San Francisco County Transportation Authority

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Memorandum

Date: 07.07.15

RE: Finance Committee
July 14, 2015

To: Finance Committee: Commissioners Avalos (Chair), Mar (Vice Chair), Campos, Cohen, Kim and Wiener (Ex Officio)

From: David Uniman – Deputy Director for Planning

Through: Tilly Chang – Executive Director

Subject: **ACTION** – Recommend Award of a Two-Year Contract to AECOM Technical Services, Inc. in an Amount Not to Exceed $400,000 for Planning and Engineering Services for the San Francisco Freeway Corridor Management Study Phase 2, and Authorizing the Executive Director to Negotiate Contract Payment Terms and Non-Material Contract Terms and Conditions

Summary

The Transportation Authority is seeking consultant services to support the Freeway Corridor Management Study (FCMS) Phase 2, which will explore feasible strategies to both manage demand and increase reliability in the freeway corridors in San Francisco. The study will examine US-101 and I-280 for opportunities to: create a managed lane that may be restricted by occupancy and/or price; manage ramp access to the freeways; and use other demand- and/or information-based management strategies. This work stems from Phase 1 of the FCMS, which documented the project's goals and a range of potential strategies. The Transportation Authority Board adopted the FCMS Phase 1 report in March 2015. Phase 2 will be the performance-based technical analysis of strategies and produce recommended strategies and an implementation plan. On May 8, 2015, the Transportation Authority issued a Request for Proposals (RFP) for planning and engineering services for Phase 2 of the project. By the June 8, 2015 deadline, we received four proposals. A review panel comprised of Transportation Authority, San Francisco Municipal Transportation Agency, and California Department of Transportation staff reviewed the proposals and interviewed three firms on June 17, 2015. Based on the competitive selection process defined in the evaluation criteria of the RFP, the review panel recommends the award of a consultant contract to the top-ranked firm, AECOM Technical Services, Inc.

BACKGROUND

The 2013 San Francisco Transportation Plan (SFTP) identified the need for a freeway corridor management strategy to manage expected future travel demand growth and improve the performance of the US-101 and I-280 corridors. The San Francisco Freeway Corridor Management Study (FCMS) is a performance-based assessment of strategies to meet those broad goals in the near- and medium-terms.

In 2014, California Department of Transportation (Caltrans) awarded a Partnership Planning for Sustainable Transportation grant to the Transportation Authority in the amount of $300,000 to conduct the FCMS. In September 2014, the Transportation Authority approved Resolution 15-09, appropriating $300,000 in Prop K sales tax funds to serve as local match for the Caltrans grant.

The FCMS is divided in two phases. In March 2015, the Transportation Authority Board unanimously approved the FCMS Phase 1 Report. This report set the foundation for the technical analysis in Phase 2. It described the existing and planned management strategies for US-101 and I-280, proposed a goals-based evaluation framework for the subsequent technical analysis, and identified the range of potential freeway management strategies to be analyzed. Phase 2 will be the performance-based technical analysis of strategies, producing recommended strategies and an implementation plan. The Transportation Authority seeks planning and engineering professional services to support this next phase of work.

DISCUSSION

The purpose of this memorandum is to summarize the procurement process and recommend the award of a two-year contract for planning and engineering services for the FCMS Phase 2 to AECOM Technical Services, Inc. (AECOM). The main objective of this phase of the FCMS is to produce, through a performance-based technical analysis and screening of policy and physical (routing and configuration) alternatives, a recommended freeway corridor management strategy for the City and County of San Francisco and an accompanying implementation plan. The overall project budget for this phase is approximately $500,000, with approximately $200,000 from a prior Prop K appropriation for FCMS and $300,000 from a Caltrans Partnership Planning for Sustainable Transportation grant. Our schedule anticipates completion of initial alternative screening, developing a short list of strategies on which the study will focus by December 2015, and final study completion, including implementation recommendations, in December 2016.

