5. **Continued SR 4 and SR 242 Ramp Metering Study Discussion Presented by Tom Biggs, Atkins North America**

Attachments:

- Revised State Route 4 and State Route 242 Ramp Metering Studies and Implementation Plan Description of Work;
- TRANSPLAN 11/10/11 agenda with TAC ramp metering study recommendation to TRANSPLAN to approve participation in the Ramp Metering Study
- Excerpt from the 2009 TRANSPAC Action Plan re: ramp metering

State Route 4 and State Route 242 Ramp Metering Studies and Implementation Plan Description of Work (Version 5)

Revisions per:
8/16/11 Transplan TAC Meet
11/09/11 Transplan Board Meet
9/22/11 Transpac TAC Meet
11/17/11 Transpac TAC Meet

Background

To assist local agencies in evaluating new ramp metering projects, MTC and Caltrans conduct technical studies of the effects of ramp metering with input from local agencies regarding technical issues of concern. In addition, Caltrans also will develop a Memorandum of Understanding (MOU) between Caltrans and local agencies regarding the operation and maintenance of the ramp meters. The MOU may be negotiated in parallel or in sequence with the technical study. This memo provides the proposed scope of work for the technical study of ramp metering of portions of State Route 4 (SR 4) and State Route 242 (SR 242) in Contra Costa County. The task of negotiating MOU is also identified in this memo.

Corridor Study Limits:

The SR 4 freeway in Contra Costa County between Alhambra Avenue and SR 160/SR 4 Bypass Interchange (Post mile: CC 8.00 to 31.5 – approximately 23.5 miles) and the SR-242 freeway from I-680 to SR-4 interchanges (approximately 3.4 miles), inclusive.

Task Order Purpose:

To work with MTC, Caltrans, Contra Costa Transportation Authority (CCTA), TRANSPAC and TRANSPLAN:

1. To study the feasibility and effects of ramp metering SR 4 and SR 242,
2. To develop a staging plan for implementation of ramp metering on SR 4 and SR 242,
3. To develop recommended ramp metering rates for the initial implementation segment (to be determined in the staging plan), and
4. To assist Caltrans in monitoring ramp meter activation and conducting a "Before and After" study of the effects for the initial implementation segment.
5. To develop a memoranda of understanding (MOU') with local agencies.

The study will be conducted in two phases: Phase 1 includes Tasks 1, 2, 3 and 4 described in the scope. Phase 2 includes Tasks 5, 6 and 7, which is not included in this task order.

Project Responsibilities:

The study will be led by Caltrans and MTC and conducted in partnership with CCTA, TRANSPAC and TRANSPLAN, and subjected to the approval of the stakeholders.

Atkins and Dowling Associates (CONSULTANT) will provide engineering support as described in this scope of work. Atkins will have primary responsibilities for facilitating meetings, preparing the presentation, presenting the results of the study, and reviewing the technical analysis and findings. Dowling Associates will have primary responsibilities for performing the technical analysis and providing results to Atkins for review prior to presentation to Caltrans, MTC, local stakeholders (defined below).

Atkins will have lead CONSULTANT responsibilities for communications (in coordination with Dowling) with one stakeholder's ramp metering technical advisory committee (assuming one

committee for this study). Dowling Associates will have lead CONSULTANT technical responsibilities and provide technical support to Atkins.

Caltrans will be responsible for:

1) Providing MTC or CONSULTANT with any readily available count and tachometer runs (tach run) vehicle data, and
2) Reviewing CONSULTANT technical recommendations and results.

MTC will be responsible for:

1) Providing CONSULTANT with the necessary data including counts (mainline and ramps) and tach runs from Caltrans or other sources,
2) Providing CONSULTANT with data from CCTA,
3) Cooperatively organizing stakeholder meetings with CCTA, and
4) Organizing reviews of CONSULTANT technical recommendations and results.

The local stakeholders will be represented by a CCTA selected Ramp Metering Technical Advisory Committee (Meter-TAC) to be formed for this study and consisting of technical representatives to be selected from the TRANSPLAN (Eastern Contra Costa) Technical Advisory Committee (TRANSPLAN-TAC) and the TRANSPAC (Central Contra Costa) Technical Advisory Committee (TRANSPAC-TAC). Local stakeholders will be requested to provide to MTC timely reviews of draft technical documents produced under this task order.

