance Phase must be coordinated with Authority and Caltrans. Any Lane Closure of general purpose lanes must be Approved in advance by Authority and Caltrans. Approved closures of general purpose lanes will be considered Permitted Lane Closures.
1794	Contractor shall submit to Authority for Approval written notice of a Permitted Lane Closure of an Express Lane(s) for review and Approval no later than seven (7) Days prior to the Permitted Lane Closure of any Express Lane.
1795	Contractor shall submit to Authority and Caltrans written request for a Permitted Lane Closure of a general purpose lane(s) for review and Approval no later than seven (7) Days prior to the Permitted Lane Closure of any general purpose lane.
1796	Lane Closure Schedule Amendments, including adding additional closures, shall be submitted by 12:00 p.m. to Authority, in writing, at least three (3) Business Days in advance of a planned closure. Approval of Closure Schedule Amendments will be at the discretion of Authority. Authority shall be notified of cancelled closures two (2) Business Days before the date of the closure. Closures that are cancelled due to unsuitable weather may be rescheduled at the discretion of Authority.
1797	Contractor shall notify the Authority immediately, as soon as Contractor knows that a Permitted Lane Closure will be late in reopening. In the event that a Permitted Lane Closure does not reopen on time, Authority and Caltrans shall not authorize any further Lane Closures until Contractor submits to Authority a corrective action plan to avoid recurrences.
1798	Authority shall have the right to suspend the Work and cancel any previously Approved Lane Closure requests for failure to reopen to public traffic a Permitted Lane Closure within the windows specified in Table 2-5: Permitted Lane Closures of 91 Express Lanes (O&M Phase) and Table 2-6: Permitted Lane Closures of I-405 Express Lanes (O&M Phase) or otherwise Approved by Authority.

1799	Lane Closures of Express Lanes and general purpose lanes shall not be allowed:
	<ul style="list-style-type: none"> • on Easter weekend;
	<ul style="list-style-type: none"> • on Mother's Day weekend;
	<ul style="list-style-type: none"> • on Father's Day weekend;
	<ul style="list-style-type: none"> • on Memorial Day weekend;
	<ul style="list-style-type: none"> • on Fourth of July weekend;
	<ul style="list-style-type: none"> • on Labor Day weekend;
	<ul style="list-style-type: none"> • between the Wednesday before Thanksgiving until the Monday following Thanksgiving; and
	<ul style="list-style-type: none"> • on any other Holidays.
1800	Contractor shall coordinate with Authority and Caltrans and local agencies to identify any special events and restrict Lane Closures accordingly.
1801	Unpermitted Lane Closures are prohibited and shall be subject to Authority Liquidated Damages in accordance with Article 18, Liquidated Damages/Lane Rental Fees, of the Agreement. The Contractor shall give written notice to the Authority of any Unpermitted Lane Closures. Upon receipt of such written notice or otherwise upon discovery of any Unpermitted Lane Closure, Authority will deliver Contractor a Notice of Unpermitted Lane Closure, and shall assess against Contractor the applicable Liquidated Damages, calculated in accordance with Article 18, Liquidated Damages/Lane Rental Fees, of the Agreement. Contractor shall pay Authority such Liquidated Damages within 24 hours after all applicable lanes reopen to public traffic.
1802	Authority will assess against Contractor the applicable Liquidated Damages in accordance with Article 18, Liquidated Damages/Lane Rental Fees, of the Agreement for failure to utilize a requested Lane Closure or cancellation of a requested Lane Closure less than 72 hours before the date and time that the requested Lane Closure is scheduled to commence.
1803	Contractor, however, may request Lane Closures outside of the Permitted Lane Closure windows. Contractor shall submit such requests in writing to Authority no later than fourteen (14) Days prior to Contractor's requested date for the Lane Closure, together with a revised TMP. Such requests and revised TMPs shall be subject to review and Approval by Authority and Caltrans in their sole discretion. Written requests for Lane Closures outside the times set forth in the Lane Requirement Charts shall, at a minimum include the following:
	<ul style="list-style-type: none"> • Justification for the Lane Closure;
	<ul style="list-style-type: none"> • Proposed time periods and hours;
	<ul style="list-style-type: none"> • Proposed location(s); and
	<ul style="list-style-type: none"> • Proposed calendar duration.
1804	Any Work involving removal/relocation of Equipment (both existing equipment and Contractor's Equipment) (loosening or removal of nuts/screws, cables, connectors etc.) shall be done with appropriate Lane Closures during nighttime period or off peak hours as listed within this section, unless otherwise Approved by Authority in its sole discretion.
1805	The Maintenance Manager shall be present during Lane Closures.

1806	The Express Lanes shall be properly closed before any Work begins in the Express Lanes. All workers and equipment must be cleared from the Express Lanes before they are reopened.
1807	Contractor shall record the beginning and ending times of all Lane Closures in the ATMS.

2.8.2.17.1 Lane Closures and Traffic Control (O&M Phase) – 91 Express Lanes

1808	All Lane Closures during the Operations and Maintenance shall conform to the Caltrans Encroachment Permit, as shown in Attachment 13 – 91 EL Encroachment Permit .
1809	The 91 Express Lanes are completely closed to all vehicular traffic every third Sunday, weather permitting, between 6:00am and 12:00 pm for maintenance by Caltrans. Contractor is encouraged to coordinate ETTM maintenance with Caltrans' regularly scheduled Lane Closures. Contractor's Lane Closure responsibility is as follows: <ul style="list-style-type: none"> • If Work is scheduled with Caltrans roadway maintenance activities, Contractor will not be responsible for paying for Lane Closure MOT and enforcement costs. • If Work is not scheduled with Caltrans roadway maintenance activities, Contractor shall be responsible for providing and paying for all Lane Closure MOT and coordinate and pay for any enforcement costs.
1810	Permitted Lane Closure windows for the 91 Express Lanes, unless otherwise Approved by Authority in its sole discretion, shall be as specified in Table 2-5: Permitted Lane Closures of 91 Express Lanes (O&M Phase) .

Table 2-5: Permitted Lane Closures of 91 Express Lanes (O&M Phase)

Direction/Period	Hours During Which Closures Permitted
Eastbound weekday (Sunday from 11:00 p.m. to Friday at 5:00 a.m.)	11:00 p.m. to 5:00 a.m.
Eastbound weekend (Friday 11:00 p.m. to Sunday at 5:00 a.m.)	11:00 p.m. to 5:00 a.m.
Westbound weekday (Sunday from 9:00 p.m. to Friday at 4:00 a.m.)	9:00 p.m. to 4:00 a.m.
Westbound weekend (Friday at 10:00 p.m. to Sunday at 5:00 a.m.)	10:00 p.m. to 5:00 a.m.

2.8.2.17.2 Lane Closures and Traffic Control (O&M Phase) – I-405 Express Lanes

Contractor shall be responsible for providing all Lane Closures and associated MOT and enforcement during the Operations and Maintenance Phase. Caltrans does not currently utilize regularly scheduled Lane Closures to perform I-405 roadway maintenance; however, Caltrans does utilize infrequent Lane Closures to perform periodic roadway maintenance. During these irregular maintenance closures, and only if Approved in writing by Authority and Caltrans, Contractor may perform Services utilizing Caltrans' Lane Closures.

1811	All Lane Closures during the Operations and Maintenance Phase shall conform to the Caltrans Encroachment Permit to be secured by Authority prior to Go-Live for the I-405 Express Lanes.
1812	Contractor is encouraged to coordinate ETTM System maintenance with scheduled Caltrans' Lane Closures. Contractor shall obtain Authority and Caltrans Approval to utilize Caltrans' scheduled Lane Closures to perform ETTM System maintenance.

1813	Contractor's Lane Closure responsibility is as follows:
	<ul style="list-style-type: none"> If Work is not scheduled with Caltrans roadway maintenance activities, Contractor shall be responsible for providing and paying for all Lane Closure MOT and coordinate and pay for any enforcement costs.
	<ul style="list-style-type: none"> If Work is scheduled with Caltrans roadway maintenance activities, Contractor will not be responsible for paying for Lane Closure MOT and enforcement costs.
1814	Permitted Lane Closure windows for the I-405 Express Lanes, unless otherwise Approved by Authority in its sole discretion, shall be as specified in Table 2-6: Permitted Lane Closures of I-405 Express Lanes (O&M Phase) .

Table 2-6: Permitted Lane Closures of I-405 Express Lanes (O&M Phase)

<i>Direction/Period</i>	<i>Hours During Which Closures Permitted</i>
Eastbound weekday (Sunday from 11:00 p.m. to Friday at 4:00 a.m.)	11:00 p.m. to 4:00 a.m.
Eastbound weekend (Friday 11:00 p.m. to Sunday at 4:00 a.m.)	11:00 p.m. to 4:00 a.m.
Westbound weekday (Sunday from 11:00 p.m. to Friday at 4:00 a.m.)	11:00 p.m. to 4:00 a.m.
Westbound weekend (Friday at 11:00 p.m. to Sunday at 4:00 a.m.)	11:00 p.m. to 4:00 a.m.

2.8.2.18 Maintenance and Software Support Records

1815	Authority shall have access to all Maintenance and Software Service records at any time for review and audit, upon reasonable Notice. Contractor shall provide monthly reports generated in the System that permits Authority to evaluate Contractor's Maintenance performance.
1816	Contractor's Maintenance manager shall maintain current, complete and accurate records for all Maintenance and Software Support Services activities. Contractor's Maintenance manager shall institute procedures that make sure Maintenance staff enters complete information into the MOMS before closing a work order or trouble ticket.
1817	All preventive, pervasive and predictive Maintenance activities shall be reported in the same manner as corrective or emergency Maintenance activities by Contractor. The information shall be contained on the MOMS and shall be made available through various MOMS reports.

2.8.2.19 Maintenance Summary Reports

1818	Contractor shall provide the Maintenance summary reports to Authority on a monthly basis in advance of the Monthly Meeting. The format of the Monthly reports shall be Approved by Authority and included in the Maintenance Plan.
1819	Contractor shall provide an annual executive summary report to Authority that summarizes Contractor's performance for the maintenance year. The format of the Executive Summary reports shall be Approved by Authority and included in the Maintenance Plan.

1820	Maintenance summary reports shall also be readily available on-demand through the System in detail or summary format to Authority authorized personnel via the network on a daily, weekly, or other time period basis determined by Authority. The Maintenance summary report shall include but not be limited to:
	<ul style="list-style-type: none"> a summary of Contractor's performance for the month under review noting all accomplishments and deficiencies;
	<ul style="list-style-type: none"> all Maintenance and System Performance Reports that show Contractor's compliance to Maintenance Performance Requirements;
	<ul style="list-style-type: none"> detailed listing of failures and the impacted subsystems where Contractor's and System performance for the month were not in compliance with the Performance Requirements;
	<ul style="list-style-type: none"> any exceptions Contractor believes are Non-Chargeable Failures that Contractor is not responsible for;
	<ul style="list-style-type: none"> detailed list of parts replaced as a result of Maintenance actions, with an identification of warranty versus non-warranty replacement;
	<ul style="list-style-type: none"> status of removed parts and Equipment with an aging status for parts under repair or replacement (serial numbers, being repaired in Maintenance shop, purchase replacement part);
	<ul style="list-style-type: none"> trend analysis for repetitive failure;
	<ul style="list-style-type: none"> status of spare parts inventory;
	<ul style="list-style-type: none"> staffing report detailing positions and staff hours worked;
	<ul style="list-style-type: none"> staff performance trends;
	<ul style="list-style-type: none"> Software and firmware releases implemented;
	<ul style="list-style-type: none"> major Maintenance activities that occurred and are scheduled to occur;
	<ul style="list-style-type: none"> incidents that invoked emergency response or resulted in loss of toll revenue and
	<ul style="list-style-type: none"> summary of work order, Software defects and trouble tickets by Priority and category.

2.8.2.20 Roadway Support Systems (RSS) Servers and Database Administration, Maintenance and Software Support Services

The Requirements in this section describe the Services to be provided by Contractor under the Maintenance and Software Support Service for the ETTM System.

1821	Contractor shall provide Maintenance and Software Support Service for all elements of the RSS in all environments required in the Agreement including but not limited to:
	<ul style="list-style-type: none"> RSS Hardware;
	<ul style="list-style-type: none"> operating systems;
	<ul style="list-style-type: none"> databases;
	<ul style="list-style-type: none"> application Software;
	<ul style="list-style-type: none"> third-party Software;
	<ul style="list-style-type: none"> security Updates;

	<ul style="list-style-type: none"> • Software configuration and • Software version control.
1822	Contractor shall provide continuous 24/7 System administration services coverage on the RSS to ensure that it is performing and will continue to perform at a satisfactory level.
1823	Contractor support staff shall be available on-call 24/7 to investigate and perform Maintenance for those failures escalated to Contractor.
1824	<p>Maintenance and Software Support Services shall include monitoring and corrective action to ensure System performance is in accordance with this Scope of Work and Requirements, to include database management and operation. This shall include, but is not limited to:</p> <ul style="list-style-type: none"> • investigation and analysis of potential errors and exceptions and taking preventative/corrective action including correcting the problem and reprocessing the data; • monitoring of notifications, and initiating corrective actions on application programs to meet Requirements; • Updates to the ETTM System and application to support Upgrades to Hardware or third-party Software; • Updates to the ETTM System and application to support all changes to Business Rules and ETTM System Configurable parameters, and deploy changes in production; • Updates to the ETTM System and application to support changes to Authority Interoperable Agencies ICD including the addition of new Interoperable Agencies; • Updates to the ETTM System and application to support the addition of new Interoperable Agencies; • Updates to the ETTM System and application to support changes to continue its compliance to updated security Requirements, and • Updates to the ETTM System and application to support legislative and statutory changes.
1825	As part of the Maintenance and Software Support Services, Contractor shall develop and test Software as required in accordance with Agreement Amendment process to accommodate corrective action and changes to Business Rules. Scope shall include provision of evidence packages detailing changes for Authority's review and Approval, installation of new Software and confirmation of successful installation.

2.9 Performance Requirements – Maintenance and Operations

Contractor shall provide an ETTM System that is designed to meet the Requirements set forth in this Scope of Work and Requirements during Maintenance and Operations.

Authority requires Contractor to continuously maintain and operate the ETTM System in accordance with the standards of performance identified in these Performance Requirements and further, that Contractor fully meet these Performance Requirements, beginning with the first month of Maintenance and Operations. In addition, as part of the Operational and Acceptance Test Contractor shall validate that the ETTM System meets the standards of performance identified in these Performance Requirements.

Authority intends to focus on the outcomes from the ETTM System by minimizing the number of Performance Requirements to be tracked, monitored and reported while still maintaining a high confidence in the ETTM System performance. This is done by closely aligning performance measurement to the timely transmission of accurate and complete transactions to the BOS and availability of the ETTM System instead of focusing on the intermediate steps in the process.

Contractor's performance will be monitored by Authority and shall be rated based on Contractor's ability to meet these Performance Requirements. Contractor shall use the Approved measurement and reporting methods developed collaboratively with Authority during the Implementation Phase, to report on Contractor's performance against these Performance Requirements.

These Performance Requirements reflect the minimum tolerable performance expected of Contractor to avoid unnecessary impact to Authority, customers or the general public.

Authority will utilize a fee adjustment-based performance method to track Contractor's compliance with the Performance Requirements. If Contractor fails to meet these Performance Requirements, Authority will assess fees for each failure. Fees will be summed, the total of which will determine any performance adjustments to be made to Contractor's monthly invoice as further detailed below. Contractor is also subject to direct damages for actual revenue loss.

Contractor shall use best efforts to minimize the impacts that result from failure to meet the Performance Requirements, regardless of whether invoice adjustments are made. Furthermore, Contractor shall take corrective action to immediately remedy any failures and provide a Corrective Action Plan (CAP) to Authority for Approval that documents the corrective action taken to prevent future reoccurrence of the problem associated with the non-performance.

A summary of the ETTM System Performance Requirements is provided in **Table 2-7: ETTM Performance Measures**, including measurement frequency and fees for each Performance Requirement. Additional detailed information about the Performance Requirements is provided in the subsequent sections.

2.9.1 General Performance Requirements

Contractor shall be required to meet all Operational Performance Requirements detailed herein and as part of the Monthly Invoice provide reports that show compliance to the defined Performance Requirements, including details of failures that resulted in the non-performance.

1826	Contractor shall design, implement, maintain and operate the ETTM System to meet the Performance Requirements specified herein.
1827	Contractor shall facilitate performance monitoring by reporting performance in clearly measurable and easy to understand terms and reports.
1828	Contractor shall validate System compliance to the accuracy requirements by collecting data to the required sample size in live traffic Operations as described below for each requirement.
1829	Data collection shall include the use of live traffic and controlled vehicles intermingled with live traffic emulating normal Operations as specified below for each requirement.
1830	Authority will conduct a review of Contractor's performance on a monthly basis, utilizing a combination of reports generated by the System, including MOMS, and other Approved reports provided by Contractor, as determined by Authority to be necessary.
1831	Contractor shall immediately notify Authority of any failure observed by Contractor whereby actual loss of revenue occurred or the potential for losses exist.
1832	If resolution of any failure is under Contractor's control and/or responsibility as described in the Agreement, as a Chargeable Failure, Contractor shall take action to correct the failure condition and return the ETTM System to normal functioning in accordance with the Agreement. If the failure condition is determined to be due to Contractor's fault and it results in failure to meet the Performance Requirements, Authority will assess fees for each failure as described in this Performance Section and may be subject to other remedies in accordance with the Agreement.
1833	Contractor shall identify and include in the Performance Requirements reporting any failures and incidents that are outside Contractor's control and/or responsibility and are described in the Contract as Non-Chargeable Failures.

2.9.1.1 Performance Measurement

Performance will be measured in categories that align with the primary functions of the ETTM System. These categories are:

- Availability
- Completeness
- Operations

Each of these categories represents a group of functions within the ETTM System and each function includes individual Key Performance Indicators (KPI), which will be used to measure Contractor's performance in meeting the Performance Requirements.

The specific method of measuring Contractor's performance will vary depending on the KPI being measured, but will generally be measured against the Performance Requirement on a monthly basis. Regardless of how a KPI is measured, Contractor shall provide reporting for all performance measures monthly.

The amount by which the KPI is missed matters in determining how well the ETTM System is performing so the Monthly Fees deductions for a particular failure are increased as the deviation from the KPI increases.

Table 2-7: Performance Measures provides a summary of the KPIs for Contractor and master table that shall be referenced in the event of discrepancies. A detailed description of each KPI and its associated Performance Requirement is provided in the subsequent sections.

Table 2-7: ETTM Performance Measures

#	Category	KPI	Performance Requirement	Measurement Frequency	Fee Adjustment (deduction from monthly invoice)
1	Availability	a. Express Lanes Lane	Each lane (travel lanes and shoulders) 99.90% of the time	Monthly	0.5% Monthly Fee adjustment for a .1% drop to 99% 5% Monthly Fee adjustment for availability below 99%
		b. I-405 Toll Rate Changeable Message Sign (CMS)	Each Toll Rate CMS 99.95% of the time	Monthly	0.5% Monthly Fee adjustment for a .1% drop to 99% 5% Monthly Fee adjustment for availability below 99%
		c. Core Roadway Support Systems (RSS)	99.95% of the time	Monthly	0.5% Monthly Fee adjustment for a .1% drop to 99% 5% Monthly Fee adjustment for availability below 99%
2	Completeness	a. ETTM Preventive Maintenance Complete	Perform Preventive Maintenance on the ETTM System according to Approved Preventive Maintenance Schedule.	Monthly	\$1000 per subsystem per month per scheduled Maintenance activity not completed per schedule
3	Operations – Vehicle Detection and Transaction Framing	a. Transponder Capture Rate	99.97%	Annual System Certification	\$250 per Calendar Day delay until KPI is met
		b. Transponder Reporting Accuracy	99.99%		\$250 per Calendar Day delay until KPI is met
		c. Vehicle Detection Accuracy	99.99%		\$250 per Calendar Day delay until KPI is met

Toll Lanes System Integrator Services

**RFP 7-1911
Exhibit B**

#	Category	KPI	Performance Requirement	Measurement Frequency	Fee Adjustment (deduction from monthly invoice)
		d. Transponder Association Accuracy	99.95%		\$250 per Calendar Day delay until KPI is met
		e. Image Capture and Reporting Accuracy	99.95%		\$250 per Calendar Day delay until KPI is met
		f. Image Association Accuracy	99.95% on all 100% of all captured images		\$250 per Calendar Day delay until KPI is met
4	Operations – Image Extraction and Accuracy	a. License Plate Extraction (OCR/LPR) Accuracy	99.95% on 70% of all captured images	Annual System Certification	\$250 per Calendar Day delay until KPI is met
		b. Overall Image Transaction Accuracy (automated and manual)	99.95%	Monthly	\$10 for each license plate in error for error rates above the 0.05 percent rate
		c. Accuracy of Rejection and Categorization of Rejected Image	99.75%	Monthly	\$10 for each incorrectly categorized rejected image in error for error rates above the 0.25 percent rate
5	Operations –Transaction and Image Processing	a. Transaction Processing and Transmission	100.00%	Monthly	\$50 per twenty-four (24) hours delay per 1,000 transactions
		b. False Read Processing	less than 0.001%	Annual System Certification	\$10 for every false read processed and included in a trip.
		c. Image Processing and Transmission	100.00%	Monthly	\$50 per twenty-four (24) hours delay per 1,000 images

Toll Lanes System Integrator Services

**RFP 7-1911
Exhibit B**

#	Category	KPI	Performance Requirement	Measurement Frequency	Fee Adjustment (deduction from monthly invoice)
6	Operations –I-405 EL Toll Rate CMS Accuracy	a. I-405 Post/Maintain the correct toll rate to the Toll Rate CMS	100% when fully functional	Monthly	\$500 for every 0.1 percent drop in the accuracy
		b. I-405 Report Toll Rate CMS errors or communications to MOMS within five (5) minutes	99.90%	Monthly	\$50 for every five (5) minutes of delay
		c. 91 Accuracy of toll rate file generated for import to the 91 EL toll rate signs	100%	Per Pricing Update	\$2,500 per incident
7	Operations - I-405 Traffic Detection	a. Traffic Detection System (TDS) Accuracy (vehicle volume on EL and GP Lanes in a direction of travel)	97.00%	Annual System Certification	\$100 per Calendar Day delay until KPI is met
		b. Traffic Detection System (TDS) Accuracy (average speed of any individual EL and GP lane)	Within 5 mph		\$100 per Calendar Day delay until KPI is met
8	Operations – Trip Management	a. Transaction/trip Assembly	99.995%	Monthly	\$25 per reported incident
		b. Transaction/Images/t rip Transmission	100.00%		\$50 per Calendar Day delay per 1,000 Trip Transactions

Toll Lanes System Integrator Services

**RFP 7-1911
Exhibit B**

#	Category	KPI	Performance Requirement	Measurement Frequency	Fee Adjustment (deduction from monthly invoice)
		c. Trip Transaction Correction Transmission	100.00%		\$5 per Calendar Day delay per Trip Transaction Correction
9	Operations – Audit and Reconciliation	a. Audit and Reconciliation	100.00%	Annual System Certification	\$250 per Calendar Day delay until KPI is met
10	Operations – Security Breach	a. Security Breaches	0 breaches	Monthly	\$10,000 per occurrence of a breach
11	Operations – Respond and Repair	a. Priority 1 – Roadside	Respond and complete repair within two (2) hours of failure/event notification. If code change is required, respond within two (2) hours, notify Authority within one (1) hour, and repair time to be reasonably determined by Authority and Contractor based on amount of testing required.	Monthly	\$100 per occurrence for every additional delay of one (1) hour
		b. Priority 1 - RSS	Respond and complete repair within four (4) hours of failure/event notification. If code change is required, respond within two (2) hours, notify Authority by next Day, and repair time to be reasonably determined by Authority and Contractor based on amount of testing required.	Monthly	\$100 per occurrence for every additional delay of one (1) hour

#	Category	KPI	Performance Requirement	Measurement Frequency	Fee Adjustment (deduction from monthly invoice)
		c. Priority 2 - Roadside	Respond and complete repair within four (4) hours of failure/event notification. If code change is required, respond within four (4) hours, notify Authority by next Day, and repair time to be reasonably determined by Authority and Contractor based on amount of testing required.	Monthly	\$100 per occurrence for every additional delay of two (2) hours
		d. Priority 2 - RSS	Respond and complete repair within eight (8) hours of failure/event notification. If code change is required, respond within four (4) hours, notify Authority by next Day, and repair time to be reasonably determined by Authority and Contractor based on amount of testing required.	Monthly	\$100 per occurrence for every additional delay of two (2) hours
		e. Priority 3 - Roadside	Respond and complete repair within twenty-four (24) hours of failure/event notification. If code change is required, respond within twenty-four (24) hours, notify Authority by next Day, and repair time to be reasonably determined by Authority and Contractor based on amount of testing required.	Monthly	\$100 per occurrence for every additional delay of twenty-four (24) hours

Toll Lanes System Integrator Services

**RFP 7-1911
Exhibit B**

#	Category	KPI	Performance Requirement	Measurement Frequency	Fee Adjustment (deduction from monthly invoice)
		f. Priority 3 - RSS	Respond and complete repair within forty eight (48) hours of failure/event notification. If code change is required, respond within twenty-four (24) hours, notify Authority by next Day, and repair time to be reasonably determined by Authority and Contractor based on amount of testing required.	Monthly	\$100 per occurrence for every additional delay of twenty-four (24) hours
12	Operations – Data Transmission and Processing	a. Transmission of TSL to the Roadside System	Transmit the Comprehensive and Incremental Home and CTOC/Interoperable TSL to each of the lane/zone controllers within thirty (30) minutes of the Roadway Support Systems receipt of the TSL.	Monthly	\$100 per occurrence per one (1) hour delay to each of the lane/zone controllers.
		b. Transmission of Files to the BOS	Transmit Toll Rate CMS Images and Traffic Summaries to BOS.	Monthly	\$1000 per Calendar Day delay
13	Operations – Annual System Certification	a. Performance of the Annual System Certification	Conduct Annual System Certification of ETTM System Performance Requirements	Annual	\$5,000 per month for delay in performing the certification
14	Operations – Occupancy Detection System (ODS) Accuracy	a. Overall ODS Reporting Accuracy	90.00%	Monthly	\$500 for every 0.1 percent drop in the accuracy
	(If Optional Service awarded)	b. False Negative Accuracy	less than 0.005%	Monthly	\$10 for every false negative processed and included in a trip.

2.9.2 ETTM System Performance Requirement Details

These KPIs are based on performance that is measured in calendar hours, days and minutes as applicable. Any issues considered Non-Chargeable Failures, that affect Contractor's ability to meet a KPI should be noted, documented appropriately and with sufficient detail and discussed as part of Monthly ETTM System Performance Reviews.

Authority places a great deal of importance on the controls Contractor has in place for the System and the effectiveness of those controls. Authority will monitor Contractor's performance for compliance with the Performance Requirements. Contractor shall be required to meet all System and Maintenance Performance requirements.

2.9.2.1 Availability – 1.a: Express Lanes Lane Availability

Tolls are collected 24 hours a day, 7 days a week and as such the Express Lanes must achieve a high degree of availability. The Express Lanes is viewed as a function; a combination of Hardware and Software that builds accurate and complete trip transactions. This Requirement will measure the function; thus, if a high availability subcomponent is not working, yet the component still performs the function as Approved in Design, it would not be counted against availability.

1834	<p>The KPI is measured for each Express Lane with all of its subsystems properly functioning and available to, create transactions and send required transactions and images to the RSS.</p> <p>Availability shall be calculated based on the following calculation: $\text{Availability} = 1 - (\text{Chargeable Failure min} / (\text{minutes in period} - \text{exception min in period}))$</p>
1835	<ul style="list-style-type: none"> System reporting detailing the Express Lanes availability along with MOMS and help desk tickets, work orders and feedback from customers, Authority staff and consultants will be utilized to identify availability failures. For any month in which any Express Lane does not meet the availability requirement, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures, for each lane not meeting the requirement.

2.9.2.2 Availability – 1.b: I-405 Toll Rate Changeable Message Sign (CMS)

The Toll Rate CMS is a direct communication link to the traveling public. Errors or inaction within this subsystem can cause extreme consequences in terms of cost and reputation, thus availability of this subsystem is vital. The Toll Rate CMS cameras are key to properly monitoring the Toll Rate CMS and shall be used to verify the Toll Rate CMS availability.

1836	<p>The KPI is measured for each Toll Rate CMS with all of its subcomponents and Software operating and displaying the toll amount accurately.</p> <p>Availability shall be calculated based on the following calculation: $\text{Availability} = 1 - (\text{Chargeable Failure min} / (\text{minutes in period} - \text{exception min in period}))$</p>
------	---

	<ul style="list-style-type: none"> System reporting detailing the Toll Rate CMS availability along with MOMS and help desk tickets, work orders and feedback from customers, Toll Rate CMS camera images, Back Office staff, Authority staff and consultants will be utilized to identify availability failures.
	<ul style="list-style-type: none"> For any month in which any Toll Rate CMS does not meet the availability requirement, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures, for each Toll Rate CMS not meeting the requirement.

2.9.2.3 Availability – 1.c: Roadway Support Systems (RSS)

Tolls are collected 24 hours a day, 7 days a week and as such the RSS must achieve a high degree of availability.

1837	<p>The KPI is measured for the RSS as described in Section 2.3.12.8, Availability, with all of its devices, Software, applications and processes properly functioning and available. Availability shall be calculated based on the following calculation: Availability = 1 - (Chargeable Failure min / (minutes in period - exception min in period))</p>
	<ul style="list-style-type: none"> System reporting detailing the RSS availability along with MOMS and help desk tickets, work orders and feedback from customers, Back Office staff, Authority staff and consultants will be utilized to identify availability failures.
	<ul style="list-style-type: none"> For any month in which the RSS does not meet the availability requirement, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures, for RSS not meeting the requirement.

2.9.2.4 Completeness – 2.a: ETTM System Preventive Maintenance Complete

Tolls are collected 24 hours a day, 7 days a week and as such Preventive Maintenance plays a crucial role in making sure all equipment, components, servers, systems, communications, infrastructure, power, and environmental controls are functioning at a high availability level. Preventive maintenance shall be performed by Contractor in accordance with Authority Approved schedule.

1838	<p>Contractor shall perform all required Maintenance activities and provide the complete and accurate Preventive Maintenance log to Authority as part of the Monthly Performance package.</p>
	<ul style="list-style-type: none"> The Maintenance log and MOMS work orders generated for Preventive Maintenance will be reviewed along with spot checks to verify the required Maintenance activities have been completed as specified.
	<ul style="list-style-type: none"> For any month in which any scheduled Preventive Maintenance activity is not performed, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures, per subsystem per month scheduled Maintenance activity not completed per schedule.

2.9.2.5 Operations - Vehicle Detection and Transaction Framing – 3.a: Transponder Capture Rate

1839	The Transponder mounted in accordance with the manufacturer mounting instructions shall be captured by the AVI System under all conditions within the Design specification described in this Scope of Work and Requirements. Accuracy = (Total Sample Size – Errors – Exceptions)/(Total Sample Size – Exceptions)
1840	The KPI is measured for all Corridors, Toll Zones and lanes based upon the Transponder mix collected during the Annual Certification period in accordance with Section 2.8.2.10, Annual System Certification. Testing shall require the use of controlled vehicles with known “good” Transponders intermixing with live traffic to create the required sample size. Scope of Work
1841	Contractor shall conduct the test and provide the test results to Authority as part of the Monthly Performance package.
	<ul style="list-style-type: none"> The System reports and reader logs will be reviewed to verify the KPI.
	<ul style="list-style-type: none"> For Contractor failure to meet the KPI during the Annual Certification period, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures, per Calendar Day delay until KPI is met.

2.9.2.6 Operations – Vehicle Detection and Transaction Framing – 3.b: Transponder Reporting Accuracy

1842	A Transponder that is detected and read by the AVI reader shall be reported to the zone controller under all conditions within the Design specification described in this Scope of Work and Requirements. Accuracy = (Total Sample Size – Errors – Exceptions)/(Total Sample Size – Exceptions)
1843	The KPI is measured for all Corridors, Toll Zones and lanes based upon the Transponder mix collected during the Annual Certification period in accordance with Section 2.8.2.10, Annual System Certification. Testing shall require the use of controlled vehicles with known “good” Transponders intermixing with live traffic to create the required sample size.
1844	Contractor shall conduct the test and provide the test results to Authority as part of the Monthly Performance package.
	<ul style="list-style-type: none"> The System reports and reader logs will be reviewed to verify the KPI.
	<ul style="list-style-type: none"> For Contractor failure to meet the KPI during the Annual Certification period, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures, per Calendar Day delay until KPI is met.

2.9.2.7 Operations – Vehicle Detection and Transaction Framing – 3.c: Vehicle Detection Accuracy

1845	The zone controller shall detect and report all vehicles traveling through the ETTM Toll Collection and Enforcement Sites and ETTM Transponder Read Sites under all conditions within the Design specification described in this Scope of Work and Requirements. Accuracy = (Total Sample Size – Errors – Exceptions)/(Total Sample Size – Exceptions)
------	---

1846	The KPI is measured for all Corridors, Toll Zones and lanes based upon the two-hour data collected during the Annual Certification period in accordance with Section 2.8.2.10, Annual System Certification. The transactions generated in the System shall be verified against the two-hour DVAS video.
1847	Contractor shall conduct the test and provide the test results to Authority as part of the Monthly Performance package. <ul style="list-style-type: none"> DVAS video, transaction reports and test results will be reviewed to verify the KPI. For Contractor failure to meet the KPI during the Annual Certification period, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures, per Calendar Day delay until KPI is met.

2.9.2.8 Operations – Vehicle Detection and Transaction Framing – 3.d: Transponder Association Accuracy

1848	Every Transponder that is reported to the zone controller shall be assigned to the correct vehicle under all conditions within the Design specification described in this Scope of Work and Requirements. Accuracy = (Total Sample Size – Errors – Exceptions)/(Total Sample Size – Exceptions)
1849	The KPI is measured for all Corridors, Toll Zones and lanes based upon the Transponder mix collected during the Annual Certification period in accordance with Section 2.8.2.10, Annual System Certification. Testing shall require the use of controlled vehicles with known “good” Transponders intermixing with live traffic to create the required sample size.
1850	Contractor shall conduct the test and provide the test results to Authority as part of the Monthly Performance package. <ul style="list-style-type: none"> The System reports, test vehicle logs and back-up ICPS images will be reviewed to verify the KPI. For Contractor failure to meet the KPI during the Annual Certification period, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures, per Calendar Day delay until KPI is met.

2.9.2.9 Operations – Vehicle Detection and Transaction Framing – 3.e: Image Capture and Reporting Accuracy

1851	The ICPS shall capture and report all vehicle images to the zone controller as defined in Authority Business Rules under all conditions within the Design specification described in this Scope of Work and Requirements. Scope of Work Accuracy = (Total Sample Size – Errors – Exceptions)/(Total Sample Size – Exceptions)
1852	The KPI is measured for all Corridors, Toll Zones and lanes based upon the two-hour data collected during the Annual Certification period in accordance with Section 2.8.2.10, Annual System Certification. The transactions and their associated images generated in the System shall be verified against the two hour DVAS video.
1853	Contractor shall conduct the test and provide the test results to Authority as part of the Monthly Performance package.

	<ul style="list-style-type: none"> DVAS video, transaction reports with ICPS images and test results will be reviewed to verify the KPI.
	<ul style="list-style-type: none"> For Contractor failure to meet the KPI during the Annual Certification period, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures, per Calendar Day delay until KPI is met.

2.9.2.10 Operations – Vehicle Detection and Transaction Framing – 3.f: Image Association Accuracy

1854	<p>The System shall correctly associate all captured image to the correct vehicle as defined in Authority Business Rules under all conditions within the Design specification described in this Scope of Work and Requirements.</p> <p>Accuracy = (Total Sample Size – Errors – Exceptions)/(Total Sample Size – Exceptions)</p>
1855	<p>The KPI is measured for all Corridors, Toll Zones and lanes based upon the two-hour data collected during the Annual Certification period in accordance with Section 2.8.2.10, Annual System Certification. The transactions and their associated images generated in the System shall be verified against the two hour DVAS video.</p>
1856	<p>Contractor shall conduct the test and provide the test results to Authority as part of the Monthly Performance package.</p> <ul style="list-style-type: none"> DVAS video, transaction reports with ICPS images and test results will be reviewed to verify the KPI. For Contractor failure to meet the KPI during the Annual Certification period, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures, per Calendar Day delay until KPI is met.

2.9.2.11 Operations – Image Extraction and Accuracy – 4.a: License Plate Extraction (OCR/LPR) Accuracy

1857	<p>The System shall correctly extract the license plate, plate type, and Jurisdiction under all conditions within the Design specification described in this Scope of Work and Requirements. This is a two-step process where the sample size against which the accuracy is calculated is first determined based on confidence level and Jurisdiction. All exceptions are also removed giving the adjusted sample size. License Plate Extraction Accuracy will be calculated for the following states: California, Nevada, Arizona, Illinois, Texas, Washington, and Utah. This provides the automation performance. Using this adjusted sample size, the accuracy is determined.</p> <p>Accuracy = (Adjusted Sample Size – Errors)/(Adjusted Sample Size)</p>
1858	<p>The KPI is measured for all Corridors, Toll Zones and lanes based upon the two-hour data collected during the Annual Certification period in accordance with Section 2.8.2.10, Annual System Certification. The accuracy will be determined on the two hour sample of vehicle transaction/images collected. Contractor shall perform the validation (review images manually using the QA functionality) and create the supporting documentation.</p>

1859	Contractor shall conduct the test and provide the test results to Authority as part of the Monthly Performance package.
	<ul style="list-style-type: none"> transaction reports with ICPS images, OCR/VSR results and test results will be reviewed to verify the KPI.
	<ul style="list-style-type: none"> For Contractor failure to meet the KPI during the Annual Certification period, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures, per Calendar Day delay until KPI is met.

2.9.2.12 Operations – Image Extraction and Accuracy – 4.b: Overall Image Transaction Accuracy

1860	<p>The ETTM System shall provide images of sufficient image quality to achieve the overall accuracy requirements and this includes automated and manual processes used by Contractor to obtain the license plate, plate type, and Jurisdiction. The incorrect determination of the license plate is considered an error.</p> <p>Accuracy = (Total Sample Size – Errors – Exceptions)/(Total Sample Size – Exceptions)</p>
1861	Reject reasons that are considered exceptions and not under Contractor's control are:
	<ul style="list-style-type: none"> the vehicle has no plate;
	<ul style="list-style-type: none"> plate is not in the normal camera field of view because it is not mounted in accordance with State laws;
	<ul style="list-style-type: none"> the plate is covered by dirt, a trailer hitch, tailgate, or some other material such that the numbers/letters are not human readable, and
1862	<ul style="list-style-type: none"> the plate is damaged so that numbers/letters are not human readable.
	<p>The KPI is measured for all Corridors, Toll Zones and lanes based upon normal operations and is part of Contractor's Maintenance Requirements. Contractor shall perform the validation (review images manually using the QA functionality) and create the supporting documentation in accordance with sampling 1% of the image review results daily each month. In addition, the BOS Contractor's staff will perform QA on a daily basis and these results will be used for verification of the accuracy.</p>
1863	Contractor shall provide the operational results to Authority as part of the Monthly Performance package.
	<ul style="list-style-type: none"> Performance reports, transaction reports with ICPS images, OCR/VSR results and QA results will be reviewed to verify the KPI.
	<ul style="list-style-type: none"> For Contractor failure to meet the KPI during the Maintenance period, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures.

2.9.2.13 Operations – Image Extraction and Accuracy – 4.c: Accuracy of Rejection and Categorization of Rejected Image

1864	Contractor shall correctly determine that the plate meets the criteria for rejection and select the correct reject reason for all images which do not meet the criteria for identification. Accuracy = (Total Sample Size – Errors)/(Total Sample Size)
1865	The KPI is measured for all Corridors, Toll Zones and lanes based upon normal operations and is part of Contractor's Maintenance Requirements and can be combined with the verification of Overall Image Transaction Accuracy. The rejected images and reject reasons will also be audited by the BOS Contractor's staff on a daily basis as part of QA process.
1866	Contractor shall provide the operational results to Authority as part of the Monthly Performance package. <ul style="list-style-type: none"> • Performance reports and QA results will be reviewed to verify the KPI. • For Contractor failure to meet the KPI during the Maintenance period, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures.

2.9.2.14 Operations – Transaction and Image Processing – 5.a: Transaction Processing and Transmission

1867	All transactions generated by the zone controllers in accordance with the accuracy Requirements shall be reported and transmitted to the RSS under all conditions within the Design specification described in this Scope of Work and Requirements. The performance will be measured daily as part of normal operations.
1868	Contractor shall provide the operational results to Authority as part of the Monthly Performance package. <ul style="list-style-type: none"> • Performance reports will be reviewed to verify the KPI. • For Contractor failure to meet the KPI during the Maintenance period, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures.

2.9.2.15 Operations – Image Transaction Processing – 5.b: False Read Processing

1869	The false read processing (for example, cross lane reads and duplicate reads that result in incorrect or duplicate transactions) should eliminate Transponder read error under all conditions within the Design specification described in this Scope of Work and Requirements. Accuracy = (Total Sample Size – Errors – Exceptions)/(Total Sample Size – Exceptions)
1870	The KPI is measured for all Corridors, Toll Zones and lanes based upon the two-hour data collected during the Annual Certification period in accordance with Section 2.8.2.10, Annual System Certification. Testing shall require the use of vehicle data collected during live traffic Operations and test results will be verified by Authority or contractor on behalf of Authority.

1871	Contractor shall conduct the test and provide the test results to Authority as part of the Monthly Performance package.
	<ul style="list-style-type: none"> • transaction reports and test results will be reviewed to verify the KPI.
	<ul style="list-style-type: none"> • monitoring the BOS reported issues for accurate Account posting will also be used.
	<ul style="list-style-type: none"> • For Contractor failure to meet the KPI during the Annual Certification period, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures.

2.9.2.16 Operations – Image Transaction Processing – 5.c: Image Processing and Transmission

1872	All images generated by the ICPS in accordance with the accuracy Requirements shall be reported and transmitted to the RSS under all conditions within the Design specification described in this Scope of Work and Requirements. The performance will be measured daily as part of normal operations.
1873	Contractor shall provide the operational results to Authority as part of the Monthly Performance package.
	<ul style="list-style-type: none"> • Performance reports will be reviewed to verify the KPI.
	<ul style="list-style-type: none"> • For Contractor failure to meet the KPI during the Maintenance period, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures.

2.9.2.17 Operations – I-405 EL Toll Rate CMS Accuracy – 6.a: Post/Maintain the correct toll rate to the Toll Rate CMS

1874	The KPI is measured for each Toll Rate CMS. The System shall post and maintain the correct toll rate to the Toll Rate CMS under all conditions within the Design specification described in the Requirements. Accuracy = (Total Number – Failures)/(Total Number)
1875	As part of the Daily Monitoring activity, maintenance personnel shall verify the accurate posting of the toll rates on the Toll Rate CMS each time there is a change but not less frequent than every three (3) minutes.
1876	Contractor shall provide the operational results to Authority as part of the Monthly Performance package.
	<ul style="list-style-type: none"> • Maintenance log showing the daily verification will be reviewed to verify KPI.
	<ul style="list-style-type: none"> • System reports showing that the toll rate displayed on the Toll Rate CMS matched what was determined by the System based on frequent polling.
	<ul style="list-style-type: none"> • For Contractor failure to meet the KPI during the Maintenance period, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures.

2.9.2.18 Operations – I-405 EL Toll Rate CMS Accuracy – 6.b: Report Toll Rate CMS errors or communications to MOMS within 5 minutes

1877	The System shall report errors from the Toll Rate CMSs to the MOMS within 5 minutes of the error detection. This includes errors in the message(s) displayed on the Toll Rate CMS, which includes but is not limited to displayed toll rates not being synchronized with TOD pricing toll rates.
1878	<p>Contractor shall provide the operational results to Authority as part of the Monthly Performance package.</p> <ul style="list-style-type: none"> Maintenance log listing failures identified during daily verification will be reviewed to verify KPI. System reports showing discrepancies between what the System reported and what is displayed on the Toll Rate CMS as determined by System polling. errors logs showing communication failures and Toll Rate CMS failures. MOMS reports showing the creation of the work orders. For Contractor failure to meet the KPI during the Maintenance period, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures.

2.9.2.19 Operations – 91 Accuracy of Toll Rate File Generated for Import to the 91Toll Rate Signs

1879	<p>The Contractor shall provide an accurate electronic file of the 91 toll rates for import into the 91 toll rate signs.</p> <ul style="list-style-type: none"> For Contractor failure to meet the KPI during the Maintenance period, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures.
------	--

2.9.2.20 Operations – I-405 Traffic Detection – 7.a: Traffic Detection System (TDS) Accuracy (vehicle volume on EL and GP Lanes in a direction of travel)

1880	<p>The TDS shall report vehicle volume at each Segment on the Express Lanes and the general purpose lanes. If a Segment has more than one sensor, the measurement shall be by sensor by lane. The traffic counts by lane will be compared to manual counts determined using the CCTV camera and DVAS for a period of time.</p> <p>Accuracy = TDS volume/Total Manual Count</p>
1881	The KPI is measured for all Corridors, Toll Zones and lanes by Segment based upon 15 minute intervals during peak and off peak traffic data, collected during the Annual Certification period. The TDS volumes will be compared to manual counts.
1882	<p>Contractor shall conduct the test and provide the test results to Authority as part of the Monthly Performance package.</p> <ul style="list-style-type: none"> CCTV and DVAS video, traffic reports and test results will be reviewed to verify the KPI.

	<ul style="list-style-type: none"> For Contractor failure to meet the KPI during the Annual Certification period, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures, per Calendar Day delay until KPI is met.
--	---

2.9.2.21 Operations – I-405 Traffic Detection – 7.b: Traffic Detection System (TDS) Accuracy (average speed of any individual EL and GP lane)

1883	<p>The average speed on any individual lane reported by the TDS at each Segment on the Express Lanes and the general purpose lanes shall be accurate to within 5 mph. The average speed shall be compared to manual measurements for 30 second intervals for a period of 30 minutes during peak and off peak traffic.</p> <p>Accuracy = Average variation between the TDS and manual measurements for each lane.</p>
1884	The KPI is measured for all lanes (both Express Lanes and general purpose lanes) measured by each TDS device during the Annual Certification period.
1885	<p>Contractor shall conduct the test and provide the test results to Authority as part of the Monthly Performance package.</p> <ul style="list-style-type: none"> traffic reports and test results will be reviewed to verify the KPI. For Contractor failure to meet the KPI during the Annual Certification period, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures, per Calendar Day delay until KPI is met.

2.9.2.22 Operations – Trip Management – 8.a: Transaction/trip Assembly

1886	All Transponder-Based Transactions and Image-Based Transactions generated with the above accuracy requirements shall be assembled into Trip Transactions under all conditions within the Design specification described in this Scope of Work and Requirements and Authority Business Rules. The performance will be measured daily as part of normal operations.
1887	<p>Contractor shall provide the operational results to Authority as part of the Monthly Performance package.</p> <ul style="list-style-type: none"> Errors identified during the QA review of Trip Transactions and those reported by the customers will be reviewed to verify the KPI. System Reports will be used to identify unmatched transactions. For Contractor failure to meet the KPI during the Maintenance period, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures.

2.9.2.23 Operations – Trip Management – 8.b: Transaction/Images/trip Transmission

1888	All Transponder-Based Transactions, Image-Based Transactions, associated images and Trip Transactions created at the RSS shall be transmitted to the BOS. The performance will be measured daily as part of normal operations.
------	--

1889	Contractor shall provide the operational results to Authority as part of the Monthly Performance package.
	<ul style="list-style-type: none"> Performance Reports will be reviewed to verify the KPI.
	<ul style="list-style-type: none"> For Contractor failure to meet the KPI during the Maintenance period, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures.

2.9.2.24 Operations – Trip Management – 8.c: Trip Transaction Correction Transmission

1890	All Trip Transaction corrections generated at the RSS and their associated images shall be transmitted to the BOS. The performance will be measured daily as part of normal operations.
1891	Contractor shall provide the operational results to Authority as part of the Monthly Performance package.
	<ul style="list-style-type: none"> Performance Reports will be reviewed to verify the KPI.
	<ul style="list-style-type: none"> For Contractor failure to meet the KPI during the Maintenance period, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures.

2.9.2.25 Operations – Audit and Reconciliation – 9.a: Audit and Reconciliation

1892	Transactions, images generated in the lanes and trips created at the RSS shall be auditable and reconcilable through System Reports and the final assembly of a transaction to a trip, and the final transmission status and disposition of the transaction to the BOS shall be tracked and reported.
1893	Contractor shall provide the operational results to Authority as part of the Monthly Performance package.
	<ul style="list-style-type: none"> Performance Reports will be reviewed to verify the KPI.
	<ul style="list-style-type: none"> For Contractor failure to meet the KPI during the Maintenance period, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures.

2.9.2.26 Operations – Security Breach – 10.a: Security Breach

1894	The ETTM System shall be designed and implemented to prevent security breaches and have monitoring and detection tools to detect any attempts to breach the security of the Express Lanes System.
1895	Contractor shall provide the operational results to Authority as part of the Monthly Performance package.
	<ul style="list-style-type: none"> Maintenance Logs, security breaches identified by Authority and the Operations Contractor, and MOMS Reports will be used to verify KPI.
	<ul style="list-style-type: none"> For Contractor failure to meet the KPI during the Maintenance period, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures.

2.9.2.27 Operations – 11: Respond and Repair

1896	Contractor shall respond to and complete repair of Priority 1 failures/events as follows:
	<ul style="list-style-type: none"> ETTM System: respond and complete repair within two (2) hours of failure/event notification; if code change is required, respond within two (2) hours, notify Authority within 1 (one) hour, and repair time to be reasonably determined by Authority and Contractor based on amount of testing required. RSS: respond and complete repair within four (4) hours of failure/event notification; if code change is required, respond within two (2) hours, notify Authority by next Day, and repair time to be reasonably determined by Authority and Contractor based on amount of testing required.
1897	Contractor shall respond to and complete repair of Priority 2 failure/events as follows:
	<ul style="list-style-type: none"> ETTM System: respond and complete repair within four (4) hours of failure/event notification; if code change is required, respond within four (4) hours, notify Authority by next Day, and repair time to be reasonably determined by Authority and Contractor based on amount of testing required. RSS: respond and complete repair within eight (8) hours of failure/event notification; if code change is required, respond within four (4) hours, notify Authority by next Day, and repair time to be reasonably determined by Authority and Contractor based on amount of testing required.
1898	Contractor shall respond to and complete repair of Priority 3 failures/events as follows:
	<ul style="list-style-type: none"> ETTM System: respond and complete repair within twenty-four (24) hours of failure/event notification; if code change is required, respond within twenty-four (24) hours, notify Authority by next Day, and repair time to be reasonably determined by Authority and Contractor based on amount of testing required. RSS: respond and complete repair within forty-eight (48) hours of failure/event notification; if code change is required, respond within twenty-four (24) hours, notify Authority by next Day, and repair time to be reasonably determined by Authority and Contractor based on amount of testing required.
1899	Contractor shall provide the operational results to Authority as part of the Monthly Performance package.
	<ul style="list-style-type: none"> Maintenance Logs and MOMS Reports will be used to verify KPI. Priority levels for each failure will be Approved by Authority.
	<ul style="list-style-type: none"> For Contractor failure to meet the KPI during the Maintenance period, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures.

2.9.2.28 Operations – Data Transmission and Processing – 12.a: Transmission of TSL to the Roadside System

1900	The BOS will transmit the TSL to the RSS, both comprehensive and incremental for the Home and CTOC/Interoperable Agencies. The RSS shall transmit the TSL to each of the lane/zone controllers within thirty (30) minutes of the RSS receipt of the TSL.
1901	Contractor shall provide the operational results to Authority as part of the Monthly Performance package.

	<ul style="list-style-type: none"> Maintenance Logs and MOMS Reports will be used to verify KPI in addition to reports obtained from the BOS.
	<ul style="list-style-type: none"> For Contractor failure to meet the KPI during the Maintenance period, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures.

2.9.2.29 Operations – Data Transmission and Processing – 12.b: Transmission of Files to the BOS

1902	Toll Rate CMS images/frames will be captured by the ETTM System and transmitted to the BOS to support customer disputes. Traffic Summaries will also be generated at the ETTM System and transmitted to BOS.
1903	Contractor shall provide the operational results to Authority as part of the Monthly Performance package. <ul style="list-style-type: none"> MOMS Reports will be used to verify KPI in addition to reports obtained from the BOS. For Contractor failure to meet the KPI during the Maintenance period, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures.

2.9.2.30 Operations – Annual System Certification – 13.a: Performance of the Annual System Certification

1904	Start dates for the Annual System Certification will be Approved by Authority and scheduled in MOMS. Contractor is responsible for execution of the tests, collection of data, evaluation of the data and submission of the reports and results to Authority showing compliance to KPI.
1905	Contractor shall provide the Annual System Certification status to Authority as part of the Monthly Performance package for that specific month when certification process is schedule to commence. <ul style="list-style-type: none"> Annual System Certification results will be reviewed to verify KPI. For Contractor failure to meet the KPI during the Maintenance period, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures.

2.9.2.31 Operations – Occupancy Detection System Accuracy – 14.a: Overall ODS Reporting Accuracy

1906	<p>The number of vehicle occupants that is detected by the ODS shall be reported to the zone controller under all conditions within the Design specification described in this Scope of Work and Requirements.</p> <p>Accuracy = (Total Sample Size – Errors – Exceptions)/(Total Sample Size – Exceptions)</p>
------	---

1907	The KPI is measured for all Corridors, Toll Zones and lanes based upon normal operations and is part of Contractor's Maintenance Requirements. Contractor shall perform the validation (review ODS images manually using the QA functionality) and create the supporting documentation in accordance with sampling 1% of the ODS image review results daily each month. In addition, the BOS Contractor's staff will perform QA on a daily basis and these results will be used for verification of the accuracy.
1908	Contractor shall conduct the test and provide the test results to Authority as part of the Monthly Performance package.
	<ul style="list-style-type: none"> • Performance reports and QA results will be reviewed to verify the KPI. • For Contractor failure to meet the KPI during the Maintenance period, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures.

2.9.2.32 Operations – Occupancy Detection System Accuracy – 14.b: False Negative Accuracy

1909	The number of vehicle occupants that is detected by the ODS shall be reported to the zone controller under all conditions within the Design specification described in this Scope of Work and Requirements. The KPI measures the accuracy of the ODS and the percentage of vehicles with a false negative designations (vehicle with fewer occupants detected than the actual number of declared occupants)
	Accuracy = (Total Sample Size – False Negatives – Exceptions)/(Total Sample Size – Exceptions)
1910	The KPI is measured for all Corridors, Toll Zones and lanes based upon normal operations and is part of Contractor's Maintenance Requirements. Contractor shall perform the validation (review ODS images manually using the QA functionality) and create the supporting documentation in accordance with sampling 1% of the ODS image review results daily each month. In addition, the BOS Contractor's staff will perform QA on a daily basis and these results will be used for verification of the accuracy.
1911	Contractor shall conduct the test and provide the test results to Authority as part of the Monthly Performance package.
	<ul style="list-style-type: none"> • Performance reports and QA results will be reviewed to verify the KPI. • For Contractor failure to meet the KPI during the Maintenance period, Contractor shall be assessed a fee adjustment of the monthly maintenance fee as described in Table 2-7: ETTM Performance Measures.

2.9.2.33 Authority Identified Anomalies and Research Requests

In addition to Contractor's monitoring of the ETTM System performance, Authority will also review System and performance data and perform tests as deemed necessary. Authority may identify data which may indicate a failure to meet one (1) or more of the Performance Requirements. As a result of Authority's activities, Authority may request that Contractor research and/or provide additional data, identify the extent of the problem or explanation related to anomalies or trends identified by Authority.

1912	Contractor shall respond and fulfill Authority's requests for research, analysis and/or explanation and provide feedback/report within one (1) week or one (1) month as agreed to by Authority.
------	---

2.9.2.34 Corrective Actions

Failure to meet a Performance Requirement does not relieve Contractor of the requirement to complete the activity associated with the Performance Requirement. Contractor shall identify the failure condition, take immediate action to remedy the condition and ensure that corrective action is taken to prevent repeated failures in the future. Contractor's compliance with this requirement shall be documented in a Corrective Action Plan (CAP). For example, if Contractor fails to completely and accurately transmit the transactions to the existing Back Office within the time required by the Performance Requirement, the transactions must still be completely and accurately transmitted and Contractor must identify the root cause of the failure, identify the extent of the problem and provide a plan to prevent future occurrences.

1913	Any failure to meet a Performance Requirement that requires the completion of a specific action(s), which is not completed in accordance with the requirement, does not relieve Contractor of the responsibility to perform in accordance with the System requirements. The required specific action(s) must be completed within 24 hours. For example, if Contractor fails to transmit all transaction files to the Agency within two (2) hours, the files must still be sent to the Agency.
1914	Contractor shall develop a CAP for each failure to meet a Performance Requirement identifying the root cause(s) and providing a plan to rectify the current situation, if applicable, and prevent future occurrences.
1915	The CAP provided by Contractor shall be in a format Approved by Authority.
1916	Contractor shall submit a CAP for each failure to meet a Performance Standard for Authority's review and Approval. Until Authority Approves the CAP the failure cannot be considered resolved.
1917	The CAP shall identify the subsystem(s), component(s), processes and activities associated with the failure to meet a Performance Requirement in sufficient detail to allow Authority to understand the issue and why the proposed solution will prevent future occurrences. The system elements include but are not limited to the elements below:
	• Availability;
	• Transponder Capture Rate;
	• Transponder Reporting Accuracy;
	• Transponder Write Performance Accuracy Rate;
	• Vehicle Detection Accuracy;
	• Transponder Association Accuracy;
	• Image Capture and Reporting Accuracy;
	• Image Association Accuracy;
	• License Plate Extraction (OCR/ALPR) Accuracy;
	• Overall Image Transaction Accuracy (automated and manual);
	• Accuracy of Rejection and Categorization of Rejected Image;

	• Transaction Processing and Transmission Requirements;
	• False Read Processing;
	• Image Processing and Transmission Requirements;
	• AVI Transaction Transmission Requirement;
	• Toll Rate CMS Performance;
	• TDS Accuracy;
	• Trip Management;
	• Audit and Reconciliation;
	• Mean Time Between Failure;
	• Security Breach;
	• Data Transmission and Processing, and
	• Contractor Maintenance Processes (Time to Respond and Repair, and Annual Certification);

2.9.2.35 Monthly Performance Review Meetings and Reporting

Contractor shall conduct Monthly ETTM System Performance Review Meetings with Authority. These meetings shall provide Authority with a detailed understanding and review of Contractor's and the ETTM System's performance for purposes of receiving guidance from Authority, Authority oversight, work planning and invoicing. Contractor shall also provide Authority a Monthly Performance Reports including calculated fee adjustments separately for the 91 Express Lanes and I-405 Express Lanes. Contractor's Performance Report will include a series of reports detailing Contractor's performance against each Performance Requirement and details related to the failure events that resulted in the non-performance. Contractor's Performance Report shall contain all information necessary for Authority to verify Contractor performance as reported by Contractor.

1918	Contractor shall manage, facilitate and conduct Monthly ETTM System Performance Review Meetings with Authority beginning at Go-Live and continuing over the life of the Agreement. At a minimum, Contractor Project Manager, Deputy Project Manager, Operations and Maintenance Manager shall attend these meetings.
1919	Contractor shall schedule and conduct the Monthly ETTM System Performance Review Meeting with Authority to occur no more than one (1) week after the submission of a Monthly Performance Report by Contractor.
1920	Performance reviews, including the provision of all required performance reporting, shall be provided by Contractor to Authority beginning one (1) month after Go-Live for the previous month. Any Monthly Maintenance Fee adjustments associated with non-performance shall not be assessed until the fourth month following Go-Live, for the previous (third) month's performance; however, this does not relieve Contractor of required performance prior to the third month and shall not constitute a waiver of any Authority rights or remedies under the Agreement in this regard.
1921	Contractor shall ensure all issues are addressed and resolved or are placed on the action item list and scheduled for resolution.

1922	Contractor shall describe in detail how the performance against a requirement will be tracked, tested and reported, identifying specific reports and data elements. In the case of a KPI which cannot be tracked by the ETTM System, the form of manual tracking or testing must be described and included in the Maintenance Plan.
1923	Contractor shall prepare and submit to Authority the Performance Report on an agreed-upon day each month as defined in these Requirements.
1924	The Performance Report shall include a calculation of the deductions from the Monthly Fees assessed that month separately for the 91 Express Lanes and I-405 Express Lanes, if applicable, and a series of reports, one (1) per Performance Requirement detailing Contractor's performance against the requirement for each KPI and a historical report detailing Contractor's performance against each requirement for the most recent 12 months.
1925	Contractor shall provide the required Performance Report package to Authority before an invoice will be considered for payment. Upon approval by Authority of the Performance Report package, Contractor may submit the request for payment as part of the monthly progress report.
1926	Performance reporting by Contractor and any associated adjustments related to Performance Requirements shall begin for the period beginning on the first day of the Operations and Maintenance Phase and shall continue for the duration of the Agreement.

3 CONTRACT DELIVERABLES REQUIREMENTS LIST

The following table identifies the Deliverables/Submittals which shall be required for this Project. This table is provided for convenience only; it is Contractor's responsibility to meet all requirements.

Table 3-1: Contract Deliverables Requirements List

CDRL ID	CDRL Name	SOW Section
1.	Project Management Plan	2.6.1.1
2.	Approved Baseline Implementation Schedule	2.6.1.6
3.	Document Control Work Plan	2.6.1.7.4
4.	Requirements Traceability Matrix (RTM)	2.6.4.1
5.	Business Rules Document	2.6.4.2
6.	System Detailed Design Documents (SDDD)	2.6.4.3
7.	ETTM System Infrastructure Design Requirements Document	2.5.13.2.1
8.	I-405 TOC Design Requirements Document	2.5.5.2
9.	ETTM System Installation Design Package	2.6.4.4
10.	RSS Installation Design Documentation	2.6.4.5
11.	Quality Assurance Plan	2.6.4.6
12.	Software Development Plan	2.6.4.7
13.	Disaster Recovery Plan	2.6.4.8
14.	Master Test Plan and Test Procedures	2.6.4.9
15.	Health and Safety Plan <ul style="list-style-type: none"> Office Safety Plan Roadside Safety Plan 	2.6.4.10
16.	Individual Test Plans <ul style="list-style-type: none"> Factory Acceptance Test Unit Testing Onsite Installation Test Installation and Commissioning Test New BOS Testing Operational and Acceptance Test 	2.7.5 2.7.6 2.7.7 2.7.8 2.7.9 2.7.10

CDRL ID	CDRL Name	SOW Section
17.	Transition Plan	2.4.4
18.	Installation Plan	2.5.9
19.	Installation Checklist	2.5.10
20.	AVI Certification Report (Third-Party)	2.2.7.1
21.	Maintenance Plan <ul style="list-style-type: none"> System Maintenance Plan Software Maintenance and Warranty Plan Annual System Certification Plan Transportation Management Plan 	2.6.4.11.1 2.6.4.11.2 2.8.2.10 2.8.2.17
22.	Operations Plan <ul style="list-style-type: none"> Incident Management Plan KPI Reporting and Management Plan 	2.6.4.12
23.	Emergency Response Management Plan	2.8.2.11
24.	Training Plan and Training Materials	2.6.4.13
25.	Third-Party Documentation <ul style="list-style-type: none"> Third-Party Software Documentation Third-Party Hardware Documentation 	2.6.4.14.1 2.6.4.14.2
26.	Manuals <ul style="list-style-type: none"> ETTM System Maintenance Manual Reconciliation and Audit Manual RSS Administrators Manual ETTM System User Manual 	2.6.5.2.1 2.6.5.2.2 2.6.5.2.3 2.6.5.2.4
27.	As-Built Documentation and Drawings	2.6.5.3
28.	Monthly Performance Reports	2.9.2.33
29.	End of Contract Transition Plan	2.6.2

Attachment 1 - OCTA Equipment for Reuse at 91 Express Lanes Facility

91 Express Lanes Equipment	Replace	Reuse
Servers & Associated Equipment	All	
Fiber Communications	By Design	All Dark Fiber
Laser communications device	All	
Network Switches	All	
AVI Antennas and Readers	All	
VES Equipment	All	
Datalogger Camera	All	
AVC Hardware	All	
CCTV Camera	All	
Cabinets	All	
Cabling (Equipment Specific)	All	
Power	By Design	
Ground-based Loops	All	
Generator	No	Yes
Gantries & Sign Structures	No	Yes
Autosense Units	All	
Enforcement Beacons	All	

91 Toll Collection and Enforcement Site						
Number	Direction	Location	Number of Toll Lanes	Left Shoulder Width	Right Shoulder Width	Toll Gantry / Structure
1	EB	STA: 348 + 80	3	Channelized 10' Shoulder - Coverage not required	There is no shoulder next to lane 3	Existing Dual Gantry
2	WB	STA: 363 + 50	3	Channelized 10' Shoulder - Coverage not required	There is no shoulder next to lane 3	Existing Dual Gantry

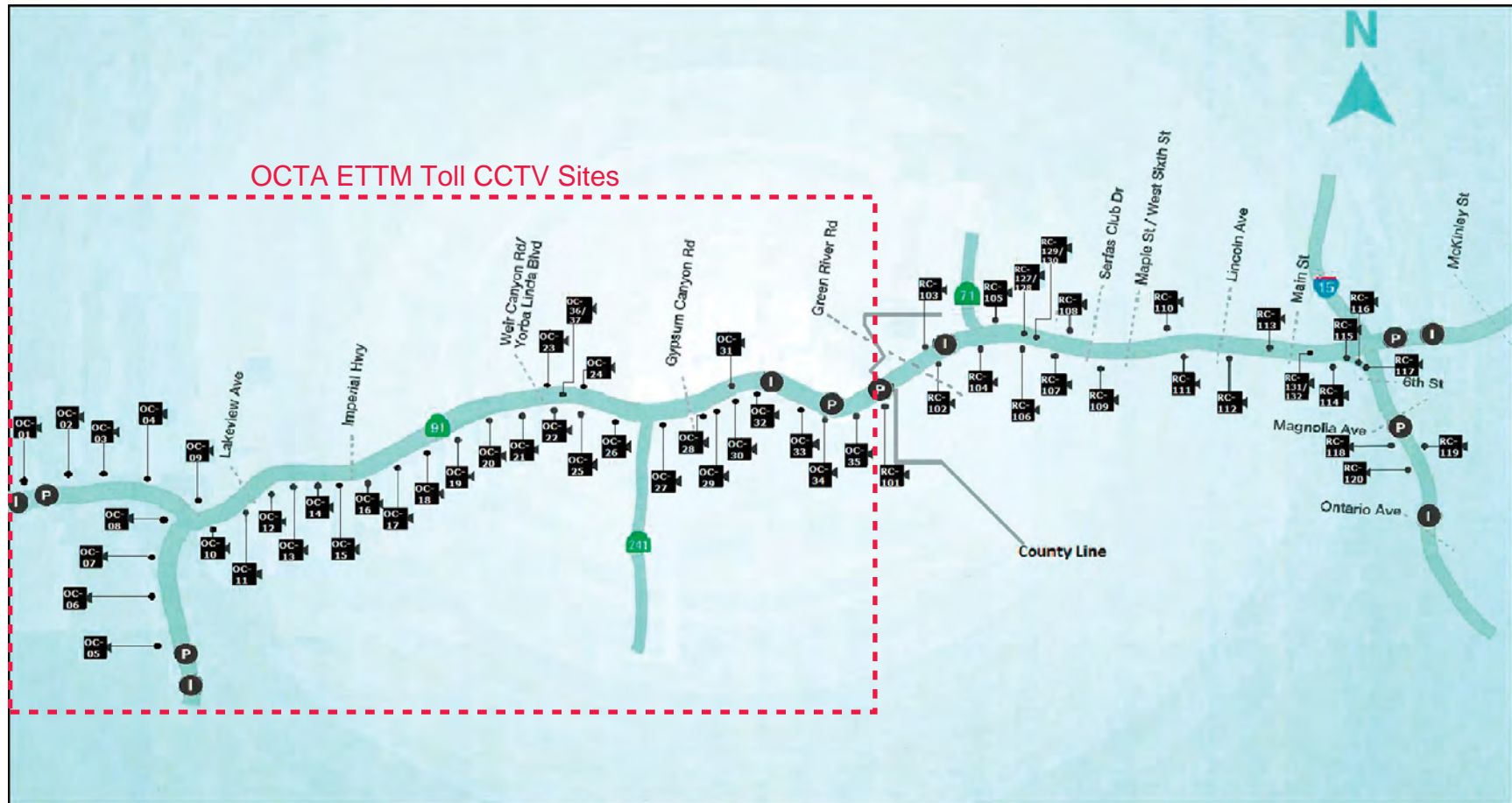
91 Transponder Read Sites						
Number	Direction	Location	Number of Read Lanes	Left Shoulder Width	Right Shoulder Width	Toll Gantry / Structure
1	WB*	SR 91 County line STA 57+50	2	n/a	n/a	Existing Overhead Sign Structure
2	EB	SR 55 Connector STA 65+00	1	1'	0'	Existing Toll Gantry
3	EB	SR 91 Connector STA 498+00	1	1'	10' - Coverage not required	Existing Toll Gantry

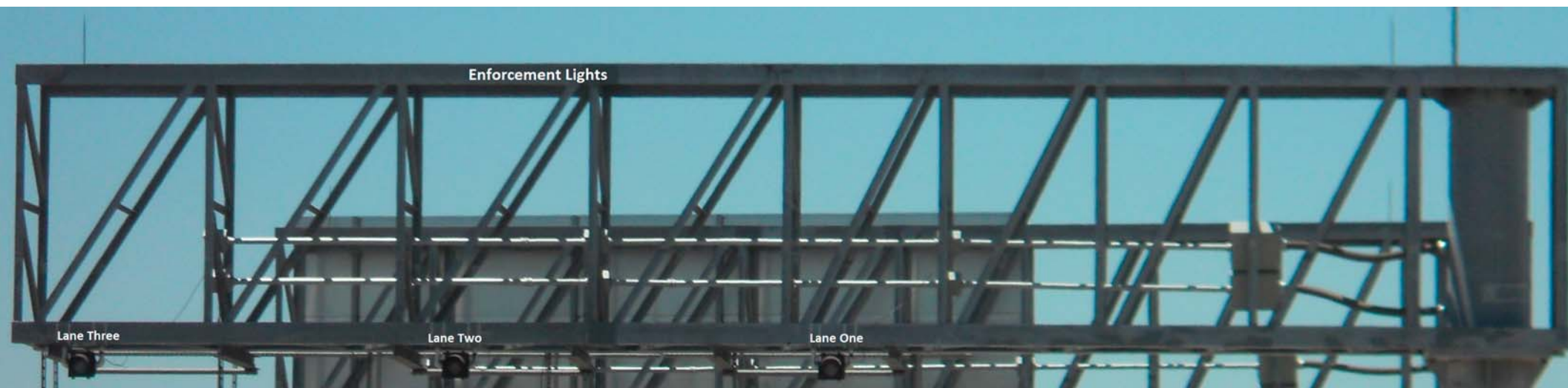
*System was removed by AWJV as part of the SR-91 Tolling Project

I-91 TMS Inventory - CCTV									
CCTV INFORMATION							91 PMC PROJECT		
#	DISTRICT	COUNTY	ROUTE	Ref: Asbuilt	Station	DIRECTION	ELEMENT TYPE	ELEMENT SUBTYPE	PM, GPS & DESCRIPTION
1	12	OC	91			WB	CCTV	FBR	
2	12	OC	91			WB	CCTV	FBR	
3	12	OC	91			WB	CCTV	FBR	
4	12	OC	91			WB	CCTV	FBR	
5	12	OC	55		275+75	WB	CCTV	FBR	
6	12	OC	55			WB	CCTV	FBR	
7	12	OC	55			EB	CCTV	FBR	
8	12	OC	55		267+00	EB	CCTV	FBR	
9	12	OC	91			WB	CCTV	FBR	
10	12	OC	91	12-0g3304_pgs_0601_0700	85+00	EB	CCTV	FBR	E-63
11	12	OC	91	12-0g3304_pgs_0601_0700	95+50	EB	CCTV	FBR	E-64
12	12	OC	91	12-0g3304_pgs_0601_0700	113+00	EB	CCTV	FBR	E-65
13	12	OC	91	12-0g3304_pgs_0601_0700	127+00	EB	CCTV	FBR	E-66
14	12	OC	91	12-0g3304_pgs_0601_0700	139+90	EB	CCTV	FBR	E-67
15	12	OC	91	12-0g3304_pgs_0601_0700	162+25	EB	CCTV	FBR	E-69
16	12	OC	91	12-0g3304_pgs_0601_0700	176+90	EB	CCTV	FBR	E-71
17	12	OC	91	12-0g3304_pgs_0601_0700	203+90	EB	CCTV	FBR	E-73
18	12	OC	91	12-0g3304_pgs_0601_0700	219+10	EB	CCTV	FBR	E-74
19	12	OC	91	12-0g3304_pgs_0601_0700	260+50	EB	CCTV	FBR	E-77
20	12	OC	91	12-0g3304_pgs_0601_0700	277+90	EB	CCTV	FBR	E-79
21	12	OC	91	12-0g3304_pgs_0601_0700	309+25	EB	CCTV	FBR	E-81
22	12	OC	91	12-0g3304_pgs_0601_0700	327+50	EB	CCTV	FBR	E-83
23	12	OC	91	12-0g3304_pgs_0601_0700	347+75	WB	CCTV	FBR	E-84
24	12	OC	91	12-0g3304_pgs_0601_0700	362+50	EB	CCTV	FBR	E-87
25	12	OC	91	12-0g3304_pgs_0601_0700	379+00	WB	CCTV	FBR	E-89
26	12	OC	91			WB	CCTV	FBR	
27	12	OC	91			WB	CCTV	FBR	
28	12	OC	91			WB	CCTV	FBR	
29	12	OC	91			WB	CCTV	FBR	
30	12	OC	91	RFP No. 12-31-112-00 - RCTC	492+10	EB	CCTV	FBR	E-A01
31	12	OC	91	RFP No. 12-31-112-00 - RCTC	515+50	EB	CCTV	FBR	E-A03

32	12	OC	91	RFP No. 12-31-112-00 - RCTC	528+20	EB	CCTV	FBR	E-A04
33	12	OC	91	RFP No. 12-31-112-00 - RCTC	548+50	EB	CCTV	FBR	E-A05
34	12	OC	91	RFP No. 12-31-112-00 - RCTC	568+00	EB	CCTV	FBR	E-A06
35	12	OC	91	RFP No. 12-31-112-00 - RCTC	578+00	EB	CCTV	FBR	E-A07

91 Express Lanes – ETTM Toll CCTV Sites





Lane Level Equipment

On the gantry, there are seven devices of note:

1. VES Cameras
2. VES Lights
3. Autosense Units
4. Ground-Based Loops
5. Enforcement Lights
6. AVI antenna
7. Data Logger Camera

There is one of each, per lane, and they are utilized as follows.

VES (Video Enforcement System) – The VES Cameras are P382 3M (Formerly PIPS) cameras. They utilize a high speed camera system that captures multiple images once the end of vehicle has been captured. The P382 utilizes two distinct lenses, an IR and a color overview lens. This allows the system to capture both license plate and overview images at a high speed in real time.

VES Lights – These are the lights that are always on, particularly at night, to help with the color overview images. The IR (plate images) are not affected by light.

Datalogger Camera – The connects directly into the Datalogger as a live feed network camera.

Autosense Units – The Autosense units present a laser curtain across the lanes. The Autosense units capture vehicles in a two-laser curtain format. Once the second beam is restored, the system triggers the VES Camera to capture the End-of-Vehicle.

Ground-Based Loops – Not unlike the Autosense units, the purpose of the Ground-Based loops is to determine the End-of-Vehicle and send the signal triggering the VES Cameras.

Enforcement Beacon – The Enforcement Beacon provides CHP officers with a very visible signal that the vehicle traveling under the gantry does not have a transponder. Additional information regarding the Enforcement Beacon system can be found under the “Enforcement Beacons” Section 2.2.7.10.

