ACKNOWLEDGEMENT OF TECHNICAL REQUIREMENTS AND MANUALS AND GUIDELINES

The undersigned, being the parties to the certain Public-Private Partnership Agreement for Presidio Parkway Project dated of even date herewith (the "Agreement") hereby acknowledge that the 321-page Technical Requirements (Volume II), attached to this acknowledgement, consisting of Division I and Sections 1 through 5 of Division II as well as the 11-page Manuals and Guidelines (Volume III) constitute the complete Technical Requirements and Manuals and Guidelines under the Agreement.

Executed as of January 3, 2011.

GOLDEN LINK CONCESSIONAIRE, LLC

By: _____
Name: Kate Speir
Title: General Manager

CALIFORNIA DEPARTMENT OF TRANSPORTATION

By: _____
Name: Cindy McKim
Title: Director

STATE OF CALIFORNIA

DEPARTMENT OF TRANSPORTATION

CONTRACT

NUMBER 04-1637U4

TO DESIGN, BUILD, FINANCE, OPERATE AND MAINTAIN

THE

PRESIDIO PARKWAY PROJECT

THROUGH A PUBLIC-PRIVATE PARTNERSHIP AGREEMENT

Volume II – Technical Requirements

Final

January 3, 2011

Presidio Parkway Project
Public-Private Partnership Agreement
Volume II (Technical Requirements)

DIVISION I

PROJECT REQUIREMENTS

Final

January 3, 2011

TABLE OF CONTENTS

1. MANAGEMENT AND REPORTING 1
1.1. Project Management Plan 1
1.1.1. Initial Project Management Plan 1
1.1.2. Subsequent Project Management Plans 6
1.2. Additional Required Schedules, Reports, and Submittals 10
1.2.1. Progress Schedule 10
1.2.2. Weekly Planning Schedule 10
1.2.3. As-Built Schedule 11
1.2.5. Utility Work Plan 11
1.2.6. Stormwater Pollution Prevention Plan 11
1.3. Meetings and Progress Reporting 12
1.4. Materials 13
1.4.1. Use of Materials 13
1.4.2. Control of Materials 13
1.4.3. Materials Testing 14
1.5. Additional Environmental Work Restrictions and Requirements 14
1.5.1. Noise Control Plan 14
1.5.2. Vibration Monitoring 18
1.5.3. Air Quality 21
1.5.4. Dust Control 22
1.5.5. Sustainability Management Plan 22
1.5.6. Cultural Resources 23
1.5.7. Treatment and Mitigation 25
1.5.8. Meetings 26
1.6. Adjacent Projects 26
1.7. Partnering 26
1.8. FHWA Plans 26
2. SUBMITTALS 26
2.1. Management Processes 26
2.1.1. Meetings 26
2.1.2. Maintenance of Records 27
2.2. Design Documents 27

2.2.1. Design Package Submittals 27
2.2.2. Checking 30
2.2.3. Temporary Works' Design Checks 31
2.2.4. As-Built Record Plans and Reports 31
2.2.5. Submittal Requirements 31
2.3. Certification 32
2.4. Corrections 34
3. OPERATIONS AND MAINTENANCE 34
3.1. Operations and Maintenance Plan 34
3.2. Department's Audit and Access to Records 35
3.3. Department Inspection and Testing 35
3.4. O&M Meetings 35
3.5. Permits Coordination and Inspection 35
4. MANUALS AND GUIDELINES 36
5. THIRD PARTY STAKEHOLDER INTERACTIONS 37
5.1. Presidio Trust 37
5.2. Golden Gate Bridge, Highway & Transportation District Interrelationship with Developer 37
6. PERSONNEL 38
6.1. Developer's Supervisory Personnel 38
6.1.1. Project Executive 38
6.1.2. Project Manager 38
6.1.3. Quality Manager 38
6.1.4. Emergency Supervisor 38
6.2. Developer's Lead Design Personnel 39
6.2.1. Architect of Record 39
6.2.2. Engineer of Record (EOR) 39
6.2.3. Geotechnical Engineer 39
6.2.4. Landscape Architect 39
6.2.5. Arborist 39
6.2.6. Survey Manager 39
6.2.7. Utility Coordination Manager 40
6.2.8. Tunnel Systems Designers and Suppliers 40
6.2.9. SCADA System Provider 40

6.2.10. Electrical System Designer 40
6.2.11. Lighting System Designer 41
6.2.12. Tunnel Mechanical Designer 41
6.2.13. Commissioning Agent 41
6.3. Developer's Lead Construction Personnel 41
6.3.1. Construction Project Manager 41
6.3.2. Superintendant 41
6.4. Developer's Lead Environmental Personnel 42
6.4.1. Cultural Resources Compliance Manager (CM) 42
6.4.2. Water Pollution Control Manager (WPCM) and/or SWPPP Preparer 42
6.4.3. Certified Erosion Control Supervisor 42
6.4.4. Independent Acoustical Engineer 42
6.4.5. Environmental Monitoring Lead 42
6.4.6. Biological Monitor 42
6.4.7. Vibration Monitoring and Analysis Lead 43
6.4.8. Archaeologist 43
6.4.9. Archaeological Monitor 43
6.4.10. Architectural Historian 43
6.4.11. Other Required Developer Personnel 44

1. MANAGEMENT AND REPORTING

1.1. Project Management Plan

Developer shall develop and submit the Project Management Plan (PMP) to the Department in accordance with the requirements of Section 4.2 of the Agreement. Thereafter Developer shall update the PMP as necessary.

The initial PMP shall include the following:

A) Management and Staffing Plan;
B) DBE/UDBE/SBE/DVBE/LBE Plan;
C) Quality Plan (including internal audit schedule);
D) Hazardous Waste Operations, Safety, and Health Plan;
E) Environmental and Cultural Resources Management Plan; and
F) Project Schedule.

All subsequent PMPs shall also include the following:

A) Project Layout Plan;
B) Master ITS / Systems Integration Plan;
C) Tunnel Systems Design Plan; and
D) Workforce Development and Training Program Plan

1.1.1. Initial Project Management Plan

The initial PMP shall, at a minimum, include the following components:

1.1.1.1. Management and Staffing Plan

Developer shall include a Management and Staffing Plan, which identifies key individuals and sets out reporting lines, responsibilities, and authority. The plan shall also include details on how the various organizations within Developer's and Developer-Related Entities' will be interlinked and managed and shall demonstrate how the design, construction, operations and maintenance, and handback responsibilities will be integrated to achieve the whole life cost and construction assumptions. The plan shall also include details of management structures and management systems to be used for design management, construction management, and operations and maintenance management. The plan shall also include details of interface protocols and systems Developer and Developer-Related Entities shall utilize for interaction with the Department, third parties, and the public.

1.1.1.2. DBE/UDBE/SBE/DVBE/LBE Plan

1.1.1.2.1. General

Developer shall prepare a Disadvantaged Business Enterprise/Underutilized Disadvantaged Business Enterprise/Small Business Enterprise/Disabled Veteran Business Enterprise/Local Business Enterprise Participation Program ("DBE/UDBE/SBE/DVBE/LBE Participation Program" or "DBE/SBE Program") that complies with all applicable Laws and Governmental Approvals, is consistent with the Contract Documents, and includes the following elements:

A) A policy statement, signed by Developer's Authorized Representative, which expresses Developer's commitment to utilize DBE/UDBE/SBE/DVBE/LBEs in all aspects of the Work, outlines the various levels of responsibility, and states the objectives of the DBE/SBE Program. Developer shall obtain the written commitment of all Developer-Related Entities to comply with and advance the intent of the policy statement;

B) Developer's designation of a person responsible for the DBE/SBE Program (the "Liaison Officer"), as well as support staff necessary and proper to administer the program and a description of the authority, responsibility, and duties of the Liaison Officer and support staff. The Liaison Officer and staff are responsible for developing, managing, and implementing the DBE/SBE Program on a day-to-day basis, for providing technical assistance to DBE/UDBE/SBE/DVBE/LBEs, and for disseminating information on available business opportunities so that DBE/UDBE/SBE/DVBE/LBEs are provided an equitable opportunity to engage in Work as Contractors. The Liaison Officer shall work in close coordination with the Department or Department designee, and shall report quarterly on Developer's and Developer-Related Entities' success in attaining the established participation goals during the Design Work and the Construction Period, and annually thereafter; and

C) A description of proposed actions to facilitate DBE/UDBE/SBE/DVBE/LBE engagement in Work as Contractors, such as:

1) On-going quarterly strategic planning sessions with the Department or Department designee to establish goals for specific bid item groups by reviewing the work, available firms, strategies, anticipated obstacles and means to overcome obstacles;
2) Conduct bid-item specific outreach meetings in coordination with the Department or Department designee for DBE/UDBE/SBE/DVBE/LBE firms to highlight current and upcoming appropriate sub-contracting opportunities;
3) Solicit statements of qualification, proposals, and/or price quotations from qualified DBE/UDBE/SBE/DVBE/LBE firms and arrange a time for the review of qualifications, plans, quantities, specifications, and delivery schedules, and for the preparation and presentation of proposals and/or price quotations;
4) Provide assistance, in coordination with the Department or Department designee, to DBE/UDBE/SBE/DVBE/LBEs so that these may overcome barriers such as the inability to obtain bonding, insurance, financing, or technical assistance;
5) Develop and conduct information and communication programs or workshops, in coordination with the Department or Department designee, on contracting procedures and specific contracting opportunities in a timely manner;
6) Encourage eligible DBE/UDBE/SBE/DVBE/LBEs to apply for certification with the Department; and
7) Contact local/regional Disadvantaged, Underutilized, Trade-Specific Contractor Associations within the greater San Francisco Bay Area

including Santa Clara, Alameda, Contra Costa, Solano, Napa, Sonoma, Marin and San Francisco Counties and appropriate city agencies with programs for disadvantaged individuals for assistance in recruiting and encouraging eligible DBE/UDBE contractors to apply for certification with the Department.

1.1.1.3. Quality Plan

The initial Quality Plan shall address only design-related activities and does not need to include the construction, operations and maintenance, and handback stages. The Quality Plan requirements are described in detail in Division I, Section 1.1.2.5. All elements of the Quality Plan shall be added to the PMP before Developer or Developer-Related Entity undertakes any work to be covered by these sections of the Quality Plan.

1.1.1.4. Hazardous Waste Operations, Safety, and Health Plan

Developer shall prepare a Hazardous Waste Operations, Safety, and Health Plan for Hazardous Waste Management. The Hazardous Waste Operations, Safety, and Health Plan shall be prepared by a Certified Industrial Hygienist licensed by the American Board of Industrial Hygiene.

1.1.1.5. Environment and Cultural Resources Management Plan

Developer shall prepare an Environmental and Cultural Resources Management Plan that sets out how Developer shall ensure that all obligations in relation to completion of required studies, protection, mitigation, avoidance of impacts, and remediation to the environment, cultural landscape, and cultural built environment are met. The Environmental and Cultural Resources Management Plan shall describe how Developer shall provide, implement, and make use of the secure internet-based collaboration tool for the use of the identified third party stakeholders that may be impacted by Developer's or Developer-Related Entities' activities. In addition, the plan shall identify Developer's Cultural Resources Compliance Manager (CM). Further, the plan shall include the following environmental compliance documentation as described in Division II, Section 3:

A) List of qualified environmental professionals working on the Project;

B) Identification of Project commitments and plan for tracking implementation of required mitigation measures;

C) Environmental monitoring and reporting schedule;

D) Hazardous Materials Management Plan;

E) Noise Control Plan; and

F) Vibration Monitoring Plan.

The plan shall include the sustainability program requirements set out in 1.5.5 of this Division I and Developer and Developer-Related Entities are encouraged to comply with ISO 14001 environmental management systems.

1.1.1.6. Project Schedule

The schedule and supporting data shall be provided using Best Management Practices. All schedule submittals shall comply with the following:

A) The Project Schedule shall show all non-workdays;
B) Each design and construction activity shall be defined;
C) The schedule shall include allowance for permits and for Department and third party processes, review processes, acceptance and return of submittals, samples, and drawings;
D) The schedule shall show the sequence, order, duration, and interdependence of all activities;
E) The schedule shall show all resource dependencies;
F) The critical path shall be identified;
G) Developer shall identify earliest and latest starts and finishes for all activities;
H) Developer shall identify all float; and
I) No negative float will be included.

In determining all relief entitlement, all float shall be assumed available for exclusive use of the Department.

The minimum areas of work to be scheduled shall be those listed in the Schedule of Values and those listed below:

A) Additional activities as determined by Developer;

B) As-built documentation;

C) Baseline reports and surveys timing with all elements defined in Appendix 22 of the Agreement;

D) Building construction;

E) Certification;

F) Clearing and grubbing;

G) Condition surveys;

H) Construction mobilization;

I) Construction Notice to Proceed (NTP 3);

J) Contamination testing;

K) Design and checking identifying each design element;

L) Design Notice to Proceed (NTP 1);

M) Design reviews by the Department;

N) Design survey;

O) Drainage construction;

P) Earthworks / geotechnical;

Q) Effective Date;

R) Equipment and systems purchase;

S) Final Acceptance Date;

T) Financing competition;

U) Foundation construction;

V) Geotechnical investigation;

W) ITS / system integration, installation, and construction;

X) Landscape construction;

Y) Lighting construction;

Z) Materials quality tracking;

AA) Mitigation and protection measures for historic buildings and artifacts;

BB) O&M Notice to Proceed (NTP 2)

CC) O&M Plan;

DD) O&M ramp-up and training;

EE) Permits (including NEPA and building permits);

FF) Roadway construction;

GG) Signal Construction;

HH) Signing and pavement markings;

II) Substantial Completion date for all Work;

JJ) Substructure construction;

KK) Superstructure construction;

LL) Testing including factory acceptance;

MM) Traffic management identifying each phase;

NN) Tunnel systems;

OO) Utility coordination / adjustments / relocations;

PP) Vibration Monitoring Plan submittal; and

QQ) Walls construction.

The Project Schedule shall adequately reflect how Developer intends to phase and sequence the Project (including any proposed segmentation of the Project). Developer shall submit schedule files to the Department in an electronic format suitable to the Department, which is currently Primavera Project Management (P5), Service Pack 2.

1.1.2. Subsequent Project Management Plans

Subsequent Project Management Plans shall contain the components of the initial Project Management Plan and the components described below. The plans described below shall be added to the PMP as they become available or as described below. Developer shall update the PMP on an ongoing basis. Developer or Developer-Related Entities shall not commence any work after NTP 2 until the PMP has been updated to include all of the items required under the initial PMP plus the following additional items:

1.1.2.1. Project Layout Plan

Developer shall prepare a plan that sets out Developer's proposals for how the Project is to be sequenced or phased, including any proposed segmentation of the Project (defined by mainline stationing). The plan shall set out how the segments or phases interact to maintain traffic flows while enabling progress with construction, testing and commissioning.

1.1.2.2. Master ITS / System Integration Plan

Developer shall prepare a plan setting out how Developer shall design, procure, install, test, commission, operate and maintain the ITS facilities and set out how Developer shall integrate the ITS facilities with those of the Department and for training of Department staff on the systems provided to the Department.

The plan shall incorporate the principles and procedures that have been agreed upon by Developer with the operators of the adjoining road network and emergency, security and law enforcement agencies such that a unified approach to traffic and incident management on the Project and surrounding road network shall be achieved. The plan shall set out the process for review and development of the principles and procedures on an ongoing basis.

1.1.2.3. Tunnel Systems Design Plan

Developer shall prepare a plan setting out how Developer proposes to design, procure, install, test, commission, operate and maintain the Tunnel Systems. Developer shall set out the intended management of the interface process with the State Fire Marshall, first responders, and other emergency, security and law enforcement agencies. Further Developer shall set out the process for integrating the Tunnel System facilities with those of the Department and the California Highway Patrol for training of and coordination with the Department and the California Highway Patrol staff.