Atkins and Dowling Associates shall submit separate invoices to MTC and shall perform project management duties needed to closely monitor their individual schedules and budget for their individual work scope, as described below.

Tasks:

1. Project Administration and Coordination

CONSULTANT will work in partnership to prepare a detailed study workplan using Microsoft Project tools as a part of this task. The workplan will identify key milestones, deliverables, agency/stakeholder review periods and periods of stakeholder outreach. The workplan will be periodically updated as needed.

A kick off meeting will follow shortly after the notice-to-proceed. The objective of this meeting is to introduce CONSULTANT key members that will be working on the study to the MTC, Caltrans, and CCTA staff overseeing this effort; review the scope; work in partnership to exchange information, and to obtain input that will guide the study. At this meeting the objectives relating to scope, schedule, budget and responsibilities will be discussed and the project management team formalized. The day to day management of the study will include documenting all coordination meetings.

Deliverables: Dowling and Atkins will deliver to MTC the following:

1. Refined Scopes of Work and Budgets by Dowling and Atkins for Respective Efforts

2. Local Agency Input and Coordination Meetings

Prior to holding the stakeholder's meeting, MTC, Caltrans, CCTA and CONSULTANT will work in collaboration to exchange information, refine the scope of the study, and discuss how

information will be presented at the Ramp Metering Technical Advisory Committee (Meter-TAC) meeting.

This task includes plans for one stakeholder meeting to collect input from local jurisdictions and refine the scope of the ramp metering feasibility study and staging plan. These meetings or phone communications will be initiated by Atkins with support by Dowling Associates. Before each stakeholder meeting there will be a pre-meeting conference call with MTC, Caltrans and CCTA to review agenda, presentations, handouts (jointly attended by Atkins and Dowling Associates). CONSULTANT shall utilize emails and phone conference calls to minimize the number of in-person meetings.

CONSULTANT shall reserve budget, in this task, for one (1) additional stakeholder meeting for the purpose of reviewing the Existing Conditions and Trends (ECT) memo. Depending on the extent of stakeholder comments related to the ECT memo, this additional meeting may or may not be utilized. MTC, Caltrans, CCTA, and CONSULTANT will determine the need for this meeting.

Caltrans and MTC will assist CCTA, to present project status reports to TRANSPAC and TRANSPLAN. Feedback from these board meetings shall be conveyed to the CONSULTANT and the appropriate Technical Advisory Committee (TAC).

Deliverables: For each meeting, Atkins (with input from Dowling) will deliver to MTC the following:

2. Draft and Final Meeting Agenda, Slide Show, and Handouts (jointly developed by Atkins and Dowling) for up to two meetings, Draft and Final Stakeholder Meeting Minutes

3. Ramp Metering Feasibility Study and Staging Plan

This task consists of: refinement of scope, development of the existing conditions memo, and preparation of the SR 4 and SR 242 Ramp Metering Feasibility and Staging Plan.

3.1 Refinement of Scope

Dowling and Atkins will refine and finalize the scope of work and analysis plan based on input from the stakeholder meetings, identified under Task 2. It is assumed that one coordination meeting will be held with the Meter-TAC to present the final study scope. This scope will identify study limits and the surface street segments, including up to 20 key intersections, to be evaluated for diversion impacts. The scope will identify the measures of effectiveness that will be used for evaluation of effects of ramp metering on SR 4, SR 242, other freeway operations and surface streets.

Deliverable: Dowling and Atkins will deliver the following

3.1 Respective Final Scopes of Work for Dowling and Atkins for the SR 4 and SR 242 Ramp Metering Feasibility and Staging Plan

3.2 Existing Conditions and Trends (ECT) Memo – Freeway

Atkins and Dowling will work to identify appropriate 4 to 5 hour peak periods (possibly 5-10 AM, 2:30-7 PM), travel direction, study segments (between and including Alhambra Avenue and SR-4 by-pass interchanges with SR-4 and between I-680 and SR-4 interchanges on SR-242),

study intersections, performance measures, and methodologies for evaluating the effects of SR 4 and SR 242 ramp metering on other critical freeways, arterials, and key intersections in Contra Costa County.