Procurement Process: We issued a Request for Proposals (RFP) for planning and engineering services on May 8, 2015. We held a pre-proposal conference on May 14, 2015, which provided opportunities for small businesses and larger firms to meet and form partnerships. 23 firms attended the conference.

For this contract, we established a Disadvantaged Business Enterprises (DBE) goal of 16%, accepting DBEs certified by the California Unified Certification Program. We took steps to encourage participation from DBE, including advertising in six local newspapers: Nichi Bei Weekly, Small Business Exchange, San Francisco Bay View, San Francisco Chronicle, San Francisco Examiner, and The Western Edition. We also distributed the RFP to certified DBEs and Local Business Enterprises, the Bay Area and cultural Chambers of Commerce, and the Small Business Council.

By the due date of June 8, 2015, we received four proposals. The review panel consisting of Transportation Authority, the San Francisco Municipal Transportation Agency, and Caltrans staff evaluated the proposals based on qualifications and other criteria identified in the RFP, including the proposers' understanding of project objectives, technical and management approach, and capabilities and experience. The panel interviewed three teams on June 17, 2015. Based on the competitive selection process, the review panel recommended the award of a consultant contract to the top-ranked firm of AECOM. The recommended team distinguished itself on the basis of: 1) its strong technical management approach reflecting a clear understanding of study objectives and a strong plan to apply the team's knowledge to move quickly and efficiently through the feasibility screening and technical analysis processes; 2) its capabilities and experiences including the project manager and team members' successful completion of other similar projects, including the I-580 Express Lanes project for the Alameda County Transportation Commission and the I-680 Express Lanes project for the Bay Area Infrastructure Financing Authority; and 3) the team members' ability and previous experience in addressing specific technical questions posed in the RFP, including an analysis of the impact of employee shuttles on managed-lane facilities and successfully providing a robust operations analysis.

All teams' proposals exceeded the 16% DBE goal. The AECOM team has pledged a total DBE utilization of 18% through Asian Pacific-owned, San Francisco-based firm CHS Consulting Group.

ALTERNATIVES

1. Recommend award of a two-year contract to AECOM in an amount not to exceed $400,000, for planning and engineering services for the San Francisco FCMS Phase 2, and authorizing the Executive Director to negotiate contract payment terms and non-material contract terms and conditions, as requested.
2. Recommend award of a two-year contract to AECOM in an amount not to exceed $400,000, for planning and engineering services for the San Francisco FCMS Phase 2, and authorizing the Executive Director to negotiate contract payment terms and non-material contract terms and conditions, with modifications.
3. Defer action, pending additional information or further staff analysis.

CAC POSITION

The CAC was briefed on this item at its June 24, 2015 meeting and adopted a motion of support for the staff recommendation.

FINANCIAL IMPACTS

Budget for services identified in this contract will be provided by funds from a Caltrans Partnership Planning for Sustainable Transportation grant as well as Prop K sales tax funds appropriated through Resolution 15-09. The first year's activity is included in the Transportation Authority's Fiscal Year 2015/16 Budget. Sufficient funds will be included in future fiscal year budgets to cover the remaining cost of the contract.

RECOMMENDATION

Recommend award of a two-year contract to AECOM in an amount not to exceed $400,000, for planning and engineering services for the San Francisco FCMS Phase 2, and authorizing the Executive Director to negotiate contract payment terms and non-material contract terms and conditions.

Attachment:

1. San Francisco Freeway Corridor Management Study Phase 2 Scope of Services

Attachment 1
San Francisco Freeway Corridor Management Study Phase 2
Scope of Services

BACKGROUND

Project Background and Purpose

The 2013 San Francisco Transportation Plan identified San Francisco's need for a Freeway Corridor Management Study (FCMS). In addition to existing mobility and livability conditions that warrant improvement, San Francisco's US-101 and I-280 freeway corridors are forecast to face high growth in demand for travel between now and 2040. San Mateo and Santa Clara Counties are currently developing and implementing management strategies along these corridors, and the state and region are revising freeway management plans for California and for the Bay Area, respectively. The San Francisco FCMS is a performance-based evaluation of a range of freeway corridor management strategies, from signage and striping to high-occupancy vehicle (HOV) or Express Lanes.