PROPOSED

I-405 ETTM - TOLL COLLECTION AND ENFORCEMENT SITES								
TOLL COLLECTION SITE INFORMATION					I-405 PMC PROJECT			
SITE #	ROUTE	DIRECTION	APPROXIMATE STATION	LOCATION	ELEMENT TYPE	Left Shoulder Width	Right Shoulder Width	NOTES
1	405	NB	619+00	JWO HARBOR BLVD	FULL SUITE	≤ 4'	0'	
2	405	SB	678+00	WEST OF EUCLID ST	FULL SUITE	≤ 4'	0'	
3	405	NB	872+00	BEACH BLVD	FULL SUITE	≤ 4'	0'	
4	405	SB	917+00	BETWEEN MCFADDEN & GOLDENWEST AVE	FULL SUITE	≤ 4'	0'	
5	405	NB	1160+00	EAST OF SEAL BEACH BLVD	FULL SUITE	≤ 4'	0'	
6	405	SB	1160+00	EAST OF SEAL BEACH BLVD	FULL SUITE	≤ 4'	0'	

PROPOSED

I-405 ETTM - TOLL COLLECTION AND ENFORCEMENT SITE CABINETS						
TOLL COLLECTION SITE CABINET INFORMATION					I-405 PMC PROJECT	
SITE #	ROUTE	DIRECTION	APPROXIMATE CABINET STATION	LOCATION	ELEMENT TYPE	NOTES
1	405	SB	619+50	JWO HARBOR BLVD	CABINET	
2	405	NB	677+75	WEST OF EUCLID ST	CABINET	
3	405	NB	871+50	BEACH BLVD	CABINET	
4	405	SB	917+00	BETWEEN McFADEN & GOLDENWEST AVE	CABINET	
5	405	NB	1160+00	EAST OF SEAL BEACH BLVD	CABINET	
6	405	NB	1160+00	EAST OF SEAL BEACH BLVD	CABINET	

PROPOSED

I-405 ETTM - TOLL TRANSPONDER READ SITES								
TOLL TRANSPONDER READ SITE INFORMATION					I-405 PMC PROJECT			
READ SITE #	ROUTE	DIRECTION	APPROXIMATE STATION	LOCATION	ELEMENT TYPE	Left Shoulder Width	Right Shoulder Width	NOTES
1	405	NB & SB	561+00	JWO / 73 INTERCHANGE	ANTENNA	≤ 4'	≤ 4'	
2	405	NB	955+50	JWO GOLDENWEST	ANTENNA	≤ 4'	≤ 4'	
3	405	SB	985+00	JWO EDWARDS ST	ANTENNA	≤ 4'	≤ 4'	
4	405	SB	1222+00	405 SB/605 SB HOV CONNECTOR	ANTENNA	≤ 4'	≤ 4'	
5	405	NB	1233+50	405 NB/605 NB HOV CONNECTOR	ANTENNA	≤ 4'	≤ 4'	

READ SITE #	ROUTE	DIRECTION	APPROXIMATE STATION	LOCATION	ELEMENT TYPE	Left Shoulder Width	Right Shoulder Width	NOTES
6	22	NB & SB	1091+80	405-22 CONNECTOR	ANTENNA	≤ 4'	≤ 4'	

PROPOSED

I-405 ETTM - TRANSPONDER READ SITE CABINETS						
TOLL TRANSPONDER READ SITE CABINET INFORMATION					I-405 PMC PROJECT	
READ SITE #	ROUTE	DIRECTION	APPROXIMATE CABINET STATION	LOCATION	ELEMENT TYPE	NOTES
1	405	SB	561+00	JWO the 73 Interchange	CABINET	
2	405	NB	955+50	JWO Goldenwest St	CABINET	
3	405	NB	984+00	JWO Edwards St	CABINET	
4	405	NB	1221+00	SR-22 SB Connector	CABINET	
5	405	SB	1234+50	SR-22 NB Connector	CABINET	

READ SITE #	ROUTE	DIRECTION	APPROXIMATE CABINET STATION	LOCATION	ELEMENT TYPE	NOTES
6	22	NB	1092+00	405-22 Connector	CABINET	

PROPOSED

I-405 ETTM - TOLL RATE CMS SITES (Mainline)							
TOLL RATE CMS SITE INFORMATION						I-405 PMC PROJECT	
TOLL RATE CMS #	COUNTY	ROUTE	DIRECTION	APPROXIMATE STATION	LOCATION/NAME	ELEMENT TYPE	NOTES
1	OC	405	NB	515+00	BEAR ST	Toll Rate CMS	
2	OC	405	NB	765+80	JEO BUSHARD ST	Toll Rate CMS	
3	OC	405	SB	821+00	JWO MAGNOLIA AVE	Toll Rate CMS	
4	OC	405	NB	919+50	JEO BOLSA AVE	Toll Rate CMS	
5	OC	405	SB	976+00	JEO EDWARDS ST	Toll Rate CMS	
6	OC	405	SB	1249+25	405 SB/605 SB HOV CONNECTOR	Toll Rate CMS	

TOLL RATE CMS #	COUNTY	ROUTE	DIRECTION	APPROXIMATE STATION	LOCATION/NAME	ELEMENT TYPE	NOTES
7	OC	605	SB	235+00	JSO E WILLOW ST	Toll Rate CMS	
8	OC	22	WB	N/A	JEO SPRINGDALE ST	Toll Rate CMS	
9	OC	73	NB	N/A	JSO BAKER ST	Toll Rate CMS	

PROPOSED

I-405 ETTM - TOLL RATE CMS SITE CABINETS (Mainline)							
TOLL RATE CMS SITE CABINET INFORMATION						I-405 PMC PROJECT	
TOLL RATE CMS #	COUNTY	ROUTE	DIRECTION	APPROXIMATE CABINET STATION	LOCATION/NAME	ELEMENT TYPE	NOTES
1	OC	405	NB	515+00	BEAR ST	CABINET	
2	OC	405	SB	766+50	JEO BUSHARD ST	CABINET	
3	OC	405	SB	819+50	JWO MAGNOLIA AVE	CABINET	
4	OC	405	SB	918+50	JEO BOLSA CHICA	CABINET	
5	OC	405	NB	975+50	JEO EDWARD ST	CABINET	
6	OC	405	SB	1250+25	405 SB/605 SB HOV CONNECTOR	CABINET	

TOLL RATE CMS #	COUNTY	ROUTE	DIRECTION	APPROXIMATE CABINET STATION	LOCATION/NAME	ELEMENT TYPE	NOTES
7	OC	605	SB	236+00	JSO E WILLONW ST	CABINET	
8	OC	22	WB	N/A	JEO SPRINGDALE ST	CABINET	
9	OC	73	NB	N/A	JSO BAKER ST	CABINET	

PROPOSED

I-405 ETTM - TOLL RATE CMS SITE (Ramp)							
TOLL RATE CMS SITE INFORMATION						I-405 PMC PROJECT	
TOLL RATE CMS #	COUNTY	ROUTE	DIRECTION	APPROXIMATE STATION	LOCATION/NAME	ELEMENT TYPE	NOTES
10	OC	405	SB	802+50	MAGNOLIA ST SB ON-RAMP	Toll Rate CMS	

PROPOSED

I-405 ETTM - TOLL RATE CMS SITE CABINET (Ramp)							
TOLL RATE CMS SITE CABINET INFORMATION						I-405 PMC PROJECT	
TOLL RATE CMS #	COUNTY	ROUTE	DIRECTION	APPROXIMATE CABINET STATION	LOCATION/NAME	ELEMENT TYPE	NOTES
10	OC	405	SB	803+00	MAGNOLIA ST SB ON-RAMP	CABINET	

PROPOSED

I-405 ETTM - TOLL CCTV SITES						
TOLL CCTV SITE INFORMATION						
TOLL CCTV #	ROUTE	DIRECTION	APPROXIMATE STATION	STRUCTURE TYPE	LOCATION	NOTES
1	405	SB	544+00	Pole	RTE 405/73 INTERCHANGE	
2	405	MED	561+00	Transponder Read Gantry	E/O FAIRVIEW ROAD	
3	405	NB	590+00	Pole	E/O HARBOR BLVD	
4	405	MED	619+00	Toll Collection Gantry	W/O HARBOR BLVD	
5	405	NB	652+00	Pole	E/O EUCLID ST	
6	405	MED	678+00	Toll Collection Gantry	E/O WARD ST	
7	405	NB	715+50	Pole	W/O TALBERT AVE	
8	405	SB	732+50	Pole	JEO BROOKHURST ST	
9	405	NB	751+50	Pole	W/O SLATER AVE	
10	405	SB	779+00	Pole	E/O WARNER AVE	
11	405	NB	801+00	Pole	E/O MAGNOLIA ST	
12	405	NB	826+00	Pole	E/O NEWLAND ST	
13	405	NB	854+50	Pole	E/O EDINGER AVE	
14	405	MED	872+00	Toll Collection Gantry	E/O BEACH BLVD	
15	405	NB	899+00	Pole	W/O MCFADDEN AVE	
16	405	MED	917+00	Toll Collection Gantry	E/O BOLSA AVE	
17	405	NB	939+75	Pole	BOLSA AVE	
18	405	MED	955+50	Transponder Read Gantry	W/O GOLDENWEST ST	
19	405	MED	985+00	Transponder Read Gantry	W/O EDWARDS ST	
20	405	NB	1016+00	Pole	W/O WESTMINSTER BLVD	
21	405	NB	1065+75	Pole	E/O VALLEY VIEW ST.	
22	405	NB	1098+75	Pole	RTE 405/22 INTERCHANGE	
23	405	NB	1109+75	Pole	RTE 405/22 INTERCHANGE	
24	405	MED	1160+00	Toll Collection Gantry	BTW. BOLSA CHICA AND SEAL BEACH	
25	405	NB	1187+50	Pole	E/O SEAL BEACH BLVD	
26	405	NB	1208+00	Pole	W/O SEAL BEACH BLVD	

PROPOSED

I-405 ETTM - TOLL CCTV SITES						
TOLL CCTV SITE INFORMATION						
TOLL CCTV #	ROUTE	DIRECTION	APPROXIMATE STATION	STRUCTURE TYPE	LOCATION	NOTES
27	405	MED	1233+50	Transponder Read Gantry	405 NB/605 NB HOV CONNECTOR	
28	405	MED	1249+50	Toll Rate CMS Sign	405 SB/605 SB HOV CONNECTOR	

TOLL CCTV #	ROUTE	DIRECTION	APPROXIMATE STATION	STRUCTURE TYPE	LOCATION	NOTES
29	73	NB	520+00	Pole	BEAR STREET	

PROPOSED

I-405 ETTM - TOLL TRAFFIC DETECTOR SITES						
TOLL TRAFFIC DETECTOR SITE INFORMATION						
TRAFFIC DETECTOR #	ROUTE	DIRECTION	APPROXIMATE STATION	STRUCTURE TYPE	LOCATION	NOTES
1	405	MED	515+00	Toll Rate CMS	E/O BEAR ST.	
2	405	NB	562+75	Pole	E/O FAIRVIEW ROAD	
3	405	SB	567+00	Pole	JEO FAIRVIEW ROAD	
4	405	NB	590+00	CCTV	E/O HARBOR BLVD	
5	405	NB	593+50	Pole	E/O HARBOR BLVD	
6	405	NB	615+25	Pole	W/O HARBOR BLVD	
7	405	SB	620+25	Pole	W/O HARBOR BLVD	
8	405	NB	652+00	CCTV	E/O EUCLID ST.	
9	405	SB	666+20	Pole	W/O EUCLID ST.	
10	405	SB	678+00	Toll Collection Gantry	E/O WARD ST.	
11	405	NB	678+00	Toll Collection Gantry	E/O WARD ST.	
12	405	SB	706+00	Pole	E/O TALBERT AVE	
13	405	NB	715+50	CCTV	W/O TALBERT AVE	
14	405	SB	744+50	Pole	E/O SLATER AVE	
15	405	NB	751+50	CCTV	W/O SLATER AVE	
16	405	SB	779+00	CCTV	E/O WARNER AVE	
17	405	NB	785+50	Pole	W/O WARNER AVE	
18	405	SB	816+75	Pole	W/O MAGNOLIA ST.	
19	405	NB	826+00	CCTV	E/O NEWLAND ST.	
20	405	SB	852+00	Pole	E/O EDINGER AVE	
21	405	NB	854+50	CCTV	E/O EDINGER AVE	
22	405	SB	872+00	Toll Collection Gantry	E/O BEACH BLVD	
23	405	NB	872+00	Toll Collection Gantry	E/O BEACH BLVD	
24	405	NB	899+00	CCTV	W/O MCFADDEN AVE	
25	405	SB	903+25	Pole	W/O MCFADDEN AVE	
26	405	NB	917+00	Toll Collection Gantry	E/O BOLSA AVE	
27	405	SB	917+00	Toll Collection Gantry	E/O BOLSA AVE	
28	405	SB	934+50	Pole	JEO BOLSA AVE	
29	405	NB	939+75	CCTV	JWO BOLSA AVE	

PROPOSED

I-405 ETTM - TOLL TRAFFIC DETECTOR SITES						
TOLL TRAFFIC DETECTOR SITE INFORMATION						
TRAFFIC DETECTOR #	ROUTE	DIRECTION	APPROXIMATE STATION	STRUCTURE TYPE	LOCATION	NOTES
30	405	NB	967+25	Pole	E/O EDWARDS ST	
31	405	SB	970+25	Pole	E/O EDWARDS ST	
32	405	NB	985+00	Transponder Read Gantry	W/O EDWARDS ST	
33	405	SB	985+00	Transponder Read Gantry	W/O EDWARDS ST	
34	405	SB	1008+75	Pole	E/O WESTMINSTER BLVD	
35	405	NB	1016+00	CCTV	W/O WESTMINSTER BLVD	
36	405	NB	1065+75	CCTV	E/O VALLEY VIEW ST	
37	405	SB	1082+25	Pole	S/O BOLSA CHICA AVE	
38	405	SB	1102+00	Pole	RTE 405/22 INTERCHANGE	
39	405	NB	1109+75	CCTV	RTE 405/22 INTERCHANGE	
40	405	NB	1160+00	Toll Collection Gantry	BTW. BOLSA CHICA AND SEAL BEACH	
41	405	SB	1160+00	Toll Collection Gantry	BTW. BOLSA CHICA AND SEAL BEACH	
42	405	NB	1187+50	CCTV	E/O SEAL BEACH BLVD	
43	405	SB	1192+75	Pole	E/O SEAL BEACH BLVD	
44	405	NB	1223+00	Pole	W/O SEAL BEACH BLVD	
45	405	SB	1227+75	Pole	W/O SEAL BEACH BLVD	
46	405	NB	1256+25	Pole	S/O 405/605 INTERCHANGE	
47	405	SB	1259+25	Pole	S/O 405/605 INTERCHANGE	

TRAFFIC DETECTOR #	ROUTE	DIRECTION	APPROXIMATE STATION	STRUCTURE TYPE	LOCATION	NOTES
48	73	SB	520+00	CCTV	BEAR STREET	
49	22	WB	1091+80	Transponder Read Gantry	RTE 405/22 HOV CONNECTOR	
50	605	SB	1271+50	Pole	RTE 405/605 INTERCHANGE	
51	605	NB	1271+50	Pole	RTE 405/605 INTERCHANGE	

PROPOSED

I-405 ETTM - TOLL EQUIPMENT BUILDING SITE						
TOLL EQUIPMENT BUILDING SITE INFORMATION						
TOLL BLDG	COUNTY	ROUTE	DIRECTION	APPROXIMATE STATION	LOCATION/NAME	NOTES
1	OC	405	NB	676+50	WO EUCLID ST	Next to existing Caltrans Communications Hub



Asaf
Executive Director

KP
Deputy CEO

INFORMATION SYSTEMS OPERATIONS SECURITY POLICY

Policy#: FA-IS-900.10ISOSP Origination Date: 03/27/2007 Revised Date: 12/07/2016

I. PURPOSE

The purpose of the Information System (IS) Operations Security Policy is to provide the Orange County Transportation Authority (OCTA) the ability to protect its resources through the identification and use of secure IS management practices.

II. ORGANIZATIONAL UNITS AFFECTED

This policy applies to all OCTA resources, as well as all employees, third parties, or visitors who require interaction with these resources.

The OCTA Security Function is responsible for the administration and maintenance of this policy. The enforcement of this policy shall be the responsibility of the Chief Executive Officer (CEO) or designee. Employees, third parties, and visitors are responsible for complying with this policy.

III. POLICY

The intent of this policy is to ensure that OCTA has a consistent, secure manner for managing the IS operations of the organization.

IV. DEFINITIONS

- A. Backup Media – the physical recording material used in the data backup process. Examples include tapes, hard drives, CDs, and DVDs.
- B. Business Continuity Plan (BCP) – a documented methodology used to create and validate an exercised logistical plan for organizational recovery or restoration following major failures, disruptions or disasters.
- C. Capacity Planning – the process of estimating the space, computer hardware, software, connection infrastructure resources, and support personnel that will be needed over some future period of time.
- D. Change Management – a structured approach to transition from a current state to a desired state.
- E. Chain of Custody – a process that tracks the movement of items through their collection, transportation, and storage by documenting each person who handled the items.
- F. Encryption Keys – a sequence of characters used by an encryption algorithm to encrypt plain text into cipher text. The use of passwords is a typical example.

Finance and Administration Division
INFORMATION SYSTEMS OPERATIONS SECURITY POLICY

Policy#: FA-IS-900.10ISOSP

Origination Date: 03/27/2007

Revised Date: 12/07/2016

- G. Encryption Tools** – mechanisms used in the process of encoding information into an unreadable form prior to its transmission or storage, until such time that it is converted back to its original form by authorized individuals or systems.
- H. Information Systems** – an automated system, comprised of technology components, designed to collect, process, transmit, and disseminate information. Examples include application, hardware, and telecommunications equipment.
- I. IS Management** – a group of managers responsible for ensuring the health and well-being of the OCTA technical environment.
- J. IS Operations** – the people, processes, and technology employed to ensure the health and well-being of the OCTA technical environment.
- K. Malicious Mobile Code** – software obtained from a remote source and executed on a local system without explicit installation or execution by the recipient. Examples include computer viruses, spyware, and worms.
- L. Resources** – any asset of the OCTA. This includes building, equipment, rolling stock, parts, phones, computers, software, data, etc.
- A. Sensitive Information** – any information that could potentially be used maliciously to compromise the security of OCTA resources or customers. For example: the administrative passwords to a financial system, security guard rotation schedules, etc.
- M. Separation of Duties** – the concept that no single individual has control over two or more phases of a transaction or operation, so that a deliberate fraud or damage is more unlikely to occur.
- N. System Faults** – a failure by a system to execute a prescribed task or set of tasks.
- O. System Log** – a record of transactions that have been executed on a given system.
- P. Technical Vulnerability Assessments** – The process of identifying and quantifying vulnerabilities in a system. Such assessments include recommendations for mitigation.
- Q. Untrusted Network** – Any network that is either not administered by OCTA or incapable of providing the same level of security controls for data protection, integrity, and availability as a trusted network. Examples include the internet, a third party network, and a wireless network.

V. PROCEDURE

- A. IS Operations management** shall document all processes, procedures, and system configurations within the IS Operations environment.
 - 1.** IS operational procedures within OCTA shall be considered sensitive information.

Finance and Administration Division
INFORMATION SYSTEMS OPERATIONS SECURITY POLICY

Policy#: FA-IS-900.10ISOSP

Origination Date: 03/27/2007

Revised Date: 12/07/2016

2. These documents shall be reviewed and updated on a regular basis.
- B.** IS Operations shall establish the processes and mechanisms required for structured change management within the OCTA technical environment.
1. Proposed system or application changes shall be tested prior to the implementation into the production environment.
 2. Any changed documentation or procedures shall be communicated to the affected staff.
- C.** IS Operations shall regularly review the roles and responsibilities of the IS Operations staff in order to ensure a clear separation of duties.
- D.** IS Operations shall manage capacity planning for the OCTA technical environment of the organization.
- E.** IS Operations shall establish the processes and mechanisms necessary for the management of encryption tools.
1. OCTA employees shall only utilize encryption tools that are approved by IS Operations.
 2. Encryption keys used to protect confidential or sensitive information shall be classified and handled as sensitive information.
 3. Encryption keys shall be stored on servers that are appropriately secured.
 4. IS Operations shall use encryption tools in accordance with the applicable laws and regulations.
- F.** IS Operations shall conduct technical vulnerability assessments on OCTA information systems on a regular basis.
- G.** IS Operations shall protect information associated with the interconnection of business information systems.
1. IS Operations shall employ appropriate safeguards for protecting electronic messaging and/or file transfers.
 2. Online transactions performed by OCTA information systems shall be configured by the IS Operations to prevent incomplete transmission, misrouting, unauthorized message alteration, unauthorized disclosure, unauthorized message duplication or replay.
- H.** IS Operations shall employ appropriate safeguards to protect OCTA data while it is passing over untrusted networks.
- I.** IS Operations shall implement safeguards to prevent unauthorized modification of data on OCTA information systems that are publicly accessible.

Finance and Administration Division
INFORMATION SYSTEMS OPERATIONS SECURITY POLICY

Policy#: FA-IS-900.10ISOSP

Origination Date: 03/27/2007

Revised Date: 12/07/2016

- J. IS Operations shall implement appropriate security controls to prevent and detect unauthorized activity on OCTA information systems.
 - 1. IS Operations shall establish processes and mechanisms to enable the appropriate monitoring of use on OCTA information systems.
 - 2. IS Operations shall establish processes and mechanisms to enable appropriate system logging on OCTA information systems.
 - 3. IS Operations shall protect log information that is generated on OCTA information systems.
 - 4. IS Operations shall log the activity of OCTA information system administrators.
 - 5. IS Operations shall identify, classify, and log systems faults that are generated on OCTA information systems.
 - 6. IS Operations shall ensure that systems clocks on OCTA information systems are synchronized.
- K. IS Operations shall establish processes and mechanisms for the secure configuration of OCTA systems.
 - 1. IS Operations shall be responsible for the configuration of all OCTA information systems.
 - 2. IS Operations shall apply operational and security patches to OCTA information systems in a timely manner.
 - 3. OCTA information systems shall be configured by IS Operations to deter the unauthorized escalation of system privileges.
 - 4. All OCTA information systems shall be physically housed in a location with the appropriate security safeguards and operating conditions.
 - 5. When operating systems are changed within OCTA, business-critical applications shall be reviewed and tested by IS Operations to ensure there is no adverse impact on organizational operations or security.
- L. IS Operations shall ensure that the data on OCTA information systems are backed up on a regular basis.
 - 1. The IS Operations backup strategy shall conform to all requirements outlined in the OCTA BCP.
 - 2. All procedures that involve the handling of backup media shall conform to the accepted OCTA chain of custody practices.
 - 3. All OCTA backups shall be tested on a regular basis.
 - 4. Backup media shall be stored in a secure environment that is designed to house this type of material.

Finance and Administration Division
INFORMATION SYSTEMS OPERATIONS SECURITY POLICY

Policy#: FA-IS-900.10ISOSP

Origination Date: 03/27/2007

Revised Date: 12/07/2016

- 5. All OCTA backup media shall be classified as sensitive information.
- 6. All OCTA backup media shall be retained in accordance with any applicable laws and regulations.
- M. IS Operations shall implement safeguards to protect against the execution of malicious and mobile code on OCTA information systems.
- N. IS Operations shall protect telecommunications systems such as voicemail and voice recognition systems with the appropriate security controls.
 - 1. Voice mail shall be considered sensitive information.
- O. All assets managed by IS Operations shall be guided by the OCTA Fixed Asset Management Manual.

VI. EXCEPTIONS

Not applicable.

VII. PROVISIONS AND CONDITIONS

Violation of this policy may result in disciplinary action including formal reprimand, suspension, and/or termination.

VIII. RELATED DOCUMENTS

- A. OCTA Fixed Asset Management Manual
- B. Information Security Management System (ISMS) Standard 27001 (ISO 27001)
 - 1. Sections a.10.1.1-3, a.10.3.1-2, a.12.3.2, a.12.6.1, a.10.8.4-5, a.10.8.5, a.10.9.1-2
- C. National Institute of Standards and Technology (NIST)
 - 1. 500 Series
 - 2. 800 Series

END OF POLICY



Finance and Administration Division

Agathe
Executive Director

KP
Deputy CEO

THIRD PARTY SECURITY POLICY

Policy#: FA-IS-900.04THIRDPARTY

Origination Date: 02/27/2007

Revised Date: 12/07/2016

I. PURPOSE

The purpose of the Third Party Security Policy is to define the level of protection that the Orange County Transportation Authority (OCTA) requires for third parties to interact, manage, maintain, or utilize OCTA resources.

II. ORGANIZATIONAL UNITS AFFECTED

This policy applies to all OCTA resources, as well as all employees, third parties, or visitors that require interaction with these resources.

The intended audience of this policy is both the management of OCTA and the Security Function.

III. POLICY

The intent of this policy is to provide the necessary safeguards to ensure the safety and security of anyone who uses or provides OCTA with services.

IV. DEFINITIONS

- A. Computing Environment – a collection of computers, telecommunications and network equipment, applications, and wiring that support the processing and communications of electronic information.
- B. Contractor – any person or body that is recognized as independent of OCTA, engaged to perform services for the organization.
- C. Contracts and Purchase Orders – a legal agreement between OCTA and another entity (e.g. a corporation, partnership, or individual) describing products and/or services to be delivered.
- D. Controlled Area – any area within an OCTA property where identification, authentication, and credentialing are required to gain admittance. An example would be access to the administrative work spaces of OCTA.
- E. Credentials – the means and manner by which access is granted to a specific resource. This can include user-IDs, passwords, badges, tokens, and keys.
- F. Information Exchange Agreements – a formal agreement between two parties that describe the conditions, means, and manner under which information may be transferred.

Finance and Administration Division
THIRD PARTY SECURITY POLICY

Policy#: FA-IS-900.04THIRDPARTY

Origination Date: 02/27/2007

Revised Date: 12/07/2016

- G. Media** – any physical or technical materials used to place, keep, and retrieve data or information. Examples of media include paper files, electronic files, email, tapes, CDs, DVDs, etc.
- H. OCTA Security Function** – the security group established within OCTA to assist management in directing the security strategy of the organization. The Security Function is represented by every division of the organization as members of the Security Advisory Group (SAG).
- I. OCTA Security Policies** – the policies established by OCTA that define the rules for addressing confidentiality, integrity, and availability for OCTA resources (900 Series Policies).
- J. Resources** – any asset of the OCTA. This includes buildings, equipment, rolling stock, parts, phones, computers, software, data, etc.
- K. Rolling Stock** – the mobile assets of OCTA. This includes, but is not limited to, buses, vans, and automobiles.
- L. Sensitive Area** – a section of a controlled area that is deemed as requiring additional protection due to its criticality, value, or risk to safety. Examples of potential sensitive areas include the revenue room or fuel island within a base, and the data center within a building.
- M. Sensitive Information** – any information that could potentially be used maliciously to compromise the security of OCTA resources or customers. For example: the administrative passwords to a financial system, security guard rotation schedules, etc.
- N. Third Parties** – any entity that interacts with OCTA, but is not directly affiliated. For example: clients, contractors, sub-contractors, government agencies, vendors, unions, etc.

V. PROCEDURE

- A.** The following statements will be used to ensure that OCTA has a consistent, secure manner for interacting with third parties:
 - 1.** OCTA shall ensure compliance with the following standards:
 - a.** An assessment shall be performed for all solicitations to determine security implications and control requirements.
 - b.** Only products that are capable of compliance with OCTA security policies shall be considered for purchase.
 - 2.** A process and mechanism shall be employed for the management of contracts and purchase orders with third parties.

Finance and Administration Division
THIRD PARTY SECURITY POLICY

Policy#: FA-IS-900.04THIRDPARTY

Origination Date: 02/27/2007

Revised Date: 12/07/2016

- a. A process shall be employed to manage changes to third party contracts and purchase orders to ensure that any adjustments maintain conformity to OCTA security policies.
3. All third party contracts and purchase orders shall ensure that they comply with the following statements:
 - a. Applicable security requirements, based upon OCTA security policies, shall be included in all contracts and purchase orders for external third parties that manage, maintain, or utilize OCTA resources.
 - b. All contracts and purchase orders for third parties shall contain language that specifies the means and manner under which the contractor shall be monitored and reviewed for compliance with OCTA security policies.
 - c. All contracts and purchase orders for third parties shall specify the acceptance criterion that is necessary to test or validate that the service or product being delivered is in accordance with OCTA security policies.
 - d. All contracts and purchase orders for third parties that house OCTA information shall include language stating that their security practices are comparable or superior to OCTA security policies.
 - e. All contracts and purchase orders for third parties that involve the transfer of media shall specify the point and time at which the third party assumes the liability and responsibility for the media and its contents.
4. A process and mechanism shall be employed to ensure that all communication involving sensitive information between third parties and OCTA is done in a secure manner.
 - a. All communications between OCTA and third parties shall conform to OCTA security policies.
 - b. The electronic transfer of sensitive information shall be performed only through secure and sanctioned mechanisms of OCTA.
 - c. Data shall not be exchanged prior to the establishment of a documented information exchange agreement.
 - d. The exchange of data between third parties and OCTA shall be done in conformance with contracted information exchange agreements.
5. Third parties shall ensure that OCTA data is handled in a secure manner.
 - a. All physical media shall be protected while in transit between OCTA and the third party.
 - b. Sensitive information obtained during the execution of a contract by third parties shall not be disclosed without the consent of OCTA.

Finance and Administration Division
THIRD PARTY SECURITY POLICY

Policy#: FA-IS-900.04THIRDPARTY

Origination Date: 02/27/2007

Revised Date: 12/07/2016

- c. All sensitive information and materials shall be returned or destroyed by contractors once the agreement has been fulfilled unless otherwise specified by contract requirements.
- 6. A process and mechanism shall be employed to manage the distribution of sensitive information and materials only to authorized third parties.
- 7. Any computing asset employed by third parties that connects to the OCTA computing environment or handles OCTA sensitive information shall conform to OCTA security policies.
- 8. Third parties shall be uniquely identified while providing services for OCTA.
 - a. OCTA shall provide third party contractors with authorized credentials that clearly identify them as non-OCTA personnel.
- 9. Third party contractors shall demonstrate that their associates have been adequately screened if they require access to OCTA sensitive areas, sensitive information, or can directly impact the safety of OCTA employees or customers.

B. Disciplinary Action

Violation of this policy by employees can result in disciplinary action including formal reprimand, suspension, and/or termination. Third parties failing to comply with this policy may result in OCTA exercising its rights pursuant to the underlying contract. Visitors who violate this policy may be subject to removal, arrest, or loss of privileges.

VI. EXCEPTIONS

Not applicable.

VII. PROVISIONS AND CONDITIONS

Not applicable.

VIII. RELATED DOCUMENTS

A. Information Security Management System (ISMS) Standard 27001

- 1. Sections a.10.x, a.10.3.x, a.6.2.x, a.10.8.x

B. National Institute of Standards and Technology (NIST)

- 1. Federal Information Processing Standards (FIPS) 201
- 2. 500 Series
- 3. 800 Series

END OF POLICY

VANGUARD® VF-2420-54x255-34-X

Amber (A) or Full-Color (RGB)

Power Specifications

Model	Viewing Angle (HxV)	Amber Amps Per Leg ³	Amber Typical Power ⁴	RGB Amps Per Leg ³	RGB Typical Power ⁴
VF-2420-54x255-34-X	30° x 30°	27	1245 W	29	1713 W

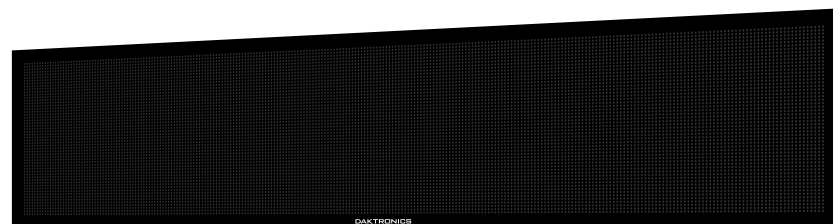
Sample Character Capacity²

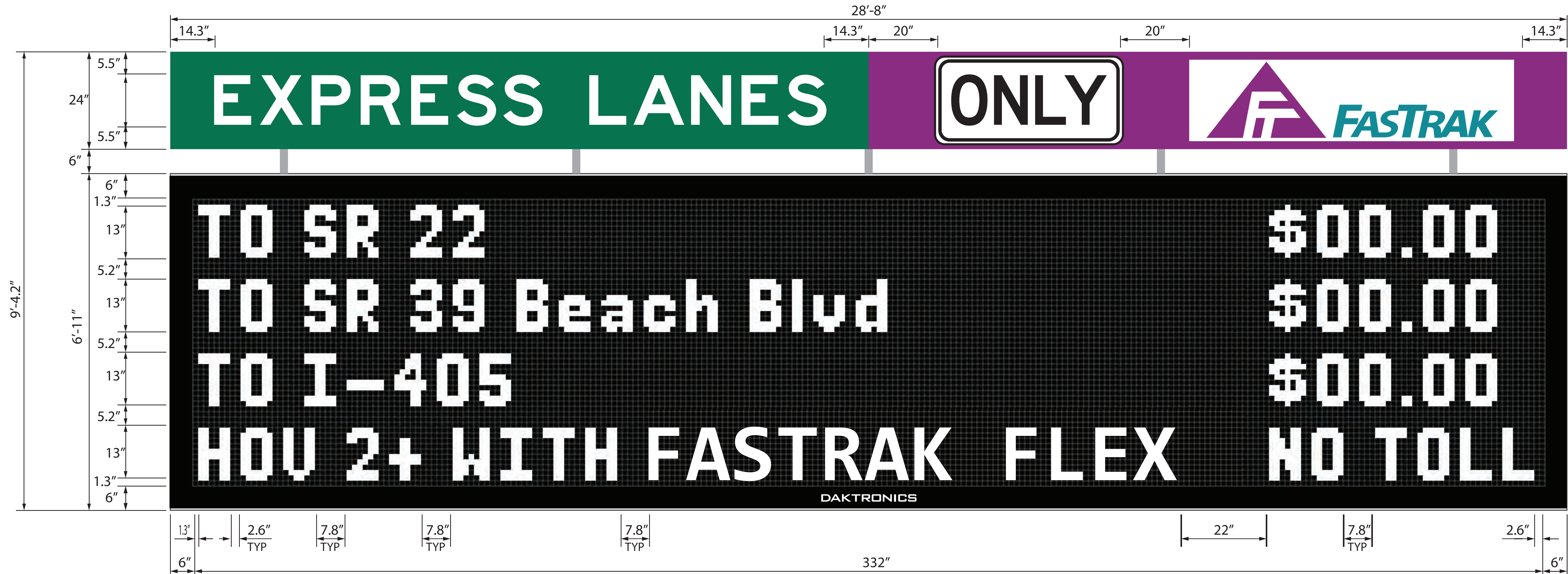
Character Height	Lines/ Characters	Example Font Size	Interline Spacing	Character Spacing
18"	3/21	14x10_2	6	2
12"	4/32	9x06_2	4	2
9"	6/42	7x05_1	3	1

Display Technology	High-intensity LED
Cabinet Access	Front access
Cabinet Enclosure	NEMA 3R
Face Panel	Aluminum mask over polycarbonate face panel
Weight	2265 lbs. (1028 kg)
Dimensions ¹	6'11" x 28'8" x 1'4" (2.09 m x 8.74 m x 0.38 m)
Operating Temp. Range	-30° F to +165° F (-34° C to +74° C)
Humidity Range	0 to 99%, non-condensing
Ventilation	Pressurized, forced-air ventilation system
Controller Location	Sign cabinet or equipment cabinet
Display Type	Full-matrix (variable text and graphics)
Active Area	5'11" x 27'7" (1.78 m x 8.42 m)
Top/Bottom Border Width	6" (152.4 mm)
Left/Right Border Width	6" (152.4 mm)
Pixel Matrix	54 rows x 255 columns
Pixel Pitch	34mm (1.33")
Viewing Distance	450' (137 m) using 9" characters
Sign Intensity	Amber 9,200 candelas/m ² minimum Full-color 12,400 candelas/m ² minimum (white)
LED Color	Amber (590nm ± 5nm) Full-color (32,000 distinct colors using red, green and blue LEDs)
Power Requirements	120/240 VAC, single-phase power (3-wires plus ground)
Communications Protocol	NTCIP 1203
Communications Options	Cellular, fiber optic, direct Ethernet and radio Ethernet
Structural Design Standard	AASHTO
NEMA Standards	NEMA TS 4 Section 2 Environmental Requirements

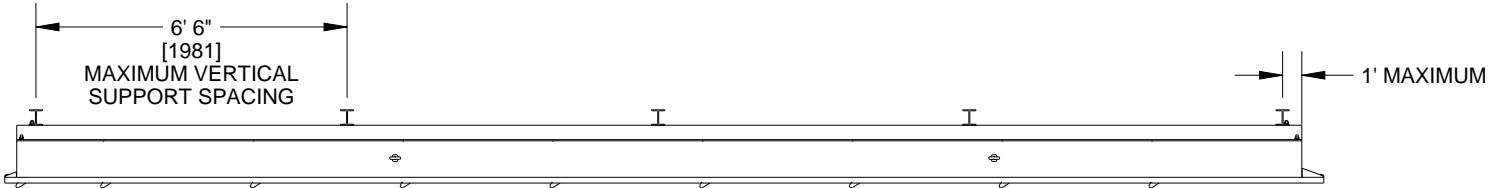
NOTES

1. Display cabinet depth measurement includes "Z" mounting brackets on the rear of the cabinet.
2. Many other font sizes are available.
3. Amps per leg calculation is based on the maximum load of a typical DMS, including a fully-loaded 15A convenience outlet. This value is measured for a 120/240 3W+G system and will vary with auxiliary options installed in the DMS.
4. Typical power includes a partially-illuminated LED sign (15% of the amber pixels or 38% of the RGB pixels at full intensity), the sign controller and ventilation system.
5. Sign front face paint color is semi-gloss black. Other sides are mill finish aluminum.
6. With the continuous improvement of all Daktronics products, the features and measurements on this page are subject to change without notice.
7. The product illustration on this page is for conceptual purposes only and may not represent the actual dimensions of the specified display.

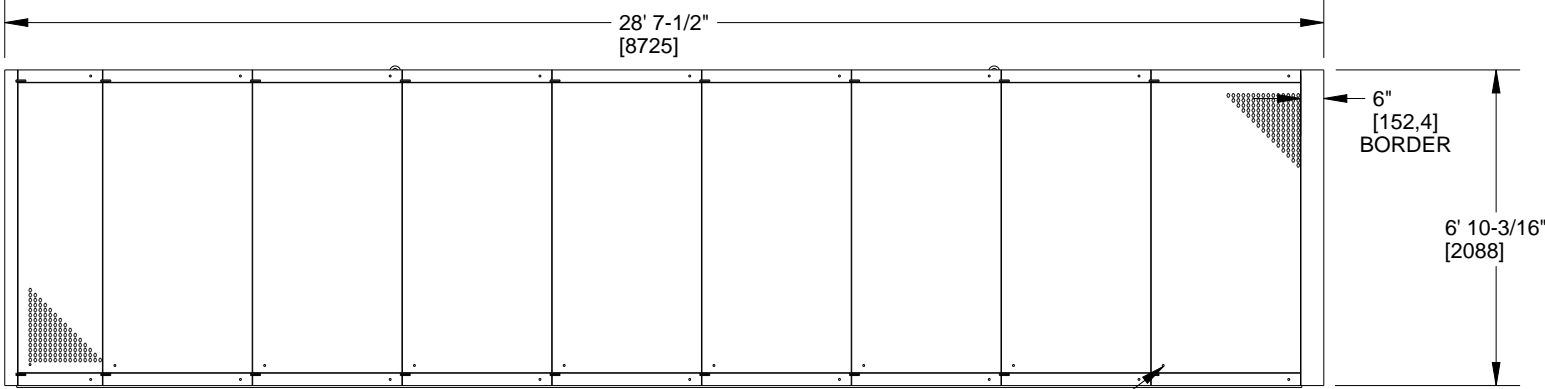




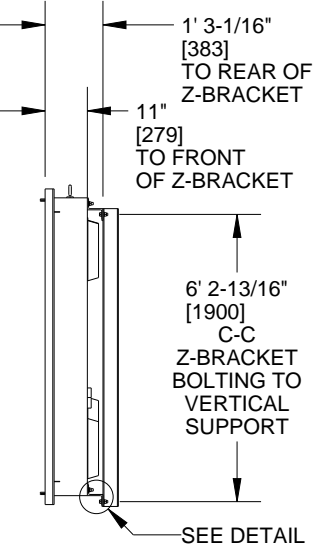
NOTE
NUMBER OF SUPPORTS SHOWN
MAY NOT BE ACTUAL NUMBER
OF SUPPORTS REQUIRED



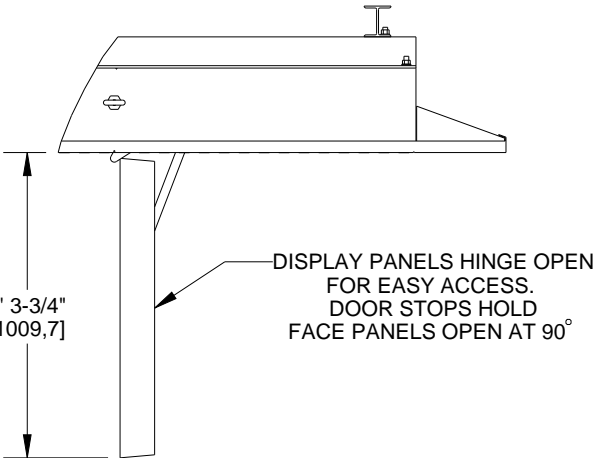
TOP VIEW



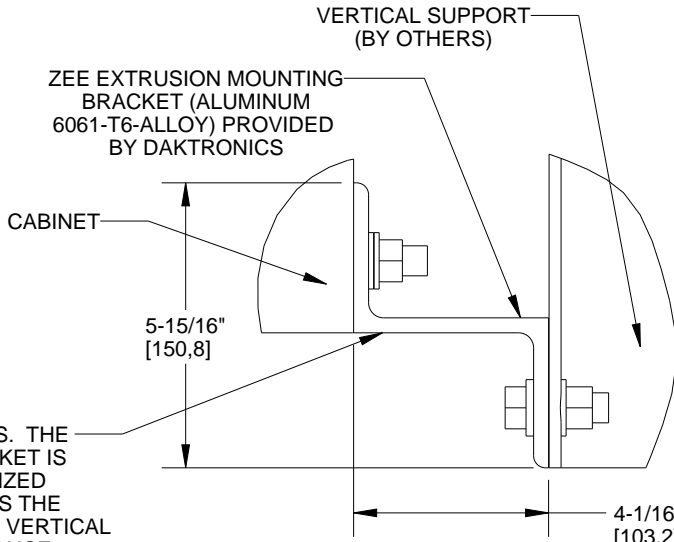
FRONT VIEW



RIGHT SIDE
VIEW



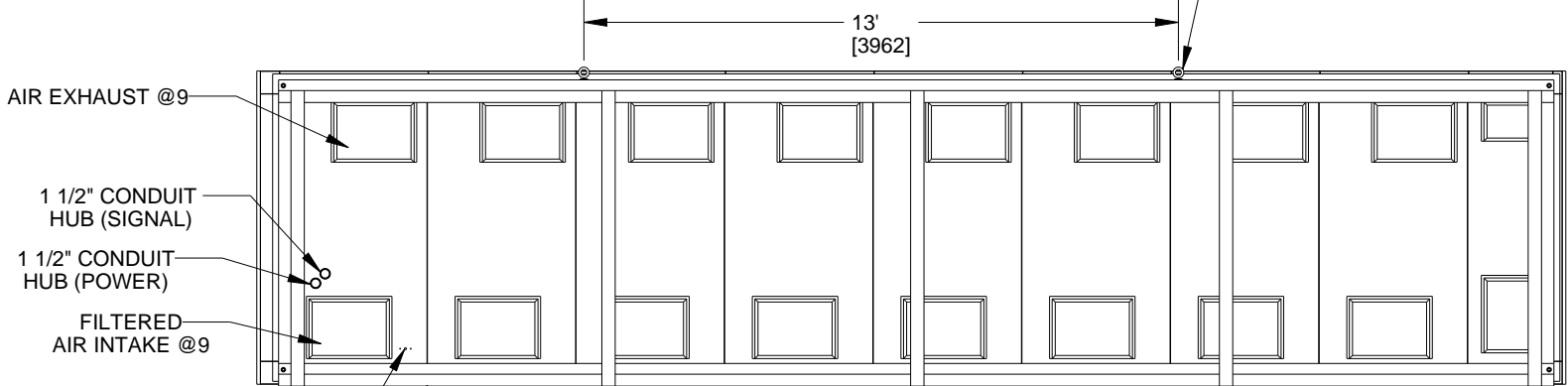
TOP PARTIAL VIEW
FACEPANEL OPEN
SCALE 1/25



DETAIL A
SCALE 1/4


Z-BRACKETS ARE BOLTED TO THE REAR OF THE DISPLAY BY DAKTRONICS. THE VERTICAL SUPPORTS SHOWN ARE PROVIDED BY OTHERS. EACH Z-BRACKET IS ATTACHED TO THE CABINET USING Ø 5/8" A325 MECHANICALLY GALVANIZED STRUCTURAL GRADE HARDWARE. FINAL REVIEW OF MOUNTING DETAIL IS THE RESPONSIBILITY OF THE CUSTOMER AND THE CUSTOMER'S ENGINEERS. THE VERTICAL SUPPORTS MUST BE ATTACHED AS SHOWN WITHIN THE STATED TOLERANCE. (STAINLESS STEEL HARDWARE IS OPTIONAL BASED ON PROJECT REQUIREMENTS.)

WHEN LIFTING DISPLAY WITH LIFT EYES USE SPREADER BEAM.
IF LIFT EYES ARE REMOVED AFTER INSTALLATION THEY SHOULD BE REPLACED WITH SS BOLTS TO PREVENT DEBRIS BUILDUP IN THE THREADS OF THE PERMANENT HARDWARE. THIS DOES NOT EFFECT WATER TIGHTNESS.



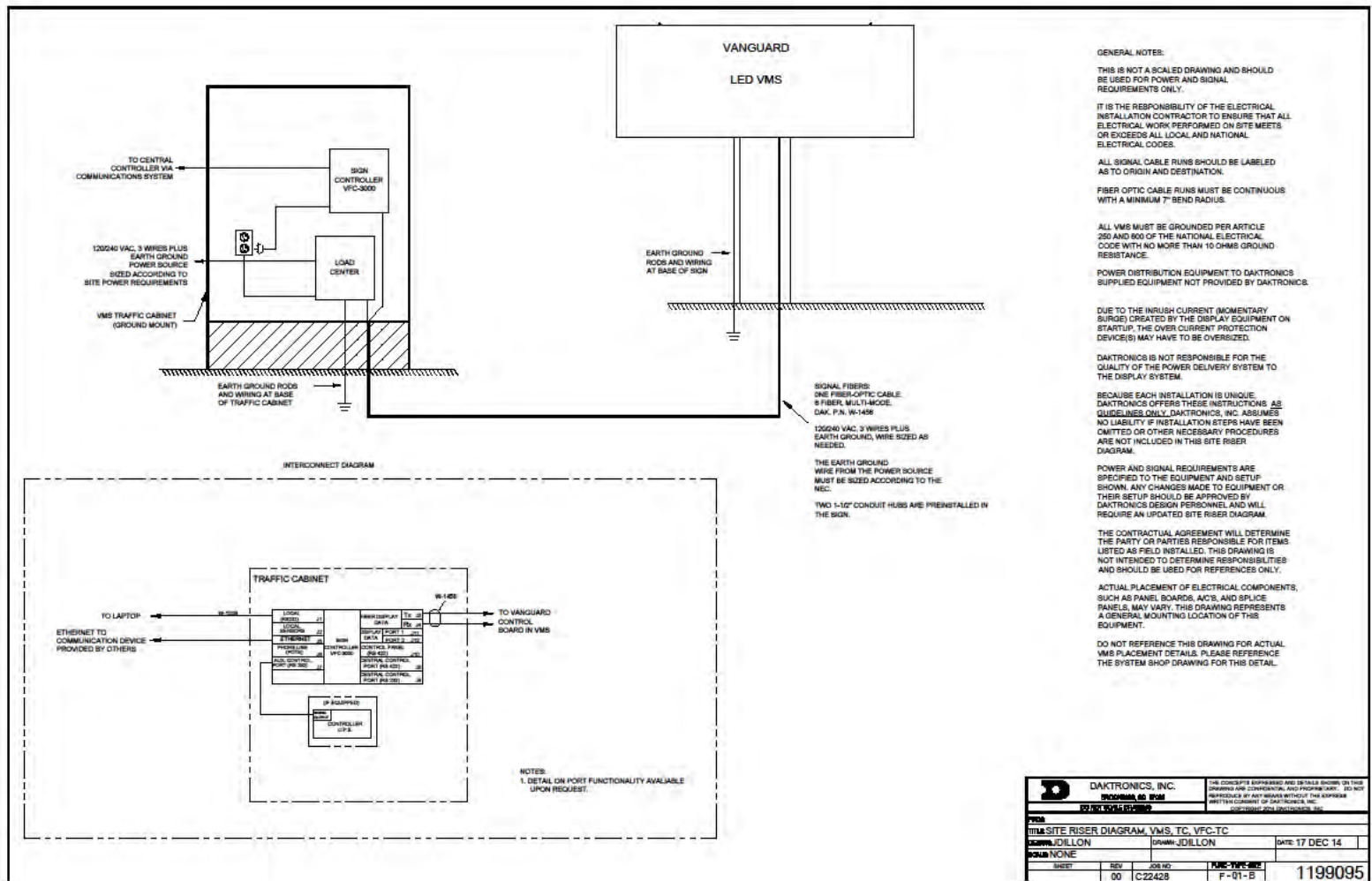
REAR VIEW

- NOTES:
- 1.) MATRIX SIZE 54 X 255
 - 2.) SEE ILLUSTRATIONS FOR POWER AND SIGNAL CONDUIT ENTRANCES.
 - 3.) ALL DIMENSIONS ARE IN FEET & INCHES [mm].
 - 4.) FULL PROTECTIVE MASKED FACE PANEL.
 - 5.) MAINTENANCE OF DISPLAY IS INTERNAL VIA FRONT ACCESS FACE PANEL.
 - 6.) ALL ALUMINUM CONSTRUCTION
 - 7.) POSITIVE PRESSURE VENTILATION SYSTEM
 - 8.) WEIGHT OF THE DISPLAY IS APPROXIMATELY 2265 LBS (1028 KG).
 - 9.) VERTICAL SUPPORTS DESIGNED AND SUPPLIED BY OTHERS.
 - 10.) MOUNTING CALCULATIONS DONE TO "AASHTO STANDARD SPEC. FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES AND TRAFFIC SIGNALS. AASHTO 6TH EDITION 2013;"
 - 11.) IF VERTICAL SUPPORTS NEED TO BE MOVED OUTSIDE OF STATED MAXIMUM SPACING OR IF SPECIFICATIONS EXCEED NOTE #10 THEN CONTACT DAKTRONICS ENGINEERING.

		DAKTRONICS, INC.	
BROOKINGS, SD 57006		THE CONCEPTS EXPRESSED AND DETAILS SHOWN ON THIS DRAWING ARE CONFIDENTIAL AND PROPRIETARY. DO NOT REPRODUCE BY ANY MEANS WITHOUT THE EXPRESS WRITTEN CONSENT OF DAKTRONICS, INC. COPYRIGHT 2014 DAKTRONICS, INC.	
DO NOT SCALE DRAWING			
PROJ: VANGUARD			
TITLE: SHOP DRAWING, VF-24**-54X255-34-*, 5/8" HW			
DESIGN: SLEE	DRAWN: JPellet	DATE: 03-JAN-14	
SCALE: 1/50			
SHEET: 1 OF 1	REV: 00	JOB NO: P 1626	FUNC-TYPE-SIZE: F - 10 - B

1159704

REV	DATE:	BY:



ADDITIONAL NOTES: Grounding Requirement: The sign structure shall be grounded independent of to the electrical service ground. Ground the structure to a ground rod located as close as practical to the sign structure location. Ground using approved connection methods at the sign structure and ground rod. Provide a minimum of #4 AWG solid copper grounding conductor from structure to ground rod. The ground is connected to the ground lug at the back of the sign. If the resistance of 10 ohms or less cannot be achieved by using the structure as a ground path, a direct connection from the ground lug on the display to the ground rod using a copper conductor is required.

SI-G-013.1 - CMS Gantry Grounding Requirement		
SS	2/4/2015	Cofiroute USA

SR-91

Monthly Traffic & Revenue

2015 & 2016

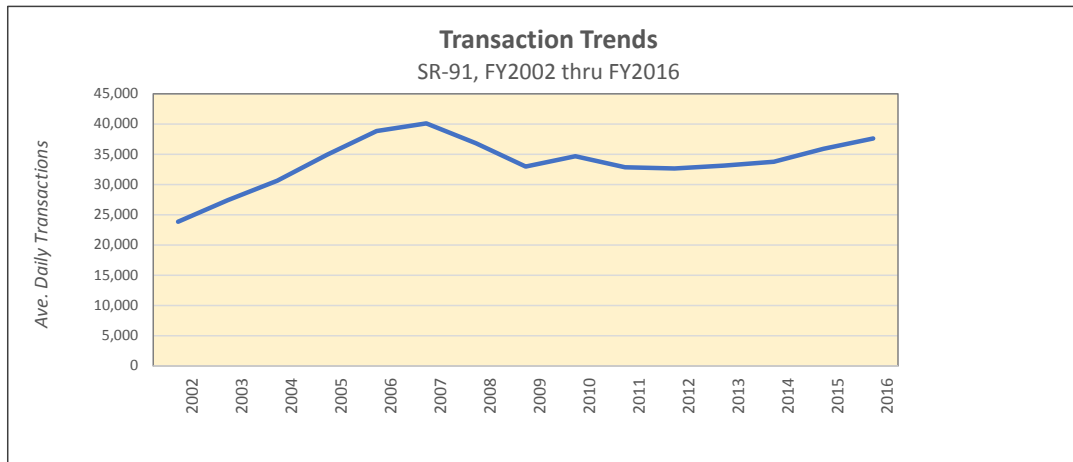
Month	2015		2016	
	Total Tx	Transponder Not Read Tx	Total Tx	Transponder Not Read Tx
Jan	1,018,633	293,989	1,052,626	303,800
Feb	1,023,415	295,369	1,050,074	303,064
Mar	1,174,757	339,049	1,209,371	349,039
Apr	1,173,914	338,805	1,156,174	333,685
May	1,144,369	330,278	1,180,648	340,749
Jun	1,172,590	338,423	1,195,928	345,159
Jul	1,194,162	344,649	1,227,807	354,359
Aug	1,178,826	340,223	1,280,594	369,594
Sep	1,123,963	324,389	1,057,115	305,096
Oct	1,177,515	339,845	1,111,047	320,661
Nov	1,106,073	319,226	1,067,472	308,085
Dec	1,147,611	331,214	1,124,685	324,597

SR-91

Annual Traffic & Revenue

FY 2002 thru FY 2016

Fiscal Year	Ave. Daily Transactions	Annual Revenue	Ave. Revenue per Tx
2002	23,850	\$23,320,000	\$2.68
2003	27,402	\$26,551,249	\$2.65
2004	30,639	\$26,971,775	\$2.41
2005	34,908	\$32,518,490	\$2.55
2006	38,857	\$37,510,374	\$2.64
2007	40,109	\$40,574,194	\$2.77
2008	36,823	\$39,635,350	\$2.94
2009	32,978	\$36,048,302	\$2.99
2010	34,682	\$37,760,887	\$2.98
2011	32,873	\$35,451,098	\$2.95
2012	32,635	\$34,312,031	\$2.87
2013	33,111	\$34,696,959	\$2.87
2014	33,772	\$36,166,803	\$2.93
2015	35,909	\$39,309,443	\$3.00
2016	37,631	\$41,905,619	\$3.04



SR-91**Daily Transaction Summary**

January 2017

Date	Weekday	Eastbound (All Three Lanes)						Westbound (All Three Lanes)					
		Total Tx	Tolled Tx	Declared HOV Tx	Declared HOV%	Transponder Not Read Tx	Transponder Not Read %	Total Tx	Tolled Tx	Declared HOV Tx	Declared HOV%	Transponder Not Read Tx	Transponder Not Read %
1/1/2017	Sun	8,795	4,537	4,258	48.4%	2,497	28.4%	11,200	6,552	4,648	41.5%	4,043	36.1%
1/2/2017	Mon	7,890	5,109	2,781	35.2%	2,539	32.2%	9,896	6,420	3,476	35.1%	3,380	34.2%
1/3/2017	Tue	21,170	17,133	4,037	19.1%	6,720	31.7%	17,378	13,459	3,919	22.6%	4,908	28.2%
1/4/2017	Wed	22,833	18,410	4,423	19.4%	6,059	26.5%	18,568	14,314	4,254	22.9%	5,194	28.0%
1/5/2017	Thu	21,275	17,378	3,897	18.3%	5,783	27.2%	17,183	13,288	3,895	22.7%	4,566	26.6%
1/6/2017	Fri	25,192	19,950	5,242	20.8%	6,720	26.7%	19,779	14,928	4,851	24.5%	5,910	29.9%
1/7/2017	Sat	13,839	9,278	4,561	33.0%	3,952	28.6%	14,539	9,545	4,994	34.3%	4,872	33.5%
1/8/2017	Sun	7,076	3,933	3,143	44.4%	2,289	32.3%	7,939	5,338	2,601	32.8%	2,831	35.7%
1/9/2017	Mon	17,788	14,865	2,923	16.4%	5,938	33.4%	15,853	12,873	2,980	18.8%	4,114	25.9%
1/10/2017	Tue	22,535	19,010	3,525	15.6%	5,841	25.9%	17,985	14,695	3,290	18.3%	4,835	26.9%
1/11/2017	Wed	20,731	17,478	3,253	15.7%	5,454	26.3%	16,810	13,760	3,050	18.1%	4,346	25.9%
1/12/2017	Thu	19,614	16,543	3,071	15.7%	5,110	26.1%	16,907	13,757	3,150	18.6%	4,460	26.4%
1/13/2017	Fri	25,197	20,466	4,731	18.8%	6,486	25.7%	17,621	13,887	3,734	21.2%	5,028	28.5%
1/14/2017	Sat	16,683	11,315	5,368	32.2%	4,629	27.7%	15,687	10,467	5,220	33.3%	5,308	33.8%
1/15/2017	Sun	10,729	6,352	4,377	40.8%	3,540	33.0%	12,681	7,979	4,702	37.1%	4,367	34.4%
1/16/2017	Mon	19,440	15,055	4,385	22.6%	6,421	33.0%	18,140	13,429	4,711	26.0%	5,389	29.7%
1/17/2017	Tue	23,186	19,487	3,699	16.0%	6,552	28.3%	19,558	15,964	3,594	18.4%	5,492	28.1%
1/18/2017	Wed	23,638	19,775	3,863	16.3%	6,168	26.1%	19,297	15,755	3,542	18.4%	5,313	27.5%
1/19/2017	Thu	20,621	17,298	3,323	16.1%	5,420	26.3%	16,847	13,627	3,220	19.1%	4,420	26.2%
1/20/2017	Fri	22,691	18,785	3,906	17.2%	5,871	25.9%	15,747	12,379	3,368	21.4%	4,230	26.9%
1/21/2017	Sat	16,032	10,889	5,143	32.1%	4,431	27.6%	16,135	10,823	5,312	32.9%	5,495	34.1%
1/22/2017	Sun	6,702	4,233	2,469	36.8%	2,173	32.4%	8,158	5,379	2,779	34.1%	2,625	32.2%
1/23/2017	Mon	16,963	14,217	2,746	16.2%	5,668	33.4%	14,550	11,801	2,749	18.9%	3,894	26.8%
1/24/2017	Tue	22,223	18,714	3,509	15.8%	5,857	26.4%	17,857	14,626	3,231	18.1%	4,720	26.4%
1/25/2017	Wed	24,508	20,657	3,851	15.7%	6,363	26.0%	18,603	15,156	3,447	18.5%	5,149	27.7%
1/26/2017	Thu	25,181	21,169	4,012	15.9%	6,715	26.7%	20,385	16,642	3,743	18.4%	5,679	27.9%
1/27/2017	Fri	29,043	23,774	5,269	18.1%	7,884	27.1%	20,625	16,204	4,421	21.4%	6,113	29.6%
1/28/2017	Sat	20,089	13,866	6,223	31.0%	5,896	29.3%	19,100	12,680	6,420	33.6%	6,676	35.0%
1/29/2017	Sun	9,496	5,415	4,081	43.0%	3,187	33.6%	10,552	6,962	3,590	34.0%	3,828	36.3%
1/30/2017	Mon	20,377	16,750	3,627	17.8%	6,942	34.1%	18,689	15,072	3,617	19.4%	5,232	28.0%
1/31/2017	Tue	24,270	20,415	3,855	15.9%	6,515	26.8%	19,895	16,253	3,642	18.3%	5,398	27.1%
Monthly Average		18,897	14,911	3,986	21.1%	5,343	28.3%	16,263	12,388	3,876	23.8%	4,768	29.3%
Ave. Weekday		22,452	18,614	3,838	17.1%	6,203	27.6%	18,007	14,422	3,585	19.9%	4,950	27.5%
Ave. Weekend / Holiday		12,434	8,180	4,254	34.2%	3,778	30.4%	13,093	8,689	4,405	33.6%	4,438	33.9%

I-405**Annual Transaction Forecast -- I-405**

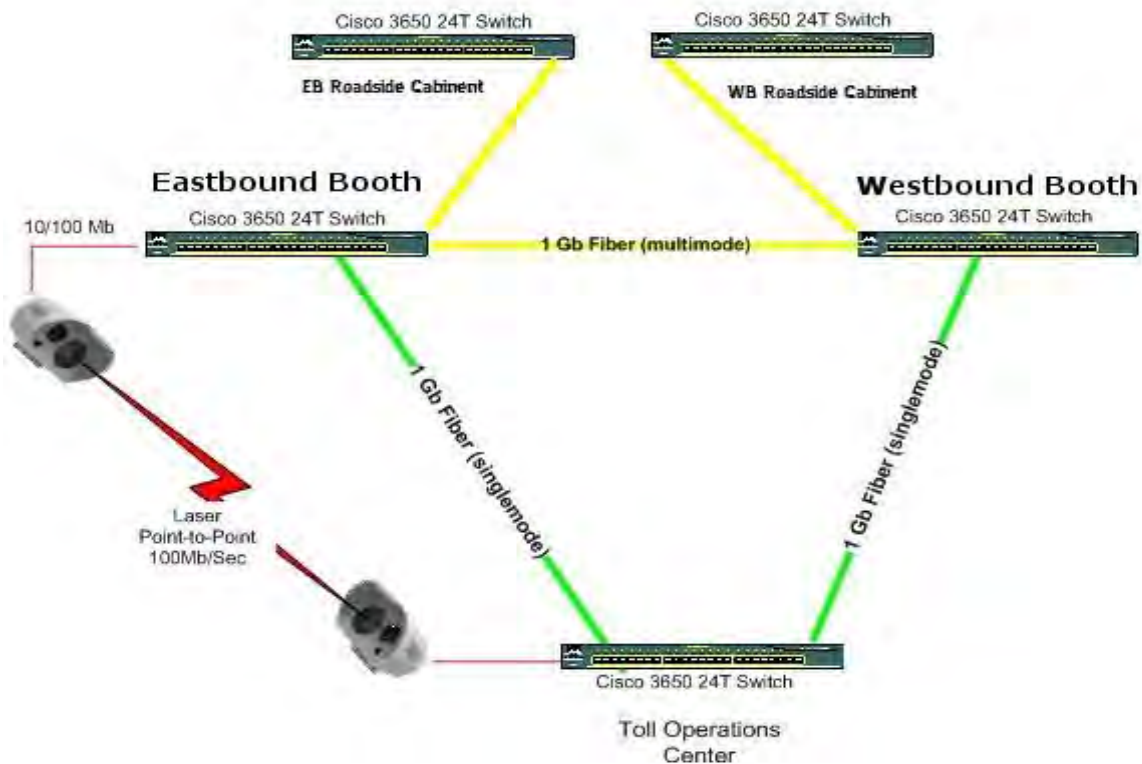
2023 - 2032

Year	Total Tx	Tolled Tx	Declared HOV Tx	Declared HOV%	Transponder Not Read Tx	Transponder Not Read %
2023	71,010,000	27,744,000	43,266,000	60.9%	25,564,000	36.0%
2024	83,744,000	34,141,000	49,603,000	59.2%	27,636,000	33.0%
2025	108,839,000	47,903,000	60,936,000	56.0%	32,652,000	30.0%
2026	122,246,000	55,538,000	66,708,000	54.6%	36,674,000	30.0%
2027	101,930,000	71,124,000	30,806,000	30.2%	30,579,000	30.0%
2028	106,162,000	73,493,000	32,669,000	30.8%	31,849,000	30.0%
2029	110,513,000	75,889,000	34,624,000	31.3%	33,154,000	30.0%
2030	112,181,000	76,404,000	35,777,000	31.9%	33,654,000	30.0%
2031	113,889,000	76,920,000	36,969,000	32.5%	34,167,000	30.0%
2032	115,640,000	77,440,000	38,200,000	33.0%	34,692,000	30.0%

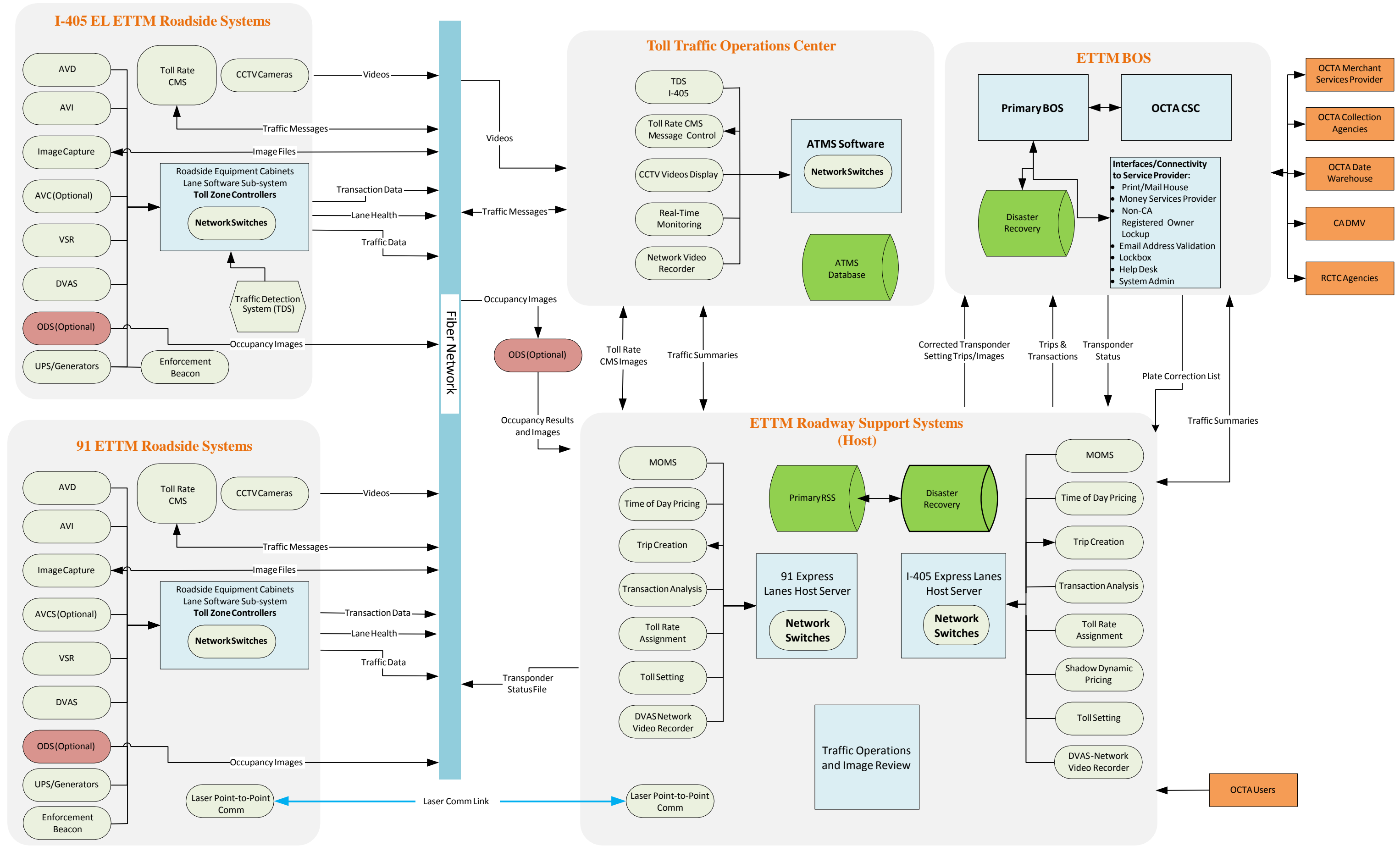
91 Express Lanes Communications Network Layout

The ETTM network consists of various devices communicating on 100mb/1000mb network connections. There are three physical locations. Each of these locations has a Cisco network switch. The switches are interconnected via 1000mb fiber interconnections.

The ETTM network utilizes a ring topology. This design ensures that a single interruption in communication will not impact the network performance. In addition, there is a wireless 100mb link from the Eastbound Booth to the TOC.



OCTA ETTM Communications Network Overview



8	COLLECTION PROCESSING SYSTEM	24
8.1	TECHNICAL DETAILS.....	24
8.2	FILE LAYOUTS.....	24
8.2.1	COLPAY	24
8.2.2	OUT3.....	25
8.2.3	A.....	25
8.2.4	D.....	25
8.2.5	OUT1.....	26
8.2.6	OUT2.....	26
8.3	TECHNICAL DETAILS.....	27
9	ACTIVE DIRECTORY	27
9.1	TECHNICAL DETAILS.....	27
10	INTEGRATED FINANCIAL AND ADMINISTRATIVE SYSTEM (IFAS)	30
10.1	DATA FLOW	30
10.2	DATA SCHEMA	30
	APPENDIX A.....	31
	TERMS AND ABBREVIATIONS	31



1 Introduction

The Riverside County Transportation Commission (RCTC) has entered into a Systems Integration and Implementation Contract (SIIC) with Cofiroute USA to serve as the Systems Integrator (SI) for the SR91 Express Lanes extension project. Cofiroute USA is to provide an Electronic Toll and Traffic Management (ETTM) System for RCTC's eight miles of tolled express lanes within State Route 91 (SR91) between the Riverside/Orange County line and the Interstate 15 interchange, all of which is commonly referred to as the Project.

As the SI, Cofiroute USA has created a back-office system, the Revenue and Account Management System (RAMS), to complete the ETTM SIIC work. This document is an Interface Control Document (ICD), which identifies and describes the various interfaces, components, and subsystems associated with RAMS and which shall be implemented over the course of the Project.

1.1 Purpose

The ICD describes the relationship between the components of a system in terms of the data and messages passed, the protocols observed, and the timing and sequencing of events. This document will provide the development teams with the documentation necessary to integrate the various subsystems needed to implement RAMS. The intended audience of this ICD is the SI Manager, the Project Engineers, and the associated development teams.

1.2 Scope

This ICD describes the interfaces for the subsystems needed to provide, process, and maintain Customer Account information for RAMS. The description of each interface will cover the method of connection, the data flow, and the data exchanged. In addition, some notation of integration will be included. It is also intended to be general enough to provide an overview of the project for non-technical personnel.

The following sections are intended to provide some narrative of the interface. Fields that will be defined (where applicable) are:

- The name of the interface
- A detailed description of the interface
- A depiction of the data flow
- Definition of the data
- Technical listings of interface transports and techniques
- Listings of contingent hardware/software needed to implement the interfaces

Data samples, notes, and additional information will be provided to address any required communications details.

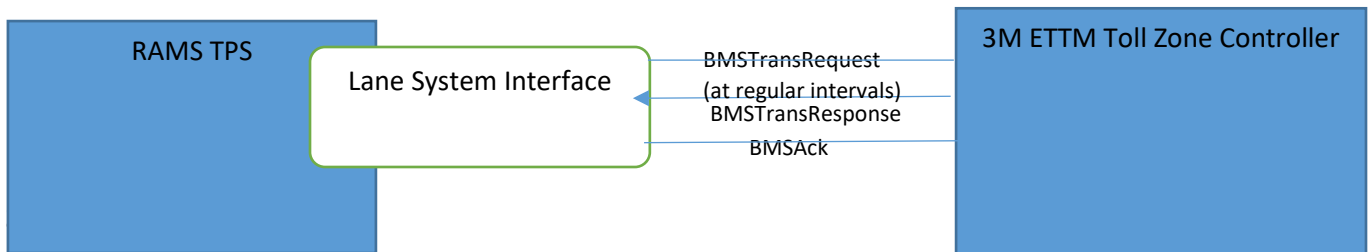
2 3M Lane System

Through the 3M Lane System (Lane System Interface, or LSI), RAMS sends a request to 3M ETTM System to obtain trips within a specified time frame.

The ETTM stores the collected information for traffic traveling on the 91 Express Lanes in a detailed transaction record called a trip. A trip is a collection of 1 or more transaction records or segments which describes the complete movement of a single vehicle along the tolling portion of a highway. ETTM derives the information from transponder-read transactions on the 91 Express Lanes.

The RAMS TPS is responsible for receiving transactions, validating transaction data, and submitting transactions to the RAMS Operations Processing Subsystem (OPS) for assignment of pricing and posting to the appropriate accounts.

2.1 Data Flow



Data exchanged within the 3M Lane System will be in XML format. The full interface will also require CIFS (Common Internet File System) in order to retrieve BLOB images.

The XML fields for 3M ETTM and the Lane Controller are defined below:

2.1.2 BMS TransResponse (Toll TransactionRecord)

```

source <xs:element name="TollTransactionRecord">
  <xs:annotation>
    <xs:documentation>Data structure to describe a toll transaction resolved by the TZC.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element name="TransactionID" type="xs:string"/>
      <xs:element name="TransactionDateTime" type="xs:dateTime"/>
      <xs:element name="SequenceID" type="xs:string" minOccurs="0"/>
      <xs:element ref="TollZone" minOccurs="0"/>
      <xs:element ref="TollZoneID" minOccurs="0"/>
      <xs:element ref="Lane" minOccurs="0"/>
      <xs:element ref="LaneID" minOccurs="0"/>
      <xs:element ref="LaneStatus" minOccurs="0"/>
      <xs:element ref="LaneStatusID" minOccurs="0"/>
      <xs:element ref="LaneMode" minOccurs="0"/>
      <xs:element ref="LaneModelID" minOccurs="0"/>
      <xs:element ref="LCTransactionRecord" minOccurs="0"/>
      <xs:element ref="VideoTransactionRecord" minOccurs="0"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

```

2.1.3 Transaction ID

```

<xs:element name="TransactionID" type="xs:string"/>

```



INTERFACE CONTROL DOCUMENT

2.1.4 Transaction Date/Time

```
<xs:element name="TransactionDateTime" type="xs:dateTime"/>
```



2.1.5 LaneID

```
<xs:element name="LaneID">
  <xs:annotation>
    <xs:documentation>Lane including Plaza designation: E1, E2, E3, W1, W2, W3</xs:documentation>
  </xs:annotation>
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="E1"/>
      <xs:enumeration value="E2"/>
      <xs:enumeration value="E3"/>
      <xs:enumeration value="W1"/>
      <xs:enumeration value="W2"/>
      <xs:enumeration value="W3"/>
    </xs:restriction>
  </xs:simpleType>
</xs:element>
```

2.1.6 LaneStatusID

```
<xs:element name="LaneStatusID">
  <xs:annotation>
    <xs:documentation>O = Open, C = Closed - SR91 is always open!!!</xs:documentation>
  </xs:annotation>
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="O"/>
      <xs:enumeration value="C"/>
    </xs:restriction>
  </xs:simpleType>
</xs:element>
```



2.1.7 LaneModelID

```
<xs:element name="LaneModelID">
  <xs:annotation>
    <xs:documentation>N = Normal (operational) or M = Maintenance</xs:documentation>
  </xs:annotation>
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="N"/>
      <xs:enumeration value="M"/>
    </xs:restriction>
  </xs:simpleType>
</xs:element>
```

2.1.8 LaneTransactionRecord

```

<xs:element name="LCTransactionRecord">
  <xs:annotation>
    <xs:documentation>Data structure to describe a transaction created in a Lane Controller.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element name="TransactionID" type="xs:string"/>
      <xs:element name="TransactionDateTime" type="xs:dateTime"/>
      <xs:element name="SequenceID" type="xs:string" minOccurs="0"/>
      <xs:element ref="TollZone" minOccurs="0"/>
      <xs:element ref="TollZoneID" minOccurs="0"/>
      <xs:element ref="Lane" minOccurs="0"/>
      <xs:element ref="LaneID" minOccurs="0"/>
      <xs:element ref="TransactionResolutionMethod"/>
      <xs:element ref="VehicleDetectionMethod" minOccurs="0"/>
      <xs:element ref="TagReading" minOccurs="0"/>
      <xs:element name="IsStraddleDetected"/>
      <xs:element ref="VehicleDetections" minOccurs="0"/>
      <xs:element ref="StatusMessage" minOccurs="0"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>

```



2.1.9 TollZoneID

```
<xs:element name="TollZoneID">
  <xs:annotation>
    <xs:documentation>Plaza ID: E or W</xs:documentation>
  </xs:annotation>
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="E"/>
      <xs:enumeration value="W"/>
    </xs:restriction>
  </xs:simpleType>
</xs:element>
```




2.1.10 VideoTransactionRecord

```
<xs:element name="VideoTransactionRecord">
  <xs:annotation>
    <xs:documentation>Data structure to describe a transaction created through image capture.</xs:documentation>
  </xs:annotation>
  <xs:complexType>
    <xs:sequence>
      <xs:element name="TransactionID" type="xs:string"/>
      <xs:element name="TransactionDateTime" type="xs:dateTime"/>
      <xs:element name="SequenceID" type="xs:string" minOccurs="0"/>
      <xs:element ref="TollZone" minOccurs="0"/>
      <xs:element ref="TollZoneID" minOccurs="0"/>
      <xs:element ref="Lane" minOccurs="0"/>
      <xs:element ref="LaneID" minOccurs="0"/>
      <xs:element ref="VehicleDetectionMethod" minOccurs="0"/>
      <xs:element ref="StatusMessage" minOccurs="0"/>
      <xs:element ref="VehicleImages"/>
      <xs:element ref="LicensePlateData" minOccurs="0"/>
      <xs:element name="LCTransactionID" minOccurs="0"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>
```

Orange County Transportation Authority (OCTA)

Toll Lane System Integrator Services for the 405 Express Lanes and 91 Express Lanes

Project Standards

The table below provides a list of standards, manuals, and guidelines that the Contractor must use to design and construct the Project (collectively, the "Project Standards"). Except as otherwise specified in the Contract Documents or otherwise directed by Authority, material and workmanship specified by the number, symbol or title of any standard established by reference to a described publication affecting any portion of the Project must comply with the latest edition or revision thereof and amendments and supplements thereto in effect as of the Setting Date. If the manual expires or revisions are issued during the course of the Project, contact Authority to determine if it should continue to use the manual, use the revision, or if the standard, manual, or guideline will be replaced.

Website addresses have been supplied to the Contractor for some of the listed standards for convenience only, in an effort to help the Contractor locate the required standard. The Websites are not guaranteed to be correct. It is ultimately the Contractor's responsibility to locate the required standard and to determine if the standard has been modified pursuant to the Contract Documents.

The following notes apply to the Caltrans Project Standards that are used on this Project, with the exception of the Standard Specifications:

1. Caltrans manuals were created as an internal guidance document for use by various Caltrans personnel. As such, the manuals are written as guidance documents and not as mandatory requirements. For purposes of this Projects, the Contractor shall assume that all provisions of the manual, including the figures and tables, are mandatory and guidelines shall be assumed to be requirements. All words such as "should," "may," "must," "might," "could," and "can" shall mean "shall" unless the context requires otherwise, as determined in the sole discretion of the Caltrans. Contractor shall disregard qualifying words such as "usually," "normally," "commonly," "in general" and "generally." It shall be in the Caltrans's sole discretion to determine when the context does not require a provision to be mandatory.
2. If a Caltrans Project Standard expires during the course of the Project the Contractor shall contact Authority and Caltrans to determine if they should continue to use the Project Standards or if it will be replaced.
3. Any references related to pay items, bid items, or quantities, measurement for payment, method of measurement, basis of payment, extra work, adjustment of unit prices, or similar phrases shall be disregarded by the Contractor, since the Contract Price is full compensation for the Work.
4. On technical issues "The Engineer" shall mean the Contractor. On administrative issues "The Engineer" shall mean Authority and/or Caltrans. If the Contractor believes that a definition of "The Engineer" is unclear, the Contractor shall have the obligation to raise the issue with Authority. Regardless of whether the Contractor raises the issue, Authority shall always have the right to notify the Contractor if the Contractor is interpreting the definition of "The Engineer" incorrectly. It shall be in the Authority's sole discretion to determine when the context refers to technical responsibilities.
5. If it is unclear whether specific provisions in the document are applicable to the Contractor, the Contractor shall raise the issue with Authority and Authority shall make that determination in its sole discretion.
6. The Contractor shall disregard paragraphs within the documents relating to questions. All questions shall be taken to Authority and/or Caltrans.
7. Some individual Caltrans documents are available in electronic format which can be accessed at the following Web Site: <http://www.dot.ca.gov/hq/esc/techpubs/>.
8. All responsibilities assigned to Caltrans shall be assigned to the Contractor, unless otherwise noted.

9. When the document refers to an action being necessary or needed, the Contractor shall construe the action as required unless the context requires otherwise, as determined in the sole discretion of Authority.
10. In addition, phrases relating to items such as activity[ies] that “will be” conducted, that are “most easily accomplished by”, that “are recommended”, that “is usually necessary”, that “should preferably be” done, that “might require”, that “is necessary” or “as necessary”, that “are” (or “is”) “required” or “done” shall be construed to be mandatory requirements unless the context requires otherwise, as determined in the sole discretion of Authority . Phrases relating to problems with activity[ies] that should not be conducted, such as “is not normally used,” “is not good practice,” “should never be done,” “cannot be used,” or “should be avoided” shall be construed as prohibited. It shall be in Authority’s sole discretion to determine when the context either requires or does not require a provision to be mandatory.
11. Where the notes refer to items that are indicated in the plans or special provisions or required in the plans or special provisions, the plans or special provisions shall mean the Contractor’s plans or special provisions.
12. References to approved products, materials, or equipment shall mean approved by Authority and/or Caltrans.
13. References to payment, pay items and quantities are hereby deleted.
14. All references to the Inspector, the Field Inspector, the Project Engineer, the Engineer, the Materials Engineer, the District Materials Engineer, the Survey Crew, the Project Supervisor, the Agency Certified Technician, the Certified Plant Technician, and the Representative of the Office of Materials shall mean the Contractor, unless noted otherwise.
15. All references to the Caltrans facilities, including the Office of Materials Laboratory, Central Laboratory, Cement Laboratory, Concrete & Metals Laboratory, Aggregate Laboratory, Chemical Laboratory, Mix Design Laboratory, District Laboratory, and the Laboratory shall mean the Contractor’s similar Laboratory facilities, unless noted otherwise.
16. All references to the Agency shall mean Caltrans, unless noted otherwise.
17. The Contractor shall use forms as required to report the same information and in the same format as the Caltrans forms shown in the documents.
18. References to Caltrans practices and policies shall be construed to be mandatory requirements unless the context requires otherwise. It shall be in the Caltrans’s sole discretion to determine when the context does not require a provision to be mandatory.
19. All references to Caltrans offices and personnel shall mean the Contractor’s similar offices and personnel, unless context notes otherwise as determined by the Authority, in its good faith discretion.
20. Contractor shall complete all laboratory testing at a Caltrans-certified facility.

Organization	Description	Format/ Availability
AASHTO	A Guide for Accommodating Utilities within Highway Right-of-Way	IS
AASHTO	A Policy on Design Standards – Interstate System	IS
AASHTO	A Policy on Geometric Design of Highways and Streets	IS
AASHTO	AASHTO Load Resistance Factor Design (LRFD) Bridge Design Specifications, 2012 (Sixth Edition) (Customary U.S. Units)	IS
AASHTO	LRFD Bridge Construction Specifications, 2012 (6th Edition) with California Amendments (AASHTO-CA BDS-6)	IS
AASHTO	Manual for Bridge Evaluation	IS
AASHTO	Roadside Design Guide	IS
AASHTO	Roadway Lighting Design Guide	IS
AASHTO	Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, with 2015 Interims	IS
AASHTO	Standard Specifications for Transportation Materials and Methods of Sampling and Testing, and Provisional Standards	IS
ACI	Guide for the Design and Construction of Externally Bonded FRP Systems for Strengthening Concrete Structures (ACI 440.2R-02)	IS
ANSI	ANSI A300 (Part 1) - Pruning: Tree Care Operations - Tree, Shrub and Other Woody Plant Maintenance - Standard Practices	IS
ANSI/EIA	ANSI/EIA 632-1999 (R2003) Process for Engineering a System	IS
ANSI	ANSI Z133. Standards for Arboricultural Operations: Safety Requirements	IS
ANSI	ANSI Z60.1-2004 American Standard for Nursery Stock	IS
ANSI	Illuminating Engineering Society of North America Roadway Lighting ANSI Approved; RP-8-00 American National Standard Practice for Roadway Lighting	IS
APWA	Southern California Chapter, Work Area Traffic Control Handbook (WATCH)	IS
ASTM	American Society of Testing and Materials Standards	IS
ATSSA	Guidance for the Use of Portable Changeable Message Signs in Work Zones	IS

Format/Availability Legend:

IS = Industry standard, Contractor's responsibility to acquire

W = standard is available as download on the organization's web site, Contractor's responsibility to acquire.

E = document to be given to Contractor in electronic format

Organization	Description	Format/ Availability
ATSSA	Quality Guidelines for Work Zone Traffic Control Devices	IS
Caltrans	ARS ONLINE: Deterministic PGA Map and ARS Online Report, Fault Data Base, 2007 Fault Errata Report http://www.dot.ca.gov/hq/esc/earthquake_engineering/sdc/documents/2007%20Caltrans%20Deterministic%20PGA%20Map.pdf	W
Caltrans	Bridge Construction Records and Procedures Manual, Volume I http://www.dot.ca.gov/hq/esc/construction/manuals/OSCCCompleteManuals/BCRPVol1.pdf	W
Caltrans	Bridge Construction Records and Procedures Manual, Volume II http://www.dot.ca.gov/hq/esc/construction/manuals/OSCCCompleteManuals/BCRPVol2.pdf	W
Caltrans	Bridge Deck Construction Manual http://www.dot.ca.gov/hq/esc/construction/manuals/OSCCCompleteManuals/Deck_Terms.pdf	W
Caltrans	Bridge Design Aids http://www.dot.ca.gov/des/techpubs/bda.html	W
Caltrans	Bridge Design Details http://www.dot.ca.gov/des/techpubs/bdd.html	W
Caltrans	Bridge Design Practice Manual http://www.dot.ca.gov/des/techpubs/bdp.html	W
Caltrans	Bridge Design Specifications (LRFD Version) http://www.dot.ca.gov/hq/esc/techpubs/manual/bridgemanuals/bridge-design-specifications/bds.html	W
Caltrans	Bridge Memo To Designers http://www.dot.ca.gov/des/techpubs/mtd.html	W
Caltrans	Bridge Standard Detail Sheets (XS Sheets) http://www.dot.ca.gov/hq/esc/techpubs/manual/bridgemanuals/bridge-standard-detail-sheets/index.html	W
Caltrans	CADD User's Manual http://www.dot.ca.gov/hq/oppd/cadd/usta/caddman/default.htm	W

Format/Availability Legend:

IS = Industry standard, Contractor's responsibility to acquire

W = standard is available as download on the organization's web site, Contractor's responsibility to acquire.

E = document to be given to Contractor in electronic format

Organization	Description	Format/ Availability
Caltrans	Caltrans California Amendments to the AASHTO LRFD Bridge Design Specifications http://www.dot.ca.gov/des/techpubs/	W
Caltrans	California Manual on Uniform Traffic Control Devices (CA MUTCD) http://www.dot.ca.gov/hq/traffops/engineering/mutcd/index.htm	W
Caltrans	California Seismic Hazard Map and Report http://www.dot.ca.gov/hq/esc/earthquake_engineering/seismology/	W
Caltrans	California Test Methods http://www.dot.ca.gov/hq/esc/ctms/index.html	W
Caltrans	Changeable Message Sign Guidelines http://www.polb.com/civica/filebank/blobdload.asp?BlobID=8863	W
Caltrans	Code of Safe Drilling Practices http://www.dot.ca.gov/hq/esc/geotech/	W
Caltrans	Code of Safe Surveying Practices http://www.dot.ca.gov/hq/row/landsurveys/SurveysManual/02_Surveys_Figure_2_1.pdf	W
Caltrans	Concrete Pavement Guide Part 2 Chapter 200 http://www.dot.ca.gov/hq/maint/Pavement/Offices/Pavement_Engineering/CPG/CPG_Ch200_CRCP.pdf	W
Caltrans	Concrete Technology Manual http://www.dot.ca.gov/hq/esc/construction/manuals/OSCCCompleteManuals/CTM_Terms.pdf	W
Caltrans	Construction Manual http://www.dot.ca.gov/hq/construc/constmanual/construction_manual.pdf	W
Caltrans	Construction Policy Bulletins http://www.dot.ca.gov/hq/construc/manual2001/CPBindex.HTM	W
Caltrans	Construction Procedure Directives http://www.dot.ca.gov/hq/construc/CPDirectives/cpdindex.htm	W

Format/Availability Legend:

IS = Industry standard, Contractor's responsibility to acquire

W = standard is available as download on the organization's web site, Contractor's responsibility to acquire.

E = document to be given to Contractor in electronic format

Organization	Description	Format/ Availability
Caltrans	Construction Site Stormwater Quality Sampling Guidance Manual http://www.dot.ca.gov/hq/construc/stormwater/SamplingGuidanceManual.pdf	W
Caltrans	Controlling Shrinkage Cracking http://www.dot.ca.gov/hq/esc/construction/manuals/OSCCCompleteManuals/ControlShrinkCracking-ACI_CT.pdf	W
Caltrans	Corrosion Guidelines http://www.dot.ca.gov/hq/esc/Translab/pubs/CorrGuidelines_200309xx.pdf	W
Caltrans	Deputy Directives by Number http://www.dot.ca.gov/hq/oppd/guidance.htm	W
Caltrans	Design Information Bulletins http://www.dot.ca.gov/hq/oppd/dib/dibprg.htm	W
Caltrans	Design Memoranda http://www.dot.ca.gov/hq/oppd/design/	W
Caltrans	Director's Policies http://www.dot.ca.gov/	W
Caltrans	District Electrical Details http://www.dot.ca.gov/hq/esc/oe/project_plans/HTM/stdplns-US-customary-units-new15.htm	W
Caltrans	District Pavement Policies and Standards http://www.dot.ca.gov/hq/maint/Pavement/Standards_and_Guidance/Pavement_Standards.html	W
Caltrans	Division of Environmental Analysis http://www.dot.ca.gov/hq/env/	W
Caltrans	Encroachment Permits Manual http://www.dot.ca.gov/trafficops/ep/manual.html	W
Caltrans	Environmental Handbook Volume 1: Guidance for Compliance http://www.dot.ca.gov/ser/vol1/vol1.htm	W

Format/Availability Legend:

IS = Industry standard, Contractor's responsibility to acquire

W = standard is available as download on the organization's web site, Contractor's responsibility to acquire.