SR 4 Freeway Analysis: Much of the data on existing conditions will be extracted from the SR 4 Corridor System Management Plan, the SR 4 Freeway Performance Initiative, and the on-going CCTA SR4 Integrated Corridor Analysis Study. Assuming this data is current and with input from the local stakeholders, Atkins will prepare the following portion of the Existing Conditions and Trends (ECT) Memo related to the SR 4 freeway describing typical AM and PM weekday peak periods:

- Existing and future SR 4 freeway bottlenecks
- Existing and future performance {vehicle-miles traveled (VMT), vehicle-hours traveled (VHT), Delay, speed} of SR 4 freeway without ramp metering, and
- Existing and future queues and delays at SR 4 on-ramps

SR 242 Freeway Analysis: Existing data for SR-242 will be obtained from the PeMS database, Caltrans census counts, any available MTC and/or CCTA databases. Dowling will summarize freeway operations for SR-242 describing typical AM and PM weekday peak periods. The discussion of operations on SR-242 will include:

- Existing and future SR 242 freeway bottlenecks
- Existing and future performance (VMT, VHT, Delay, speed) of SR 242 freeway without ramp metering, and
- Existing and future queues and delays at SR 242 on-ramps

Other Freeway and Surface Street Analysis: Based on data contained in the prior and on-going SR 4 studies (CSMP, FPI, and Corridor Management Plan – CMP), data provided by local stakeholders and data contained in the CCTA model, Dowling will prepare the portion of the ECT memo relevant to existing and baseline (2015 AM and PM) trends for peak hour operating conditions on the freeways and surface streets that the local stakeholders have identified to be of concern. The scope estimates that this analysis would address the following freeway and arterial segments:

- Freeways
    - I-680 (SR 242 to Pacheco Blvd.)
    - SR 160 (SR 4 to Wilbur Ave)
    - State Route 4 Bypass (Rte 160) from SR 4 to Laurel Road
- Arterials in East County
    - Bailey Road
    - Buchanan Road
    - East 10th Street/ Harbor Street.
    - A Street/East 18th Street.
    - Hillcrest Avenue.
    - James Donlon Boulevard and Extension
    - Kirker Pass Road/Railroad Avenue

  - Leland Road and Extension/Delta Fair Boulevard
  - Lone Tree Way
  - Ninth Street/Tenth Street
  - Pittsburg-Antioch Highway
  - Somersville Road
  - Willow Pass Road
- Arterials in Central County
  - Alhambra Avenue
  - Contra Costa Boulevard
  - Pacheco Boulevard
  - Treat Boulevard
  - Ygnacio Valley Road
  - Kirker Pass Road

The input of local agencies and RTPC's will be considered when finalizing the arterial routes to be studied during the project. Additional streets besides the arterials listed above (such as Loveridge Road in Pittsburg, Willow Pass Road/Evora Road in Concord/Bay Point, and Imhoff/Arnold Industrial Pkwy in Concord) may be evaluated in consultation with local agencies. The segment analyses of other freeways and surface streets will be AM and PM peak hour volumes, v/c, and mean speed by segment.

In addition to all of the signalized intersections at the entrance of each on-ramp, up to 20 key intersections away from the freeways, selected in consultation with the local stakeholders, will be evaluated for level of service. The level of service method is to be determined in consultation with the local stakeholders.

No new intersection traffic counts will be gathered under this task order. It is understood that CCTA or local agencies will provide intersection counts and signal timing sheets (if needed by the selected LOS method) from their files for any intersections they wish to include in the analysis of the effects of ramp metering that are not already covered in prior SR 4 CSMP, FPI, or CMP work.

Dowling will combine the SR 4 and SR-242 freeways, other freeway, surface streets and intersection analyses into an Existing Conditions and Trends (ECT) memorandum. The memorandum will include the identification of bottleneck locations, queue lengths, and congestion duration, with specific explanations of the causes of congestion problems.

Consultant will compute appropriate system wide performance statistics (VMT, VHT, mean speed, PMT, PHT) for 2015 and 2030 reflecting the countywide effects of ramp metering or not metering. The road and transit improvements to be included in the 2015 and 2030 analyses will be updated in consultation with CCTA and the ramp metering TAC. Since this is a countywide effect, the system-wide performance measures will be computed using the CCTA model, rather than the FREQ model

The draft ECT memorandum will be submitted to MTC and Caltrans for a preliminary review, followed by CCTA review and comments. The draft ECT memo will then be revised by the CONSULTANT based on those comments. The revised memo will be circulated among the local

stakeholders for review. Comments received from the local stakeholders will be reviewed by MTC, Caltrans, and CCTA; and the CONSULTANT will prepare the final ECT. If a meeting is needed to reconcile responses to comments, MTC will plan, organize, and schedule the meeting, and CONSULTANTs will attend, document the meeting, and finalize the ECT after the meeting.