Phase 1 of the FCMS documented the project's background, outlined goals and objectives, identified a range of potential strategies for achieving those goals, and described the existing institutional and regulatory framework in which San Francisco initiates this effort. The goals and objectives identified in Phase 1 will serve as the criteria by which strategies carried forward to Phase 2 will be evaluated. These goals include:

- Improve San Francisco freeway corridors' ability to move people to support economic competitiveness and accommodate existing and new residents and workers
- Improve trip reliability for all freeway corridor users and modes
- Improve travel mode choices for trips on freeway corridors that start or end in San Francisco
- Support coordinated and integrated strategies and plans across jurisdictional boundaries, including Caltrans, MTC, and adjacent counties
- Reduce freeway corridor emissions
- Ensure safe, equitable, and balanced local arterial and freeway operations while minimizing impacts on neighborhoods

In March 2015, the Transportation Authority Board adopted the FCMS Phase 1 Final Report and its recommended alternative.

Existing Work Products

The FCMS Phase 1 Final Report and its appendices are available on the Transportation Authority website at http://www.sfcta.org/sf-freeway-corridor-management-study, and should be reviewed prior to commencing work. The body of the report includes information pertaining to potential operational and technological strategies for follow-up exploration in Phase 2 of the study. Appendix A-4 contains a detailed review of the current institutional context for managed lanes policy and systems development in San Francisco, including approval and financial responsibilities.

Project Organization

The Transportation Authority will be the lead agency for this phase of work. Other participating agencies include the California Department of Transportation (Caltrans), and the San Francisco Municipal Transportation Agency (SFMTA). Roles include:

- **Transportation Authority:** lead agency, including overall project management; lead for public, stakeholder, and policy-maker outreach; lead for inter-agency coordination; and management of consultants
- **Caltrans:** technical review
- **SFMTA:** review of proposed designs including lane and intersection configurations, traffic controls and any effects on local streets and arterials, including transit lanes; review of traffic analysis

SCOPE OF SERVICES

The Transportation Authority seeks consultant services to support the Freeway Corridor Management Study Phase 2, which will explore feasible strategies to both manage demand and increase reliability in the freeway corridors in San Francisco. The study will examine US 101/I-80 and a portion of I-280 for opportunities to provide a managed lane on those corridors that may be restricted by occupancy or price, opportunities to manage ramp access to the freeways, as well as opportunities for other demand- and/or information-based management strategies. A study area will be confirmed through early tasks, but for purposes of this procurement should be assumed to be the US 101 corridor from the San Francisco / San Mateo County Line to the Central Freeway and the I-280 corridor from US 101 to 6th and King Streets. Additional adjacent freeway corridor segments, such as I-80, may be included in the analysis related to certain tasks for operational modeling purposes. The Transportation Authority has budgeted up to $400,000 for this contract.

Project Schedule: The Transportation Authority desires that all tasks outlined in this scope of services be completed within two years from the execution of contract with the selected consultant.

General: The Consultant shall provide qualified planners, engineers and other professionals to provide the requested services. All management, planning, engineering and design tasks are to be performed in accordance with applicable federal, state and local criteria and guidelines. By submitting a proposal to provide services, the Consultant represents itself as fully qualified to provide the requested services and knowledgeable concerning laws, regulations, and procedures to be followed. The Consultant will be expected to have all capabilities needed to assist the Transportation Authority in the successful completion of this study.

Licensing Requirements: All persons performing work for which the California Professional Engineers Act (Building and Professions Code §§ 6700-6799) requires licensing as professional engineers in the State of California shall be so licensed. Each person shall be licensed in the discipline appropriate for that person's scope of responsibility and anticipated tasks.

Standards and Guidelines: The Consultant shall be versed in design and analysis standards and guidelines of Caltrans, the SFMTA, and the San Francisco Department of Public Works (SF Public Works).