1.1.2.4. Workforce Development and Training Program Plan

1.1.2.4.1. Workforce Program Development

Developer shall prepare and implement a plan to work closely with the Department or Department designee to explore the feasibility of promoting job opportunities associated with the Work (the "Workforce Development and Training Program" or "Workforce Program"), and shall ensure that the Workforce Program is comprehensive and equitably distributed among all Developer-Related Entities. This Workforce Program shall include a full complement of workforce services including, but not limited to: job identification, community education and

outreach, candidate recruitment/screening/referral, job training, job retention support, and progress monitoring/tracking/reporting and the following:

A) Job Identification & Development of a Job Referral Process: For each aspect of the Work, Developer shall work with the Department or Department designee to develop and implement a plan to identify potential and appropriate job opportunities for local candidates. These activities will be completed prior to NTP 2. Developer and Developer-Related Entities shall also utilize relationships with union locals to work through employment referral or dispatch issues for any of the identified positions;

B) Community Education & Outreach: Developer shall prepare and implement a plan to utilize existing networks of community-based organizations, San Francisco's CityBuild Program, the San Francisco One-Stop system, and relationships with the building trades and unions to inform the wider community about Work-related employment opportunities available; establish and manage the employment referral process that will be utilized for the Project; and be responsive to inquiries from interested job seekers. Developer shall report monthly on its plan-related community education and outreach efforts during the Design Work and the Construction Period, and semi-annually thereafter. Such reports shall include documentation of any relevant meetings and community education and outreach events;

C) Identification and Screening of Job Seekers: Developer shall prepare and implement a plan to disseminate the job requirements for each available position throughout its recruitment network and screen candidates prior to placement. This plan shall ensure that only interested, qualified and job ready candidates are referred for open positions;

D) Outreach and Education with Developer-Related Entities: Developer shall prepare and implement a plan to work closely with all Developer-Related Entities to ensure they are fully integrated in the workforce development referral process, understand their obligations within the Workforce Program, and be knowledgeable about the array of services that Developer will be providing throughout the Term;

E) Management of the Job Referral Process: Throughout the course of each contract between Developer and a Contractor, Developer shall implement a plan that will be responsive for managing all aspects of the job referral process. This would include keeping the Department or Department designee informed and preparing progress reports as requested by the Department;

F) Special Training Capacity: Developer shall prepare and implement a plan to work with existing local workforce development programs such as CityBuild and its training partners (i.e. City College of San Francisco, Laborers Regional Training Center) to have the ability to respond to almost any worker training request. This plan shall anticipate providing, as necessary, specialized training for Safety, Hazardous Materials Handling, Green Building Practices, and Environmental Sampling and Monitoring;

G) Job Training: Developer shall prepare and implement a plan to ensure that all Developer's and Developer-Related Entities' personnel receive adequate training to fulfill the requirements of their respective positions in accordance to the Contract Documents. Specific job training requirements are described in Division I and Division II; and

H) Workforce Monitoring and Reporting: Developer shall prepare and implement a plan to track and report on a monthly basis during the Design Work and the Construction Period, and semi-annually thereafter, individual and programmatic level Workforce Program progress. The plan should address how electronic payroll reporting programs will be utilized to track and report on workforce development goal attainment.

1.1.2.5. Quality Plan

1.1.2.5.1. Quality Plan Requirements

The Quality Plan shall cover the design, construction, operations and maintenance, and handback stages of the Project. The Quality Plan is part of the PMP and is subject to the Department's review and comment. The Quality Plan shall contain Developer's Quality Assurance System and Quality Control Program and shall address design, construction, operations and maintenance and handback. Together the Quality Plan, Quality Assurance System and Quality Control Program form the Quality System.

Developer shall implement a Quality Assurance System that includes a system for the monitoring and evaluation of the various aspects of the Project. Developer's Quality Assurance System shall comply with the requirements of ISO 9001.

Developer shall implement a Quality Control Program by which Developer plans to ensure the quality of all aspects required to be constructed, operated and maintained as part of the Project.

Developer shall include a process for the Department to raise nonconformance reports within the Quality System. The Quality System shall include procedures for Developer to report and for the Department to monitor status of, and close out of, all nonconformance events throughout the Term.

Developer's Quality Plan shall include, but is not limited to, the following:

A) Document control procedures including control of quality records;

B) Management roles and responsibilities;

C) Resource management and training;

D) Construction inspection, verification, checking, control, and testing;

E) Materials inspection, verification, checking, control, and testing;

F) Design development review, control, checking, and certification;

G) Communication and interface protocols;

H) Reporting protocols; and

I) Internal Audit Schedule

The Quality Plan shall describe the quality control procedures to be utilized to verify, check, and review all design, drawings, specifications, and other documentation prepared as a part of the Project. In addition, the Quality Plan shall include a quality assurance program to confirm that the quality control procedures are being followed. Developer shall describe how the checking and review processes are to be documented and by whom to verify that the required procedures are followed.

1.1.2.5.1.1. Quality Control Program Inspections of Materials and Equipment at Source

At the Department's option, the Department will inspect materials or equipment at the source of supply, manufacture, or fabrication; however, Developer must provide the Department with unrestricted entry at all times to such parts of the facilities that concern the manufacture, fabrication, production, or testing upon reasonable notice from the Department. Developer shall bear all Developer and Developer-Related Entities' costs in determining whether the material or equipment meets the requirements of the Contract Documents. Developer shall detail these arrangements in the Quality Control Program.

Developer shall provide all necessary inspection to ensure effective quality control of the operations related to materials and equipment acceptance. Developer and Developer-Related Entities must maintain a record of all inspections, including but not limited to, date of inspection, sampling and testing undertaken and results of such sampling and testing. The Quality Control Program shall set out Developer's and Developer-Related Entities' procedures for inspection, sampling, testing and recording to be performed by or for Developer.

1.1.2.5.1.2. Quality Control Program Notification of Placing Order

Developer and Developer-Related Entities shall order materials and equipment sufficiently in advance of their incorporation in the work to allow time for sampling, testing and inspection. Developer shall provide notification to the Department prior to placing orders for materials and equipment and the procedure for this shall be detailed in the Quality Plan.

Developer shall notify the Department at least thirty (30) days before beginning any production and include a production and testing schedule in the Quality Plan. The items to be included shall include but not be limited to steel bridge components, overhead cantilevered sign supports with cantilevered arms exceeding forty one (41) feet, moveable bridge components, ITS and Tunnel Systems or any other item identified as an item requiring commercial inspection in the Contract Documents.

1.1.2.5.1.3. Additional Quality Control Program Provisions

Developer shall ensure that prestressed concrete plants supplying materials for the Works are qualified. Obtaining qualification will require a current Precast/Prestressed Concrete Institute (PCI) certification and an approved Quality Control Program. The processes to be used by Developer to ensure these requirements are complied with shall be detailed in the Quality System

Developer shall ensure that the fabricators of steel and miscellaneous metal products who supply materials for the Works are qualified. Obtaining qualification requires an accepted Quality

Control Program. A current American Institute of Steel Construction, Inc (AISC) certification and ASTM certification is a requirement for the Quality Control Acceptance Program of the steel and miscellaneous metal fabricators, provided that AISC and ASTM certification program is available for the category of the fabrication products. The processes to be used by Developer to ensure these requirements are complied with shall be detailed in the Quality System.

1.1.2.5.1.4. Quality System Specific Operations and Maintenance Requirements.

The Quality Plan shall set out Developer's self-monitoring process and shall be utilized to monitor the performance and quality of Developer's and Developer-Related Entities' Operation and Maintenance (O&M) Work, as well as to verify conformance to procedures, plans and accuracy of monitoring and reporting. The Quality Plan shall detail the quality assurance systems and procedures provided for validating the information accuracy and results in the O&M Monthly Reports, O&M Annual Reports and Renewal Work Reports. The O&M Quality Management System shall include at a minimum, procedures to validate the data, times, dates, other information and calculations that form the basis of the Availability Payment calculations, Construction Noncompliance Events, O&M Noncompliance Events, Closures, Construction Closures and Noncompliance Points.

1.1.2.5.2. Quality Plan Review and Acceptance

The Quality Plan shall be revised when it is evident that noncompliance with the Contract Documents is not being properly registered as a noncompliance or nonconformance within the Quality System.

Developer shall submit any revision to the Department for review and comment. The Department will respond to Developer within seven (7) days of receipt of any revised Quality Plan.

1.1.2.6. Health and Safety Plan

Developer shall prepare, implement, manage, operate and as required update a Health and Safety Plan that complies with all Applicable Law and Best Management Practice. Developer shall submit the plan to the Department, thirty (30) days prior to commencing work to be covered by the plan. The plan shall cover all aspects of the Work and shall include details of the training to be provided by Developer or Developer-Related Entities for Department staff and representatives required by their duties to visit the Project or facilities to be used for the production of materials or equipment.

1.2. Additional Required Schedules, Reports, and Submittals

1.2.1. Progress Schedule

On or before the last day of each month, Developer shall submit to the Department an updated schedule showing the status of Work actually completed during the preceding period.

1.2.2. Weekly Planning Schedule

Developer shall submit a two-week "look ahead" planning schedule at each weekly planning meeting, showing the items of work planned for the next two (2) weeks.

1.2.3. As-Built Schedule

As a condition for Final Acceptance, Developer shall submit an as-built schedule that describes the actual order and start and finish times for all activities associated with the Phase II Construction. Developer shall submit the as-built schedule to the Department for review and comment fifteen (15) days prior to the anticipated date for Final Acceptance.