E = document to be given to Contractor in electronic format

Organization	Description	Format/ Availability
Caltrans	Environmental Handbook Volume 2: Cultural Resources http://www.dot.ca.gov/ser/vol2/vol2.htm	W
Caltrans	Environmental Handbook Volume 3: Biological Resources http://www.dot.ca.gov/ser/vol3/vol3.htm	W
Caltrans	Environmental Handbook Volume 4: Community Impact Assessment http://www.dot.ca.gov/ser/vol4/vol4.htm	W
Caltrans	Falsework Manual http://www.dot.ca.gov/hq/esc/construction/manuals/OSCCCompleteManuals/FW_Terms.pdf	W
Caltrans	Fiber Optic Design Guidelines	W
Caltrans	Foundation Manual http://www.dot.ca.gov/hq/esc/construction/manuals/OSCCCompleteManuals/Foundation.pdf	W
Caltrans	Foundation Reports for Earth Retaining Systems (ERS) http://www.dot.ca.gov/hq/esc/geotech/geo_manual/page/	W
Caltrans	Geotechnical Manual http://www.dot.ca.gov/hq/esc/geotech/geo_manual/manual.html	W
Caltrans	Guidelines for Structures Foundation Reports http://www.dot.ca.gov/hq/esc/geotech/geo_manual/page/	W
Caltrans	Guidelines on Foundation Loading and Deformation Due to Liquefaction Induced Lateral Spreading http://www.dot.ca.gov/research/structures/peer_lifeline_program/	W
Caltrans	Highway Design Manual http://www.dot.ca.gov/hq/oppd/hdm/hdmtoc.htm	W
Caltrans	Lab Procedures http://www.dot.ca.gov/hq/esc/Translab/ormt/fpmlab.htm	W
Caltrans	Landscape Architecture PS&E Guide http://www.dot.ca.gov/hq/LandArch/lap_guide/index.htm	W

Format/Availability Legend:

IS = Industry standard, Contractor's responsibility to acquire

W = standard is available as download on the organization's web site, Contractor's responsibility to acquire.

E = document to be given to Contractor in electronic format

Organization	Description	Format/ Availability
Caltrans	Life Cycle Cost Analysis Procedures Manual http://www.dot.ca.gov/hq/maint/Pavement/Offices/Pavement_Engineering/LCCA_index.html	W
Caltrans	Local Agency Structure Representative Guidelines http://www.dot.ca.gov/hq/construc/CPDirectives/LASR_Guidelines.pdf	W
Caltrans	Local Assistance Procedures Manual Exhibit 11-E Checklist for Drainage http://www.dot.ca.gov/hq/LocalPrograms/lam/forms/chapter11/11e.pdf	W
Caltrans	Maintenance Manual Volume 1 http://www.dot.ca.gov/hq/maint/manual/maintman.htm	W
Caltrans	New Policy and Directives http://www.dot.ca.gov/trafficops/policy.html	W
Caltrans	Outline of Field Construction Practices	E
Caltrans	Overhead Sign Structures Guide	E
Caltrans	Pavement-relevant Design Information Bulletins http://www.dot.ca.gov/hq/maint/Pavement/Standards_and_Guidance/Pavement_Standards.html	W
Caltrans	Pavement Design Software http://www.dot.ca.gov/hq/maint/Pavement/Offices/Pavement_Engineering/Software.html	W
Caltrans	Pavement Tapers and Transitions Guide http://www.dot.ca.gov/hq/maint/Pavement/Offices/Pavement_Engineering/PDF/Pavement-Tapers_Transitions-Guide.pdf	W
Caltrans	Plans Preparation Manual http://www.dot.ca.gov/hq/oppd/cadd/usta/ppman/default.htm	W
Caltrans	Plant Setback and Spacing Guide http://www.dot.ca.gov/dist4/rightofway/documents/airspace/plant_list.pdf	W
Caltrans	Prestress Manual http://www.dot.ca.gov/hq/esc/construction/manuals/	W

Format/Availability Legend:

IS = Industry standard, Contractor's responsibility to acquire

W = standard is available as download on the organization's web site, Contractor's responsibility to acquire.

E = document to be given to Contractor in electronic format

Organization	Description	Format/ Availability
Caltrans	Project Development Procedures Manual http://www.dot.ca.gov/hq/oppd/pdpm/other/PDPM-Chapters.pdf	W
Caltrans	Quality Control Quality Assurance Manual for Asphalt Concrete Production and Placement http://www.dot.ca.gov/hq/construc/publicationlist.htm	W
Caltrans	Ramp Metering Design Manual http://www.dot.ca.gov/trafficops/tm/docs/RMDM.pdf	W
Caltrans	Ready to List and Construction Contract Award Guide http://www.dot.ca.gov/hq/esc/oe/construction_contract_standards/rtl_guide/	W
Caltrans	Reference Sheets for Structural Design Aids Overhead and Roadside Signs http://www.dot.ca.gov/des/techpubs/manuals/reference-sheets/page/english/cover.pdf	W
Caltrans	Right of Way Manual http://www.dot.ca.gov/hq/row/rowman/manual/	W
Caltrans	Safety and Health Manual http://hs.onramp.dot.ca.gov/safety-manual-online	W
Caltrans	Seismic Design Criteria, Version 1.7 http://www.dot.ca.gov/hq/esc/earthquake_engineering/sdc/documents/	W
Caltrans	Sign Specifications http://www.dot.ca.gov/trafficops/tcd/specs.html	W
Caltrans	Signal and Lighting Guidelines http://www.dot.ca.gov/trafficops/camutcd/traffic-manual.html	W
Caltrans	Soil and Rock, Logging, Classification, and Presentation Manual http://www.dot.ca.gov/hq/esc/geotech/sr_logging_manual/page/	W
Caltrans	Specifications for Changeable Message Sign System http://www.dot.ca.gov/trafficops/tech/docs/CMS_2009.pdf	W

Format/Availability Legend:

IS = Industry standard, Contractor's responsibility to acquire

W = standard is available as download on the organization's web site, Contractor's responsibility to acquire.

E = document to be given to Contractor in electronic format

Organization	Description	Format/ Availability
Caltrans	Standard Environmental Reference http://www.dot.ca.gov/ser/	W
Caltrans	Standard Highway Signs http://www.dot.ca.gov/trafficops/tcd/specs.html	W
Caltrans	Standard Plans http://www.dot.ca.gov/hq/esc/oe/project_plans/HTM/stdplns-US-customary-units-new15.htm	W
Caltrans	Standard Specifications and Revised Standard Specifications http://www.dot.ca.gov/hq/esc/oe/construction_contract_standards/std_specs/	W
Caltrans	Standard Special Provisions with updates http://www.dot.ca.gov/hq/esc/oe/2015_SSPs.php	W
Caltrans	Statewide Storm Water Management Plan (SWMP) http://www.dot.ca.gov/hq/env/stormwater/	W
Caltrans	Storm Water – BMPs http://www.dot.ca.gov/hq/oppd/stormwtr/bmps.htm	W
Caltrans	Stormwater and Water Pollution Control – Access Based SWPPP Template http://www.dot.ca.gov/hq/construc/stormwater/	W
Caltrans	Stormwater Quality Handbooks: Construction Site Best Management Practices (BMPs) Manual http://www.dot.ca.gov/hq/construc/stormwater/	W
Caltrans	Stormwater Quality Handbooks: Project Planning and Design Guide http://www.dot.ca.gov/hq/construc/stormwater/	W
Caltrans	Stormwater Quality Handbooks: Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual http://www.dot.ca.gov/hq/construc/stormwater/	W
Caltrans	Structural Detailing Standards http://www.dot.ca.gov/hq/esc/techpubs/manual/othermanual/other-engin-manual/structural-detailing-standards/page/SDS.pdf	W

Format/Availability Legend:

IS = Industry standard, Contractor's responsibility to acquire

W = standard is available as download on the organization's web site, Contractor's responsibility to acquire.

E = document to be given to Contractor in electronic format

Organization	Description	Format/ Availability
Caltrans	Surveys Manual http://www.dot.ca.gov/hq/row/landsurveys/SurveysManual/Manual_TOC.html	W
Caltrans	Technical Memoranda http://www.dot.ca.gov/des/index.html	W
Caltrans	Temporary Pedestrian Facilities Handbook http://www.dot.ca.gov/hq/construc/safety/Temporary_Pedestrian_Facilities_Handbook.pdf	W
Caltrans	Traffic Manual http://www.dot.ca.gov/trafficops/camutcd/traffic-manual.html	W
Caltrans	Traffic Noise Analysis Protocol http://www.dot.ca.gov/hq/env/noise/	W
Caltrans	Transportation and Construction Vibration Guidance Manual http://www.dot.ca.gov/hq/env/noise/pub/TCVGM_Sep13_FINAL.pdf	W
Caltrans	Transportation Electrical Equipment Specifications (TEES) http://www.dot.ca.gov/trafficops/tech/tees.html	W
Caltrans	Transportation Management Plan (TMP) Guidelines	E
Caltrans	Traffic Operations Policy Directives http://www.dot.ca.gov/hq/traffops/policy.htm	W
Caltrans	Trenching and Shoring Manual http://www.dot.ca.gov/hq/esc/construction/manuals/	W
Caltrans	Water Quality Management Plan Template - Streets, Road, Highway, Freeway and Above Ground Linear Drainage Projects http://www.dot.ca.gov/hq/construc/stormwater/	W
CAPUC	G.O. 128 – Rules for Construction of UG Electric Supply and Communication Systems http://www.cpuc.ca.gov/gos/GO128/GO_128_Startup_page.html	W

Format/Availability Legend:

IS = Industry standard, Contractor's responsibility to acquire

W = standard is available as download on the organization's web site, Contractor's responsibility to acquire.

E = document to be given to Contractor in electronic format

Organization	Description	Format/ Availability
City of Costa Mesa	Standard Drawings http://www.costamesaca.gov/index.aspx?page=1493	W
City of Fountain Valley	Standard Plans http://www.fountainvalley.org/448/City-Standard-Plans	W
City of Fountain Valley	Steel Pipe Casing Standards	E
City of Huntington Beach	Standard Plans http://www.huntingtonbeachca.gov/government/departments/public_works/standard_plans.cfm	W
City of Seal Beach	Standard Plans for Sewer Facilities	E
City of Seal Beach	Standard Plans for Streets	E
City of Seal Beach	Standard Plans for Water Facilities	E
City of Seal Beach	Pavement Repair	E
City of Westminster	Standard Requirements for Disinfection	E
City of Westminster	Index to City Standards	E
City of Westminster	VIDS, Ethernet HUB Switch, and Ethernet Intersection Switch Specifications	E
Crimson Pipeline	Pipeline Construction Requirements	E
County of Orange	Orange County Flood Control Design Manual and Policy Memos http://ocflood.com/civicax/filebank/blobdload.aspx?BlobID=26296	W
County of Orange	Orange County Hydrology Manual, including Workbook, Soil Maps and Addendum http://ocflood.com/docs/manuals	W
County of Orange	Orange County Local Drainage Manual http://ocflood.com/civicax/filebank/blobdload.aspx?BlobID=8330	W
County of Orange	Public Works Standards Plan 1405 http://ocpublicworks.com/civicax/filebank/blobdload.aspx?blobid=27411	W

Format/Availability Legend:

IS = Industry standard, Contractor's responsibility to acquire

W = standard is available as download on the organization's web site, Contractor's responsibility to acquire.

E = document to be given to Contractor in electronic format

Organization	Description	Format/ Availability
County of Orange	Technical Guidance Document (TGD) For the Preparation of Conceptual/Preliminary and /or Project Water Quality Management Plans (WQMPs) http://cms.ocgov.com/civicax/filebank/blobdload.aspx?blobid=38765	W
EIA	Electronics Industries Alliance (EIA) Standards	IS
EIA/TIA	Fiber Optic Test Procedure (FTOP) Standards	IS
FGDC	Geospatial Positioning Accuracy Standards, Part 3: National Standard for Spatial Data Accuracy https://www.fgdc.gov/standards/projects/accuracy/part3/chapter3	W
FHWA	Guidelines for Applying Microsimulation Modeling Software https://ops.fhwa.dot.gov/trafficanalysisistools/	W
FHWA	Manual on Uniform Traffic Control Devices with Revisions 1 and 2, May 2012 http://mutcd.fhwa.dot.gov/	W
FHWA	Culvert Inspection Manual FHWA-IP-86-2 http://www.dot.state.mn.us/bridge/inspection.html	W
FHWA	Guide for Selecting Manning's Roughness Coefficients for Natural Channels and Flood Plains FHWA-TS-84-204 http://www.fhwa.dot.gov/BRIDGE/wsp2339.pdf	W
FHWA	Hydraulic Design Series No. 1 Hydraulics of Bridge Waterways FHWA-EPD-86-101 http://www.fhwa.dot.gov/engineering/hydraulics/pubs/hds1.pdf	W
FHWA	Hydraulic Design Series No. 3 Design Charts for Open-Channel Flow FHWA-EPD-86-102 http://www.fhwa.dot.gov/engineering/hydraulics/pubs/hds3.pdf	W
FHWA	Hydraulic Design Series No. 5 Hydraulic Design of Highway Culverts FHWA-NHI-01-020 https://www.fhwa.dot.gov/engineering/hydraulics/pubs/12026/hif12026.pdf	W
FHWA	Hydraulic Design Series No. 9 Debris Control Structures Evaluation and Countermeasures FHWA-IF-04-016 http://www.fhwa.dot.gov/engineering/hydraulics/pubs/04016/hec09.pdf	W
FHWA	Hydraulic Engineering Circular No. 13 (HEC-13), Hydraulic Design of Improved Inlets for Culverts http://www.fhwa.dot.gov/engineering/hydraulics/pubs/hec/hec13.pdf	W

Format/Availability Legend:

IS = Industry standard, Contractor's responsibility to acquire

W = standard is available as download on the organization's web site, Contractor's responsibility to acquire.

E = document to be given to Contractor in electronic format

Organization	Description	Format/ Availability
FHWA	Hydraulic Engineering Circular No. 14 (HEC-14), Hydraulic Design of Energy Dissipaters for Culverts and Channels FHWA-NHI-06-086 http://www.fhwa.dot.gov/engineering/hydraulics/pubs/06086/hec14.pdf	W
FHWA	Hydraulic Engineering Circular No. 15 (HEC-15), Design of Roadside Channels with Flexible Linings FHWA-NHI-05-114 http://www.fhwa.dot.gov/engineering/hydraulics/pubs/05114/05114.pdf	W
FHWA	Hydraulic Engineering Circular No. 17 (HEC-17), The Design of Encroachments on Flood Plains Using Risk Analysis FHWA-EPD-86-112 http://www.fhwa.dot.gov/engineering/hydraulics/pubs/hec/hec17.pdf	W
FHWA	Hydraulic Engineering Circular No. 18 (HEC-18), Evaluating Scour at Bridges FHWA-NHI-01-001 https://www.fhwa.dot.gov/engineering/hydraulics/pubs/hif12003.pdf	W
FHWA	Hydraulic Engineering Circular No. 21 (HEC-21), Design of Bridge Deck Drainage Systems FHWA-SA-92-010 http://www.fhwa.dot.gov/engineering/hydraulics/pubs/hec/hec21.pdf	W
FHWA	Hydraulic Engineering Circular No. 23 (HEC-23), Bridge Scour and Stream Instability Countermeasures: Experience, Selection, and Design-Guidance FHWA-NHI-09-111 http://www.fhwa.dot.gov/engineering/hydraulics/pubs/09111/09111.pdf	W
Greenbook Committee	Standard Specifications for Public Works Construction (Greenbook), including all supplements	IS
International Society of Arboriculture (ISA)	Best Management Practices: Tree Pruning	IS
ISO/IEC	ISO/IEC15288 Systems Engineering	IS
ITE	Institute of Transportation Engineers (ITE) Standards http://www.ite.org/standards/index.asp	W
Midway City Sanitation District	Encasement	E
Midway City Sanitation District	Manhole Adjustment	E

Format/Availability Legend:

IS = Industry standard, Contractor's responsibility to acquire

W = standard is available as download on the organization's web site, Contractor's responsibility to acquire.

E = document to be given to Contractor in electronic format

Organization	Description	Format/ Availability
Midway City Sanitation District	Steel Pipe Casing	E
NCHRP	Report 350 – Recommended Procedures for the Safety Performance Evaluation of Highway Features http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_350-a.pdf	W
NEMA	National Electrical Manufacturers Association (NEMA) Standards http://www.nema.org/Standards/Pages/All-Standards.aspx	W
NFPA	National Electric Code (NEC) Standards, including Listing Requirements	IS
NTCIP	National Transportation Communications for ITS Protocol (NTCIP) Standards https://www.ntcip.org/library/documents/	W
Orange County Sanitation District	OCSD Design Manual	E
State of California	State Administrative Manual - Records Management Act - Section 1600 https://www.documents.dgs.ca.gov/sam/SamPrint/new/sam_master/sam_master_file/chap1600/chap1600(print).pdf	W
State of California	CalRIM E-Records Guidebook http://archives.cdn.sos.ca.gov/pdf/calrim_e_records_guidebook_full.pdf	W
State of California	CalRIM Records Retention Handbook http://archives.cdn.sos.ca.gov/pdf/calrim-records-retention-handbook.pdf	W
State of California	Executive Order B-37-16 – Making Water Conservation a California Way of Life	E
TIA	Telecommunications Industries Association (TIA) Standards http://www.tiaonline.org/standards/	W
TRB	Highway Capacity Manual	IS
USDA	Revised Universal Soil Loss Equation 2 - RUSLE2 http://www.ars.usda.gov/Research/docs.htm?docid=6010	W
USDA	Rural Utilities Service (RUS) Specifications	IS

Format/Availability Legend:

IS = Industry standard, Contractor's responsibility to acquire

W = standard is available as download on the organization's web site, Contractor's responsibility to acquire.

E = document to be given to Contractor in electronic format

<i>Organization</i>	<i>Description</i>	<i>Format/ Availability</i>
USDOT	National ITS Architecture	IS
US Military Standard (MIL)	499B Systems Engineering	IS
Verizon CA, Inc.	Developer Responsibilities	E

Format/Availability Legend:

IS = Industry standard, Contractor's responsibility to acquire

W = standard is available as download on the organization's web site, Contractor's responsibility to acquire.

E = document to be given to Contractor in electronic format

Attachment 10 - Anticipated Project Timeline

Major Milestone Description	Projected Start Date	Projected End Date
Notice to Proceed	3/30/18	
Project Kickoff Meeting	April 2018	
Initial Project Planning Documentation Project Management Plan, Baseline Implementation Schedule, Software Development Plan, Document Control Work Plan, Health and Safety Plans, Quality Assurance Plan	Q2 2018	Q2 2018
I-405 Express Lanes ETTM System Infrastructure Design Requirements Document Full Requirementse Documentation and Plans Submitted	NTP	NTP + 90 day
Second Group of Planning Documentation Installation Plan, Master Test Plan, Individual Test Plans, Test Procedures, Disaster Recovery Plan, Transition Plan	Q2 2018	Q4 2018
System Design (91 EL and applicable portions 405 EL) ETTM System Installation Design Package, RSS Installation Design Documentation, Requirements Traceability Matrix, Installation Checklist, Business Rules Document and Final System Detail Design Documents	Q2 2018	Q4 2018
Third Group of Planning Documentation Maintenance Plans, Operations Plan, Emergency Response Management Plan, Training Plan, Manuals, End of Contract Transition Plan	Q4 2018	Q2 2019
System Development and Initial Testing (91 EL and applicable portions of 405 EL) AVI Certification Report (Third-Party), Software Development, Factory Acceptance Test (FAT), Unit Testing	Q3 2018	Q2 2019
Installation and Testing (91 EL) Installation of all ETTM Sites, Installation RSS, Onsite Installation Test (OIT)	Q2 2019	Q3 2019
Final Testing and Go-Live (91 EL) Installation and Commissioning Test, Data Migration (as required), Go-Live all 91 EL ETTM	Q3 2019	Q4 2019
System Operations / Acceptance for the 91 (Start of Maintenance Phase for 91 EL) As-Built Documentation and Drawings, Operational and Acceptance Testing, Decommissioning of existing 91 EL Equipment, 91 EL Acceptance	Q4 2019	Q2 2019
System Design Remaining Portions of I-405 EL) ETTM System Installation Design Package, I-405 TOC Design Requirements Document, RSS Installation Design Documentation, Requirements Traceability Matrix, Installation Checklist, Business Rules Document and Final System Detail Design Documents	Q3 2019	Q2 2021
Updates to All Planning Documentation	Q2 2021	Q1 2022
System Development and Initial Testing (Remaining portions of 405 EL) AVI Certification Report (Third-Party), Software Development, Factory Acceptance Test (FAT), Unit Testing	Q2 2021	Q1 2022
Installation and Testing (I-405 EL) Installation of all ETTM Sites, Installation RSS, Onsite Installation Test (OIT)	Q2 2022	Q4 2022 ¹
Final Testing and Go-Live (I-405 EL) Installation and Commissioning Test, Data Migration (as required), Go-Live all I-405 EL ETTM	Q4 2022	Q1 2023 ¹
System Operations / Acceptance for the 405 (Start of Maintenance Phase for I-405) As-Built Documentation and Drawings, Operational and Acceptance Testing, I-405 EL Acceptance	Q1 2023	Q3 2023 ¹
Project Acceptance		Q3 2023 ¹

1. Installation, Testing, and Acceptance of I-405 Express Lane ETTM System contingent upon Design-Builder schedule.

91 EL ETTM System Responsibility Matrix - Authority and TSI

	Toll Systems Integrator			OCTA		
	Design	Furnish	Construct/ Install	Design	Furnish	Construct/ Install
91 Express Lanes System Infrastructure						
Power						
Utility service point and connection	A	A	A	C	D	C
Coordinate with electrical utility service provider	A	A	A	C	D	C
Mainline power distribution network	A	A	A	C	D	C
All foundations (including for cabinets and generators)	A	A	A	C	D	C
All junction boxes	A	A	A	C	D	C
All trenching, bores and conduit to cabinets and from cabinets to structures	A	A	A	C	D	C
Toll system power from termination point at cabinet to tolling equipment	A	A	A	C	D	C
Uninterruptible Power Supply (UPS)	A	A	A	C	D	C
Fiber Communications						
Corridor fiber backbone	A	A	A	C	D	C
Laterals to all Roadside Equipment	A	A	A	C	D	C
Conduits and innerducts	A	A	A	C	D	C
Conduits, service cabinets, pull boxes, and pull strings	A	A	A	C	D	C
Termination of fiber in primary toll equipment cabinet	A	A	A	C	D	C
Fiber from primary toll equipment cabinet to junction boxes, specialized toll equipment cabinets and toll equipment.	A	A	A	C	D	C
Network equipment and logical connectivity from Express Lane fiber optic communications network infrastructure to Caltrans and commercial fiber	A	A	A	C	D	C
Toll Zone Gantry						
Gantry Structure	B	B	B	A	A	A
Equipment Frames, Mounts & Brackets	A	A	A	C	D	C
Tolling Equipment on Structure	A	A	A	C	D	C
Tolling CCTV Camera (if needed)	A	A	A	C	D	C
Toll Gantry Pavement Sensors	A	A	A	C	D	C
Tolling enforcement beacon	A	A	A	C	D	C
Enforcement Beacon	A	A	A	C	D	C
Smart Loop Detectors (if needed)	A	A	A	C	D	C
Structures (if necessary)						
Foundations and poles	A	A	A	C	D	C
Special poles mounted to structures or otherwise to support toll rate CCTV cameras	A	A	A	C	D	C
Cabinets and Specialized Conduits						
Primary toll equipment cabinets & foundations	A	A	A	C	D	C
Specialized toll equipment cabinets & foundations	A	A	A	C	D	C
Conduit from ground-mount or pole-mount junction boxes to toll specialized cabinet or toll equipment	A	A	A	C	D	C
Toll Collection Site Pavement						
In and below pavement conduit, junction and boxes risers	A	A	A	C	D	C

Legend
A = PRIMARY RESPONSIBILITY
B = SUPPORT RESPONSIBILITY
C = COORDINATION RESPONSIBILITY ONLY
D = NO RESPONSIBILITY
Preliminary and subject to change

San Diego Freeway (I-405) Improvement Project

Freeway Mainline, Ramps and Connectors Lane Closure Charts (LCC)



PARSONS
March 16, 2016



Freeway Mainline Segments

LANE CLOSURE CHARTS INDEX

FREEWAY MAINLINE LANE REQUIREMENTS (A) AND NIGHTLY COMPLETE CLOSURES (B)			
Chart No.	Route/Direction	PM	Closure Limits
NORTHBOUND FREEWAY SEGMENTS (From South to North)			
1	73 NB	PM: R27.3 to R27.8	Bear UC to N73-N405 Connector OC
2	405 NB	PM: 9.5 to 9.9	Bristol OC to Bear OC
3	405 NB	PM: 9.9 to 10.3	Bear OC to Junction SR-73
4	405 NB	PM: 10.3 to 10.8	Junction SR-73 to Fairview OC
5	405 NB	PM: 10.8 to 11.5	Fairview OC to Harbor UC
6	405 NB	PM: 11.5 to 12.4	Harbor UC to Euclid UC
7	405 NB	PM: 12.4 to 13.2	Euclid UC to Ward OC
8	405 NB	PM: 13.2 to 13.4	Ward OC to Talbert OC
9	405 NB	PM: 13.4 to 13.8	Talbert OC to Brookhurst OC
10	405 NB	PM: 13.8 to 14.1	Brookhurst OC to Slater OC
11	405 NB	PM: 14.1 to 14.5	Slater OC to Bushard OC
12	405 NB	PM: 14.5 to 14.8	Bushard OC to Warner OC
13	405 NB	PM: 14.8 to 15.2	Warner OC to Magnolia OC
14	405 NB	PM: 15.2 to 15.5	Magnolia OC to Heil Pedestrian OC
15	405 NB	PM: 15.5 to 15.9	Heil Pedestrian OC to Newland OC
16	405 NB	PM: 15.9 to 16.3	Newland OC to Edinger OC
17	405 NB	PM: 16.3 to 16.5	Edinger OC to Junction SR-39 / Beach UC
18	405 NB	PM: 16.5 to 17.0	Junction SR-39 / Beach UC to McFadden OC
19	405 NB	PM: 17.0 to 17.8	McFadden OC to Bolsa OC
20	405 NB	PM: 17.8 to 17.9	Bolsa OC to Goldenwest OC
21	405 NB	PM: 17.9 to 18.6	Goldenwest OC to Edwards OC
22	405 NB	PM: 18.6 to 19.2	Edwards OC to Westminster OC
23	405 NB	PM: 19.2 to 19.4	Westminster OC to Springdale OC
24	405 NB	PM: 19.4 to 20.6	Springdale OC to Bolsa Chica OC
25	405 NB	PM: 20.6 to 20.7	Bolsa Chica OC to Junction SR-22 EB
26	405 NB	PM: 20.7 to 22.6	Junction SR-22 EB to Seal Beach OC
27	405 NB	PM: 22.6 to 23.3	Seal Beach OC to Junction SR-22 WB / 7th
28	405 NB	PM: 23.3 to 24.0	Junction SR-22 WB / 7th to Junction I-605
29	405 NB	PM: 24.0 to 24.2	Junction I-605 to LA/OC County Line
30	605 NB	PM: R0.2 to R1.4	N&S605 to N405 Connector OC to Katella UC
SOUTHBOUND FREEWAY SEGMENTS (From North to South)			
50	605 SB	PM: R1.4 to R0.2	Katella UC to N&S605 to N405 Connector OC
51	405 SB	PM: 24.2 to 24.0	LA/OC County Line to Junction I-605
52	405 SB	PM: 24.0 to 23.3	Junction I-605 to Junction SR-22 WB / 7th
53	405 SB	PM: 23.3 to 22.6	Junction SR-22 WB / 7th to Seal Beach OC
54	405 SB	PM: 22.6 to 20.7	Seal Beach OC to Junction SR-22 EB
55	405 SB	PM: 20.7 to 20.6	Junction SR-22 EB to Bolsa Chica OC
56	405 SB	PM: 20.6 to 19.4	Bolsa Chica OC to Springdale OC
57	405 SB	PM: 19.4 to 19.2	Springdale OC to Westminster OC
58	405 SB	PM: 19.2 to 18.6	Westminster OC to Edwards OC
59	405 SB	PM: 18.6 to 17.9	Edwards OC to Goldenwest OC
60	405 SB	PM: 17.9 to 17.8	Goldenwest OC to Bolsa OC
61	405 SB	PM: 17.8 to 17.0	Bolsa OC to McFadden OC
62	405 SB	PM: 17.0 to 16.5	McFadden OC to Junction SR-39 / Beach UC
63	405 SB	PM: 16.5 to 16.3	Junction SR-39 / Beach UC to Edinger OC
64	405 SB	PM: 16.3 to 15.9	Edinger OC to Newland OC
65	405 SB	PM: 15.9 to 15.5	Newland OC to Heil Pedestrian OC
66	405 SB	PM: 15.5 to 15.2	Heil Pedestrian OC to Magnolia OC
67	405 SB	PM: 15.2 to 14.8	Magnolia OC to Warner OC
68	405 SB	PM: 14.8 to 14.5	Warner OC to Bushard OC
69	405 SB	PM: 14.5 to 14.1	Bushard OC to Slater OC
70	405 SB	PM: 14.1 to 13.8	Slater OC to Brookhurst OC
71	405 SB	PM: 13.8 to 13.4	Brookhurst OC to Talbert OC
72	405 SB	PM: 13.4 to 13.2	Talbert OC to Ward OC
73	405 SB	PM: 13.2 to 12.5	Ward OC to Euclid UC
74	405 SB	PM: 12.5 to 11.5	Euclid UC to Harbor UC
75	405 SB	PM: 11.5 to 10.8	Harbor UC to Fairview OC

LANE CLOSURE CHARTS INDEX

FREEWAY MAINLINE LANE REQUIREMENTS (A) AND NIGHTLY COMPLETE CLOSURES (B)			
Chart No.	Route/Direction	PM	Closure Limits
76	405 SB	PM: 10.8 to 10.3	Fairview OC to Junction SR-73
77	405 SB	PM: 10.3 to 9.9	Junction SR-73 to Bear OC
78	73 SB	PM: R27.6 to R27.3	Fairview Road On-ramp OC to Bear UC

Chart No. 1A Freeway Lane Requirements																											
County: Orange								Route/Direction: 73 / NB								PM: R27.3 to R27.8											
Closure Limits: Bear UC to N73-N405 Connector OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	1																	S	4	3	2	
Fridays		1	1	1	1	1																	S	4	3	2	
Saturdays		1	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
Sundays		1	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 1B																											
Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 73 / NB								PM: R27.3 to R27.8											
Closure Limits: Bear UC to N73-N405 Connector OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays																											
Fridays																											
Saturdays																											
Sundays																											
<p>Legend:</p> <div><div></div></div> <div><div></div> No complete freeway closure is permitted.</div>																											
<p>REMARKS:</p>																											

Chart No. 2A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / NB								PM: 9.5 to 9.9											
Closure Limits: Bristol OC to Bear OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	1																	S	4	3	2	
Fridays		1	1	1	1	1																	S	4	3	2	
Saturdays		1	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
Sundays		1	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 2B																											
Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / NB										PM: 9.5 to 9.9									
Closure Limits: Bristol OC to Bear OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays																											
Fridays																											
Saturdays																											
Sundays																											
<p>Legend:</p> <div><div></div></div> <div><div></div> No complete freeway closure is permitted.</div>																											
<p>REMARKS:</p>																											

Chart No. 3A																																
Freeway Lane Requirements																																
County: Orange								Route/Direction: 405 / NB								PM: 9.9 to 10.3																
Closure Limits: Bear OC to Junction SR-73																																
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																																
Mondays through Thursdays								1	1	1	1	1																S	4	3	2	
Fridays								1	1	1	1	1																S	4	3	2	
Saturdays								1	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2
Sundays								1	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																																
REMARKS:																																

Chart No. 3B																											
Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / NB										PM: 9.9 to 10.3									
Closure Limits: Bear OC to Junction SR-73																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays																											
Fridays																											
Saturdays																											
Sundays																											
<p>Legend:</p> <div><div></div></div> <div><div></div> No complete freeway closure is permitted.</div>																											
<p>REMARKS:</p>																											

Chart No. 4A																										
Freeway Lane Requirements																										
County: Orange						Route/Direction: 405 / NB										PM: 10.3 to 10.8										
Closure Limits: Junction SR-73 to Fairview OC																										
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays		1	1	1	1	1																S	4	3	2	
Fridays		1	1	1	1	1																S	4	3	2	
Saturdays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
Sundays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div>1 Provide at least one through freeway lane open in direction of travel.</div> <div>2 Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div>3 Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div>4 Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div>S Work allowed within right shoulder area when lane closure is not required.</div> </div>																										
REMARKS:																										

Chart No. 4B Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / NB												PM: 10.3 to 10.8							
Closure Limits: Junction SR-73 to Fairview OC																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays								C	C	C	C	C															C
Fridays								C	C	C	C	C															C
Saturdays								C	C	C	C	C	C														C
Sundays								C	C	C	C	C	C														C
Legend: <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> <div>Freeway may be closed completely.</div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> <div>No complete freeway closure is permitted.</div> </div>																											
REMARKS: (1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure. (2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.																											

Chart No. 5A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / NB								PM: 10.8 to 11.5											
Closure Limits: Fairview OC to Harbor UC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	1																	S	4	3	2	
Fridays		1	1	1	1	1																	S	4	3	2	
Saturdays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
Sundays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 5B Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / NB												PM: 10.8 to 11.5							
Closure Limits: Fairview OC to Harbor UC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		C	C	C	C	C																					C
Fridays		C	C	C	C	C																					C
Saturdays		C	C	C	C	C	C																				C
Sundays		C	C	C	C	C	C																				C

Legend:

C

Freeway may be closed completely.

No complete freeway closure is permitted.

REMARKS:

(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.

(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.

Chart No. 6A																																	
Freeway Lane Requirements																																	
County: Orange								Route/Direction: 405 / NB										PM: 11.5 to 12.4															
Closure Limits: Harbor UC to Euclid UC																																	
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																																	
Mondays through Thursdays								1	1	1	1	1																S	4	3	2		
Fridays								1	1	1	1	1																S	4	3	2		
Saturdays								2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2
Sundays								2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																																	
REMARKS:																																	

Chart No. 6B																											
Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / NB										PM: 11.5 to 12.4									
Closure Limits: Harbor UC to Euclid UC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		C	C	C	C	C																				C	
Fridays		C	C	C	C	C																				C	
Saturdays		C	C	C	C	C	C																			C	
Sundays		C	C	C	C	C	C																			C	
<p>Legend:</p> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> <div>Freeway may be closed completely.</div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> <div>No complete freeway closure is permitted.</div> </div>																											
<p>REMARKS:</p> <p>(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.</p> <p>(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.</p>																											

Chart No. 7A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / NB										PM: 12.4 to 13.2									
Closure Limits: Euclid UC to Ward OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	1																	S	4	3	2	
Fridays		1	1	1	1	1																	S	4	3	2	
Saturdays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
Sundays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 7B																										
Complete Freeway Closure Hours - Nightly																										
County: Orange						Route/Direction: 405 / NB										PM: 12.4 to 13.2										
Closure Limits: Euclid UC to Ward OC																										
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays		C	C	C	C	C																				C
Fridays		C	C	C	C	C																				C
Saturdays		C	C	C	C	C	C																			C
Sundays		C	C	C	C	C	C																			C

Legend:

C Freeway may be closed completely.

No complete freeway closure is permitted.

REMARKS:

(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.

(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.

Chart No. 8A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / NB										PM: 13.2 to 13.4									
Closure Limits: Ward OC to Talbert OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	1																	S	4	3	2	
Fridays		1	1	1	1	1																	S	4	3	2	
Saturdays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
Sundays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 8B Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / NB												PM: 13.2 to 13.4							
Closure Limits: Ward OC to Talbert OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		C	C	C	C	C																					C
Fridays		C	C	C	C	C																					C
Saturdays		C	C	C	C	C	C																				C
Sundays		C	C	C	C	C	C																				C

Legend:

C

Freeway may be closed completely.

No complete freeway closure is permitted.

REMARKS:

(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.

(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.

Chart No. 9A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / NB										PM: 13.4 to 13.8									
Closure Limits: Talbert OC to Brookhurst OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	1																	S	4	3	2	
Fridays		1	1	1	1	1																	S	4	3	2	
Saturdays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
Sundays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 9B																											
Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / NB										PM: 13.4 to 13.8									
Closure Limits: Talbert OC to Brookhurst OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		C	C	C	C	C																				C	
Fridays		C	C	C	C	C																				C	
Saturdays		C	C	C	C	C	C																			C	
Sundays		C	C	C	C	C	C																			C	

Legend:

☐ C Freeway may be closed completely.

☐ No complete freeway closure is permitted.

REMARKS:

(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.

(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.

Chart No. 10A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / NB										PM: 13.8 to 14.1									
Closure Limits: Brookhurst OC to Slater OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	1																	S	4	3	2	
Fridays		1	1	1	1	1																	S	4	3	2	
Saturdays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
Sundays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 10B Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / NB												PM: 13.8 to 14.1							
Closure Limits: Brookhurst OC to Slater OC																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays								C	C	C	C	C															C
Fridays								C	C	C	C	C															C
Saturdays								C	C	C	C	C	C														C
Sundays								C	C	C	C	C	C														C
Legend: <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> <div>Freeway may be closed completely.</div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> <div>No complete freeway closure is permitted.</div> </div>																											
REMARKS: (1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure. (2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.																											

Chart No. 11A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / NB										PM: 14.1 to 14.5									
Closure Limits: Slater OC to Bushard OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	1																	S	4	3	2	
Fridays		1	1	1	1	1																	S	4	3	2	
Saturdays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
Sundays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 11B																											
Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / NB										PM: 14.1 to 14.5									
Closure Limits: Slater OC to Bushard OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		C	C	C	C	C																				C	
Fridays		C	C	C	C	C																				C	
Saturdays		C	C	C	C	C	C																			C	
Sundays		C	C	C	C	C	C																			C	

Legend:

C Freeway may be closed completely.

No complete freeway closure is permitted.

REMARKS:

(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.

(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.

Chart No. 12A Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / NB								PM: 14.5 to 14.8											
Closure Limits: Bushard OC to Warner OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	1																S	4	3	2		
Fridays		1	1	1	1	1																S	4	3	2		
Saturdays		1	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
Sundays		1	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div>1 Provide at least one through freeway lane open in direction of travel.</div> <div>2 Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div>3 Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div>4 Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div>S Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 12B Complete Freeway Closure Hours - Nightly																												
County: Orange								Route/Direction: 405 / NB												PM: 14.5 to 14.8								
Closure Limits: Bushard OC to Warner OC																												
<div style="display: flex; justify-content: space-between;"> FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 </div>																												
Mondays through Thursdays								C	C	C	C	C																C
Fridays								C	C	C	C	C																C
Saturdays								C	C	C	C	C	C															C
Sundays								C	C	C	C	C	C															C
<p>Legend:</p> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Freeway may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> No complete freeway closure is permitted. </div>																												
<p>REMARKS:</p> <p>(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.</p> <p>(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.</p>																												

Chart No. 13A																																
Freeway Lane Requirements																																
County: Orange								Route/Direction: 405 / NB								PM: 14.8 to 15.2																
Closure Limits: Warner OC to Magnolia OC																																
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																																
Mondays through Thursdays								1	1	1	1	1																S	4	3	2	
Fridays								1	1	1	1	1																S	4	3	2	
Saturdays								1	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2
Sundays								1	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																																
REMARKS:																																

Chart No. 13B Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / NB												PM: 14.8 to 15.2							
Closure Limits: Warner OC to Magnolia OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		C	C	C	C	C																					C
Fridays		C	C	C	C	C																					C
Saturdays		C	C	C	C	C	C																				C
Sundays		C	C	C	C	C	C																				C

Legend:

C

Freeway may be closed completely.

No complete freeway closure is permitted.

REMARKS:

(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.

(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.

Chart No. 14A Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / NB										PM: 15.2 to 15.5									
Closure Limits: Magnolia OC to Heil Pedestrian OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	1																S	4	3	2		
Fridays		1	1	1	1	1																S	4	3	2		
Saturdays		1	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2		
Sundays		1	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2		
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 14B Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / NB												PM: 15.2 to 15.5							
Closure Limits: Magnolia OC to Heil Pedestrian OC																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays								C	C	C	C	C															C
Fridays								C	C	C	C	C															C
Saturdays								C	C	C	C	C	C														C
Sundays								C	C	C	C	C	C														C
Legend: <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> <div>Freeway may be closed completely.</div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> <div>No complete freeway closure is permitted.</div> </div>																											
REMARKS: (1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure. (2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.																											

Chart No. 15A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / NB										PM: 15.5 to 15.9									
Closure Limits: Heil Pedestrian OC to Newland OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	1																S	4	3	2		
Fridays		1	1	1	1	1																S	4	3	2		
Saturdays		1	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
Sundays		1	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 15B Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / NB												PM: 15.5 to 15.9							
Closure Limits: Heil Pedestrian OC to Newland OC																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays								C	C	C	C	C															C
Fridays								C	C	C	C	C															C
Saturdays								C	C	C	C	C	C														C
Sundays								C	C	C	C	C	C														C
Legend: <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> <div>Freeway may be closed completely.</div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> <div>No complete freeway closure is permitted.</div> </div>																											
REMARKS: (1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure. (2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.																											

Chart No. 16A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / NB										PM: 15.9 to 16.3									
Closure Limits: Newland OC to Edinger OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	1																	S	4	3	2	
Fridays		1	1	1	1	1																	S	4	3	2	
Saturdays		1	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
Sundays		1	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div>1 Provide at least one through freeway lane open in direction of travel.</div> <div>2 Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div>3 Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div>4 Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div>S Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 16B																												
Complete Freeway Closure Hours - Nightly																												
County: Orange								Route/Direction: 405 / NB										PM: 15.9 to 16.3										
Closure Limits: Newland OC to Edinger OC																												
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																												
Mondays through Thursdays								C	C	C	C	C																C
Fridays								C	C	C	C	C															C	
Saturdays								C	C	C	C	C	C														C	
Sundays								C	C	C	C	C	C														C	
<p>Legend:</p> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> <div>Freeway may be closed completely.</div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> <div>No complete freeway closure is permitted.</div> </div>																												
<p>REMARKS:</p> <p>(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.</p> <p>(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.</p>																												

Chart No. 17A																															
Freeway Lane Requirements																															
County: Orange								Route/Direction: 405 / NB								PM: 16.3 to 16.5															
Closure Limits: Edinger OC to Junction SR-39/Beach UC																															
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																															
Mondays through Thursdays								1	1	1	1	1															S	4	3	2	
Fridays								1	1	1	1	1														S	4	3	2		
Saturdays								1	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2
Sundays								1	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div>1 Provide at least one through freeway lane open in direction of travel.</div> <div>2 Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div>3 Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div>4 Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div>S Work allowed within right shoulder area when lane closure is not required.</div> </div>																															
REMARKS:																															

Chart No. 17B																											
Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / NB										PM: 16.3 to 16.5									
Closure Limits: Edinger OC to Junction SR-39/Beach UC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		C	C	C	C	C																				C	
Fridays		C	C	C	C	C																				C	
Saturdays		C	C	C	C	C	C																			C	
Sundays		C	C	C	C	C	C																			C	
<p>Legend:</p> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> <div>Freeway may be closed completely.</div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> <div>No complete freeway closure is permitted.</div> </div>																											
<p>REMARKS:</p> <p>(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.</p> <p>(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.</p>																											

Chart No. 18A																															
Freeway Lane Requirements																															
County: Orange								Route/Direction: 405 / NB								PM: 16.5 to 17.0															
Closure Limits: Junction SR-39/Beach UC to McFadden OC																															
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																															
Mondays through Thursdays								1	1	1	1	1															S	4	3	2	
Fridays								1	1	1	1	1														S	4	3	2		
Saturdays								1	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2
Sundays								1	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div>1 Provide at least one through freeway lane open in direction of travel.</div> <div>2 Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div>3 Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div>4 Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div>S Work allowed within right shoulder area when lane closure is not required.</div> </div>																															
REMARKS:																															

Chart No. 18B																										
Complete Freeway Closure Hours - Nightly																										
County: Orange						Route/Direction: 405 / NB										PM: 16.5 to 17.0										
Closure Limits: Junction SR-39/Beach UC to McFadden OC																										
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays		C	C	C	C	C																				C
Fridays		C	C	C	C	C																				C
Saturdays		C	C	C	C	C	C																			C
Sundays		C	C	C	C	C	C																			C

Legend:

C Freeway may be closed completely.

No complete freeway closure is permitted.

REMARKS:

(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.

(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.

Chart No. 19A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / NB										PM: 17.0 to 17.8									
Closure Limits: McFadden OC to Bolsa OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	1																S	4	3	2		
Fridays		1	1	1	1	1																S	4	3	2		
Saturdays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
Sundays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 19B																												
Complete Freeway Closure Hours - Nightly																												
County: Orange								Route/Direction: 405 / NB										PM: 17.0 to 17.8										
Closure Limits: McFadden OC to Bolsa OC																												
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																												
Mondays through Thursdays								C	C	C	C	C																C
Fridays								C	C	C	C	C															C	
Saturdays								C	C	C	C	C	C														C	
Sundays								C	C	C	C	C	C														C	
<p>Legend:</p> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> <div>Freeway may be closed completely.</div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> <div>No complete freeway closure is permitted.</div> </div>																												
<p>REMARKS:</p> <p>(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.</p> <p>(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.</p>																												

Chart No. 20A																															
Freeway Lane Requirements																															
County: Orange								Route/Direction: 405 / NB								PM: 17.8 to 17.9															
Closure Limits: Bolsa OC to Goldenwest OC																															
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																															
Mondays through Thursdays								1	1	1	1	2															S	4	3	2	
Fridays								1	1	1	1	2														S	4	3	2		
Saturdays								2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2
Sundays								2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div>1 Provide at least one through freeway lane open in direction of travel.</div> <div>2 Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div>3 Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div>4 Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div>S Work allowed within right shoulder area when lane closure is not required.</div> </div>																															
REMARKS:																															

Chart No. 20B Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / NB												PM: 17.8 to 17.9							
Closure Limits: Bolsa OC to Goldenwest OC																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays								C	C	C	C	C															C
Fridays								C	C	C	C	C															C
Saturdays								C	C	C	C	C	C														C
Sundays								C	C	C	C	C	C														C
Legend: <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> <div>Freeway may be closed completely.</div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> <div>No complete freeway closure is permitted.</div> </div>																											
REMARKS: (1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure. (2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.																											

Chart No. 21A Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / NB										PM: 17.9 to 18.6									
Closure Limits: Goldenwest OC to Edwards OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	1																S	4	3	2		
Fridays		1	1	1	1	1																S	4	3	2		
Saturdays		1	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2		
Sundays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2		
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div>1 Provide at least one through freeway lane open in direction of travel.</div> <div>2 Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div>3 Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div>4 Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div>S Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 21B																													
Complete Freeway Closure Hours - Nightly																													
County: Orange								Route/Direction: 405 / NB										PM: 17.9 to 18.6											
Closure Limits: Goldenwest OC to Edwards OC																													
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																													
Mondays through Thursdays								C	C	C	C	C																	C
Fridays								C	C	C	C	C																C	
Saturdays								C	C	C	C	C	C															C	
Sundays								C	C	C	C	C	C															C	
<p>Legend:</p> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Freeway may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> No complete freeway closure is permitted. </div>																													
<p>REMARKS:</p> <p>(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.</p> <p>(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.</p>																													

Chart No. 22A Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / NB										PM: 18.6 to 19.2									
Closure Limits: Edwards OC to Westminster OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	1																	S	4	3	2	
Fridays		1	1	1	1	1																	S	4	3	2	
Saturdays		1	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	3	
Sundays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 22B Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / NB												PM: 18.6 to 19.2							
Closure Limits: Edwards OC to Westminster OC																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays								C	C	C	C	C															C
Fridays								C	C	C	C	C															C
Saturdays								C	C	C	C	C	C														C
Sundays								C	C	C	C	C	C														C
Legend: <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> <div>Freeway may be closed completely.</div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> <div>No complete freeway closure is permitted.</div> </div>																											
REMARKS: (1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure. (2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.																											

Chart No. 23A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / NB										PM: 19.2 to 19.4									
Closure Limits: Westminster OC to Springdale OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	1																	S	4	3	2	
Fridays		1	1	1	1	1																	S	4	3	2	
Saturdays		1	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	3	
Sundays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 23B Complete Freeway Closure Hours - Nightly																												
County: Orange								Route/Direction: 405 / NB												PM: 19.2 to 19.4								
Closure Limits: Westminster OC to Springdale OC																												
<div style="display: flex; justify-content: space-between;"> FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 </div>																												
Mondays through Thursdays								C	C	C	C	C																C
Fridays								C	C	C	C	C																C
Saturdays								C	C	C	C	C	C															C
Sundays								C	C	C	C	C	C															C
<p>Legend:</p> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Freeway may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> No complete freeway closure is permitted. </div>																												
<p>REMARKS:</p> <p>(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.</p> <p>(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.</p>																												

Chart No. 24A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / NB										PM: 19.4 to 20.6									
Closure Limits: Springdale OC to Bolsa Chica OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	1																S	4	3	2		
Fridays		1	1	1	1	1																S	4	3	2		
Saturdays		1	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	3	
Sundays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 24B																												
Complete Freeway Closure Hours - Nightly																												
County: Orange								Route/Direction: 405 / NB										PM: 19.4 to 20.6										
Closure Limits: Springdale OC to Bolsa Chica OC																												
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																												
Mondays through Thursdays								C	C	C	C	C																C
Fridays								C	C	C	C	C															C	
Saturdays								C	C	C	C	C	C														C	
Sundays								C	C	C	C	C	C														C	
<p>Legend:</p> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> <div>Freeway may be closed completely.</div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> <div>No complete freeway closure is permitted.</div> </div>																												
<p>REMARKS:</p> <p>(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.</p> <p>(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.</p>																												

Chart No. 25A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / NB								PM: 20.6 to 20.7											
Closure Limits: Bolsa Chica OC to Junction SR-22 WB																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	1																S	4	3	2		
Fridays		1	1	1	1	1																S	4	3	2		
Saturdays		1	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	3	
Sundays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 25B																											
Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / NB										PM: 20.6 to 20.7									
Closure Limits: Bolsa Chica OC to Junction SR-22 WB																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		C	C	C	C	C																					C
Fridays		C	C	C	C	C																					C
Saturdays		C	C	C	C	C	C																				C
Sundays		C	C	C	C	C	C																				C

Legend:

C Freeway may be closed completely.

No complete freeway closure is permitted.

REMARKS:

(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.

(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.

Chart No. 26A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / NB										PM: 20.7 to 22.6									
Closure Limits: Junction SR-22 WB to Seal Beach OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		2	2	2	2	3																	S	5	4	3	
Fridays		2	2	2	2	3																	S	5	4	3	
Saturdays		2	2	2	2	3	3	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	5	4	3	
Sundays		2	2	2	2	3	3	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	5	4	3	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div>1 Provide at least one through freeway lane open in direction of travel.</div> <div>2 Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div>3 Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div>4 Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div>S Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 26B Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / NB												PM: 20.7 to 22.6							
Closure Limits: Junction SR-22 WB to Seal Beach OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays																											
Fridays																											
Saturdays																											
Sundays																											
Legend: <div style="margin-bottom: 10px;"> <input style="width: 20px; height: 10px; border: 1px solid black;" type="checkbox"/> </div> <div> <input style="width: 20px; height: 10px; border: 1px solid black;" type="checkbox"/> No complete freeway closure is permitted. </div>																											
REMARKS: (1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure. (2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.																											

Chart No. 27A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / NB								PM: 22.6 to 23.3											
Closure Limits: Seal Beach OC to Junction SR-22 WB/7th																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		2	2	2	2	2																	S	5	4	2	
Fridays		2	2	2	2	2																	S	5	4	3	
Saturdays		2	2	2	2	2	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	5	4	3	
Sundays		2	2	2	2	2	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	5	4	3	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 27B Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / NB												PM: 22.6 to 23.3							
Closure Limits: Seal Beach OC to Junction SR-22 WB/7th																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays																											
Fridays																											
Saturdays																											
Sundays																											
Legend: <div style="border: 1px solid black; width: 30px; height: 15px; margin-bottom: 10px;"></div> <div style="border: 1px solid black; width: 30px; height: 15px; display: inline-block; vertical-align: middle;"></div> No complete freeway closure is permitted.																											
REMARKS: (1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure. (2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.																											

Chart No. 28A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / NB								PM: 23.3 to 24.0											
Closure Limits: Junction SR-22 WB/7th to Junction I-605																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		2	1	1	1	2																	S	4	3	2	
Fridays		2	1	1	1	2																	S	4	3	2	
Saturdays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	3	
Sundays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div>1 Provide at least one through freeway lane open in direction of travel.</div> <div>2 Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div>3 Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div>4 Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div>S Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 28B Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / NB												PM: 23.3 to 24.0							
Closure Limits: Junction SR-22 WB/7th to Junction I-605																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays																											
Fridays																											
Saturdays																											
Sundays																											
Legend: <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 10px; margin-right: 5px;"></div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 10px; margin-right: 5px;"></div> <div>No complete freeway closure is permitted.</div> </div>																											
REMARKS: (1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure. (2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.																											

Chart No. 29A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / NB										PM: 24.0 to 24.2									
Closure Limits: Junction I-605 to LA/OC County Line																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		2	1	1	1	2																	S	4	3	2	
Fridays		2	1	1	1	2																	S	4	3	2	
Saturdays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
Sundays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 29B Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / NB												PM: 24.0 to 24.2							
Closure Limits: Junction I-605 to LA/OC County Line																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays																											
Fridays																											
Saturdays																											
Sundays																											
Legend: <div style="border: 1px solid black; width: 30px; height: 15px; margin-bottom: 10px;"></div> <div style="border: 1px solid black; width: 30px; height: 15px; display: inline-block; vertical-align: middle;"></div> No complete freeway closure is permitted.																											
REMARKS: (1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure. (2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.																											

Chart No. 30A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 605 / NB								PM: R0.2 to R1.4											
Closure Limits: N&S605-N405 Connector OC to Katella UC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		2	1	1	1	1																	S	4	3	2	
Fridays		2	1	1	1	1																	S	4	3	2	
Saturdays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
Sundays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div>1 Provide at least one through freeway lane open in direction of travel.</div> <div>2 Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div>3 Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div>4 Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div>S Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 30B Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 605 / NB												PM: R0.2 to R1.4							
Closure Limits: N&S605-N405 Connector OC to Katella UC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays																											
Fridays																											
Saturdays																											
Sundays																											
Legend: <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 10px; margin-right: 5px;"></div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 10px; margin-right: 5px;"></div> <div>No complete freeway closure is permitted.</div> </div>																											
REMARKS: (1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure. (2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.																											

Chart No. 50A																										
Freeway Lane Requirements																										
County: Orange						Route/Direction: 605 / SB										PM: R1.4 to R0.2										
Closure Limits: Katella UC to N&S605-N405 Connector OC																										
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays		2	1	1	1	1																	S	4	3	2
Fridays		2	1	1	1	1																	S	4	3	2
Saturdays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2
Sundays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																										
REMARKS:																										

Chart No. 50B																											
Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 605 / SB										PM: R1.4 to R0.2									
Closure Limits: Katella UC to N&S605-N405 Connector OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays																											
Fridays																											
Saturdays																											
Sundays																											
<p>Legend:</p> <div><div></div></div> <div><div></div> No complete freeway closure is permitted.</div>																											
<p>REMARKS:</p>																											

Chart No. 51A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / SB										PM: 24.2 to 24.0									
Closure Limits: LA/OC County Line to Junction I-605																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		2	1	1	1	2																	S	4	3	2	
Fridays		2	1	1	1	2																	S	4	3	2	
Saturdays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	3	
Sundays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 51B																											
Complete Freeway Closure Hours - Nightly																											
County: Orange							Route/Direction: 405 / SB										PM: 24.2 to 24.0										
Closure Limits: LA/OC County Line to Junction I-605																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays																											
Fridays																											
Saturdays																											
Sundays																											
<p>Legend:</p> <div><div></div></div> <div><div></div> No complete freeway closure is permitted.</div>																											
<p>REMARKS:</p>																											

Chart No. 52A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / SB								PM: 24.0 to 23.3											
Closure Limits: Junction I-605 to Junction SR-22 WB/7th																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		2	2	2	2	2																	S	4	3	2	
Fridays		2	2	2	2	2																	S	4	3	2	
Saturdays		2	2	2	2	2	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	3	
Sundays		2	2	2	2	2	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 52B Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / SB												PM: 24.0 to 23.3							
Closure Limits: Junction I-605 to Junction SR-22 WB/7th																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays																											
Fridays																											
Saturdays																											
Sundays																											
Legend: <div style="margin-bottom: 10px;"> <div style="border: 1px solid black; width: 30px; height: 15px; display: inline-block;"></div> </div> <div> <div style="border: 1px solid black; width: 30px; height: 15px; display: inline-block;"></div> No complete freeway closure is permitted. </div>																											
REMARKS: (1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure. (2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.																											

Chart No. 53A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / SB								PM: 23.3 to 22.6											
Closure Limits: Junction SR-22 WB/7th to Seal Beach OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		2	2	2	2	2																	S	5	4	2	
Fridays		2	2	2	2	2																	S	5	4	2	
Saturdays		2	2	2	2	2	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	5	4	3	
Sundays		2	2	2	2	2	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	5	4	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 53B Complete Freeway Closure Hours - Nightly																										
County: Orange						Route/Direction: 405 / SB										PM: 23.3 to 22.6										
Closure Limits: Junction SR-22 WB/7th to Seal Beach OC																										
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays																										
Fridays																										
Saturdays																										
Sundays																										
<p>Legend:</p> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 10px; margin-right: 5px;"></div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 10px; margin-right: 5px;"></div> <div>No complete freeway closure is permitted.</div> </div>																										
<p>REMARKS:</p> <p>(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.</p> <p>(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.</p>																										

Chart No. 54A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / SB								PM: 22.6 to 20.7											
Closure Limits: Seal Beach OC to Junction SR-22 EB																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		2	2	2	2	2																	S	5	4	3	
Fridays		2	2	2	2	2																	S	5	4	3	
Saturdays		2	2	2	2	2	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	5	4	3	
Sundays		2	2	2	2	2	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	5	4	3	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 54B Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / SB												PM: 22.6 to 20.7							
Closure Limits: Seal Beach OC to Junction SR-22 EB																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays																											
Fridays																											
Saturdays																											
Sundays																											
Legend: <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 10px; margin-right: 5px;"></div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 10px; margin-right: 5px;"></div> <div>No complete freeway closure is permitted.</div> </div>																											
REMARKS: (1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure. (2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.																											

Chart No. 55A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / SB								PM: 20.7 to 20.6											
Closure Limits: Junction SR-22 EB to Bolsa Chica OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	1																S	4	3	2		
Fridays		1	1	1	1	1																S	4	3	2		
Saturdays		1	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2		
Sundays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2		
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 55B Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / SB												PM: 20.7 to 20.6							
Closure Limits: Junction SR-22 EB to Bolsa Chica OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		C	C	C	C	C																				C	
Fridays		C	C	C	C	C																				C	
Saturdays		C	C	C	C	C	C																			C	
Sundays		C	C	C	C	C	C																			C	

Legend:

C

Freeway may be closed completely.

No complete freeway closure is permitted.

REMARKS:

(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.

(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.

Chart No. 56A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / SB								PM: 20.6 to 19.4											
Closure Limits: Bolsa Chica OC to Springdale OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	1																S	4	3	2		
Fridays		1	1	1	1	1																S	4	3	2		
Saturdays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2		
Sundays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2		
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 56B Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / SB												PM: 20.6 to 19.4							
Closure Limits: Bolsa Chica OC to Springdale OC																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays								C	C	C	C	C															C
Fridays								C	C	C	C	C															C
Saturdays								C	C	C	C	C	C														C
Sundays								C	C	C	C	C	C														C
Legend: <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> <div>Freeway may be closed completely.</div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> <div>No complete freeway closure is permitted.</div> </div>																											
REMARKS: (1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure. (2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.																											

Chart No. 57A																																
Freeway Lane Requirements																																
County: Orange								Route/Direction: 405 / SB										PM: 19.4 to 19.2														
Closure Limits: Springdale OC to Westminster OC																																
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																																
Mondays through Thursdays								1	1	1	1	1																S	4	3	2	
Fridays								1	1	1	1	1																S	4	3	2	
Saturdays								1	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2
Sundays								1	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																																
REMARKS:																																

Chart No. 57B Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / SB												PM: 19.4 to 19.2							
Closure Limits: Springdale OC to Westminster OC																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays								C	C	C	C	C															C
Fridays								C	C	C	C	C															C
Saturdays								C	C	C	C	C	C														C
Sundays								C	C	C	C	C	C														C
Legend: <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> <div>Freeway may be closed completely.</div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> <div>No complete freeway closure is permitted.</div> </div>																											
REMARKS: (1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure. (2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.																											

Chart No. 58A																																
Freeway Lane Requirements																																
County: Orange								Route/Direction: 405 / SB								PM: 19.2 to 18.6																
Closure Limits: Westminster OC to Edwards OC																																
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																																
Mondays through Thursdays								1	1	1	1	1															S	4	3	2		
Fridays								1	1	1	1	1														S	4	3	2			
Saturdays								2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
Sundays								2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div>1 Provide at least one through freeway lane open in direction of travel.</div> <div>2 Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div>3 Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div>4 Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div>S Work allowed within right shoulder area when lane closure is not required.</div> </div>																																
REMARKS:																																

Chart No. 58B Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / SB												PM: 19.2 to 18.6							
Closure Limits: Westminster OC to Edwards OC																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays								C	C	C	C	C															C
Fridays								C	C	C	C	C															C
Saturdays								C	C	C	C	C	C														C
Sundays								C	C	C	C	C	C														C
Legend: <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> <div>Freeway may be closed completely.</div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> <div>No complete freeway closure is permitted.</div> </div>																											
REMARKS: (1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure. (2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.																											

Chart No. 59A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / SB										PM: 18.6 to 17.9									
Closure Limits: Edwards OC to Goldenwest OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	1																S	4	3	2		
Fridays		1	1	1	1	1																S	4	3	2		
Saturdays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2		
Sundays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	2		
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 59B Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / SB												PM: 18.6 to 17.9							
Closure Limits: Edwards OC to Goldenwest OC																											
<div style="display: flex; justify-content: space-between;"> FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 </div>																											
Mondays through Thursdays								C	C	C	C	C															C
Fridays								C	C	C	C	C															C
Saturdays								C	C	C	C	C	C														C
Sundays								C	C	C	C	C	C														C
<p>Legend:</p> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Freeway may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> No complete freeway closure is permitted. </div>																											
<p>REMARKS:</p> <p>(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.</p> <p>(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.</p>																											

Chart No. 60A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / SB										PM: 17.9 to 17.8									
Closure Limits: Goldenwest OC to Bolsa OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	1																S	4	3	2		
Fridays		1	1	1	1	1																S	4	3	2		
Saturdays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2		
Sundays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2		
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 60B																									
Complete Freeway Closure Hours - Nightly																									
County: Orange						Route/Direction: 405 / SB										PM: 17.9 to 17.8									
Closure Limits: Goldenwest OC to Bolsa OC																									
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																									
Mondays through Thursdays						C	C	C	C	C															C
Fridays						C	C	C	C	C															C
Saturdays						C	C	C	C	C	C														C
Sundays						C	C	C	C	C	C														C
<p>Legend:</p> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> <div>Freeway may be closed completely.</div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> <div>No complete freeway closure is permitted.</div> </div>																									
<p>REMARKS:</p> <p>(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.</p> <p>(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.</p>																									

Chart No. 61A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / SB										PM: 17.8 to 17.0									
Closure Limits: Bolsa OC to McFadden OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	1																	S	4	3	2	
Fridays		1	1	1	1	1																	S	4	3	2	
Saturdays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
Sundays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div>1 Provide at least one through freeway lane open in direction of travel.</div> <div>2 Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div>3 Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div>4 Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div>S Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 61B Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / SB												PM: 17.8 to 17.0							
Closure Limits: Bolsa OC to McFadden OC																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays								C	C	C	C	C															C
Fridays								C	C	C	C	C															C
Saturdays								C	C	C	C	C	C														C
Sundays								C	C	C	C	C	C														C
Legend: <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> <div>Freeway may be closed completely.</div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> <div>No complete freeway closure is permitted.</div> </div>																											
REMARKS: (1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure. (2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.																											

Chart No. 62A Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / SB								PM: 17.0 to 16.5											
Closure Limits: McFadden OC to Junction SR-39/Beach UC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	1																S	4	3	2		
Fridays		1	1	1	1	1																S	4	3	2		
Saturdays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2		
Sundays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2		
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div>1 Provide at least one through freeway lane open in direction of travel.</div> <div>2 Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div>3 Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div>4 Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div>S Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 62B																												
Complete Freeway Closure Hours - Nightly																												
County: Orange								Route/Direction: 405 / SB										PM: 17.0 to 16.5										
Closure Limits: McFadden OC to Junction SR-39/Beach UC																												
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																												
Mondays through Thursdays								C	C	C	C	C																C
Fridays								C	C	C	C	C															C	
Saturdays								C	C	C	C	C	C														C	
Sundays								C	C	C	C	C	C														C	
<p>Legend:</p> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> <div>Freeway may be closed completely.</div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> <div>No complete freeway closure is permitted.</div> </div>																												
<p>REMARKS:</p> <p>(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.</p> <p>(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.</p>																												

Chart No. 63A																																
Freeway Lane Requirements																																
County: Orange								Route/Direction: 405 / SB								PM: 16.5 to 16.3																
Closure Limits: Junction SR-39/Beach UC to Edinger OC																																
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																																
Mondays through Thursdays								1	1	1	1	1																S	4	3	2	
Fridays								1	1	1	1	1																S	4	3	2	
Saturdays								2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2
Sundays								2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div>1 Provide at least one through freeway lane open in direction of travel.</div> <div>2 Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div>3 Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div>4 Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div>S Work allowed within right shoulder area when lane closure is not required.</div> </div>																																
REMARKS:																																

Chart No. 63B Complete Freeway Closure Hours - Nightly																												
County: Orange								Route/Direction: 405 / SB												PM: 16.5 to 16.3								
Closure Limits: Junction SR-39/Beach UC to Edinger OC																												
<div style="display: flex; justify-content: space-between;"> FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 </div>																												
Mondays through Thursdays								C	C	C	C	C																C
Fridays								C	C	C	C	C																C
Saturdays								C	C	C	C	C	C															C
Sundays								C	C	C	C	C	C															C
<p>Legend:</p> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Freeway may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> No complete freeway closure is permitted. </div>																												
<p>REMARKS:</p> <p>(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.</p> <p>(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.</p>																												

Chart No. 64A																																
Freeway Lane Requirements																																
County: Orange								Route/Direction: 405 / SB								PM: 16.3 to 15.9																
Closure Limits: Edinger OC to Newland OC																																
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																																
Mondays through Thursdays								1	1	1	1	1															S	4	3	2		
Fridays								1	1	1	1	1														S	4	3	2			
Saturdays								2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
Sundays								2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div>1 Provide at least one through freeway lane open in direction of travel.</div> <div>2 Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div>3 Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div>4 Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div>S Work allowed within right shoulder area when lane closure is not required.</div> </div>																																
REMARKS:																																

Chart No. 64B																											
Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / SB										PM: 16.3 to 15.9									
Closure Limits: Edinger OC to Newland OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		C	C	C	C	C																				C	
Fridays		C	C	C	C	C																				C	
Saturdays		C	C	C	C	C	C																			C	
Sundays		C	C	C	C	C	C																			C	
<p>Legend:</p> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> <div>Freeway may be closed completely.</div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> <div>No complete freeway closure is permitted.</div> </div>																											
<p>REMARKS:</p> <p>(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.</p> <p>(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.</p>																											

Chart No. 65A																																
Freeway Lane Requirements																																
County: Orange								Route/Direction: 405 / SB								PM: 15.9 to 15.5																
Closure Limits: Newland OC to Heil Pedestrian OC																																
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																																
Mondays through Thursdays								1	1	1	1	2																S	4	3	2	
Fridays								1	1	1	1	2																S	4	3	2	
Saturdays								2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2
Sundays								2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div>1 Provide at least one through freeway lane open in direction of travel.</div> <div>2 Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div>3 Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div>4 Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div>S Work allowed within right shoulder area when lane closure is not required.</div> </div>																																
REMARKS:																																

Chart No. 65B																												
Complete Freeway Closure Hours - Nightly																												
County: Orange								Route/Direction: 405 / SB										PM: 15.9 to 15.5										
Closure Limits: Newland OC to Heil Pedestrian OC																												
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																												
Mondays through Thursdays								C	C	C	C	C																C
Fridays								C	C	C	C	C															C	
Saturdays								C	C	C	C	C	C														C	
Sundays								C	C	C	C	C	C														C	
<p>Legend:</p> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> <div>Freeway may be closed completely.</div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> <div>No complete freeway closure is permitted.</div> </div>																												
<p>REMARKS:</p> <p>(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.</p> <p>(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.</p>																												

Chart No. 66A Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / SB								PM: 15.5 to 15.2											
Closure Limits: Heil Pedestrian OC to Magnolia OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	2																S	4	3	2		
Fridays		1	1	1	1	2																S	4	3	2		
Saturdays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2		
Sundays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2		
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 66B																													
Complete Freeway Closure Hours - Nightly																													
County: Orange								Route/Direction: 405 / SB										PM: 15.5 to 15.2											
Closure Limits: Heil Pedestrian OC to Magnolia OC																													
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																													
Mondays through Thursdays								C	C	C	C	C																	C
Fridays								C	C	C	C	C																	C
Saturdays								C	C	C	C	C	C																C
Sundays								C	C	C	C	C	C																C
<p>Legend:</p> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> <div>Freeway may be closed completely.</div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> <div>No complete freeway closure is permitted.</div> </div>																													
<p>REMARKS:</p> <p>(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.</p> <p>(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.</p>																													

Chart No. 67A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / SB										PM: 15.2 to 14.8									
Closure Limits: Magnolia OC to Warner OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	2																	S	4	3	2	
Fridays		1	1	1	1	2																	S	4	3	2	
Saturdays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
Sundays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 67B																													
Complete Freeway Closure Hours - Nightly																													
County: Orange								Route/Direction: 405 / SB										PM: 15.2 to 14.8											
Closure Limits: Magnolia OC to Warner OC																													
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																													
Mondays through Thursdays								C	C	C	C	C																	C
Fridays								C	C	C	C	C																	C
Saturdays								C	C	C	C	C	C																C
Sundays								C	C	C	C	C	C																C
<p>Legend:</p> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Freeway may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> No complete freeway closure is permitted. </div>																													
<p>REMARKS:</p> <p>(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.</p> <p>(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.</p>																													

Chart No. 68A Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / SB								PM: 14.8 to 14.5											
Closure Limits: Warner OC to Bushard OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	2																S	4	3	2		
Fridays		1	1	1	1	2																S	4	3	2		
Saturdays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2		
Sundays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2		
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div>1 Provide at least one through freeway lane open in direction of travel.</div> <div>2 Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div>3 Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div>4 Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div>S Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 68B																											
Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / SB										PM: 14.8 to 14.5									
Closure Limits: Warner OC to Bushard OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		C	C	C	C	C																				C	
Fridays		C	C	C	C	C																				C	
Saturdays		C	C	C	C	C	C																			C	
Sundays		C	C	C	C	C	C																			C	

Legend:

☐ C Freeway may be closed completely.

☐ No complete freeway closure is permitted.

REMARKS:

(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.

(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.

Chart No. 69A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / SB										PM: 14.5 to 14.1									
Closure Limits: Bushard OC to Slater OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	2																	S	4	3	2	
Fridays		1	1	1	1	2																	S	4	3	2	
Saturdays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
Sundays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div>1 Provide at least one through freeway lane open in direction of travel.</div> <div>2 Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div>3 Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div>4 Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div>S Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 69B Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / SB												PM: 14.5 to 14.1							
Closure Limits: Bushard OC to Slater OC																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays								C	C	C	C	C															C
Fridays								C	C	C	C	C															C
Saturdays								C	C	C	C	C	C														C
Sundays								C	C	C	C	C	C														C
Legend: <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> <div>Freeway may be closed completely.</div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> <div>No complete freeway closure is permitted.</div> </div>																											
REMARKS: (1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure. (2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.																											

Chart No. 70A Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / SB								PM: 14.1 to 13.8											
Closure Limits: Slater OC to Brookhurst OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	2																S	4	3	2		
Fridays		1	1	1	1	2																S	4	3	2		
Saturdays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	3		
Sundays		2	1	1	1	1	2	2	3	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2		
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div>1 Provide at least one through freeway lane open in direction of travel.</div> <div>2 Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div>3 Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div>4 Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div>S Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 70B																											
Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / SB										PM: 14.1 to 13.8									
Closure Limits: Slater OC to Brookhurst OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		C	C	C	C	C																				C	
Fridays		C	C	C	C	C																				C	
Saturdays		C	C	C	C	C	C																			C	
Sundays		C	C	C	C	C	C																			C	

Legend:

C Freeway may be closed completely.

No complete freeway closure is permitted.

REMARKS:

(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.

(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.

Chart No. 71A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / SB								PM: 13.8 to 13.4											
Closure Limits: Brookhurst OC to Talbert OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	2																	S	4	3	2	
Fridays		1	1	1	1	2																	S	4	3	2	
Saturdays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	3	
Sundays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 71B																												
Complete Freeway Closure Hours - Nightly																												
County: Orange								Route/Direction: 405 / SB										PM: 13.8 to 13.4										
Closure Limits: Brookhurst OC to Talbert OC																												
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																												
Mondays through Thursdays								C	C	C	C	C																C
Fridays								C	C	C	C	C															C	
Saturdays								C	C	C	C	C	C														C	
Sundays								C	C	C	C	C	C														C	
<p>Legend:</p> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> <div>Freeway may be closed completely.</div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> <div>No complete freeway closure is permitted.</div> </div>																												
<p>REMARKS:</p> <p>(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.</p> <p>(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.</p>																												

Chart No. 72A Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / SB										PM: 13.4 to 13.2									
Closure Limits: Talbert OC to Ward OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	2																	S	4	3	2	
Fridays		1	1	1	1	2																	S	4	3	2	
Saturdays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	3	
Sundays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 72B Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / SB												PM: 13.4 to 13.2							
Closure Limits: Talbert OC to Ward OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		C	C	C	C	C																				C	
Fridays		C	C	C	C	C																				C	
Saturdays		C	C	C	C	C	C																			C	
Sundays		C	C	C	C	C	C																			C	

Legend:

C

Freeway may be closed completely.

No complete freeway closure is permitted.

REMARKS:

(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.

(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.

Chart No. 73A Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / SB								PM: 13.2 to 12.5											
Closure Limits: Ward OC to Euclid UC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	2																S	4	3	2		
Fridays		1	1	1	1	2																S	4	3	2		
Saturdays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	3		
Sundays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2		
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div>1 Provide at least one through freeway lane open in direction of travel.</div> <div>2 Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div>3 Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div>4 Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div>S Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 73B																												
Complete Freeway Closure Hours - Nightly																												
County: Orange								Route/Direction: 405 / SB										PM: 13.2 to 12.5										
Closure Limits: Ward OC to Euclid UC																												
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																												
Mondays through Thursdays								C	C	C	C	C																C
Fridays								C	C	C	C	C															C	
Saturdays								C	C	C	C	C	C														C	
Sundays								C	C	C	C	C	C														C	
<p>Legend:</p> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> <div>Freeway may be closed completely.</div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> <div>No complete freeway closure is permitted.</div> </div>																												
<p>REMARKS:</p> <p>(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.</p> <p>(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.</p>																												

Chart No. 74A Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / SB										PM: 12.5 to 11.5									
Closure Limits: Euclid UC to Harbor UC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	2																	S	4	3	2	
Fridays		1	1	1	1	2																	S	4	3	3	
Saturdays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	3	
Sundays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 74B																													
Complete Freeway Closure Hours - Nightly																													
County: Orange								Route/Direction: 405 / SB										PM: 12.5 to 11.5											
Closure Limits: Euclid UC to Harbor UC																													
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																													
Mondays through Thursdays								C	C	C	C	C																	C
Fridays								C	C	C	C	C																	C
Saturdays								C	C	C	C	C	C																C
Sundays								C	C	C	C	C	C																C
<p>Legend:</p> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> <div>Freeway may be closed completely.</div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 10px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> <div>No complete freeway closure is permitted.</div> </div>																													
<p>REMARKS:</p> <p>(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.</p> <p>(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.</p>																													

Chart No. 75A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / SB										PM: 11.5 to 10.8									
Closure Limits: Harbor UC to Fairview OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	2																	S	4	3	2	
Fridays		1	1	1	1	2																	S	4	3	3	
Saturdays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	3	
Sundays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center; line-height: 10px;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 75B Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / SB												PM: 11.5 to 10.8							
Closure Limits: Harbor UC to Fairview OC																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays								C	C	C	C	C															C
Fridays								C	C	C	C	C															C
Saturdays								C	C	C	C	C	C														C
Sundays								C	C	C	C	C	C														C
Legend: <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> <div>Freeway may be closed completely.</div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> <div>No complete freeway closure is permitted.</div> </div>																											
REMARKS: (1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure. (2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.																											

Chart No. 76A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / SB								PM: 10.8 to 10.3											
Closure Limits: Fairview OC to Junction SR-73																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	2																	S	4	3	2	
Fridays		1	1	1	1	2																	S	4	3	2	
Saturdays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	3	
Sundays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 76B Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / SB												PM: 10.8 to 10.3							
Closure Limits: Fairview OC to Junction SR-73																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays								C	C	C	C	C															C
Fridays								C	C	C	C	C															C
Saturdays								C	C	C	C	C	C														C
Sundays								C	C	C	C	C	C														C
Legend: <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> <div>Freeway may be closed completely.</div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> <div>No complete freeway closure is permitted.</div> </div>																											
REMARKS: (1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure. (2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.																											

Chart No. 77A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 405 / SB								PM: 10.3 to 9.9											
Closure Limits: Junction SR-73 to Bear OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	2																	S	4	3	2	
Fridays		1	1	1	1	2																	S	4	3	2	
Saturdays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	3	
Sundays		2	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2	
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div>1 Provide at least one through freeway lane open in direction of travel.</div> <div>2 Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div>3 Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div>4 Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div>S Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 77B																											
Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 405 / SB										PM: 10.3 to 9.9									
Closure Limits: Junction SR-73 to Bear OC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays																											
Fridays																											
Saturdays																											
Sundays																											
<p>Legend:</p> <div><div></div></div> <div><div></div> No complete freeway closure is permitted.</div>																											
<p>REMARKS:</p>																											

Chart No. 78A																											
Freeway Lane Requirements																											
County: Orange								Route/Direction: 73 / SB								PM: R27.6 to R27.3											
Closure Limits: Fairview Road On-ramp OC to Bear UC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		1	1	1	1	2																S	4	3	2		
Fridays		1	1	1	1	2																S	4	3	2		
Saturdays		1	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2		
Sundays		1	1	1	1	1	2	3	4	S	S	S	S	S	S	S	S	S	S	S	S	S	4	3	2		
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">1</div> Provide at least one through freeway lane open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">3</div> Provide at least three adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">4</div> Provide at least four adjacent through freeway lanes open in direction of travel.</div> <div><div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">S</div> Work allowed within right shoulder area when lane closure is not required.</div> </div>																											
REMARKS:																											

Chart No. 78B Complete Freeway Closure Hours - Nightly																											
County: Orange								Route/Direction: 73 / SB										PM: R27.6 to R27.3									
Closure Limits: Fairview Road On-ramp OC to Bear UC																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		C	C	C	C	C																					C
Fridays		C	C	C	C	C																					C
Saturdays		C	C	C	C	C	C																				C
Sundays		C	C	C	C	C	C																				C

Legend:

C

Freeway may be closed completely.

No complete freeway closure is permitted.

REMARKS:

(1) Provide detour route and coordinate with Caltrans regarding other mainline segment closures in conjunction with this nightly closure.

(2) Nightly complete freeway closure in one or both directions may be allowed as necessary for safety of motorists during bridge demolitions, falsework set-up/removals, bridge deck installations, and lifting of pile cages greater than 100 feet in length. Nightly complete freeway closures are allowed within the hours shown above in the chart. For hours beyond the hours shown above, submit a request in writing, along with proposed detour plans, supporting traffic analysis and revised TMP to the Authority, Caltrans and affected Corridor Cities for review and approval.