Specific Tasks include the following: 1) Project Initiation and Ongoing Management, 2) Interagency Coordination, 3) Outreach, 4) Goals Framework and Existing Conditions, 5) Physical and Operations Feasibility, 6) Initial Managed-Lane Network Scenario Definition, 7) Demand and Usage Analysis, 8)

Travel Time and Reliability Analysis, 9) Other Management Strategies, 10) Recommendations and Cost Estimate, 11) Implementation Plan, and 12) Final Report.

Proposers may suggest changes/additions/subtractions to the task descriptions and the division of responsibility between the Transportation Authority and the Consultant team as a part of their proposals, but this should be stated clearly, and the value of consultant services must stay within the Transportation Authority's budgeted amount. The Transportation Authority is interested in establishing an efficient process that utilizes both in-house and Consultant expertise.

Task 1. Project Initiation and Ongoing Project Management

The Consultant shall be responsible for:

- Producing a final work plan and schedule for Consultant activities, including a budget by task;
- Revised scope and budget, as needed;
- Project reporting and invoices by task; and
- Monthly progress meetings.

Project team coordination meetings are expected to occur approximately monthly over the course of a two-year study. This task also provides for any ongoing management activity on an as-needed basis.

Deliverables: Project workplan and schedule, monthly progress meeting attendance, regular project reports and invoices, revised scope and budget as needed.

Task 2. Interagency Coordination

Task 2.1 Technical Advisory Committee

Transportation Authority staff will convene and lead an interagency Technical Advisory Committee (TAC). The TAC will consist of at least the following agencies:

- SFMTA
- Caltrans
- California Highway Patrol
- MTC
- City/County Association of Governments of San Mateo County
- San Mateo County Transportation Authority
- Peninsula Corridor Joint Powers Board (Caltrain)
- Bay Area Rapid Transit District (BART)

Transportation Authority staff will convene the TAC on a quarterly basis throughout the study process to discuss and provide input on other study deliverables.

The Consultant will provide technical support at TAC meetings as needed (eight meetings).

Task 2.2 Other Agency Coordination

Consultant will assist Transportation Authority in preparing for and attending other interagency coordination meetings as needed (two meetings).

Deliverables: Technical presentations, support at TAC and interagency coordination meetings as-needed.

Task 3. Outreach

This task is not a part of this consultant contract but is described for informational purposes.

Transportation Authority will undertake an outreach effort throughout the study process to inform the community of the study and its process and to incorporate community input. Transportation Authority will generate an outreach plan describing key stakeholders and diverse communities, and questions for which to seek input, public outreach and involvement activities, and communication channels to be used, including web-based and culturally appropriate channels. The outreach plan, being prepared by Transportation Authority, will include at least two hosted community meetings, workshops, direct outreach, and regular briefings to the Transportation Authority's Citizens Advisory Committee. Consultant will be asked to provide technical materials and may be asked to attend the meeting to answer questions.

Deliverables: None.

Task 4. Goals Framework and Existing Conditions Characterization

In this task, the study will characterize existing conditions and trends for the study corridors. This work includes gathering, summarizing, assessing, and presenting several types of existing conditions information. Transportation Authority, with assistance from the consultant as needed, will gather information from readily available sources, including, but not limited to: relevant local and regional planning documents; traffic data and collision sources; as-built plans; available mapping and aerial imagery; and travel demand models. This effort will focus on collecting existing data and minimize creation or collection of new data, but the Transportation Authority may request Consultant to do so as appropriate to supplement existing sources. For purposes of this RFP, bidders should assume no data collection for this task and that Consultant effort for this task is limited to analyzing and synthesizing available data in the categories below:

1. Goals Framework - Goals, objectives, and performance metrics, starting from Phase 1 findings. At a minimum, the goals will address: person throughput; travel time and reliability; emissions; safety and equity; and effects on local streets.