Deliverables: Dowling will prepare (with input from Atkins) the following:

Deliverable 3.2A: Draft and Final Existing Conditions and Trends (ECT) Memo
Deliverable 3.2B: SR 4 and SR 242 FREQ and Intersection LOS input files

3.3 Ramp Metering Feasibility Study and Staging Plan

The purpose of this task is to develop a feasibility and implementation staging plan for SR 4 and SR 242, and to provide information to local stakeholders on the projected effect of ramp metering on freeway and arterial operations.

Dowling (with advice and input from Atkins) will identify the appropriate freeway segments along with timelines for implementation/activation of ramp metering on SR 4 and SR-242. The analysis will first test the effects of strictly on-ramp metering. Freeway-to-freeway ramps at I-680, SR 242, and at SR 160/SR 4 bypass will initially be assumed to be unmetered. Should the analysis indicate that so much traffic will come from some freeway-to-freeway ramps as to render on-ramp metering ineffective in the vicinity of those interchanges, then consultant will identify those locations for consideration for additional steps to be determined at that time in consultation with the stakeholders.

Staging plan will take into consideration the timing, growth and shifting of locations of freeway bottlenecks between 2011 and 2015, current and planned construction work, the relative cost-effectiveness of metering different groups of ramps, the effect on cut-through traffic of metering some ramps before others, the effect on surface street traffic shifts of metering some ramps before others, and degree to which some meters can be implemented before others (because of previously installed equipment, or because of the completion of construction in some freeway sections before others). The Consultant will take into account the status of the ramp metering equipment installations, which will be provided by Caltrans (those meters already installed, those installed and in need repairs, those currently being constructed, and those currently being designed).

Dowling will use the existing conditions FREQ files (one-hour time slice) to identify metering rates that will maximize the computed Vehicle-Miles Traveled (VMT) or other selected measure of productivity (among those available in FREQ and defined in task 3.2) subject to ramp storage constraints.

Ramp storage constraints will be computed assuming 30 feet per vehicle, measuring the distance from the ramp meter stop bar back to the ramp entrance. If the surface street has an exclusive turn lane feeding into the on-ramp that can store freeway-bound vehicles without hindering surface street through movements, and only if the local agency having jurisdiction is also agreeable to the use of these lanes to store ramp queues, that distance may be added to the available storage length for the ramp.

Dowling will develop initial metering rates and the recommended hours of ramp metering for the purposes of the feasibility analysis.

Dowling will use a combination of FREQ and the CCTA model to estimate potential diversion of traffic, if any, to the arterial street system. FREQ's arterial diversion option will be employed for this task. The FREQ predicted diversion volumes and those predicted by the CCTA model will be input to the CONSULTANT's estimate of the predicted volume changes for impacted intersections.

Dowling (with input and advice from Atkins) will prepare a draft Ramp Metering Feasibility and Staging Plan to document the forecasted effects of the recommended ramp metering plan on freeway and arterial street operations. The analyzed arterial intersections (up to 20 locations, if impacted) would include traditional Highway Capacity Manual intersection capacity analysis. The results of that analysis would include delays and queue estimates, as well as any recommended changes to signal timings or phasing to mitigate the effects.

The ramps recommended for metering will be grouped into a logical staging plan for implementation. Upon review by MTC, Caltrans, CCTA, and Ramp Metering Technical Advisory Committee (Meter-TAC), CCTA, TRANSPLAN and TRANSPAC, CONSULTANT will finalize the Ramp Metering Feasibility and Staging Plan Report.

The feasibility study will:

1. Identify the effects of ramp metering on freeway and surface street demands.
2. Identify the freeway operations effects of ramp metering.
3. Report the intersection level of service effects of ramp metering at ramp intersections and at selected other signalized intersections away from the freeway.
4. Identify ramps where queue storage would exceed the available storage capacity, even at maximum feasible metering rates.
5. Recommend mitigations for ramps with identified queue storage problems. .
6. Identify a staging plan for implementing ramp metering.
7. Consider the impact of ramp metering on bike/pedestrians and transit service.