Freeway Ramps and Connectors

LANE CLOSURE CHARTS INDEX

FREEWAY RAMPS AND CONNECTORS

NIGHTLY CLOSURES (A), SHORT/LONG TERM CLOSURES (B) AND LANE REQUIREMENTS (C)

Chart No.	Direction	Closure Limits	Post Mile	Type A	Type B (Nightly)	Type C (10/30 days)
NORTHBOUND RAMPS (From South to North)						
100	73 NB	On-Ramp from Bear	R27.435		10pm	
101	73 NB	Off-Ramp to Fairview	R27.741		10pm	
102	73-405 NB	NB SR-73 to NB I-405 Connector (Upstream from Susan/Harbor Exit)	R27.741	Lane Requirements	11pm	
103	405 NB	Loop On-Ramp from NB Bristol	9.470		10pm	
104	405 NB	Direct On-Ramp from SB Bristol	9.663		10pm	
105	405 NB	Off-Ramp to South Coast/Fairview/Susan/Harbor CD Road	10.036		11pm	
106	405 NB CD	Off-Ramp to South Coast	10.270		10pm	Long Term
107	405 NB CD	Off-Ramp to Fairview	10.481		10pm	Long Term
108	405 NB CD	Off-Ramp to Susan	11.045		10pm	Short Term
109	405 NB CD	Off-Ramp to Harbor	11.268		10pm	
110	73-405 NB	NB SR-73 to NB I-405 Connector (Downstream from Susan/Harbor Exit)	10.513	Lane Requirements	11pm	
111	405 NB	On-Ramp from Fairview	10.928		10pm	Long Term
112	405 NB	Loop On-Ramp from NB Harbor	11.438		10pm	Long Term
113	405 NB	On-Ramp from Hyland	11.959		10pm	Short Term
114	405 NB	Off-Ramp to Euclid	12.640		11pm	Short Term
115	405 NB	On-Ramp from Euclid	12.873		10pm	Short Term
116	405 NB	Off-Ramp to Brookhurst CD Road	13.543		10pm	
117	405 NB CD	Off-Ramp to NB Brookhurst	13.548		10pm	Short Term
118	405 NB CD	Loop On-Ramp from NB Brookhurst	13.745		10pm	Short Term
119	405 NB CD	Loop Off-Ramp to SB Brookhurst	13.905		10pm	
120	405 NB CD	On-Ramp from SB Brookhurst	13.979		10pm	Short Term
121	405 NB	On-Ramp from Brookhurst CD Road	14.057		10pm	
122	405 NB	Off-Ramp to Warner/Magnolia CD Road	14.704		10pm	
123	405 NB CD	Loop Off-Ramp to WB Warner	14.819		10pm	Short Term
124	405 NB CD	On-Ramp from WB Warner	14.882		10pm	Short Term
125	405 NB CD	Off-Ramp to NB Magnolia	15.076		10pm	Short Term
126	405 NB CD	Loop On-Ramp from NB Magnolia	15.174		10pm	Short Term
127	405 NB CD	On-Ramp from SB Magnolia	15.419		10pm	Short Term
128	405 NB	On-Ramp from Magnolia/Warner CD Road	15.509		10pm	
129	405 NB	Off-Ramp to Beach CD Road	16.209		11pm	
130	405 NB CD	Off-Ramp to NB Beach	16.383		11pm	Short Term
131	405 NB CD	Loop On-Ramp from NB Beach	16.508		11pm	Short Term
132	405 NB CD	Loop Off-Ramp to SB Beach	16.675		11pm	
133	405 NB CD	On-Ramp from SB Beach	16.798		11pm	Short Term
134	405 NB	On-Ramp from Beach CD Road	16.871		11pm	
135	405 NB	Loop Off-Ramp to WB Bolsa	17.696		10pm	Short Term
136	405 NB	Loop On-Ramp from NB Goldenwest	17.935		10pm	Short Term

LANE CLOSURE CHARTS INDEX

FREEWAY RAMPS AND CONNECTORS						
NIGHTLY CLOSURES (A), SHORT/LONG TERM CLOSURES (B) AND LANE REQUIREMENTS (C)						
Chart No.	Direction	Closure Limits	Post Mile	Type A	Type B (Nightly)	Type C (10/30 days)
137	405 NB	Off-Ramp to Westminster CD Road	18.789		10pm	
138	405 NB CD	Off-Ramp to Westminster	18.902		10pm	
139	405 NB CD	Loop Off-Ramp to WB Westminster	18.903		10pm	Short Term
140	405 NB	On-Ramp from Westminster	19.290		10pm	Short Term
141	405 NB	Off-Ramp to Bolsa Chica	20.277		10pm	Short Term
142	22-405 NB	WB SR-22 GP to NB I-405 GP Connector	20.910	Lane Requirements	11pm	
143	22-405 NB	WB SR-22 HOV to NB I-405 HOV Connector	21.167		11pm	
144	405 NB	Off-Ramp to Seal Beach	22.386		11pm	Short Term
145	405 NB	Loop On-Ramp from Seal Beach	22.558		10pm	
146	405-22 NB	NB I-405 to WB SR-22 Connector/7th	23.036		10pm	
147	405-605 NB	NB I-405 GP to NB I-605 GP Connector	23.828	Lane Requirements	12am	
148	405-605 NB	NB I-405 HOV to NB I-605 HOV Connector	23.376		11pm	
149	22 WB	On-Ramp from Old Ranch	23.036		10pm	Short Term
SOUTHBOUND RAMPS (From North to South)						
200	605-405 SB	SB I-605 GP to SB I-405 GP Connector	23.550	Lane Requirements	12am	
201	22-405 SB	EB SR-22 to SB I-405 Connector	23.179		11pm	
202	605-405 SB	SB I-605 HOV to SB I-405 HOV Connector	23.345		11pm	
203	405 SB	Off-Ramp to Seal Beach	22.705		10pm	Long Term
204	405 SB	On-Ramp from Seal Beach	22.518		10pm	Short Term
205	405 SB-22EB	SB I-405 GP to EB SR-22 GP Connector	21.107	Lane Requirements	11pm	
206	405 SB-22EB	SB I-405 HOV to EB SR-22 HOV Connector	21.154		10pm	
207	405 SB	Off-Ramp to SB Bolsa Chica	20.851		10pm	
208	405 SB	Loop On-Ramp from SB Bolsa Chica	20.511		10pm	Short Term
209	405 SB	Off-Ramp to Springdale/Westminster CD Road	19.528		10pm	
210	405 SB CD	Off-Ramp to Springdale	19.414		10pm	Short Term
211	405 SB CD	Loop Off-Ramp to EB Westminster	19.415		10pm	Short Term
212	405 SB	On-Ramp from Westminster	19.012		10pm	Long Term
213	405 SB	Off-Ramp to Goldenwest/Bolsa CD Road	18.028		10pm	
214	405 SB CD	Off-Ramp to Goldenwest/Westminster Mall	17.937		10pm	Short Term
215	405 SB CD	Loop On-Ramp from SB Goldenwest/Westminster Mall	17.988		10pm	Short Term
216	405 SB CD	Loop Off-Ramp to EB Bolsa	17.728		10pm	Short Term
217	405 SB CD	On-Ramp from EB Bolsa	17.630		10pm	Long Term
218	405 SB	On-Ramp from Bolsa/Goldenwest CD Road	17.554		10pm	
219	405 SB	Off-Ramp to Beach CD Road	16.810		10pm	
220	405 SB CD	Off-Ramp to Beach/Center	16.714		10pm	
221	405 SB CD	Loop On-Ramp from SB Beach/Center	16.595		10pm	Short Term
222	405 SB CD	Loop Off-Ramp to NB Beach	16.467		10pm	
223	405 SB	On-Ramp from Beach CD Road	16.412		10pm	

LANE CLOSURE CHARTS INDEX

FREEWAY RAMP AND CONNECTORS

NIGHTLY CLOSURES (A), SHORT/LONG TERM CLOSURES (B) AND LANE REQUIREMENTS (C)

Chart No.	Direction	Closure Limits	Post Mile	Type A	Type B (Nightly)	Type C (10/30 days)
224	405 SB	On-Ramp from EB Edinger	16.208		10pm	Short Term
225	405 SB	Off-Ramp to Magnolia	15.364		10pm	Long Term
226	405 SB	Loop On-Ramp from SB Magnolia	15.135		10pm	Short Term
227	405 SB	Loop Off-Ramp to EB Warner	14.848		10pm	Short Term
228	405 SB	On-Ramp from EB Warner	14.698		10pm	Long Term
229	405 SB	Off-Ramp to Brookhurst CD Road	14.014		10pm	
230	405 SB CD	Off-Ramp to SB Brookhurst	13.901		10pm	Short Term
231	405 SB CD	Loop On-Ramp from SB Brookhurst	13.814		10pm	Short Term
232	405 SB CD	Loop Off-Ramp to NB Brookhurst	13.670		10pm	
233	405 SB	On-Ramp from Brookhurst CD Road	13.626		10pm	
234	405 SB	On-Ramp from EB Talbert	13.356		10pm	Long Term
235	405 SB	Off-Ramp to Euclid	12.707		10pm	Short Term
236	405 SB	Loop On-Ramp from Euclid	12.554		10pm	Short Term
237	405 SB	Off-Ramp to Harbor	11.675		10pm	Short Term
238	405 SB	Loop On-Ramp from SB Harbor	11.495		10pm	Short Term
239	405 SB	On-Ramp from NB Harbor	11.292		10pm	Long Term
240	405 SB	Off-Ramp to Fairview	10.933		10pm	Long Term
241	405-73 SB	SB I-405 to SB SR-73 Connector	10.508	Lane Requirements	10pm	
242	405 SB	On-Ramp from Fairview	10.187		10pm	Short Term
243	405 SB	Off-Ramp to Bristol	9.745		10pm	
244	73 SB	On-Ramp from Fairview	R27.728		10pm	Short Term
245	73 SB	Off-Ramp to Bear	R27.416		10pm	

LEGEND:

10pm Nightly Closures: 10pm-5am Weekdays. 10pm-6am or 7am Weekends.
11pm Nightly Closures: 11pm-5am Weekdays. 11pm-6am or 7am Weekends.
12Am Nightly Closures: 12Am-5am Weekdays. 12am-6am or 7am Weekends.
Short Term - 24-Hrs Complete closure for up to 10 days
Long Term - 24-Hrs Complete closure for up to 30 days.

Chart No. 100B Complete Ramp Closure - Nightly																										
County: Orange	Route/Direction: 73 / NB												PM: R27.435													
Closure Limits: On-Ramp from Bear																										
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays	C	C	C	C	C																			C	C	
Fridays	C	C	C	C	C																			C	C	
Saturdays	C	C	C	C	C	C	C																	C	C	
Sundays	C	C	C	C	C	C	C																	C	C	
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																										
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																										

Chart No. 101B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 73 / NB												PM: R27.741												
Closure Limits: Off-Ramp to Fairview																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																			C	C
Fridays	C	C	C	C	C																			C	C
Saturdays	C	C	C	C	C	C	C																	C	C
Sundays	C	C	C	C	C	C	C																	C	C
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 102A																										
Connector Lane Requirements																										
County: Orange						Route/Direction: 73-405 / NB										PM: R27.7 to 11.3										
Closure Limits: NB I-405 Connector (Upstream from Susan/Harbor Exit)																										
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays		1	1	1	1	1																				1
Fridays		1	1	1	1	1																				1
Saturdays		1	1	1	1	1	1	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	1
Sundays		1	1	1	1	1	1	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	1
<p>Legend:</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div> Work permitted within project right of way where shoulder or lane closure is not required.</div> <div>1 Provide at least one through connector lane open in direction of travel.</div> <div>2 Provide at least two adjacent through connector lanes open in direction of travel.</div> <div>S Work allowed within right shoulder area when lane closure is not required.</div> </div>																										
REMARKS:																										

Chart No. 102B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 73-405 / NB														PM: R27.741												
Closure Limits: NB SR-73 to NB I-405 Connector (Upstream from Susan/Harbor Exit)																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																				C		
Fridays	C	C	C	C	C																				C		
Saturdays	C	C	C	C	C	C	C																		C		
Sundays	C	C	C	C	C	C	C																		C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 103B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 405 / NB												PM: 9.47												
Closure Limits: Loop On-Ramp from NB Bristol																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																			C	C
Fridays	C	C	C	C	C																			C	C
Saturdays	C	C	C	C	C	C	C																	C	C
Sundays	C	C	C	C	C	C	C																	C	C
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 104B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / NB														PM: 9.663												
Closure Limits: Direct On-Ramp from SB Bristol																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 105B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / NB														PM: 10.036												
Closure Limits: Off-Ramp to South Coast/Fairview/Susan/Harbor CD Road																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																				C		
Fridays	C	C	C	C	C																				C		
Saturdays	C	C	C	C	C	C	C																		C		
Sundays	C	C	C	C	C	C	C																		C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 106B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 405 / NB												PM: 10.27												
Closure Limits: Off-Ramp to South Coast																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																			C	C
Fridays	C	C	C	C	C																			C	C
Saturdays	C	C	C	C	C	C	C																	C	C
Sundays	C	C	C	C	C	C	C																	C	C
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 106C																											
Complete Ramp Closure - Long-Term																											
County: Orange				Route/Direction: 405 / NB												PM: 10.27											
Closure Limits: Off-Ramp to South Coast																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
<div>Legend:</div> <div><div>C</div> Ramp may be closed completely.</div>																											
REMARKS: Ramp may be closed completely for up to 30 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 107B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / NB														PM: 10.481												
Closure Limits: Off-Ramp to Fairview																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 107C																											
Complete Ramp Closure - Long-Term																											
County: Orange				Route/Direction: 405 / NB												PM: 10.481											
Closure Limits: Off-Ramp to Fairview																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
<div>Legend:</div> <div><div>C</div> Ramp may be closed completely.</div>																											
REMARKS: Ramp may be closed completely for up to 30 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 108B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 405 / NB												PM: 11.045												
Closure Limits: Off-Ramp to Susan																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																			C	C
Fridays	C	C	C	C	C																			C	C
Saturdays	C	C	C	C	C	C	C																	C	C
Sundays	C	C	C	C	C	C	C																	C	C
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 108C Complete Ramp Closure - Short-Term																											
County: Orange	Route/Direction: 405 / NB														PM: 11.045												
Closure Limits: Off-Ramp to Susan																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Legend: <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div>																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 109B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 405 / NB												PM: 11.268												
Closure Limits: Off-Ramp to Harbor																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																			C	C
Fridays	C	C	C	C	C																			C	C
Saturdays	C	C	C	C	C	C	C																	C	C
Sundays	C	C	C	C	C	C	C																	C	C
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 110A																										
Connector Lane Requirements																										
County: Orange					Route/Direction: 73-405 / NB										PM: 11.3 to 10.5											
Closure Limits: NB I-405 Connector (Downstream from Susan/Harbor Exit)																										
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays		1	1	1	1	1																				1
Fridays		1	1	1	1	1																				1
Saturdays		1	1	1	1	1	1	1	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	1
Sundays		1	1	1	1	1	1	1	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	1
Legend:																										
<div></div>		Work permitted within project right of way where shoulder or lane closure is not required.																								
<div>1</div>		Provide at least one through connector lane open in direction of travel.																								
<div>2</div>		Provide at least two adjacent through connector lanes open in direction of travel.																								
<div>S</div>		Work allowed within right shoulder area when lane closure is not required.																								
REMARKS:																										

Chart No. 110B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 73-405 / NB															PM: 10.513									
Closure Limits: NB SR-73 to NB I-405 Connector (Downstream from Susan/Harbor Exit)																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																				C
Fridays	C	C	C	C	C																				C
Saturdays	C	C	C	C	C	C	C																		C
Sundays	C	C	C	C	C	C	C																		C
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 111B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 405 / NB												PM: 10.928												
Closure Limits: On-Ramp from Fairview																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																			C	C
Fridays	C	C	C	C	C																			C	C
Saturdays	C	C	C	C	C	C	C																	C	C
Sundays	C	C	C	C	C	C	C																	C	C
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 111C																											
Complete Ramp Closure - Long-Term																											
County: Orange				Route/Direction: 405 / NB												PM: 10.928											
Closure Limits: On-Ramp from Fairview																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
<div>Legend:</div> <div><div>C</div> Ramp may be closed completely.</div>																											
REMARKS: Ramp may be closed completely for up to 30 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 112B Complete Ramp Closure - Nightly																												
County: Orange								Route/Direction: 405 / NB												PM: 11.438								
Closure Limits: Loop On-Ramp from NB Harbor																												
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																												
Mondays through Thursdays								C	C	C	C	C															C	C
Fridays								C	C	C	C	C															C	C
Saturdays								C	C	C	C	C	C	C													C	C
Sundays								C	C	C	C	C	C	C													C	C
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																												
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																												

Chart No. 112C																											
Complete Ramp Closure - Long-Term																											
County: Orange					Route/Direction: 405 / NB													PM: 11.438									
Closure Limits: Loop On-Ramp from NB Harbor																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
<div>Legend:</div> <div><div>C</div> Ramp may be closed completely.</div>																											
REMARKS: Ramp may be closed completely for up to 30 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 113B Complete Ramp Closure - Nightly																										
County: Orange	Route/Direction: 405 / NB												PM: 11.959													
Closure Limits: On-Ramp from Hyland																										
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays	C	C	C	C	C																			C	C	
Fridays	C	C	C	C	C																			C	C	
Saturdays	C	C	C	C	C	C	C																	C	C	
Sundays	C	C	C	C	C	C	C																	C	C	
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																										
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																										

Chart No. 113C Complete Ramp Closure - Short-Term																											
County: Orange				Route/Direction: 405 / NB												PM: 11.959											
Closure Limits: On-Ramp from Hyland																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
<div>Legend:</div> <div><div>C</div> Ramp may be closed completely.</div>																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 114B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / NB														PM: 12.64												
Closure Limits: Off-Ramp to Euclid																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																				C		
Fridays	C	C	C	C	C																				C		
Saturdays	C	C	C	C	C	C	C																		C		
Sundays	C	C	C	C	C	C	C																		C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 114C																														
Complete Ramp Closure - Short-Term																														
County: Orange								Route/Direction: 405 / NB												PM: 12.64										
Closure Limits: Off-Ramp to Euclid																														
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																														
Mondays through Thursdays								C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays								C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays								C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Sundays								C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
<p>Legend:</p> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px 5px; margin-right: 5px;">C</div> Ramp may be closed completely. </div>																														
<p>REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.</p>																														

Chart No. 115B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / NB														PM: 12.873												
Closure Limits: On-Ramp from Euclid																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 115C																											
Complete Ramp Closure - Short-Term																											
County: Orange					Route/Direction: 405 / NB															PM: 12.873							
Closure Limits: On-Ramp from Euclid																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
<div>Legend:</div> <div><div>C</div> Ramp may be closed completely.</div>																											
<div>REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.</div>																											

Chart No. 116B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 405 / NB												PM: 13.543												
Closure Limits: Off-Ramp to Brookhurst CD Road																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																			C	C
Fridays	C	C	C	C	C																			C	C
Saturdays	C	C	C	C	C	C	C																	C	C
Sundays	C	C	C	C	C	C	C																	C	C
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 117B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 405 / NB												PM: 13.548												
Closure Limits: Off-Ramp to NB Brookhurst																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																			C	C
Fridays	C	C	C	C	C																			C	C
Saturdays	C	C	C	C	C	C	C																	C	C
Sundays	C	C	C	C	C	C	C																	C	C
Legend: <div style="display: flex; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 117C																											
Complete Ramp Closure - Short-Term																											
County: Orange				Route/Direction: 405 / NB												PM: 13.548											
Closure Limits: Off-Ramp to NB Brookhurst																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Legend: <div><div>C</div> Ramp may be closed completely.</div>																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 118B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / NB														PM: 13.745												
Closure Limits: Loop On-Ramp from NB Brookhurst																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 118C																											
Complete Ramp Closure - Short-Term																											
County: Orange						Route/Direction: 405 / NB												PM: 13.745									
Closure Limits: Loop On-Ramp from NB Brookhurst																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays						C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays						C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays						C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays						C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
<div>Legend:</div> <div><div>C</div> Ramp may be closed completely.</div>																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 119B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / NB														PM: 13.905												
Closure Limits: Loop Off-Ramp to SB Brookhurst																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 119C																											
Complete Ramp Closure - Short-Term																											
County: Orange					Route/Direction: 405 / NB														PM: 13.905								
Closure Limits: Loop Off-Ramp to SB Brookhurst																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
<div>Legend:</div> <div><div>C</div> Ramp may be closed completely.</div>																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 120B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 405 / NB												PM: 13.979												
Closure Limits: On-Ramp from SB Brookhurst																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																		C	C	
Fridays	C	C	C	C	C																		C	C	
Saturdays	C	C	C	C	C	C	C																C	C	
Sundays	C	C	C	C	C	C	C																C	C	
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 120C Complete Ramp Closure - Short-Term																											
County: Orange					Route/Direction: 405 / NB														PM: 13.979								
Closure Limits: On-Ramp from SB Brookhurst																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Legend: <div>C</div> Ramp may be closed completely.																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 121B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 405 / NB												PM: 14.057												
Closure Limits: On-Ramp from Brookhurst CD Road																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																			C	C
Fridays	C	C	C	C	C																			C	C
Saturdays	C	C	C	C	C	C	C																	C	C
Sundays	C	C	C	C	C	C	C																	C	C
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 122B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / NB														PM: 14.704												
Closure Limits: Off-Ramp to Warner/Magnolia CD Road																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 123B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 405 / NB												PM: 14.819												
Closure Limits: Loop Off-Ramp to WB Warner																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																			C	C
Fridays	C	C	C	C	C																			C	C
Saturdays	C	C	C	C	C	C	C																	C	C
Sundays	C	C	C	C	C	C	C																	C	C
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 123C																											
Complete Ramp Closure - Short-Term																											
County: Orange					Route/Direction: 405 / NB													PM: 14.819									
Closure Limits: Loop Off-Ramp to WB Warner																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
<div>Legend:</div> <div><div>C</div> Ramp may be closed completely.</div>																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 124B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 405 / NB												PM: 14.882												
Closure Limits: On-Ramp from WB Warner																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																			C	C
Fridays	C	C	C	C	C																			C	C
Saturdays	C	C	C	C	C	C	C																	C	C
Sundays	C	C	C	C	C	C	C																	C	C
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 124C																											
Complete Ramp Closure - Short-Term																											
County: Orange					Route/Direction: 405 / NB															PM: 14.882							
Closure Limits: On-Ramp from WB Warner																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Legend: <div>C</div> Ramp may be closed completely.																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 125B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 405 / NB												PM: 15.076												
Closure Limits: Off-Ramp to NB Magnolia																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																			C	C
Fridays	C	C	C	C	C																			C	C
Saturdays	C	C	C	C	C	C	C																	C	C
Sundays	C	C	C	C	C	C	C																	C	C
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 125C Complete Ramp Closure - Short-Term																											
County: Orange	Route/Direction: 405 / NB														PM: 15.076												
Closure Limits: Off-Ramp to NB Magnolia																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Legend: <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div>																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 126B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 405 / NB												PM: 15.174												
Closure Limits: Loop On-Ramp from NB Magnolia																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																			C	C
Fridays	C	C	C	C	C																			C	C
Saturdays	C	C	C	C	C	C	C																	C	C
Sundays	C	C	C	C	C	C	C																	C	C
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 126C Complete Ramp Closure - Short-Term																											
County: Orange	Route/Direction: 405 / NB														PM: 15.174												
Closure Limits: Loop On-Ramp from NB Magnolia																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Legend: <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div>																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 127B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 405 / NB												PM: 15.419												
Closure Limits: On-Ramp from SB Magnolia																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																			C	C
Fridays	C	C	C	C	C																			C	C
Saturdays	C	C	C	C	C	C	C																	C	C
Sundays	C	C	C	C	C	C	C																	C	C
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 127C																											
Complete Ramp Closure - Short-Term																											
County: Orange				Route/Direction: 405 / NB												PM: 15.419											
Closure Limits: On-Ramp from SB Magnolia																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
<div>Legend:</div> <div><div>C</div> Ramp may be closed completely.</div>																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 128B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / NB														PM: 15.509												
Closure Limits: On-Ramp from Magnolia/Warner CD Road																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 129B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / NB														PM: 16.209												
Closure Limits: Off-Ramp to Beach CD Road																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																				C		
Fridays	C	C	C	C	C																				C		
Saturdays	C	C	C	C	C	C																			C		
Sundays	C	C	C	C	C	C																			C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 130B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / NB														PM: 16.383												
Closure Limits: Off-Ramp to NB Beach																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																				C		
Fridays	C	C	C	C	C																				C		
Saturdays	C	C	C	C	C	C																			C		
Sundays	C	C	C	C	C	C																			C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 130C																											
Complete Ramp Closure - Short-Term																											
County: Orange							Route/Direction: 405 / NB														PM: 16.383						
Closure Limits: Off-Ramp to NB Beach																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays							C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays							C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays							C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays							C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
<div>Legend:</div> <div><div>C</div> Ramp may be closed completely.</div>																											
<div>REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.</div>																											

Chart No. 131B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / NB														PM: 16.508												
Closure Limits: Loop On-Ramp from NB Beach																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																				C		
Fridays	C	C	C	C	C																				C		
Saturdays	C	C	C	C	C	C																			C		
Sundays	C	C	C	C	C	C																			C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 131C Complete Ramp Closure - Short-Term																											
County: Orange					Route/Direction: 405 / NB														PM: 16.508								
Closure Limits: Loop On-Ramp from NB Beach																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Legend: <div>C</div> Ramp may be closed completely.																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 132B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 405 / NB												PM: 16.675												
Closure Limits: Loop Off-Ramp to SB Beach																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																				C
Fridays	C	C	C	C	C																				C
Saturdays	C	C	C	C	C	C																			C
Sundays	C	C	C	C	C	C																			C
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 132C																											
Complete Ramp Closure - Short-Term																											
County: Orange					Route/Direction: 405 / NB													PM: 16.675									
Closure Limits: Loop Off-Ramp to SB Beach																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Legend: <div>C</div> Ramp may be closed completely.																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 133B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / NB														PM: 16.798												
Closure Limits: On-Ramp from SB Beach																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																				C		
Fridays	C	C	C	C	C																				C		
Saturdays	C	C	C	C	C	C																			C		
Sundays	C	C	C	C	C	C																			C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 133C																											
Complete Ramp Closure - Short-Term																											
County: Orange					Route/Direction: 405 / NB													PM: 16.798									
Closure Limits: On-Ramp from SB Beach																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Legend: <div>C</div> Ramp may be closed completely.																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 134B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / NB														PM: 16.871												
Closure Limits: On-Ramp from Beach CD Road																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																					C	
Fridays	C	C	C	C	C																					C	
Saturdays	C	C	C	C	C	C	C																			C	
Sundays	C	C	C	C	C	C	C																			C	
Legend: <div style="display: flex; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 135B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 405 / NB												PM: 17.696												
Closure Limits: Loop Off-Ramp to WB Bolsa																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																			C	C
Fridays	C	C	C	C	C																			C	C
Saturdays	C	C	C	C	C	C	C																	C	C
Sundays	C	C	C	C	C	C	C																	C	C
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 135C Complete Ramp Closure - Short-Term																											
County: Orange				Route/Direction: 405 / NB												PM: 17.696											
Closure Limits: Loop Off-Ramp to WB Bolsa																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
<div>Legend:</div> <div><div>C</div> Ramp may be closed completely.</div>																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 136B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / NB														PM: 17.935												
Closure Limits: Loop On-Ramp from NB Goldenwest																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 136C																											
Complete Ramp Closure - Short-Term																											
County: Orange					Route/Direction: 405 / NB													PM: 17.935									
Closure Limits: Loop On-Ramp from NB Goldenwest																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Legend: <div>C</div> Ramp may be closed completely.																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 137B Complete Ramp Closure - Nightly																											
County: Orange								Route/Direction: 405 / NB												PM: 18.789							
Closure Limits: Off-Ramp to Westminster CD Road																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C																				C	C	
Fridays	C	C	C	C	C																				C	C	
Saturdays	C	C	C	C	C	C	C																		C	C	
Sundays	C	C	C	C	C	C	C																		C	C	
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 138B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / NB														PM: 18.902												
Closure Limits: Off-Ramp to Westminster																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 138C Complete Ramp Closure - Short-Term																											
County: Orange	Route/Direction: 405 / NB														PM: 18.902												
Closure Limits: Off-Ramp to Westminster																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Legend: <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div>																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 139B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 405 / NB															PM: 18.903									
Closure Limits: Loop Off-Ramp to WB Westminster																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																			C	C
Fridays	C	C	C	C	C																			C	C
Saturdays	C	C	C	C	C	C	C																	C	C
Sundays	C	C	C	C	C	C	C																	C	C
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 139C Complete Ramp Closure - Short-Term																											
County: Orange					Route/Direction: 405 / NB														PM: 18.903								
Closure Limits: Loop Off-Ramp to WB Westminster																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
<div>Legend:</div> <div><div>C</div> Ramp may be closed completely.</div>																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 140B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 405 / NB												PM: 19.29												
Closure Limits: On-Ramp from Westminster																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																			C	C
Fridays	C	C	C	C	C																			C	C
Saturdays	C	C	C	C	C	C	C																	C	C
Sundays	C	C	C	C	C	C	C																	C	C
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 140C Complete Ramp Closure - Short-Term																											
County: Orange	Route/Direction: 405 / NB														PM: 19.29												
Closure Limits: On-Ramp from Westminster																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Legend: <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div>																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 141B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 405 / NB												PM: 20.277												
Closure Limits: Off-Ramp to Bolsa Chica																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																			C	C
Fridays	C	C	C	C	C																			C	C
Saturdays	C	C	C	C	C	C	C																	C	C
Sundays	C	C	C	C	C	C	C																	C	C
Legend: <div style="display: flex; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 141C Complete Ramp Closure - Short-Term																											
County: Orange					Route/Direction: 405 / NB													PM: 20.277									
Closure Limits: Off-Ramp to Bolsa Chica																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Legend: <div>C</div> Ramp may be closed completely.																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 142A																										
Connector Lane Requirements																										
County: Orange					Route/Direction: 22-405 / NB										PM: R0.9 to 20.9											
Closure Limits: WB SR-22 GP to NB I-405 GP Connector																										
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays		1	1	1	1	1																				1
Fridays		1	1	1	1	1																				1
Saturdays		1	1	1	1	1	1	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	1
Sundays		1	1	1	1	1	1	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	1
<div>Legend:</div> <div><div></div>Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div>1</div>Provide at least one through connector lane open in direction of travel.</div> <div><div>2</div>Provide at least two adjacent through connector lanes open in direction of travel.</div> <div><div>S</div>Work allowed within right shoulder area when lane closure is not required.</div>																										
REMARKS:																										

Chart No. 142B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 22-405 / NB														PM: 20.91												
Closure Limits: WB SR-22 GP to NB I-405 GP Connector																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																				C		
Fridays	C	C	C	C	C																				C		
Saturdays	C	C	C	C	C	C																			C		
Sundays	C	C	C	C	C	C																			C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 143B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 22-405 / NB														PM: 21.167												
Closure Limits: WB SR-22 HOV to NB I-405 HOV Connector																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																					C	
Fridays	C	C	C	C	C																					C	
Saturdays	C	C	C	C	C	C																				C	
Sundays	C	C	C	C	C	C																				C	
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 144B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / NB														PM: 22.386												
Closure Limits: Off-Ramp to Seal Beach																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																				C		
Fridays	C	C	C	C	C																				C		
Saturdays	C	C	C	C	C	C	C																		C		
Sundays	C	C	C	C	C	C	C																		C		
Legend: <div style="display: flex; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 144C																											
Complete Ramp Closure - Short-Term																											
County: Orange					Route/Direction: 405 / NB															PM: 22.386							
Closure Limits: Off-Ramp to Seal Beach																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
<div>Legend:</div> <div><div>C</div>Ramp may be closed completely.</div>																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 145B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 405 / NB												PM: 22.558												
Closure Limits: Loop On-Ramp from Seal Beach																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																			C	C
Fridays	C	C	C	C	C																			C	C
Saturdays	C	C	C	C	C	C	C																	C	C
Sundays	C	C	C	C	C	C	C																	C	C
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 145C																											
Complete Ramp Closure - Short-Term																											
County: Orange							Route/Direction: 405 / NB														PM: 22.558						
Closure Limits: Loop On-Ramp from Seal Beach																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Legend: <div>C</div> Ramp may be closed completely.																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 146B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405-22 / NB														PM: 23.036												
Closure Limits: NB I-405 to WB SR-22 Connector/7th																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 147A																										
Connector Lane Requirements																										
County: Orange					Route/Direction: 405-605 / NB										PM: 23.8 to R0.2											
Closure Limits: NB I-405 GP to NB I-605 GP Connector																										
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays		1	1	1	1	1																				
Fridays		1	1	1	1	1																				
Saturdays		1	1	1	1	1	1	1	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Sundays		1	1	1	1	1	1	1	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Legend:																										
<div></div>		Work permitted within project right of way where shoulder or lane closure is not required.																								
<div>1</div>		Provide at least one through connector lane open in direction of travel.																								
<div>2</div>		Provide at least two adjacent through connector lanes open in direction of travel.																								
<div>S</div>		Work allowed within right shoulder area when lane closure is not required.																								
REMARKS:																										

Chart No. 147B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405-605 / NB														PM: 23.828												
Closure Limits: NB I-405 GP to NB I-605 GP Connector																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																						
Fridays	C	C	C	C	C																						
Saturdays	C	C	C	C	C	C	C																				
Sundays	C	C	C	C	C	C	C																				
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 148B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405-605 / NB														PM: 23.376												
Closure Limits: NB I-405 HOV to NB I-605 HOV Connector																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																				C		
Fridays	C	C	C	C	C																				C		
Saturdays	C	C	C	C	C	C	C																		C		
Sundays	C	C	C	C	C	C	C																		C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 149B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 22 / WB														PM: 23.036												
Closure Limits: On-Ramp from Old Ranch																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 149C																											
Complete Ramp Closure - Short-Term																											
County: Orange							Route/Direction: 22 / WB														PM: 23.036						
Closure Limits: On-Ramp from Old Ranch																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Legend: <div>C</div> Ramp may be closed completely.																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 200A																										
Connector Lane Requirements																										
County: Orange					Route/Direction: 605-405 / SB										PM: R0.2 to 23.6											
Closure Limits: SB I-605 GP to SB I-405 GP Connector																										
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays		1	1	1	1	1																				
Fridays		1	1	1	1	1																				
Saturdays		1	1	1	1	1	1	1	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Sundays		1	1	1	1	1	1	1	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
<div>Legend:</div> <div><div></div>Work permitted within project right of way where shoulder or lane closure is not required.</div> <div><div>1</div>Provide at least one through connector lane open in direction of travel.</div> <div><div>2</div>Provide at least two adjacent through connector lanes open in direction of travel.</div> <div><div>S</div>Work allowed within right shoulder area when lane closure is not required.</div>																										
<div>REMARKS:</div>																										

Chart No. 200B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 605-405 / SB														PM: 23.55												
Closure Limits: SB I-605 GP to SB I-405 GP Connector																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																						
Fridays	C	C	C	C	C																						
Saturdays	C	C	C	C	C	C	C																				
Sundays	C	C	C	C	C	C	C																				
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 201B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 22-405 / SB														PM: 23.179												
Closure Limits: EB SR-22 to SB I-405 Connector																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																					C	
Fridays	C	C	C	C	C																					C	
Saturdays	C	C	C	C	C	C	C																			C	
Sundays	C	C	C	C	C	C	C																			C	
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 202B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 605-405 / SB														PM: 23.345												
Closure Limits: SB I-605 HOV to SB I-405 HOV Connector																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																				C		
Fridays	C	C	C	C	C																				C		
Saturdays	C	C	C	C	C	C	C																		C		
Sundays	C	C	C	C	C	C	C																		C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 203B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / SB														PM: 22.705												
Closure Limits: Off-Ramp to Seal Beach																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 203C																											
Complete Ramp Closure - Long-Term																											
County: Orange				Route/Direction: 405 / SB												PM: 22.705											
Closure Limits: Off-Ramp to Seal Beach																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
<div>Legend:</div> <div><div>C</div> Ramp may be closed completely.</div>																											
REMARKS: Ramp may be closed completely for up to 30 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 204B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 405 / SB												PM: 22.518												
Closure Limits: On-Ramp from Seal Beach																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																			C	C
Fridays	C	C	C	C	C																			C	C
Saturdays	C	C	C	C	C	C	C																	C	C
Sundays	C	C	C	C	C	C	C																	C	C
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 204C																											
Complete Ramp Closure - Short-Term																											
County: Orange							Route/Direction: 405 / SB											PM: 22.518									
Closure Limits: On-Ramp from Seal Beach																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
<div>Legend:</div> <div><div>C</div> Ramp may be closed completely.</div>																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 205A																										
Connector Lane Requirements																										
County: Orange					Route/Direction: 405-22 / SB										PM: 23.3 to R0.9											
Closure Limits: SB I-405 GP to EB SR-22 GP Connector																										
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays	1	1	1	1	1																			1	1	
Fridays	1	1	1	1	1																			2	1	
Saturdays	1	1	1	1	1	1	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	2	1	
Sundays	1	1	1	1	1	1	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	2	1	
Legend:																										
<div><div></div> Work permitted within project right of way where shoulder or lane closure is not required.</div>																										
<div><div>1</div> Provide at least one through connector lane open in direction of travel.</div>																										
<div><div>2</div> Provide at least two adjacent through connector lanes open in direction of travel.</div>																										
<div><div>S</div> Work allowed within right shoulder area when lane closure is not required.</div>																										
REMARKS:																										

Chart No. 205B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / SB														PM: 21.107												
Closure Limits: SB I-405 GP to EB SR-22 GP Connector																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																				C		
Fridays	C	C	C	C	C																				C		
Saturdays	C	C	C	C	C	C																			C		
Sundays	C	C	C	C	C	C																			C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 206B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 405 / SB												PM: 21.154												
Closure Limits: SB I-405 HOV to EB SR-22 HOV Connector																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																			C	C
Fridays	C	C	C	C	C																			C	C
Saturdays	C	C	C	C	C	C	C																	C	C
Sundays	C	C	C	C	C	C	C																	C	C
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 207B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 405 / SB												PM: 20.851												
Closure Limits: Off-Ramp to SB Bolsa Chica																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																			C	C
Fridays	C	C	C	C	C																			C	C
Saturdays	C	C	C	C	C	C	C																	C	C
Sundays	C	C	C	C	C	C	C																	C	C
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 208B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / SB														PM: 20.511												
Closure Limits: Loop On-Ramp from SB Bolsa Chica																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 208C Complete Ramp Closure - Short-Term																											
County: Orange	Route/Direction: 405 / SB														PM: 20.511												
Closure Limits: Loop On-Ramp from SB Bolsa Chica																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Legend: <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div>																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 209B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / SB														PM: 19.528												
Closure Limits: Off-Ramp to Springdale/Westminster CD Road																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 210B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 405 / SB												PM: 19.414												
Closure Limits: Off-Ramp to Springdale																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																			C	C
Fridays	C	C	C	C	C																			C	C
Saturdays	C	C	C	C	C	C	C																	C	C
Sundays	C	C	C	C	C	C	C																	C	C
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 210C Complete Ramp Closure - Short-Term																											
County: Orange	Route/Direction: 405 / SB														PM: 19.414												
Closure Limits: Off-Ramp to Springdale																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Legend: <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div>																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 211B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / SB														PM: 19.415												
Closure Limits: Loop Off-Ramp to EB Westminster																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 211C Complete Ramp Closure - Short-Term																													
County: Orange								Route/Direction: 405 / SB												PM: 19.415									
Closure Limits: Loop Off-Ramp to EB Westminster																													
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																													
Mondays through Thursdays								C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays								C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays								C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Sundays								C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Legend: <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="border: 1px solid black; padding: 2px 5px; margin-right: 10px;">C</div> Ramp may be closed completely. </div>																													
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																													

Chart No. 212B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / SB														PM: 19.012												
Closure Limits: On-Ramp from Westminster																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 212C Complete Ramp Closure - Long-Term																											
County: Orange	Route/Direction: 405 / SB														PM: 19.012												
Closure Limits: On-Ramp from Westminster																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Legend: <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div>																											
REMARKS: Ramp may be closed completely for up to 30 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 213B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 405 / SB												PM: 18.028												
Closure Limits: Off-Ramp to Goldenwest/Bolsa CD Road																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																			C	C
Fridays	C	C	C	C	C																			C	C
Saturdays	C	C	C	C	C	C	C																	C	C
Sundays	C	C	C	C	C	C	C																	C	C
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 214B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / SB														PM: 17.937												
Closure Limits: Off-Ramp to Goldenwest/Westminster Mall																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 214C																											
Complete Ramp Closure - Short-Term																											
County: Orange						Route/Direction: 405 / SB												PM: 17.937									
Closure Limits: Off-Ramp to Goldenwest/Westminster Mall																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays						C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays						C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays						C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays						C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
<div>Legend:</div> <div><div>C</div> Ramp may be closed completely.</div>																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 215B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / SB														PM: 17.988												
Closure Limits: Loop On-Ramp from SB Goldenwest/Westminster Mall																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 215C																											
Complete Ramp Closure - Short-Term																											
County: Orange				Route/Direction: 405 / SB												PM: 17.988											
Closure Limits: Loop On-Ramp from SB Goldenwest/Westminster Mall																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
<div>Legend:</div> <div><div>C</div> Ramp may be closed completely.</div>																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 216B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / SB														PM: 17.728												
Closure Limits: Loop Off-Ramp to EB Bolsa																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 216C Complete Ramp Closure - Short-Term																											
County: Orange	Route/Direction: 405 / SB														PM: 17.728												
Closure Limits: Loop Off-Ramp to EB Bolsa																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Legend: <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div>																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 217B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / SB														PM: 17.63												
Closure Limits: On-Ramp from EB Bolsa																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 217C																											
Complete Ramp Closure - Long-Term																											
County: Orange					Route/Direction: 405 / SB														PM: 17.63								
Closure Limits: On-Ramp from EB Bolsa																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Legend: <div>C</div> Ramp may be closed completely.																											
REMARKS: Ramp may be closed completely for up to 30 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 218B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 405 / SB												PM: 17.554												
Closure Limits: On-Ramp from Bolsa/Goldenwest CD Road																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																			C	C
Fridays	C	C	C	C	C																			C	C
Saturdays	C	C	C	C	C	C	C																	C	C
Sundays	C	C	C	C	C	C	C																	C	C
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 219B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / SB														PM: 16.81												
Closure Limits: Off-Ramp to Beach CD Road																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 220B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / SB														PM: 16.714												
Closure Limits: Off-Ramp to Beach/Center																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 221B Complete Ramp Closure - Nightly																											
County: Orange							Route/Direction: 405 / SB														PM: 16.595						
Closure Limits: Loop On-Ramp from SB Beach/Center																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C																				C	C	
Fridays	C	C	C	C	C																				C	C	
Saturdays	C	C	C	C	C	C	C																		C	C	
Sundays	C	C	C	C	C	C	C																		C	C	
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 221C																											
Complete Ramp Closure - Short-Term																											
County: Orange					Route/Direction: 405 / SB															PM: 16.595							
Closure Limits: Loop On-Ramp from SB Beach/Center																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Legend: <div>C</div> Ramp may be closed completely.																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 222B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / SB														PM: 16.467												
Closure Limits: Loop Off-Ramp to NB Beach																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 222C																											
Complete Ramp Closure - Short-Term																											
County: Orange					Route/Direction: 405 / SB													PM: 16.467									
Closure Limits: Loop Off-Ramp to NB Beach																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
<div>Legend:</div> <div><div>C</div> Ramp may be closed completely.</div>																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 223B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 405 / SB												PM: 16.412												
Closure Limits: On-Ramp from Beach CD Road																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																			C	C
Fridays	C	C	C	C	C																			C	C
Saturdays	C	C	C	C	C	C	C																	C	C
Sundays	C	C	C	C	C	C	C																	C	C
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 224B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / SB														PM: 16.208												
Closure Limits: On-Ramp from EB Edinger																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 224C																											
Complete Ramp Closure - Short-Term																											
County: Orange					Route/Direction: 405 / SB													PM: 16.208									
Closure Limits: On-Ramp from EB Edinger																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Legend: <div>C</div> Ramp may be closed completely.																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 225B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / SB														PM: 15.364												
Closure Limits: Off-Ramp to Magnolia																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 225C Complete Ramp Closure - Long-Term																											
County: Orange	Route/Direction: 405 / SB														PM: 15.364												
Closure Limits: Off-Ramp to Magnolia																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Legend: <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div>																											
REMARKS: Ramp may be closed completely for up to 30 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 226B Complete Ramp Closure - Nightly																											
County: Orange								Route/Direction: 405 / SB												PM: 15.135							
Closure Limits: Loop On-Ramp from SB Magnolia																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 226C Complete Ramp Closure - Short-Term																												
County: Orange							Route/Direction: 405 / SB											PM: 15.135										
Closure Limits: Loop On-Ramp from SB Magnolia																												
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																												
Mondays through Thursdays							C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays							C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays							C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Sundays							C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Legend: <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="border: 1px solid black; padding: 2px 5px; margin-right: 5px;">C</div> Ramp may be closed completely. </div>																												
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																												

Chart No. 227B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / SB														PM: 14.848												
Closure Limits: Loop Off-Ramp to EB Warner																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 227C																											
Complete Ramp Closure - Short-Term																											
County: Orange					Route/Direction: 405 / SB													PM: 14.848									
Closure Limits: Loop Off-Ramp to EB Warner																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Legend: <div>C</div> Ramp may be closed completely.																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 228B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / SB														PM: 14.698												
Closure Limits: On-Ramp from EB Warner																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 228C																											
Complete Ramp Closure - Long-Term																											
County: Orange				Route/Direction: 405 / SB												PM: 14.698											
Closure Limits: On-Ramp from EB Warner																											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Mondays through Thursdays		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
<div>Legend:</div> <div><div>C</div> Ramp may be closed completely.</div>																											
REMARKS: Ramp may be closed completely for up to 30 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 229B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / SB														PM: 14.014												
Closure Limits: Off-Ramp to Brookhurst CD Road																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 230B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / SB														PM: 13.901												
Closure Limits: Off-Ramp to SB Brookhurst																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 230C																											
Complete Ramp Closure - Short-Term																											
County: Orange				Route/Direction: 405 / SB												PM: 13.901											
Closure Limits: Off-Ramp to SB Brookhurst																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Legend: <div>C</div> Ramp may be closed completely.																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 231B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / SB														PM: 13.814												
Closure Limits: Loop On-Ramp from SB Brookhurst																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 231C Complete Ramp Closure - Short-Term																												
County: Orange	Route/Direction: 405 / SB														PM: 13.814													
Closure Limits: Loop On-Ramp from SB Brookhurst																												
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																												
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Legend: <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="border: 1px solid black; padding: 2px 5px; margin-right: 10px;">C</div> Ramp may be closed completely. </div>																												
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																												

Chart No. 232B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / SB														PM: 13.67												
Closure Limits: Loop Off-Ramp to NB Brookhurst																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 233B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 405 / SB												PM: 13.626												
Closure Limits: On-Ramp from Brookhurst CD Road																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																			C	C
Fridays	C	C	C	C	C																			C	C
Saturdays	C	C	C	C	C	C	C																	C	C
Sundays	C	C	C	C	C	C	C																	C	C
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 234B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / SB														PM: 13.356												
Closure Limits: On-Ramp from EB Talbert																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 234C Complete Ramp Closure - Long-Term																											
County: Orange	Route/Direction: 405 / SB														PM: 13.356												
Closure Limits: On-Ramp from EB Talbert																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Legend: <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div>																											
REMARKS: Ramp may be closed completely for up to 30 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 235B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 405 / SB												PM: 12.707												
Closure Limits: Off-Ramp to Euclid																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																			C	C
Fridays	C	C	C	C	C																			C	C
Saturdays	C	C	C	C	C	C	C																	C	C
Sundays	C	C	C	C	C	C	C																	C	C
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

Chart No. 235C																												
Complete Ramp Closure - Short-Term																												
County: Orange							Route/Direction: 405 / SB														PM: 12.707							
Closure Limits: Off-Ramp to Euclid																												
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																												
Mondays through Thursdays							C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays							C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays							C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Sundays							C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
<p>Legend:</p> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; padding: 2px 5px; margin-right: 5px;">C</div> Ramp may be closed completely. </div>																												
<p>REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.</p>																												

Chart No. 236B Complete Ramp Closure - Nightly																											
County: Orange							Route/Direction: 405 / SB														PM: 12.554						
Closure Limits: Loop On-Ramp from Euclid																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays							C	C	C	C	C															C	C
Fridays							C	C	C	C	C															C	C
Saturdays							C	C	C	C	C	C	C													C	C
Sundays							C	C	C	C	C	C	C													C	C
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> <div>Ramp may be closed completely.</div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> <div>Work permitted within project right of way where shoulder or lane closure is not required.</div> </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 236C Complete Ramp Closure - Short-Term																											
County: Orange	Route/Direction: 405 / SB														PM: 12.554												
Closure Limits: Loop On-Ramp from Euclid																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Legend: <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div>																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 237B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / SB														PM: 11.675												
Closure Limits: Off-Ramp to Harbor																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 237C Complete Ramp Closure - Short-Term																											
County: Orange	Route/Direction: 405 / SB														PM: 11.675												
Closure Limits: Off-Ramp to Harbor																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
Legend: <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div>																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 238B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / SB														PM: 11.495												
Closure Limits: Loop On-Ramp from SB Harbor																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 238C																											
Complete Ramp Closure - Short-Term																											
County: Orange					Route/Direction: 405 / SB													PM: 11.495									
Closure Limits: Loop On-Ramp from SB Harbor																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
<div>Legend:</div> <div><div>C</div> Ramp may be closed completely.</div>																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 239B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / SB														PM: 11.292												
Closure Limits: On-Ramp from NB Harbor																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 239C																											
Complete Ramp Closure - Long-Term																											
County: Orange				Route/Direction: 405 / SB												PM: 11.292											
Closure Limits: On-Ramp from NB Harbor																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Legend: <div><div>C</div> Ramp may be closed completely.</div>																											
REMARKS: Ramp may be closed completely for up to 30 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 240B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / SB														PM: 10.933												
Closure Limits: Off-Ramp to Fairview																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 240C																											
Complete Ramp Closure - Long-Term																											
County: Orange				Route/Direction: 405 / SB												PM: 10.933											
Closure Limits: Off-Ramp to Fairview																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
<div>Legend:</div> <div><div>C</div> Ramp may be closed completely.</div>																											
REMARKS: Ramp may be closed completely for up to 30 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 241A																									
Connector Lane Requirements																									
County: Orange				Route/Direction: 405-73 / SB										PM: R27.6 to 10.4											
Closure Limits: SB I-405 to SB SR-73 Connector																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	1	1	1	1	2																			2	1
Fridays	1	1	1	1	2																			2	1
Saturdays	1	1	1	1	1	1	1	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	2	1
Sundays	1	1	1	1	1	1	1	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	2	1
Legend:																									
<div><div></div> Work permitted within project right of way where shoulder or lane closure is not required.</div>																									
<div><div>1</div> Provide at least one through connector lane open in direction of travel.</div>																									
<div><div>2</div> Provide at least two adjacent through connector lanes open in direction of travel.</div>																									
<div><div>S</div> Work allowed within right shoulder area when lane closure is not required.</div>																									
REMARKS:																									

Chart No. 241B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405-73 / SB														PM: 10.508												
Closure Limits: SB I-405 to SB SR-73 Connector																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 242B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / SB														PM: 10.187												
Closure Limits: On-Ramp from Fairview																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 242C																											
Complete Ramp Closure - Short-Term																											
County: Orange					Route/Direction: 405 / SB													PM: 10.187									
Closure Limits: On-Ramp from Fairview																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Legend: <div>C</div> Ramp may be closed completely.																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 243B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 405 / SB														PM: 9.745												
Closure Limits: Off-Ramp to Bristol																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 244B Complete Ramp Closure - Nightly																											
County: Orange	Route/Direction: 73 / SB														PM: R27.728												
Closure Limits: On-Ramp from Fairview																											
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Mondays through Thursdays	C	C	C	C	C																			C	C		
Fridays	C	C	C	C	C																			C	C		
Saturdays	C	C	C	C	C	C	C																	C	C		
Sundays	C	C	C	C	C	C	C																	C	C		
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																											
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																											

Chart No. 244C																											
Complete Ramp Closure - Short-Term																											
County: Orange					Route/Direction: 73 / SB														PM: R27.728								
Closure Limits: On-Ramp from Fairview																											
FROM HOUR TO HOUR 24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Fridays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
<div>Legend:</div> <div><div>C</div> Ramp may be closed completely.</div>																											
REMARKS: Ramp may be closed completely for up to 10 consecutive days, one time only during the entire construction schedule. Provide detour route and coordinate closely with Caltrans.																											

Chart No. 245B Complete Ramp Closure - Nightly																									
County: Orange	Route/Direction: 73 / SB															PM: R27.416									
Closure Limits: Off-Ramp to Bear																									
FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C	C																		C	C	
Fridays	C	C	C	C	C																		C	C	
Saturdays	C	C	C	C	C	C	C																C	C	
Sundays	C	C	C	C	C	C	C																C	C	
Legend: <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																									
REMARKS: Provide detour route and coordinate with Caltrans regarding consecutive night closures required.																									

ENCROACHMENT PERMIT

TR-0120 (REV. 2/98)

In compliance with (Check one):

☒ Your application of FEBRUARY 8, 2007☐ Utility Notice No. _____ Of _____☐ Agreement No. _____ Of _____☐ R/W Contract No. _____ Of _____

TO:

ORANGE COUNTY TRANSPORTATION AUTHORITY (OCTA)
P.O. BOX 14184
ORANGE, CA 92863-1584

DIPACK ROY
714-560-5863

Permit No.
1207-NMC- 0097

Dist/Co/Rte/PM
12-ORA- 91- 8.9/ 18.9
12-ORA- 55- 17.0/ 17.8

Date
FEBRUARY 7, 2007

Fee Paid
EXEMPT

Deposit
\$

Performance Bond Amount (1)
\$

Payment Bond Amount (2)
\$

Bond Company

Bond Number (1)

Bond Number (2)

And subject to the following, PERMISSION IS HEREBY GRANTED to:

, PERMITTEE

Operate, maintain and manage the daily operation of the State Route 91 median improvements and appurtenances thereof from Tustin Avenue Overcrossing in the city of Anaheim to Orange/Riverside County Line in the city of Orange.

All performed work shall be in accordance with current Caltrans Standard Specifications and Standard Plans, Section 500 (Specific Permits) of the Encroachment Permits Manual, the attached Provisions, assigned Lease/ Franchise Agreement by and between California Private Transportation Company, L.P. and State of California, Department of Transportation regarding State Route 91 Median Improvements dated June 30, 1993 and As-Built Plans for Contract Numbers 12-000964 and 12-000974.

Permittee shall contact State Permit Inspector **TOM SHAMSABADI at 949-440-4493** between 7 AM and 9 AM a minimum of 5 working days prior to the start of work. Failure to comply with this requirement will result in suspension of this permit.

The following attachments are also included as part of this permit
(Check applicable):

<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	General Provisions
<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	Utility Maintenance Provisions
<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	Special Provisions
<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	A Cal-OSHA permit required prior to beginning work;
# _____		

In addition to fee, the permittee will be billed actual costs for:

<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	Review
<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	Inspection
<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	Field Work

(If any Caltrans effort expended)

☐ Yes ☐ No The information in the environmental documentation has been reviewed and is considered prior to approval of this permit.

This permit is void unless the work is complete before **SEE LEASE/ FRANCHISE AGREEMENT**

This permit is to be strictly construed and no other work other than specifically mentioned is hereby authorized.

No project work shall be commenced until all other necessary permits and environmental clearances have been obtained.

PERMITTEE

FILE 07-0097

T. Shamsabadi, Permits

APPROVED:

Cindy Quon, District Director

BY:

Mory Mohtashami, District Permit Engineer

MTCE. (2)
Prepared by SHR

Permittee shall arrange a pre-maintenance meeting with his contractor(s) and the State Permit Inspector to clarify traffic control requirements and safety constraints relating to Permittee's performance of maintenance work adjacent to moving traffic. All Permittee's Contractors and Subcontractors shall furnish the State with a signed application requesting a separate Caltrans Encroachment Permit called Double Permit (DP), authorizing the Contractor(s) to perform the work within the State right of way on Permittee's behalf. The amount of the required deposit will be determined at the time of application.

Prior to issuance of the DP, Permittee's Contractors and Subcontractors shall submit a Policy of General Liability Insurance, including coverage for Bodily Injury Liability and Property Damage Liability. Such policy shall contain an additional insured endorsement naming the State, its officers and employees as additional-insured. Coverage shall be evidenced by a Certificate of Insurance in a form satisfactory to Caltrans.

The authorized work under this Encroachment Permit provides rights to Orange County Transportation Authority (OCTA) for subsurface, surface and airspace facilities, and ongoing operations and maintenance thereof for appurtenances of the State Route 91 Median Improvements. Said facilities include:

1. Electric power, electrical signal and fiber optic cable installed in a subsurface network of conduit with associated vaults and pullboxes and surface-installed pedestals, panels, junction boxes, service cabinets and transformers. This network is located generally along:
 - a) The north shoulder of State Route 91 from Station 496+00 (west of Tustin Avenue) to Station 79+00 (east of the 91/55 Interchange).
 - b) The south shoulder of State Route 55 from the 91/55 Interchange to the Riverside County Line.
 - c) The west shoulder of State Route 55 from Station 900+00 (north of Lincoln Avenue) to the 91/55 Interchange.
2. Electric Power Services and connecting cable, conduit and pullboxes between the service locations and the network described in item 1 above. These services are located at the following addresses.
 - a) 2824 N. Santiago Boulevard
 - b) 1810 E. Heim Avenue
 - c) 932 N. Tustin Avenue
 - d) 116 N. Gypsum Canyon Road
 - e) 171 Coal Canyon Road
 - f) 5176 Green River Road
 - g) 4392 Prado Road
 - h) 4001 E. Riverdale Avenue
 - i) 106 N. Lakeview Avenue
 - j) 290 N. Imperial Highway
 - k) 7793 E. Santa Ana Canyon Road
 - l) 176 N. Riverview Drive
 - m) 3222 E. Frontera Street
3. Six variable message signs installed in the median, with associated electric power, telephone cabling and conduits. These signs are located as follows:
 - a) State Route 91 Station 461+00 east of Kraemer Boulevard/Glassell Street
 - b) State Route 91 Station 504+90 east of Tustin Avenue
 - c) State Route 91 Station 567+80 near the Riverside County Line
 - d) State Route 91 Station 67+00 east of Prado Road
 - e) State Route 55 Station 866+00 North of Heim Avenue
 - f) State Route 55 Station 906+00 north of Lincoln Avenue
4. Electric toll collection system devices, including supporting structures and associated electric power, telephone and fiber optic cabling and conduits. These are generally located at:
 - a) The entrance to the toll lane on northbound State Route 55 near Station 58+00 (at the 91/55 Interchange).
 - b) The entrance to the toll lanes on eastbound State Route 91 near Station 530+00 (east of the 91/55 Interchange).
 - c) The entrance to the toll lanes on westbound State Route 91 near Station 531+65 (east of Coal Canyon Road).
 - d) The Toll Zone located east of Weir Canyon Road, including overhead sign structures that span the eastbound and westbound of State Route 91 roadways at Station 351+60 and Station 366+65, respectively.

5. Approximately 50 closed-circuit television cameras and associated poles, electric power, fiber optics, telephone cabling and conduits along State Route 91 and State Route 55. These cameras are located generally within the limits of the network described in Item 1 above.
6. Approximately 40 traffic-monitoring stations, including inductive loops in the toll lanes, mixed flow lanes and associated controllers, cabinets, electric power and fiber optic cabling and conduits along State Route 91 and State Route 55. These traffic-monitoring stations are located generally within the limits of the network described in item 1 above.
7. Overhead and roadside signs as shown in the Construction Documents for the State Route 91 Median Improvements. These signs are generally located along State Route 55 from Katella Avenue to the 91/55 Interchange, and along State Route 91 from the 91/57 Interchange to the 91/71 Interchange.

As-Built plans shall be prepared for all authorized work under this permit and when such plans are finalized and approved by Caltrans they shall be incorporated by reference at that time without further action of parties and become part of this permit. This permit shall expire at the same time that the Lease Agreement expires. Currently, the expiration date of the Lease Agreement is December 21, 2030.

In addition to the attached General Provisions (TR-0045), the following Special Provisions are applicable:

- Permittee shall contact the LOCAL LAW ENFORCEMENT JURISDICTION at least 48 hours prior to implementing traffic control measures.
- Whenever the work area is more than 1.83 m away from the adjacent traffic lane but within a designated shoulder or parking lane, a shoulder closure or parking lane closure acceptable to Caltrans shall be utilized.
- Personal vehicles of the Contractor's employees shall not be parked on paved shoulders or traveled way within the limits of this work.
- Traffic control shall be under Caltrans Inspector's directions.
- All components of the traffic control system shall be removed from the traveled way and paved shoulders at the end of each work period.
- Orange vests and hard hats shall be worn at all times while working within State right-of-way.
- The full width of traveled way shall be open for use by public traffic on Saturdays, Sundays and designated legal holidays, after 3:00 PM on Fridays and on the day preceding designated legal holidays, and when construction operations are not actively in progress.
- Unless otherwise approved by the State Permit Inspector no work that interferes with public traffic shall be performed on weekdays between 6:00 AM and 9:00 AM, and between 3:00 PM and 6:30 PM.
- Safe access through the work area shall be provided for bicyclists and pedestrians at all times, when required by the State Permit Inspector.
- All backfill shall meet Caltrans Standards.
- All steel plates shall be recessed, spiked and welded.
- All striping shall be replaced in thermoplastic.
- All excavations shall be either backfilled by the end of each working day, or otherwise secured to protect the public.
- In case of any discrepancy between the Lease/Franchise Agreement and these Permit Special Provisions, lease/Franchise Agreement Provisions shall prevail.
- Unless otherwise approved by these Permit Special Provisions or by the State Permit Inspector, no freeway lane, ramp or shoulder closure is permitted.
- Immediately following completion of the work permitted herein, Permittee shall fax to **949-724-2265** the **Work Completion Notice/Customer Service Questionnaire** to facilitate final permit processing.

STATE OF CALIFORNIA · DEPARTMENT OF TRANSPORTATION
ENCROACHMENT PERMIT
 TR-0120 (REV. 6/2012)

In compliance with:

☒ Your application of August 10, 2016
☐ Utility Notice No. _____ of _____
☒ Agreement No. 12-697 of June 30, 2015
☐ R/W Contract No. _____ of _____

Permit No. <u>12-16-N-OP-0634</u>	
Dist/Co/Rte/PM <u>12-ORA-405 PM 9.8-PM 24.2</u>	
Date <u>12/29/2016</u>	
Fee Paid \$ <u>EA 0H1001</u>	Deposit \$ <u>EA 0H1001</u>
Performance Bond Amount (1) \$ <u>0.00</u>	Payment Bond Amount (2) \$ <u>0.00</u>
Bond Company	
Bond Number (1)	Bond Number (2)

TO: ORANGE COUNTY TRANSPORTATION AUTHORITY
 P.O. BOX 14184
 ORANGE, CA 92863-1584
 Attn: Jeff Mills, Program Manager 714-560-5925

, PERMITTEE

and subject to the following, PERMISSION IS HEREBY GRANTED to:

Enter onto State Right of Way on I-405 from SR-73 to I-605 to monitor and construct all work consisting of construction of express lanes, general purpose lanes and related improvements, oversight the Design Build contractor's work (design and construction) necessary to complete the project as described in the Design-Build (D-B) contract (OCTA Request for Proposal RFP-5-3843), executed Cooperative Agreement (District Agreement No. 12-697 effective June 30, 2015), OCTA Agreement No. C-4-1847 and any future amendments.

All performed work shall be in accordance with current Caltrans Standard Specifications and Standard Plans, Section 500 (Specific Permits) of the Encroachment Permits Manual, California MUTCD latest edition, and the attached Provisions. Permittee shall contact Kausi Amuth, Caltrans Sr. Construction Engineer at (949) 279-8688, and Caltrans Structure Construction Representative John Zehnder at 714-803-2588 a minimum of 10 working days prior to the date of the pre-construction meeting. Failure to comply with this requirement will result in suspension of this permit.

THIS PERMIT IS NOT A PROPERTY RIGHT AND DOES NOT TRANSFER WITH THE PROPERTY TO A NEW OWNER.

The following attachments are also included as part of this permit (Check applicable):

☒ Yes ☐ No General Provisions
☐ Yes ☒ No Utility Maintenance Provisions
☒ Yes ☐ No Storm Water Special Provisions
☒ Yes ☐ No Special Provisions
☐ Yes ☒ No A Cal-OSHA permit, if required: Permit No. _____
☐ Yes ☒ No As-Built Plans Submittal Route Slip for Locally Advertised Projects
☐ Yes ☒ No Storm Water Pollution Prevention Plan / Water Pollution Control Plan

In addition to fee, the permittee will be billed actual costs for:

☐ Yes ☒ No Review
☐ Yes ☒ No Inspection
☒ Yes ☐ No Field Work

(if any Caltrans effort expended)

☒ Yes ☐ No The information in the environmental documentation has been reviewed and considered prior to approval of this permit.

This permit is void unless the work is completed before June 30, 2023

This permit is to be strictly construed and no other work other than specifically mentioned is hereby authorized.

No project work shall be commenced until all the other necessary permits and the environmental clearances have been obtained.

PERMIT ENGINEER: Raj Gohil
 COPIES TO:
 Maintenance
 Andrew Chuah, Project Management
 Nooshin Yoosefi, Project Management
 Kausi Amuth, Construction
 John Zehnder, Structure Construction
 File: 16-0634

APPROVED:

BY:

Ryan Chamberlain, District Director

Tom Shalod, P.E.
 MAHESH R. BHATT, P.E., District Permit Engineer

FM 91 1436 (D12 Permit App.)

1. **AUTHORITY:** The Department's authority to issue encroachment permits is provided under, Div. 1, Chpt. 3, Art. 1, Sect. 660 to 734 of the Streets and Highways Code.
2. **REVOCATION:** Encroachment permits are revocable on five days notice unless otherwise stated on the permit and except as provided by law for public corporations, franchise holders, and utilities. These General Provisions and the Encroachment Permit Utility Provisions are subject to modification or abrogation at any time. Permittees' joint use agreements, franchise rights, reserved rights or any other agreements for operating purposes in State highway right of way are exceptions to this revocation.
3. **DENIAL FOR NONPAYMENT OF FEES:** Failure to pay permit fees when due can result in rejection of future applications and denial of permits.
4. **ASSIGNMENT:** No party other than the permittee or permittee's authorized agent is allowed to work under this permit.
5. **ACCEPTANCE OF PROVISIONS:** Permittee understands and agrees to accept these General Provisions and all attachments to this permit, for any work to be performed under this permit.
6. **BEGINNING OF WORK:** When traffic is not impacted (see Number 35), the permittee shall notify the Department's representative, two (2) days before the intent to start permitted work. Permittee shall notify the Department's Representative if the work is to be interrupted for a period of five (5) days or more, unless otherwise agreed upon. All work shall be performed on weekdays during regular work hours, excluding holidays, unless otherwise specified in this permit.
7. **STANDARDS OF CONSTRUCTION:** All work performed within highway right of way shall conform to recognized construction standards and current Department Standard Specifications, Department Standard Plans High and Low Risk Facility Specifications, and Utility Special Provisions. Where reference is made to "Contractor and Engineer," these are amended to be read as "Permittee and Department representative."
8. **PLAN CHANGES:** Changes to plans, specifications, and permit provisions are not allowed without prior approval from the State representative.
9. **INSPECTION AND APPROVAL:** All work is subject to monitoring and inspection. Upon completion of work, permittee shall request a final inspection for acceptance and approval by the Department. The local agency permittee shall not give final construction approval to its contractor until final acceptance and approval by the Department is obtained.
10. **PERMIT AT WORKSITE:** Permittee shall keep the permit package or a copy thereof, at the work site and show it upon request to any Department representative or law enforcement officer. If the permit package is not kept and made available at the work site, the work shall be suspended.
11. **CONFLICTING ENCROACHMENTS:** Permittee shall yield start of work to ongoing, prior authorized, work adjacent to or within the limits of the project site. When existing encroachments conflict with new work, the permittee shall bear all cost for rearrangements, (e.g., relocation, alteration, removal, etc.).
12. **PERMITS FROM OTHER AGENCIES:** This permit is invalidated if the permittee has not obtained all permits necessary and required by law, from the Public Utilities Commission of the State of California (PUC), California Occupational Safety and Health Administration (Cal-OSHA), or any other public agency having jurisdiction.
13. **PEDESTRIAN AND BICYCLIST SAFETY:** A safe minimum passageway of 4' shall be maintained through the work area at existing pedestrian or bicycle facilities. At no time shall pedestrians be diverted onto a portion of the street used for vehicular traffic. At locations where safe alternate passageways cannot be provided, appropriate signs and barricades shall be installed at the limits of construction and in advance of the limits of construction at the nearest crosswalk or intersection to detour pedestrians to facilities across the street. Attention is directed to Section 7-1.09 Public Safety of the Department Standard Specifications.
14. **PUBLIC TRAFFIC CONTROL:** As required by law, the permittee shall provide traffic control protection warning signs, lights, safety devices, etc., and take all other measures necessary for traveling public's safety. While providing traffic control, the needs and control of all road users [motorists, bicyclists and pedestrians, including persons with disabilities in accordance with the Americans with Disabilities Act of 1990 (ADA)] shall be an essential part of the work activity.

Day and night time lane closures shall comply with the California Manual on Uniform Traffic Control Devices (Part 6, Temporary Traffic Control), Standard Plans, and Standard Specifications for traffic control systems. These General Provisions are not intended to impose upon the permittee, by third parties, any duty or standard of care, greater than or different from, as required by law.
15. **MINIMUM INTERFERENCE WITH TRAFFIC:** Permittee shall plan and conduct work so as to create the least possible inconvenience to the traveling public; traffic shall not be unreasonably delayed. On conventional highways, permittee shall place properly attired flagger(s) to stop or warn the traveling public in compliance with the California Manual on Uniform Traffic Control Devices (Chapter 6E, Flagger Control).
16. **STORAGE OF EQUIPMENT AND MATERIALS:** The storage of equipment or materials is not allowed within State highway right-of-way, unless specified within the Special Provisions of this specific encroachment permit. If Encroachment Permit Special Provisions allow for the storage of equipment or materials within the State right of way, the equipment and material storage shall comply with Standard Specifications, Standard Plans, Special Provisions, and the Highway Design Manual. The clear recovery zone widths must be followed and are the minimum desirable for the type of facility indicated below: freeways and expressways - 30', conventional highways (no curbs) - 20', conventional highways (with curbs) - 15'. If a fixed object cannot be eliminated, moved outside the clear recovery zone, or modified to be made yielding, it should be shielded by a guardrail or a crash cushion.
17. **CARE OF DRAINAGE:** Permittee shall provide alternate drainage for any work interfering with an existing drainage facility in compliance with the Standard Specifications, Standard Plans and/or as directed by the Department's representative.
18. **RESTORATION AND REPAIRS IN RIGHT OF WAY:** Permittee is responsible for restoration and repair of State highway right of way resulting from permitted work (State Streets and Highways Code, Sections 670 et. seq.).

19. **RIGHT OF WAY CLEAN UP:** Upon completion of work, permittee shall remove and dispose of all scraps, brush, timber, materials, etc. off the right of way. The aesthetics of the highway shall be as it was before work started.

20. **COST OF WORK:** Unless stated in the permit, or a separate written agreement, the permittee shall bear all costs incurred for work within the State right of way and waives all claims for indemnification or contribution from the State.

21. **ACTUAL COST BILLING:** When specified in the permit, the Department will bill the permittee actual costs at the currently set hourly rate for encroachment permits.

22. **AS-BUILT PLANS:** When required, permittee shall submit one (1) set of folded as-built plans within thirty (30) days after completion and approval of work in compliance with requirements listed as follows:

1. Upon completion of the work provided herein, the permittee shall send one vellum or paper set of As-Built plans, to the State representative. Mylar or paper sepia plans are not acceptable.
2. All changes in the work will be shown on the plans, as issued with the permit, including changes approved by Encroachment Permit Rider.
3. The plans are to be stamped or otherwise noted AS-BUILT by the permittee's representative who was responsible for overseeing the work. Any original plan that was approved with a State stamp, or Caltrans representative signature, shall be used for producing the As-Built plans.
4. If As-Built plans include signing or striping, the dates of signing or striping removal, relocation, or installation shall be shown on the plans when required as a condition of the permit. When the construction plans show signing and striping for staged construction on separate sheets, the sheet for each stage shall show the removal, relocation or installation dates of the appropriate staged striping and signing.
5. As-Built plans shall contain the Permit Number, County, Route, and Post Mile on each sheet.
6. Disclaimer statement of any kind that differ from the obligations and protections provided by Sections 6735 through 6735.6 of the California Business and Professions Code, shall not be included on the As-Built plans. Such statements constitute non-compliance with Encroachment Permit requirements, and may result in the Department of Transportation retaining Performance Bonds or deposits until proper plans are submitted. Failure to comply may also result in denial of future permits, or a provision requiring a public agency to supply additional bonding.

23. **PERMITS FOR RECORD PURPOSES ONLY:** When work in the right of way is within an area under a Joint Use Agreement (JUA) or a Consent to Common Use Agreement (CCUA), a fee exempt permit is issued to the permittee for the purpose of providing a notice and record of work. The Permittee's prior rights shall be preserved without the intention of creating new or different rights or obligations. "Notice and Record Purposes Only" shall be stamped across the face of the permit.

24. **BONDING:** The permittee shall file bond(s), in advance, in the amount set by the Department. Failure to maintain bond(s) in full force and effect will result in the Department stopping of all work and revoking permit(s). Bonds are not required of public corporations or privately owned utilities, unless permittee failed to comply with the provision and conditions under a prior permit. The surety company is responsible for any latent defects as provided in California Code of Civil Procedures, Section 337.15. Local agency permittee shall comply with requirements established as follows: In recognition that

project construction work done on State property will not be directly funded and paid by State, for the purpose of protecting stop notice claimants and the interests of State relative to successful project completion, the local agency permittee agrees to require the construction contractor furnish both a payment and performance bond in the local agency's name with both bonds complying with the requirements set forth in Section 3-1.02 of State's current Standard Specifications before performing any project construction work. The local agency permittee shall defend, indemnify, and hold harmless the State, its officers and employees from all project construction related claims by contractors and all stop notice or mechanic's lien claimants. The local agency also agrees to remedy, in a timely manner and to State's satisfaction, any latent defects occurring as a result of the project construction work.

25. **FUTURE MOVING OF INSTALLATIONS:** Permittee understands and agrees to relocate a permitted installation upon notice by the Department. Unless under prior property right or agreement, the permittee shall comply with said notice at his sole expense.

26. **ARCHAEOLOGICAL/HISTORICAL:** If any archaeological or historical resources are revealed in the work vicinity, the permittee shall immediately stop work, notify the Department's representative, retain a qualified archaeologist who shall evaluate the site, and make recommendations to the Department representative regarding the continuance of work.

27. **PREVAILING WAGES:** Work performed by or under a permit may require permittee's contractors and subcontractors to pay appropriate prevailing wages as set by the Department of Industrial Relations. Inquiries or requests for interpretations relative to enforcement of prevailing wage requirements are directed to State of California Department of Industrial Relations, 525 Golden Gate Avenue, San Francisco, California 94102.

28. **RESPONSIBILITY FOR DAMAGE:** The State of California and all officers and employees thereof, including but not limited to the Director of Transportation and the Deputy Director, shall not be answerable or accountable in any manner for injury to or death of any person, including but not limited to the permittee, persons employed by the permittee, persons acting in behalf of the permittee, or for damage to property from any cause. The permittee shall be responsible for any liability imposed by law and for injuries to or death of any person, including but not limited to the permittee, persons employed by the permittee, persons acting in behalf of the permittee, or for damage to property arising out of work, or other activity permitted and done by the permittee under a permit, or arising out of the failure on the permittee's part to perform his obligations under any permit in respect to maintenance or any other obligations, or resulting from defects or obstructions, or from any cause whatsoever during the progress of the work, or other activity or at any subsequent time, work or other activity is being performed under the obligations provided by and contemplated by the permit.

The permittee shall indemnify and save harmless the State of California, all officers, employees, and State's contractors, thereof, including but not limited to the Director of Transportation and the Deputy Director, from all claims, suits or actions of every name, kind and description brought for or on account of injuries to or death of any person, including but not limited to the permittee, persons employed by the permittee, persons acting in behalf of the permittee and the public, or damage to property resulting from the performance of work or other activity under the permit, or arising out of the failure on the permittee's part to perform his obligations under any permit in respect to maintenance or any other obligations, or resulting from defects or obstructions, or from any cause whatsoever during the progress of the work, or other activity or at any subsequent time, work or other activity is being performed under the obligations provided by and contemplated by the permit, except as otherwise provided by statute.

The duty of the permittee to indemnify and save harmless includes the duties to defend as set forth in Section 2778 of the Civil Code. The permittee waives any and all rights to any type of expressed or implied indemnity against the State, its officers, employees, and State contractors. It is the intent of the parties that the permittee will indemnify and hold harmless the State, its officers, employees, and State's contractors, from any and all claims, suits or actions as set forth above regardless of the existence or degree of fault or negligence, whether active or passive, primary or secondary, on the part of the State, the permittee, persons employed by the permittee, or acting on behalf of the permittee.

For the purpose of this section, "State's contractors" shall include contractors and their subcontractors under contract to the State of California performing work within the limits of this permit.

29. **NO PRECEDENT ESTABLISHED:** This permit is issued with the understanding that it does not establish a precedent.

30. **FEDERAL CIVIL RIGHTS REQUIREMENTS FOR PUBLIC ACCOMMODATION:**

A. The permittee, for himself, his personal representative, successors in interest, and assigns as part of the consideration hereof, does hereby covenant and agree that:

1. No person on the grounds of race, color, or national origin shall be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities.
2. That in connection with the construction of any improvements on said lands and the furnishings of services thereon, no discrimination shall be practiced in the selection and retention of first-tier subcontractors in the selection of second-tier subcontractors.
3. That such discrimination shall not be practiced against the public in their access to and use of the facilities and services provided for public accommodations (such as eating, sleeping, rest, recreation), and operation on, over, or under the space of the right of way.
4. That the permittee shall use the premises in compliance with all other requirements imposed pursuant to Title 15, Code of Federal Regulations, Commerce and Foreign Trade, Subtitle A. Office of the Secretary of Commerce, Part 8 (15 C.F.R. Part 8) and as said Regulations may be amended.
5. That in the event of breach of any of the above nondiscrimination covenants, the State shall have the right to terminate the permit and to re-enter and repossess said land and the land and the facilities thereon, and hold the same as if said permit had never been made or issued.

31. **MAINTENANCE OF HIGHWAYS:** The permittee agrees, by acceptance of a permit, to properly maintain any encroachment. This assurance requires the permittee to provide inspection and repair any damage, at permittee's expense, to State facilities resulting from the encroachment.

32. **SPECIAL EVENTS:** In accordance with subdivision (a) of Streets and Highways Code Section 682.5, the Department of Transportation shall not be responsible for the conduct or operation of the permitted activity, and the applicant agrees to defend, indemnify, and hold harmless the State and the city or county against any and all claims arising out of any activity for which the permit is issued.

The permittee understands and agrees to comply with the obligations of Titles II and III of the Americans with Disabilities Act of 1990 in the conduct of the event, and further agrees to indemnify and save harmless the State of California, all officers and employees thereof, including but not limited to the Director of Transportation, from any claims or liability arising out of or by virtue of said Act.

33. **PRIVATE USE OF RIGHT OF WAY:** Highway right of way shall not be used for private purposes without compensation to the State.

The gifting of public property use and therefore public funds is prohibited under the California Constitution, Article 16.

34. **FIELD WORK REIMBURSEMENT:** Permittee shall reimburse State for field work performed on permittee's behalf to correct or remedy hazards or damaged facilities, or clear debris not attended to by the permittee.

35. **NOTIFICATION OF DEPARTMENT AND TMC:** The permittee shall notify the Department's representative and the Transportation Management Center (TMC) at least 7 days before initiating a lane closure or conducting an activity that may cause a traffic impact. A confirmation notification should occur 3 days before closure or other potential traffic impacts. In emergency situations when the corrective work or the emergency itself may affect traffic, TMC and the Department's representative shall be notified as soon as possible.

36. **SUSPENSION OF TRAFFIC CONTROL OPERATION:** The permittee, upon notification by the Department's representative, shall immediately suspend all lane closure operations and any operation that impedes the flow of traffic. All costs associated with this suspension shall be borne by the permittee.

37. **UNDERGROUND SERVICE ALERT (USA) NOTIFICATION:** Any excavation requires compliance with the provisions of Government Code Section 4216 et. seq., including, but not limited to notice to a regional notification center, such as Underground Service Alert (USA). The permittee shall provide notification at least 48 hours before performing any excavation work within the right of way.

STORM WATER SPECIAL PROVISIONS for MINIMAL or NO IMPACT

TR-0400 (Rev 09/2012)

1. GENERAL: The purpose of these Special Provisions is to provide the Permittee with specifications for water pollution control to minimize, prevent, or control the discharge of material into the air, surface waters, groundwater, and storm sewers owned by the State or local agencies. These provisions are not intended to take the place of the Caltrans Water Pollution Control Program (WPCP) for projects where soil disturbance from work activities less than one acre, or work activities of one acre or more subject to the preparation of the Caltrans Storm Water Pollution Prevention Plan (SWPPP) that would require a waste discharge identification number or coverage under the California Construction General Permit (*Order No. 2009-0009-DWQ, NPDES No CAS000002*). The Permittee shall comply with the following Special Provisions and the direction of the State Representative.

2. NPDES REQUIREMENTS: The Permittee shall be responsible for full compliance with the Caltrans Storm Water Program and the Caltrans National Pollutant Discharge Elimination System (NPDES) Permit requirements. It is the Permittee's responsibility to install, inspect, and repair or maintain facilities and devices used for water pollution control practices before performing daily work activities. Installation and maintenance responsibilities on the job site include: 1) soil stabilization materials in work areas that are inactive or prior to storm events, 2) water pollution control devices to control sediment and erosion, 3) implementation of spill and leak prevention procedures for chemical and hazardous substances stored on the job site, 4) material storage, 5) stockpile management, 6) waste management, 7) non-stormwater management, 8) water conservation, and 9) illicit connection, illegal discharge detection and reporting. The Permittee shall report to the state representative when discharges enter into receiving waters, adjacent property, drainage systems or when discharges could be a cause or a threat for water pollution. The Permittee shall also control illicit discharges or illegal dumping prior to start of daily work schedule. Copies of written notices or orders from the Regional Water Quality Control Board or other regulatory agency shall be provided to the State representative within 48 hours of reported activity. For additional information on storm water compliance, visit the State Water Resources Control Boards storm water Website at http://www.waterboards.ca.gov/water_issues/programs/stormwater

3. RESPONSIBILITY FOR DEBRIS REMOVAL: The Permittee shall be responsible for preventing sediment, trash, debris, and other construction waste from entering the street, the storm drains, local creeks, or any other bodies of water.

4. SPOILS AND RESIDUE: The Permittee shall vacuum any saw-cut concrete waste material, debris, residue, etc. No spoils, debris, residue, etc. shall be washed into a drainage system.

5. SWEEPING: Sweep paved roads at construction entrance and exit locations and surrounding paved areas daily within the job site during: 1) clearing and grubbing, 2) earthwork, 3) trenching, 4) soil disturbance, 5) pavement grinding and/or cutting, and 6) after observing tracking of material onto or off the State property. Keep dust to a minimum during sweeping activities. Use vacuum whenever dust generation is excessive or sediment pickup is ineffective. Roadways or work areas shall not be washed down with water. Street sweeping operations must conform to Section 13 Water Pollution Control of the State of California standard specifications for construction (most current version) <http://www.dot.ca.gov/hq/esc/oe/specifications/SSPs/2010-SSPs/>.

6. VEHICLES AND EQUIPMENT: Permittee shall prevent all vehicles, equipment, etc. from leakage or mud tracking onto

roadways. If leaks cannot be repaired immediately, remove the vehicle or equipment from the job site.

7. MAINTENANCE AND FUELING OF VEHICLES AND EQUIPMENT: Maintenance and fueling of equipment shall not result in any pollution at the job site. The Permittee shall immediately clean up spills/leaks, and properly dispose of contaminated soil and materials.

8. CLEANING VEHICLES AND EQUIPMENT: Limit vehicle and equipment cleaning or washing at the job site except what is necessary to control vehicle tracking or hazardous waste. The Permittee shall clean all equipment within a bermed area or over a drip pan large enough to prevent run-off. No soaps, solvents, degreasers, etc shall be used in State right of way. Any water from this operation shall be collected and disposed of at an appropriate site. Containment berms or dikes shall be used for fueling, washing, maintaining and washing vehicles or equipment in outside areas. Containment must be performed at least 100 feet from concentrated flows of storm water, drainage courses, and storm drain inlets if within a flood plain, otherwise at least 50 feet if outside the floodplain. Keep adequate quantities of absorbent spill-cleanup material and spill kits in the fueling or maintenance area and on fueling trucks.

9. DIESEL FUELS: The use of diesel fuel from petroleum or other fossil fuel as a form-oil or solvent is not allowed.

10. WEATHER CONDITIONS AT WORKSITE: Any activity that would generate fine particles or dust that could be transported off site by stormwater shall be performed during dry weather.

11. HOT MIX ASPHALT: Runoff from washing hot mix asphalt shall not enter into any drainage conveyances.

12. PROTECTION OF DRAINAGE FACILITIES: The Permittee shall protect/cover gutters, ditches, drainage courses, and inlets with gravel bags, fiber rolls, State approved fabric filters, etc., to the satisfaction of the State representative during grading, paving, saw-cutting, etc. and materials must conform to Section 13-6.02 Materials for Water Pollution Control of the State of California standard specifications for construction (most current version). No such protection measures shall cause an obstruction to the traveling public. The Permittee shall implement spill and leak prevention procedures for chemicals and hazardous substances stored on the job site in accordance to section 13-4.03B(1-3) Spill Prevention and Control, Water Pollution Control, of the State of California standard specifications for construction (2010 version).

13. PAINT: Rinsing of painting equipment and materials is not permitted in state right-of-way. When thoroughly dry, dispose of the following as solid waste: dry latex paint, paint cans, used brushes, rags, gloves, absorbent materials, and drop cloths. Oil based paint sludge and unusable thinner shall be disposed of at an approved hazardous waste site.

14. CONSTRUCTION MATERIALS: Stockpile of all construction materials, including, but not limited to; pressure treated wood, asphalt concrete, cold mix asphalt concrete, concrete, grout, cement containing premixes, and mortar, shall conform to section 13-4.03C Material Management (Storage & Stockpiles), Water Pollution Control, of the State of California standard specifications for construction (2010 version).

15. CONCRETE EQUIPMENT: Concrete equipment shall be washed in a designated washing area in a way that does not contaminate soil, receiving waters, or storm drain systems.

STORM WATER SPECIAL PROVISIONS for MINIMAL or NO IMPACT
TR-0400 (Rev 09/2012)

16. EXISTING VEGETATION: Established existing vegetation is the best form of erosion control. Minimize disturbance to existing vegetation. Damaged or removed vegetation shall be replaced as directed by the State Representative.