2. Facilities Description - Existing freeway facility description: US 101/I-80, I-280. This discussion will include an inventory and analysis of cross sections and dimensions, including number of lanes, profile and elevation relative to surrounding streets, and on-ramp and off-ramp locations, configurations, lengths and profiles. The task will include developing simplified and/or schematic visual representations of this information.

3. Travel Conditions - Existing freeway travel conditions and trends: US 101/I-80, I-280. The task will describe daily volumes, travel speeds and travel time reliability, as well as time-of-day trends, including defining peak periods and describing travel conditions during those periods. The task will describe key congestion locations and analyze causes. The task will characterize recurrent and non-recurrent congestion. The task will describe, either via existing data or new collection, occupancy rates for vehicles in the corridors. The task will describe, either from empirical data or SF-CHAMP-derived projections, existing travel characteristics, markets, and origin-destination pairs for those travelers using the corridors and parallel transit services.

4. Parallel Routes/Services - Other corridor facilities. This task will describe alternate travel routes and modes in the 101/280 corridors, including parallel routes and services which may include Bayshore Boulevard, Potrero Avenue, Alemany Avenue, San Jose Avenue/Guerrero/Dolores Avenue, Junipero Serra/Portola Avenue, Ocean Avenue/Monterey Boulevard, Muni, Caltrain, San Mateo County Transit District, and BART. It will describe current volumes/ridership and service levels as applicable, including by time of day. The consultant will produce metrics describing the local street and transit network as well as the regional transit network. It is anticipated that approximately two freeway-to-freeway interchanges and 50 surface intersections where the freeway and local network interface will be inventoried and described. Collision and safety data will be collected and described, with an emphasis on collisions that occur at the interface between the freeway and local street network.
5. Planned Projects - The list of planned projects is to be developed in consultation with Transportation Authority staff, focusing on projects within the study's time horizon, including adjoining agency projects, which would most affect or be affected by management strategies for San Francisco freeways.

Deliverables: Goals Framework, Conditions Characterization Technical Memorandum.

Task 5. Physical and Operational Feasibility

Task 5.1 Lane Conversion Feasibility

This task will assess the physical and practical operational feasibility of providing an actively managed lane by converting an existing mixed-flow lane on the mainline freeway network and/or local arterial network. The study will focus mainly on HOV conversion but will also explore the feasibility of priced managed lanes consistent to the extent possible with regional approaches. For both left-side and right-side lane concepts, the task will identify the physical design options and constraints, addressing safety and adequacy of right-of-way, lane continuity including weaving areas for merges and diverges, logical endpoints and connections to adjacent counties' facilities, access into and out of the lanes, technology issues, and enforcement issues. The study will consider need for multiple-lane designs. The task will provide both narrative and graphical descriptions of the options and constraints. The study will assess feasibility for freeway portions of US 101/I-80 and I-280 within San Francisco.

As detailed operational analysis and modeling resources are limited, the consultant will use industry-practice-informed professional judgment to assess whether converted lanes would provide a non-negligible positive travel time and/or reliability benefit for lane users, given current operational conditions and constraints, especially for US 101 near I-80, and near any other congested freeway-to-freeway junctions where queue spill-back or bottlenecks may occur (such as the US 101/I-280 junction). In the case where more operational information is required to perform this initial professional judgment assessment, the consultant may perform limited off-model calculations to estimate travel performance. The consultant will use this assessment to inform the feasibility of lane conversion. Alternatives that show exceptional benefit and minimal operational challenges will be identified for accelerated analysis with a goal of expedited implementation. Proposers are encouraged to describe their proposed approach to conducting this task in a defensible way given limited resources.

Task 5.2 Ramp Access Feasibility

Separately, the study may assess the feasibility of actively managing ramp access to US 101 and I-280. The study will consider options including ramp metering and selective ramp access restrictions, such as

HOV and priced access, and include consideration of the freeway-to-freeway ramps as well as the local access ramps. These options will be assessed to determine if active ramp management would provide a non-negligible travel time benefit to freeway users, as well as what impacts may occur to the local street and transit networks as a result.