1.2.4. Survey Records and Reports

Survey records shall be submitted to the Department in both hardcopy and electronic file format. They shall be delivered to the Department within sixty (60) days of completion of the survey work.

A survey report shall be submitted to the Department for review and comment within sixty (60) days of the completion of each survey regardless of the type of survey performed. The report shall be in a hardcopy format and also in electronic file format when possible. The report shall include information related to the source data used, the calculations performed, and the data produced as part of the survey process. At the request of Developer the Department will provide the format specifications that are acceptable to the Department for each report type. Each report shall be reviewed and signed by the Survey Manager.

1.2.5. Utility Work Plan

Developer shall submit a Utility Work Plan that sets forth Developer's plan to coordinate all utility Work for the Project. Developer's Utility Work Plan shall include, but is not limited to, the following requirements:

A) A detailed description of Developer's plan to identify and locate utilities;

B) A detailed description of Developer's plan to coordinate activities with each Utility Agency Owner (UAO);

C) A detailed description of Developer's plan to coordinate activities with the UAOs on unknown or newly discovered utilities; and

D) A detailed description of how Developer will either relocate or replace all affected utilities at Developer's or Developer-Related Entities' expense.

1.2.6. Stormwater Pollution Prevention Plan

Developer shall design and implementation erosion control and sedimentation prevention measures. The erosion control plan shall comply with the requirements of the National Pollutant Discharge Elimination System (NPDES), in accordance with the Department's Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual. The Plan shall include detailed limits of all erosion control elements.

1.3. Meetings and Progress Reporting

Developer and Developer-Related Entities shall attend periodic meetings with Department personnel and other agencies as required for resolution of design, construction, operations and maintenance, and/or handback issues. These meetings may include:

A) Partnering meetings;

B) Department technical issue resolution meetings;

C) Design workshops;

D) Disputes Review Board meetings;

E) Permit / resource agency coordination;

F) Local government agency coordination;

G) Scoping meetings;

H) Progress meetings;

I) Utility meetings;

J) Drainage meetings; and

K) Treatment Oversight Panel meetings.

Commencing at NTP1 Developer shall meet with the Department on a monthly basis and provide a monthly look ahead of the activities to be completed during the upcoming month including details of planned traffic management measures and lane closures.

Before Developer or Developer-Related Entities begin actual construction, the Department will call a preconstruction conference to review construction and operations and maintenance aspects of the Project. Developer, Lead Contractor and Lead Operations and Maintenance Contractor will attend this meeting, along with the Department and other involved parties and stakeholders as deemed necessary.

Between NTP 2 and Substantial Completion, in addition to the required formal monthly progress meetings described in Section 4.14.2 of the Agreement, Developer shall meet with the Department on a weekly basis and provide a two-week look ahead for activities to be performed during the coming two (2) weeks.

Throughout the Term, Developer shall, on a monthly basis, provide written progress reports to the Department that describe the work undertaken, progress on each task, areas of concern and a summary of the non conformances raised through the Quality System.

1.4. Materials

1.4.1. Use of Materials

1.4.1.1. Use of Materials on the Project Right of Way

1.4.1.1.1. Removal and Disposal of Structures and Obstructions

Existing highway facilities that are within the Project Right of Way, that are to be removed, shall become the property of Developer, except where excluded by the Contract Documents, and shall be removed and suitably disposed of by Developer or Developer-Related Entity, at no additional compensation or extension of Final Acceptance Deadline.

1.4.1.2. Salvaged Material

Developer shall maintain adequate property control records for materials or equipment specified in the Contract Documents to be salvaged for the Department or other designated parties. Developer shall be responsible for the handling, storage, transportation, removal and protection of salvaged materials and equipment and shall be responsible for all associated costs.

1.4.1.3. Temporary and Interim Structures, Facilities, and Systems

Developer shall provide and maintain all temporary structures, facilities, and systems required for the Project. Developer is required to operate and maintain those temporary structures, facilities, and systems provided by the Department as detailed in the Contract Documents. Temporary structures, facilities and systems may include, but will not be limited to, interim water supply, interim power, Tunnel Systems and lighting.

1.4.1.4. Maintenance of Site and Adjacent Properties

The Project is to be constructed and operated with live traffic on or adjacent to the Site. Developer shall use Best Management Practices in caring for the workforce and traveling public and adjacent properties and occupants and users.

1.4.2. Control of Materials

1.4.2.1. Defective Materials and Equipment

Developer shall not incorporate defective materials or equipment within the Work.

1.4.2.2. Certificates of Compliance

A Certificate of Compliance shall be furnished prior to the use of any materials for which the Contract Documents require such a certificate.

A Certificate of Compliance shall be furnished with each lot of material delivered to the work and the lot so certified shall be clearly identified in the certificate. The fact that material is used on the basis of a Certificate of Compliance shall not relieve Developer of responsibility for incorporating material in the Work which conforms to the requirements of the Contract Documents.

1.4.3. Materials Testing

Developer or Developer-Related Entities shall perform verification sampling and testing in accordance with the Contract Documents and the Quality Plan.

Developer shall be responsible for acceptance and verification sampling and testing on site as well as at off site locations. The acceptance and verification testing shall be conducted by independent laboratories at Developer's or Developer-Related Entities' cost. The Department's conflict of interest policy on verification testing shall apply.

The Department reserves the right to perform independent verification, independent assurance, independent audit and independent testing.

1.5. Additional Environmental Work Restrictions and Requirements

1.5.1. Noise Control Plan

The Project area includes adjacent land uses that will be affected by noise and vibration from construction, operations and maintenance activities. Developer shall be responsible for all abatement and mitigation of construction, operation and maintenance noise to acceptable levels as measured within the Project Right of Way and at nearby residential and commercial noise-sensitive receptor locations.

Developer shall prepare and implement a Noise Control Plan. In addition to construction the Noise Control Plan shall address the operations and maintenance of the Project. Developer shall implement noise control measures and monitor sound levels during construction. Developer shall comply with noise control provisions within the Department Standard Specifications and Standard and Special Specifications and provisions provided within the Contract Documents. In particular, Developer and Developer-Related Entities shall comply with the requirements of the Right of Entry Agreement. If any of the requirements or obligations are in conflict then the most onerous obligation will take precedence. Developer shall submit the Noise Control Plan to the Department for review and comment thirty (30) days prior to NTP 2.

Except for the work described in points A) to F) below the Noise Control Plan shall set out how Developer shall ensure that the average hourly noise level (hourly Leq) and hourly maximum noise level (Lmax) from Developer's operations shall not exceed the ambient baseline Leq or baseline Lmax by more than five (5) decibels measured before Construction Work begins at a minimum of sixteen (16) receptor locations adjacent to the location of the source of the noise generating activity:

A) Work performed during normal work hours;

B) Continuous operations for the weekend traffic switch between stages or to final traffic configuration;

C) Tunnel excavation by the nature of their size or complexity that require to extend beyond normal working hours to ensure the safe execution of the Works;

D) Concrete pours by the nature of their size or complexity that require to extend beyond normal working hours;

E) Continuous drilling; and

F) Work, during noise restricted work hours, performed on mainline Highway 1, mainline Highway 101 and the ramps to these routes.

Developer shall notify, through the Department, the Presidio Trust at least seventeen (17) days in advance of commencing such work as described in items (B) through (F) above in accordance with Volume II, Division I, Article 2.

1.5.1.1. Noise Restricted Work Hours

The following periods are deemed to be noise restricted work hours:

A) Monday through Thursday 7:00 pm to 7:00 am

B) Friday 7:00 pm to Saturday 9:00 am

C) Saturday 6:00 pm to Monday 7:00 am

During noise restricted work hours, Developer shall not allow noise generation to exceed five (5) decibels above ambient noise levels, measured at the closest point of the nearest of:

A) occupied residential tenanted building; or

B) occupied commercial tenanted building in which business activity is occurring outside of work hours.

It is generally acknowledged that Work may be required during noise restricted work hours. To the extent that Work during noise restricted work hours does not exceed the above noise restriction criteria, Developer shall notify, through the Department, the Presidio Trust at least seventeen (17) days in advance of commencing such work in accordance with Volume II, Division I, Article 2.