17. SOIL DISTURBANCE: Soil disturbing activities shall be avoided during the wet weather season. If construction activities during wet weather are allowed in your permit, all necessary erosion control and soil stabilization measures shall be implemented in advance of soil disturbing activity.

18. SLOPE STABILIZATION AND SEDIMENT CONTROL: Consider a certified expert in Erosion and Sediment control in cases where slopes are disturbed during construction. The Permittee is directed to comply with Section 13.5 Temporary Soil Stabilization and Section 21 Erosion Control of the State of California (2010 version) standard specifications for construction during application of temporary soil stabilization measures to the soil surface. Fiber rolls or silt fences may be required down slope until permanent soil stabilization is established. Remove the accumulated sediment whenever the sediment accumulates to 1/3 of the linear sediment barrier height.

19. STOCKPILES: Stockpiles containing aggregate and/or soil shall be stored at least 100 feet from concentrated flows of storm water, drainage courses, and storm drain inlets if within a flood plain, otherwise at least 50 feet if outside the floodplain, and shall be covered and protected with a temporary perimeter sediment barrier. Cold mix stockpiles shall be stored on an impermeable surface and covered with 9mil plastic to prevent contact with water.

20. DISCOVERY OF CONTAMINATION: The State Representative shall be notified in case any unusual discoloration, odor, or texture of ground water, is found in excavated material or if abandoned, underground tanks, pipes, or buried debris are encountered.

21. SANITARY AND SEPTIC WASTE: Do not bury or discharge wastewater from a sanitary or septic system within the highway. Properly connected sewer facilities are free from leaks. With State Representative approval place portable sanitary facility at least 50 feet away from storm drains, receiving waters, and flow lines. Permittee must comply with local health agency provisions when using an on-site disposal system.

22. LIQUID WASTE: Prevent job site liquid waste from entering storm drain systems and receiving waters. Drilling slurries, grease or oil-free waste water or rinse water, dredging, wash water or rinse water running off a surface or other nonstorm water liquids not covered under separate waste water permits shall be held in structurally sound, leak-proof containers, such as portable bins or portable tanks. Store containers at least 50 feet away from moving vehicles and equipment. Liquid waste may require testing to determine hazardous material content prior to disposal.

23. WATER CONTROL AND CONSERVATION: Manage water use in a way that will prevent erosion and the discharge of pollutants into storm drain systems and receiving waters. Direct runoff water, including water from water line repair from the job site to areas where it can infiltrate into the ground. Direct water from off-site sources around the job site or from contact with jobsite water.

24. PILE DRIVING: Keep spill kits and cleanup materials at pile driving locations. Park pile driving equipment over drip pans,

absorbent pads, or plastic sheeting with absorbent material, and away from storm water run-on when not in use.

25. DEWATERING: Dewatering consists of discharging accumulated storm water, groundwater, or surface water from excavations or temporary containment facilities. All dewatering operations shall comply with the latest Caltrans guidelines. Contact State representative for approval of dewatering discharge by infiltration or evaporation, otherwise, any effluent discharged into a permitted storm water system requires approval from the Regional Water Quality Control Board. Prior to the start of dewatering, the Permittee shall provide the State Representative with a dewatering and discharge work plan that complies with section 13-4.01B Submittals, Water Pollution Control, of the State of California standard specifications for construction (2010 version). A copy of the Waste Discharge Permit and a copy of a valid WDID number issued by the Regional Board shall be provided to the State representative.

In addition to the attached General Provisions (TR-0045), the following Special Provisions are applicable:

- 1) Notwithstanding General Provision #4, Permittee's contractor is required to apply for and obtain a separate fee-exempt Caltrans Encroachment Permit called Double Permit (DP) authorizing the Contractor to perform the work within the State right of way on Permittee's behalf. The DP's for the Design Build (DB) project are subject to separate reviews and approvals.
- 2) Permittee's DB Contractor shall submit with the DP application the following three items:
 - a) Proof that Contractor has performance and payment bonds executed in favor of Orange County Transportation Authority to adequately cover the construction cost of the project and which shall be kept in full force and effect until the permitted work is completed.
 - b) A policy of General Liability Insurance, including coverage of Bodily Injury Liability and Property Damage Liability in accordance with Section 7-1.06D of the State Standard Specifications. Such policy shall contain an additional-insured endorsement naming the State, its Officers, and employees as additional-insured. Coverage shall be evidenced by a Certificate of Insurance (in a form satisfactory to Caltrans). Coverage shall remain in effect through the duration of the permit.
 - c) If the work within the State Right of Way requires the implementation of temporary traffic control, Caltrans Standard Plans may be used without the requirement to submit Traffic Control Plans subject to the concurrence of Caltrans Traffic Operations and or Roadway Construction Manager.
- 3) Permittee's DB Contractor may start the preliminary site investigation work upon the approval of the Double Permit and the concurrence of "Notice to Proceed 1" by Caltrans. Preliminary site investigation work shall include but is not limited to the following work activities:
 - Mobilization of Design-Builder's personnel
 - Structural Design
 - Roadway Design
 - Coordination with UPRR
 - Utility relocation coordination and design
 - Utility potholing
 - Environmental permitting support and coordination
 - Partnering plan and initial partnering session
 - Establishment of dispute resolution process
 - Design survey
 - Geotechnical investigation and engineering
 - Sign inventory
 - Community outreach
 - Aerial mapping
 - Participation in meeting and presentations with the Authority and providing technical support and presentation materials
- 4) No construction activities in conjunction with "Notice to Proceed 2" shall be performed until the "Release for Construction Plans, a Storm Water Pollution Prevention Plan (SWPPP), and the Traffic Management Plan (TMP) are submitted to and approved by Caltrans. In addition, a Notice of Intent (NOI) must be submitted to the State Water Resources Control Board (SWRCB) at least 30 days prior to the start of construction. The NOI, the Waste Discharge Identifications number, and a Sampling Analysis Plan must be included in the SWPPP.

- 5) Permittee's DB Contractor shall contact Caltrans Roadway Construction Manager a minimum of two working days prior to the implementation of any lane closures
- 6) A separate permit is required for Utility Relocation within the State Right of Way. Permittee's Utility Contractor shall submit the permit application package for Utility Relocation to Caltrans I-405 Office of Corridor Management to initiate the Encroachment Permit Review process.
- 7) Whenever the work area is more than 6 ft. away from the adjacent traffic lane but within a designated shoulder or parking lane, a shoulder closure or parking lane closure acceptable to Caltrans shall be utilized.
- 8) All components of the traffic control system shall be removed from the traveled way and paved shoulders at the end of the each work period unless approved by Caltrans Roadway Construction Manager.
- 9) Safety vests, hard hats and personal protective equipment as required by Cal OSHA shall be worn at all times while working within State right-of-way.
- 10) Access through the work area shall be provided for bicyclists and pedestrians at all times, when required by the Caltrans Roadway Construction Manager.
- 11) The following three Provisions apply to preliminary site investigation work that is going to be performed prior to the start of "Notice to Proceed 1":
 - a) The full width of traveled way shall be open for use by public traffic on Saturdays, Sundays and designated legal holidays, after 3:00 PM on Fridays and on the day preceding designated legal holidays, and when construction operations are not actively in progress.
 - b) Unless otherwise approved by the Caltrans, no work that interferes with public traffic shall be performed on weekdays between 6:00 AM and 9:00 AM, and between 3:00 PM and 6:30 PM.
 - c) Permittee shall not perform any preliminary design and construction investigation without prior approval from Caltrans. Submittal and approval of temporary traffic control plans may be required per Caltrans Roadway Construction Manager's discretion.
- 12) It is the responsibility of the Permittee, Permittee's agents, or Permittee's Contractors to comply with all provisions of this permit and instructions from the Caltrans Roadway Construction Manager.
- 13) Permittee shall remain solely responsible for compliance with all requirements of this permit.**
- 14) Prior to performing any work pursuant to this permit, the Permittee shall obtain all necessary permits and authorizations required of other governmental agencies and by law. The Permittee shall make the necessary arrangements with the appropriate agencies to monitor and test performed work to ensure accordance with requirements of those agencies.
- 15) Caltrans Roadway Construction Manager must ascertain and agree to all work details and all aspects of traffic control or no work shall begin on this permit.
- 16) The permitted work shall comply with Caltrans "Deputy Directive 64 : Complete Streets - Integrating the Transportation System".

- 17) ADA compliance requirements for pedestrian facilities shall be met in accordance with Caltrans "Design Information Bulletin 82: Pedestrian Accessibility Guidelines for Highway Projects" available at: <http://www.dot.ca.gov/hq/oppd/dib/dibprg.htm>

Compliance with DIB 82 is documented with the "Certification of Compliance with the Americans with Disabilities Act" (form TR-0405) available at:
<http://www.dot.ca.gov/hq/traffops/developserv/permits/applications/index.html>

Separate TR-0405 forms are required for the Design and Post Construction Certifications. The Design Certification must be submitted by Permittee's DB Contractor prior to the issuance of the Double Permit for the work affecting pedestrian facilities.

The Post Construction Certification must be submitted to Caltrans Roadway Construction Manager after construction is completed. The signature and stamp of a California Licensed Professional Engineer, Licensed Architect or Licensed Landscape Architect are required on the TR-0405 forms. A stamp is not required when the certification is done by (1) an authorized utility company representative or (2) an authorized (at the discretion of the District Permit Engineer) Caltrans representative with direct knowledge of the entire project's pedestrian facilities.

The District's Office of Corridor Management must retain both forms (Design and Post Construction) in the project file.

18) TRAFFIC STRIPING, MARKINGS, AND SIGNS (MCS) SPECIAL PROVISIONS

1. Traffic striping, pavement markings and signs shall be furnished and placed by the Permittee' DB Contractor and the cost shall be borne by the Permittee. Where new asphalt concrete has been placed, painted striping and pavement markings shall be installed within 24-hours. Where shown on the plans, after thirty (30) days curing time, thermoplastic materials shall be applied in compliance with Section 84 of the Standard Specifications.
 2. Roadside signs shall be placed at locations shown on the permit plans and shall be installed in compliance with the latest edition of Caltrans Standard Plans.
 3. Permittee' DB Contractor shall furnish to State's representative a completed Form CEM-3101 "Notice of Materials to be Used," and approval of the material used shall be obtained prior to its installation.
- 19) Your attention is directed to Standard Specification, Section 5-1.36 Property and Facility Preservation, and Business and Professions Code, Section 8771. Permittee's DB Contractor shall physically inspect the work site and locate survey monuments before work commencement. Monuments that might be disturbed shall be referenced or reset in accordance with Business and Professions Code." "If feasible, monuments should not be set within the traveled way. All monuments that must be set or perpetuated in paved surfaces, shall be constructed in accordance with Caltrans Standard Specification Section 81 'monuments' and Standard Plan A74, Type D, or equal with prior approval of the Caltrans Surveys Engineer."

"Copies of Corner Records filed or Record of Surveys recorded in compliance with the Business and Professions Code shall be forwarded to the District Surveys Engineer."

- 20) The Permittee's DB Contractor shall provide the stage construction traffic handling plans, work schedule and a list of all sub-contractors to the Caltrans Representative at the time of the pre-construction meeting or prior to start construction.
- 21) All traffic control, signing and striping shall comply with California MUTCD. It is available at: <http://www.dot.ca.gov/trafficops/engineering/>
- 22) Permittee's DB Contractor shall comply with Caltrans Standard Specifications and Standard Plans, Revised Standard Plans and the project special provisions. The latest Revised Standard Plans are available at: <http://www.dot.ca.gov/des/oe/construction-contract-standards.html>
- 23) The Permittee's DB Contractor's work shall be subordinated to any operations which the Caltrans may conduct and shall not delay, nor interfere with the Caltrans Forces or Caltrans Contractors.
- 24) No lane may be closed or obstructed at any time unless specifically allowed per the encroachment permit, shown in approved traffic control plans, and/or as directed by the Caltrans Representative.
- 25) Except for installing, maintaining and removing traffic control devices, any work encroaching within 3 feet of the edge of a travel lane for areas with a posted speed limit below 45mph, or 6 feet of the edge of a travel lane, for areas with a speed limit posted at 45mph or higher, shall require closing of that travel lane. Any work encroaching within 6 feet of the edge of the shoulder, shall require closing of that shoulder. The Permittee's DB Contractor shall notify the Caltrans Representative, and obtain approval of, all traffic control, lane closures or detours, at least seven (7) WORKING DAYS prior to setting up of any traffic control.
- 26) Should any deviation from these procedures or conditions be observed, all work shall be suspended until satisfactory steps have been taken to ensure compliance.
- 27) If time extension is necessary, a request for time extension and the accompanying attachments must be made a minimum of two (2) weeks prior to completion date stated on the face of the permit.
- 28) No vehicle or equipment shall be stored overnight within the right of way; it shall be removed immediately at the completion of the day's work unless approved by Caltrans Roadway Construction Manager. Refueling of vehicle or equipment within the right of way is strictly prohibited.
- 29) Required traffic control devices shall be installed around fixed objects to warn the motoring public for safety. Personal vehicles of the contractor shall not be parked within freeway right of way.
- 30) Except as specifically provided herein, all requirements of the Vehicle Code and other applicable laws must be complied with in all particulars.
- 31) When traffic cones or delineators are used to delineate a temporary edge of traffic lane, the line of cones or delineators shall be considered to be the edge of the traffic lane. The Permittee's DB Contractor shall not reduce the width of the existing lane to less than 12 feet without written approval from the Caltrans Representative.
- 32) Excavations made within the limits of the right of way shall be backfilled and resurfaced to original condition before leaving the work area unless otherwise authorized by the Caltrans Representative.

- 33) The Permittee shall be responsible for arranging the services of a qualified traffic control contractor to provide any needed traffic control.
- 34) The Permittee shall arrange a meeting between his field representative, traffic control contractor, Department's Representative and CHP at least two (2) weeks prior to start of any work covered under this permit to arrange date and time of starting work and determine appropriate methods of handling traffic. At least 3 working days' notice shall be given to the Caltrans representative and the CHP, prior to the meeting to allow time to arrange for attendance.
- 35) A copy of this permit, complete with all attachments, shall be kept by Permittee or Permittee's DB Contractor working under this permit and must be shown to the Caltrans Representatives, or Law Enforcement Officer, on demand.
- 36) The Permittee shall be responsible for notifying the appropriate utility companies or underground service alert prior to any excavation work.
- 37) When the work area encroaches upon a sidewalk, walkway, or crosswalk area, special consideration must be given to pedestrian safety. Protective barricades, fencing, handrails and bridges, together with warning and guidance devices and signs must be utilized so that the passageway for pedestrians, especially blind and other physically handicapped, is safe and well defined and shown on the approved permit plan.
- 38) Pedestrian walkways and canopies within State Right of Way shall comply with the requirements of the applicable local agency or of the latest edition of the Uniform Building Code whichever contains the higher standards.
- 39) A monolithic pour of sidewalk and curb and gutter shall not be permitted.
- 40) If existing public or private utilities conflict with the construction project, Permittee will make necessary arrangements with the owners of such utilities for their protection, relocation, or removal. Permittee shall inspect the protection, relocation, or removal of such facilities. Total costs of such protection, relocation, or removal which State or Permittee must legally pay, will be borne by Permittee. If any protection, relocation, or removal of utilities is required, including determination of liability for cost, such work shall be performed in accordance with State policy and procedure. Permittee shall require any utility company performing relocation work in the State's right-of-way to obtain a State Encroachment Permit before the performance of said relocation work. Any relocated utilities shall be correctly located and identified on the as-built plans".
- 41) The Permittee shall notify the California Highway Patrol Area Commander at least 72 hours prior to implementing traffic control.
- 42) Traffic signal system shutdowns shall be limited to periods as shown in the approved Traffic Management Plan.
- 43) All salvaged electrical equipment shall remain the property of the State of California and shall be delivered to the Caltrans Batavia Maintenance Yard in Orange, CA.
- 44) A temporary 6' high access control fence shall be provided before removing the existing fence. Existing fence fabric shall be salvaged and delivered to the nearest State facility as directed by the Caltrans representative at no cost to the State. The remaining access control fence shall be tied to the wall.
- 45) Fence posts are to be removed completely and the holes backfilled with compacted earthen material.

PAGE 6: ATTACHED TO AND MADE PART OF PERMIT NO. 12-16-N-OP-0634

- 46) Access to the worksite from the freeway is prohibited unless authorized by Caltrans Roadway Construction Manager.
- 47) Any material stored at the worksite within 30' of the traveled way when work is not in progress shall be protected by Type K barrier railing placed at a 20: 1 taper or as otherwise directed by the Caltrans representative.

PAGE 8: ATTACHED TO AND MADE PART OF PERMIT NO. 12-16-N-OP-0634

- 48) If shoring failures could damage State facilities or if the excavation is 5-ft or deeper, Permittee's DB Contractor must submit shoring plans and calculations to Caltrans Roadway Construction Manager for approval.

The Caltrans "Trenching and Shoring Manual" is available at the following website:
<http://www.dot.ca.gov/hq/esc/construction/manuals/>

The Permittee's DB Contractor may elect to use the Construction Safety Order Details, it is not required that a

Professional Engineer prepare the plan. However, a plan is still required. This plan can be a letter to the Caltrans Representative containing the information outlined in Section 2.0 "Shoring Plan Submittal" in Chapter 2 of the Caltrans Trenching and Shoring Manual (Second paragraph Section 1.6 page 1-9 Caltrans Trenching and Shoring Manual).

Shoring that does not meet the California Department of Safety and Health, Title 8 of the California Administration Code (Construction Safety Orders) must be designed by a California Registered Civil or Structural Engineer of the Permittee's DB Contractor, and they shall sign the shoring plan.

- 49) Any Type K barrier placed within 10' of the traveled way shall have one appropriate reflective marker affixed to the top of each section. A Type "P" object marker shall be installed in front of the approach end section. The end section shall also be protected by a temporary crash cushion array.

EMERGENCY VEHICLE PREEMPTION SYSTEM

The Permittee's DB Contractor will install the Emergency Vehicle Preemption System.

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
ENCROACHMENT PERMIT STEEL PLATE BRIDGING UTILITY PROVISIONS
TR -0157 (Rev. 07/2009)

See attached for TR-0157 Provisions.

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION
**ENCROACHMENT PERMIT - UNCASSED HIGH PRESSURE NATURAL GAS PIPELINE
SPECIAL PROVISIONS**

See attached for TR-0158 Provisions.

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
ENCROACHMENT PERMIT OVERHEAD UTILITY PROVISIONS
TR - 0162 (Rev. 12/2007)

See attached for TR-0162 Provisions.

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
ENCROACHMENT PERMIT UNDERGROUND UTILITY PROVISIONS
TR - 0163 (Rev. 03/2013)

See attached for TR-0163 Provisions.

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION Page 1 of 2
STORM WATER SPECIAL PROVISIONS for MINIMAL or NO IMPACT
TR-0400 (Rev 09/2012)
See attached for TR-0400 Provisions.

VIBRIO GENERATING EQUIPMENT (GV) SPECIAL PROVISIONS

1. Equipment shall not be operated on any pavement or other paved surface.
2. Equipment shall not be operated within access-controlled rights of way.
3. Equipment shall be placed and operated as close to the right of way line as possible.
4. Equipment shall be operated so that no damage will occur to trees, plants, wells, culverts, headwalls, structures or other improvements.
5. This permit does not authorize the shear wave method.
6. Equipment shall not be parked on or operated on the traveled way except for normal legal travel.

7. Personnel working within the State right of way shall wear Personal Safety Equipment including hardhat and safety vest per Cal-OHSA requirement.
8. All mud, dirt or gravel tracked onto the highway pavement shall be immediately and completely removed.
9. Dirt areas within the State right of way disturbed by Geophysical testing operations shall be graded back to its original shape and grade.

TREE TRIMMING, REMOVAL, AND CHEMICAL APPLICATION (LT) SPECIAL PROVISIONS

I. GENERAL

1. Any traffic control that requires lane closure shall be in compliance with the appropriate traffic control plan. Where required by the plan, the use of a flashing arrow board is MANDATORY.
2. All debris shall be removed from the right of way and the area left in a safe and presentable condition at the end of each work day.
3. Climbing Spurs shall not be used except when removing trees or when working in the tops of Eucalyptus, Palms and Conifers.
4. Head back trim consists of reducing the height and/or spread of a tree by not more than one third. Head back trim is performed by a method called "drop crotch" pruning, which permits the preservation of a natural appearing foliage margin. Drop crotch pruning consists of removing perimeter branches at their junction with shorter branches. The shorter branches are retained intact to form a new foliage margin at the specified height and/or spread.

II. TREE TRIMMING

Tree trimming shall be performed by or under the detailed supervision of Permittee's DB Contractor's qualified tree trimmer and the work must conform to the following:

1. In general, only light trimming of annual growth 2" or less in diameter will be permitted. The basic structure of the tree must be preserved. All large cuts shall be painted.
2. All trees shall be left in a symmetrical shape that is characteristic to their species.
3. This Permit alone does not grant permission to trim trees which are wholly or partly on private property. Permission must also be secured from the local property owner before trimming these trees.
4. Permittee's DB Contractor shall trim excessive growth on the sides or top of the tree in all instances where it is obvious that previous pruning practices (topping and/or side trimming) are the cause of the excessive growth over State or adjacent private property. The finished tree shall be balanced and symmetrical.

5. Crown reduction shall be accomplished by use of selective trimming, not directive. Cuts, whenever possible, shall be made at strong laterals. Stubbing and/or shear pruning will not be permitted.
6. Limbs larger than 2" in diameter may be removed for restructuring of the crown framework or to remove undesirable growth. Entire limbs may be cut off at the trunk. Care must be taken to avoid large holes in the canopy or to avoid creating unbalanced trees.
7. Pruning should be done only to maintain minimum required clearances for a two year (2) maximum period.
8. Trimming which would have the effect of forcing an unbalanced side growth or hazardous overhang on the highway will not be permitted. Under these conditions, proper thinning and heading in will be required before top or center trimming is permitted. The terminal bud of the leader shall not be removed.
9. Restructuring growth shall be cut for removal of crows' nests or brooms. Locate these cuts at strong laterals on older wood. Thinning by selective trimming or drop crotching for a more open canopy is desirable. The terminal bud shall not be removed.
10. All Elm trees shall be pruned and debris removed according to Department of Forestry Regulations.
11. All Pines shall be pruned and debris removed according to recommendations of Department of Forestry to prevent spread of pitch canker.
12. Final pruning cuts shall be made without leaving a stub. They shall be made in a manner to favor the earliest possible covering of the wound by callus growth. This requires that the wound be as small as practicable; the cut be reasonably flush and within the shoulder ring area; and that the cambial tissues at the edge of the cut be alive and healthy. Extremely flush cuts that produce large wounds and weaken the tree at the cut shall not be made.

MANDATORY INSPECTIONS REQUIRED

IRRIGATION:

- a) Trenching and placing of supply lines.
- b) Pressure testing of supply lines.
- c) Backfill and compaction.
- d) Sprinklers and sprinkler coverage.
- e) Functional test.

PLANTING:

- a) Inspection Certificates (Nursery Stock Certificates) required by law shall accompany each shipment of plants. All plant materials and nursery invoices shall be inspected prior to planting.
- b) Designate plant locations.
- c) Preparation of planting areas and plant holes.
- d) Upon completion of planting.
- e) Additional inspections as determined by the Caltrans' Representative may be required.

If a registered Civil Engineer is chosen, in lieu of a registered Landscape Architect to perform the function of a Resident Engineer, Permittee shall furnish, at Permittee's expense, and subject to the approval of Caltrans Representative, a landscape architect to perform the function of assistant "Resident Engineer" who is responsible for both daily on-site inspections and final decisions including but not limited to: the highway planting and irrigation system portions of the work. Final decisions shall continue to be subject to the satisfaction and approval of the Caltrans Representative.

SOURCE OF MATERIALS:

All work shall comply with the Department's current issue of STANDARD SPECIFICATIONS. Section 20-2.13 "Materials" of the Standard Specifications states that the Permittee's DB Contractor shall furnish a certificate of compliance for irrigation equipment, soil amendment, and mulch. This certificate shall be supplied to the Caltrans Representative prior to use of any such material.

As-Built Plans and Other Completion Records

AS-BUILT" PLANS ARE REQUIRED UPON COMPLETION OF ALL WORK. PLEASE REFER TO THE GENERAL PROVISION TR-0045, ITEM 22 FOR THE "AS-BUILT" REQUIREMENTS. NO FINAL INSPECTION WILL BE PERFORMED UNTIL THE DEPARTMENT IS IN RECEIPT OF "AS-BUILT" PLANS

The Encroachment Permit General Provisions require submittal of as-built plans (updated original project plan sheets showing changes made during construction) by the Permittee when specified in the permit. Utility permittees are required by the California Public Utilities Commission (C.P.U.C) to keep and maintain their own records.

Upon completion of permit work, the Permittee also furnishes to Caltrans details of the locations of hidden encroachments so that information may be retained for Caltrans' future reference.

If the permit includes any capital improvement work (whether a Capital Outlay Program or a Permit Program) involving structure related facilities, then submittals of structure as-builts and other structure completion records are required as detailed in Structure Work Special Provision (see below).

Additionally, utility or private entity permittees, working on these projects, shall submit accurate, reproducible as-built plans and any other required completion records to Caltrans for approval before bonds are released. Local agency permittees failing to provide complete, accurate, and reproducible, signed and approved completion records to Caltrans for permit work shall be cause for the State to require performance bonds on future permits. Future permitted work is subject to a bond requirement until the completion records of said previously permitted work is submitted satisfactorily (California Streets and Highways Code, Section 678).

As-built plans should conform to requirements stated in Caltrans' "Plans Preparation Manual", "Construction Manual", and "Structures OSFP Information and Procedures Guide". As-built plans must be stamped, signed, and dated as follows:

As-Built plans for Roadway
Geometric and Above Ground Features

State's Representative

Date

STRUCTURE WORK

Use these special provisions when Permit includes any capital improvement work (Capital Outlay Program or Permit Program) involving structure related facilities such as: modification to existing bridges, new bridges, all tunnels, underground structures, single and multi-cell culverts wider than 20' measured in the direction of traffic, storage boxes, non-standard retaining walls, non-standard sound walls (including sound walls on retaining wall), earth retaining systems, bridge-mounted sign structures, overhead sign structures, pump plants, slope paving under bridges (including any paving or channel lining around bridge columns), seal slabs/boat sections, transit stations, and toll plazas.

1) BEGINNING OF WORK:

The Permittee's DB Contractor shall notify the Department's Representative, JOHN ZEHNDER at 714-803-2588 Two (2) weeks before the intent to start permitted work to ensure coordination with the Division of Structure Construction.

2) CONTRACT DOCUMENTS:

In addition to the number of as-advertised contract document sets required by Caltrans Representative for Caltrans' use, the Permittee's DB Contractor shall include a minimum of eleven (11) additional sets of contract documents (plans, special provisions and addenda) for use by the Caltrans Engineering Service Center. Upon approval of the permit application, the District Permit Office shall distribute the eleven additional sets of contract documents to:

State of California
Department of Transportation
Engineering Service Center
Office of Special Funded Projects, MS 9-2/7G
1801 30th Street
Sacramento, CA 95816

Depending on the work contemplated in the project, more copies may be required as determined by the Caltrans' Representative and the Structures OSFP Liaison Engineer.

3) AS-BUILT & OTHER COMPLETION RECORDS

Within sixty (60) days following completion and acceptance of the project construction contract, Permittee shall furnish acceptable completion records, which are applicable to the project, to the State representatives shown in the following table. Completion records shall be submitted in accordance with the "Submittal Instructions and Forms" shown in the following table. When requested by the Permittee, the State representative shall furnish the instructions and forms shown in the following table. This information is also available from the Caltrans internet website.

Completion records or accompanying correspondence shall not include disclaimer statements of any kind. Such statements shall constitute non-compliance with these provisions.

For Locally Advertised projects, the As-Built Plan Package shall include the "Structures As-Built Plan Submittal Route Slip."

Pre-Construction Meeting:

I, _____ acting as an authorized agent for the Permittee, do hereby agree to personally accomplish or have another designated person arrange for all involved company representatives to attend a pre-construction meeting with the authorized Department's Representative at _____, as specified on this permit. Such meeting must be held two (5) days or more prior to the planned start of the work on this project. The Authorized Caltrans Representative shall have complete authority to determine whether the permit conditions, either implied or written, have been complied with. The Department's Representative may then allow the permit work to proceed as appropriate. The Pre-construction Meeting Record below must be signed by both the Department's Representative and the Permittee before the permit work may start.

I have read and understand the attached General Provisions TR-0045 and other attached provisions of this permit. This agreement or a copy thereof, must be mailed back to the Department's District 12 Encroachment Permit Office at 1750 East 4th Street, Santa Ana, CA 92704 within three (3) working days prior to the pre-construction meeting. Failure to return this form could delay the release of your bonds. A copy of this document shall be at the job site at all times when work is in progress and failure to do so may result in the suspension of work, as directed by the Caltrans Representative.

It is the permittee's responsibility to insure that the Caltrans Representative is notified of work completion and that the attached Completion Notice is mailed to the Caltrans' Permit office.

Signature

Date

Print or Type Name

Position or Title

METS REQUIREMENTS:

For permits which have overhead sign and/or pole structures, Permittee' DB Contractor shall furnish a completed form DC-CEM-3101 "Notice of Materials to be Used" to the Materials Engineering and Testing Services (METS) Materials Administrator for all signal poles, sign poles, light poles, mast arms, BBS, LED's, overhead sign, and other items as specified by the State Representative along with three copies of approved plans for overhead sign and/or pole structures, specifications, special provisions and the permit that reference the permit number. Materials identified on a TL-608 "Notice of Materials to be Furnished" may require a minimum of six weeks for source inspection, testing, and approval. Materials identified on a TL-608 which are not inspected and approved by the State at the manufacturer's/fabricator's plant will be rejected for use on the State highway system. The METS Materials Administrator can be reached via fax at 916-227-7084, via e-mail at materials_administrator-METS@dot.ca.gov or the following mailing address:

State of California
Department of Transportation
Division of Engineering Services
Materials Engineering and Testing Services
Materials Administrator, MS#5
5900 Folsom Blvd., Room 517
Sacramento, CA 95819-4612

Permittee's DB Contractors or subcontractors performing welding operations for overhead sign and pole structures shall have successfully completed the Department's "Manufacturing Qualification Audit for Overhead Sign and Pole Structures," and during welding operations must be listed as having a current audit. A current list of completed audits is available at:
<http://www.dot.ca.gov/hq/esc/Translab/OSM/SMBAudits.htm>

Field welding for Overhead Sign and Pole Structures is only acceptable for splicing of Pole Structures and must be approved by METS. A welding quality control plan and galvanizing repair procedure must be approved by METS prior to start of splicing.

Copies of the audit form, and procedures for requesting and completing the audit, are available at the Transportation Laboratory or at: <http://www.dot.ca.gov/hq/esc/Translab/OSM/smbresources.htm>

8-3. WELDING

http://www.dot.ca.gov/hq/esc/oe/specifications/SSPs/2006-SSPs/Sec_08_Mtls/08-3_Welding/S8-W04_E_B09-01-06.doc

WELDING FOR OVERHEAD SIGN AND POLE STRUCTURES

http://www.dot.ca.gov/hq/esc/oe/specifications/SSPs/2006-SSPs/Sec_08_Mtls/08-3_Welding/S8-W05_E_B09-01-06.doc

NONDESTRUCTIVE TEST FOR OVERHEAD SIGN STRUCTURE:

http://www.dot.ca.gov/hq/esc/oe/specifications/SSPs/2006-SSPs/Sec_10/49-59/56-010_E_B09-21-07.doc

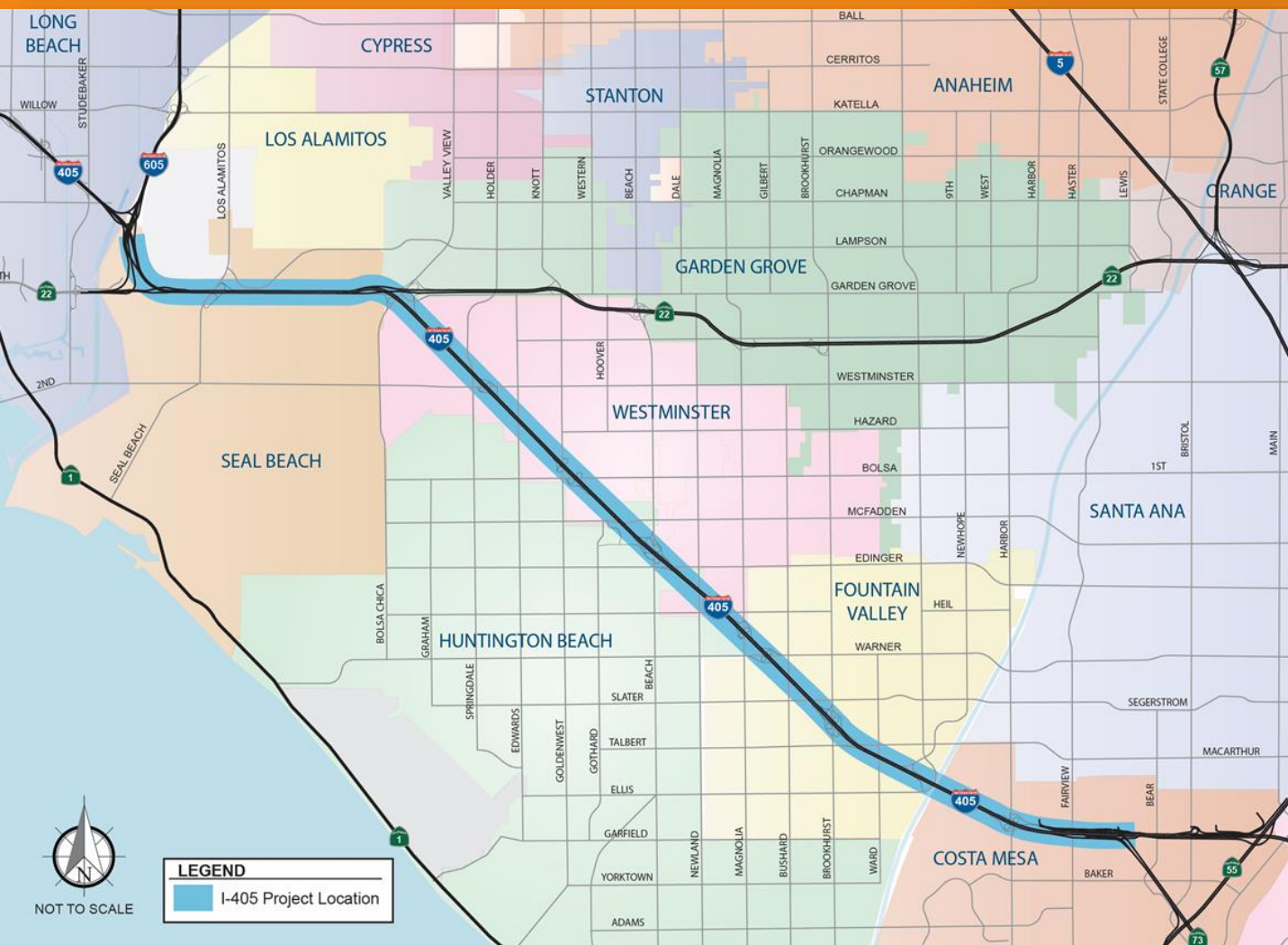
- Immediately following completion of the work permitted herein, Permittee's DB Contractor shall fax to (TBD) the **Work Completion Notice and Customer Service Questionnaire** to facilitate final permit processing.



Approval to Release Request for Proposals for Toll Lanes System Integrator Services for the 405 Express Lanes and 91 Express Lanes



Project Location and Key Features



Background

- On October 12, 2015, the Orange County Transportation Authority (OCTA) Board of Directors (Board) approved assumptions for the 405 Express Lanes, including that the facility would operate in a manner similar to the 91 Express Lanes
- On May 23, 2016, the Board approved the 405 Express Lanes Toll Policy
- On September 26, 2016, staff presented the toll systems and operations services procurement approach to the Board

Multiple Toll Systems/Operations Contracts

- Based on the September 26, 2016 Board presentation, the procurement approach includes three separate contracts:
 - Toll lanes system integrator (TLSI) – designs, installs, operates, and maintains the electronic toll and traffic management (ETTM) system. The ETTM system tracks the number of vehicles, takes images of vehicles, and stores all transponder transactional data
 - Back office system and customer service center – back office hardware and software systems and staffing for customer service center (start procurement in 2018)
 - Customer assistance patrol – similar to freeway service patrol (start procurement in 2020)
- Multiple procurements approach encourages state of the art technology, supports a high level of customer service, and encourages competition to achieve best value for OCTA

Combining 405 and 91 Express Lanes

- Based on the September 26, 2016 Board presentation, the 405 Express Lanes and 91 Express Lanes will be combined into one TLSI procurement
- Consolidating the TLSI procurements provides the following benefits:
 - Eliminates duplicate procurement effort and costs
 - Significantly saves capital and operating costs
 - Further encourages competition and state of the art technology
 - Reduces risk for 405 Express Lanes start-up
- Timing of combining the procurements is ideal:
 - TLSI will begin coordination with 405 design-builder early next year as design progresses and construction begins
 - OCTA scheduled to replace the ETTM system on the 91 Express Lanes prior to 2021
 - 405 Express Lanes implementation prior to 2023 opening

Recommendations

- Approve the proposed evaluation criteria and weightings for Request for Proposals 7-1911 for selection of a contractor to provide toll lanes system integrator services.
- Approve the release of Request for Proposals 7-1911 to provide toll lanes system integrator services for the 405 Express Lanes and 91 Express Lanes.

Next Steps

Milestone	Date
TLSI Request for Proposals Release	August 28, 2017
TLSI Contract Award	February 2018
TLSI Notice to Proceed	March 2018



MEMORANDUM

August 28, 2017

To: Members of the Board of Directors
From: Darrell Johnson, Chief Executive Officer
Subject: Managed Lanes Workshop

A handwritten signature in blue ink, appearing to read 'Darrell Johnson', is written over a light blue rectangular background.

A workshop to discuss managed lanes is planned for the August 28, 2017 Board of Directors (Board) meeting. The workshop was requested by the Board and is intended to provide perspectives on related statewide and regional planning and implementation efforts, as well as elicit Board input for the upcoming 2018 Long-Range Transportation Plan.

The attached resource book has been prepared for Board information and includes the opening Orange County Transportation Authority (OCTA) presentation and the panelists' presentations. In addition, the resource book includes important reference material such as a listing of managed lanes across the United States, the most recent State of California planning policy document, and relevant regional/local managed plans. Lastly, the latest Board-adopted OCTA guiding principles on this topic dated December 12, 2011 are included.

DJ: km
Attachments

c: Executive Staff



Orange County Transportation Authority
Managed Lanes Resource Book

August 28, 2017

TABLE OF CONTENTS

WORKSHOP PRESENTATIONS

SPEAKER BIOGRAPHIES

ROBERT POOLE – REASON FOUNDATION

KOME AJISE - CALTRANS

STEPHEN FINNEGAN – SOUTHERN CALIFORNIA AUTOMOBILE CLUB

PATRICK JONES – INTERNATIONAL BRIDGE, TUNNEL, AND TURNPIKE ASSOCIATION

NATIONAL

PRICED MANAGED LANES OPERATING OR IN CONSTRUCTION, FEBRUARY 2017

TRB NATIONAL EXPRESS LANES DATABASE

PRICED MANAGED LANE GUIDE: PRICED MANAGED LANES REQUISITES (EXCERPT)

STATE

CALIFORNIA TRANSPORTATION PLAN 2040: IMPLEMENTATION HIGHLIGHTS

DEPUTY DIRECTIVE 43-R1: MANAGED LANE FACILITIES

REGIONAL

SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS (SCAG)

2016 RTP/SCS APPENDIX: HIGHWAYS & ARTERIALS APPENDIX

EXHIBIT 8 – REGIONAL EXPRESS LANE NETWORK

TABLE 2 – REGIONAL EXPRESS LANE NETWORK

LOS ANGELES METROPOLITAN TRANSPORTATION AUTHORITY (METRO)

COUNTYWIDE EXPRESSLANES STRATEGIC PLAN

EXECUTIVE SUMMARY

ATTACHMENT B

PRESENTATION

RIVERSIDE COUNTY TRANSPORTATION COMMISSION (RCTC)

SR-91 EXPRESS LANE PROJECT FACTSHEET

I-15 EXPRESS LANE PROJECT FACTSHEET

SAN BERNARDINO COUNTY TRANSPORTATION AUTHORITY (SBCTA)

I-15 EXPRESS LANE PROJECT FACTSHEET

I-10 EXPRESS LANE PROJECT FACTSHEET

EXPRESS LANES TOLLING POLICY AND TOLL REVENUE POLICY

CALTRANS DISTRICT 12

2015 CALIFORNIA HOV LANE DEGRADATION DETERMINATION REPORT (D12 EXCERPT)

SYSTEM PLAN FOR MANAGED LANES ON CALIFORNIA STATE HIGHWAYS

EXHIBIT 56 – DISTRICT 12 FUTURE MANAGED LANES SYSTEM

DRAFT MANAGED LANES NETWORK STUDY – OCTA BOARD PRESENTATION (DEC 2016)

ORANGE COUNTY MANAGED LANES NETWORK STUDY

ORANGE COUNTY TRANSPORTATION AUTHORITY (OCTA)

EXPRESS LANE PLANNING AND IMPLEMENTATION PRINCIPLES

STAFF REPORT (DEC 2011)

SR-91 EXPRESS LANES FACTSHEET

I-405 IMPROVEMENT PROJECT FACTSHEET

REFERENCE ARTICLES

AS INLAND TOLL LANES BOOM, WHY ARE NEW FREEWAY LANES RARELY FREE?

**THERE'S ONLY ONE WAY TO FIX L.A.'S TRAFFIC, AND IT ISN'T ELON MUSK'S
TUNNELS. WE NEED TOLLS – LOTS OF THEM**



Managed Lanes Workshop

Orange County Transportation Authority
Board of Directors
August 28, 2017

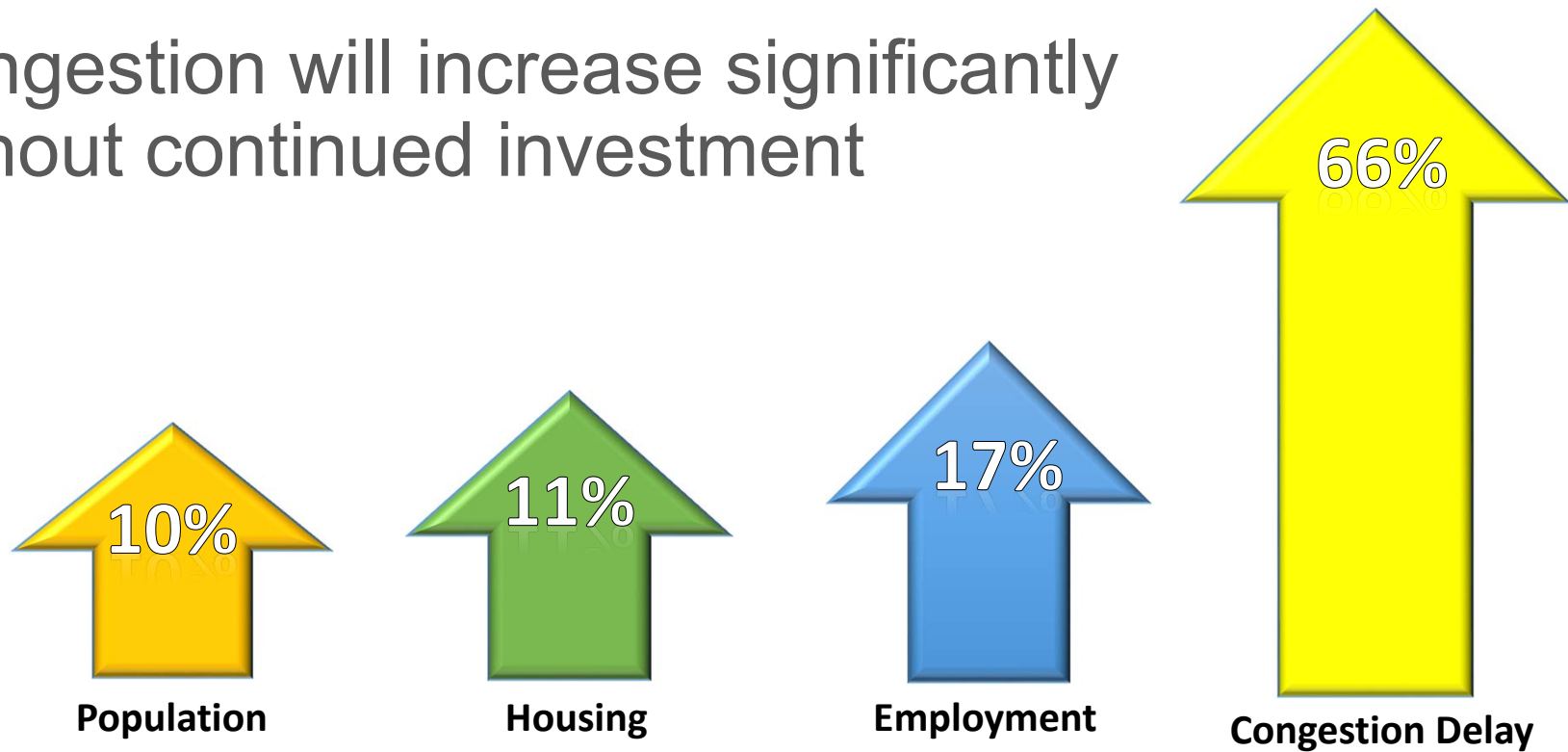
Context



Now is the time to develop a freeway strategy beyond Measure M2

Orange County Growth (2015-2040)

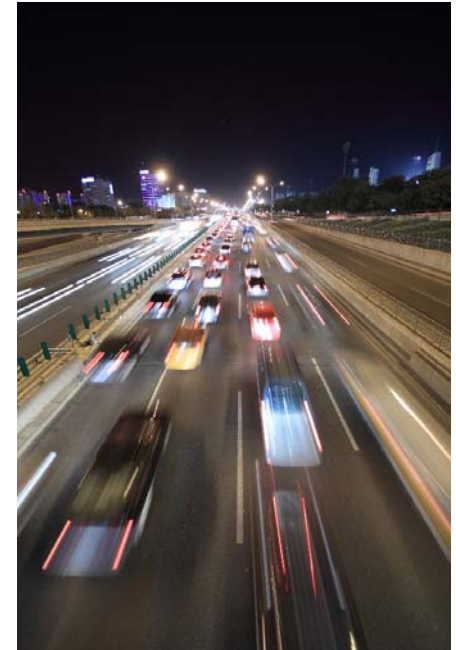
- Congestion will increase significantly without continued investment



Intercounty Travel Demand

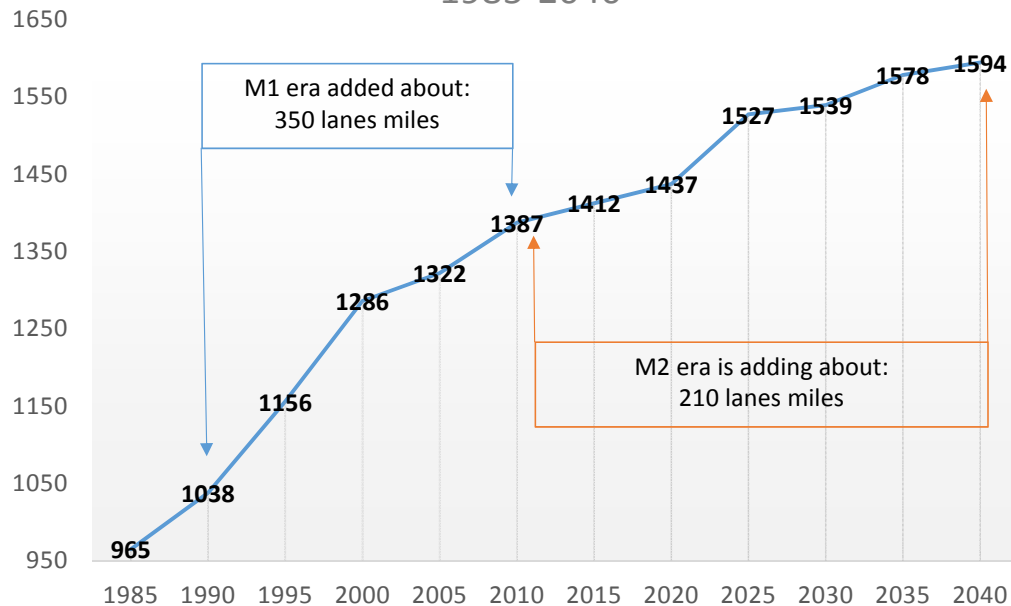
- In-bound workers
 - About 650,000 workers commute to OC
- Out-bound residents
 - Over 490,000 OC residents commute to jobs in other counties
- By 2040, in-bound commuters will increase by 25 percent
- Intercounty accessibility to jobs is critical to Orange County's economy and quality of life

Source: U.S. Census Bureau, Center for Economic Studies and Center for Demographic Research, Cal State University Fullerton



Freeway Development

OC Freeway Lane Miles
1985-2040



Note: Does not include Toll Roads network

Managed Lanes History

1980s – First carpool lanes open



1990s – Implement buffered carpool lanes and 91 Express Lanes open



2000s – Added direct connectors



2010s – Dual HOV/priced managed lanes



Federal Performance Standards

- Federal regulations require HOV lanes to operate at 45+mph during peak periods
- Today, most of Orange County's HOV lanes do not meet this standard

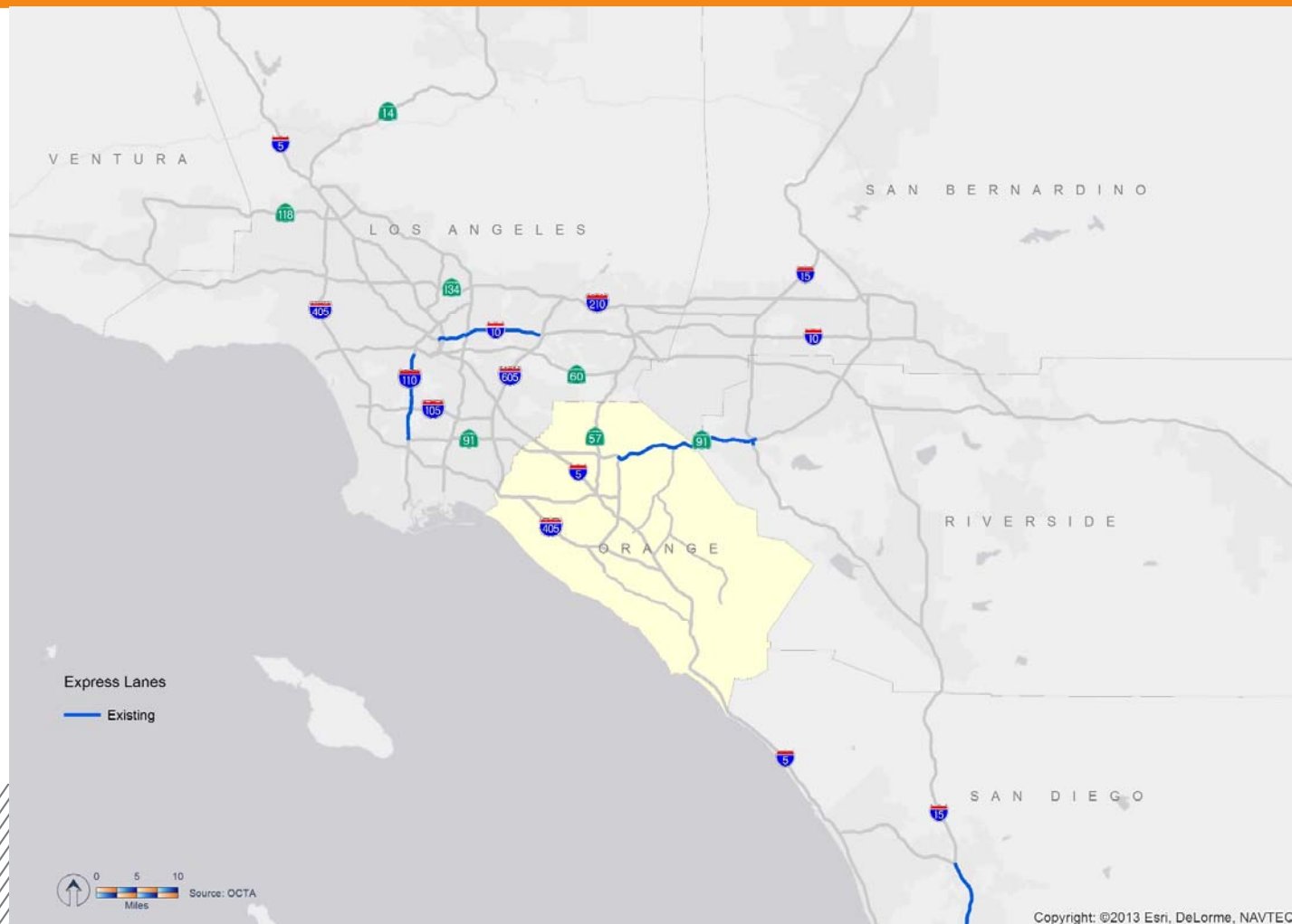


State Plans

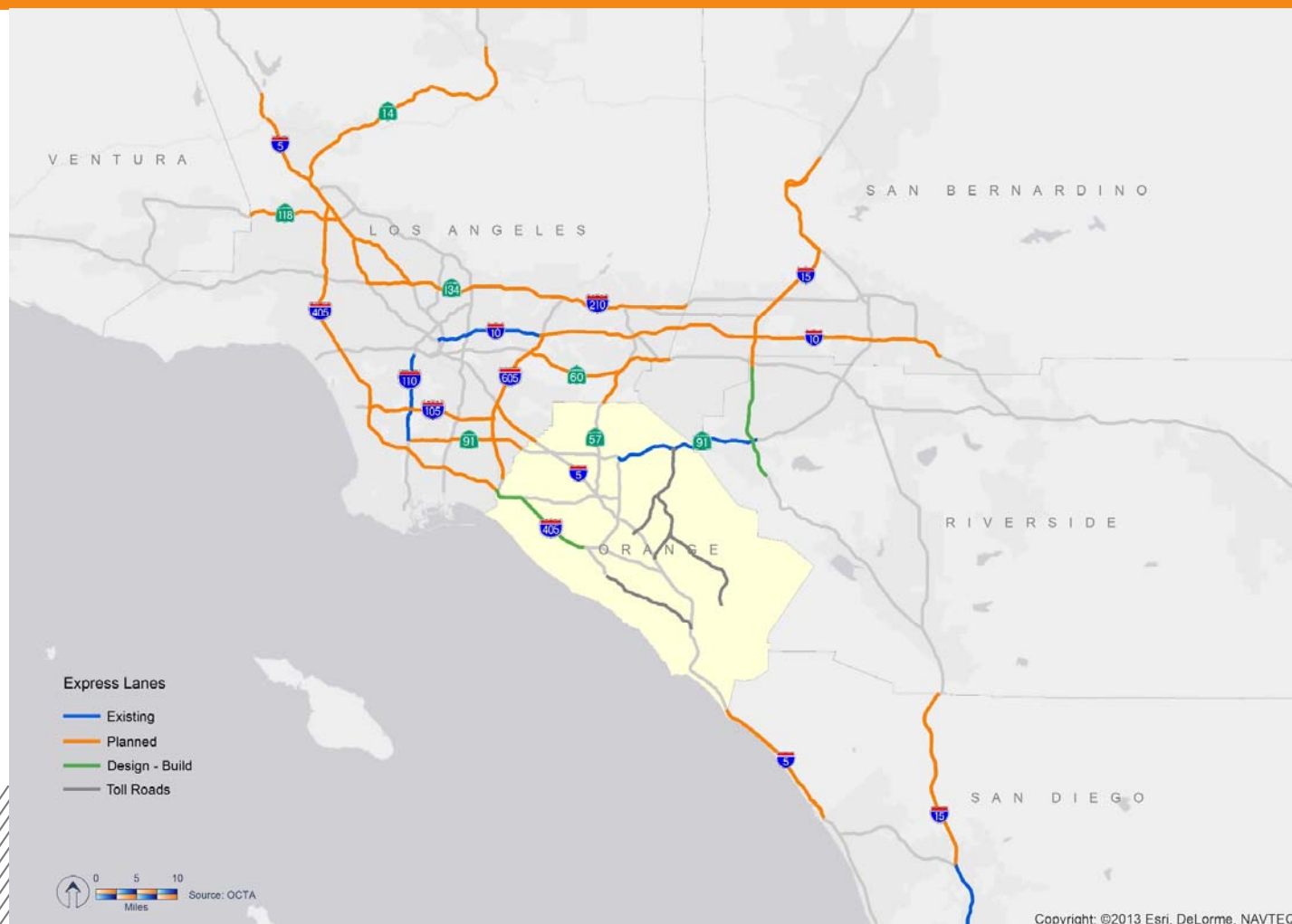
- Caltrans is charged with:
 - Monitoring HOV lane performance
 - Maintaining an action plan to address degraded HOV lanes
- District 12 developed a Managed Lanes Network Study to comply with federal performance standards



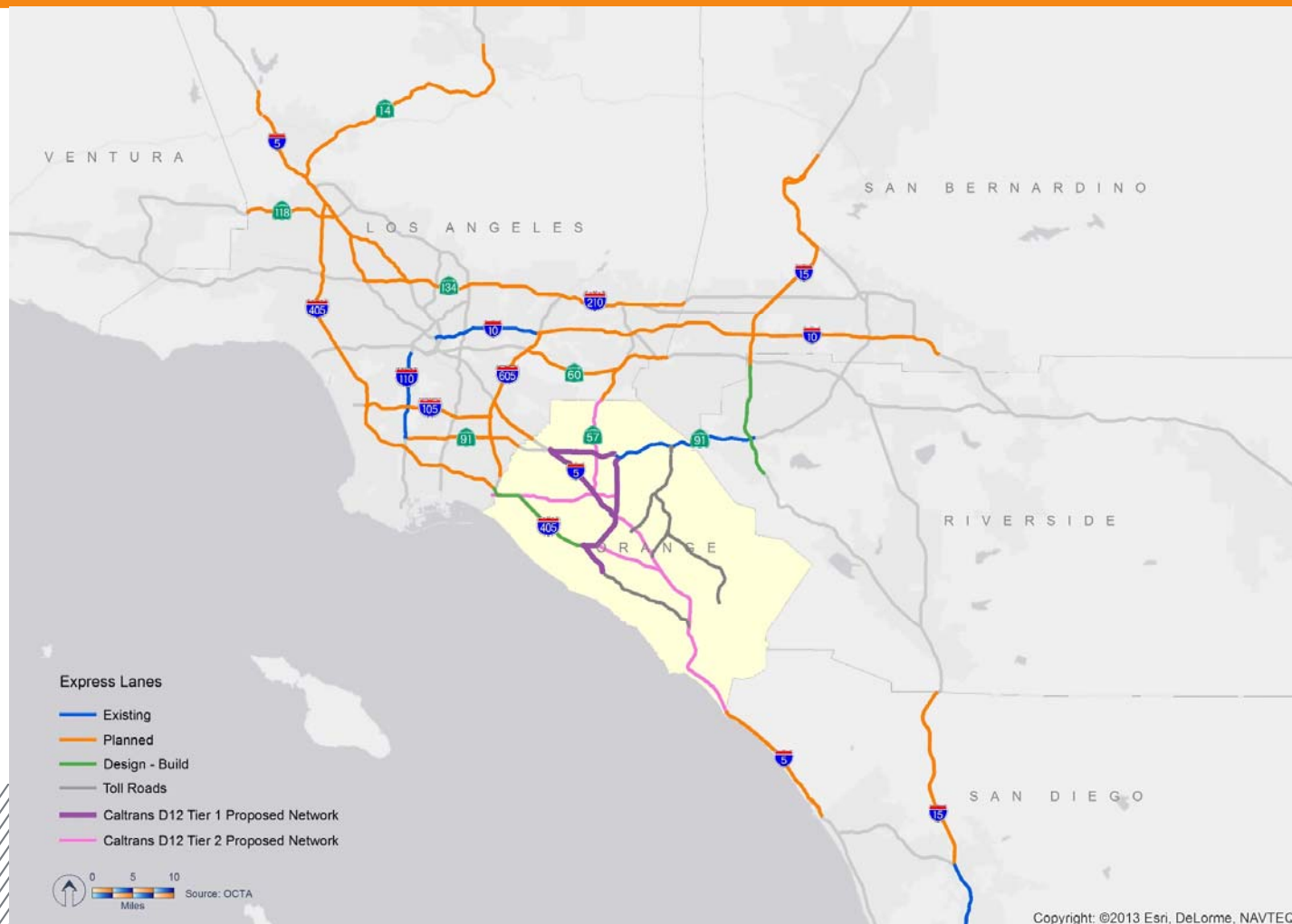
Southern California Existing Express Lanes



Planned Regional Express Lanes



Planned Caltrans Express Lanes



Planned Express Lanes – OC Focus



Panel Introductions



Robert Poole

Director of Transportation
Policy and Searle Freedom
Trust Transportation Fellow
at Reason Foundation



Kome Ajise

Chief Deputy Director,
California Department of
Transportation



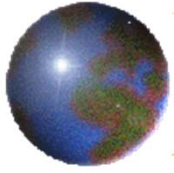
Stephen Finnegan

Manager of Government
& Community Affairs,
Automobile Club of
Southern California



Patrick Jones

Executive Director/Chief
Executive Officer,
International Bridge, Tunnel,
and Turnpike Association



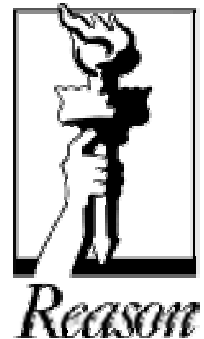
Managed Lanes 2017: What They Are and How They Work

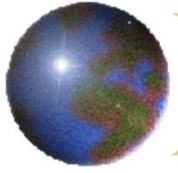
Robert W. Poole, Jr.

Director of Transportation Policy

Reason Foundation

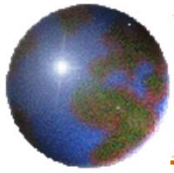
<http://reason.org>





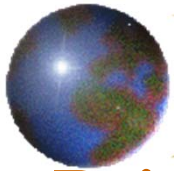
What are Managed Lanes?

- ✚ Lanes restricted by price or vehicle type.
 - ✚ HOT lane: HOVs and paying vehicles
 - ✚ Express Toll Lane: all (or nearly all) pay
- ✚ Today, over 1,500 lane-miles in operation.
- ✚ In use or planned in 17 metro areas.

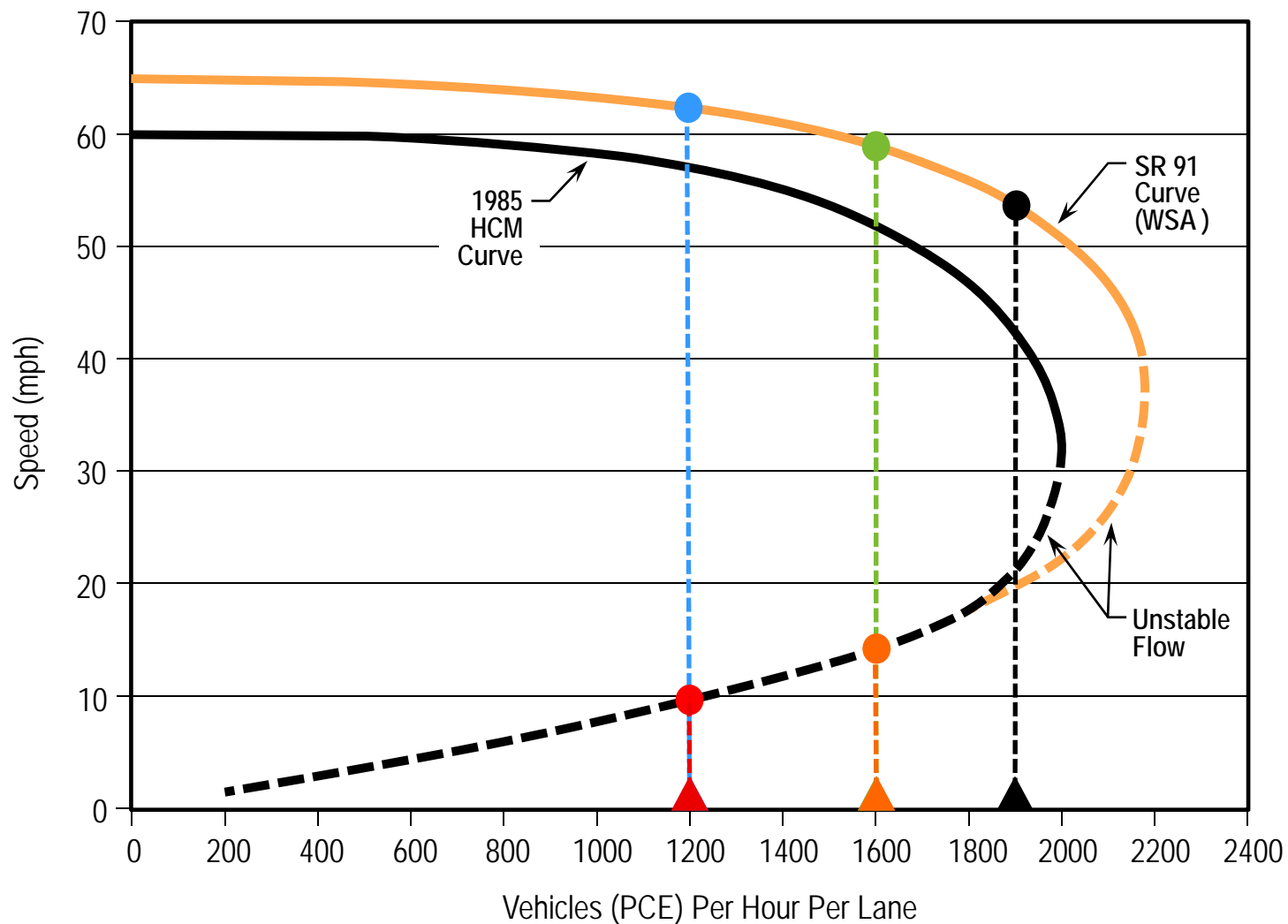


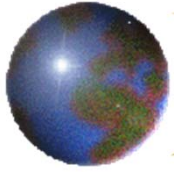
Managed Lanes Projects, 2017





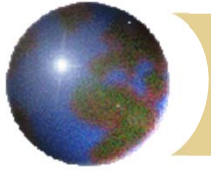
Pricing enables uncongested traffic flow.





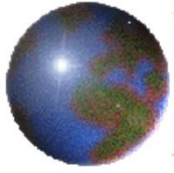
Problems with non-paying vehicles

- ✚ Maintaining uncongested flow depends on effective pricing.
- ✚ Large majority *must* be priced.
- ✚ Still no proven way to enforce HOV occupancy.
- ✚ High person throughput via vanpools, buses as *alternative* to HOVs going free.
- ✚ Recent trend of no HOVs free: MoPac, I-595, I-95 MD, I-4 Orlando



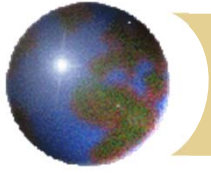
National trend is ML networks

<u>Metro Area</u>	<u>Under Way</u>	<u>Planned</u>
Atlanta	X	
Dallas/Ft. Worth	X	
Denver	X	
Houston	X	
Jacksonville	X	
Los Angeles	X	
Miami	X	
Minneapolis/St. Paul	X	
Orlando		X
San Diego		X
San Francisco	X	
Seattle	X	
Tampa		X
Washington, DC	X	



What do ML networks need?

- ✚ Consistent user experience (access, occupancy, pricing, signage)
- ✚ Seamless connectors
- ✚ Revenue maximization (to build out the network, including connectors)
- ✚ MLs also on toll roads, if congested



Synergy of Managed Lanes and express bus service

- ⊕ Market-priced lane is *virtual equivalent* of an exclusive fixed guideway.
- ⊕ Pricing limits vehicle flow to what's compatible with LOS C conditions.
- ⊕ Reliable high speed is sustainable long-term, thanks to pricing.
- ⊕ Lanes should include bus-friendly features.



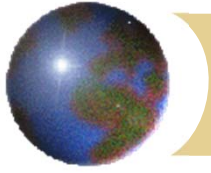
Main Lanes

**Managed
Lanes**

**Direct Access
Road to Arterial**

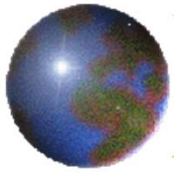
**Direct Transit
Access Ramps**

**BRT
Station**

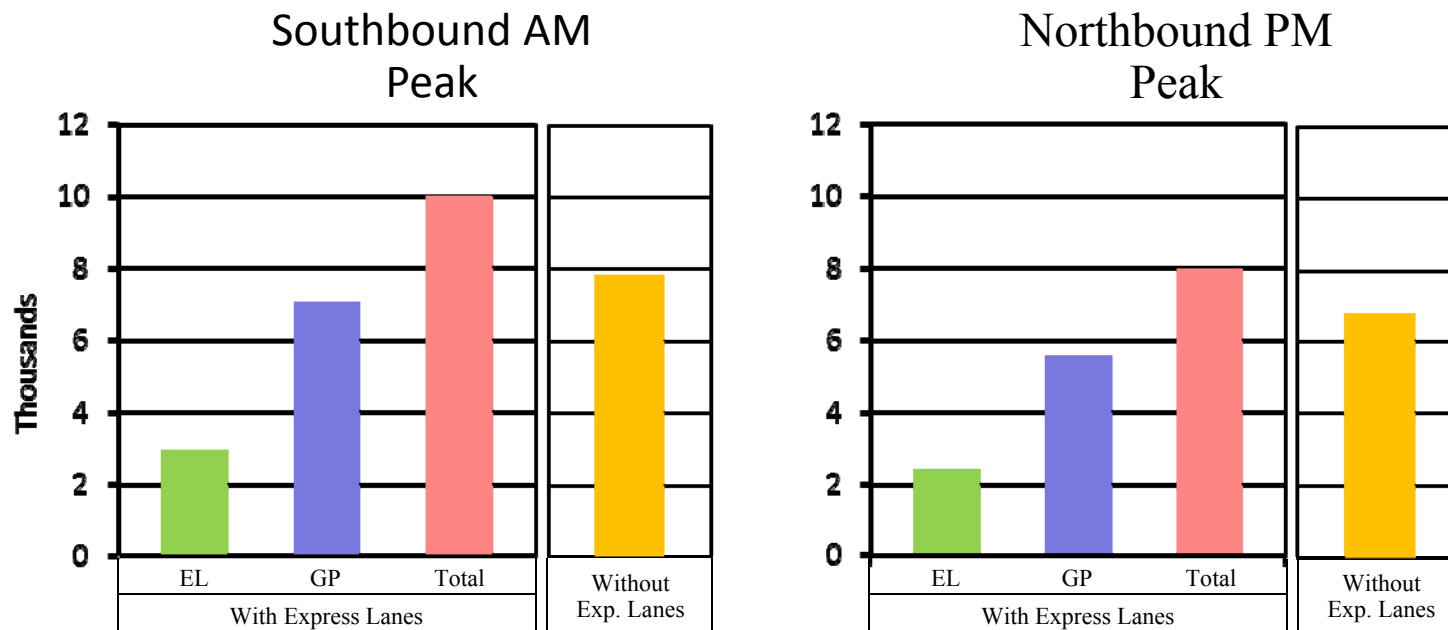


Typical ML concerns

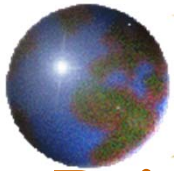
- ✚ Less throughput than general lanes
- ✚ "Lexus Lanes"
- ✚ Unaffordable tolls
- ✚ No room to add lanes



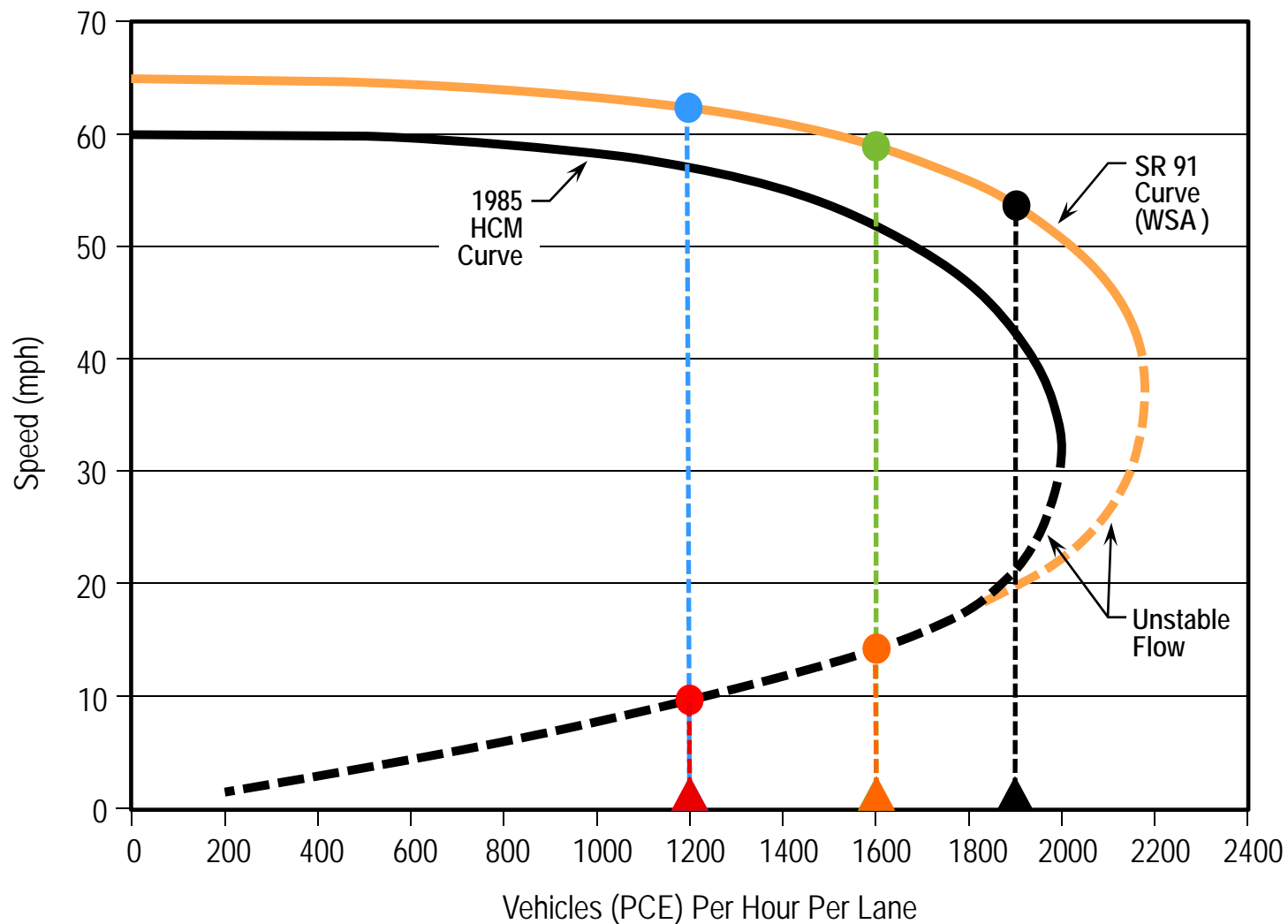
I-95 Miami throughput comparison

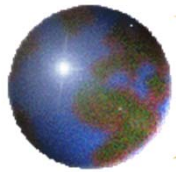


Source: FDOT / Kimley-Horn; Cambridge Systematics



Pricing enables uncongested traffic flow.



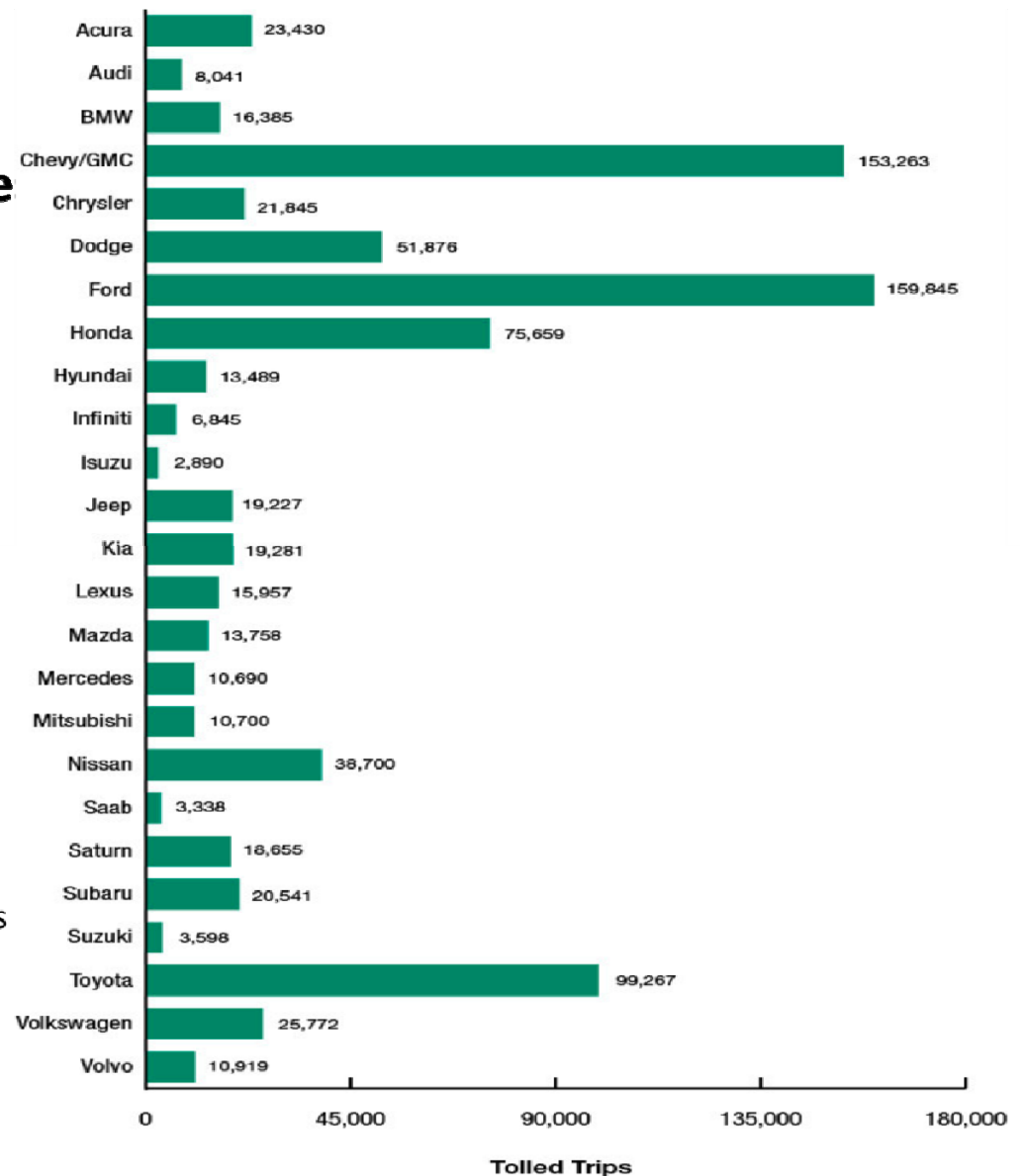


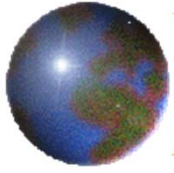
These are not “Lexus Lanes”

Five most frequently tolled vehicle in SR 167 HOT lanes:

1. Ford
2. Chevrolet/GMC
3. Toyota
4. Honda
5. Dodge

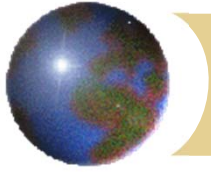
Based on *Good To Go!* account data for HOT Lanes
users who paid a toll





“Unaffordable” tolls

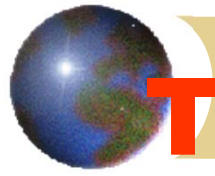
- ✚ Opponents use highest peak toll, full length of facility, twice a day, 5 days a week.
- ✚ The 90/10 rule: 90% of ML customers use it about 10% of the time.
- ✚ Better measure is average toll for all customers (SR 91 2014, \$2.93)
- ✚ Better to have a fast, reliable alternative to congestion than NO alternative.
- ✚ Express bus on MLs is a new alternative.



What if there is little or no room to widen the corridor?

Innovations in use today:

- ✚ Elevated express toll lanes--Tampa
- ✚ Depressed express toll lanes--
Dallas

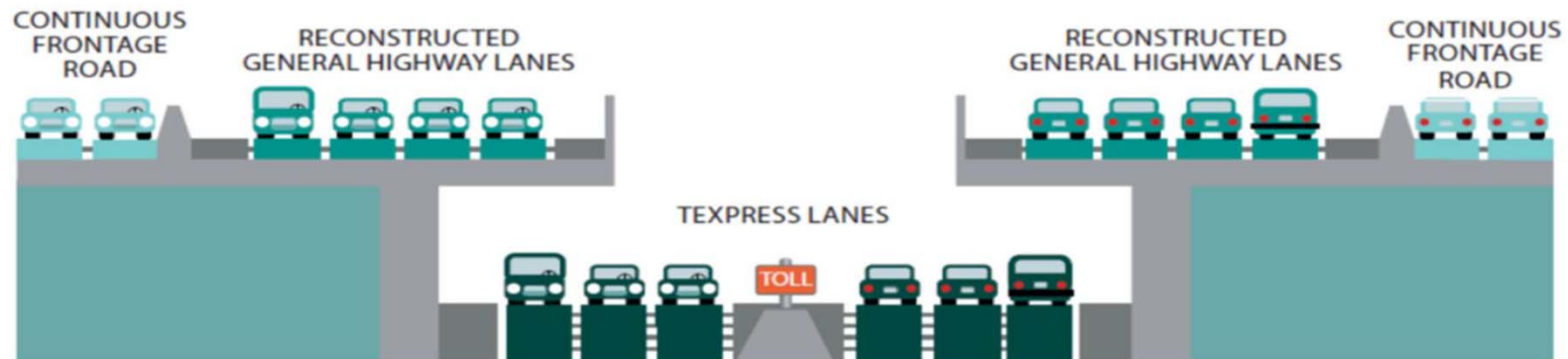


Tampa Express Toll Lanes

- ☐ Reversible, cashless toll lanes
- ☐ Elevated: “6 lanes on 6 feet”
- ☐ Uncongested guideway for express bus service, also



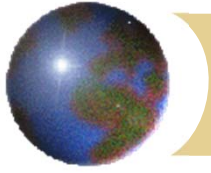
Completed ahead of time and on budget



- **LBJ:** 3 additional managed lanes per direction completed Oct 2015, **3 months ahead of schedule, on budget**
- **NTE:** 2 additional managed lanes per direction completed Sept 2014, **9 months ahead of schedule, on budget**

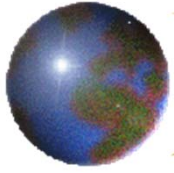
Financial Highlights:

- **\$5.34bn** initial investment, **27% savings** due to delivery efficiencies
- **\$1.16bn** NPV of Future Investment and Maintenance
- **\$1.12bn** Public Contribution



Conclusions

- ✚ Managed Lanes are a national trend.
- ✚ Pricing works well, if nearly all vehicles are priced.
- ✚ Networks offer benefits, but need consistent policies.
- ✚ ML network offers free guideway for region-wide express bus service.



Questions?