Deliverables: Dowling will prepare (with input from Atkins) the following:

Deliverable 3.3A: Draft and Final Ramp Metering Feasibility and Staging Plan Report (Electronic files only)
Deliverable 3.3B: Supporting FREQ and Intersection LOS input files

4. Additional Coordination Meetings (Optional Task)

This task includes additional stakeholder meetings to obtain feedback and provide information from and to the local jurisdictions throughout the study. These meetings or phone communications will be initiated by MTC and Caltrans with support by Atkins and Dowling Associates. CONSULTANT shall provide technical support and help with general coordination tasks for these meetings. It is assumed that the documentation and exhibits generated for stakeholder meetings listed under Task 2 will be adequate for these additional coordination meetings.

Phase 2 Services (Task 5, 6 and 7)

5. Develop Memoranda of Understanding

Consultant will assist Caltrans to develop a memorandum of understanding (MOU) with those local agencies in the study corridor where ramp metering is recommended in the Feasibility Study and Staging Plan. The MOU will outline responsibilities and protocols for the operation of the ramp meters. Initial discussions will be conducted at the TRANSPLAN/TRANSPAC level, but ultimately, the MOU will be considered and acted on by each local jurisdiction. This task can proceed in parallel with or prior to the other Phase 2 tasks.

6. Metering Rate Plan for Initial Implementation Section

Once the metering implementation staging plan is finalized, CONSULTANT will prepare a recommended metering rate plan for the initial implementation section or sections. This will involve updating the FREQ volume inputs for the initial implementation section to forecasted summer 2012 volumes and re-running FREQ to obtain the updated optimal metering rates. CONSULTANT will gather new AM and PM peak period ramp counts for the initial implementation section. Mainline volumes will be updated based on data from Caltrans or new mainline counts.

The metering rate plan will take into consideration both capacities on the mainline freeways as well as the ramps. The capability is built into the FREQ software to be used for the analyses.

The draft FREQ files will be submitted to MTC, Caltrans, CCTA, TRANSPLAN and TRANSPAC for review.

The FREQ recommended metering rates will be translated into Caltrans TOS (Traffic Operating Systems) Time of Day Table Memory Map, and Metering Plan Memory Map inputs. The FREQ metering rates will be limited to the range 240 vph to 900 vph (with 1000 vph possible if two cars per green implemented) and rounded to the available metering rates within the TOS system. The metering rates will be converted to the equivalent percent occupancy thresholds using mainline volume/occupancy data provided to CONSULTANT by Caltrans, one set for each metered ramp. CONSULTANT will fit parabolic curve (as appropriate) to Caltrans data and determine appropriate percent occupancy thresholds for stepping down metering rates as mainline occupancy increases. CONSULTANT will prepare draft TOS metering plan and revise it to final form based on Caltrans comments.

The Draft TOS Metering Plan will be submitted to MTC, Caltrans CCTA, TRANSPLAN and TRANSPAC for review.

Deliverables: CONSULTANT will prepare the following:

Deliverable 6.1:	Draft and Final FREQ Input/Output Files with Optimized Metering Rates
Deliverable 6.2:	Draft and Final TOS Metering Plan

7. Initial Implementation Section Monitoring and "Before/After" Study

To the extent that Caltrans would like assistance in monitoring the metering on activation day and in conducting the before and after study, CONSULTANT is prepared to do the following.

7.1 Before Metering Data Collection

Caltrans shall conduct freeway mainline traffic counts and ramp traffic counts for the same three days as the other data that shall be collected on the freeway. CONSULTANT shall perform the sub-tasks described below. The data shall be collected on the same three mid-week days unless stated otherwise.

7.1.1 Arterial Machine Counts

Traffic data shall be collected in 15-minute increments for three consecutive 24-hour days on up to 10 arterial roadway locations to be determined based on consultations with local stakeholders.

Deliverable 7.1.1: Tables and Figures Showing Daily and Peak Hour Arterial Traffic Volumes Before Metering

7.1.2 Arterial Turning Movement Counts

Traffic data shall be collected at intersections during a morning peak period and the afternoon peak period for a single typical weekday at up to 20 locations to be determined based on consultations with local stakeholders.