It is further acknowledged that certain Work may be required during noise restricted work hours that may exceed the above noise restriction criteria. Such Work may include but not be limited to, concrete pours, Tunnel excavation, continuous drilling, weekend Closures, and construction activities that once commenced must proceed to conclusion. To the extent that such Work exceeds the above noise criteria during noise restricted work hours, such Work shall be exempted from the above noise restriction provided that Developer shall submit a work plan proposal to the Department for review and comment at least twenty (20) days in advance of any such proposed periods of work, and notify, through the Department, the Presidio Trust at least seventeen (17) days in advance of commencing such work in accordance with Volume II, Division I, Article 2.

Notwithstanding the above exceptions, noise levels for Construction Work performed on Sundays shall not exceed 5 decibels above ambient measured at the closest point of the nearest (a) occupied residential tenanted building or (b) occupied commercial tenanted building in which business activity is occurring.

No delivery and hauling vehicles are allowed to idle for more than five (5) minutes within the Presidio.

No work will be performed in the Presidio (Rte SF-1 PM 5-90/7.1, SF-101 PM 8.05/9.85) on days listed below:

Table 2.1 Presidio Restricted Days

Presidio Event	Date of Event
Emerald Nuts across the Bay 12k	2nd Sunday in March
Girl Scout Golden Gate Bridging Ceremony	2nd Saturday in May
Annual Memorial Day Observance	Memorial Day
Anchorman Escape from Alcatraz Triathlon*	1st or 2nd Sunday in June
Golden Gate Triathlon	3rd or 4th Sunday in June
Avon 2 Day Walk	2nd Saturday and Sunday in July
San Francisco Marathon	Last Sunday in July
Aloha Festival Event	First full weekend in August
Film in the Fog	Last Saturday in September or 1st Sunday of October
Susan G. Komen 3-Day Breast Cancer Walk	First full Friday - Sunday weekend in October
KNBR Bridge to Bridge Run	First Sunday of October
Fleet Week/Blue Angel Performances	2nd or 3rd weekend of October
Nike Marathon	3rd Sunday of October
U.S. ½ Marathon	2nd or 3rd Sunday of November

*Note: Alcatraz Triathlon is tide dependant and may take place between June and September.

1.5.1.2. Noise Monitoring

When work is performed during normal work hours or noise restricted work hours, including excepted work as detailed in 1.5.1.1 above, Developer shall conduct continuous noise monitoring at a minimum of sixteen (16) receptor locations. The noise monitoring equipment shall be capable of providing a real time alert to Developer's Supervisory Personnel and the Engineer of Record when noise levels (Lmax or Leq) are exceeded. The noise monitoring system shall store the following measured acoustical data:

A) Hourly Leq, hourly Lmax;

B) Start time and duration of each exceedance event;

C) The maximum sound level measured during each exceedance event; and

D) Continuous audio recordings:

1) If no exceedance event occurs, the audio recordings may be deleted after 48 hours; and

2) Retain at least sixty (60) seconds of audio recording directly preceding and following the exceedance event for submission to the Resident Engineer.

Developer shall provide the Department with a daily summary of all noise monitoring data and audio recordings of exceedance events in a format suitable to the Department. The daily summary shall include descriptions of operations including time and locations of work. Copies of all documentation must be kept for a minimum of one (1) year after Final Acceptance. The daily report shall be signed by Developer's Project Manager or designee and submitted to the Department within twenty four (24) hours.

If the noise level of work during Noise Restricted Work Hours exceeds five (5) decibels above baseline ambient noise level at the receptor locations, the operation causing that noise shall be ceased immediately. Before resuming this Work, Developer shall submit a revised Noise Control Plan detailing new, revised or additional measures to mitigate the noise and shall not resume Work until the revised plan has been approved by the Department in its good faith discretion.

Developer and Developer-Related Entities shall minimize noise levels of work during normal work hours to the maximum extent possible by applying industry recognized Best Management Practice.

The noise level requirements apply to all aspects of the Project and include all the equipment utilized for the construction, operation and maintenance of the Project, including but not limited to trucks, transit mixers or transient equipment that might or might not be owned by Developer or any Developer Related Entity. The use of loud sound signals shall be avoided in favor of light warnings except those required by safety laws for the protection of personnel.

Additionally, Developer shall be responsible for documenting any adverse impacts on birds as a result of construction noise from the Project. Developer shall monitor long-term disturbance noise (i.e., noise that occurs for several hours a day, on a daily basis) associated with the Project, which could result in changed behavior of bird species at four locations along the Project corridor as detailed in the Avian and Noise Monitoring – Baseline Surveys report and as follows:

A) Two monitoring locations along the southern boundary of Crissy Marsh and Doyle Drive;

B) One monitoring location along Dragonfly Creek on the west side of Route 1;

C) One monitoring location along the southern corner of the Project construction corridor on the east side of Route 1.

Developer shall record noise levels for two events prior to construction activities at each of the locations identified above, and then for one event every three months during construction at each of the identified locations. An event covers a period of two (2) consecutive days. Concurrently with these noise monitoring events, a qualified biologist as described in the Biological

Monitoring Plan, will monitor bird activity for a minimum two-hour period beginning just before the start of daily construction activities. The biologist will survey each of the four noise monitoring locations at least once every three (3) months.

Developer shall use the information to support a "best professional judgment" as to what degree of disturbance Developer's activities are having, if any, on the birds in the ROW or area surrounding the Project. Based on the findings, Developer and Developer-Related Entities shall undertake all reasonable measures that can be taken to reduce impacts on birds, and implement at Developer's or Developer-Related Entities' cost. The information obtained and mitigation measures implemented shall be summarized in an annual report distributed to the Department and Presidio Trust and supported by the views of an independent expert that best professional judgment has been applied**.**

Evaluation of collected data will focus on answering the following questions:

A) Is there a noise level at which certain bird species become noticeably stressed?

B) Is there a noise level at which certain bird activities are adversely affected?

C) If birds are flushed off their nest or out of their feeding area during short-term loud noise events or in response to start of daily construction activities, how long before they return?, and

D) Do certain construction activities appear to have a greater influence than others on bird behavior?

1.5.2. Vibration Monitoring

Developer shall undertake an analysis of all buildings within two hundred feet of any Developer or Developer-Related Entity activity. Where such activity is forecast to exceed the values shown in the following Table 2.2 then Developer, at Developer's or Developer-Related Entities' expense, shall implement protection and stabilization measures necessary to protect the buildings. All proposed stabilization measures shall be completed in accordance with the Programmatic Agreement (PA) and subject to the processes described in Section 2 below.

Developer shall conduct vibration monitoring to ensure protection of the following properties from excessive vibration during construction activities. Additional properties, to be determined by Developer, may require to be monitored depending upon Developer's final design and chosen construction methods:

Table 2.2 Vibration Monitoring Locations and Limits

BUILDING NO. / NAME	MAXIMUM PEAK PARTICLE VELOCITY (INCH/SECOND)
108 Electric Shop	0.3
123 Garage	0.3
150 VAC chapel	0.3
151 VAC house	0.3

BUILDING NO. / NAME	MAXIMUM PEAK PARTICLE VELOCITY (INCH/SECOND)
105 Barrack	0.3
106 Band	0.3
107 Switching station	0.3
108 Electric shop	0.3
122 Gymnasium	0.3
123 Garage	0.3
128 Enlisted family housing	0.3
129 Enlisted family housing	0.3
150 VAC chapel	0.3
151 VAC house	0.3
152 VAC restroom	0.3
153 VAC garage	0.3
154 VAC maint. Garage	0.3
201 Exchange	0.3
204 Exchange	0.3
210 Guard House	0.3
222 Warehouse	0.3
223 Warehouse	0.3
227 Warehouse	0.3
228 Bakery	0.3
229 Bakery	0.3
603 Commissary	0.3
631 Ammunition magazine	0.3
632 Ammunition magazine	0.3
635 Battery Blaney	0.3
636 Battery Sherwood	0.3
649 Army reserve center	0.3
650 Stilwell Hall	0.3
651 Administration	0.3
652 Transformer vault	0.3
654 Guardhouse	0.3
661 Stable	0.3
662 Stable	0.3

BUILDING NO. / NAME	MAXIMUM PEAK PARTICLE VELOCITY (INCH/SECOND)
667 Stable	0.3
669 Incinerator	0.3
681 Barracks	0.3
682 En. barracks and mess	0.3
683 Barracks	0.3
966 Radio	0.3
967 Film Vault	0.3
1063 Med supply	0.3
1151 Pool	0.3
1152 Gym	0.3
1160 Warehouse	0.3
1161 Warehouse	0.3
1162 Warehouse	0.3
1163 Warehouse	0.3
1167 Warehouse	0.3
1169 Warehouse	0.3
1170 Warehouse	0.3
1182 Warehouse	0.3
1183 Warehouse	0.3
1184 Warehouse	0.3
1185 Warehouse	0.3
1186 Warehouse	0.3
1187 Warehouse	0.3
1188 Warehouse	0.3
1263 Enlisted family housing	0.3
1266 Enlisted family housing	0.3
1270 Enlisted family housing	0.3
1289 Enlisted family housing	0.3
1290 Enlisted family housing	0.3
1291 Enlisted family housing	0.3
1293 Enlisted family housing	0.3
Battery Slaughter	0.3
Battery Baldwin	0.3

BUILDING NO. / NAME	MAXIMUM PEAK PARTICLE VELOCITY (INCH/SECOND)
Palace of Fine Arts	0.3
VA Cemetery to first road	0.3

Vibration measurements and recording shall be conducted to form a baseline record before commencement of any construction activities and during pile driving, earthmoving, placing of base material, compaction, paving operations and demolition or other significant activity when that activity occurs within two hundred (200) feet of the above listed properties or any other property within two hundred (200) feet of such construction activities.