Contact information:

bobp@reason.org

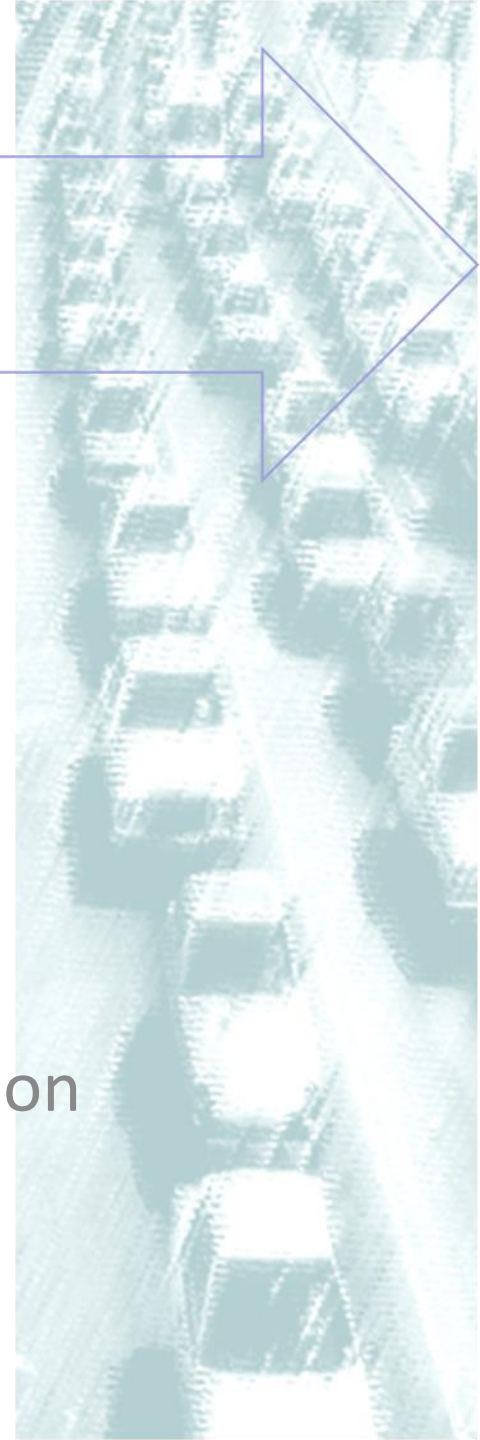
954-587-9426

Statewide Managed Lanes Planning

Kome Ajise

Chief Deputy Director

California Department of Transportation



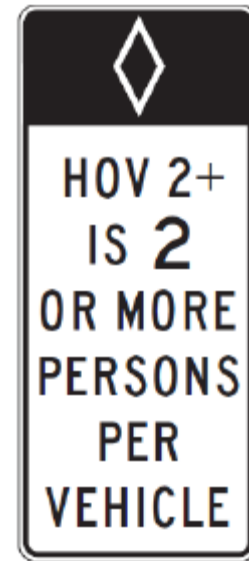
Managed Lanes Today



- Operating
 - Nearly 1400 lane-miles HOV
 - Over 200 lane-miles HOT
- In Development
 - Just over 700 lane-miles HOV
 - Over 1700 lane-miles HOT
- Extensive regional partnerships in system development and operation

Managed Lanes Today

- Predominantly HOV-2
- Single occupant plug-in hybrids & clean-air vehicles allowed
- Key component to achieving AB 32 air quality goals
- System does not always meet performance objectives
 - Half of system is degraded according to federal standards



Planning for the Future

- CTP 2040 Policies
 - Manage and Operate an Efficient System
 - Improve management of the SHS using tools such as managed lanes
 - Invest Strategically to Optimize Performance
 - Use a broad range of strategies – such as managed lanes – on the most congested corridors
 - GHG Reduction Objective
 - Coordinated pricing could be effective in reducing GHG per capita

Statewide Managed Lane Policy

- Supports the use of managed lanes on State highways
- Supports local and State cooperation and partnerships
- Outlines roles and responsibilities for developing and operating managed lanes
- Promote basic Statewide Consistency with built in flexibility

California Department of Transportation

Serious drought.
Help save water!

Deputy Directive

Number:	DD-43-R1
Refer to Director's Policy:	DP-08, Freeway System Management; DP-23-R1, Energy Efficiency, Conservation, and Climate Change; DP-26, Intelligent Transportation Systems; DP-27-R1, Bus Rapid Transit Implementation Support
Effective Date:	05/29/2015
Supersedes:	DD-43 (07/01/1995)
Responsible Program:	Traffic Operations

TITLE MANAGED LANE FACILITIES

POLICY

The California Department of Transportation (Caltrans) uses managed lanes on the State Highway System (SHS) as a sustainable transportation system management strategy. Managed lanes are used to promote carpooling and transit usage, improve travel-time reliability, reduce greenhouse gas emissions, and maximize the efficiency of a freeway by increasing person and vehicle throughput while reducing congestion and delay.

Each district that currently operates, or expects to operate, managed lanes within the next twenty years shall prepare, in cooperation with regional transportation agencies and other stakeholders, a Managed Lanes System Plan (MLSP). The MLSP shall contain a list of each managed lane facility that is currently in operation or planned for operation within the next twenty years. Each district shall review and update its MLSP biennially and ensure that future managed lanes are included in regional transportation plans and other system planning documents.

Managed lanes are designed and operated in a manner that will not degrade the overall mobility and safety performance of the freeway. All appropriate guidelines, policies, procedures, and standards, including Caltrans' *Highway Design Manual* design criteria, shall be applied when planning, designing, and operating managed lanes. Design features and operational strategies for managed lanes, and any changes to those features or strategies, shall be

"Provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability"

Managed Lane System Planning

- Blueprint for managed lanes on the State Highway System
 - Conversion to HOT lanes
 - Added capacity to existing managed lanes
- Utilize work already done at the regional level
 - Some districts are doing more detailed plans
- Element of Caltrans Strategic Management Plan



Caltrans' Perspective on Managed Lanes

- Managed lanes are a mobility tool first; revenue generation is secondary
 - Objective is to increase throughput on the corridor
- Caltrans may operate express lanes
 - Will be done in partnership with local agencies
 - Revenues will stay in the corridor
 - Lifecycle Considerations are important



Caltrans' Perspective on Managed Lanes



- Consider pricing when raising occupancy on existing HOV lanes (HOV-2 to HOT-3)
 - Minimizes underutilization of the lane due to low HOV-3 volumes
 - Allows HOV-2 to buy back in, preferably at discounted rate



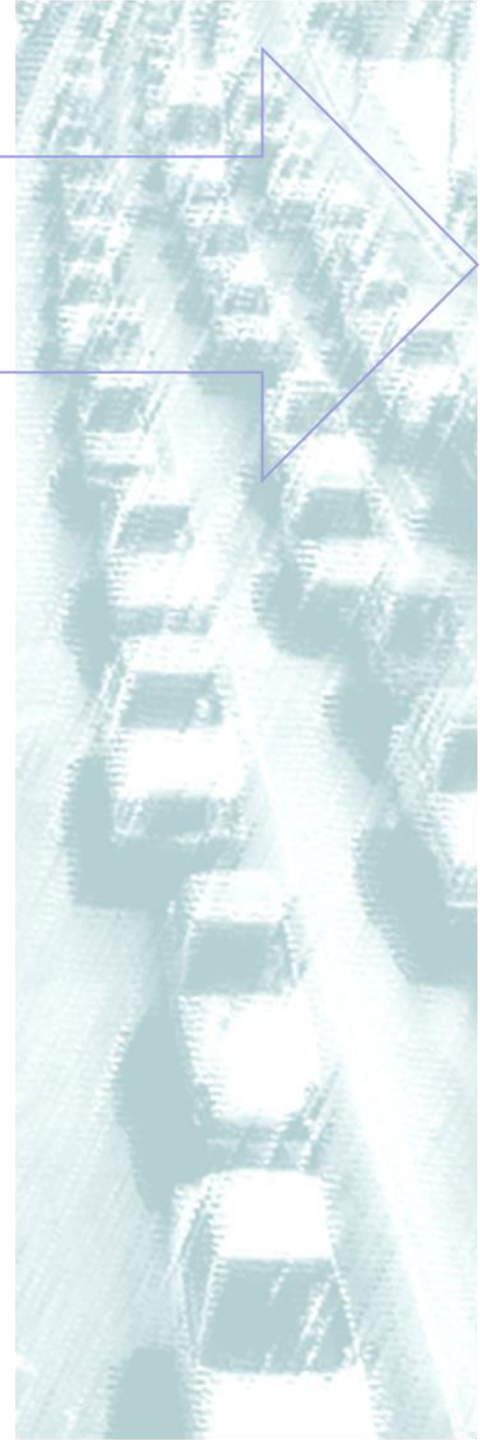
- Decisions on managed lanes must balance local versus regional needs

Managed Lane Project Development



- SB 1 Provides Several Funding Opportunities for Managed Lane Projects
 - STIP
 - Congested Corridor Program
 - Local Partnership Program
- Local support and partnership is key to success

Thank You



Orange County Transportation Authority

Managed Lane Workshop

August 28, 2017



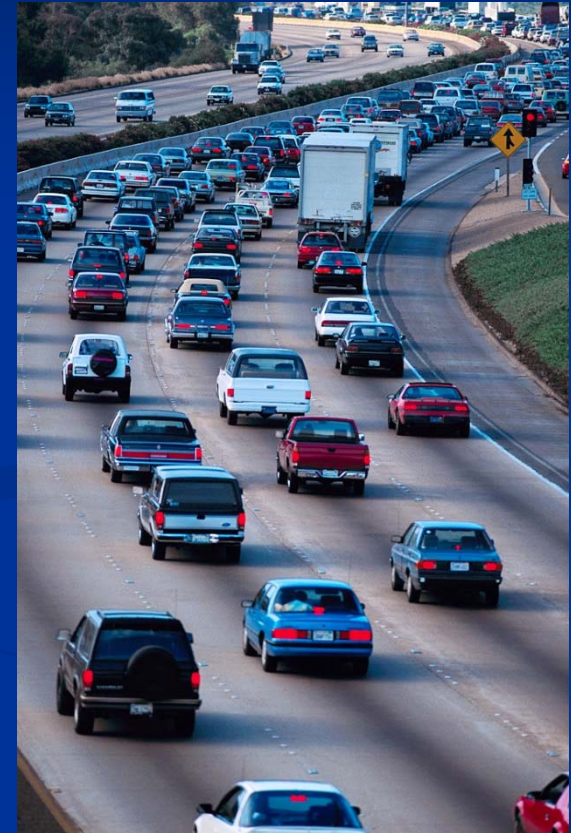
Stephen Finnegan

Public and
Government Affairs

Automobile Club of
Southern California

“Managed” Lanes and Road Pricing

- Varying views:
 - Raise money
 - Market forces
 - Charge more
 - Unfair
 - Double taxation
 - Privacy
- Needs to be understood and supported by the public



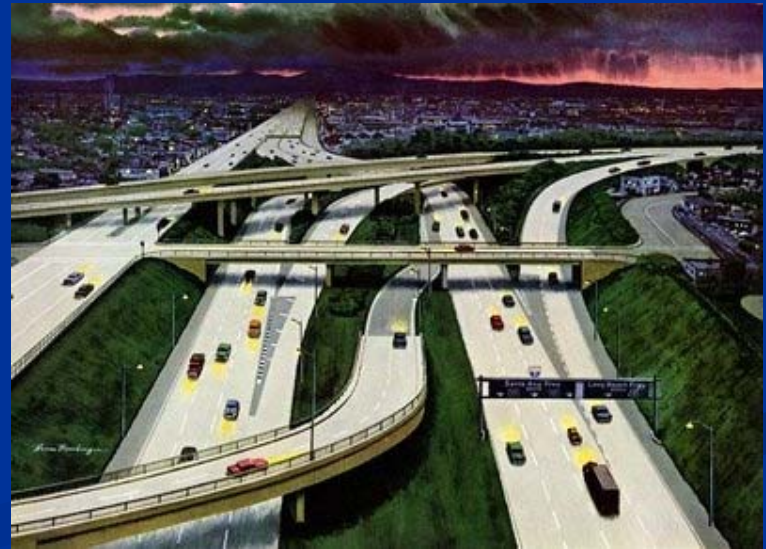
Value

- Essential, bottom-line issue
 - New lanes / roads
 - HOV to HOT
 - General purpose lanes



Objectives and Results

- Improve mobility
 - Direct, recognizable benefits for motorists paying the charge
- Do no harm to:
 - Non-priced lanes
 - Surface streets and parallel routes



Equity Impacts

- Need to be addressed
- Standard assurances:
 - Low income people will pay
 - Revenue goes to transit
 - No worse than now
- Two-tiered system should not become three-tiered



Revenue

- It's always about the money.
- Revenues should improve mobility and benefit users.
 - Capital cost of new facilities
 - Operations and maintenance
 - Improving and expanding priced and parallel lanes and routes
 - Effective transit services



Carpool Lanes

- Purpose:
 - Provide incentive to carpool or take transit
 - Way to build new lanes
- Incentive disappears when lanes become congested
- Options:
 - Convert to regular lanes
 - Increase occupancy requirement
 - Allow priced use in addition to carpools



Path Forward

- Communication
 - Honest and understandable
 - Clear and realistic objectives
- Projects and policies
 - Meet travel needs
 - Improve mobility
- Operations and rules
 - Regional/statewide uniformity
 - User friendly/understandable
- Broader state and federal reforms are still needed



Next Steps

2018 Long-Range Transportation Plan

Activity	Schedule
Outreach	Ongoing
Scenario Development and Analysis	Summer/Fall 2017
Draft 2018 LRTP Public Review	Spring 2018
Final 2018 LRTP	Summer/Fall 2018



Robert Poole
Director of Transportation Policy and
Searle Freedom Trust Transportation
Fellow at Reason Foundation

General Background

Robert Poole is Director of Transportation Policy and the Searle Freedom Trust Transportation Fellow at the Reason Foundation. He received his B.S. and M.S. in mechanical engineering at MIT and did graduate work in operations research at NYU.

His 1988 policy paper proposing privately financed, congestion-relief toll lanes inspired California's landmark public-private partnership pilot projects law (AB 680), which has served as the prototype for more than 20 similar laws in other states. In 1993 he directed a study that introduced the term HOT Lanes.

Poole has been an advisor to the Federal Highway Administration, the Federal Transit Administration, the White House Office of Policy Development, and the DOTs of California, Florida, Georgia, Indiana, Utah, Virginia, Texas, and Washington State. He served on the Caltrans Privatization Advisory Steering Committee, in 1989-90, and was a member of California's Commission on Transportation Investment in 1995-96.

He is a member of the board of the Public-Private Partnerships division of ARTBA and a member of the Transportation Research Board's Managed Lanes Committee. In 2003-05 he was a member of the TRB's special committee on the long-term viability of fuel taxes for transportation funding. In 2008 he served as a member of the Texas Study Committee on Private Participation in Toll Roads. In 2010 he served as a member of the Expert Review Panel on Managed Lanes, for the Washington State DOT. He also served on the transition team for Florida's Gov.-Elect Rick Scott. He writes a monthly column on transportation policy issues for *Public Works Financing*, and publishes the monthly e-newsletter, *Surface Transportation Innovations*.



Kome Ajise
Chief Deputy Director
California Department of Transportation

Kome Ajise Chief Deputy Director at the California Department of Transportation (Caltrans), responsible for overseeing the internal operations for approximately 19,000 employees and an annual budget that exceeds \$11 billion.

Kome began his career in 1987 in District 6 (Fresno) and has served in various assignments at both the district and Headquarters offices. From February 2001, he served as the North Region Environmental Division Chief until April 2004 when he was appointed as the District 10 Director in Stockton. The eight counties District 10 covers include the central Sierras, consisting of four trans-sierra mountain passes. The northern San Joaquin Valley is a goods movement gateway from the valley into the Bay Area. Between the years 2009–2012, he served as Program Manager, Public–Private Partnerships before being appointed Deputy Director, Planning and Modal Programs in 2012.

Kome has a Bachelor of Science degree in Geography and Regional Planning from the University of Benin, Nigeria and a master of City and Regional Planning degree from California State University, Fresno.



Stephen Finnegan
Manager of Government & Community Affairs,
Automobile Club of Southern California

Stephen Finnegan leads public and government affairs, media and community relations, and traffic safety programs for the Automobile Club of Southern California (AAA). He advocates for motorist and business issues, including improved traffic safety and mobility, effective and efficient use of transportation resources, adequate infrastructure for economic growth, and a healthy business environment.

Mr. Finnegan has over 25 years of experience in transportation, finance, business, and advocacy. His career includes work as a financial analyst with Bank of America, leadership positions in planning and operations with the Los Angeles Metropolitan Transportation Authority (Metro), and serving as a management consultant to public agencies and non-profit organizations.

Mr. Finnegan received a Master of Arts degree in urban planning from the University of California at Los Angeles and a Bachelor of Arts from Claremont McKenna College.

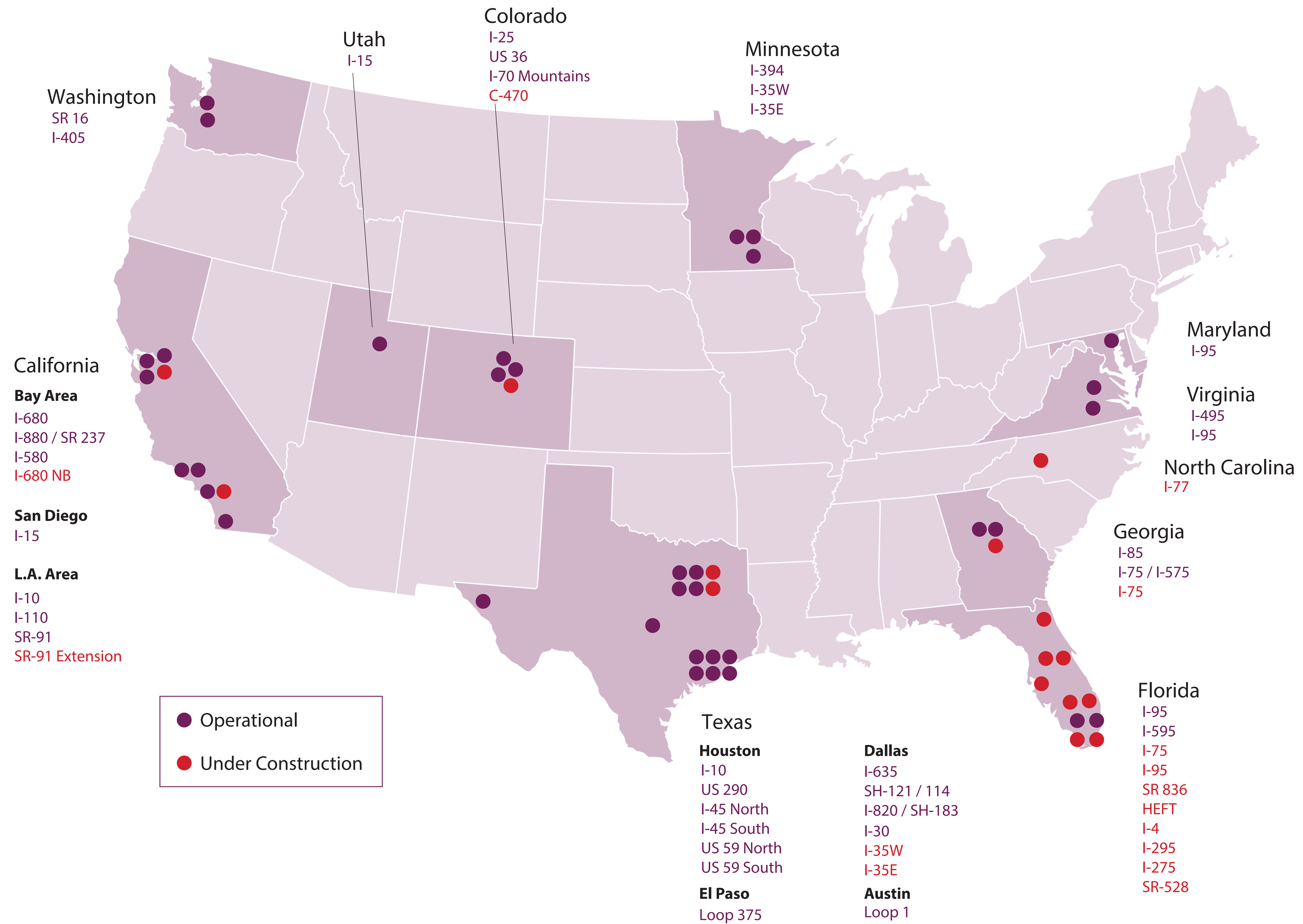


Patrick Jones
Executive Director/Chief Executive Officer
International Bridge, Tunnel and Turnpike Association

Patrick Jones is Executive Director and Chief Executive Officer of the International Bridge, Tunnel and Turnpike Association. Since assuming this position in 2002, Pat has built IBTTA into the principal advocate for toll-financed transportation and the leader in producing high quality educational experiences for toll industry professionals. Under his leadership, IBTTA launched the IBTTA Leadership Academy and introduced many new programs including global tolling summits in Europe, South America, Australia, South Africa and Mexico. IBTTA has also developed a highly successful industry public awareness campaign. Before joining IBTTA, Pat held senior positions at the American Trucking Associations, the American Public Transportation Association, and the Health Insurance Association of America. Pat holds a BA in political science from The George Washington University in Washington, D.C. and an MBA from Marymount University in Arlington, Virginia.



Priced Managed Lanes Operating or in Construction, February 2017



Part 1 – Facility Description, Hours, Access and Occupancy											
(1) ID	(2) State ID (YearOpen)	(3) Facility	(4) Length (C/L) (Lane)	(5) Type	(6) Hours of Operation	(7) Separation Treatment (Type) (Lanes)	(8) Separation Treatment (Detail) (Width)	(9) Access Control (No.) (Dir) (Type)	(10) Hours of Operation Policy	(11) Occupancy Rules (Initial)	(12) Occupancy Rules (Current)
1	CA1	SR 91 Express Lanes	10 40	New	24/7	Pylon (2-2)	PPP 4-0	2 EB/1 WB; Ends	Formal	SOV and 2+ tolled; 3+ free	SOV and 2+ tolled; 3+ free some of the time; 3+ discount some of the time
2	CA2	I-15 Express Lanes	20 80	Conv. New	24/7	Paint 2-2; Barrier 2-2 & 3-1R	PBP 4-0 and varies; PSBSP 22-0 and varies	Limited; 7G&7S NB; 7G&6S SB	Formal	2+ free	Same
3	CA3	I-110 Express Lanes		HOV Conv	24/7	Paint (1-1)		Limited	Implicit		
4	CA4	I-10 Express Lanes		Bus Conv	24/7	Paint (1-1)		Limited	Implicit		
5	CA5	I-680 Express Lanes		HOV Conv	SB 5AM-8PM weekdays	Paint (1D)		Limited	Implicit		
6	CA6	SR 237/I-880 Express Lanes		HOV Conv	WB 5-10 AM, 3-7 PM EB 5-9 AM, 3-7 PM weekdays	Paint (1-1)		Limited Access	Implicit		
7	CO1 - HOV 2000 / HOT 2006	I-25 Central Express Lanes	10	HOT	SB 5-10AM NB 12-3AM	Barrier (2R)		Limited	Formal - P3	HOV 2+	HOV 3+ Effective 01/01/2017
8	CO2- Phase I Federal to Interlocken Opened 07/22/2015; Phase II Interlocken to Table Mesa Opened 04/206	US 36, Federal to Table Mesa	38	Conv / New	24/7	Paint (1-1)		Limited	Formal-P3	HOV 2+	HOV 3+ Effective 01/01/2017
9	CO3- under construction - toll commencement 2020	C-470, I-25 to Wadsworth	28	Under Construction	24/7	Paint		Limited	Formal	All Pay	
10	CO4- Opened 07/12/16	I-25 North Segment 2, US 36 to 120th	12	HOT	24/7	Paint		Limited	Formal	HOV 2+	HOV 3+ Effective 01/01/2017
11	CO5- Opened 12/12/2015	I-70 Mountain Express Lane, EB only, HSR operation, Empire to US 6 Exit	13	New	Predominately Weekend - Open 90 days per Calendar Year; +/- 10 days	Paint (1D)		Limited	Formal	All Pay	
12	FL1 (Jan2010)	I-95 Express Lanes Phase 1	7.1	Conv New	24/7	Pylons (2-2)		Limited	Formal	HOV 2+	HOV 3+
13	FL3 (Oct 2016)	I-95 Express Lanes Phase 2	14.3	Conv New	24/7	Pylons (2-2)		Limited	Formal	HOV 2+	HOV 3+

(1) ID	(2) State ID (YearOpen)	(3) Facility	(4) Length (C/L) (Lane)	(5) Type	(6) Hours of Operation	(7) Separation Treatment (Type) (Lanes)	(8) Separation Treatment (Detail) (Width)	(9) Access Control (No.) (Dir) (Type)	(10) Hours of Operation Policy	(11) Occupancy Rules (Initial)	(12) Occupancy Rules (Current)
14	FL2 (Mar 2014)	I-595 Express Lanes	11	New	24/7	Barrier (3R)		Limited	Formal	N/A	All Pay (multi-axle vehicles allowed)
15	GA1 (Sep 2015)	I-85 Express Lanes	15.5	HOV Conv	24/7	Paint (1-1)	Standard HOV buffer 2-0	Limited	Implicit	HOV 2+	HOV 3+
16	GA2 (Jan 2017)	I-75 S Express Lanes	11.5	New	24/7	Barrier (2R)		Limited	Formal	N/A	All Pay
17	MD1 (Dec 2014)	I-95 Express Toll Lanes	8.5 33	New	24/7	Barrier (2-2)	PSBSP 23-9	Ends	Formal	All Pay	All Pay
18	MN1	I-394 Managed Lanes Penn Avenue) (At		HOV Conv	6-10 AM 2-7 PM	Paint/25% Barrier (1-1)		Continue	Formal	2+ Free	Same
19	MN2	I-35W Managed Lanes (At Blackdog Rd)		Conv New	6-10 AM 2-7 PM	Paint (1-1)		Continue	Formal	2+ Free	Same
20	MN2	I-35E Managed Lanes (Arlington SB; Co Rd. 8 NB)		New	6-10 AM 2-7 PM	Paint (1-1)		Limited	Formal	2+ Free	Same

(1) ID	(2) State ID (YearOpen)	(3) Facility	(4) Length (C/L) (Lane)	(5) Type	(6) Hours of Operation	(7) Separation Treatment (Type) (Lanes)	(8) Separation Treatment (Detail) (Width)	(9) Access Control (No.) (Dir) (Type)	(10) Hours of Operation Policy	(11) Occupancy Rules (Initial)	(12) Occupancy Rules (Current)
21	TX1	I-10 Katy Freeway Managed Lanes	12 (48)	New	24/7 HOV 5-11 AM HOV 2-8 PM	Pylons (2-2)		Limited	Formal	Buses and Vanpools Only	HOV 2+
22	TX2	I-45 North (North Freeway) HOT Lanes ** Feed by I-45 HOV Lanes (TX16)	19.9 (19.9)	HOV Conv	5-11 AM in 2-8 PM out	Barrier (1R)		Limited	Formal	Buses and Vanpools Only	HOV 2+
23	TX3	I-45 South (Gulf Freeway) HOT Lanes	15.5 (15.5)	HOV Conv	5-11 AM in 7-8 AM No \$ 1-8 PM Out 4-6 PM No \$	Barrier (1R)		Limited	Formal	HOV 2+	HOV 2+
24	TX4	US-59 North (Eastex Freeway) HOT Lanes	20.2 (20.2)	HOV Conv	5-11 AM in 2-8 PM out	Barrier (1R)		Limited	Formal	HOV 2+	HOV 2+
25	TX5	US-59 South (Southwest Freeway) HOT Lanes	15.5 (15.5)	HOV Conv	5-11 AM in 2-8 PM out	Barrier (1R)		Limited	Formal	HOV 2+	HOV 2+

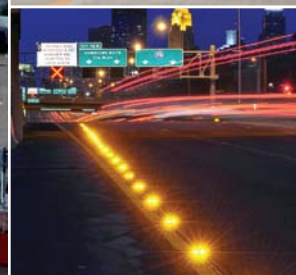
(1) ID	(2) State ID (Year Open)	(3) Facility	(4) Length (C/L) (Lane)	(5) Type	(6) Hours of Operation	(7) Separation Treatment (Type) (Lanes)	(8) Separation Treatment (Detail) (Width)	(9) Access Control (No.) (Dir) (Type)	(10) Hours of Operation Policy	(11) Occupancy Rules (Initial)	(12) Occupancy Rules (Current)
26	TX6	US-290 (Northwest Freeway) HOT Lanes	13.5 (13.5)	HOV Conv	5-11 AM in 2-8 PM out	Barrier		Limited	Formal	HOV 2+	HOV 2+ (HOV 3+ from 6:30 - 8:00 a.m.)
27	TX7 (Sep 2015)	LBJ TEXpress Lanes	13.25 miles CL / 191.83 miles total	New	24/7	Barrier (2-2 & 3-3)	PSBSP Segments underneath the GP lanes & others elevated	Limited	Formal P3	2+ HOV 50% discount peak periods; trucks allowed	2+ HOV 50% discount peak periods; trucks allowed
28	TX8 (June 2014)	Loop 375 (Cesar Chavez Express) Toll Lanes		New	24/7	Pylons (1-1)		Limited	Formal		
29	TX9 (June 2014)	DFW Connector TEXpress Lanes	3.63 miles CL / 14.5 miles total	New	24/7	Barrier (2-2)	PSBSB	Ends (2)	Formal	HOV 2+	HOV 2+
30	TX10 (Oct 2014)	North Tarrant TEXpress Lanes	13.26 miles CL / 200 miles total	New	24/7	Barrier (2-2)	PSBSP	Limited (16*) Verify *	Formal P3	2+ HOV 50% discount peak periods; trucks allowed	2+ HOV 50% discount peak periods; trucks allowed
31	TX11 (Aug 2016)	I-30 West (3 Phases) (Construction Interruption at SH 360)	9	New	Directional East of SH 161 and 24/7 West of SH 161	Barrier (1R East) (1-1 West)	Offset to CTB & Sldr	5-EB, 5-WB Slip and WB	Formal	HOV 2+	HOV 2+
32	TX12	Loop 375 Toll Lanes (More under constr.)		New	24/7	Barrier (2-2)		Limited	Formal	All Pay	All Pay
33	TX13	I-635 (LBJ) East Express		HOV Conv	24/7	Pylons (1-1)	PPP	4-EB, 4-WB	Formal	HOV 2+	HOV 2+ No Charge
34	TX14	MoPac Loop 1 Express Toll (Phase I)	11 miles Ult. (11)	New	24/7	Pylons (1-1)		3-NB, 3-SB	Formal	All Pay	All Pay
35	TX15	SH 71 Toll Express (Under Construction)	3.9 (13.7)	New	24/7						

(1) ID	(2) State ID (YearOpen)	(3) Facility	(4) Length (C/L) (Lane)	(5) Type	(6) Hours of Operation	(7) Separation Treatment (Type) (Lanes)	(8) Separation Treatment (Detail) (Width)	(9) Access Control (No.) (Dir) (Type)	(10) Hours of Operation Policy	(11) Occupancy Rules (Initial)	(12) Occupancy Rules (Current)
36	TX16	** I-45 HOV Lanes (Feeder Facility)	20	New		Pylons (1-1)		Limited	Formal	HOV 2+	HOV 2+
37	UT1	I-15 Express Lanes	72 miles	HOV Conv	24/7	Paint (1-1)	PPP, 4ft buffer in the north sectioni (Utah and Davis County)	Limited	Implicit	HOV 2+	HOV 2+
38	VA1 (Dec 2012)	I-495 Express Lanes	14	New	24/7	Pylon (2-2)	PPP 2-0	Limited	Formal P3	N/A	HOV 3+
39	VA2 (Dec 2014)	I-95 Express Lanes	29	Conversion	24/7 (minus 2X 1-hour lane reversal timeframes)	Barrier (2-2)		Limited	Formal P3	2+Free	HOV 3+
40	WA1	SR 167 HOT Lanes	11	HOV Conv	5 AM to 7 PM	Paint (1-1)	PBP	Continue (A)	Formal	HOV 2+	HOV 2+
41	WA2	I-405	17	HOV Conv	5 AM to 7 PM	Paint (1-1,2-2)	PBP , PBPOPBP	Limited (10NB,11SB, A)	Formal	HOV 2+	HOV 3+



U.S. Department of Transportation
Federal Highway Administration

PRICED MANAGED LANE GUIDE 2012



1.6 Priced Managed Lane Requisites

The most common requisite for priced managed lane projects is recurring congestion. Highway congestion occurs when average speeds operate below 35 miles per hour (mph) for prolonged periods of 2 to 3 hours or more during each peak commute period. Priced managed lanes can be part of a broader strategy to manage congestion. Today's priced managed lane projects benefit from a variety of complementary strategies that improve their performance, including the following:

- **Active Traffic Management (ATM):** Techniques that use intelligent transportation system (ITS) strategies together with innovative operational approaches to manage traffic congestion and increase traffic flows, improve travel-time reliability, and optimize the use of roadway capacity.
- **Transportation Demand Management (TDM):** Strategies to manage and provide new choices on the location of the workplaces, the timing of the work day, shared and alternate travel modes, and routes used for work trips.
- **Integrated Corridor Management (ICM):** Multimodal strategies developed in a coordinated manner by partnering agencies to manage highways, arterial streets, and rail and bus transit in heavily traveled corridors as a system-rather than individual assets.

There are a number of conditions that may indicate that priced managed lanes could be effective:

- **Lack of Free-Flowing Parallel Routes:** Priced managed lanes work best in metropolitan areas with high-density corridors where there are limited travel options. When there are limited travel options other than the highway corridor itself, priced managed lanes offer motorists and transit riders a new choice.
- **Lack of Planned Future Improvements:** The corridor or region does not have enough future capacity planned to meet demand looking forward, given consideration for all modes and likely travel patterns affected.
- **Congested HOV Facilities:** Priced managed lanes can also be effective when the demand for an HOV lane exceeds the capacity of a single lane, but cannot justify the addition of a second HOV lane. The introduction of pricing coupled with raising occupancy requirements on carpools may make optimal use of congested HOV lanes.
- **Underutilized HOV Facilities:** Priced managed lanes are effective in locations where demand for an existing HOV lane is below its operational capacity and there is congestion on the parallel general-purpose lanes.

These precursor conditions lead to two distinctly different types of priced managed lane projects: those that convert existing HOV lanes to priced operation, and those that add new priced capacity to existing highways.

1.6.1 HOV-to-HOT Conversions and Extensions of Existing Facilities

One common motivation behind the conversion of an HOV lane to HOT operation is the desire to manage demand on the corridor more effectively, thereby improving the overall efficiency of the HOV lane and the general-purpose lanes. While the conversion of existing HOV lanes to tolled operation is relatively simple

and inexpensive compared to projects adding new highway capacity, there are a number of challenges. These often involve the location and installation of electronic toll collection equipment and signage. In some cases, local traffic mitigation is needed at exit points due to increased traffic volumes as a result of the conversion.

HOV-to-HOT conversions should also be considered when HOV lanes are congested and operating at or in excess of their capacity. When this is the case, project sponsors often consider increasing occupancy requirements, normally from HOV-2 to HOV-3. The sponsors may also consider revoking occupancy requirement exemptions for ILEVs. These changes can markedly reduce the number of vehicles in the HOV lane. However, a simultaneous HOT conversion provides the opportunity to use the newly opened capacity with variably priced tolls used as a tool to meter the flow of paying vehicles so that acceptable traffic services levels are maintained.

HOT conversions can also work well in situations where existing HOV facilities operate at capacity during peak travel periods, but have excess capacity to accommodate additional traffic during fringes of the peak or off-peak periods and in the nonpeak direction. In this case, the feasibility of a HOT conversion is enhanced if the parallel general-purpose lanes experience congestion at those times. This is the case with the I-10 HOV lanes in Los Angeles, where the facility has an HOV-3+ occupancy requirement from 6:00 to 9:00 a.m. and 3:00 to 7:00 p.m. on weekdays, and an HOV-2+ requirement at all other times. A similar approach is being taken in Houston on I-45 South. Requiring carpools to register may have the same potential benefit of metering flow, particularly if the registration process is coupled with transponder requirements for toll-paying customers.

In some situations an HOV-to-HOT conversion may also involve new construction to extend the existing HOV lane or fill in missing sections so that the converted facility has greater coverage and improved connectivity. Conversions may also involve reconfiguring the existing roadway. Several HOV-to-HOT conversion projects, notably I-95 in Miami and I-10 in Los Angeles, added a design change that accommodated a second managed lane without roadway widening next to the original HOV lane, thus adding capacity and better management to both directional lanes at the same time.

1.6.2 New Capacity Managed Lane Opportunities

A growing number of regions—including Seattle, Austin, Salt Lake City, San Diego, Houston, Dallas-Fort Worth, Miami, and Northern Virginia—are incorporating priced managed lanes as major highway expansion projects. This is an appropriate strategy in congested highway corridors where there is a lack of parallel routes that can offset demand. Invariably these types of projects are expensive, but under the right conditions can generate revenues to fund a modest to significant portion of the project cost. This approach is particularly viable in regions with funding gaps and an extensive backlog of unbuilt projects.

The possibility of operating new highway capacity on a priced managed lane basis should be considered during the environmental approval process. Environmental impact statements (EIS) and environmental assessments (EA) that contain priced alternatives provide an excellent opportunity to assess the mobility benefits enabled by pricing and regional public opinion on the use of tolling. The extensive public outreach efforts associated with environmental approval documents also provide project sponsors with the opportunity to engage stakeholders in a dialog about pricing and the ability of tolls to make projects affordable in regions that might not be able to undertake them on an un-tolled basis. Public consensus is essential to move large highway projects forward and is even more important on projects involving pricing.

Selected new capacity managed lane projects under construction or recently opened include the following:

- **I-15 FasTrak®, San Diego, CA:** This 20-mile, \$1.2 billion project sponsored by the San Diego Association of Governments (SANDAG) and the California Department of Transportation (Caltrans) added 4 express lanes and was constructed in three phases over 7 years. The project was completed in January 2012, and also involves the provision of four park-and-ride lots and associated transit centers. The four priced managed lanes are equipped with a moveable center barrier, allowing the flexibility to provide three priced lanes in the peak travel direction. The project was cleared with a Finding of No Significance (FONSI) in 2004 and construction began in 2006. The project has been funded by the TransNet (half-cent sales tax) program, as well as other state and federal funds. It replaced the initial 8-mile, two-lane, reversible-flow HOV lane facility that was the first HOV-to-HOT conversion project in the United States in 1996.
- **495 Express, Northern Virginia:** This \$2.1 billion public-private partnership (P3) is adding two new priced managed lanes in each direction on an 11-mile segment of the Capital Beltway between I-95 and Tysons Corner in Northern Virginia. The project also involves the reconstruction of the eight general-purpose lanes, 11 interchanges, and the replacement of more than \$260 million of aging infrastructure, including 53 bridges. The project will also provide dedicated HOV ramps connecting the managed lanes on the Capital Beltway and I-95. This project was environmentally cleared in 2006; construction began in 2008 and will be completed in 2013. The project is being delivered as a 75-year design-build-finance-operate-maintain (DBFOM) concession, with toll proceeds covering approximately 74 percent of the cost of constructing the project. The Virginia Department of Transportation (VDOT) has provided a public subsidy of \$500 million to make the P3 approach financially feasible.
- **North Tarrant Express, Fort Worth, Texas:** This \$2.1 billion P3 project involves the reconstruction, widening, and addition of priced managed lanes along 13.3 miles of existing highway. Initially, two priced managed lanes will be added in each direction together with new frontage roads on I-820 and SH 121/SH183 extending east from Fort Worth toward Dallas-Fort Worth International Airport. By 2030, a third priced managed lane along SH121/SH183 and a third general-purpose lane along I-820 will also be constructed. The project is being delivered as a 52-year DBFOM agreement. The project was environmentally cleared in 2008 and 2009. Construction began in 2010 and will be complete in 2015. Toll proceeds are being used to finance 72 percent of the implementation costs. The Texas Department of Transportation (TxDOT) is providing a \$575 million public subsidy to support the remaining 28 percent of the capital cost.

Implementation Highlights



The succeeding implementation highlights illustrate the vision and direction of the CTP 2040:

- ❖ **Improve transit** by completing the entire California High-Speed Rail Authority Business Plan Phase 1 High-Speed Rail System by 2029, and making it the backbone of an integrated statewide transit system linking all transit operators with one-stop ticketing and well-coordinated transfers.
- ❖ **Reduce long-run repair and maintenance costs** by using “fix-it first”, smart asset management, and life-cycle costing, to maintain our transportation infrastructure in good condition—this should include developing a comprehensive assessment of climate-related vulnerabilities, and actions to ensure system resiliency and adaptation to extreme events.
- ❖ **Improve highways and roads** by using management systems and technologies to maximize system efficiency through integrated multimodal corridor management (intelligent transportation system, high-occupancy toll lanes, and bus rapid transit lanes, which are managed in coordination with active transportation and rail lines), and through new technologies and services including autonomous and connected vehicles, smart parking, vehicle-to-vehicle communications, infrastructure-to-vehicle communication, and vehicle sharing and ride-sharing services.
- ❖ **Improve freight efficiency and the economy** by completing the California Sustainable Freight Action Plan outlined in Executive Order B-32-15, and through creation of dedicated federal and State freight funding programs to invest in California’s primary trade corridor, including multimodal last mile connections to major freight facilities including ports and hubs.
- ❖ **Improve communities** through the region-led Sustainable Communities Strategies, which will be updated as the State moves toward 2030 and 2050 greenhouse gas reduction targets—the State can continue to partner with regions through the investment of Greenhouse Gas Reduction Funds and other measures such as better use of highway corridors for recreation and to reconnect communities.
- ❖ **Reduce transportation-system deaths and injuries** through multi-agency coordination that implements the Toward Zero Deaths vision, and public engagement to reduce distracted driving, impaired driving, and unsafe work-zone driving.
- ❖ **Expand the use and safety of bike and pedestrian facilities** by utilizing the Active Transportation Program to support a broad range of investments that go beyond individual projects to encourage corridor-wide and citywide strategies, and also through improved State and local implementation of Complete Streets strategies that will increase active transportation for short trips, first/last mile transit trips, and school trips.
- ❖ **Make our vehicles and transportation fuels cleaner** through incentives and regulations to increase zero-emission vehicles and other methods outlined in the California Air Resources Board’s Assembly Bill 32 Scoping Plan.
- ❖ **Improve public health and achieve climate and other environmental goals** through the strategies above and through implementation of robust advanced mitigation to streamline transportation projects and maximize the biological benefit.
- ❖ **Secure permanent, stable, and sufficient transportation revenue** from transportation users to achieve the state of good repair, freight efficiency, and other investments outlined in this plan.

Deputy Directive

<i>Number:</i>	DD-43-R1
<i>Refer to Director's Policy:</i>	DP-08, Freeway System Management; DP-23-R1, Energy Efficiency, Conservation, and Climate Change; DP-26, Intelligent Transportation Systems; DP-27-R1, Bus Rapid Transit Implementation Support
<i>Effective Date:</i>	05/29/2015
<i>Supersedes:</i>	DD-43 (07/01/1995)
<i>Responsible Program:</i>	Traffic Operations

<i>TITLE</i>	<i>MANAGED LANE FACILITIES</i>
--------------	--------------------------------

POLICY

The California Department of Transportation (Caltrans) uses managed lanes on the State Highway System (SHS) as a sustainable transportation system management strategy. Managed lanes are used to promote carpooling and transit usage, improve travel-time reliability, reduce greenhouse gas emissions, and maximize the efficiency of a freeway by increasing person and vehicle throughput while reducing congestion and delay.

Each district that currently operates, or expects to operate, managed lanes within the next twenty years shall prepare, in cooperation with regional transportation agencies and other stakeholders, a Managed Lanes System Plan (MLSP). The MLSP shall contain a list of each managed lane facility that is currently in operation or planned for operation within the next twenty years. Each district shall review and update its MLSP biennially and ensure that future managed lanes are included in regional transportation plans and other system planning documents.

Managed lanes are designed and operated in a manner that will not degrade the overall mobility and safety performance of the freeway. All appropriate guidelines, policies, procedures, and standards, including Caltrans' *Highway Design Manual* design criteria, shall be applied when planning, designing, and operating managed lanes. Design features and operational strategies for managed lanes, and any changes to those features or strategies, shall be

determined by Caltrans in cooperation with regional transportation agencies, the California Highway Patrol (CHP), and other affected stakeholders.

Tolling may be used as an operational strategy on managed lanes. Caltrans, or a regional transportation agency in cooperation with Caltrans, may seek tolling authority pursuant to applicable laws. The following provisions shall apply for any tolled managed lane on the SHS:

- Tolls shall be collected electronically and use congestion pricing to manage demand.
- Toll revenues shall be used to pay for debt service related to development of the managed lanes project, the costs of administering, operating, and maintaining the managed lanes, including CHP enforcement activities, capital expenses, and reserves for these purposes.
- Unless financing requirements or State laws dictate otherwise, excess toll revenues shall be used for projects or programs that improve or preserve safety, operations, or travel reliability for any transportation mode or provide new or enhanced travel options in the corridor in which the tolls were collected. Excess toll revenues may also be used to augment, but not replace, State resources used for maintenance and operation of adjacent general-purpose lanes.
- A toll revenue expenditure plan shall be developed by Caltrans and the regional transportation agency. This plan shall be updated annually. In some instances, State laws may dictate the process for development of the expenditure plan.
- An agreement shall be made with the CHP regarding enforcement and an Enforcement Plan shall be developed.
- If Caltrans will not be operating the managed lanes, the regional transportation agency shall develop, in cooperation with the CHP and Caltrans, an Incident Management Plan. The Incident Management Plan shall be updated through the life of the project as needed.
- A Concept of Operations shall be developed. This document shall, at a minimum, describe the design and operational characteristics of the managed lanes, enforcement, incident management, and agency and stakeholder coordination. The Concept of Operations shall be prepared during the Project Initiation Document phase and finalized in the Project Approval and Environmental Document phase. It shall be updated through the life of the project as needed.
- Caltrans, the regional transportation agency, and other stakeholders, as appropriate, shall enter into agreements that define overall roles, responsibilities, and requirements related to maintenance and operation of the managed lanes, use of toll revenues, risk management, data sharing, performance monitoring, and annual audits and reports. If the regional transportation agency will have tolling authority, the agreements will include reimbursement to Caltrans for costs incurred relative to the

development, operation, maintenance, or improvement of the managed lanes.

DEFINITION/BACKGROUND

A managed lane is an exclusive- or preferential-use lane that is managed proactively in response to changing conditions in order to achieve improved efficiency and performance. Managed lanes use operational strategies such as access control, vehicle eligibility, and tolling, or a combination thereof. These strategies are determined based on factors such as safety, regional and interregional consistency, impacts on freeway performance, enforcement needs, environmental considerations, and community support. Strategies may be adjusted to meet required performance standards or to address other managed lane or freeway performance issues. For the purposes of this policy, a managed lane is defined as one of the following:

- A high-occupancy vehicle (HOV) lane.
- A high-occupancy/toll (HOT) lane. This HOV lane may also be accessed by tolled vehicles.
- An express toll lane (ETL). All vehicles must pay a toll to access this lane.

A tolled managed lane, such as a HOT lane or an ETL, is also referred to as an “express lane” and signed as such.

Title 23 United States Code sections 129 and 166 authorize public authorities to operate managed lanes on federal-aid highways and provide required performance standards for the lanes. Related California legislation includes the following:

- Vehicle Code section 21655.5 and Streets and Highways Code section 149 authorize Caltrans to operate exclusive- or preferential-use lanes on the SHS for buses and other HOVs.
- Vehicle Code section 21655.6 requires Caltrans to obtain the approval of the appropriate transportation planning agency or county transportation commission prior to establishing exclusive- or preferential-use lanes on the SHS.
- Vehicle Code sections 21655.9 and 5205.5 authorize zero-emission vehicles and certain classes of low-emission vehicles to use HOV lanes without meeting occupancy requirements and to use HOT lanes without paying a toll or by paying a discounted rate.
- Streets and Highways Code sections 149.1 and 149.4 through 149.10 and Public Utilities Code sections 130240 and 130244 authorize various regional transportation agencies to operate, in cooperation with Caltrans, a limited number of tolled managed lanes on the SHS.

- Government Code section 64112 authorizes the California Transportation Financing Authority to grant authority to Caltrans or regional transportation agencies to operate toll facilities such as a tolled managed lane on the SHS.

RESPONSIBILITIES

Deputy Director, Finance

Ensures revenues from tolled managed lanes are appropriated in accordance with State and federal laws and with the plan and agreements outlined in the Policy section herein.

Chief, Division of Traffic Operations

- Develops, implements, and maintains statewide policies, procedures, standards, and guidance concerning managed lanes.
- Provides direction, training, and assistance with the development and operation of managed lanes, including necessary agreements, to divisions, districts, and other stakeholders.
- Ensures consistent implementation and operation of managed lanes throughout the districts.
- Provides direction, training, and assistance with the development of MLSPs, in partnership with the Division of Transportation Planning, to district Traffic Operations staff.
- Maintains a statewide inventory of planned, programmed, and constructed managed lanes.
- Ensures managed lanes are monitored for compliance with State and federal performance requirements. Reviews managed lanes performance reports and shares trends and findings with the districts, the Federal Highway Administration, the CHP, and regional transportation agencies.
- Coordinates and evaluates research studies and best practices pertaining to managed lane systems operational methods, strategies, enforcement, and equipment.
- Collaborates with the districts, other divisions, regional transportation agencies, the CHP, and other external stakeholders, as appropriate, to develop proposals for tolled managed lanes.

Chief, Division of Transportation Planning

- Provides direction, training, and assistance with the development of MLSPs, in partnership with the Division of Traffic Operations, to district Planning staff.
- Ensures consistent development of MLSPs throughout the districts.
- Integrates MLSPs into applicable statewide system planning documents.
- Collaborates with the Division of Traffic Operations developing, implementing, and revising statewide policies, procedures, standards, and guidance concerning managed lanes.

Chief, Division of Maintenance

Develops, implements, and revises statewide policies, procedures, standards, and guidance concerning the maintenance of managed lanes.

Chief, Division of Design

- Develops, implements, and revises statewide policies, procedures, standards, and guidance concerning the design of managed lanes.
- Provides direction, training, and assistance with the design of managed lanes to divisions, districts, and other stakeholders.

District Directors

- Ensure the use of managed lanes where appropriate on the SHS is considered and encouraged.
- Ensure selected managed lane strategies are appropriate for each SHS corridor.
- Collaborate with regional transportation agencies to implement managed lanes where appropriate.
- Collaborate with regional transportation agencies and other project stakeholders to develop and update toll revenue expenditure plans for tolled managed lanes.

Deputy District Directors, Traffic Operations

- Implement managed lane strategies in cooperation with regional transportation agencies, the CHP, and other stakeholders, as appropriate.
- Review performance of managed lanes and identify and implement operational changes on managed lanes in cooperation with regional transportation agencies, the CHP, and other stakeholders, as appropriate.
- Ensure consistent managed lane operations between neighboring jurisdictions and districts to the greatest extent possible.
- Ensure Incident Management Plans and Concepts of Operations are developed for tolled managed lanes, in cooperation with the Federal Highway Administration and the CHP.
- Ensure annual performance monitoring reports of managed lanes are developed and submit this information to headquarters, regional transportation agencies, the CHP, and other stakeholders, as appropriate.
- Provide cost estimates of division activities associated with tolled managed lanes for tracking and reimbursement purposes.

Deputy District Directors, Planning and Modal Programs

- Collaborate with district Traffic Operations staff and regional transportation agencies to develop and maintain the district MLSP.
- Incorporate managed lanes projects into system and corridor planning documents developed by regional transportation agencies or Caltrans.

- Ensure consistency of the district MLSP with neighboring districts' MLSPs.
- Provide traffic forecasting for development of the district MLSP, in coordination with district Traffic Operations staff.

Deputy District Directors, Maintenance

- Ensure managed lane facility operations are considered when maintaining the SHS.
- Provide cost estimates of division activities associated with tolled managed lanes for tracking and reimbursement purposes.

Deputy District Directors, Design and Construction

Ensure managed lane facility operations are considered when designing and constructing improvements to the SHS.

Deputy District Directors, Program/Project Management

Work with Headquarters divisions and regional transportation agencies to develop and execute any necessary agreements for tolled managed lanes.

Employees

- Adhere to statewide policies, procedures, standards, and guidance concerning planning, designing, operating, and maintaining managed lanes.
- Collaborate with stakeholders to implement managed lane strategies or adjustments to existing managed lane operations.
- Identify and report impediments to implementing managed lane strategies or adjusting existing managed lane operations and seek expeditious resolution.
- Identify and report opportunities to include appropriate managed lane strategies in capital projects.

APPLICABILITY

All Caltrans employees involved in the planning, design, construction, maintenance, and operation of managed lane facilities on the SHS.

Original signed by:

KOME AJISE
Chief Deputy Director

05/29/2015

Date Signed



THE **2016-2040** REGIONAL TRANSPORTATION PLAN/ SUSTAINABLE COMMUNITIES STRATEGY

A Plan for Mobility, Accessibility, Sustainability and a High Quality of Life

ADOPTED
APRIL 2016

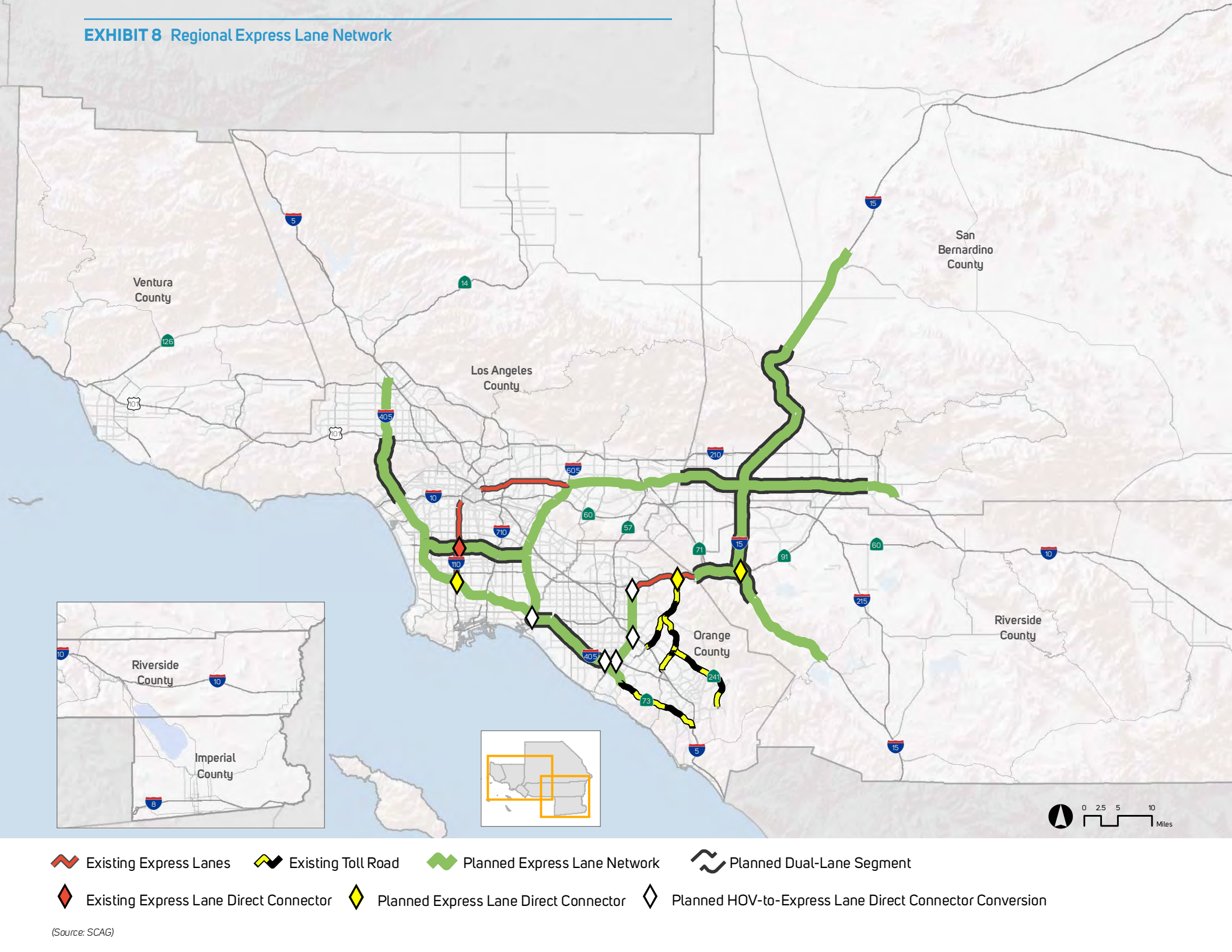
EXHIBIT 8 Regional Express Lane Network





This map illustrates the regional express lane network in Southern California, covering parts of Ventura, Los Angeles, San Bernardino, Orange, Riverside, and Imperial counties. The map shows existing express lanes (red wavy lines), existing toll roads (yellow wavy lines), and the planned express lane network (green wavy lines). It also identifies existing express lane direct connectors (red diamonds), planned express lane direct connectors (yellow diamonds), and planned HOV-to-express lane direct connector conversions (black diamonds). Major highways are shown with their respective shields (Interstates 5, 10, 15, 210, 215, 405, 60, 71, 73, 78, 91, 101, 126, 14, 241, 52, 54, 67, 163, 905; State Routes 52, 54, 67, 163, 905; and US Routes 101, 126, 14, 241, 52, 54, 67, 163, 905). The map includes an inset map of California showing the study area and a scale bar (0 to 10 miles).




Legend:

- Existing Express Lanes
- Existing Toll Road
- Planned Express Lane Network
- Planned Dual-Lane Segment
- Existing Express Lane Direct Connector
- Planned Express Lane Direct Connector
- Planned HOV-to-Express Lane Direct Connector Conversion

(Source: SCAG)



 Existing Express Lanes
  Existing Toll Road
  Planned Express Lane Network
  Planned Dual-Lane Segment

 Existing Express Lane Direct Connector
  Planned Express Lane Direct Connector
  Planned HOV-to-Express Lane Direct Connector Conversion

(Source: SCAG)

TABLE 2 Regional Express Lane Network

	County	Route	From	To
EXPRESS LANE ADDITIONS	Los Angeles	I-10	I-605	San Bernardino County Line
	Los Angeles	I-105	I-405	I-605
	Los Angeles	I-405	I-5	Orange County Line
	Los Angeles	I-605	I-10	Orange County Line
	Orange	SR-55	SR-91	I-405
	Orange	SR-73	I-405	MacArthur Boulevard
	Orange	I-405**	Los Angeles County Line	SR-55
	Orange	I-605	Los Angeles County Line	I-405
	Riverside	I-15*	San Bernardino County Line	Cajalco Road
	Riverside	SR-91*	Orange County Line	I-15
	San Bernardino	I-10**	Los Angeles County Line	Ford Street
	San Bernardino	I-15*	US-395	Riverside County Line
EXPRESS LANE DIRECT CONNECTORS	Los Angeles	I-405/I-110	I-405 NB to I-110 NB and I-110 SB to I-405 SB	
	Orange	I-5/SR-55	Existing HOV to proposed express lane direct connector	
	Orange	SR-91/SR-55	Existing HOV to proposed express lane direct connector	
	Orange	SR-91/SR-241	SR-241 NB to SR-91 EB and SR-91 WB to SR-241 SB	
	Orange	I-405/SR-55	Existing HOV to proposed express lane direct connector	
	Orange	I-405/SR-73	Planned HOV to proposed express lane direct connector	
	Orange	I-405/I-605	Existing HOV to proposed express lane direct connector	
	Riverside	SR-91/I-15	SR-91 EB to I-15 SB and I-15 NB to SR-91 WB	

Notes: * Dual Express lanes for entire length ** Dual Express lanes for a section



Los Angeles County

Metropolitan Transportation Authority

Countywide ExpressLanes Strategic Plan Executive Summary

PREPARED FOR:



ONE GATEWAY PLAZA

LOS ANGELES, CA 90012

Prepared by:



444 SOUTH FLOWER STREET, SUITE 800
LOS ANGELES, CA 90071

January 6, 2017

EXECUTIVE SUMMARY

This Countywide ExpressLanes Strategic Plan builds on the success of the I-110 and I-10 Congestion Reduction Demonstration pilot program (also known as ExpressLanes) by establishing a vision for Metro to deliver a system of Express Lanes for Los Angeles County using a network approach to maximize regional benefits. A countywide ExpressLanes network will create a more reliable, faster travel option that makes better use of existing vehicle capacity in carpool lanes - also known as high occupancy vehicle (HOV) lanes. The plan also aims to address the degradation in HOV lane performance already experienced on many freeway corridors in the county, and provide Express Lanes users with a seamless customer experience.

The Strategic Plan identifies the most promising Express Lane corridors and potential funding sources needed to implement the plan. The Metro Countywide ExpressLanes Strategic Plan was prepared as an extension of *Southern California Association of Governments (SCAG's) Express Travel Choices Phase II Study - Regional Express/HOT Lanes Implementation Plan and Concept of Operations*. The Metro Strategic Plan is consistent with the analysis methodology used in the SCAG study to estimate the potential mobility benefits and revenue generated by Express Lane projects. This approach ensured that the Metro Countywide ExpressLanes Strategic Plan is consistent with the SCAG regional study and minimized duplication of effort.

The Strategic Plan is intended to be updated periodically to reflect changes in project costs, revenues, economic conditions, and project priorities that will undoubtedly occur over the next 30+ years.

The primary objectives of Metro's Countywide ExpressLanes Strategic Plan are to:

- Identify and recommend potential corridors that can benefit from HOV to High Occupancy Toll (HOT) or Express Lane conversion;
- Develop a resource plan for existing and future Express Lane corridors;
- Respond to degraded HOV facilities across Los Angeles County as well as transportation needs which have outpaced traditional revenue sources;
- Provide recommendations regarding tiers of projects, phasing, planning-level costs and revenue forecasts, and a timetable for implementation;
- Provide a high-level assessment of vehicle occupancy requirements on existing and planned HOV/Express Lane facilities.

The Countywide ExpressLanes Strategic Plan screened all planned, in construction, and existing carpool lanes in Los Angeles to assess the potential benefits and costs of conversion to ExpressLanes operation. The individual corridors included in the Strategic Plan were evaluated using a two-phased screening process assessing their mobility benefits and financial feasibility.

The screening process utilized the SCAG Regional Travel Demand model and the Rapid Toll Optimization Model (RapidTOM) to quantify the mobility benefits of potential ExpressLanes based on available capacity in the HOT lanes, congestion in the general purpose lanes (GPLs),

and the value of time savings by using the HOT lanes. This analysis also provided a general indication of the financial feasibility of an Express Lane.

The corridors were ranked according to their mobility and financial feasibility score and then qualitative factors were applied including connectivity with other Express Lane corridors, transit benefits, funding availability, and the potential ability to accommodate two Express Lanes in each direction. Project segments in Tier 1 had the highest combined mobility and financial screening scores and tended to exhibit the most robust forecasts of traffic and revenue. Segments in Tiers 2 and 3 exhibited comparatively lower screening results and, as such, tended to have less robust traffic and revenue performance.

Recognizing that the implementation of a Countywide ExpressLanes network would require substantial investment and time to plan and construct, it was assumed that the individual segments comprising the network would be implemented in tiers approximately ten-years apart as follows:

- Tier 1 — near-term (within 5-10 years)
- Tier 2 — mid-term (within 15 years)
- Tier 3 — longer-term (within 25 years)

Following the identification of the three project tiers, a preliminary, high level ExpressLanes Resource Plan was prepared to estimate the cost of the strategic plan projects and identify existing and potential funding sources.

The analysis led to the recommendation to develop a 621 lane-mile Express Lane network, mostly comprised of single lane facilities but dual lane facilities are preferred where right-of-way allows. The proposed Express Lane network is shown in **Figure 1** and is made up of the existing I-110 and I-10 ExpressLanes and the Tier 1, 2, and 3 projects.

Some of the proposed ExpressLanes projects are funded through Measure M (**Table 1**). For projects without identified funding, staff will attempt to secure other sources of funding including bonds, Transportation Infrastructure Financing and Innovation Act (TIFIA) loans, grants, and net toll revenue loans from other ExpressLanes within the County if permitted.

In order to move forward with a system of Express Lanes in Los Angeles County, Metro will submit Tier 1 projects as a network to the California Transportation Commission to request tolling authority for those corridors; begin planning studies for Tier 1 projects to analyze the mobility benefits, cost, and right-of-way requirements of single and dual ExpressLanes, prepare traffic and revenue studies, develop preliminary concept of operations reports, and prepare a comprehensive financial plan. In addition, Metro will conduct a detailed analysis to identify locations and configurations of HOV direct connectors.

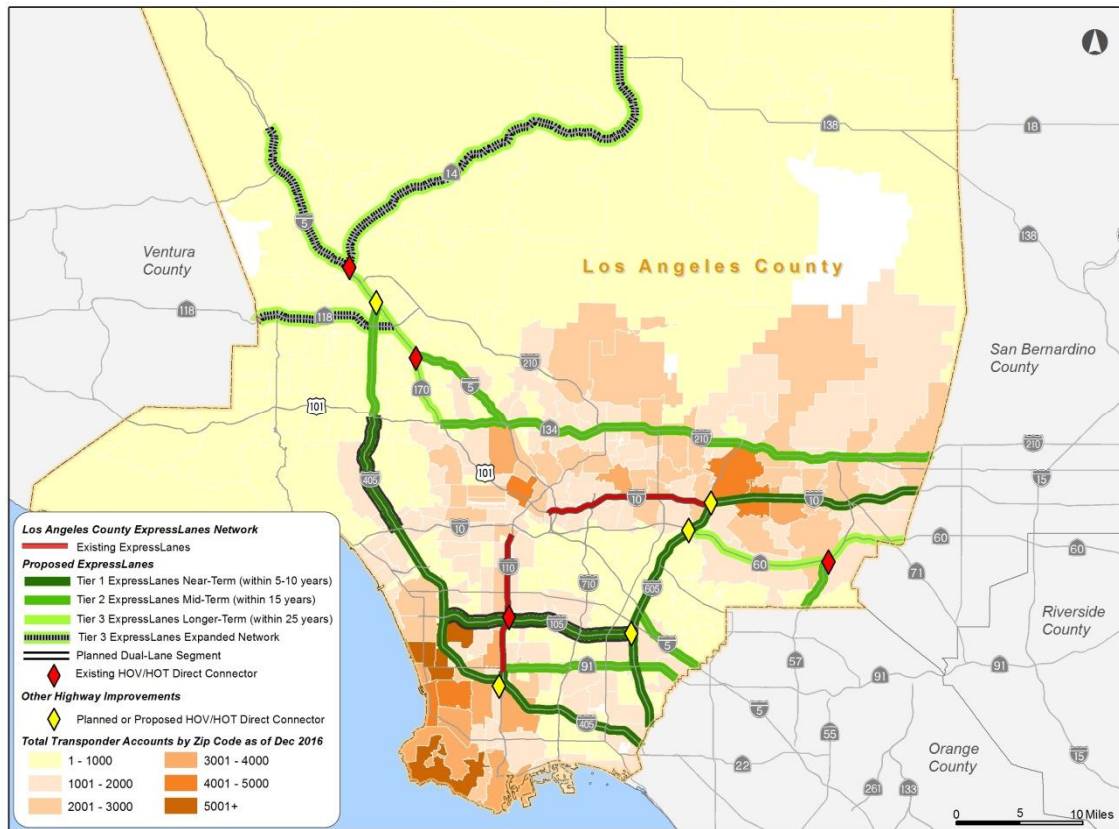


Figure 1: Los Angeles County Strategic Buildout Express Lanes Network

Table 1: Express Lane Projects Funded through Measure M

Tier 1	Measure M Funding
I-10 between I-605 & LA/SB county line	None identified*
I-105 between I-405 and I-605	\$175,000,000
I-110 ExpressLane extension south to I-405/I-110 interchange	\$51,500,000
I-405/I-110 Int. HOV Connect Ramps and Interchange Improvements	\$250,000,000
I-405 between US-101 & I-10	\$260,000,000
I-405 between I-10 and LA/OC county line	None identified*
I-605 between I-10 & LA/OC county line	None identified*
I-605/SR-60 Interchange HOV Direct Connectors	\$130,000,000
Tier 2	
I-5 between I-605 & LA/OC county line	None identified*
I-5 between SR-170 & SR-134	None identified*
SR-57 between SR-60 & LA/OC county line	None identified*
SR-91 between I-110 and LA/OC county line	None identified*
SR-134 between I-210 & SR-170	None identified*
I-405 between US-101 and I-5	None identified*
Tier 3	
I-5 between SR-170 and Parker Road	None identified*
SR-14 between Avenue P8 & I-5	None identified*
SR-60 between I-605 & LA/SB county line	None identified*
SR-118 between I-5 & LA/Ventura county line	None identified*
SR-170 between I-5 & SR-134	None identified*

* May be eligible for Measure M Highway Funds

TIER 1 PROJECTS

Metro Express Lanes Program 5-10 Year Implementation Phasing Plan (Tier 1)

Corridor	From	To	Lane Miles	Scope	Non-Standard Cost	Full-Standard Cost
Existing Network						
I-10	Alameda St.	I-605	39.1	In operation	N/A	N/A
I-110	Harbor Gateway Transit Center	Adams Blvd.	35.3	In operation	N/A	N/A
Tier 1 Baseline Network						
I-10	I-605	LA/SB CL	34.2	Convert existing and future HOV to Single HOT in each direction	\$43M	\$196.8M
I-105	I-405	I-605	32.0	Convert existing HOV to single HOT in each direction*	\$37.4M	\$73.2M
I-110	182 nd Street	I-405	2.2	Add new HOT lanes by extending existing single HOT lanes in each direction south to I-405; construct new HOV/HOT Direct Connector at I-110/I-405	N/A	\$280.4M +\$250M (Connector)
I-405	US 101	LA/OC CL	77.6	Convert existing HOV to single HOT in each direction**	\$94.5M	\$305M
I-605	I-10	LA/OC CL	41.2	Convert existing HOV to single HOT in each direction	\$50.3M	\$249.6M
I-605/SR-60 Interchange HOV Direct Connectors			0.1	Construct HOV direct connectors at I-605/SR-60 interchange	N/A	\$490.6
Tier 1 Total			187.3		\$225.2M	\$1,845.6M

Source: Conceptual-Level Cost Estimate Report, SCAG Express Travel Choices Phase II Study - Regional Express Lane Network, April 8, 2015

*Metro expects that dual Express Lanes can be implemented on the I-105 (I-405 to I-605); final configuration to be determined through the Project Approval/Environmental Document (PA/ED). Caltrans I-105 PSR-PDS estimated cost for dual-lanes is \$125M to \$200M.

** Metro expects that dual Express Lanes can be implemented on the I-405 (US 101 to I-10); final configuration to be determined through the Project Approval/Environmental Document (PA/ED). Prior Sepulveda Pass Corridor Systems Planning Study Supplemental Traffic and Revenue Study estimated cost for dual-lanes at \$188M.

Tier 1 Express Lanes 10-Year Plan (2017-2027)



TIER 2 PROJECTS

Metro Express Lanes Program 15-Year Implementation Phasing Plan (Tier 2)

Corridor	From	To	Lane Miles	Scope	Non-Standard Cost	Full-Standard Cost
Tier 2 Baseline Network						
I-5	I-605	LA/OC CL	12.9	Convert future HOV to single HOT in each direction	\$15.4M	\$40.5M
I-5	SR-170	SR-134	20.0	Convert future HOV to single HOT in each direction	\$23.8M	\$52.9M
SR-57	LA/OC CL	SR-60	9.6	Convert existing HOV to single HOT in each direction	\$12.1M	\$44M
SR-91	I-110	LA/OC CL	29.0	Convert existing HOV to single HOT in each direction	\$34.8M	\$475M
SR-134	SR-170	I-210	26.2	Convert existing HOV to single HOT in each direction	\$33.6M	\$1,205M
I-210	SR-134	LA/SB CL	56.2	Convert existing HOV to single HOT in each direction	\$68.7M	\$2,251.4M
I-405	I-5	US 101	17.4	Convert existing HOV to single HOT in each direction	\$22.4M	\$73.9M
Tier 2 Total			171.3		\$210.8M	\$4,142.7M

Source: Conceptual-Level Cost Estimate Report, SCAG Region Value Pricing Project—Regional Express Lane Network, April 8, 2015

Tier 2 Express Lanes 15-Year Plan (2027-2032)



TIER 3 PROJECTS

Metro Express Lanes Program 25-Year Implementation Phasing Plan (Tier 3)

Corridor	From	To	Lane Miles	Scope	Non-Standard Cost	Full-Standard Cost
Tier 3 Baseline Network						
I-5	SR-14	SR-170	17.2	Convert existing HOV to single HOT in each direction	\$17.7M	\$80.8M
SR-60	I-605	LA/SB CL	36.2	Convert existing HOV to single HOT in each direction	\$48.3M	\$217.3M
SR-170	SR-134	I-5	13.3	Convert existing HOV to single HOT in each direction	\$17M	\$57.7M
Tier 3 Expanded Network (included as sensitivity tests for possible inclusion to Tier 3 Baseline)						
I-5	SR-14	Parker Rd.	26.8	Convert future HOV to single HOT in each direction	\$95.3M	\$370.7M
SR-14	I-5	Avenue P8	71.8	Convert existing HOV to single HOT in each direction	\$37.3M	\$336.5M
SR-118	LA/VEN CL	I-5	22.8	Convert existing HOV to single HOT in each direction plus I-110/I-405 direct connectors	\$26.8M	\$92.6M
Tier 3 Total*			190.3		\$242.4M	\$1,686M

Sources: Conceptual-Level Cost Estimate Report, SCAG Region Value Pricing Project—Regional Express Lane Network, April 8, 2015

Tier 3 Express Lanes 25-Year Plan (2032-2042)



Countywide ExpressLanes Strategic Plan

Ad Hoc Congestion, Highway, and Roads Committee
January 18, 2017



Metro

Background and Study Assumptions

- In November 2014, the Metro Board directed staff to prepare an ExpressLanes Strategic Plan
- Key Features:
 - Consistent with SCAG Regional ExpressLanes Study
 - Developed in conjunction with Caltrans District 7
 - Freeways with existing, in construction, or planned HOV (High Occupancy Vehicle) lanes were considered for conversion into ExpressLanes

Methodology

- Corridor Screening
- Financial Screening
- Refinement

Corridor Screening

- Two step process –
 - SCAG regional travel demand model used to forecast traffic volume in 2020 and 2035
 - RapidTOM (Toll Optimization Model) takes SCAG model output and calculates the number of vehicles and amount they are willing to pay to use the ExpressLanes
 - Evaluation Metrics :
 - 1) Value of travel time savings
 - 2) HOT lane person throughput
 - 3) Average peak period vehicle speeds in the general purpose lanes

Financial Screening

Two step process:

- 1) Estimate gross revenue generation for each corridor
- 2) Estimate Net revenue, calculated by subtracting projected gross revenue from construction and operations costs based on actual costs incurred on the I-10 and I-110 ExpressLanes

Composite Score

- Each corridor was ranked into quintiles (top 20%, second 20%, third 20%, fourth 20%, and fifth 20%) for the three corridor screening metrics and financial screening
- The ranks were averaged to get a composite score. For example, if a project scored in the top 20% in each criteria then the composite ranking would be in the first quintile.

Refinement

Four qualitative criteria were used to refine the results of the corridor and financial screening:

- Connectivity with other existing and potential express lane corridors;
- Transit benefits;
- Funding availability;
- Ability to provide two ExpressLanes in each direction.

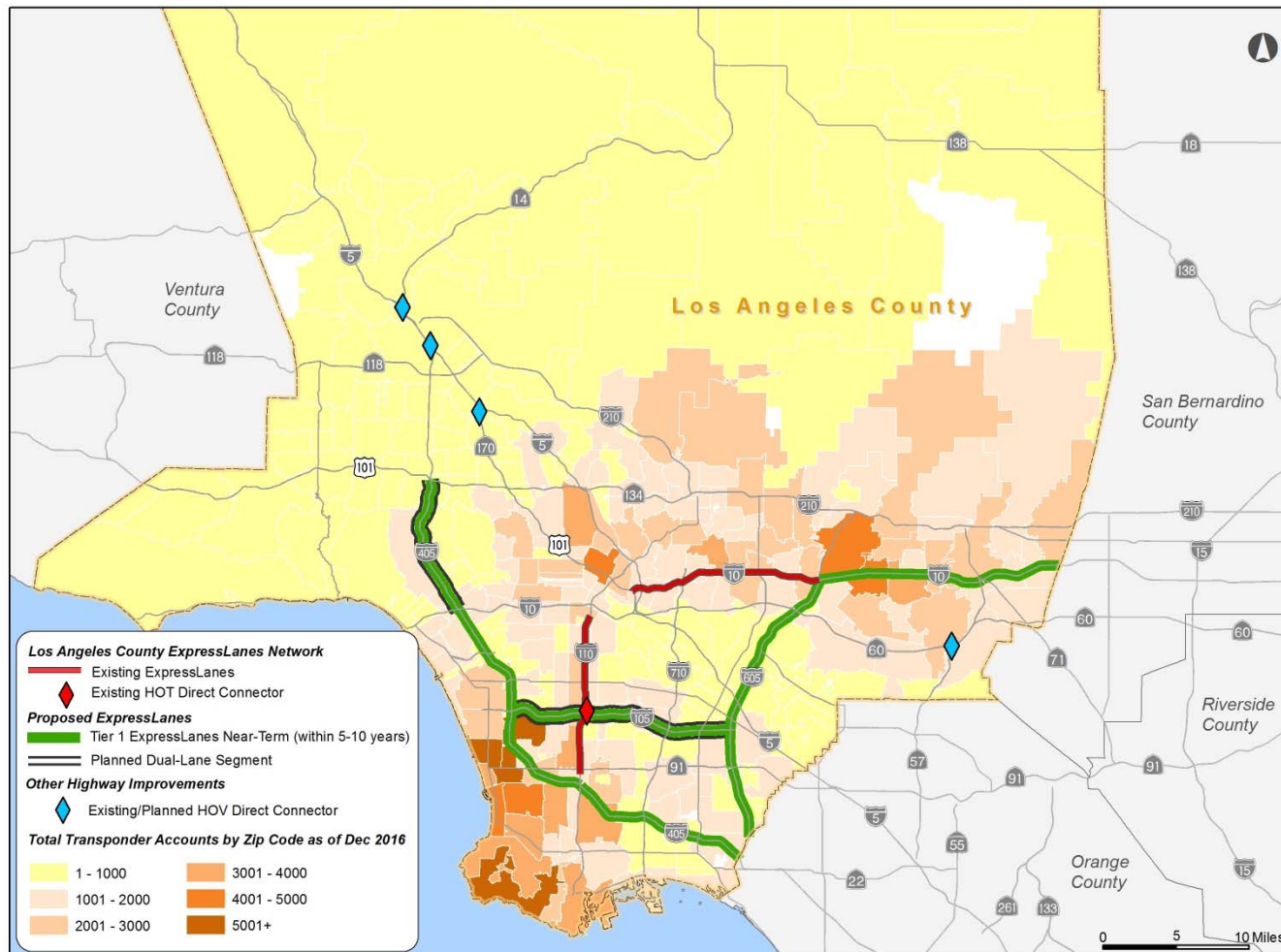
Project Tiers

- Based on the corridor financial screening metrics and the refinement criteria, projects were placed into three tiers:
 - Tier 1 – near-term (within 5-10 years)
 - Tier 2 – mid-term (within 15 years)
 - Tier 3 – longer-term (within 25 years)

Recommended Tier 1 Projects (5 to 10 Years)

Project	Measure M Funding	Funding Availability
I-405 from I-10 to US-101	\$260,000,000	2024
I-105 ExpressLanes from I-405 to I-605	\$175,000,000	2027
I-405/I-110 Int. HOV Connect Ramps and Interchange Improvements	\$250,000,000	2042
I-605/SR-60 Interchange HOV Direct Connectors	\$130,000,000	2043
I-110 ExpressLane extension south to I-405/I-110 interchange	\$51,500,000	2044
I-605 from I-10 to I-405	None	N/A
I-405 from I-10 to LA/Orange County line	None	N/A
I-10 from I-605 to LA/San Bernardino County line	None	N/A

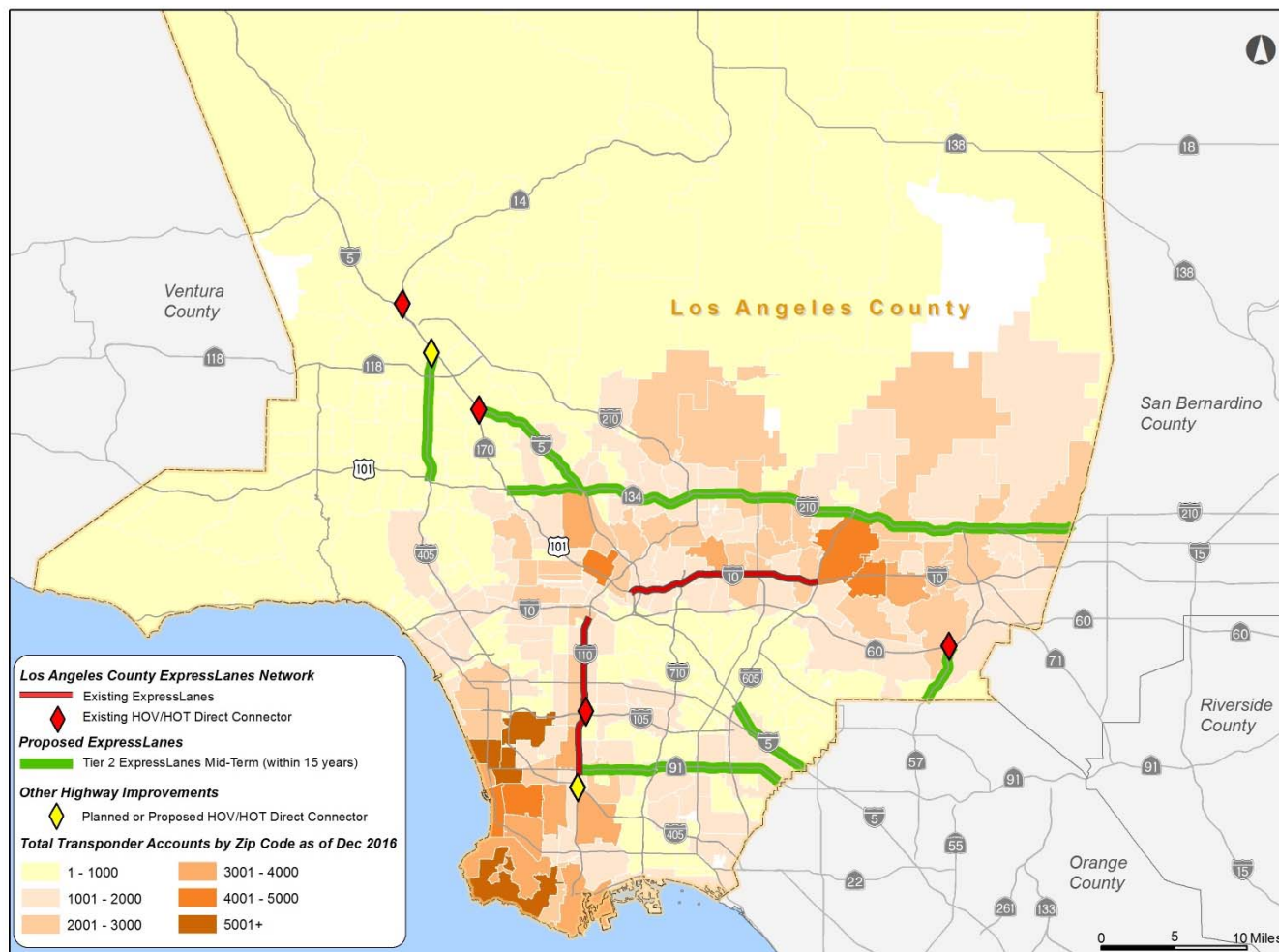
Recommended Tier 1 Projects (5 to 10 Years)



Recommended Tier 2 Projects (15 Years)

Project	Measure M Funding	Funding Availability
I-5 from I-605 to LA/Orange County line	None	N/A
I-5 from SR-134 to SR-170	None	N/A
SR-57 from SR-60 to LA/Orange County line	None	N/A
SR-91 from I-110 to LA/Orange County line	None	N/A
SR-134 from SR-170 to I-210	None	N/A
I-210 from SR-134 to LA/San Bernardino County line	None	N/A
I-405 from I-101 to I-5	None	N/A

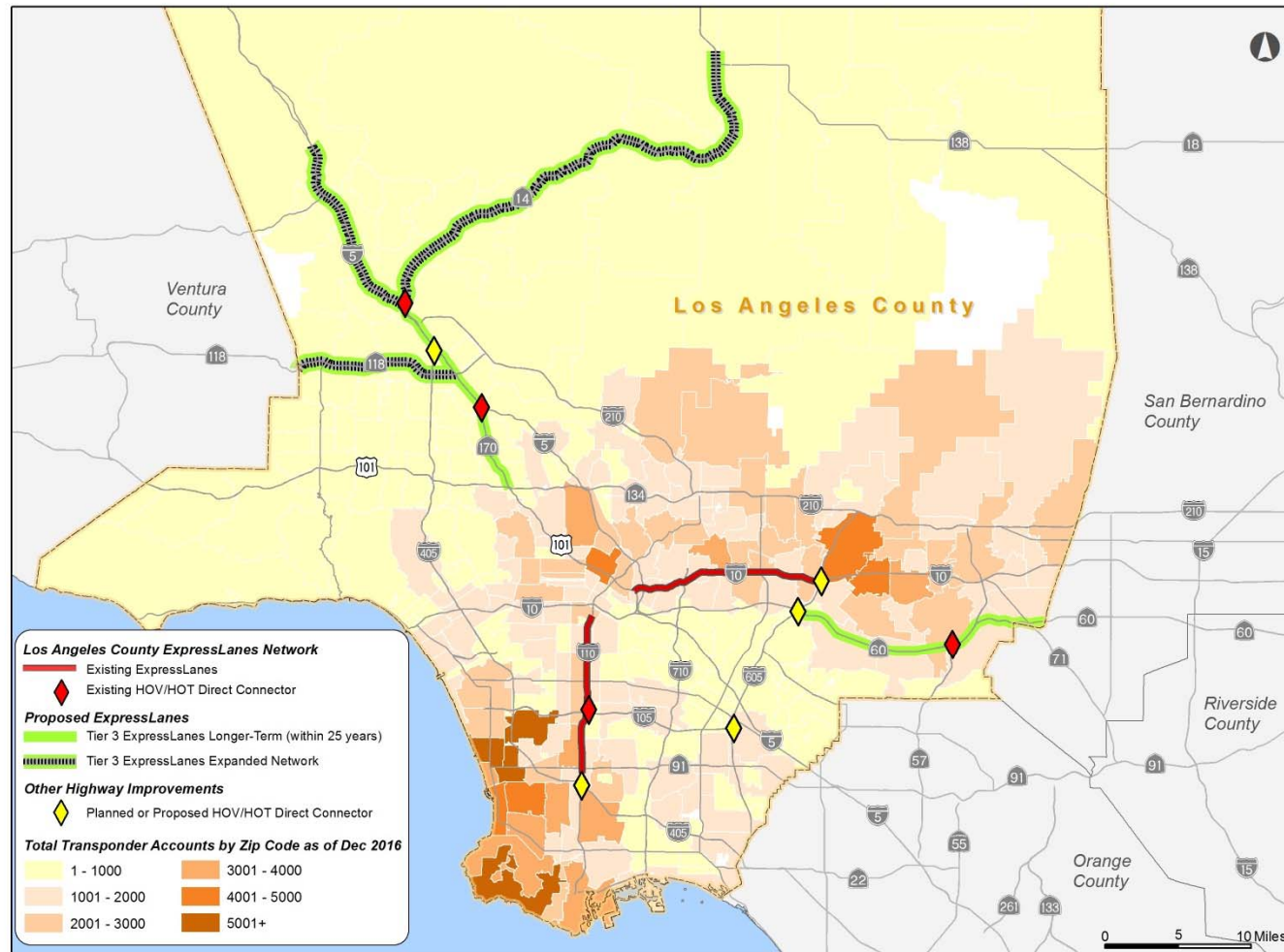
Recommended Tier 2 Projects (15 Years)



Recommended Tier 3 Projects (25+ Years)

Project	Measure M Funding	Funding Availability
I-5 from SR-170 to SR-14	None	N/A
SR-60 from I-605 to LA/San Bernardino County line	None	N/A
SR-170 from I-5 to SR-134	None	N/A
I-5 from SR-14 to Parker Road	None	N/A
SR-14 from I-5 to Avenue P8	None	N/A
SR-118 from I-5 to LA/Ventura County line	None	N/A

Recommended Tier 3 Projects (25+ Years)



Funding Options

- Measure M
- Bonding
- TIFIA loans
- Grants
- Net toll revenue loans from other ExpressLanes

Recommendations/Board Actions

Request the Board to:

- Receive and file the report; and,
- Authorize the CEO to:
 - Initiate planning studies including a comprehensive financial plan for Tier 1 projects and submit those projects as a network to the California Transportation Commission to request tolling authority



FAST FORWARD

RIVERSIDE COUNTY TRANSPORTATION COMMISSION



91 Project Overview

Afternoon traffic congestion on State Route 91 between Orange County and Riverside County is among the top trouble spots in the nation. Traveling the 91 is a challenge in either direction, any day of the week, including weekends.