Deliverable 7.1.2: Tables and Figures Showing Morning Peak Hour Turning Movement Counts Before Metering

7.1.3 Arterial Travel Time, Speed, and Delay Runs (Floating Cars)

Floating car runs shall be performed along up to 10 arterial routes to be determined in consultation with the local stakeholders.

Travel time, speed, and delay shall be obtained using GPS unit equipped floating cars. Vehicles shall depart every 30 minutes along each route the morning and afternoon peak periods to yield 6 runs along each route per peak period.

The longitude and latitude of each car shall be recorded to the nearest 1/100,000th of a degree for each second of travel time for each travel time run (in effect, to the nearest 4 feet latitude, and nearest 3 feet longitude for the 37 degree latitude of the study corridor).

The GPS data shall be reported and delivered in Excel spreadsheet format similar to that shown below (exact format varies by data collection vendor and hardware/software they use):

Run	Date	Time	Speed	Latitude	Longitude	HDOP	Sat Used
1	08/01/11	7:27:23	14.8	37.94428	121.72431	4.1	12
1	08/01/11	7:27:24	17.6	37.94427	121.72434	4.1	12

- Run = run number
- Date = date stamp.
- Time = time stamp

- Speed = vehicle speed at time stamp
- Latitude (to nearest 100,000th of a degree, about 4 feet at 37 degrees latitude)
- Longitude(to nearest 100,000th of a degree, about 3 feet at 37 degrees latitude)
- HDOP = horizontal dilution of precision (5 or lower desired)[1]
- Sat Used = Number of satellites in view (the more the better)

The drivers shall aim for the median speed, passing as many vehicles as pass them. The GPS data shall be reported and delivered in Excel spreadsheet format. The location of the back of any observed recurring queues shall be recorded and documented.

Deliverable 7.1.3 Tables and Figures Showing Peak Period Arterial Travel Time, Speed, and Delay Before Metering

7.1.4 Visual Observations

CONSULTANT shall perform visual observations of arterial traffic operations as part of Tasks 7.1.2 and 7.1.3. Locations of congestion, excessive queuing or other notable conditions shall be recorded.

Deliverable 7.1.4: Memorandum Describing Conditions Observed On the Arterial Streets and Figure Showing Locations of Notable Conditions Before Metering

7.1.5 Compile Technical Data

CONSULTANT shall compile the data collected by Caltrans and CONSULTANT for before metering conditions. Freeway floating car data described above shall also be included in the technical memorandum.

Deliverable 7.1.5: Draft and Final Before Ramp Metering Technical Memorandum

7.2 Local Media Press Release (Caltrans)

Caltrans, with approval of MTC, CCTA, TRANSPLAN and TRANSPAC, shall provide the local media press release.

7.3 Metering Plan Activation

Caltrans shall activate the metering plan, perform visual observations of freeway mainline and ramp traffic operations, and fine-tune ramp metering equipment in cooperation with the local agencies. CONSULTANT shall assist Caltrans with Task 7.3.1 (visual observations of selected freeway ramps) and shall perform Task 7.3.2.

7.3.1 Visual Observation of Ramps

CONSULTANT shall assist Caltrans with observation of metered ramps during the morning period and the evening period for four days as directed by Caltrans. CONSULTANT shall observe traffic operations at up to 4 of the 8 metered on-ramps to be determined in consultation with Caltrans. Each ramp in each group will be monitored first to determine if they are performing properly and if the meter is operating at an appropriate cycle length consistent with the ramp metering plans. After initial confirmation that all ramps are functioning properly, the CONSULTANT shall monitor each ramp beginning with the most westerly ramps and

[1] See http://en.wikipedia.org/wiki/Dilution_of_precision_(GPS). HDOP is related to the angles between satellites.

proceeding to the east ramps to observe the end of the vehicle queues on the ramps at 5-minute intervals. The goal will be to observe as many 5-minute intervals as possible at each ramp so that data may be collected at each ramp at least every hour. At each observation (at least every hour), the ramp meter cycle length will be observed to determine if the meter is operating consistent with the ramp metering plans with observation of the freeway mainline to estimate the level of congestion (detector occupancy).

If at any time CONSULTANT notices that a vehicle queue exceeds or is likely to exceed the storage capacity of a ramp or if a meter does not appear to be operating according to plan, CONSULTANT shall immediately notify the designated Caltrans staff person (and local agency having jurisdiction as specified in the MOU between Caltrans and the agency) of the nature of the problem.