The baseline vibration monitoring at each location shall be conducted prior to the start of construction activities.

Vibration monitoring instruments shall be furnished and installed by Developer and shall be capable of continuous operation with instant monitoring and reporting of results.

The vibration monitoring instruments shall be set up in a manner such that an immediate warning is given when peak particle velocity equal to or exceeding 75% of the maximum values is measured as shown in Table 2.2 above. When any reading on the vibration monitoring instrument equals or exceeds values as shown in Table 2.2 above, work shall immediately cease and Developer shall immediately take whatever action is necessary to reduce and maintain the peak particle velocity to below the maximum values as shown in Table 2.2 above.

Developer shall prepare a tabulated report of the measured vibration levels at three (3) axes and associated frequencies. The report shall also include, but not be limited to, the following:

A) measurement location;

B) date; and

C) source of vibration.

The highest measured vibration levels for each axis and their relationship to the criteria shall be included in the report. Developer shall submit the report no later than twenty four (24) hours after each monitoring.

Compliance with this section does not relieve Developer of full responsibility for damage caused by vibration as a result of Developer's or Developer-Related Entities' actions.

1.5.3. Air Quality

Developer and Developer-Related Entities shall comply with all applicable laws and Contract Documents relating to air quality. A copy of the notification form and attachments to be provided as required by the Bay Area Air Quality Management District shall be provided to the Department prior to submittal to the Bay Area Air Quality Management District. Notification shall take place prior to starting demolition or renovation activities as defined in the National Emissions Standards for Hazardous Air Pollutants (NESHAP) regulations.

1.5.4. Dust Control

Developer and Developer-Related Entities shall follow the guidance of the Bay Area Air Quality Management District California Environmental Quality Act Air Quality Guidelines.

1.5.5. Sustainability Management Plan

Developer shall prepare and submit to the Department for review and comment a Sustainability Management Plan that applies to the term of the contract and addresses the goals identified in the Doyle Drive Sustainability Program. These goals should relate to sustainability items that Developer can measure, and that Developer can control and manage. Where applicable, Developer may demonstrate how Doyle Drive Sustainability Program goals are being met through activities in response to other requirements contained within the Contract Documents, such as in Volume II, Division II, Section 3, Article 4.

Specifically, as part of the Sustainability Management Plan, Developer shall develop sections that include the following:

A) Improvement of the energy efficiency.

B) Reduction of dependence on oil.

C) Reduction of greenhouse gas emissions.

D) Reduction of other transportation-related impacts on ecosystems.

E) Materials and resource management.

F) Waste management.

At a minimum, the Sustainability Management Plan shall:

A) identify Project commitments and measurable results to demonstrate performance by the Developer over sustainability items that it can control and manage;

B) identify performance criteria and reporting requirements;

C) describe a plan for implementing activities that meet Project commitments;

D) provide an organizational structure which sets out roles and responsibilities;

E) provide a monitoring and reporting schedule; and

F) provide the means to remedy deviations from the commitments.

All monitoring reports required by the Sustainability Management Plan shall provide sufficient evidence on the measures that have been implemented and describe the effect such measures have had on performance.

The Sustainability Management Plan shall distinguish between the requirements for the construction period as set forth in Division II, Section 3, and the O&M period as set forth in Volume II, Division II, Section 4.

When developing the Sustainability Management Plan it is recommended the Developer use Reference Documents such as, but not limited to, the following:

A) General Reporting Protocol from the Climate Registry (CR) for development of the measurement, monitoring and reporting of GHG emissions;

B) San Francisco Ordinance No. 27-06 (Construction and Demolition Waste Management) for development of waste management practices; and

C) Caltrans Standard Specifications, including Phase 1 Specifications , for development of sustainable material and resource use practices.

Developer is encouraged to refer to the most recent version of The Greenroads Manual when developing the Sustainability Management Plan, to explore obtaining a Greenroads project review prior to NTP 2, and to submit paperwork for a Greenroads certification before the Final Acceptance Date.

1.5.6. Cultural Resources

The San Francisco Presidio is a National Historic Landmark District. Consequently, Developer shall be required to complete aspects of Works that impact cultural resources in compliance with NEPA, CEQA and Section 106 as outlined in the Final EIS/R, Section 106, the Programmatic Agreement, Right of Entry Agreement, and built environment and archaeological treatment plans.

1.5.6.1. Construction Support and Discoveries

1.5.6.1.1. Training

Developer shall conduct training of Developer staff and employees and staff and employees of all Developer Related Entities with respect to treatment, protection and preservation of cultural resources. All field personnel regardless of their position and role shall undergo cultural resources training prior to beginning Work on Site. Evidence of training in the form of employee sign-in sheets, stickers for hard hats, and other tracking measures as identified in the PMP shall be used by Developer to demonstrate compliance with these requirements.

1.5.6.1.2. Monitoring

Developer shall monitor cultural resources as required by the Programmatic Agreement and treatment plans. Monitoring logs shall be produced daily by Developer. These logs shall be made available to the Department and through the Department the Treatment Oversight Panel (TOP) on a daily basis, either by uploading to an electronic document distribution site to be established by Developer at Developer's or Developer-Related Entities' cost or by email. These logs will include at a minimum the following:

A) start and stop times of monitoring;

B) the description and location of monitoring;

C) name(s) of monitoring personnel; and

D) cultural observations.

Department shall be informed immediately if any discoveries are made by Developer or any Developer Related Entity.

1.5.6.1.3. Archaeology

The general parameters for archaeology and archaeological monitoring are provided in the Archaeological Treatment Plan (ATP). Archaeological monitoring shall be undertaken for all areas where ground disturbance is to occur. All archaeological protection measures shall be included on construction plans prior to commencing any work in the area covered by the construction plan. All personnel responsible for ensuring that cultural protection measures are in place and that such protection measures are adequate shall be properly briefed on planned construction activity and provided with copies of all construction plans Developer shall be responsible for ensuring that the protection measures are maintained throughout the period from NTP 2 until Final Acceptance.

If archaeological resources dating to the prehistoric period are found during construction, Developer and Developer-Related Entities shall be required to follow the measures outlined in the ATP for notifying and consulting with Native American signatories to the Programmatic Agreement.

1.5.6.1.4. Built Environment and Cultural Landscape

The general parameters for built environment monitoring are provided in the Built Environment Treatment Plan (BETP). Developer and Developer-Related Entities shall comply with all requirements detailed in the BETP. All known built environment resources within the Area of Potential Effect (APE), including buildings and cultural landscape features, have been identified during previous inventories and Developer shall be deemed to be fully aware of the findings of this work. All known cultural landscape features within the known Temporary Construction Easement (TCE) were identified and documented during the Historic American Landscapes Survey (HALS) inventory, and those resources identified by the Department (in consultation with the Presidio Trust in accordance with Volume II, Division I, Article 5) as requiring preservation have been identified. Developer shall be deemed to be fully aware of the findings of this work. These resources and their protection measures shall be mapped on construction drawings by Developer. Developer shall install, maintain and monitor all necessary protection measures to ensure that both the built environment and the cultural landscape are protected. If any event adversely impacts the built environment and the cultural landscape, Developer shall immediately notify the Department and implement further additional protection measures to prevent further impacts and mitigate consequences.