Task 5.3 Multimodal Safety Analysis

Using data on traffic volume, speed, and recurrent congestion locations collected in Task 4, and based on the analysis conducted in Task 5, consultant will identify interface points between the freeway and local networks that can be reasonably expected to see increased traffic volumes and/or speeds under various operational scenarios that will advance to further analysis. Consultant will also identify all interface points between the freeway and local networks that either fall along the Vision Zero High-Injury Network or have been classified as a Vision Zero High-Injury Intersection.

For those intersections identified, Transportation Authority will coordinate with SFMTA to identify up to five priority ramp touchdown points and associated intersections. Factors potentially including collision history, intersection configuration, signal timing, and traffic volumes will be evaluated. Treatments for these intersections, addressing specific issues identified in the assessment, will be recommended, building off of the Walk First toolbox and in coordination with Caltrans. Recommendations will take the form of narrative descriptions and example images as applicable. Detailed engineering design and graphics are not included in the project scope.

Deliverables: Draft Lane Conversion and Ramp Access Control Feasibility Technical Memorandum, Draft and Final Multimodal Safety Technical Memorandum.

Task 6. Initial Managed-Lane Network Alternative Definition and Screening

Using the results of Task 5, the study will define managed-lane scenarios to test by combining physical network alternatives with operational policy options. The development process will consider alternatives featuring managed lanes and/or ramps on US 101, I-280, or both. These scenarios will be selected to maximize the feasibility of the network and the likelihood of near-term implementation. Under this task, the study will explore HOV (non-pricing) and pricing strategies for the managed-lane network. The consultant will define the pricing schemes to be evaluated, including price levels, times of day, and policy issues such as potential discounts, and, if feasible, include up to two pricing policy alternatives in the managed-lane network alternatives. Alternatives proposing to restrict access to the managed lane will include a definition of the relevant policy, e.g. HOV 2+, HOV 3+, transit, and/or a pricing scheme, including any proposed discount policies. The scenarios may also include ramp access control if warranted based on Task 5 results.

The scenarios will then be analyzed and screened through a process based on performance metrics as defined in Task 4 to produce up to three scenarios for further testing, identifying the advantages and disadvantages, both relative and absolute, of the various potential scenarios. This task will prioritize selecting promising alternatives which feature an HOV, transit, and/or price managed lane. The definition will include a narrative description and a visual representation of the proposed facilities.

This task will entail two rounds of review and refinement: Round 1 with internal Transportation Authority review and comment, and Round 2 with Interagency TAC review and comment.

Deliverables: Round 1 Alternatives Definition, Round 2 Alternatives Definition, Alternatives Definition Report.

Task 7. Demand and Usage Analysis

This task will analyze the travel demand data and facility usage associated with the managed lane alternatives generated in Task 6. The task will produce estimates of demand/usage-related metrics as defined in Task 4 for all the transportation facilities and services of interest to the study. This task will also analyze any strategies prioritized for further study and that are amenable to testing via travel demand analysis as identified in Task 9 Other Management Strategies, which will be undertaken concurrently to Task 5. The analysis will utilize a travel demand model, such as SF-CHAMP. It will include multiple scenarios for a near term future-year horizon:

- Baseline "no-build"
- Proposed managed-lane scenarios (up to three)

The analysis will document assumptions used for future land use and transportation networks. The analysis will use model outputs to calculate metrics for each scenario as defined in Task 4. The analysis will account separately for the use of private transportation services, such as shuttles and ride-hailing services, and their potential use of any proposed managed lanes as defined in the scenarios. Proposers should include in their responses to this RFP their recommended approach for accounting for these private transportation services.

Transportation Authority staff will prepare model inputs in coordination with the consultant. Among the inputs to be determined are transportation network assumptions, including under-construction and already-planned projects, which Transportation Authority and the consultant will consider together. The inputs may also require inclusion of assumptions for how travel conditions relating to specific operational issues identified in Task 5 may change in each scenario that SF-CHAMP does not explicitly estimate. Transportation Authority staff and the consultant will need to determine the appropriate assumptions to make. Transportation Authority staff will generate a model input report that describes the assumptions. Transportation Authority staff will conduct model runs and provide model outputs to the consultant. The consultant will use model outputs to calculate metrics and document the analysis results in a technical memorandum.