CONSULTANT staff shall meet with Caltrans staff at the end of each day of observation to review results.

Deliverable 7.3.1	Draft and Final Memorandum Describing Metering Rates Implemented and Excessive Queues Observed and Corrective Action Taken to Implement Plan as Intended

7.3.2. Visual Observation of Arterials

CONSULTANT shall perform visual observations of arterial traffic operations generally at the locations identified for study in Task 7.1. Study arterials shall be observed during the morning peak period and the evening peak period for four days, and locations of congestion, excessive queuing or other notable conditions shall be recorded. Abnormal congestion shall be identified and reported to the Caltrans project manager and the appropriate local agency.

CONSULTANT staff shall meet with Caltrans staff at the end of each day of observation to review results and will contact local agency staff if necessary.

Deliverable 7.3.2	Draft and Final Memorandum Describing Abnormal Conditions Observed During Metering Plan Activation on the Arterial Streets and Corrective Action Taken to Return Traffic Operations to Normal

7.4 After Metering Study

Three to six months after implementation of ramp metering, Caltrans shall conduct freeway mainline traffic counts and ramp traffic counts. The data shall be collected on the same three mid-week days unless otherwise stated. CONSULTANT shall perform the tasks below.

7.4.1 Arterial Machine Counts

Traffic data shall be collected in 15-minute increments for three consecutive 24-hour days at the same locations identified for Task 7.1.

Deliverable 7.4.1:	Tables and Figures Showing Daily and Peak Hour Arterial Traffic Volumes After Metering

7.4.2 Arterial Turning Movement Counts
Traffic data shall be collected at intersections during a morning and the afternoon peak periods for a single typical weekday at the same locations identified for Task 7.1.

Deliverable 7.4.2: Tables and Figures Showing Morning Peak Hour Turning Movement Counts After Metering

7.4.3 Travel Time, Speed, and Delay Runs for Freeway Lanes
Floating car runs shall be performed along the same route and using the same procedures described in Task 7.1.

Deliverable 7.4.3: Tables and Figures Showing Peak Period Freeway Mixed-Flow Travel Time, Speed, and Delay and CHP Media Traffic Incident Information

7.4.4 Arterial Travel Time, Speed, and Delay Runs (Floating Cars)
Floating car runs shall be performed along the routes identified in Task 7.1 using the same procedures. The GPS data shall be reported and delivered in Excel spreadsheet format. Locations of back of queues shall be recorded twice per hour at all metered ramps during the morning and afternoon peak periods after ramp metering is implemented. These data may be recorded on different days from the collection of the other data collected for this study.

Deliverable 7.4.4: Tables and Figures Showing Peak Period Arterial Travel Time, Speed, and Delay After Metering

7.4.5 Visual Observations
CONSULTANT shall perform visual observations of arterial traffic operations. Locations of congestion, excessive queuing or other notable conditions shall be recorded.

Deliverable 7.4.5: Memorandum Describing Conditions Observed On the Arterial Streets and Figure Showing Locations of Notable Conditions After Metering

7.4.6 Compile Technical Data
CONSULTANT shall compile the data collected by Caltrans and CONSULTANT after metering is implemented.

Deliverable 7.4.6: Draft and Final After Ramp Metering Tables and Figures in the Same Format as Provided in the Before Study Technical Memorandum

7.4.7 Prepare Report
CONSULTANT shall prepare a Before/After Ramp Metering Report that describes the following:

1. Final ramp metering plan with meter on/off times and discharge rates
2. Changes in freeway, street segment, and intersection turning movement traffic volumes resulting from ramp metering
3. Changes in freeway and arterial travel times resulting from ramp metering
4. Discussion of visual observations of effects of ramp metering

Deliverable 7.4.7: Draft & Final Before/After Ramp Metering Report

7.5 Coordinate Meetings with Local Stakeholders
CONSULTANT shall coordinate up to three meetings with local stakeholders for the stage one implementation of ramp metering to discuss progress of the ramp metering project, identify a date for implementation, and report findings of the before and after study. CONSULTANT shall arrange for no-cost public agency venues for the meetings, prepare agendas, organize presentations, and prepare brief minutes for the local stakeholders meeting.