1.5.6.1.5. Discoveries

It is anticipated that during the design and construction of the Project discoveries of previously unknown cultural and historical resources will occur. The procedures to deal with these discoveries are outlined in the Programmatic Agreement and treatment plans. Developer shall immediately inform the Department of all such discoveries. Department will liaise with other parties regarding how discoveries will be handled to comply with the PA and ATP for archaeological discoveries and BETP for built environment and cultural landscape discoveries. Developer and Developer-Related Entities will cease work immediately in the area of the discovery unless work is required to ensure the safety of the workforce and general public. Developer shall inform the Department of all such discoveries within one (1) hour of making the discovery. The procedures for the discovery and treatment of Native American human remains and compliance with the Native American Graves Protection and Repatriation Act are outlined in the ATP. Work shall not recommence in the area of the discovery until all measures as set out in the contract documents governing discoveries have been completed and the Department has notified Developer that work can recommence.

1.5.7. Treatment and Mitigation

Mitigation measures for all potential resource types are identified in the Programmatic Agreement and treatment plans. As these documents did not contemplate delivery of the Project through the use of a Public-Private Agreement, all approvals related to the PA and treatment plans will be directed through the Department. In cases where Developer or Developer-Related Entities identify Project design elements requiring changes in the APEs or new Section 106 compliance, Developer identifies archaeological site or feature, or Developer identifies potential for previously unidentified built environment impact, Developer shall immediately notify the Department as required by the Contract Documents.

1.5.7.1. Post-Project Mitigation

Developer shall implement all mitigation detailed in the Programmatic Agreement required as a result of the Project. BETP Sections 9.4 through 9.7 provides additional measures that shall be implemented by Developer. All Work shall be carried out by or under the direct supervision of persons meeting the Secretary of the Interior's Professional Qualification Standards and who will be approved by the Department in its good faith discretion.

1.5.8. Meetings

The Department, SFCTA, the Presidio Trust and the National Park Service may request meetings with Developer and Developer-Related Entities to discuss matters relating to landscape and the built environment. Developer shall inform the Department, SFCTA, the Presidio Trust and the National Park Service of any such request and give each fifteen (15) days notice of the proposed date of such requested meeting. Developer shall organize such meeting and shall prepare and distribute a record of the meeting within fifteen (15) days of the meeting.

1.6. Adjacent Projects

Developer shall be responsible for identifying and coordinating Design Work and Construction Work with other on-going projects that are impacted by, or impact the Project. This shall include projects under the jurisdiction of local governments, the Department, or other local, regional and state agencies. It shall be Developer's responsibility to determine the complete inventory of adjoining projects (present and planned) and the required coordination.

1.7. Partnering

The objective of Partnering is to establish a partnership charter and action plan for Developer, the Department and other parties impacted by the activities covered under the Agreement to identify and achieve reciprocal goals. Developer shall organize and host the first workshop within sixty (60) days of NTP 1. Developer shall be responsible for the partnering location and retaining the services of a facilitator.

Partnering workshops shall be held once a year between NTP1 and Substantial Completion.

1.8. FHWA Plans

Developer shall cooperate with the Department and provide all necessary information for the FHWA including input to the FHWA Project Management and Financial Plans.

2. SUBMITTALS

2.1. Management Processes

2.1.1. Meetings

If Developer wishes to hold meetings with the Department, Developer shall provide the Department fifteen (15) days notice prior to the requested meeting date with an agenda and all

supporting documentation. The Department shall confirm within five (5) days if the proposed date is acceptable or if further supporting information is required. If the proposed date is not acceptable to the Department, the Department will propose two (2) alternative dates within a fifteen (15) day period of Developer's proposed date.

After Substantial Completion, Developer shall conduct quarterly review meetings with the Department. At the Department's request, Developer shall require any Developer Related Entity to attend.

2.1.2. Maintenance of Records

Developer shall maintain a full and complete copy of all Contract Documents at Developer's field office during the period from NTP 2 until Substantial Completion.

Developer shall maintain a full and complete copy of all Contract Documents at Developer's home office closest to the Project from NTP 1 until the end of the Term.

2.2. Design Documents

2.2.1. Design Package Submittals

Design Packages shall be submitted in accordance with the Contract Documents and the Project Management Plan. Design Packages shall be complete submittals along with all supporting information necessary for the Department to conduct a review.

2.2.1.1. Conceptual Design Submittal

The intent of the Conceptual Design Submittal as defined below is to provide a formal opportunity for the Department, Developer, various design team disciplines, and other Project stakeholders including the TOP to review the construction plans in order to ensure that the design is progressing appropriately. The plans included in the Conceptual Design Submittal shall reflect Developer's requirements for construction, and the Contract Document requirements for design features. The contents of the Conceptual Design Submittal for each discipline shall include the following documents, if applicable, and other items as reasonably required by the Department:

A) Roads and Roadway Facilities:

1) plans and profiles showing highway geometry (including superelevation), Right of Way limits, critical cross-sections (at 500' maximum intervals), horizontal and vertical clearances, and limits of structural features' locations (bridges, retaining walls);

2) construction sequencing and temporary traffic management proposals with narrative;

3) proposals for pavement design, drainage, lighting, signing and pavement markings, intelligent transportation systems (ITS) and utility relocations; and

4) landscaping.

B) Structures:

1) type selection reports;

2) preliminary general arrangement drawings;

3) preliminary foundation reports;

4) preliminary seismic reports;

5) preliminary hydraulic reports; and

6) preliminary aesthetic treatment proposals.

C) Other Requirements:

1) Design Exceptions' Report;

2) verification of consistency with components already constructed or to be constructed; and

3) summary of the status of any consultations with third parties pertaining to package.

2.2.1.2. Intermediate Design Submittal

The Intermediate Design Submittal as defined below shall include the following packages and shall be prepared and submitted to the Department when the design for a given element or area is 60% complete. The Intermediate Design Submittal shall include plan sheets, specifications, technical memos, reports, studies, calculations, and other pertinent data, as applicable. The Intermediate Design Submittal shall include details of how the Department's comments resulting from the Conceptual Design Submittal have been addressed. The contents of the Intermediate Design Submittal for each discipline shall include the following documents, as applicable and other items as reasonably required by the Department:

A) Roads and Roadway Facilities:

1) as Conceptual Design Submittals but with comments, if any, incorporated and design and reports enhanced through to 60%.

B) Structures:

1) as Conceptual Design Submittals but with comments, if any, incorporated and design and reports enhanced through to 60%.

C) Other Requirements:

1) as Conceptual Design Submittals, together with other specifications, technical memos, studies, calculations and other pertinent data, as applicable.

2.2.1.3. Final Design Submittal

The Final Design Submittal as defined below shall include the following packages and shall be prepared and submitted to the Department when the design for a given element or area is 100% complete. The Final Design Submittal shall include plan sheets, specifications, technical memos, reports, studies, calculations, and other pertinent data, as applicable. The Final Design Submittal shall include details of how the Department's comments resulting from the Intermediate Design Submittal have been addressed. The contents of the Final Design Submittal for each discipline shall include the following documents, as applicable and other items as reasonably required by the Department:

A) Roads and Roadway Facilities:

1) as Intermediate Design Submittals but with comments, if any, incorporated and design and reports enhanced through to 100%.

B) Structures:

1) as Intermediate Design Submittals but with comments, if any, incorporated and design and reports enhanced through to 100%; and

2) independent design check reports on bridge and tunnel structures.

C) Other Requirements:

1) as Intermediate Design Submittals, together with other specifications, technical memos, studies, calculations and other pertinent data, as applicable.

2.2.1.4. Release for Construction Submittals

When all comments from the Final Design Submittal have been addressed and appropriately incorporated, Developer shall submit the following to the Department.

A) Roads and Roadway Facilities;

1) as Final Design Submittals but with comments, if any, incorporated.

B) Structures;

1) as Final Design Submittals but with comments, if any, incorporated.

C) Other Requirements.

1) as Final Design Submittals, together with other specifications, technical memos, studies, calculations and other pertinent data, as applicable; and

2) Developer's Engineer of Record to sign and date their seal on documents, and verify date and revision number on each document.

Release for Construction Submittals shall be delivered to the Department a minimum of fifteen (15) days prior to construction of the relevant Project component and all final submissions shall be signed and sealed by Developer's Engineer of Record.

Developer shall submit to the Department ten (10) hardcopies and ten (10) electronic copies (on CD or DVD) of each Conceptual, Intermediate, Final Design Package, and Release for Construction Submittals. The electronic copies of the plans in each package shall be in pdf format. The electronic copies shall be secured using the Professional Electronic Data Delivery System, and the signed hardcopy of the delivery manifest must accompany each delivery. Each set of component plans (e.g. – roadway plans, structure plans, etc.) shall be submitted as a separate pdf file. Ten (10) electronic copies of design files, calculations, reports, documentation, etc. shall be submitted in their original file formats and in pdf format. CADD files shall be submitted in their original file formats only.