Deliverables: Demand Analysis Technical Memorandum.

Task 8. Travel Time and Reliability Analysis

Task 8.1 Sketch-Level Analysis

Conduct a sketch-level based analysis of the travel time and reliability effects of the proposed managed-lane alternatives developed in Task 6, for both current year and a near-term future horizon. The sketch-level analysis will document a methodology to generate estimates of travel time and reliability to compare effects among the defined scenarios. The travel time methodology may use a combination of existing conditions data, case studies from other areas, results from the Transportation Authority's SF-CHAMP travel demand model and/or Dynamic Traffic Assignment (DTA) model, and/or other sources. Use of microsimulation is not anticipated for this subtask, and the effort is anticipated to only involve manual analyses (e.g., hand calculations). The analysis must account for the effects of merge and diverge operations, such as the US 101/I-80 junction, and will provide estimates showing effects for SF-based and –bound travelers separately from all freeway travelers. The reliability methodology may utilize a combination of existing conditions data, case studies from other areas, qualitative description, and/or probabilistic analysis. The analysis will also generate estimates of the effects on parallel routes and services, with attention to potential spillover onto parallel routes and changes in ridership on parallel transit services, as well as the groups of travelers and neighborhoods that would be most affected. With SFMTA oversight, consultant will generate the estimate of effects on travel time and reliability for the

local street and transit network. The Consultant shall clearly indicate the assumptions or recommendations for sketch-level analyses.

Task 8.2 Scenario Refinement

Develop a refined list of up to three scenarios that are operationally and financially feasible. Criteria to be considered will include conclusions and observations from the sketch-level based analysis; existing and required policies; operational characteristics; available and applicable funding; or other factors developed in consultation with the Transportation Authority. All outstanding questions or issues shall be clearly documented for further development in a future phase, such as the Caltrans project development and/or environmental review process.

Task 8.3 Operations Modeling

Create an operations model to support analysis of up to three refined managed-lane concepts resulting from Task 8.2. This effort will focus on the following subtasks:

a. Create, calibrate, and validate a freeway operations model (e.g., FREQ) at a level necessary to further analyze potential operational issues or operationally challenging locations previously identified, including weaving and ramp access restriction analysis, bottleneck locations, and other characteristics that potentially impact freeway operations. The geographic extent of the model will be US 101/I-80 from the southern San Francisco County Line to the Bay Bridge and I-280 from US 101 to 6th Street and King Street. Note that for US 101, the model should be able to account for queue spillback effects caused by Bay-Bridge-bound traffic. The model will cover base and near-term future near-term horizon year scenarios in the a.m. and p.m. peak periods, to be determined based on the findings for time-of-day existing freeway performance that will be completed in Task 4. The model's methodology, assumptions, and validation process will be documented.
b. Use the model to support the preliminary feasibility assessment in Task 5 if needed; and to assist in generating metrics for the travel time and reliability analysis. The model should establish a high-level operational feasibility for the managed-lane scenarios, detailing design elements that appear operationally complex, e.g., that may require managed lanes and general purpose lanes or on- or off-ramps to weave across one another. The analysis must account for the effects of merge and diverge operations, such as the US 101/I-280 junction. The analysis will provide estimates of performance for both managed lanes and general purpose lanes within the corridor. The model will also provide estimates of queuing effects for on-ramps, for the purpose of identifying potential effects to the local network. The model will also provide outputs to inform a reliability analysis.
c. Analyze the results from the modeling, producing metrics and/or visual displays of transportation performance to support the previous analyses. The metrics to be reported will include those needed to calculate overall travel time and reliability estimates and other metrics as identified under Task 4 Goals and Conditions.
d. If needed, refine the modeled scenarios and re-test them for transportation performance. Two additional scenario tests can be assumed.