Deliverable 7.5A: Brief Minutes of Local Stakeholders Meeting No. 1

Deliverable 7.5B: Brief Minutes of Local Stakeholders Meeting No. 2

Deliverable 7.5C: Brief Minutes of Local Stakeholders Meeting No. 3

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TRANSPLAN Committee Meeting

Thursday, November 10, 2011 – 6:30 PM

Tri Delta Transit Board Room, 801 Wilbur Avenue, Antioch

We will provide reasonable accommodations for persons with disabilities to participate in TRANSPLAN meetings if they contact staff at least 48 hours before the meeting. Please contact John Cunningham at (925) 335-1243 or john.cunningham@dcd.cccounty.us

AGENDA

Items may be taken out of order based on the business of the day and preferences of the Committee.

1. Open the meeting.

2. Accept public comment on items not listed on agenda.

Consent Items (*see attachments where noted* [♦])

3. Adopt Minutes from October 13, 2011 TRANSPLAN Meeting. ♦ PAGE 4

4. Accept Correspondence. ♦ PAGE 10

5. Accept News Articles ♦ PAGE 32

6. Accept Status Report on Major Projects. ♦ PAGE 38

7. Request Authorization for the 511 Contra Costa - TRANSPAC/ TRANSPLAN TDM Program Manager to Submit Applications and Enter in to Necessary Contracts and Agreements to CCTA, BAAQMD, and MTC for Grant Funds to Conduct Program Activities. *The TAC reviewed the request at their October TAC Meeting and Recommends the Committee Approve the Request. Please see attached staff report for detail.* **♦ PAGE 48**

End of Consent Items

Action/Discussion Items (*see attachments where noted* [♦])

8. Appoint TRANSPAN Member to the Contra Costa Transportation Authority's (CCTA) Technical Coordinating Committee: *See attached recommendation.* **♦ PAGE 51**

9. Authorization to Enter into Memorandum of Understanding with Contra Costa Transportation Authority and the East Contra Costa Regional Fee and Finance Authority: *The State Route 4 Bypass Authority has requested that the CCTA assume certain project development responsibilities related to the Bypass. Details provided in the attached staff report.* **♦ PAGE 56**

10: Receive Report, Provide Comments on the State Route 4 Ramp Metering Proposal and APPROVE the TAC recommendation: ♦ PAGE 72
CCTA Staff will give a presentation on ramp metering, provide an overview of the proposed State Route 4 Ramp Metering Study, and respond to questions from the

♦ = An attachment has been included for this agenda item.

Committee. The TRANSPLAN Technical Advisory Committee reviewed the proposal in August, provided comments on the scope, and recommends that the Committee APPROVE the scope and DIRECT staff to assist with the conduct of study.

11. Consider Report on Status of Regional Fee Program Requirements/City of Pittsburg and Take Action as Appropriate

12. Receive Update: State Route 4 Integrated Corridor Analysis

End of Action/Discussion Items – Adjournment

13: Adjourn to next meeting on Thursday, December 9, 2011 at 6:30 p.m. or other day/time as deemed appropriate by the Committee. Upcoming agenda items includes a presentation by the East Bay Economic Development Alliance on their report, "Building on our Assets".

♦ = An attachment has been included for this agenda item.

GOAL 2	Increase HOV lane usage
ACTIONS	2-A: Support the completion of a continuous HOV system on I-680.
	2-B: Support consistent occupancy requirements for toll-free HOV lanes on the Benicia-Martinez Bridge and I-680.
	2-C: Support additional incentives for HOV users.
	2-D: Provide additional park-and-ride lots.
RESPONSIBLE AGENCIES	TRANSPAC will continue to advocate for funding and phasing to complete the HOV lane system and to encourage incentives.
TIMELINE	Depending on funding availability, Action 2-A in the southbound direction is intended to be completed by 2014. Other actions are ongoing.

GOAL 3	Work to improve freeway flow
ACTIONS	3-A: Continue to monitor and evaluate operational improvements at freeway interchanges on I-680, SR-242, SR-24, and SR-4.
	3-B: Continue to support the completion of the fourth bore of the Caldecott Tunnel (SR-24).
	3-C: Support the study and implementation of potential regional freeway management strategies.
	3-D: Consider a multi-agency approach to freeway ramp metering.
RESPONSIBLE AGENCIES	TRANSPAC and its jurisdictions
TIMELINE	These actions are ongoing. Depending on funding availability, target completion of the Caldecott Tunnel fourth bore is 2014.