The Riverside County Transportation Commission (RCTC) and its project partners are moving **"Fast Forward"** with the 91 Project. Extending from the Riverside County/Orange County line in Corona to Pierce Street in Riverside, the 91 Project will add regular lanes, tolled express lanes and connectors and improve interchanges, bridges, ramps and local streets. New connections between the 91 and Interstate 15 also will be made.

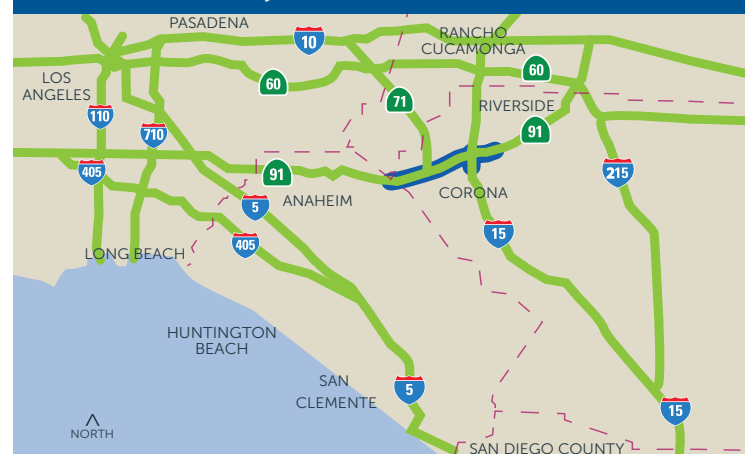
These improvements are designed to reduce delays, offer a choice between regular lanes and express lanes, allow faster emergency response, relieve local street congestion and provide better access to public transit and trails.

The 91 is approaching 50 years old, and the traffic demands now placed on it far exceed its original design from the early 1960s. Close to 280,000 vehicles travel this section of the 91 each day, and that number is expected to grow by another 140,000 vehicles daily by 2035. The 91 is the

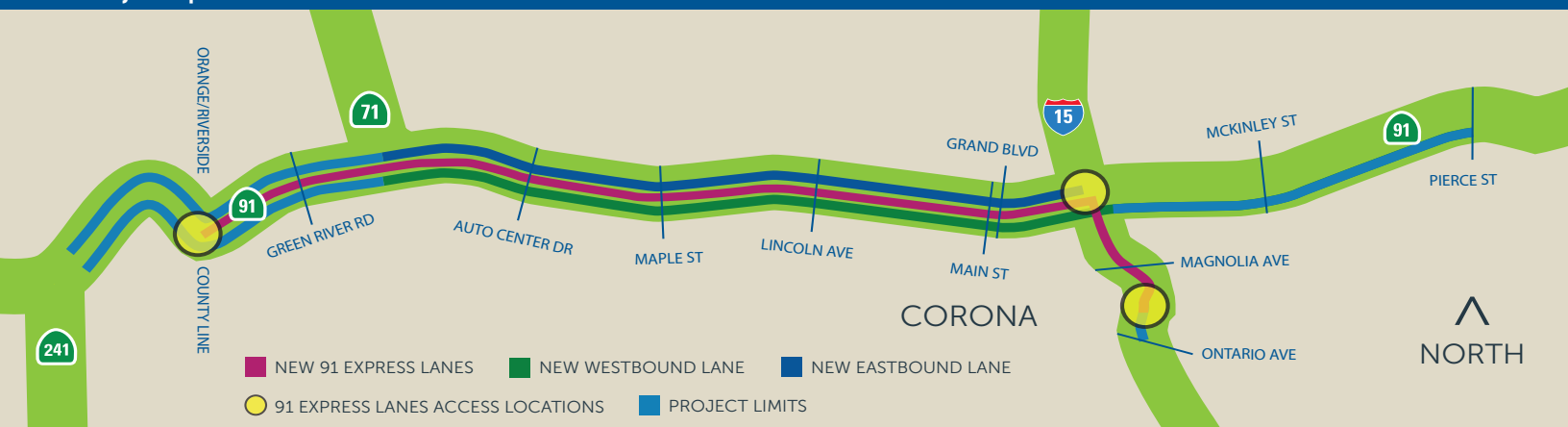
only major east-west route between Orange County and Riverside County and is used heavily for commuting, commercial transport and local travel.

Environmental approvals for this \$1.4 billion project were received in late 2012. A design-build approach is allowing the same firm to finalize the design and construct the project, speeding up delivery by three to four years. Construction began in early 2014, with new lanes anticipated to open by 2017.

Southern California, Project Location



91 Project Improvements



Para solicitar esta información en español, llame al 877-770-9191 o visite el sitio de internet del proyecto en sr91project.info

Project Milestones

By the Numbers

- > **1980s** Congestion increases as western Riverside County grows
- > **1995** 91 Express Lanes open, operated by private company
- > **2002** Orange County Transportation Authority (OCTA) makes agreement to buy 91 Express Lanes
RCTC passes renewal of Measure A with improvement project in sales tax measure
- > **2003** OCTA takes possession of toll lanes
- > **2004** Immediate improvement projects for auxiliary lanes and restriping begin
- > **2005** Major Investment Study completed
- > **2006** Project Study Report completed by Caltrans
Toll Lane Feasibility Study and 10-Year Measure A Delivery Plan prepared by RCTC
Westbound auxiliary lane project complete, SR-241 to SR-71
- > **2008** State Tolling Authority received
- > **2009** Federal Tolling Authority received
- > **2012** Environmental approvals received
Invitation to submit TIFIA federal loan application
- > **2013** Design-build contract awarded
Financing completed
- > **2014** Construction began
- > **2017** New lanes anticipated to open

90: Number of minutes that express lane users can expect to reduce their round-trip commute during peak hours.

16,200: Number of jobs the 91 Project is forecast to create, with about 4,600 related to project construction.

\$1.4 billion: Total project cost, provided by a combination of federal, state and local sources, as well as toll revenue bonds.

\$664 million: Design-build contract amount.

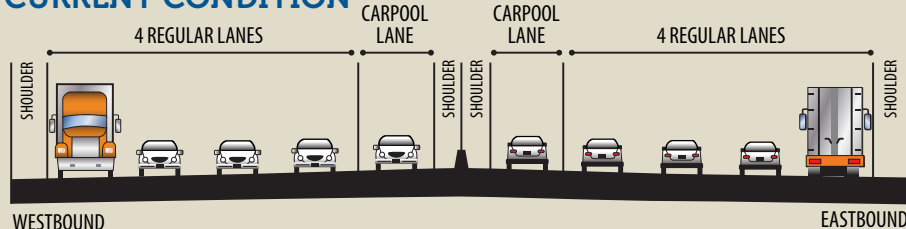
3-4: Number of years saved by using a design-build approach, compared to a traditional design-bid-build approach

280,000: Average number of vehicles that travel the 91 each day. This number is expected to grow by another 140,000 by 2035.

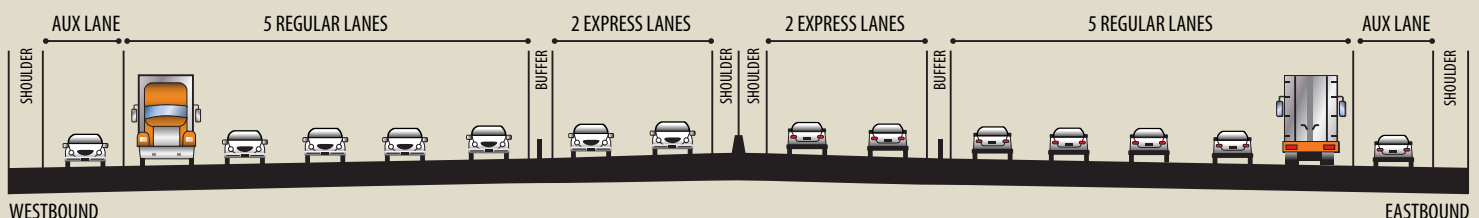
80: Percent of Orange County 91 Express Lane users who said they plan to use the new RCTC tolled express lanes.

877-770-9191: The 91 Project's helpline for questions and comments. Calls will be returned by the next business day.

CURRENT CONDITION



FUTURE CONDITION



Project Partners:



Project Helpline: 877-770-9191

Website: sr91project.info

May 2015



I-15 EXPRESS LANES PROJECT

A project of the Riverside County Transportation Commission

PROJECT OVERVIEW

The Riverside County Transportation Commission (RCTC), in partnership with Caltrans, is investing \$455 million to improve I-15 between Cajalco Road and State Route 60 (SR-60). The project will add two tolled express lanes in each direction on I-15 between Cajalco Road and SR-60, a distance of approximately 15 miles. An enhanced feature of this project is that drivers will be able to access and exit the tolled facility at multiple locations, and the project continues RCTC's ongoing commitment to expand the express lanes network.

PROJECT BENEFITS

- ✓ Improve existing and future mobility along the I-15 corridor
- ✓ Reduce congestion and improve traffic operations
- ✓ Provide a time-saving travel choice with multiple entry / exit points
- ✓ Expand the tolled express lane network
- ✓ Increase travel time reliability

PROJECT TIMELINE

RCTC is proceeding with a design-build process to expedite delivery of the project, minimize construction costs, and take advantage of the existing 91 Express Lanes project experience.

Design-Build Contract Awarded	April 2017
Construction Begins	2018
Express Lanes Open to Cars	2020

STAY CONNECTED!

For more project information, call the project helpline (844) 415-9777 or send an email to I-15expresslanesinfo@rctc.org.



Improving the I-15 For All Who Use It



The I-15 Corridor is an economic lifeline connecting San Bernardino County and the nation.

The I-15 Corridor, which includes the segment between SR 60 and US 395 in the High Desert, is an economic lifeline connecting San Bernardino County and the nation. It is a key freeway used by travelers visiting mountain and desert communities, in addition to people heading on vacation to neighboring states. Furthermore, it is a key trucking route for moving goods throughout California and beyond.

As a result of I-15 being the primary and often only choice for motorists to reach their destination, there is a tremendous amount of traffic along the corridor. Daily vehicle traffic averages about 223,000 and this number is expected to increase significantly during the coming decades as the population and economic standing of the High Desert will continue to grow.

In addition, goods movement growth will also create heavier traffic conditions on I-15. Approximately 10 to 15% of total traffic consists of trucks, with up to 20,000 traveling on the corridor each day. Truck traffic is projected to continue growing by 2 to 2.5% per year.

The solutions being studied are designed to provide motorists a choice when traveling along I-15 and to encourage economic growth, a sustainable environment, and a high quality of life for everyone who lives, works and travels in and through San Bernardino County.

15 I-15 Timeline

FORMAL PUBLIC
COMMENT PERIOD
EARLY 2018

ENVIRONMENTAL
APPROVAL
SPRING 2018

PHASE I
OPENING 2024

IDENTIFY AND STUDY
PROJECT ALTERNATIVES

DESIGN & BUILD
SELECTED ALTERNATIVE

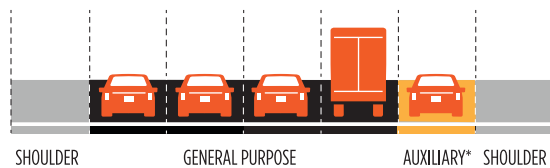
2012 2014 2016 2018 2020 2022 2024

This timeline represents the study of adding two Express Lanes in each direction from SR 60 to SR 210. Final phases for SR 210 to I-215 and I-215 to US 395 will be selected at a later date.

The I-15 Project Alternatives

There are two alternatives that are being studied by San Bernardino County Transportation Authority (SBCTA) as part of the I-15 Corridor Improvement Project:

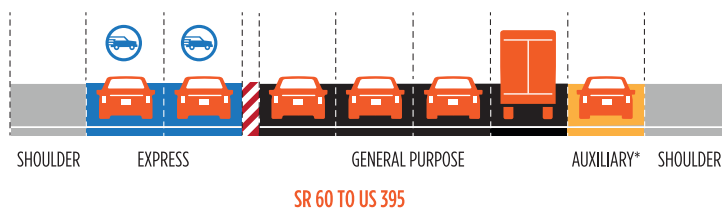
ALTERNATIVE ONE: NO BUILD



This alternative looks at what might happen if nothing is changed – no additional travel lanes or ramp improvements would be built.

**Auxiliary lanes are on the far right-side of the freeway that help ease the transition on and off the freeway between an on- and off-ramp.*

ALTERNATIVE TWO: EXPRESS LANES



The addition of 33-mile Express Lanes in each direction between SR 60 and US 395. Single-occupant motorists may choose to pay a toll to travel faster on the Express Lanes, with carpools enjoying free or reduced travel depending on congestion. The number of General Purpose Lanes would not be changed.

Progress So Far

The I-15 Corridor Project is currently in the environmental review phase. Public input throughout the environmental process will play an important role.



2012: SBCTA began preliminary technical studies and public outreach.



October 2014: SBCTA started the final technical studies.



PROJECT COSTS AND FUNDING

The estimated construction cost is approximately \$1.3 billion. Funding comes from toll-revenue bonds and a federal loan that would be repaid by toll revenue, complemented by traditional Federal, State and Measure I funding resources since the system allows for HOV use.

**Refer to FAQs on our website for additional information at www.1015projects.com.*

Why is there no HOV/Carpool alternative on I-15?

Limited funding only allows for one High Occupancy Vehicle (HOV)/ and two Carpool alternative to be considered on one corridor. Traffic studies on the I-10 and I-15 demonstrated a greater need for a HOV/Carpool alternative on the I-10.

UPDATED APRIL 26, 2017



stay
connected!

#MovingSB



website

www.1015projects.com



email

INFO@1015projects.com



project hotline

(877) 726-2241



twitter

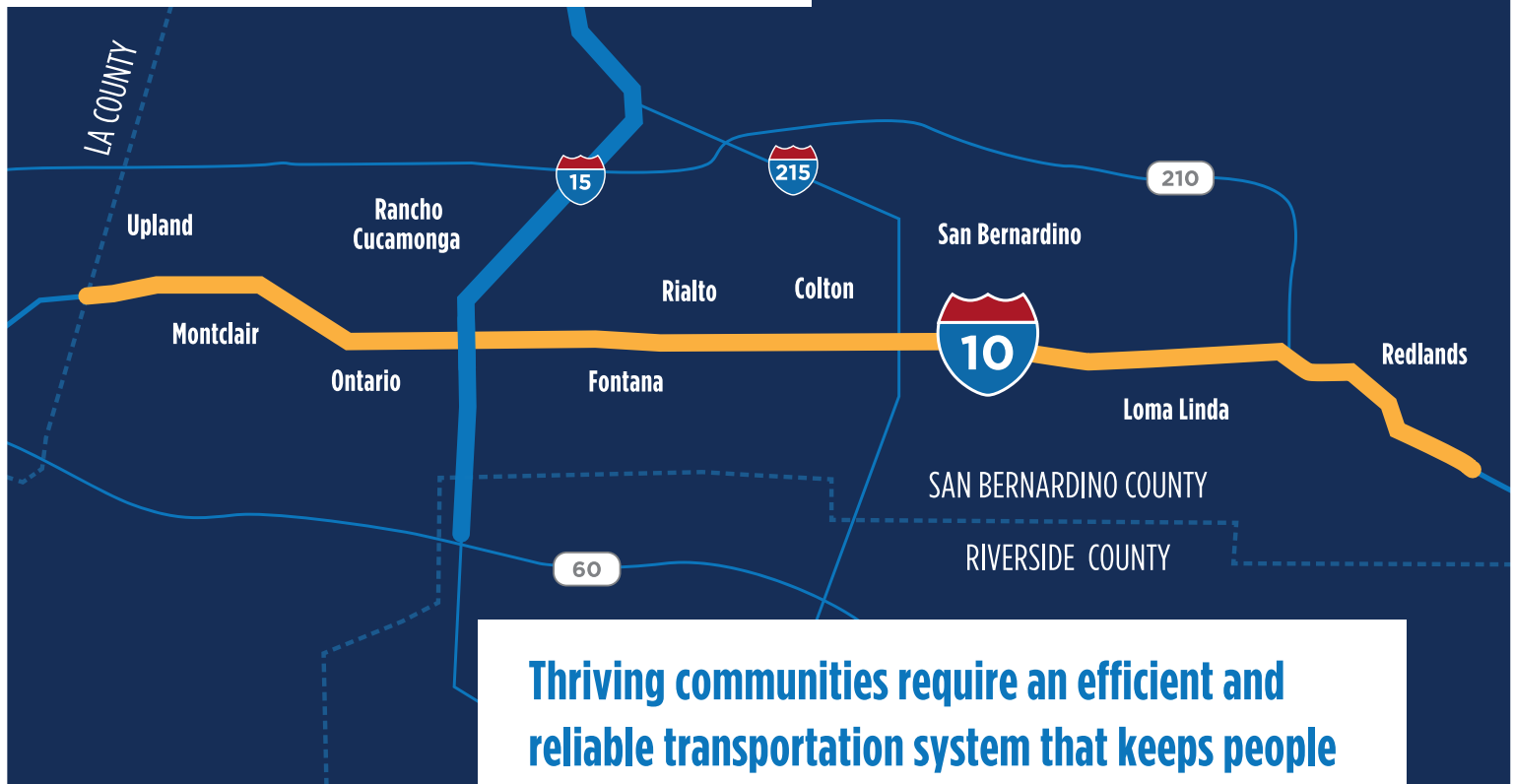
[goSBCTA](https://twitter.com/goSBCTA)



facebook

[1015projects](https://www.facebook.com/1015projects)

Improving the I-10 For All Who Use It



Thriving communities require an efficient and reliable transportation system that keeps people and goods moving.

The I-10 freeway is a critical transportation corridor through San Bernardino County used by residents, businesses and visitors. It's also a major trucking route between Southern California and the rest of the country as goods movement is vitally important for the local and national economies. Up to 263,000 vehicles and more than 20,000 trucks travel through this corridor each day.

As our region grows, travel will also increase. As a result, we will continue to see congestion grow during many hours of the day. This reduces time people can spend at home with family, friends, or engaging in activities of their choice.

To address these challenges, San Bernardino Associated Governments (SANBAG), the council of governments and transportation planning agency for San Bernardino County, is studying alternatives now as part of the I-10 Corridor Project to keep traffic moving.

The solutions being studied are designed to provide choices to motorists when driving along I-10 and to encourage economic growth, a sustainable environment and a high quality of life for everyone who lives, works and travels in and through San Bernardino County.

Understanding Lane Designations

GENERAL PURPOSE LANES



AUXILIARY*

General Purpose Lanes are for all types of vehicles at any time. These will not be removed, repurposed, or replaced as part of any alternative.

MANAGED LANES

HOV



High Occupancy Vehicle (HOV) Lanes, also called carpool or diamond lanes, are limited to vehicles with multiple occupants. They have a diamond symbol and are available on many freeways in Southern California.

EXPRESS LANES



Express Lanes can be used by motorists choosing to pay a toll. Toll rates are determined by traffic conditions and how many people are in the car. 3+ occupants on I-10 will receive free or discounted rates.

The Challenge: We're Growing

Over the past 40 years, San Bernardino County's population has tripled to 2.1 million people. This is expected to increase by more than 30% in 2035, and more than 60% by 2060; increasing the population to nearly 3.4 million people. That's like adding the entire population of Phoenix, Arizona into the county. This trend is continuing with neighboring counties as well with Riverside County growing at a similar pace.

With this population growth, daily traffic on the I-10 is expected to increase to 350,000 vehicles by 2045. Increasing goods movement will also create heavier traffic conditions. For example, between 2003 and 2030, there will be a 75% increase in truck traffic on I-10 resulting in 23,000 trucks on the I-10 everyday.

Clearly, there is a need for viable, tested solutions to manage that anticipated traffic demand.



The I-10 Project Alternatives

There are three alternatives that are being studied by SANBAG as part of the I-10 Corridor Improvement Project:

ALTERNATIVE ONE: NO BUILD



This alternative looks at what might happen if nothing is changed – no additional travel lanes or ramp improvements would be built.

ALTERNATIVE TWO: HOV LANE



The addition of an HOV/Carpool Only Lane in each direction of I-10 between Haven Avenue in Ontario and Ford Street in Redlands (25 miles). The number of General Purpose Lanes would not be changed.

*Auxiliary lanes are on the far right-side of the freeway that help ease the transition on and off the freeway between an on- and off-ramp.

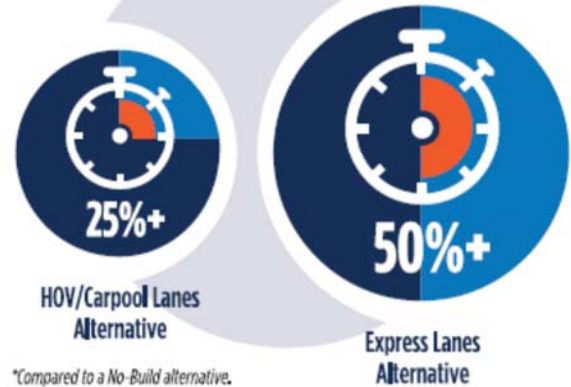
Adding Managed Lanes Benefit Everyone*

The addition of one HOV/Carpool Lane or two Express Lanes benefits all motorists, the local community and the environment:

- There will be less traffic in General Purpose Lanes because of managed lane users; if Express Lanes are chosen, there will be a time savings of 50%+ and if HOV/Carpool Lanes are chosen, the time savings will be 25%+ compared to a No-Build alternative (during peak drive times when traveling the entire corridor).
- Overall emissions are lowered and air quality is improved because there is less traffic congestion.
- If Express Lanes are selected, toll revenues stay local and help fund local transportation improvements.



General Purpose Lanes Time Savings



A Solution: Provide Travel Choices

SANBAG started the I-10 Corridor Project in 2007 to explore the best solutions to relieve congestion now and in the future. With limited funding and land available for expansion, we must be creative in our decisions to best manage traffic on I-10. We can no longer build our way out of congestion by simply adding more General Purpose Lanes.

Managed Lanes can improve traffic flow and give drivers a choice in how they travel on the freeway. Adding a HOV/Carpool Lane to reduce the number of cars on the road will help some, but traffic is most likely to become congested again within a decade. Traffic studies show adding Express Lanes are a long-term solution to relieve congestion in all lanes.

Regardless of drivers' choices to travel via General Purpose, HOV/Carpool or Express Lanes, time will be saved on the drive. All travelers benefit because reduced congestion results in faster driving time and better air quality. Plus, for those choosing to pay a toll, those revenues stay local and help fund various types of transportation and public transit improvements.

What are Express Lanes?

Express Lanes use innovative technology that measures the congestion level on the freeway and sets a toll based on volume. Pricing is highest during peak commute hours or if there is a special event causing significant traffic delays. Motorists may choose to pay a toll to travel faster on the Express Lanes, with carpools enjoying free or reduced tolls depending on congestion. The cost is always displayed so motorists can choose whether to pay and use the Express Lanes or remain in the free General Purpose Lanes.

ALTERNATIVE THREE: EXPRESS LANES



The addition of 33-mile Express Lanes in each direction between the Los Angeles/San Bernardino County line and Ford Street in Redlands. The number of General Purpose Lanes would not be changed.

PROJECT COSTS AND FUNDING



The estimated construction cost is approximately \$650 million for the HOV alternative and approximately \$1.8 billion for Express Lanes. The HOV project funding comes from the traditional Federal, State and Measure I resources. Express Lanes project funding, however, uses those same traditional resources since the system allows for HOV use, as well as toll-revenue bonds and a federal loan. The bonds and loan will be repaid by future revenues generated from use of the Express Lanes.

*Refer to FAQs on our website for additional information at www.1015projects.com.



Community Input is Always Needed

You have a voice for choice in this process. SANBAG is committed to ongoing, meaningful community input to ensure the I-10 Corridor Project reflects the values and priorities of the people who live and travel in San Bernardino County. Your comments, questions and suggestions are welcome any time via email, phone, social media, or the website.

The I-10 Corridor Project has three established Community Advisory Groups (West Valley, East Valley and High Desert) that meet quarterly. Members review project status updates and provide critical feedback to the project team. New members can be added as space is available. Applications are available on the website.

The public also has various opportunities to provide comment throughout the environmental process, which includes the public review period of the draft environmental document from April 25, 2016 to June 8, 2016.

Progress So Far

The I-10 Corridor Project is currently in the environmental review phase. While the SANBAG Board has selected Express Lanes as the locally preferred alternative, that does not mean it's the final decision. Public input throughout the environmental process will play an important role.



2007: SANBAG initiated study of the I-10 Project.



August 2011: SANBAG started the study of Express Lanes.



January 2012: SANBAG began final technical studies and extensive public outreach.



October 2012: SANBAG conducted public scoping meetings.



July 2014: SANBAG Board selected Express Lanes as the locally preferred alternative.



November 2015: SANBAG Board reconfirmed the selection of Express Lanes as the locally preferred alternative.

UPDATED APRIL 22, 2016



**stay
connected!**

#MovingSB



website

www.1015projects.com



email

INFO@1015projects.com



project hotline

(877) SANBAG10 or
(877) 726-2241



twitter

[sanbagnews](https://twitter.com/sanbagnews)



facebook

[1015Projects](https://www.facebook.com/1015Projects)

Minute Action

AGENDA ITEM: 12

Date: *April 1, 2015*

Subject:

Express Lanes Tolling Policy and Toll Revenue Policy

Recommendation:

That the Board, acting in its capacity as the San Bernardino County Transportation Commission:

Approve the Express Lane tolling policies included in Table 1, and approve the toll revenue policies included in Table 2.

Background:

At the July 2014 Board Meeting, the SANBAG Board approved the Express Lanes Alternative as the Locally Preferred Alternative for the I-10 Corridor Project, subject to the completion of the California Environmental Quality Act/National Environmental Policy Act (CEQA/NEPA) review. SANBAG is also evaluating an Express Lanes Alternative as the sole build alternative for the I-15 corridor. In order to continue the development of these two corridor projects, several activities need to advance concurrently with the environmental process, one of which is completion of the Investment Grade Traffic and Revenue Forecast.

A Preliminary Traffic and Revenue Forecast was completed in 2011, which confirmed the potential for Express Lanes on the I-10 and I-15 corridors. The Intermediate Traffic and Revenue Study, presented to the Board in October 2013, confirmed financial feasibility for the two corridor projects. The next financial analysis step is to develop an Investment Grade Traffic and Revenue Forecast, which will serve as a key component of the updated financial plan for the two corridors, and is required to be completed prior to submission of a Transportation Infrastructure Finance and Innovation Act (TIFIA) Application.

In order to advance the I-10 and I-15 project most effectively, the Investment Grade Traffic and Revenue studies should be completed in 2016, which would enable the TIFIA process to move forward in 2017. To complete this high level traffic and revenue study requires the approval of key tolling policies that would impact the results of the study. The tolling policies recommended by the I-10 and I-15 Corridor Sub-Committee are included in Table 1. Additional background information on these tolling policies is included in Attachment 1.

Table 1: Key Tolling Policies

1. Provide free or discounted travel for HOV 3+ vehicles
2. Maintain 24-hour tolling with a minimum toll rate
3. Utilize both switchable transponders and License Plate Recognition (LPR) for toll collection

Entity: CTC

4. Implement dynamic pricing with pricing by segment
5. Maintain normal toll pricing for Clean Air Vehicles
6. Create a Low Income Equity Program for San Bernardino County residents
7. Enable California Highway Patrol (CHP) to reroute General Purpose lane traffic into the Express Lanes in the event of a severe incident
8. Evaluate tolling HOV 3+ at a discounted rate (as opposed to free) during super-peak events

Toll revenue generated by an Express Lanes project must first be used to cover operations, maintenance, debt service and major maintenance and rehabilitation reserves for the toll facility. Toll revenue may also be dedicated to complete the Express Lanes system, or to pay back any local contributions. Remaining “excess” revenue is typically allocated to corridor improvements including transit. Toll revenue use is typically broadly defined within legislation, and is then more specifically defined within Board-approved expenditure plans and project financing documents.

In order to allocate toll revenue in the Investment Grade Traffic and Revenue Forecast for the I-10 and I-15 corridors, it is necessary to establish a toll revenue policy. After discussion with the I-10 and I-15 Joint Sub-Committee on January 15, 2015 and February 12, 2015, the sequential toll revenue policy shown in Table 2 is recommended for inclusion in the updated financial plans.

Table 2: Toll Revenue Policy

1. Operate the Express Lanes System
2. Maintain the Express Lanes System
3. Pay Express Lanes Debt Service
4. Complete the Express Lanes System
5. Pay back the Measure I Contributions
6. Implement Transit and Corridor Improvements within I-10 and I-15 Corridors

The policy will allow toll revenue to be reflected appropriately in the updated financial plan, while preserving flexibility to further define projects for completion within the Express Lanes system, projects to be completed using funds paid back to Measure I and additional transit and corridor improvements within the I-10 and I-15 corridors. Potential projects for inclusion in the Express Lanes System include the I-10/I-15 Direct Connectors and the extension of the I-15 Express Lanes from US-395 to the potential High Desert Corridor. Payback of the Measure I contributions would need to return to the source of the funds, i.e. the Valley Freeway Program. If toll revenue is used to complete the Express Lanes System and pay back the Measure I contributions, it is anticipated that any “excess” revenue would not be available until 2045.

Approval of the tolling policies is needed to develop an accurate Investment Grade Traffic and Revenue Forecast. Similarly, approval of the toll revenue policies is needed in order to allocate estimated toll revenue properly in the updated financial plan. Staff recommends approval of the Express Lanes policies listed in Tables 1 and 2.

Board of Directors Agenda Item

April 1, 2015

Page 3

Financial Impact:

This item imposes no impact on the Fiscal Year 2014/2015 budget.

Reviewed By:

This item was reviewed and recommended for approval (15-0-0) with a quorum of the Board present at the Board of Directors Metro Valley Study Session on March 12, 2015. This item was reviewed and unanimously recommended for approval by the Mountain/Desert Policy Committee on March 20, 2015.

Responsible Staff:

John Meier, Project Manager

Approved
Board of Directors
Date: April 1, 2015

Witnessed By:

Express Lanes Tolling Policy

<u>Item One:</u>	High Occupancy Vehicle (HOV) Policy
<u>Description:</u>	Establishes HOV requirements for free travel within the Express Lanes.
<u>2013 Traffic and Revenue (T&R) Assumption:</u>	HOV 2+ travel free until 2024; HOV 3+ travel free 2024 and beyond.
<u>Discussion:</u>	<p>Traffic and Revenue (T&R) modeling indicates that HOV 2+ free would not be financially viable. From a capacity standpoint, two Express Lanes in each direction could support HOV 2+ free, but there would be little excess capacity to sell to Single Occupant Vehicles (SOVs). Therefore, funds would not be available to construct the second lane.</p> <p>Under the assumed HOV 3+ policy, approximately 15 to 20% of the vehicles would be traveling free in 2030. Shifting from HOV 3+ to HOV 2+ free during off-peak hours would reduce toll revenue by 20 to 25%, possibly more in the early years. Off-peak is defined as 9:30 a.m. to 3:30 p.m. and 7:30 p.m. to 6:30 a.m.</p> <p>Note I: A single-lane HOV 2+ addition would be degraded within 10 years of opening, and would provide no relief for existing HOV 2+ congestion between the Los Angeles County line and Haven Avenue.</p> <p>Note II: The 2013 Traffic and Revenue (T&R) assumed HOV 2+ would travel free during the initial I-10 segment opening from Los Angeles County Line to I-15 in 2022 and 2023, which includes the portion of existing HOV lanes from LA County Line to Haven that would be converted to Express Lanes. This segment would be converted to HOV 3+ in 2024, which is when the remaining I-10 segments are scheduled to be completed. On 12/11/14, the Express Lanes Ad Hoc Committee recommended that this HOV2+ to HOV3+ transition be eliminated, and that all Express Lanes segments open as HOV3+.</p> <p>Note III: Vehicles would be required to have a transponder in order to obtain the HOV 3+ credit, as the geometric design does not contain HOV 3+ declaration lanes.</p> <p>Note IV: For the time period from July through October 2014, OCTA data from the 91 Express Lanes indicates approximately 21% of trips were HOV 3+.</p>
<u>Recommendation:</u>	Implement free travel for HOV 3+ for all Express Lanes segments, including the initial I-10 segment opening in 2022.

Express Lanes Tolling Policy

<u>Item Two:</u>	Minimum Toll Rate / Hours of Operation
<u>Description:</u>	Establishes minimum toll for entry into the Express Lanes.
<u>2013 T&R Assumption:</u>	24-hour tolling, with a minimum toll for entry into the Express Lanes of \$0.05 per mile from point of entry to the end of a segment or \$0.50 per segment, whichever is greater.
<u>Discussion:</u>	<p>Tolls in an Express Lanes Facility can be collected either during peak-hours only, or 24 hours a day.</p> <p>Peak-hour only tolling would allow access to all passenger vehicles during off-peak hours, which is defined as volumes in the Express Lanes below 1,200 vehicles per hour per lane. Under 24 hour tolling, a minimum toll rate would be charged during off-peak hours.</p> <p>Traffic and Revenue models indicate that the off-peak hours would run from approximately 9:30 a.m. to 3:30 p.m. and 7:30 p.m. to 6:30 a.m. for the I-10 corridor in 2030. Eliminating minimum toll during off-peak hours would reduce toll revenue by at least 15 to 25% prior to 2030; 15% in 2030; and 2-5% in 2046, based on the off-peak hours specified above.</p> <p>Establishing a minimum toll rate minimizes weaving in and out of Express Lanes, which can caused congestion and reduce throughput in both the Express Lanes and General Purpose lanes.</p> <p>24-hour tolling is consistent with neighboring Riverside, Orange and Los Angeles counties. Off-peak only tolling could create confusion at county lines as well additional complexity for users as to when to expect free travel.</p> <p>Note I: For the I-10 project, the minimum toll rate is estimated at \$2.15 for the 33-mile trip in 2030 (expressed in 2012 dollars). For the I-15 project, the minimum toll rate is estimated at \$2.30 for the 33-mile trip in 2030 (expressed in 2012 dollars).</p> <p>Note II: For comparison, the minimum toll rate for the 10-mile trip on the OCTA 91 Express Lanes is currently \$1.45, which would be even higher if based on 2030 volumes.</p>
<u>Recommendation:</u>	Maintain 24-hour tolling with a minimum toll rate of \$0.50 per zone in order to maximize efficient and safe operation of Express Lanes and General Purpose lanes, and to maintain financial feasibility of the Express Lanes project.

Express Lanes Tolling Policy

<u>Item Three:</u>	Toll Collection Methodology
<u>Description:</u>	Establishes toll collection methodology for the Express Lanes Facility
<u>2013 T&R Assumption:</u>	Switchable RFID Transponders and License Plate Recognition
<u>Discussion:</u>	<p>Toll collection methodology varies across the country, and includes cash collection, Radio-Frequency Identification (RFID) transponders, switchable RFID transponders and license plate recognition (LPR).</p> <p>Cash collection introduces additional operations cost, traveler delay and requires a larger geometric footprint, and is largely being phased out across the country.</p> <p>All-Electronic Tolling, which includes the use of transponders and LPR, allows tolling without the need to stop at a cash collection booth.</p> <p>Transponder-only facilities provide the lowest administrative cost of the toll collection methods, but restricts use of the Express Lanes to those with a transponder. Switchable transponders provide the added benefit of declaring vehicle occupancy, thereby eliminating the need for declaration lanes for qualifying HOV vehicles.</p> <p>LPR has a higher administrative cost than transponder-only, but allows access to a much broader range of users than transponder-only facilities. For example, visitors or infrequent users can still use the facility and pay the toll via the web. LPR users would be charged a surcharge to offset the higher administrative cost.</p> <p>Note I: Transponders issued in California are required by law to be interoperable, e.g. an OCTA transponder works on a Metro Express Lanes facility, and this requirement will soon be in effect nationwide.</p> <p>Note II: As tolling technology continues to evolve, there is the potential that transponders would no longer be required by the time of construction. This issue will be monitored further during future Concept of Operations development.</p>
<u>Recommendation:</u>	Utilize switchable RFID Transponders and License Plate Recognition for toll collection.

Express Lanes Tolling Policy

<u>Item Four:</u>	Toll Pricing Process
<u>Description:</u>	Establishes the tolling concept for the Express Lanes
<u>2013 T&R Assumption:</u>	Dynamic Pricing with Pricing by Segment
<u>Discussion:</u>	<p>The I-10 and I-15 Express Lanes would utilize dynamic pricing, which maximizes the ability to manage traffic demand by adjusting pricing based on real-time traffic demand. Actual pricing can be based on a per-mile basis or a per-segment basis.</p> <p>Per-mile pricing would charge users based on the distance covered within the Express Lane facility, with the per-mile rate varying based on demand.</p> <p>Under segment pricing, per-mile toll rates are converted into toll charges for each segment by multiplying the per-mile rate by the longest distance covered by each tolling segment.</p> <p>Segment-based pricing tends to increase the share of long-distance trips, i.e. minimizes weaving, due to a relatively higher price for trips using only a short portion of a tolling segment. Shorter trips lead to increased weaving in and out of the Express Lanes, which may cause operational issues leading to increased congestion and reduced corridor throughput.</p> <p>Utilizing per-mile pricing on a long corridor with multiple ingress-egress points introduces signage complexity, with a wide range of total trip distance scenarios available upon entry into the facility. Segment pricing simplifies signage by indicating cost for using the initial segment, followed by cost to the end of the facility.</p> <p>Note I: Tolls that are displayed on signage are guaranteed upon entry.</p>
<u>Recommendation:</u>	Utilize Dynamic Pricing with Pricing by Segment

Express Lanes Tolling Policy

<u>Item Five:</u>	Clean Air Vehicle Policy
<u>Description:</u>	Establishes policy for free or discounted travel for Clean Air Vehicles in the Express Lanes facility.
<u>2013 T&R Assumption:</u>	No discount or free travel for Clean Air Vehicles
<u>Discussion:</u>	<p>Current State policy, which expires in 2019, provides free travel for qualifying Clean Air vehicles in many managed lanes facilities.</p> <p>Tolling Clean Air Vehicles has a positive financial impact; however, actual impact has not been quantified as it was a core assumption in the 2013 Traffic and Revenue Forecast.</p> <p>Tolling Clean Air Vehicles reduces incentive for Clean Air Vehicle use, which is a potential air quality issue.</p> <p>SCAG is moving towards a blanket exemption for Clean Air Vehicles priority usage of managed lanes, i.e. no discount or free travel for Clean Vehicles.</p>
<u>Recommendation:</u>	Consistent with law anticipated at the start of tolling in 2022, maintain normal toll pricing for Clean Air Vehicles

Express Lanes Tolling Policy

<u>Item Six:</u>	Low-Income Equity Program
<u>Description:</u>	Policy would establish a program to attract and facilitate usage of the Express Lanes facility by low-income users.
<u>2013 T&R Assumption:</u>	Not modeled
<u>Discussion:</u>	<p>Policy would be modeled after Metro Express Lanes Equity Program, which provides \$25 credit for account set-up and waives the monthly account fee</p> <p>Primary recommendation from the Equity Study Report; financial impact to be quantified.</p> <p>Note I: Metro annual cost is approximately \$54,000 in toll credits.</p> <p>Note II: Participation in the Low Income Equity Program requires registration and issuance of a transponder. The requirement of a transponder will be further reviewed during Concept of Operations development, as toll collection technology is evolving rapidly.</p>
<u>Recommendation:</u>	Recommend including Equity Program for San Bernardino County residents; financial impact to be verified during Investment Grade Traffic and Revenue analysis.

Express Lanes Tolling Policy

<u>Item Seven:</u>	Incident Management
<u>Description:</u>	Establish policy to allow or not allow General Purpose lane traffic to be rerouted into Express Lanes toll-free in event of traffic incident in General Purpose lanes
<u>2013 T&R Assumption:</u>	Not modeled
<u>Discussion:</u>	<p>In the event of a significant incident in the General Purpose lanes, the flexibility to reroute General Purpose lane traffic into the Express Lanes could serve to alleviate congestion associated with the incident, benefitting the General Purpose lane users of the Corridor.</p> <p>The drawbacks include the lack of choice for a “guaranteed” travel time in the Express Lanes facility during severe General Purpose lane incidents, and the drop in Express Lane throughput due to congestion resulting from the influx of General Purpose Lane traffic.</p> <p>Note I: If General Purpose lane traffic is rerouted into the Express Lanes due to an incident, a tolling reversal (credit) would be issued to the Express Lane users. Similarly, if the Express Lanes become congested due to an incident in the Express Lanes, traffic would be rerouted into the General Purpose lanes and a tolling reversal (credit) would be issued.</p> <p>Note II: Specific language would need to be drafted specifying the conditions under which CHP could reroute traffic into the Express Lanes facility.</p>
<u>Recommendation:</u>	Develop specific language, coordinated with CHP, to enable CHP to reroute General Purpose lane traffic into the Express Lanes in the event of a severe incident in the General Purpose lanes. Financial impact would need to be reflected during development of the Investment Grade Traffic and Revenue Forecast.

Express Lanes Tolling Policy

<u>Item Eight:</u>	Tolling during Super-Peak Traffic Hours
<u>Description:</u>	Policy would charge 3+ vehicles at a full or discounted rate rather than free during weekend and Holiday Super-Peak periods.
<u>2013 T&R Assumption:</u>	HOV 3+ vehicles travel free 24 hours a day, 365 days per year.
<u>Discussion:</u>	<p>Peak hours are defined as the hours during which traffic volumes reach a point near which the traffic flow become unstable. Since the capacity of the Express Lanes facility is limited, pricing is used to manage the demand to keep traffic flowing at optimal levels during peak hours.</p> <p>“Super-Peak” hours are defined as the hours during which demand greatly outstrips capacity (supply), resulting in high toll prices to manage the demand. Super-Peak demand is typically directional in nature. For example, the demand on the I-15 northbound is typically highest on a Friday night, particularly in the Cajon Pass area, and I-15 southbound is typically highest on a Sunday night.</p> <p>For the I-10 and the I-15 corridors, the super-peak events typically coincide with the weekends and holidays, i.e. recreational traffic. Much of the recreational traffic is HOV 3+, meaning it takes a higher percentage of the Express Lanes capacity without paying a toll. Additionally, much of the recreational traffic is coming from outside San Bernardino County.</p> <p>Charging HOV 3+ a partial toll during super-peak events provide an overall positive financial impact. Additionally, it captures revenue from HOV 3+ traffic emanating from outside San Bernardino County.</p> <p>Note: The OCTA 91 Express Lanes charge HOV 3+ one half of the posted toll rate Monday through Friday from 4:00 p.m. to 6:00 p.m in the eastbound direction only.</p>
<u>Recommendation:</u>	Evaluate tolling HOV 3+ at a discounted rate (as opposed to free) during super-peak events in the next phase of Traffic and Revenue forecasting.

CALIFORNIA DEPARTMENT OF TRANSPORTATION



**2015 CALIFORNIA HIGH-OCCUPANCY VEHICLE LANE
DEGRADATION DETERMINATION REPORT**

Prepared by

**Division of Traffic Operations
Office of Traffic Management**

Submitted to

**Federal Highway Administration
California Division**

December 1, 2016

2.6. DISTRICT 12 ANALYSIS

District 12, located in Orange County, was established by the California State Legislature in 1988. The District has a population of 3.15 million people.⁴ District 12 is responsible for 284 centerline miles of highway and operates HOV lanes on Routes 5, 22, 55, 57, 91, 405 and 605.

Degradation increased from 171 lane-miles to 175 lane-miles between the first and second halves of 2015, respectively. Figures 17 and 18 provide maps of the degraded segments in District 12. Degraded segments along the same route are combined into corridors for easier reference. The corridors may include gaps of non-degraded segments. Tables 12 and 13 list the corridors with degraded HOV lanes in District 12.

⁴ State of California, Department of Finance. *E-4 Population Estimates*.
< <http://www.dof.ca.gov/Forecasting/Demographics/Estimates/E-4/2011-20/> >

DISTRICT 12 DEGRADED HOV LANES JANUARY 1 TO JUNE 30, 2015



System Plan for Managed Lanes on California State Highways



System Metrics Group, Inc.
Final Report
October 2016



Exhibit 56: District 12 Future Managed Lanes System Configuration Most Likely Plan (2040)



December 12, 2016

To: Members of the Board of Directors

From: Laurena Weinert, Clerk of the Board

Subject: California Department of Transportation Draft Managed Lanes
Network Study

Regional Planning and Highways Committee Meeting of December 5, 2016

Present: Directors Bartlett, Do, Donchak, Miller, Nelson, Spitzer, and Ury

Absent: Director Lalloway

Committee Vote

Following the discussion, no action was taken on this receive and file information item.

Staff Recommendation

Receive and file as an information item.



ORANGE COUNTY TRANSPORTATION AUTHORITY

**California Department of Transportation Draft Managed
Lanes Network Study**

PowerPoint - Board

- Purpose – Prioritize Managed Lane Freeway Corridors for Project Development
- Presentation Overview
 - Background – Why Now?
 - Study Process
 - Study Results/Recommendations
 - Next Steps

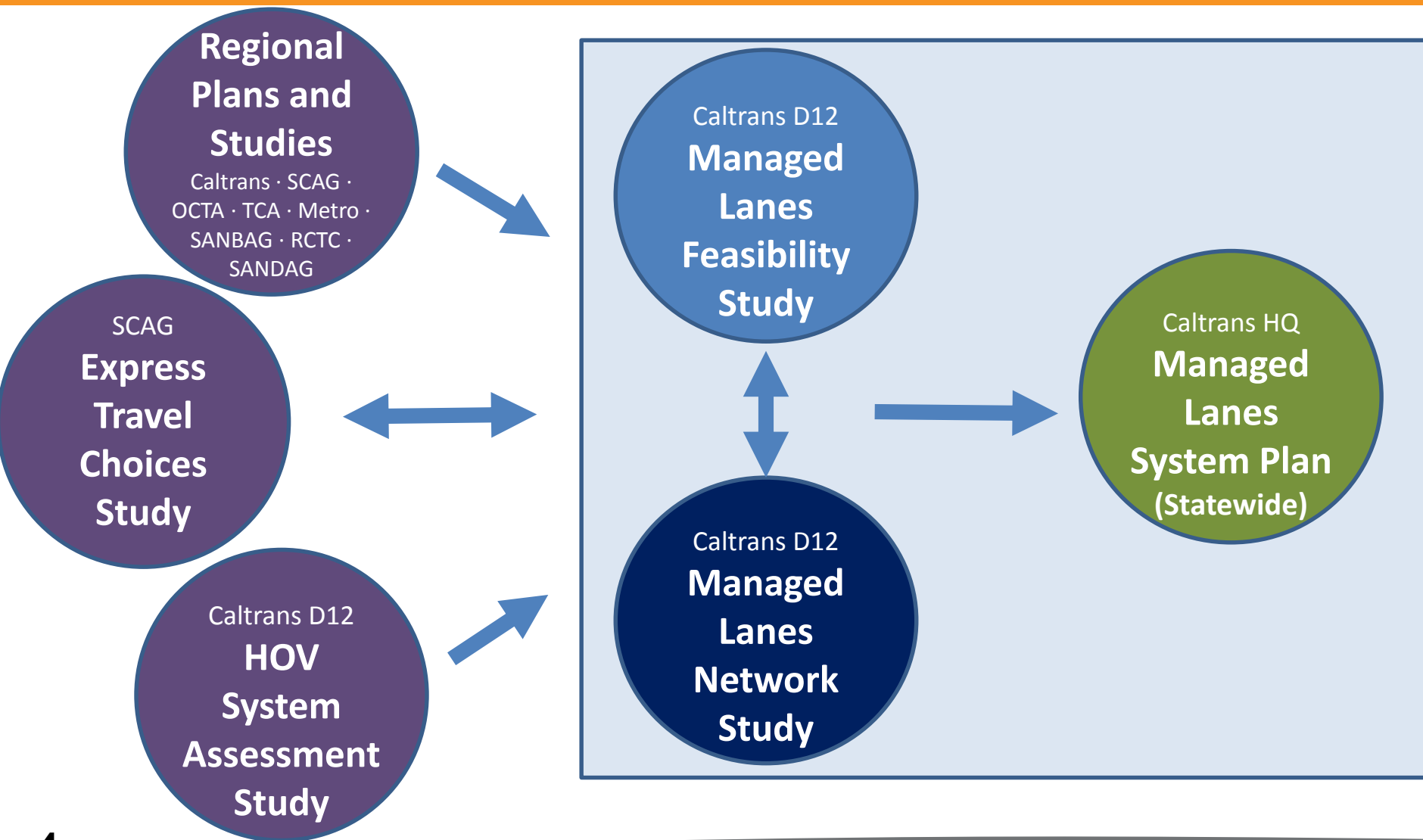
OVERVIEW

WHY NOW?

- Managed Lanes Planning
 - California Transportation Plan 2040
 - Caltrans Policy (Deputy Directive 43-R1)
- HOV Degradation



MANAGED LANES STUDIES



EVALUATION

Data

- OCTAM – OCTA model
- PeMS – Caltrans database

Analysis

- DTRAM – managed lanes modeling for demand, operations and revenue

Collaboration

- Representatives from FHWA, SCAG, OCTA, TCA, Caltrans HQ/Districts, Business Community and Public



EVALUATION SCENARIOS

Scenario 1 (“Single-Lane HOT”)

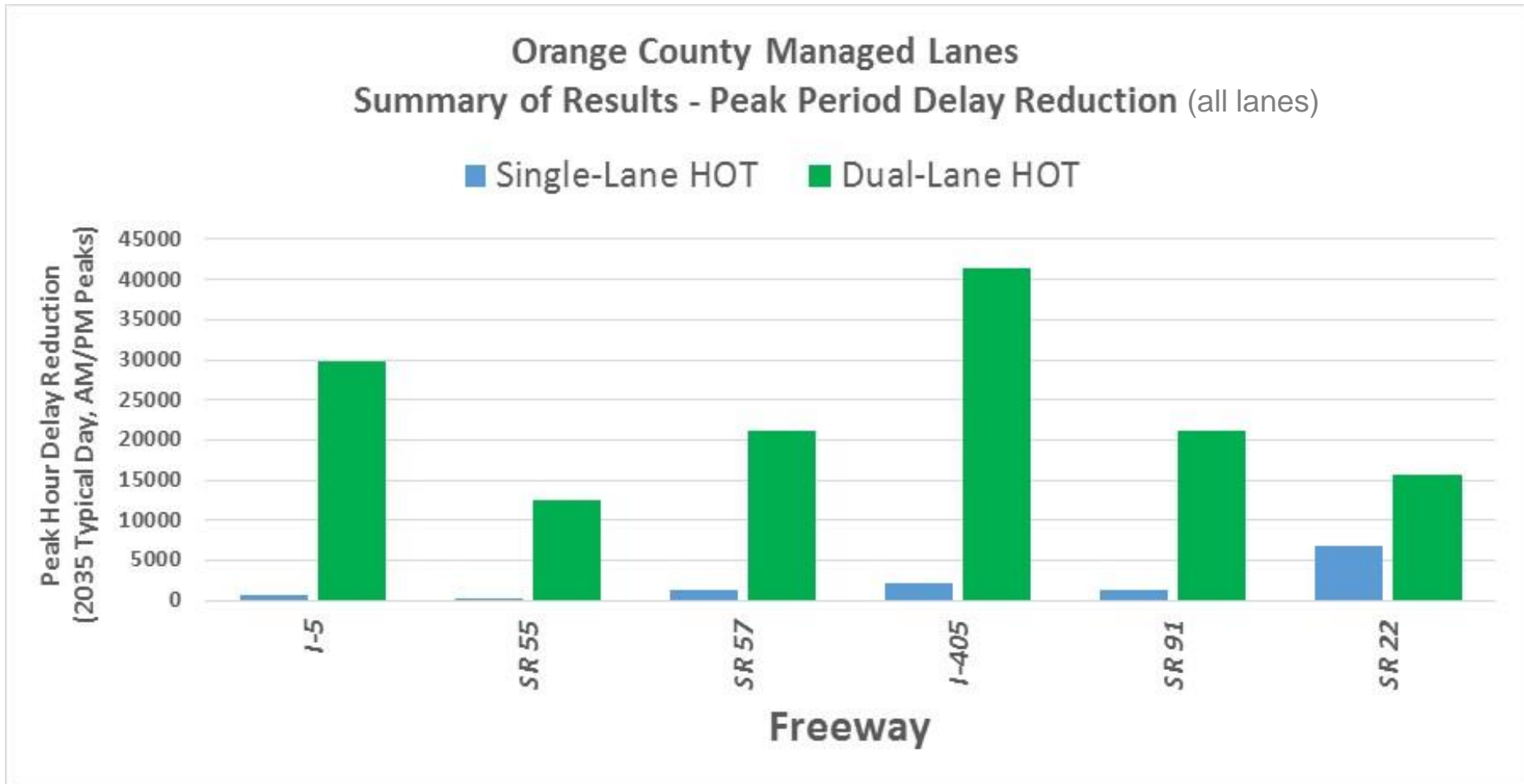
- **Convert** existing (HOV-2+) to Express Lanes (HOT-3+)

Scenario 2 (“Dual-Lane HOT”)

- **Add lanes** to create two managed lanes in each direction.

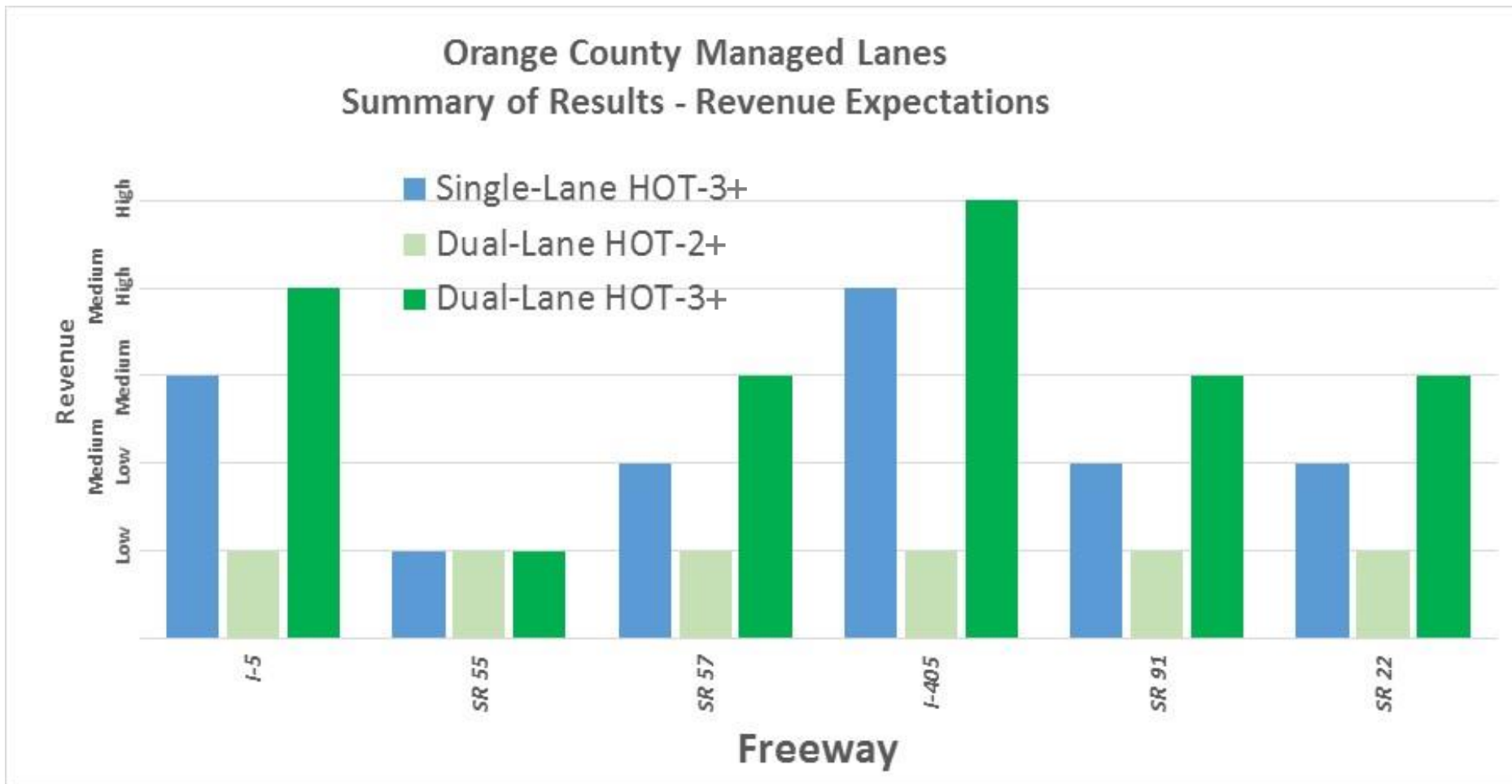
RESULTS: DELAY IMPROVEMENTS

Throughout the peak periods, how much less time will vehicles be stuck in traffic?

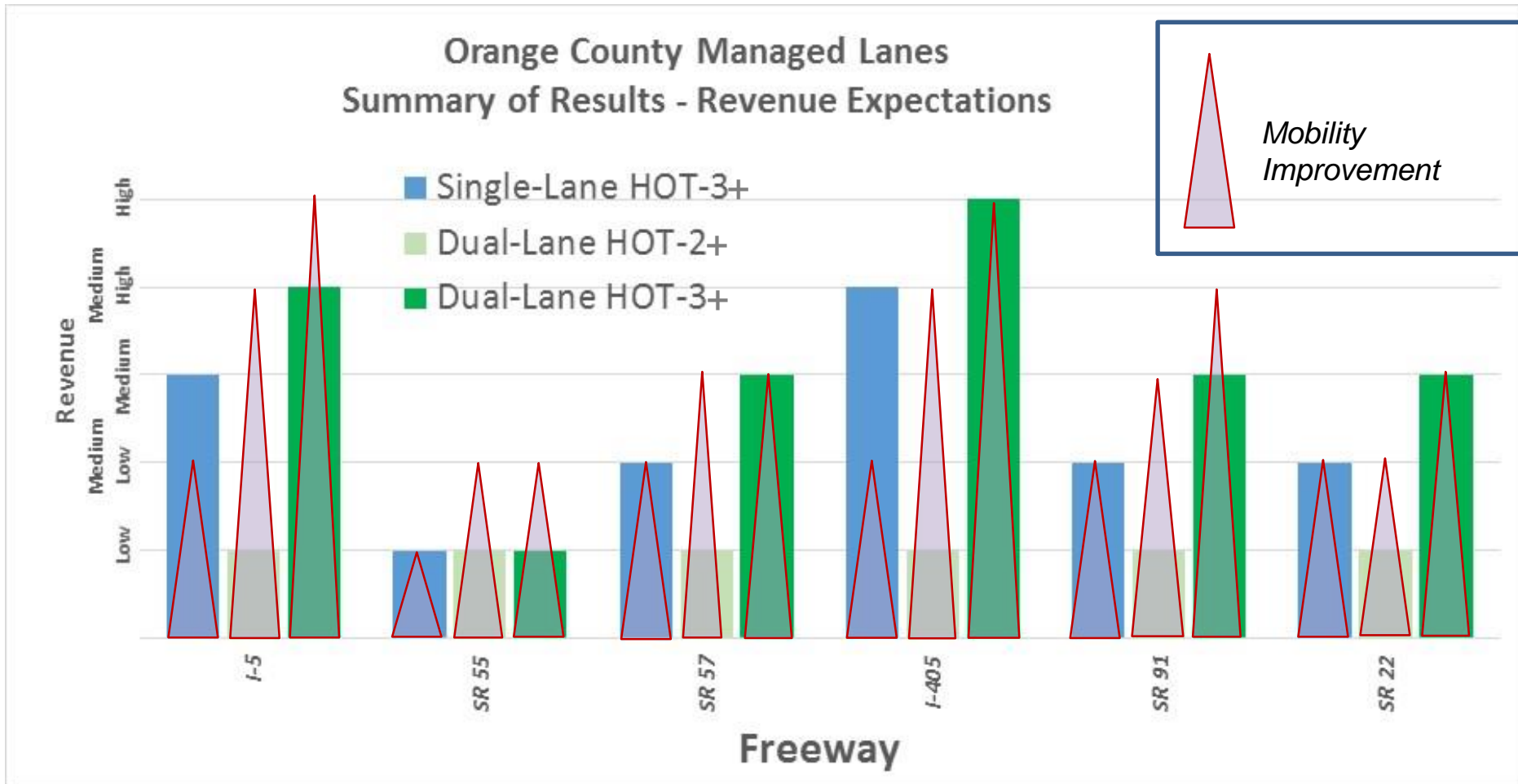


RESULTS: TOLL REVENUE

What toll revenue is expected?



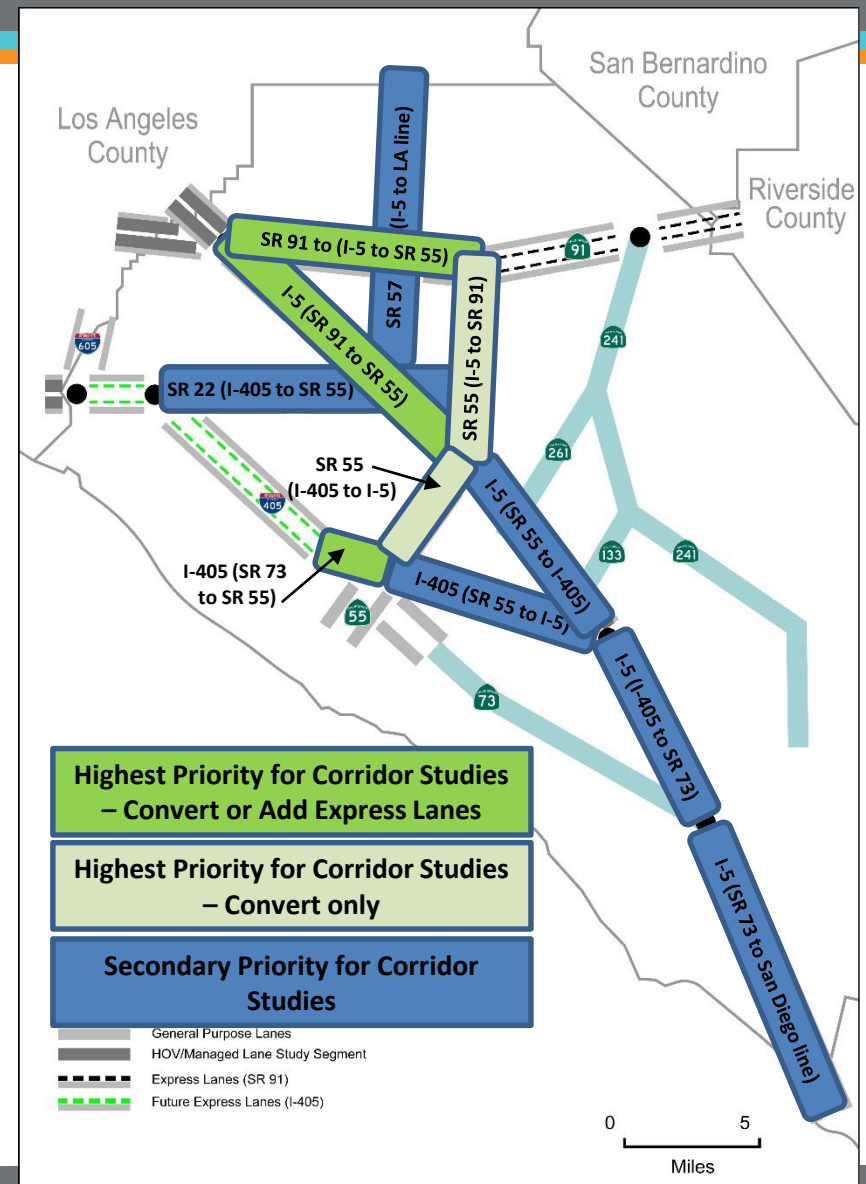
RESULTS: REVENUE AND MOBILITY BENEFITS



RECOMMENDED CORRIDORS

Evaluation Measures

- Managed lanes operations
- Speed and delay
- Funding (revenue vs. cost)
- Connectivity and system integration
- Stakeholders and policy
- Independent function



NEXT STEPS

- Continue to work with regional partners
 - Consensus on priority corridors (Early 2017)
 - Initiate PSRs/Corridor Studies (Late 2017)

Planning
Studies



Project
Initiation



Project
Approval /
Environmental
Document
(PA/ED)



Plans,
Specifications,
& Estimates
(PS&E), and
Right of Way



Construction



QUESTIONS AND DISCUSSION

Orange County Managed Lanes Network Study

Summary of Findings and Implementation Plan



Prepared for



Prepared by



6 Hutton Centre Drive, Suite 700
Santa Ana, CA 92707

September 2016

Table of Contents

Summary of Findings and Implementation Plan – Orange County Managed Lanes Network Study..1

1.	Background.....	1
2.	General Benefits of Express Lanes	7
3.	Approach for Analyzing Managed Lanes.....	9
3.1	Evaluation Scenarios	10
3.2	Evaluation Measures.....	11
3.3	Evaluation Tools	12
4.	Evaluation Results	14
5.	Implementation Priorities	19
	Technical Reference 1: Literature Survey.....	22
	Technical Reference 2: Caltrans Deputy Directive DD-43-R1.....	22
	Technical Reference 3: Stakeholders	22
	Technical Reference 4: OCTAM Modeling Request.....	22
	Technical Reference 5: Performance Measures for Managed Lanes.....	22
	Technical Reference 6: Approach for Analyzing Managed Lanes	22
	Technical Reference 7: DTRAM-ML Results	22
	Technical Reference 8: Concept of Operations.....	22

Exhibits

1	Priced Managed Lanes Example.....	1
2	Study Area Network	4
3	Speed-Flow Relationship	4
4	Orange County HOV Lanes Identified as Operationally Degraded (Either Direction, 2014 Data).....	6
5	Relevant Recent Studies (State, Regional, and District 12).....	9
6	Comparison of Managed Lanes Studies	9
7	Planning-Level Toll Demand and Revenue Analysis Modeling Approach Flow Diagram	13
8	Study Area Segmentation.....	14
9	Analysis Summary: Delay Improvements	15
10	Analysis Summary: Managed Lane Improvements	16
11	Analysis Summary: GP Speed Improvements	17
12	Analysis Summary: Toll Revenue Benefits.....	18
13	Summary Evaluation.....	19
14	Managed Lane Implementation Priorities.....	20

Tables

1	Express Lanes Operating in California	3
2	Orange County HOV Segments Identified as Operationally Degraded (Extremely, Very, or Slightly)	5
3	Evaluation Measures	11



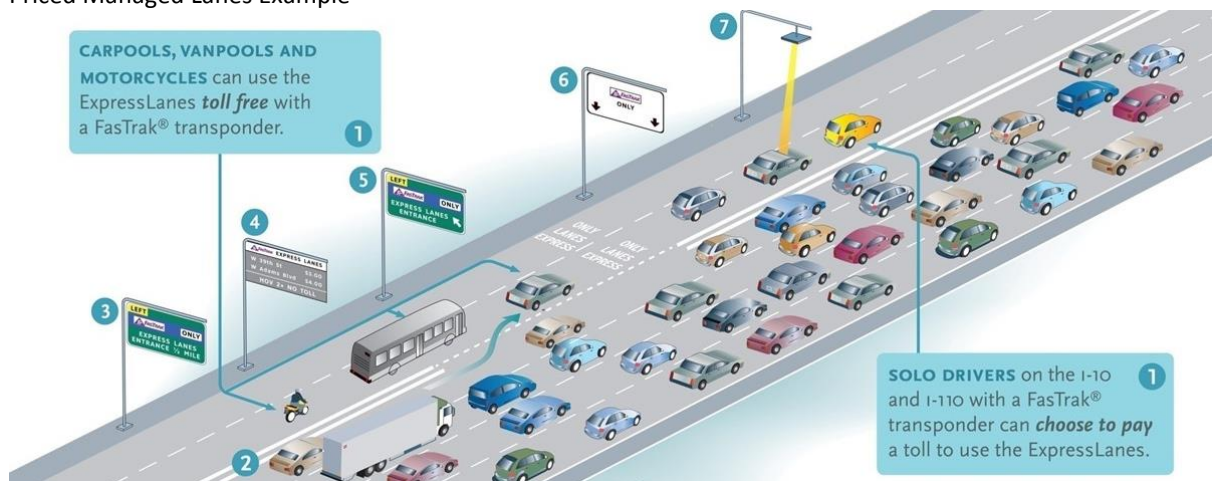
Summary of Findings and Implementation Plan – Orange County Managed Lanes Network Study

1. Background


Managed lanes are an innovative solution to managing congestion, improving safety and offering options to Orange County's traveling public. "Managed lanes" is the general term for freeway lanes that are actively managed to improve operations or utilization. This document focuses on priced managed lanes, which is a subset of managed lanes, which carry a mix of tolled and High Occupancy Vehicle (HOV) traffic. The terms priced managed lanes, High Occupancy Toll (HOT) lanes, and Express Lanes are typically synonymous with each other, with the latter being the most marketed to the general public. Exhibit 1 depicts a typical example of priced managed lanes and Technical Reference 1 is a detailed survey of recent managed lanes activities.

EXHIBIT 1

Priced Managed Lanes Example



Source: <https://www.metroexpresslanes.net/en/about/howit.shtml>



Priced managed lanes (often called "HOT" or Express Lanes) are used on the one or two left (inside) lanes. They allow carpools or drivers who pay a toll to avoid the congestion from the general purpose lanes.

Caltrans' Deputy Directive DD-43-R1 (Technical Reference 2) states that managed lanes "are used to promote carpooling and transit usage, improve travel-time reliability, reduce greenhouse gas emissions, and maximize the efficiency of a freeway by increasing person and vehicle throughput while reducing congestion and delay."

Managed lanes present the motorist with travel choices. In addition to mobility, managed lanes are consistent with other goals and objectives of Caltrans, District 12 and the Federal Highway Administration (FHWA), including safety, stewardship of the environment, and prudent financial management of public funds.

Managed lanes are implemented with tools to manage demand, such as pricing, eligibility based on occupancy and vehicle type, and physical access via striping or barriers. Ideally, the demand for the managed lane can be reduced to match the capacity and thereby ensure free-flow conditions. Priced managed lanes are a form of congestion pricing, where tolls allow operating agencies to manage excess demand during peak periods. The economic basis is that when users are forced to pay for negative impacts they create, they will be more likely to change to their behavior, thereby reducing congestion.

Orange County has extensive experience with managed facilities on the HOV network, Express Lanes and toll roads. HOV lanes first opened in Orange County in 1985, on State Route (SR) 55. The HOV lanes on Interstate 5 (I-5), SR 57, SR 91, and I-405 also have all been open for more than 20 years, and have been highly successful. All lanes operate all hours of the day with HOV-2+ requirements (vehicles with two or more occupants, including the driver, are allowed to use the lanes). There are several HOV direct connectors, direct access ramps (DARs), as well as a short two-lane section south of the El Toro “Y” on I-5, and on I-405 between SR 22 and I-605.

Orange County’s HOV network has 216 lane-miles of existing HOV lanes, more than in any other California county except Los Angeles. District 12 is also unique in that nearly all of the non-toll freeways in the County have HOV lanes. The southern end of I-5 is the longest section without HOV lanes, and most of that section is either currently under construction or in planning/design to add an HOV lane. There is a mix of limited-access and continuous striping.

Orange County has only one of seven priced managed lanes (Express Lanes) currently operating in California, on SR 91. The SR 91 Express Lanes provide two lanes in each direction for 10 miles between the SR 91/SR 55 interchange in Anaheim and the Orange/Riverside County Line. The other Express Lanes in the state are I-15 in San Diego County, I-110 and I-10 in Los Angeles County I-580, I-680, and SR 237/I-880 in the Bay Area as shown in Table 1.

Caltrans Highway Design

Manual definitions:

Managed lanes are proactively managed in response to changing operating conditions in efforts to achieve improved efficiency and performance. Typically employed on highways with increasing recurrent traffic congestion and limited resources.

(a) **High-Occupancy Vehicle (HOV) Lanes**--An exclusive lane for vehicles carrying the posted number of minimum occupants or carpools, either part time or full time.

(b) **High Occupancy Toll (HOT) Lanes**—An HOV lane that allows vehicles qualified as carpools to use the facility without a fee, while vehicles containing less than the required number of occupants to pay a toll. Tolls may change based on real time conditions (dynamic) or according to a schedule (static).

(c) **Express Toll Lanes**--Facilities in which all users are required to pay a toll, although HOVs may be offered a discount. Tolls may be dynamic or static.

TABLE 1
Express Lanes Operating in California

Express Lanes	County	Length (miles)	Number of Lanes	Free Travel Eligibility
SR-91	Orange	10	2 lanes per direction	HOV-3+*
I-15	San Diego	20	2 lanes per direction	HOV-2+
I-10	Los Angeles	14	2 lanes per direction	HOV-3+
I-110	Los Angeles	11	2 lanes per direction	HOV-2+
I-580	Alameda	12	2 lanes eastbound and 1 lane westbound	HOV-2+
I-680	Alameda	14	1 lane southbound	HOV-2+
SR 237/I-880	Santa Clara	4	1 lane per direction	HOV-2+

* Half price on Monday-Friday 4:00 PM to 6:00 PM in the eastbound direction

The network study area is shown in Exhibit 2; it highlights the various study segments. All of Orange County's freeways are included in the Managed Lanes Network Study, except for the toll roads and Express Lanes (the current lanes on SR 91 and the future I-405 Express Lanes, OCTA's M2 project that will open in approximately 2023). The Express Lanes are managed by the Orange County Transportation Authority (OCTA).

There is also a network of toll roads in Orange County, consisting of SR 241, SR 73, SR 133, and SR 261, operated by the Transportation Corridor Agencies (TCA). Tolls on these facilities vary by time of day, but the tolling is not dynamic, or responsive to demand. There are four defined tolling periods: peak hour, pre-/post-peak, non-peak, and weekend, each of which is tolled at a predefined rate. These toll roads are managed lane facilities, because variable tolling is used to address variations in the demand. The toll roads are somewhat different, however, in that all lanes are tolled and the tolls are the same regardless of occupancy. Therefore, this study is focused on the existing HOV system and the potential for conversion or construction of managed lanes facilities, and does not identify or propose toll road expansion.



Toll roads and HOT lanes are different. Toll roads charge all drivers on all lanes, and carpools do not get a discount. HOT lanes are similar to HOV lanes, but require tolls (except for carpools, which are free or discounted). HOT lanes are only on the one or two left lanes.

While HOV lanes have been successful in Orange County (and across California and the U.S.) for many years, their effectiveness is beginning to wane as demand increases. Once demand exceeds capacity, the lane becomes congested. Once this occurs, the HOV lanes is deemed "degraded", which is addressed by a federal requirement. Degradation is defined as when the average traffic speed during the morning or evening weekday peak hour is less than 45 miles per hour (mph) for more than 10 percent of the time over a consecutive 180-day period. In other words, the HOV lane's average traffic speed cannot drop below 45 mph for an average of more than two weekdays each month.



EXHIBIT 2

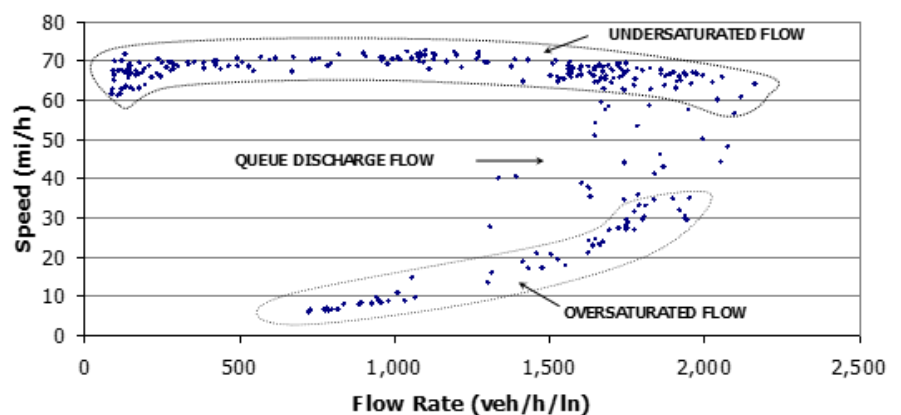
Study Area Network



EXHIBIT 3

Speed-Flow Relationship

Exhibit 3 helps explain the goals behind managing flow. On the top of the graph, as flows (demand) increase towards the maximum (approximately 2000 vehicles/hour/lane), speeds are generally maintained. However, as demand increases beyond the maximum, the system breaks down (the lower part of the graph). With higher demand, both flows




Source: Highway Capacity Manual, 6th Edition (data from Caltrans, I-405, 2008)

and speed decrease as congestion sets in. Speeds around 45 mph are the break point between free-flow operations and congestion.

Federal guidelines, including MAP-21 (the Moving Ahead for Progress in the 21st Century Act, 2012) and the FAST Act (Fixing America's Surface Transportation Act, 2015), require monitoring and remediation strategies when HOV lanes are degraded. In response, Caltrans prepares the annual *California High-Occupancy Vehicle Lane Degradation Determination Report* (the latest is 2014) to assess current performance.

Most of the HOV lanes in Orange County are degraded (see Table 2 and Exhibit 4). Based on federal guidelines, District 12 (Orange County) had approximately 20 percent of the degraded HOV lane miles statewide in 2014. Degradation in Orange County has increased from 139 lane-miles to 146 lane-miles between the first and second halves of 2014. Specifics on peak period operations and specific locations are available in the *Degradation Determination Report*. Of course, managed lane degradation is not limited to Orange County, and there are operational issues at the boundaries with other counties (particularly Los Angeles). However, the focus here is on Orange County facilities.



The status quo is not a viable option. The investment in HOV lanes in Orange County requires improvements to the system to reduce congestion and improve reliability. Those potential improvements to managed lanes are the subject of this study.

TABLE 2

Orange County HOV Segments Identified as Operationally Degraded (Extremely, Very, or Slightly)

Freeway	Direction	Begin (Interchange)	End (Interchange)	2014 Degradation*
I-5	Northbound	Junipero Serra Rd.	Oso Pkwy.	Slightly
		Bake Parkway	SR 57-SR 22	Extremely
	Southbound	Lincoln Ave.	Jeffrey Rd.	Extremely
		Bake Parkway	Junipero Serra Rd.	Slightly
SR 22	Eastbound	Magnolia St	Glassell St.	Slightly
	Westbound	Magnolia St.	I-405	Very
SR 55	Northbound	I-405	SR-91	Extremely
	Southbound	SR-91	I-5	Extremely
SR 57	Northbound	Lincoln Ave.	LA County	Very
	Southbound	LA County	I-5	Very
SR 91	Eastbound	LA County	SR 55	Extremely
	Westbound	SR 55	LA County	Extremely
I-405	Northbound	I-5	LA County	Extremely
	Southbound	LA County	I-5	Extremely

Source: http://www.dot.ca.gov/hq/traffops/trafmgmt/hov/files/degrd_rept/2014-HOV-degradation-report.pdf

*Levels of degradation: slightly (10 to 49%), very (50 to 74%) or extremely degraded (74 to 100%) of days when the average traffic speed during the morning or evening weekday peak hour is less than 45 mph

EXHIBIT 4

Orange County HOV Lanes Identified as Operationally Degraded (Either Direction, 2014 Data)



Source: http://www.dot.ca.gov/hq/traffops/trafmgmt/hov/files/degrd_rept/2014-HOV-degradation-report.pdf

2. General Benefits of Express Lanes

Caltrans' mission is to provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability. Managed lanes, including priced managed lanes, are consistent with the fulfillment of this mission. Per DD-43-R1, Caltrans uses managed lanes as a "sustainable transportation system management strategy". Express Lanes address regional growth and provide long-term congestion relief. Caltrans must focus on efficient lane management due to limited opportunities for current and future freeway expansion, as well as the need to minimize right of way impacts.