Task 8.4 Pricing Alternatives Assessment

For those refined scenarios that include a price managed lane, the consultant will use the results from this task and Task 7 to produce conceptual level estimates of overall demand, characteristics of travelers using the freeway and freeway alternatives within the corridor, usage of the managed lanes, and revenues generated, if applicable.

Deliverables: Sketch Travel Time and Reliability Technical Memorandum (including Refined Alternative Recommendation); Calibrated, validated operations model; Model results for one no-build and up to three build scenarios, plus two additional refined scenarios if needed; Refined Travel Time and Reliability Technical Memorandum, including data collection summary and operations model results; Pricings Alternatives Assessment Technical Memorandum.

Task 9. Other Management Strategies

This task will conduct a screening process to select and prioritize the freeway and demand management strategies identified in FCMS Phase 1 Visioning for further study. The task will utilize the evaluation framework devised in the Task 4 Conditions Characterization and provide a narrative description of whether and why each strategy considered is recommended for further study. The screening process will prioritize strategies that have proven benefits in a context relevant to San Francisco. Strategies not meeting this criterion will be removed from further consideration. Of the remaining strategies, the process will determine whether the strategy would address the goals and objectives commensurate to its cost and impacts relative to other options. Chronologically, this task will be undertaken concurrently with Task 5 Lane Conversion and Ramp Access Control Feasibility in order to be used as assumptions as needed in Tasks 6, 7, and/or 8.

Deliverables: Freeway Management Strategy Assessment Technical Memorandum.

Task 10. Recommendations and Cost Estimate

This task will produce a set of recommended freeway management strategies to advance for implementation. The task will utilize the evaluation framework as defined in Task 4 Conditions Characterization, supplying the underlying metrics to determine which strategy or strategies best meet the study's overall goals and objectives. Some of these metrics will derive from microsimulation and SF-CHAMP modeling and some will need to be otherwise generated by the consultant. The recommendations will include consideration of public input and the managed-lane and ramp access control scenarios, as well as any other management strategies as identified in Task 9 Other Management Strategies. The task will consider and produce both near-term and long-term recommendations. For each recommended strategy, the study will generate planning level estimates for both capital and operating costs, based on information from similar projects and programs, and also including costs for development phases, financing and program management. For budgeting purposes, assume costing effort to be completed on six strategies.

Deliverables: Recommendation Technical Memorandum, Cost Estimate Technical Memorandum.

Task 11. Implementation Plan

In this task, the study will create an implementation plan for the recommendations. The implementation plan will address, for all recommended strategies and solutions:

- Federally required documentation and approvals

- Caltrans-required documentation and approvals, including development of a project fact sheet and project charter
- Required legislative approvals
- Local agreements, approvals and/or policy actions
- Community process
- Environmental review process
- Conceptual Cost Estimates
- Possible Funding Sources
- Sequencing of Improvements
- Next-phase project design/development
- Other next steps

The task will describe the scopes of these documents and approvals. The task will identify the type of participation (lead, support, approval, etc.) is needed from the involved agencies, including from the Transportation Authority, the SFMTA, SF Public Works, MTC/Bay Area Toll Authority, other county transportation agencies, Caltrans, and the FHWA. The task will also generate a schedule of activities for implementation of the recommendations.

Deliverables: Implementation Plan Memorandum.

Task 12. Final Report

The consultant will produce a final report describing the results of the study process. The report will summarize previous study products, and those previous study products could be included as appendices to the report itself. The consultant will first produce an annotated outline for review with Transportation Authority staff. After adjustments, the consultant will produce a Round 1 report for Transportation Authority and TAC review and comment. The consultant will incorporate Transportation Authority and TAC comments into a Round 2 report. In addition, the report will include an executive summary of approximately 10 pages. Also in this task, the consultant will provide a presentation slide deck summarizing the study, for use in conducting outreach and the Transportation Authority Board approval process.

Deliverables: Annotated Final Report Outline, Round 1 Final Report, Round 2 Final Report, Final Report Presentation Slide Deck.