Express Lanes enhance California's sustainability and livability as follows:

- **Travel times and reliability are improved across the system.** With Express Lanes, travel times in the managed lanes will be reduced, and speed variations will become less common. Since some solo drivers will shift to Express Lanes, even drivers who stay in the free lanes can benefit.
- **Travelers have more choices.** Solo drivers can also use these lanes, allowing for the option to pay for faster trips and more reliable travel.
- **Transit use, new transit services, and carpooling are all encouraged.** Travelers are incentivized to use transit or carpools, maximizing people throughput and not just vehicle throughput. Express Lanes make the transit mode choice more attractive, encouraging the modal shift to vanpools, carpools, and buses. Toll revenue can also be used to support these strategies, encouraging the expansion of the transit system. These benefits have already been realized in San Diego County, where transit ridership has increased significantly along I-15 corridor, and new Bus Rapid Transit (BRT) service has been instituted.
- **Express Lanes help Caltrans address federal guidelines.** Degradation is nearly ubiquitous in the Orange County HOV system. The federal guidelines require monitoring and remediation strategies, and Express Lanes are an effective tool for addressing degradation.
- **The managed lanes system is more sustainable.** A priced managed lanes system is more sustainable. There were great investments into the HOV system when they were first introduced. Decades later, they have become so successful that more innovative ways are needed to sustain their effectiveness. Express lanes allow for the flexibility necessary to make the system more sustainable, and they provide for long-term mobility benefits by preserving a portion of the roadway for assured free-flow operation.
- **Caltrans and other agencies can better manage the freeway system.** With Express Lanes, Caltrans and other agencies can manage traffic volumes better and limit congestion. HOV lanes alone are not flexible enough to be an effective tool for active management.
- **Safety is enhanced.** Harmonizing speeds across lanes by reducing stop/starts in the managed lanes and minimizing mainline bottlenecks can significantly reduce the number and frequency of incidents during peak periods. This has been demonstrated in managed lane facilities across the nation.¹
- **There are environmental benefits.** Less congestion means reduced vehicle emissions as speeds are higher and more consistent. Decreases in idling and stop-and-go driving also help improve air quality. Potential benefits include reductions in particular matter (PM), carbon monoxide (CO) and greenhouse gas (GHG) emissions.

¹ FHWA (<http://www.ops.fhwa.dot.gov/freewaymgmt/faq.htm>) notes that "studies have shown that HOV lanes are frequently as safe as, and in many cases safer than, unrestricted lanes".

- **Express Lanes are consistent with regional planning goals.** Express Lanes are in alignment with goals of the Southern California Association of Governments (SCAG) Regional Transportation Plan (RTP) and Senate Bill 375 requirements. They also close the gaps in interconnectivity, providing better mobility for the entire region.
- **Express Lanes improve quality of life.** Travel time savings allow for more time spent with families, businesses to operate more efficiently, and the safe and reliable movement of goods and services, including those services from emergency responders.

3. Approach for Analyzing Managed Lanes

This study is the culmination of a series of efforts conducted by Caltrans and the Southern California Association of Governments (SCAG). Exhibit 5 illustrates the connection between this study and other relevant planning efforts.

The Managed Lanes Network Study is a companion to the Managed Lanes Feasibility Study, and it is a more region-specific assessment of managed lanes in Orange County from the SCAG Express Travel Choices Study, which examined Express Lanes throughout the SCAG region (Ventura, Los Angeles, Orange, Riverside, San Bernardino, and Imperial Counties). Exhibit 6 illustrates that the Managed Lanes Network Study is more comprehensive than the other two studies; it includes an evaluation of added priced managed lanes (not included in the SCAG study) and traffic analysis (not included in the Managed Lanes Feasibility Study).

Similar to the Managed Lanes Feasibility Study, the primary goal of the Managed Lanes Network Study is to identify specific projects to move forward in the project development process. With this report, Caltrans is also putting policies (like DD-43-R1) into practice.

EXHIBIT 5

Relevant Recent Studies (State, Regional, and District 12)

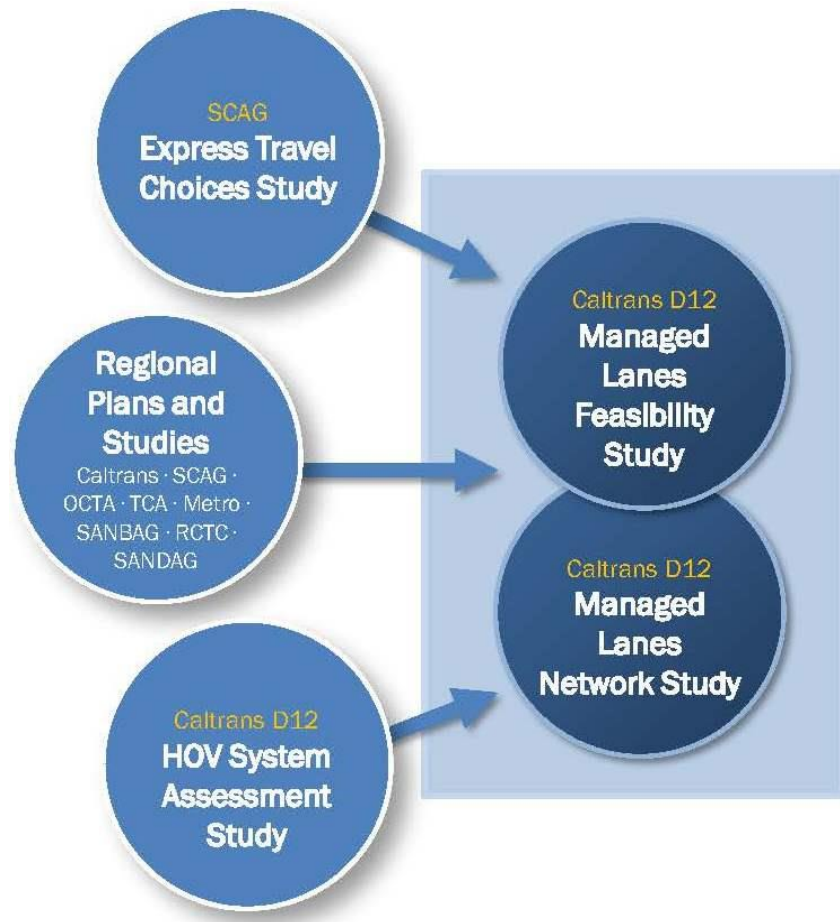
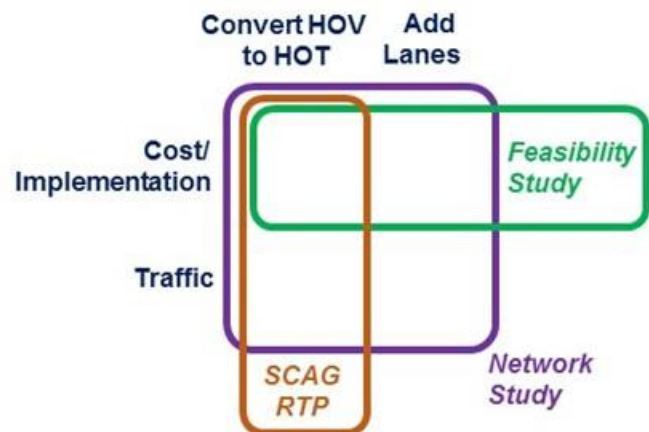


EXHIBIT 6

Comparison of Managed Lanes Studies





The ultimate goal of this study is to identify specific implementation priorities for moving forward with managed lanes projects. Both policy and current operations drive the need for improvements to the managed lanes system.

To do so, technical analysis was needed to support the recommendations. This section outlines the types of analysis that were conducted. Section 4 is a summary of the results, and Section 5 identifies the implementation plan priorities.

3.1 Evaluation Scenarios

All of the freeways in Orange County were evaluated to determine how well they would work with priced managed lanes (Express Lanes) instead of HOV lanes. Each freeway was evaluated with two scenarios², customized for each freeway:

- **Scenario 1:** Convert existing HOV lanes (2+ occupancy) to Express Lanes (vehicles with 3+ occupancy would remain free to encourage carpooling and transit). Implement limited physical/capital improvements, except for toll equipment.
- **Scenario 2:** Add lanes, as needed, to create two managed lanes in each direction. Convert new and existing HOV lanes to Express Lanes (the analysis baseline was that vehicles with 2+ or 3+ occupancy would be free³, to encourage carpooling and transit, although those details have not yet been determined.

These scenarios were compared to a future baseline network that included all programmed future projects (e.g., all of the OCTA Measure M2 projects), plus additional projects identified by stakeholders. Technical Reference 3 is a summary of the stakeholders and Technical Reference 4 is a summary of the formal modeling request. The project definitions were the result of a collaborative process among technical stakeholders from OCTA, SCAG, TCA, FHWA, Caltrans Headquarters and neighboring Districts.

The future Express Lanes on I-405 were included as a baseline project, for all scenarios including No-Build. The I-405 Express Lanes project will improve 16 miles of I-405 between the SR 73 freeway in Costa Mesa and I-605 near the L.A. County line. The project includes adding one General Purpose (GP) lane in each direction from Euclid Street to I-605, and the construction of the 405 Express Lanes (two lanes in each direction from SR-73 to I-605). The project is financially committed, and expected to be completed by 2023. It is funded with a combination of federal, state, local, and toll revenues⁴.

An HOV-2 to HOV-3 conversion scenario was considered but not included in the analysis. With this scenario, no pricing would be implemented. The only change would be to modify the occupancy requirements for carpools from HOV-2 to HOV-3. While this scenario would improve managed lanes operations, it would result in increased congestion on the GP lanes, with associated degradation of reliability, safety, and air quality. An HOV-3 scenario would also likely create “empty lane syndrome”, where drivers in the congested GP lanes would see the adjacent HOV lane with mostly available capacity.

² It is possible that both scenarios could occur on the same freeway, as part of a phased implementation plan. A project built on one freeway would have effects (positive and negative) on other freeways in the system. Individual project plans will need to address these effects, as project timing is better known.

³ A scenario with a reduced toll for HOV-2 vehicles (and free for HOV-3+) scenarios is feasible but was not explicitly analyzed. The performance of this scenario would be between the HOT-2 and the HOT-3 scenarios. The decision on tolling HOV-2s would depend on future financial plans, so further future evaluation would be needed.

⁴ More details on toll revenue can be found in Section 6.4 of Technical Reference 6.



Conversions of GP or HOV-2+ lanes to HOV-3+ facilities have rarely been implemented. FHWA guidance⁵ notes that HOV-2+ to HOV-3+ may “result in underutilization of the HOV lanes ... It is very likely that prevailing traffic congestion on general purpose lane will worsen.” One GP lane on the Santa Monica Freeway (I-10) was converted to HOV-3+ in 1976⁶. The increased congestion in the other GP lanes was not well-received by the public and the media. Eventually, a lawsuit was initiated and the lanes were restored to GP by court order. Another example that demonstrates the inefficiencies of HOV3+ conversions is the I-10 (Katy) HOV Lane⁷. The Katy HOV lanes were opened in October 1984 and only buses and vanpools were initially allowed. There were only a total of 86 vehicles using the facility during the morning peak hour. To address this low use, the lane was open to authorized HOV-4+ in 1985. The occupancy requirement was dropped to HOV-3+ later in 1985 and to HOV-2+ in 1986.

3.2 Evaluation Measures

There are many different evaluation measures that can be used for assessing priced managed lanes. For this study, six measures were used, as summarized in Table 3. A balanced set of evaluation measures is important, because not all potential improvements will address every measure. The evaluation measures are generally consistent with those used in the regional Express Travel Choices Study. Technical Reference 5 is a comprehensive assessment of performance measures for managed lanes that provides more details on evaluation.

TABLE 3
Evaluation Measures

Measure	Purpose	Measured By
Managed lanes operations	Address degradation of HOV lanes and ensure performance of Express Lanes	Predicted speed improvement in managed lanes
Speed and delay (GP lanes)	Improve operations for all freeway users; improve air quality	Speed change and delay reduction in GP lanes
Funding (revenue vs. cost)	Develop financially feasible projects that can help improve corridor operations	Preliminary toll revenue and cost estimates
Connectivity and planning	Identify projects that are consistent with regional planning priorities	Evaluation of countywide network, considering other projects
Stakeholders and policy	Identify potential conflicts with key stakeholders and their policies	Assessment of other agencies (SCAG, OCTA, TCA) and their programs
Independent function	Identify projects that can be developed independently prior to network completion	Consideration of corridor alignment and existing connectors

⁵ http://ops.fhwa.dot.gov/publications/fhwahop08034/hot1_0.htm

⁶ <http://next10.org/sites/next10.org/files/10%20High-Occupancy%20Vehicle%20Lanes.pdf>

⁷ <http://ops.fhwa.dot.gov/docs/houston/houstoncasestudy.pdf>



3.3 Evaluation Tools

The first three measures listed in Table 3 required detailed technical analysis, using advanced modeling software. Exhibit 7 is an overview of the approach for conducting the planning-level traffic forecasting and economic analysis.

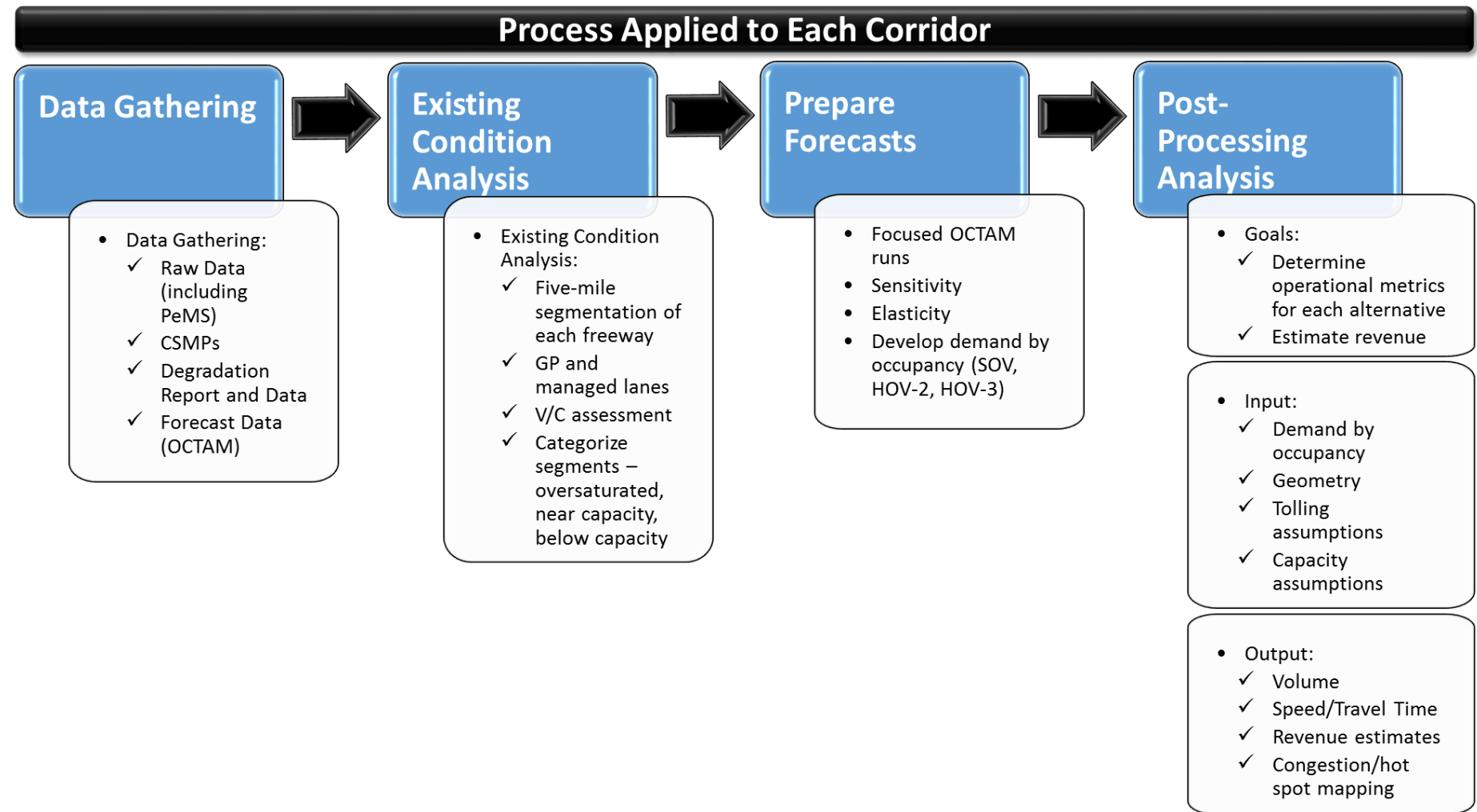
A suite of tools was used to conduct the technical evaluation. The general strategy was to apply a modeling tool that integrates and extends available models and leverages current data. The Orange County Transportation Analysis Model (OCTAM), supplemented by current data from Caltrans' Performance Monitoring System (PeMS), was the primary resource for the evaluation. The key steps were:

1. Data collection – gather information from available sources.
2. Existing conditions analysis – assess current operations as a baseline to validate the model.
3. Traffic forecasting – extract data from the OCTAM model (year 2040) for the baseline analysis (without new priced managed lanes).
4. Post-processing analysis - assess the operational metrics for each alternative and estimate demand, traffic operations, and revenue on each corridor. Key outputs include volume, speed/travel time and delay, congestion mapping, and revenue. The CH2M Desktop Traffic and Revenue Analysis Model for Managed Lanes (DTRAM-ML) was used for the analysis.

Technical Reference 6 is a summary of these technical details.

EXHIBIT 7

Planning-Level Toll Demand and Revenue Analysis Modeling Approach Flow Diagram



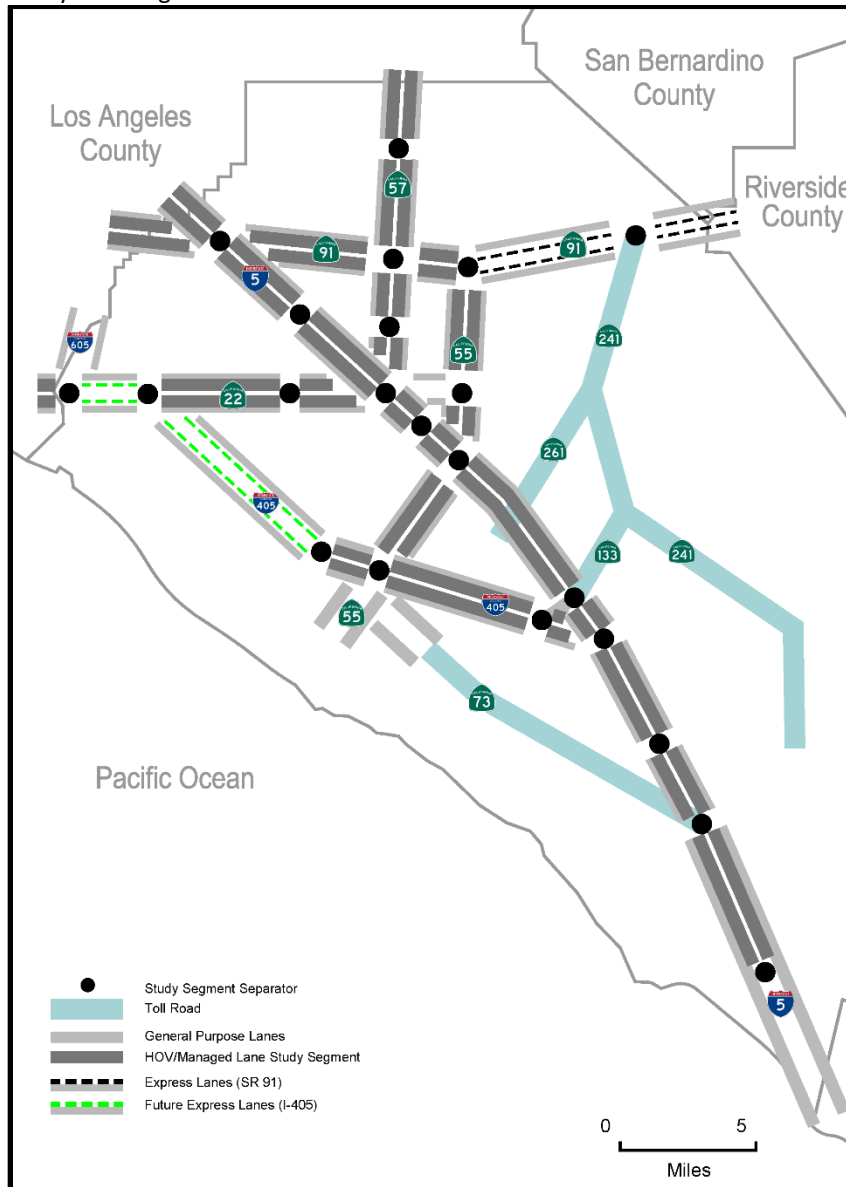
4. Evaluation Results

The DTRAM-ML analysis of managed lanes scenarios resulted in an extensive data set. Variables in the analysis are as follows:

- Segments: up to 11 segments, depending on the freeway, as illustrated in Exhibit 8.
- Directions: northbound/southbound, or eastbound/westbound
- Study periods: AM, midday, PM, and night-time
- Year: 2010 to 2075 (2035 was used as the typical horizon year)
- Freeway element: Managed and GP lanes
- Mode: Single-occupancy vehicle (SOV), HOV-2, HOV-3+, and truck

EXHIBIT 8

Study Area Segmentation



For a single scenario, the demand, volume/capacity (V/C), and speed were calculated. For I-5 alone, the calculations resulted in over 46,000 individual base calculations (not including iterations), or well over one million calculations for all scenarios. The resulting database, which totaled approximately 500 megabytes of data, was summarized by corridor and scenario.

Note that the existing Express Lanes on SR 91 (east of SR 55), and the financially committed future Express Lanes on I-405 (from SR 73 to I-605) are included in the baseline analysis. Therefore, the benefits of these Express Lanes are not part of the assessment of additional Express Lanes in these corridors. In short, the results below reflect the benefits of Express Lanes on SR 91 only west of SR 55, and on I-405 only south of SR 73.

Exhibit 9 is a summary of the delay reduction benefits, which include delay savings on both the managed and GP lanes. The graph includes data for the peak period (either AM or PM) for the entire corridor. Higher numbers indicate where Express Lanes will reduce delay the most, for all drivers (Express and GP). The delay savings are much greater for Scenario 2, where a second managed lane is added, providing substantial additional capacity. Technical details can be found on pages TR-92 to TR-262 in Technical Reference 7.

EXHIBIT 9

Analysis Summary: Delay Improvements

Delay: Throughout the peak periods, how much less time will vehicles be stuck in traffic?

Priced managed lanes will reduce overall delay for the aggregate of all vehicles, on all freeways in Orange County. The biggest reductions will be on the congested I-5 and I-405 freeways. More congestion reduction is projected when a second managed lane can be added.

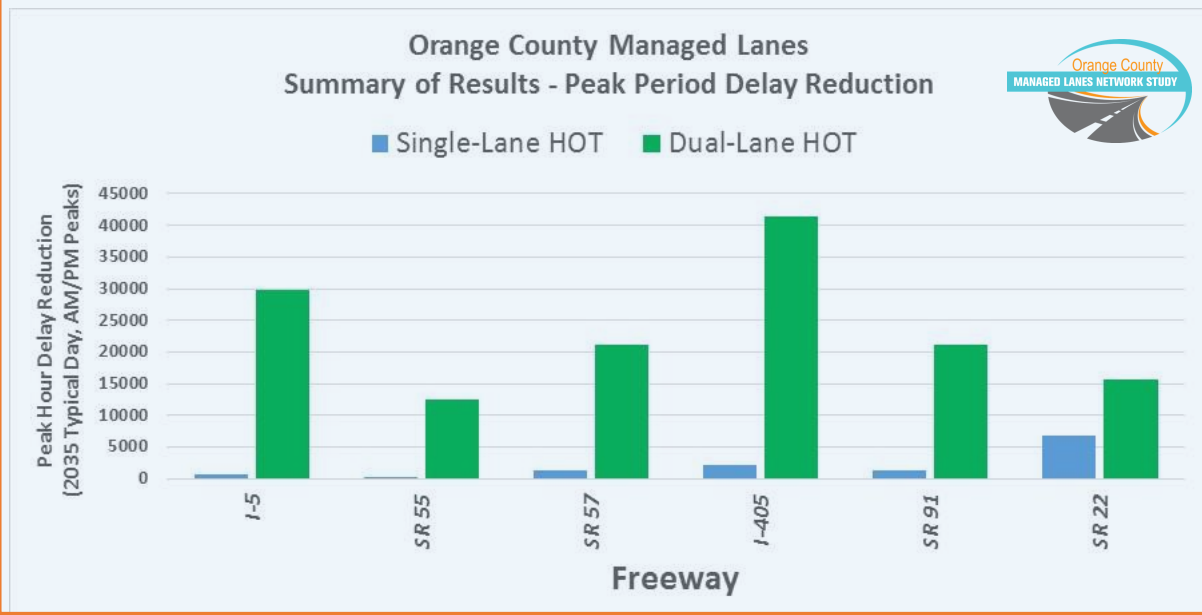


Exhibit 10 is a summary of how well the managed lanes will achieve the primary goal of addressing degradation. The graph includes a proxy estimate of the reduction in degradation in the two peak periods (AM and PM) for managed lanes in each corridor. The differences reflect how well Express Lanes can address degradation in the often-congested HOV lanes. Higher numbers indicate where Express Lanes will reduce degradation the most. The benefits are somewhat greater for Scenario 2, where a second managed lane is added, although the change from HOV-2 to HOT-3 in Scenario 1 still provides substantial benefits. On I-5, the degradation benefits are comparable to those of Scenario 1, primarily because of the high vehicle occupancy on that freeway. Technical details can be found on pages TR-92 to TR-262 in Technical Reference 7.

EXHIBIT 10

Analysis Summary: Managed Lane Improvements

ML Operations: How much will Express lanes eliminate degradation on the managed lanes?

Priced managed lanes will eliminate future degradation on the congested HOV lanes on the I-5, SR 57 and I-405 freeways the most. For both scenarios, speeds will get better with pricing, so managed lanes drivers will have more reliable trips. Adding the second managed lane will improve speeds even more.

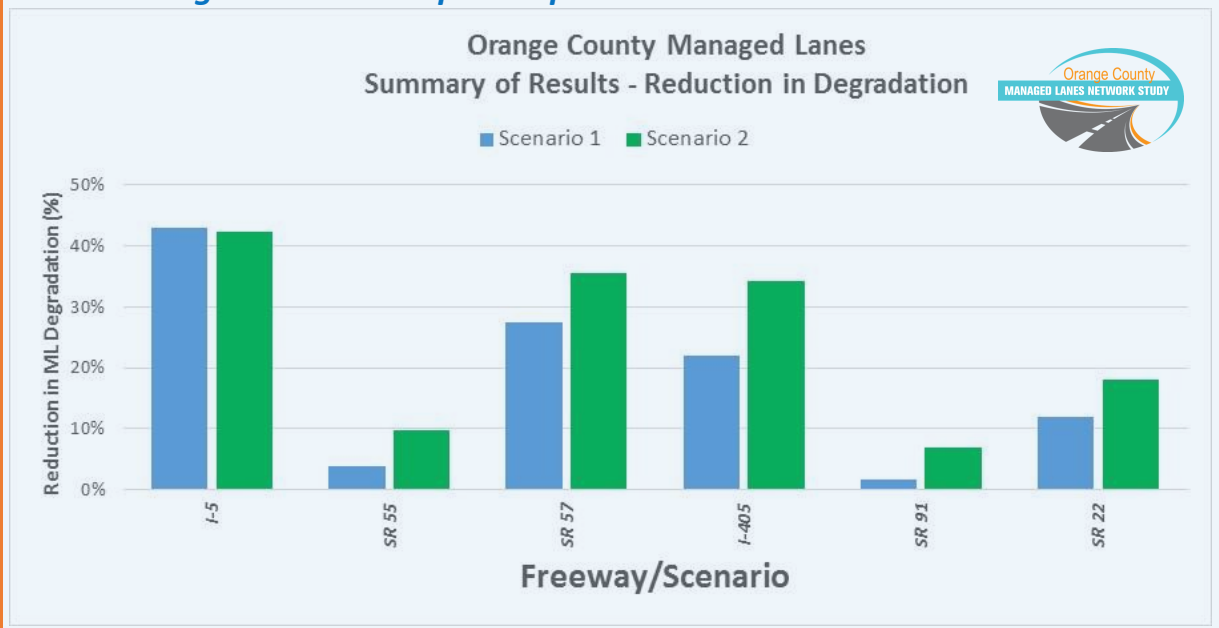


Exhibit 11 is a summary of the speed benefits for the GP lanes. The graph includes data for the peak periods (both AM and PM) for the entire corridor. Higher numbers indicate where Express Lanes will increase speed the most for the GP lanes. There are generally only speed benefits for Scenario 2, where a second managed lane is added, providing substantial additional capacity. Technical details can be found on pages TR-92 to TR-262 in Technical Reference 7.

EXHIBIT 11

Analysis Summary: GP Speed Improvements

Speed: How will speeds change for General Purpose (GP) lanes users?

Priced managed lanes will have a modest effect on GP speeds unless a second managed lane is added (Scenario 2). Scenario 1 speed changes are near zero because some HOVs shift to the GP lanes (counterbalancing paying SOVs shifting to the managed lanes). GP speeds in Scenario 2 are markedly higher.

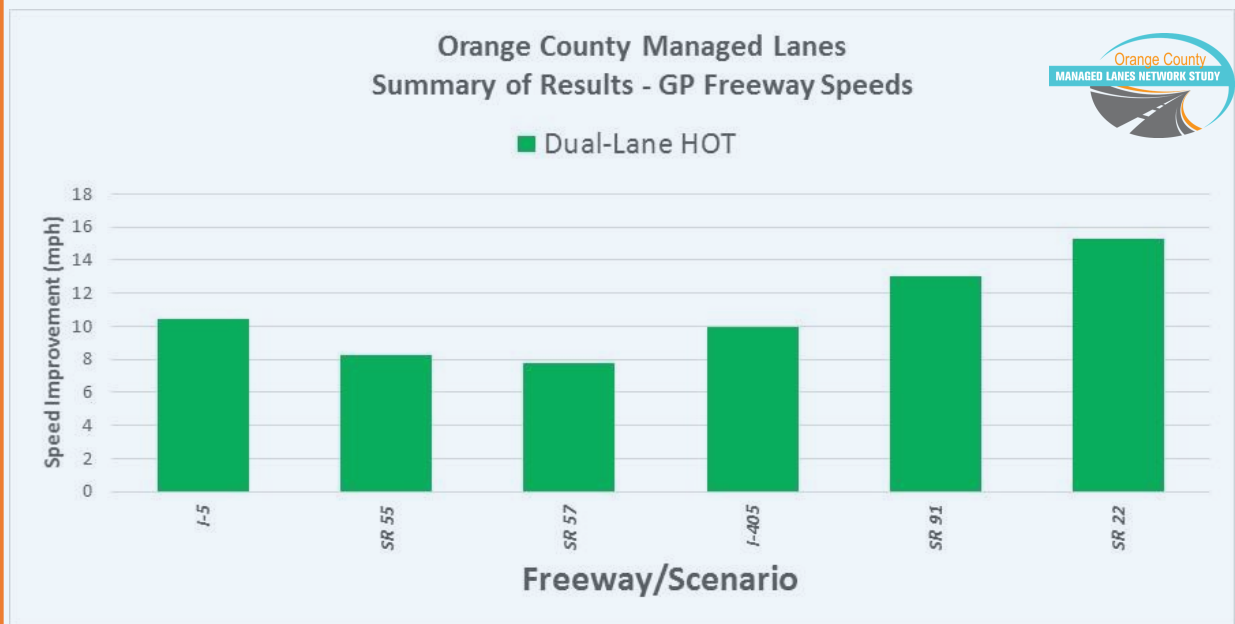


Exhibit 12 is a summary of the expected toll revenue benefits. The graph includes an assessment of annual revenue for each freeway. The DTRAM-ML model includes a toll estimation module, but the projections are less detailed than typical projections with a Traffic and Revenue (T&R) Study. However, DTRAM-ML is accurate for comparing revenues between scenarios because the assumptions are consistent in each analysis. Those revenue projections are presented in Exhibit 12 on the vertical axis (from low to high).

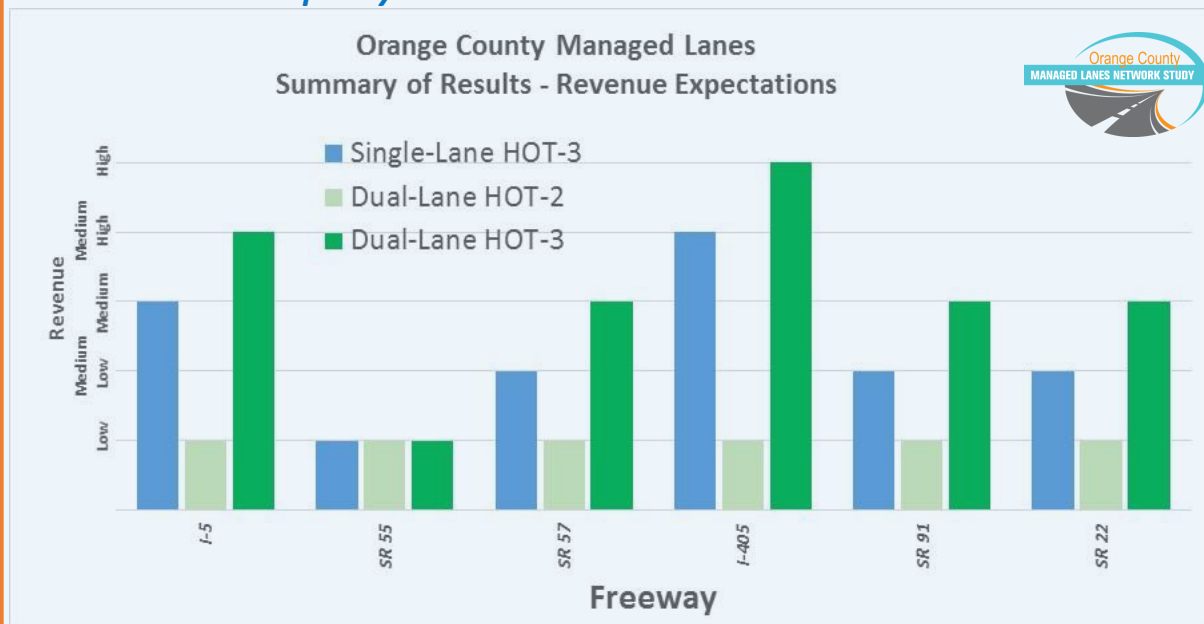
Scenario 1 is shown in blue, and the two Scenario 2 options are shown in green. The Scenario 2 HOT-2 option (light green) has the lowest expected revenue because the available capacity in the Express Lanes will serve more free HOV-2s. The Scenario 2 HOT-3 option (dark green) has the highest expected revenue because of the number of vehicles (SOV and HOV-2) who will pay to use the available capacity in the managed lanes. Technical details can be found on pages TR-92 to TR-262 in Technical Reference 7.

EXHIBIT 12

Analysis Summary: Toll Revenue Benefits

Revenue: What toll revenue is expected?

Priced managed lanes will provide additional funding to operate and maintain the existing freeway and support transit services in the corridors that they serve. Scenario 2 revenue is highest when HOV-3+ occupancy is used.



5. Implementation Priorities

The goal of this study is to determine which freeways will do best overall, and make those a priority when implementing priced managed lanes. The results in Section 4 indicate that some freeways under certain scenarios will perform better for some (but not all) of these measures.

Exhibit 13 highlights results from a combined rating and ranking exercise. Each of the performance measures described in Section 4 was evaluated on a 1-100 scale, and then combined for each freeway and scenario. From there, the ratings were converted to a *Consumer Reports*-style assessment.

The freeway corridors were assessed for the Scenario 1 (conversion) and Scenario 2 (added managed lane) evaluations. The technical (modeling) results were very different for Scenario 1 and Scenario 2, so the two separate evaluations were conducted. The technical comparisons between the two evaluations in Exhibit 13 were independent. A “best” performance rating for Scenario 1 may not be as good as a “good” or “fair” performance rating for Scenario 2, because of the additional capacity as part of Scenario 2. The approach was to compare corridors with similar investments.

EXHIBIT 13

Summary Evaluation

Summary by Freeway

Scenario 1: HOV->HOT Conversion Only

	I-5	SR 55	SR 57	I-405	SR 91	SR 22
Managed Lanes Operations	●	●	●	●	●	●
Speed and Delay	●	●	●	●	●	●
Funding (Revenue vs. Cost)	●	●	●	●	●	●
Connectivity and Planning	●	●	●	●	●	●
Stakeholders and Policy	●	●	●	●	●	●
Independent Function	●	●	●	●	●	●

Scenario 2: Added Managed Lane, for Two HOT Lanes

	I-5	SR 55	SR 57	I-405	SR 91	SR 22
Managed Lanes Operations	●	●	●	●	●	●
Speed and Delay	●	●	●	●	●	●
Funding (Revenue vs. Cost)	●	●	●	●	●	●
Connectivity and Planning	●	●	●	●	●	●
Stakeholders and Policy	●	●	●	●	●	●
Independent Function	●	●	●	●	●	●

●	Best performance/fewest challenges
●	Good performance/minor challenges
●	Fair performance/some challenges
●	Poor performance/major challenges

The last step was to translate the evaluation into implementation priorities. The timeline for project development (from project initiation through environmental documentation through final design through construction) can be several years, and securing funding may add even more time. Therefore, 15-year time periods were used to prioritize improvements. Therefore, implementing managed lanes on the highest priority corridors should be initiated as soon as practical, to complete construction before 2030. The second tier of projects would likely not be considered until after 2030.

Exhibit 14 is the final summary of implementation priorities (primary and secondary) for the corridors in Orange County. The table was developed by considering the technical analysis and input from stakeholders. The assessment of these implementation priorities was based on the assessment in Exhibit 13, comparing across freeways and between the two scenarios. Then, synergies among corridors were considered, to get to a package of corridors for each set of priorities.

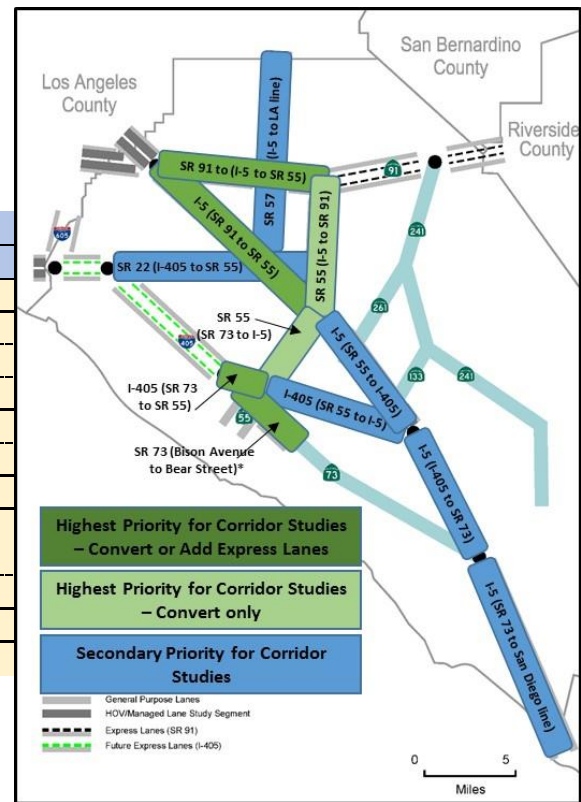
There are different priorities for SR 55 for the convert vs. add lanes scenarios, due to differences in the performance from the modeling findings. For all of the other corridors, the findings are consistent.

EXHIBIT 14

Managed Lane Implementation Priorities

Segment	Convert		Add Lanes	
	Priority		Priority	
	1	2	1	2
I-5: SR 91 to SR 55	☑		☑	
I-5: SR 55 to SR 73		☑		☑
I-5: SR 73 to San Diego line		☑		☑
SR 55: SR 73 to I-5	☑			☑
SR 55: I-5 to SR 91	☑			☑
SR 57: I-5 to LA line		☑		☑
I-405: SR 73 to SR 55 and SR 73: Bison to Bear*	☑		☑	
I-405: SR 55 to I-5		☑		☑
SR 91: SR 55 to I-5	☑		☑	
SR 22: I-405 to SR 55		☑		☑

*Include consideration of SR 73 north (Bison Avenue to Bear Street) in future project development studies and plans



The end result is a set of recommended corridors to prioritize in the next phase of the project development process. I-5, SR 91, SR 55, and I-405 should be strongly considered for moving forward in the project development process, with a goal of completed construction by 2030 or earlier. Conversion to Express Lanes, including a second lane where feasible, are recommended on:

- I-5 north of SR 55
- SR 91 from the existing Express Lanes, west to I-5
- SR 55 from SR-73 to SR 91
- I-405 from SR 73 to SR 55 (potentially including SR 73 from Bison Avenue to Bear Street)



All of the recommended corridors result in clear benefits with the implementation of Express Lanes, for both the system and individually. As a system, the corridors will form a north-south connection between the existing SR 91 Express Lanes and the new I-405 Express Lanes that will be built by 2023. Proceeding forward, the intent is that the findings of the study will serve as one of the various sources that will help drive the region's planning documents, including but not limited to future RTP and Long

Range Transportation Plan (LRTP) amendments/revisions. Individually, the key reasons for recommending each corridor for moving forward to the next stage of the project development process are:

- **I-5** ranks very high on improving operations (by reducing speed and delay) on both the managed and GP lanes. As the longest corridor in Orange County, it will also function well as a stand-alone Express Lane corridor, while also connecting to SR 55 and SR 91.
- **SR 91** is the logical extension to the existing Express Lanes to the east (which are being extended into Riverside County). The operations benefits are clear, and it should be well-received by stakeholders because of the existing Express Lanes.
- **SR 55** will see clear benefits for all users if Express Lanes are implemented. As the central spine freeway in the County, SR 55 is an essential piece of the puzzle, and will connect to several other Express Lanes corridors (I-405, I-5, and SR 91).
- **I-405** is the logical extension to the upcoming Express Lanes to the north, which are expected to be completed by 2023. Like SR 91, extending these Express Lanes (and connecting them to SR 55, where there are already managed lanes connectors at the system interchange) is a logical next step. The north end of SR 73 does not have managed lanes, although the freeway was built with sufficient pavement width for HOV or other managed lanes in the median. With the connection to I-405, SR 55, and the SR 73 toll road, Caltrans and the other stakeholders have identified this section as a high priority for Express Lanes consideration. Coupling it with the segment of I-405 (from SR 73 to SR 55) would be a natural fit for a corridor study.

To support the managed lanes network concept, an initial concept of operations (ConOps) has been developed. While it is the first ConOps and covers a broad range, it can serve as the starting point for corridor-specific ConOps throughout the County. The initial ConOps is attached as Technical Reference 8.

Other projects should be considered for implementation in the 2030 to 2045 timeline. While there are benefits in these corridors, the operations, connectivity, and policy issues suggest that they should be a lower priority. Also, regardless of the priority for implementation, all priced managed lanes projects should include monitoring and enforcement programs. Partnership meetings and public workshops should also be included.

In summary, there are clear benefits associated with improving the managed lanes system in Orange County. Converting to Express Lanes (HOT lanes) will help ensure that the investment in HOV lanes can be used as intended: to provide travel time benefits for carpools and transit users. Caltrans and other agencies will be able to better manage the freeway system, and travel time/reliability will be markedly improved. With the implementation of a more robust managed lanes network, travelers will have more choices. As transit use and carpooling become more attractive, they will be encouraged. With improvements in traffic flow, safety and the environment will be enhanced. Finally, Express Lanes will help Caltrans address federal guidelines for degradation. Moving towards two Express Lanes in each direction is ideal, but intermediate projects to convert lanes will also provide noticeable benefits.



New and expanded Express Lanes in the I-5, SR 91, SR 55, and I-405 corridors will help address degradation, improve corridor operations, advance network connectivity, and will be fiscally responsible. Project Initiation Documents (PIDs) should be started to further develop and refinement improvements in these corridors, and move toward implementation.



Technical Reference 1: Literature Survey

Technical Reference 2: Caltrans Deputy Directive DD-43-R1

Technical Reference 3: Stakeholders

Technical Reference 4: OCTAM Modeling Request

Technical Reference 5: Performance Measures for Managed Lanes

Technical Reference 6: Approach for Analyzing Managed Lanes

Technical Reference 7: DTRAM-ML Results

Technical Reference 8: Concept of Operations

All technical references are provided as separate attachments.





Express Lane Planning and Implementation Principles

User Experience

1. Express lane projects shall be designed and implemented to provide safe, reliable, and predictable travel times.
2. Express lanes shall be planned and implemented to support improved regional connectivity.
3. Design and management of the interface of express lane facilities with existing freeway, high-occupancy vehicle, and express facilities shall seek to achieve a consistent, seamless user experience.

Existing System

4. Express lane projects shall not be implemented to replace committed projects to be funded with local transportation sales tax revenues.
5. Although Caltrans and Federal Highway Administration control highway operations, OCTA does not intend to replace existing mixed-flow freeway lanes with express lanes.
6. Existing high-occupancy vehicle lanes may be functionally encompassed within an express lane project, provided:
 - a. The total number of lanes is increased by the project; and
 - b. Both vehicle throughput and average vehicle occupancy levels can be maintained and/or improved.

Operations

7. Express lane operations policies shall:
 - a. Assure coverage of capital and operations costs as well as maintenance responsibilities.
 - b. Maximize overall corridor throughput and efficiency through congestion pricing.
 - c. Promote increased average vehicle occupancy, including incentives for carpools, vanpools, and transit services.

Revenues

8. Any express lane project revenues in excess of what is needed for annual debt payments, financing requirements, and operations responsibilities shall be used for congestion relief projects and expanded transit options in the same corridor area.
9. Continued operations of express lanes, beyond bond retirement dates, shall be subject to demonstrated congestion relief measured by vehicle throughput and average vehicle occupancy levels in the corridor.



ORANGE COUNTY TRANSPORTATION AUTHORITY

Toll Lane Planning and Implementation Principles

Transmittal



BOARD COMMITTEE TRANSMITTAL

December 12, 2011

To: Members of the Board of Directors
From: Wendy Knowles, Clerk of the Board *WK*
Subject: Toll Lane Planning and Implementation Principles

Board of Directors' meeting of December 5, 2011

Present: Chairman Bates, Directors Amante, Bankhead, Campbell, Cavecche, Crandall, Dalton, Galloway, Hansen, Hennessey, Herzog, Moorlach, Nguyen, Pulido, Quon, and Winterbottom
Absent: Vice Chair Glaab and Director Nelson

Board Vote

A vote was not taken; by consensus, the Board's direction was to return this matter to the December 12, 2011 Board meeting.

Board Recommendation

Adopt the revised Express Lane Planning and Implementation Principles.

Board Discussion

On December 5, 2011, the Board of Directors (Board) discussed proposed toll lane planning and implementation principles and requested staff to make a few modifications and return with revised principles for Board action.

The revised document is attached, along with the original staff report. The revised principles 1) refer to "toll lanes" as "express lanes" to distinguish from traditional toll roads; 2) address maintenance and operations "responsibilities" instead of "costs" to accommodate future negotiation on these issues; and 3) reinforce the use of congestion pricing to ensure efficient operations.



BOARD COMMITTEE TRANSMITTAL

While there was discussion regarding express lanes and voter-committed projects, no changes were made in this regard because the language protects against "bait and switch" concerns and the agency continues to be on a path to deliver the commitments to the Measure M2 voters. Any future considerations regarding sales tax funding shortfalls can be addressed in the future through amendments to the principles and/or the Measure M2 Ordinance No. 3, if proven to be necessary.

Also, there was discussion regarding the need for additional financial guarantees, should express lanes not meet the initial financial projections. Staff believes this concern can be best addressed when project level details regarding costs, patronage estimates, revenues, funding sources, and financing are available and can be properly analyzed.

Lastly, language was added to clarify that highway operation is the ultimate responsibility of state and federal departments of transportation while expressing the clear intent that express lanes will not replace existing mixed flow freeway lanes. Staff believes the revised guidelines address the major points of discussion and recommends approval.



ORANGE COUNTY TRANSPORTATION AUTHORITY

Toll Lane Planning and Implementation Principles

Transmittal



BOARD COMMITTEE TRANSMITTAL

December 12, 2011

To: Members of the Board of Directors
From: Wendy Knowles, Clerk of the Board *WK*
Subject: Toll Lane Planning and Implementation Principles

Board of Directors' meeting of December 5, 2011

Present: Chairman Bates, Directors Amante, Bankhead, Campbell, Cavecche, Crandall, Dalton, Galloway, Hansen, Hennessey, Herzog, Moorlach, Nguyen, Pulido, Quon, and Winterbottom
Absent: Vice Chair Glaab and Director Nelson

Board Vote

A vote was not taken; by consensus, the Board's direction was to return this matter to the December 12, 2011 Board meeting.

Board Recommendation

Adopt the revised Express Lane Planning and Implementation Principles.

Board Discussion

On December 5, 2011, the Board of Directors (Board) discussed proposed toll lane planning and implementation principles and requested staff to make a few modifications and return with revised principles for Board action.

The revised document is attached, along with the original staff report. The revised principles 1) refer to "toll lanes" as "express lanes" to distinguish from traditional toll roads; 2) address maintenance and operations "responsibilities" instead of "costs" to accommodate future negotiation on these issues; and 3) reinforce the use of congestion pricing to ensure efficient operations.



BOARD COMMITTEE TRANSMITTAL

While there was discussion regarding express lanes and voter-committed projects, no changes were made in this regard because the language protects against "bait and switch" concerns and the agency continues to be on a path to deliver the commitments to the Measure M2 voters. Any future considerations regarding sales tax funding shortfalls can be addressed in the future through amendments to the principles and/or the Measure M2 Ordinance No. 3, if proven to be necessary.

Also, there was discussion regarding the need for additional financial guarantees, should express lanes not meet the initial financial projections. Staff believes this concern can be best addressed when project level details regarding costs, patronage estimates, revenues, funding sources, and financing are available and can be properly analyzed.

Lastly, language was added to clarify that highway operation is the ultimate responsibility of state and federal departments of transportation while expressing the clear intent that express lanes will not replace existing mixed flow freeway lanes. Staff believes the revised guidelines address the major points of discussion and recommends approval.



ORANGE COUNTY TRANSPORTATION AUTHORITY

Toll Lane Planning and Implementation Principles

Revised Attachment A

Express Lane Planning and Implementation Principles

User Experience

1. Express lane projects shall be designed and implemented to provide safe, reliable, and predictable travel times.
2. Express lanes shall be planned and implemented to support improved regional connectivity.
3. Design and management of the interface of express lane facilities with existing freeway, high-occupancy vehicle, and express facilities shall seek to achieve a consistent, seamless user experience.

Existing System

4. Express lane projects shall not be implemented to replace committed projects to be funded with local transportation sales tax revenues.
5. Although Caltrans and Federal Highway Administration control highway operations, OCTA does not intend to replace existing mixed-flow freeway lanes with express lanes.
6. Existing high-occupancy vehicle lanes may be functionally encompassed within an express lane project, provided:
 - a. The total number of lanes is increased by the project; and
 - b. Both vehicle throughput and average vehicle occupancy levels can be maintained and/or improved.

Operations

7. Express lane operations policies shall:
 - a. Assure coverage of capital and operations costs as well as maintenance responsibilities.
 - b. Maximize overall corridor throughput and efficiency through congestion pricing.
 - c. Promote increased average vehicle occupancy, including incentives for carpools, vanpools, and transit services.

Revenues

8. Any express lane project revenues in excess of what is needed for annual debt payments, financing requirements, and operations and maintenance responsibilities shall be used for congestion relief projects and expanded transit options in the same corridor area.
9. Continued operations of express lanes, beyond bond retirement dates, shall be subject to demonstrated congestion relief measured by vehicle throughput and average vehicle occupancy levels in the corridor.

Express Toll-Lane Planning and Implementation Principles

User Experience

1. Express Toll lane projects shall be designed and implemented to provide safe, reliable, and predictable travel times.
2. Express Toll lanes shall be planned and implemented to support improved regional connectivity.
3. Design and management of the interface of express toll lane facilities with existing freeway, high-occupancy vehicle, and express facilities shall seek to achieve a consistent, seamless user experience.

Existing System

4. Express Toll lane projects shall not be implemented to replace committed projects to be funded with local transportation sales tax revenues.
5. Although Caltrans and Federal Highway Administration control highway operations, OCTA does not intend to ~~Toll lane projects shall not replace existing mixed-flow freeway lanes with express lanes.~~
6. Existing high-occupancy vehicle lanes may be functionally encompassed within an express toll lane project, provided:
 - a. The total number of lanes is increased by the project; and
 - b. Both vehicle throughput and average vehicle occupancy levels can be maintained and/or improved.

Operations

7. Express Toll lane operations policies shall:
 - a. Assure coverage of capital and operations costs as well as maintenance responsibilities.
 - b. Maximize overall corridor throughput and efficiency through congestion pricing.
 - c. Promote increased average vehicle occupancy, including incentives for carpools, vanpools, and transit services.

Revenues

8. Any express toll lane project revenues in excess of what is needed for annual debt payments, financing requirements, and operations and maintenance responsibilities ~~costs~~ shall be used for congestion relief projects and expanded transit options in the same corridor area.
9. Continued operations of express toll lanes, beyond bond retirement dates, shall be subject to demonstrated congestion relief measured by vehicle throughput and average vehicle occupancy levels in the corridor.



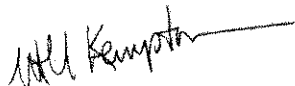
ORANGE COUNTY TRANSPORTATION AUTHORITY

Toll Lane Planning and Implementation Principles

Staff Report



December 5, 2011

To: Members of the Board of Directors 
From: Will Kempton, Chief Executive Officer
Subject: Toll Lane Planning and Implementation Principles

Overview

On October 3, 2011, the Executive Committee discussed and gave staff guidance regarding draft principles for toll lane planning and implementation. Revised principles are proposed, consistent with that guidance, for consideration by the Executive Committee.

Recommendation

Adopt the revised Toll Lane Planning and Implementation Principles.

Background

Orange County has been a state and regional leader in the modern development and application of toll facilities and toll lanes as part of the highway system. This includes the San Joaquin, Foothill, and Eastern toll roads built and operated by the Transportation Corridor Agencies and the 91 Express Lanes owned and operated by the Orange County Transportation Authority (OCTA).

In recent years, proposals for additional toll facilities have proliferated in the Southern California region. Projects directly involving Orange County include completion of the State Route 241 (SR-241) toll road in south Orange County; extension of the 91 Express Lanes into Riverside County; direct connection of the 91 Express Lanes and the SR-241 toll road in Orange County; and the consideration of express lanes on Interstate 405 from the State Route 55/ State Route 73 area to the Los Angeles County line. In neighboring areas, San Diego County plans for tolled lanes on Interstate 5 to Orange County, Riverside County plans to extend express lanes on State Route 91 and Interstate 15 (I-15), San Bernardino County is studying toll lanes on Interstate 10 and I-15, and Los Angeles County is pursuing high-occupancy toll lanes on various routes, some of which may connect directly to Orange, Riverside, and San Bernardino counties.

The Southern California Association of Governments (SCAG), in preparation for the 2012 Regional Transportation Plan update, is also conducting a study of toll lanes and the potential for a toll lane system in the SCAG region.

In order to respond to the many and varied toll lane and facility proposals, both within and potentially connecting to Orange County, staff is proposing a set of guiding principles to provide a framework for future Board of Directors (Board) decisions and negotiations in regards to the planning and implementation of toll lanes that affect Orange County's highway system and its users. These principles are meant to apply solely to new facilities implemented and/or operated by OCTA.

Discussion

The increasing consideration and application of tolled facilities and toll lanes on Southern California's highway system is driven by three main factors:

1. The continuing challenges of traffic congestion and the desire to better manage traffic demand and provide improved and more reliable mobility through additional capacity, operational improvements, and pricing;
2. The declining availability and reliability of traditional revenue sources (gas tax and sales tax) to fully pay for new highway facilities; and
3. Emerging environmental concerns and requirements, including pending new air quality and greenhouse gas reduction targets for transportation sources.

The potential for a growing network of toll lanes in Southern California, operated by multiple entities, often with different goals and policies, requires new thinking about planning, implementation, inter-connection, and operations of these facilities. This includes transportation policy issues such as the conditions under which such lanes will be considered and retained, how to treat existing facilities and entitlements such as high-occupancy vehicle lanes, or how to utilize "excess" revenues. In addition, it includes operational policies, such as performance objectives (throughput, congestion management, and revenues); design considerations, such as transitions between facilities and access points; and customer experience issues, such as toll information, varied toll rates, multiple collection technologies, and enforcement policies.

Staff is proposing eight fundamental principles (summarized in Attachment A) designed to guide the Board's approach as it considers various proposals for additional toll lanes on the highway system, whether within Orange County or connecting to the County from surrounding jurisdictions. More detailed and specific policy direction will be necessary as planning and implementation proceeds for any given facility, but these principles communicate a policy framework for project proponents, as well as initial benchmarks for evaluating the suitability of various proposals and projects.

- Principles 1 through 3 establish guidelines for defining the user experience focused on safety, reliability, connectivity, and to the extent possible, a seamless transition to and from various toll lanes and the traditional highway system. Since toll lanes are a service business, user experience and customer satisfaction must be bedrock concepts.
- Principles 4 through 6 define the fundamentals of how toll lanes should be considered in relation to the existing highway system, including keeping faith with existing voter commitments, preserving the existing mixed flow freeway lanes, and preserving the functional elements of existing high-occupancy vehicle lanes.
- Principle 7 establishes priority and benchmark criteria for operations of toll lanes, including cost recovery and maximizing mobility benefits.
- Principle 8 and 9 outline the allowable uses of revenues to be collected from tolls.

These principles have been developed based upon the experience with the 91 Express Lanes and consistent with the existing Board policies governing the 91 Express Lanes operation. As well, these principles take into account pending Board consideration of the addition of, and future connection to, new toll lanes and facilities in Southern California eventually becoming a network that complements the existing highway system.

These principles make a clear statement about the role that toll lanes should play in Orange County and the region, not as a replacement or an alternative for the highway system, but as an additional tool to address the significant challenges of managing congestion, funding transportation improvements, and preserving the quality of life for Orange County and Southern California residents and travelers.

Summary

Toll lane planning and implementation principles are presented to provide a framework for reviewing and making policy decisions on proposals for new toll lane facilities within and connecting to Orange County's highway system.

Attachment

- A. Draft Toll Lane Planning and Implementation Principles

Prepared by:

A handwritten signature in black ink, appearing to read 'Kia Mortazavi', is written over a horizontal line.

Kia Mortazavi
Executive Director, Planning
(714) 560-5741



ORANGE COUNTY TRANSPORTATION AUTHORITY

Toll Lane Planning and Implementation Principles

Attachment A

Toll Lane Planning and Implementation Principles

User Experience

1. Toll lane projects shall be designed and implemented to provide safe, reliable, and predictable travel times.
2. Toll lanes shall be planned and implemented to support improved regional connectivity.
3. Design and management of the interface of toll lane facilities with existing freeway, high-occupancy vehicle, and express facilities shall seek to achieve a consistent, seamless user experience.

Existing System

4. Toll lane projects shall not be implemented to replace committed projects to be funded with local transportation sales tax revenues.
5. Toll lane projects shall not replace existing mixed-flow freeway lanes.
6. Existing high-occupancy vehicle lanes may be functionally encompassed within a toll lane project, provided:
 - a. The total number of lanes is increased by the project; and
 - b. Both vehicle throughput and average vehicle occupancy levels can be maintained and/or improved.

Operations

7. Toll lane operations policies shall:
 - a. Assure coverage of capital and operations costs.
 - b. Maximize overall corridor throughput and efficiency.
 - c. Promote increased average vehicle occupancy, including incentives for carpools, vanpools, and transit services.

Revenues

8. Any toll lane project revenues in excess of what is needed for annual debt payments, financing requirements, and operations costs shall be used for congestion relief projects and expanded transit options in the same corridor area.
9. Continued operations of toll lanes, beyond bond retirement dates, shall be subject to demonstrated congestion relief measured by vehicle throughput and average vehicle occupancy levels in the corridor

91 EXPRESS LANES



OCTA'S 10-MILE TOLL ROAD

AT A GLANCE

HIGHLIGHTS (FISCAL YEAR 2016):

Year OCTA acquired	2003
Length of toll road (in miles)	10
Total vehicle volume (in millions)	13.8
Total customer accounts	119,782
Transponders assigned to accounts	182,522
Gross Potential Toll Revenue	\$41.9 million

WEBSITE: www.91expresslanes.com

Fact sheet as of 7/2016

HISTORY

The 91 Express Lanes is a four-lane, 10-mile toll road extending from the Orange/Riverside County line west to State Route 55. The 91 Express Lanes project was authorized as a toll road by the State of California legislature in 1989. Built at a cost of \$135 million, the toll road opened in 1995.

The California Private Transportation Company (CPTC) was the original owner of the 91 Express Lanes. An agreement with the State of California Department of Transportation (Caltrans) included a non-compete provision that created a 1.5-mile protection zone along each side of State Route 91 (SR-91). This zone prohibited improvements along the corridor and created mobility problems as the region and corresponding transportation demands grew.

To mitigate growing concerns over congestion, the Orange County Transportation Authority (OCTA) acquired the 91 Express Lanes franchise rights in January 2003. This eliminated the non-compete provision, clearing the way for future enhancements that will increase capacity and improve traffic flow along the SR-91 corridor.

TOLL POLICY

The 91 Express Lanes toll policy, known as congestion management pricing, adjusts toll rates based on the number of vehicles on the toll road to maintain a “free flow” commute at all times. Motorists pay tolls through the convenient use of windshield mounted FasTrak® transponders that automatically deduct fees from a pre-paid account. Depending on the time of day, commuters reported saving 30 minutes on average on their drive time by using the 91 Express Lanes.

FUNDING

OCTA purchased the 91 Express Lanes from CPTC for \$207.5 million, including \$72.5 million in cash and the assumption of \$135 million in taxable bonds.

In 2004, the 91 Express Lanes became the first stand-alone toll facility to receive “A” category bond ratings. In 2015, one of the bond ratings were raised to “AA” rating following a debt restructuring. A high bond rating indicates financial strength and well-managed resources and reflects the 91 Express Lane's long history, solid long-term prospects for continued traffic growth, and strong debt-service coverage.

For more information, please visit the 91 Express Lanes website at www.91expresslanes.com, or call (800) 600-9191.



Orange County Transportation Authority

550 S. Main Street
P.O. Box 14184
Orange, CA 92863-1584
(714) 560-OCTA
www.octa.net

INTERSTATE 405 IMPROVEMENT PROJECT

MILES
16 miles

CORRIDOR CITIES/COMMUNITIES

Costa Mesa, Fountain Valley, Westminster, Huntington Beach, Garden Grove, Seal Beach, Los Alamitos, the community of Rossmore, and Long Beach.

AT A GLANCE

PROJECT COST: \$1.9 billion

FUNDING: Federal & State
Local Measure M/Project K
Tolls/User Fees

**PROJECT
MANAGER:** Jeff Mills, P.E.

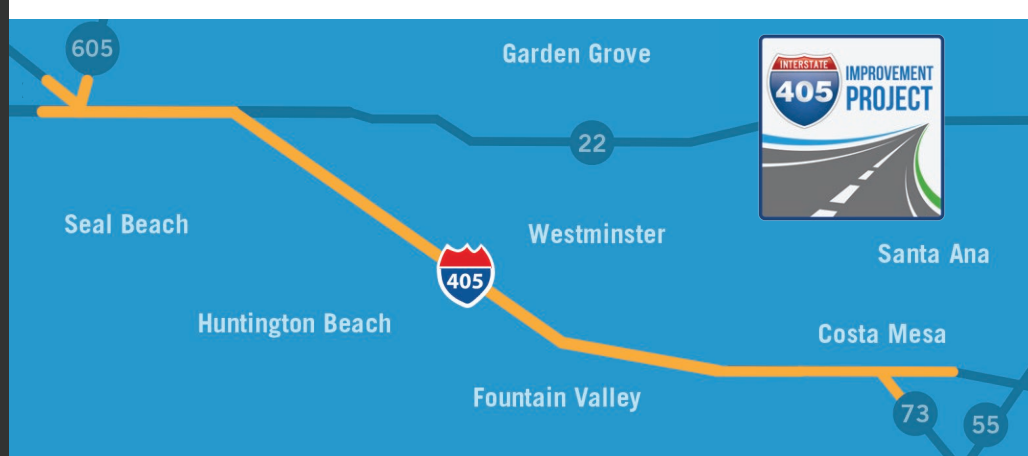
**COMMUNITY
OUTREACH:** The Community
Outreach Team
888.400.8994
405project@octa.net

WEBSITE: www.octa.net/405improvement

FACEBOOK: facebook.com/405improvement
TWITTER: @405improvement

Fact Sheet as of 5/24/17

17OC_043

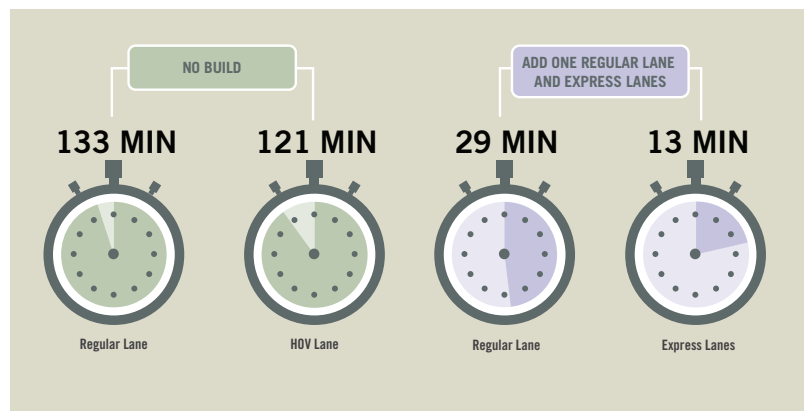


PROJECT HIGHLIGHTS

Currently, the San Diego Freeway (I-405) is one of the most congested freeways in Orange County, carrying more than 300,000 vehicle trips in some sections each day. By 2040, traffic volumes on the I-405 are expected to increase significantly. This project will increase freeway capacity, improve traffic and interchange operations, and enhance road safety to meet state and federal standards.

PROJECT STATUS / OVERVIEW

OCTA in cooperation with The California Department of Transportation (Caltrans) is widening the San Diego Freeway (I-405) between State Route 73 (SR-73) and Interstate 605 (I-605). The project will improve 16 miles of I-405 and includes adding one regular lane in each direction from Euclid Street to I-605 and making improvements to freeway entrances, exits and bridges. It also will construct the 405 Express Lanes from SR-73 to I-605. The new express lanes – incorporating the existing carpool lanes and connectors that opened in 2014 – will provide two lanes in each direction and give solo drivers the choice to speed up their commute for a toll, and carpoolers ride free.



In 2040, it's expected to take 29 minutes to travel during rush hour from SR-73 to I-605 in the general purpose lanes after improvements to the I-405 are complete. That commute can be reduced to 13 minutes if a driver chooses to take the 405 Express Lanes.

On May 23, 2016, the OCTA Board of Directors approved an initial toll policy for the 405 Express Lanes and a preliminary finance plan for the entire project.

The Measure M project, being constructed in cooperation with Caltrans, will be funded mostly through a combination of local, state and federal funds, with the express lanes portion of the Project paid for by those to choose to pay a toll and use the 405 Express Lanes.

PROJECT SCHEDULE

Finalize Toll Policy	2017
Secure Financing	2016 to 2017
Design and Construction	2017* to 2023
<i>*construction to start late 2017</i>	



Orange County Transportation Authority
550 S. Main Street
P.O. Box 14184
Orange, CA 92863-1584
(714) 560-OCTA
www.octa.net

LOCAL NEWS

As Inland toll lanes boom, why are new freeway lanes rarely free?



The west bound toll lanes on the 91 freeway are used but not as much as the main lanes of the 91 freeway on a afternoon commute Friday in Corona, CA. August 11, 2017. (TERRY PIERSON, THE PRESS-ENTERPRISE/SCNG)

By **IMRAN GHORI** | ighori@scng.com | The Press-Enterprise
 PUBLISHED: August 13, 2017 at 8:00 am | UPDATED: August 15, 2017 at 7:50 am

In March, toll lanes debuted in the Inland area with the opening of the 91 Express Lanes in Corona.

They won't be the last.

Within a decade, there could be four toll lane corridors in the region.

Their growth in the Inland area reflects a regional and national trend in which transportation agencies are turning to toll lanes to finance freeway improvements and manage congestion. The lanes are easier to build because they're paid for by tolls. Still, some say paying to drive on the freeway isn't fair to those who cannot afford the fees.

"The idea is catching on quickly and spreading throughout the country," said Martin Wachs, a professor emeritus of urban planning at the UCLA Luskin School of Public Affairs and an expert on transportation policy and planning.

The Riverside County Transportation Commission spent more than a decade planning its \$1.4 billion **91 toll lane project**, which added two toll lanes plus one general lane on an 8-mile corridor from the Orange County line to the 15 Freeway.

The agency already is looking ahead to its next project on the [15 Freeway, from Cajalco Road south of Corona to the 60 Freeway](#) at the San Bernardino County line. The \$471 million project, which will add two lanes in each direction over 14.6 miles, is expected to start construction early next year and open in 2020.

And, to the north, the San Bernardino County Transportation Authority is moving forward with plans for a 33-mile corridor on [the 10 Freeway](#) that would add two toll lanes from the Los Angeles County line near Montclair east to Redlands. The \$1.8 billion project will be the first toll project in that county.

The agency also is considering a second toll lane project on the 15, from the 60 to Highway 395 in Hesperia — essentially continuing north from where the planned Riverside County lanes would end. Officials will decide what to do next year when the environmental review is done. Construction could begin in mid-2020.

Why toll lanes?

A combination of factors are leading to construction of toll lanes instead of just widening existing freeways with more general lanes, Wachs said.

One prime reason is that charging a toll allows the agencies to manage congestion, while general lanes only provide short-term relief and quickly fill up as they are built, he said.

Traffic studies have shown that motorists will readjust their driving patterns and more will drive during peak times when free lanes are added, Wachs said.

“The only way to ensure that traffic is moving more swiftly is to charge people for it,” he said. “It can always reduce congestion because you can raise the price higher and higher until some people choose not to use it.”

When Riverside County began planning for the 91 widening, they wanted a project that would have a larger impact than just a general lane, said John Standiford, deputy executive director of the Riverside County Transportation Commission.

“I think there was a desire to build as much as we could,” he said. “We were looking at the 91 and the even bigger 15 project that we’re doing now.”

Another reason why the agency chose toll lanes was that such a project would continue toll lanes on the Orange County portion between the 55 Freeway and the county line. Riverside County residents were already a significant portion of the 91 toll lane drivers, Standiford said.

Dollars matter

Funding is another big reason behind toll lanes.

State and federal transportation dollars are scarcer for projects that don’t do more to manage congestion through carpool or toll lanes, Standiford said.

Tim Watkins, spokesman for the San Bernardino County Transportation Authority, agreed. His agency also explored a carpool-only option for widening the 10 Freeway, but would have had trouble finding a way to pay for it.

“It’s just not available for us to do it the other way,” Watkins said.

Both agencies are funding toll lanes by bonding and loans that will be paid back through future toll lane proceeds.

The Orange County Transportation Authority is considering several projects on major freeways, including the 5, 405 and 55. The agency, which today has toll lanes only on the 91, is planning one toll lane project — on the 405 between the 73 and 605 freeways.

Orange County also is home to a network of toll roads that are not part of regular freeways and are exclusively for users who pay a premium price.

In Los Angeles, the Metropolitan Transportation Authority adopted an ambitious express lanes strategic plan in January that lists 21 projects it is considering over the next 25 years. So far, five have funding available.

The agency now runs toll lanes on the 110 from Los Angeles to Torrance and the 10 from the 101 to the 605 that officials say have been successful.

One project Los Angeles County is considering would have a San Bernardino County connection — a continuation of the 10 toll lanes from the 605 to the county line.

If completed, drivers would see continuous toll lanes on the 10 from Los Angeles to Redlands. The same will happen with the two 15 Freeway projects in Riverside and San Bernardino counties and is already happening on the 91, between Orange and Riverside counties.

Both the Riverside and San Bernardino county agencies do have some non-toll projects in the works.

The Riverside County agency plans the Mid-County Parkway, a new 16-mile highway that will connect Perris and San Jacinto between the 215 and 79 freeways.

In San Bernardino County, the authority is working on plans to widen the 210 freeway through Highland, San Bernardino and Redlands. The project would close a bottleneck by adding an extra lane in each direction on a 6.1-mile stretch where the freeway now goes from four lanes to three.

Toll network

Transportation planners foresee more such connections in the coming years.

"There seems to be a network that is being established of Express Lanes," Watkins said.

That was one of the issues raised by Ontario City Councilman Alan Wapner, president of the transportation authority board, when the 10 Freeway project won approval last month.

"When we narrow the lanes down, there's going to be bottlenecks at the entrance of the county," he said. "It only makes sense that we be consistent with our neighboring counties."

As agencies turn towards toll lanes, they continue to be controversial among some residents and politicians.

Critics have referred to them as "Lexus lanes," saying wealthy drivers who can afford them benefit most.

When San Bernardino County Supervisor Josie Gonzales voted against the 10 project last month, she said she couldn't support a project that many residents in her working-class district couldn't afford.

Wachs, the UCLA professor, said there's no question that rich drivers can afford to pay to drive toll lanes. But he said those driving in regular lanes benefit because of the traffic that is taken out of those lanes and into toll lanes.

"People are not demanding these, but it's becoming more acceptable politically," Wachs said. "It's something the regional transportation agencies are promoting because it's a rational way to address congestion."

Tags: [15 Freeway](#), [91 Freeway](#), [Top Stories PE](#), [Transportation](#)



Imran Ghor

Imran Ghor has been a reporter with The Press-Enterprise since 1999. He covers Moreno Valley and Jurupa Valley.

[Follow Imran Ghor @ImranGhor1](#)

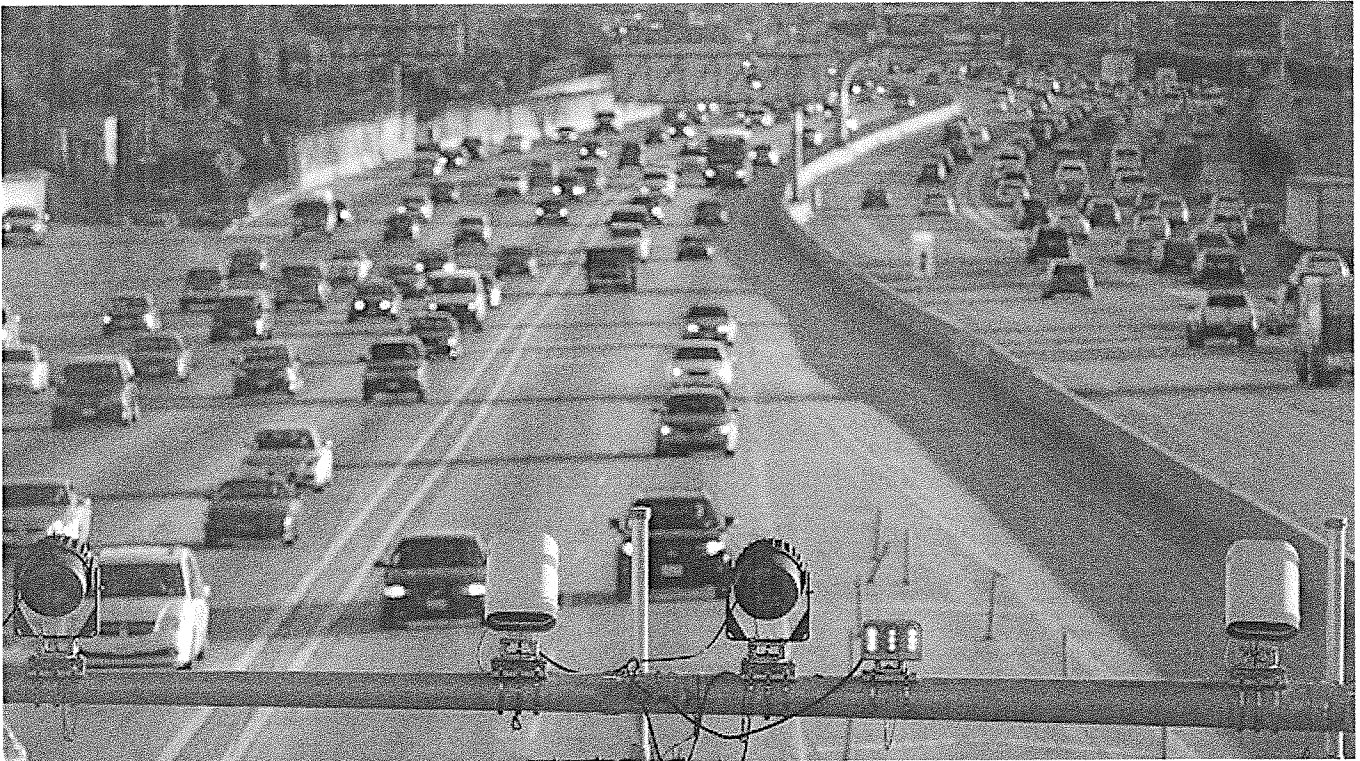
VIEW COMMENTS

Join the Conversation

We invite you to use our commenting platform to engage in insightful conversations about issues in our community. Although we do not pre-screen comments, we reserve the right at all times to remove any information or materials that are unlawful, threatening, abusive, libelous, defamatory, obscene, vulgar, pornographic, profane, indecent or otherwise objectionable to us, and to disclose any information necessary to satisfy the law, regulation, or government request. We might permanently block any user who abuses these conditions.

If you see comments that you find offensive, please use the "Flag as Inappropriate" feature by hovering over the right side of the post, and pulling down on the arrow that appears. Or, contact our editors by emailing moderator@scng.com.

Opinion There's only one way to fix L.A.'s traffic, and it isn't Elon Musk's tunnels. We need tolls — lots of them



Cameras and electronic sensors stand over the express lane south of the Slauson Avenue transit station on the 110 Freeway. (Los Angeles Times)

By **Herbie Huff**

MARCH 3, 2017, 7:25 AM

Los Angeles is fed up with its traffic. Despite billions spent in herculean efforts to expand our roads, our freeways are as clogged as ever. We spent \$1.6 billion to widen the 405 Freeway in 2014, and yet commute times through the Sepulveda Pass are the same. Perhaps even more frustrating, we're spending billions more to get people out of their cars and onto Metro — and not only is our traffic problem unmoved, transit ridership is declining.

Things have gotten so bad that billionaire futurist Elon Musk recently promised to “just start digging” tunnels underneath L.A. With enough layers of tunnels, says Musk, any amount of cars could be provided for.

With all due respect to Mr. Musk, this plan encapsulates everything that's wrong with how we think about traffic. Instead of building our way out of the problem, there is a proven solution to fighting traffic, one that's much easier, more effective and less costly than our current approach. It's putting a price on the use of our roads.

Nobody likes paying for anything they are used to getting for free, and freeway tolls are no exception. But why are we willing to pay for electricity, gasoline or air travel, but not for roads?

The reason that electrical power and air travel don't fail every time they get crowded is that we raise prices to manage demand. If things cost more, people use less of them. We all accept that airline tickets are more expensive during the holidays. And yet we miss that this very same, simple system of *pricing* could solve our congestion problem. Roads are the only piece of infrastructure we allow to consistently fail due to overuse.

Since 2003, cities across the country have been experimenting with something called "dynamic tolling" as a traffic solution. This entails adding what are called High-Occupancy/Toll (HOT) lanes on freeways. In a HOT lane, carpools drive for free, while solo drivers have to pay. Tolls are usually collected via a transponder, without ever having to slow down. Two of these experimental HOTs are right here in Los Angeles on the 110 and the 10 freeways.

In these HOT lanes, congestion is basically a thing of the past. On one highway in Miami, for example, average speeds went from 20 mph to 62 mph. On a Minneapolis road, speeds of 50-55 mph are maintained 95% of the time. Here in Los Angeles, average speeds on the 10 and 110 are 45 mph in the general purpose lanes and 65 mph in the HOT lanes. And the free flowing lanes are benefiting transit riders, too. Transit usage jumped 10% following the opening of the 10 and 110 ExpressLanes. Despite a poor, under-publicized rollout by Metro, these facilities have created far more traffic relief than the 405 widening at a fraction of the cost.

Dynamic tolling works by varying the price of the toll lanes by time of day. It costs more when traffic is typically busy, and less when fewer people want to use it. Prices can range from \$0.50 to around \$8 per trip.

A free-flowing road also carries more cars than a congested road, so by keeping things moving, the price actually increases the capacity on the road. Minneapolis' HOT lane, for instance, carried 33% more cars than it did when it was free.

The system works because when prices go up, it sends a signal to drivers that there are lots of other cars on the road. Just as with airfare, people respond to these signals.

People have more flexibility in their drive times than you might imagine. Roughly half of peak-hour trips are not commutes to work or school. With HOT lanes, when prices are high, people adjust accordingly. If it's worth it, they get in the lane and save time. If they don't want to pay, they have that most American of options — choice: They could use the unpriced lanes, go at a different time, carpool, or take transit to avoid the cost.

Experts have pointed to tolls as a traffic solution for decades, yet building political support for road fees continues to be a challenge — the most common complaint being: "Oh, so only rich people can drive?"

This critique ignores the fact that working Americans often suffer the most severely from the impacts of poor mobility. Working-class parents who are late to pick up their kids from day care, for example, often pay severe financial penalties. Having the option to reach their destination quickly could actually save them money. In fact, experience with dynamic tolling in the United States has shown that people of all income levels use these lanes. This objection also ignores just how inequitable and dysfunctional our current system is. Tolls may disproportionately burden the poor, but so do sales taxes, gas taxes and every other way we pay for roads.

Moreover, if you're concerned about progress and justice, consider how corrosive the traffic problem is to our public life. Competing for space in unpleasant and unpredictable traffic erodes our hospitality. Clogged roads dim our civic pride and diminish our ability to imagine a better future for our city. How many opportunities — both individually and as a city — have we rejected because we were afraid of traffic? We miss out on sporting events, or we refuse to build housing, or we fight against bike lanes and other roadway safety projects that could save lives.

Is there another way besides tolls? Unfortunately, no. We've tried them all. We've tried keeping neighborhoods suburban. We've tried density. We've tried building billions of dollars' worth of transit lines. We've tried widening roads at great expense.

Why are we so willing to try expensive, desperate policies, often with dire, unintended consequences, in order to solve traffic *without* pricing the roads? The bottom line is, when you give away something valuable for free, you create insatiable demand. Traffic is the result.

The definition of insanity is trying the same thing over and over and expecting different results.

Herbie Huff is a researcher and lecturer at the UCLA Institute of Transportation Studies.

Follow the Opinion section on Twitter @latimesopinion or Facebook

MORE FROM LIVABLE CITY

E-bikes may be the greenest form of transportation in human history. Why aren't cities taking advantage?

Don't listen to the backers of Measure S. Los Angeles isn't overdeveloped; we're in a housing slump

Why I'm breaking up with the Blue Line after 19 years. (It's not me, it's definitely you)

Copyright © 2017, Los Angeles Times