Solely Developer shall bear the risk of any required modifications to the component construction due to subsequent design changes as the result of further design development.

2.2.1.5. Review Process

The Department will, as soon as practicable, and in any event within fifteen (15) days of receipt of a design submittal package, return one copy of the submittal package marked "Reviewed with No Comments" or "Reviewed with Comments".

In the case of a design submittal endorsed "Reviewed with No Comments", Developer may proceed to implementation of the design submittal package or further development of the design.

In the case of a design submittal endorsed "Reviewed with Comments" Developer may request a formal comment resolution meeting by notifying the Department at least five (5) days prior to the requested date of the meeting. Developer shall be responsible for documenting all comments received from the Department and the corresponding resolutions.

In the case of a design submittal endorsed "Reviewed with Comments" Developer may proceed to implementation, or further design development, after having amended the submittal in accordance with such comments but need not resubmit to the Department.

2.2.2. Checking

Developer shall employ a checker for all design work as set out in the following sections. Checker shall either be:

A) an independent firm not related to any Developer-Related Entity, the Independent Checker;

B) an independent team within the Lead Engineering Firm not associated with the Design, the Internal Checker; or

C) an independent team for the checking of Temporary Works; the Temporary Works Checker.

The Checker shall be contracted by Developer at Developer's own cost.

Developer shall have an independent design check performed on all structure designs and plans. The checks shall be performed by the independent checker. Developer shall have all other design checked by the Internal Checker except for Temporary Works which will be checked by the Temporary Works Checker.

2.2.3. Temporary Works' Design Checks

Developer shall submit all Temporary Works Design Documents to the Department for review and comment forty five (45) days prior to any proposed date for fabrication, construction, installation, or erection of such Temporary Works. The Department will have thirty (30) days to review and comment upon the submission.

2.2.4. As-Built Record Plans and Reports

2.2.4.1. Contents

Developer shall produce As-Built Record Plans, as defined in Appendix 1 to the Agreement, documenting the location of the as-built alignments and profiles of each permanent element of the Work built, installed, or relocated by Developer including, Roadway, Structures, utilities, drainage, signage, ITS, Tunnel Systems and survey control monument placement. The reports shall include descriptive statements for the survey methods used to determine the as-built location of the feature being surveyed, as well as the coordinate types (x, y, and/or z) and feature codes in the same format that the preliminary construction data was generated in. The As-Built Record Plans shall also include a description of each permanent element of the Work including each Structure and details of maintenance assumptions made by the Lead Engineering Firm and measures incorporated into the design to accommodate these assumptions.

The As-Built Record Plans shall be split out so that elements of the Works to be returned to third parties prior to the end of Term are included in separate reports and plans from those elements of the Project to be maintained by Developer until the end of Term.

2.2.5. Submittal Requirements

Developer shall submit As-Built Record Plans for the Project in accordance with the Department's procedures. Developer shall furnish two (2) electronic copies in Tagged Image File Format (TIFF) format and two copies in a format compatible with the Department's then current drafting package on CD or DVD of the following to the Department:

A) 11" X 17" As-Built Record Plans (plans must be signed and sealed by a Professional Engineer who is licensed in the State of California);

B) Signed and sealed As-Built Bridge Load Rating (plans must be signed and sealed by a Professional Engineer who is licensed in the State of California);

C) Final documentation (if different from final component submittal);

D) Notice of completion for permits (with all structural elevations signed and sealed); and

E) Quality assurance / quality control certification statement.

With the exception of As-Built Record Plans required for Final Acceptance and As-Built Record Plans required on or about the Termination Date (refer to Sections 4.9.3.1 and 19.6.4.5 of the Agreement), As-Built Record Plans must be submitted within ninety (90) days after Final Acceptance of the Project. The As-Built Record Plans shall be submitted as a composite set of plans for the Project. All documents shall be professionally endorsed (signed, sealed and certified) by Developer's Engineer of Record. The professional endorsement shall be performed in accordance with the Department's Plans Preparation Manual.

2.3. Certification

Developer shall control through the QA system a technical approval and certification system. As a minimum the certification shall include the following:

A) Conceptual Design Certification;

B) Intermediate Design Certification;

C) Final Design Certification;

D) Design Check Certification;

E) Release for Construction Certification;

F) Temporary Works Certification;

G) Temporary Works Check Certification;

H) Temporary Works Erection Certification; and

I) Construction Certification.

Developer shall ensure that all certificates required by the Contract Documents are prepared, signed by all required parties and submitted to the Department.

All Design Documents other than for Temporary Works shall be prepared by or under the supervision of the Lead Engineering Firm. The Lead Engineering Firm shall prepare certificates for each element of the Design Works at each stage of the design process. Developer shall issue such certificates to the Department as part of each submittal detailed in Division I. The Lead Engineering Firm shall submit all Design Documents to the checker at the Final Design stage for review and audit. Only when the checker has been satisfied that such Design Documents meet the requirements of the Contract Documents, the checker shall issue a check certificate in respect of such Design Documents and the Lead Engineering Firm shall certify and release the Design

Documents for construction. Developer shall issue such certificate to the Department before releasing the Design Documents for construction described in this Section 2.2 of Division I.

In the case where such Design Documents do not relate to Temporary Works or to any Bridge or Tunnel structure the Lead Engineering Firm shall submit the Design Documents to the internal checker. The internal checker shall only prepare a design check certificate as described in this Section 2.2 of Division I when it has satisfied itself that the Design Documents meet the requirements of the Contract Documents.

In the case where such Design Documents relate to any structure, the Lead Engineering Firm shall submit the Design Documents to the independent checker. The independent checker shall only prepare a design check certificate as described in this Section 2.2 of Division I when it has satisfied itself that the Design Documents meet the requirements of the Contract Documents.

Where the Design Works relate to Temporary Works the Temporary Works Designer shall prepare a certificate for each element of the Temporary Works. Developer shall issue such certificates to the Department as part of the Temporary Works submittal detailed in this Division I.

For each element of Temporary Works the temporary works checker shall perform an independent check on the Temporary Works Design Documents and prepare a temporary works check certificate. Developer shall issue such certificates to the Department as part of the Temporary Works submittal detailed in this Division I.

For Temporary Works Construction Works the Contractor and Temporary Works Designer shall prepare a Temporary Works Erection Certificate and Developer shall provide the certificate to the Department within three (3) days of the erection, installation provision or construction of the Temporary Works or any modification thereof after the initial erection, installation provision or construction and certification.

For Construction Work the Contractor and Lead Engineering Firm shall prepare a Construction Certificate that is signed and sealed by a Professional Engineer who is registered in the State of California for each permanent element of the Project. Developer shall provide the certificate to the Department within three (3) days of the completion of the element of the Construction Work to which the certificate relates.

The formats of the required certificates under this section of the Contract Documents are set out in the exhibits attached to this Section 2.2 of Division I.

A) Conceptual Design Certificate	Exhibit Division I # 01
B) Intermediate Design Certificate	Exhibit Division I # 02
C) Final Design Certificate	Exhibit Division I # 03
D) Design Check Certificate	Exhibit Division I # 04
E) Release for Construction Certificate	Exhibit Division I # 05

F)	Temporary Works Certificate	Exhibit Division I # 06
G)	Temporary Works Check Certificate	Exhibit Division I # 07
H)	Temporary Works Erection Certificate	Exhibit Division I # 08
I)	Construction Certificate	Exhibit Division I # 09

2.4. Corrections

For Work that Developer or Developer-Related Entities constructs incorrectly or otherwise does not meet the requirements of the Contract Documents, Developer has the prerogative to submit an acceptance proposal to the Department for the Department's approval in its sole discretion. The acceptance proposal shall describe the error or defect and either describe remedial action for its correction or propose a method for its acceptance. In either case, the acceptance proposal shall address structural integrity, aesthetics, maintainability, and the effect on the Project Schedule. Developer's Engineer of Record will perform a technical assessment and this will form part of the submittal to the Department. Where Developer intends to rectify the defect in accordance with the Design Documents and Contract Documents, Developer does not need to submit and the Department is not required to approve an acceptance proposal.

Corrective measures will be Developer's responsibility and shall be carried out at Developer's own cost.

3. OPERATIONS AND MAINTENANCE

3.1. Operations and Maintenance Plan

The Operations & Maintenance (O&M) Plan shall include the Operations Manual and Maintenance Manual. The O&M Plan shall initially address O&M During Construction and be updated during the last annual update cycle prior to Substantial Completion to address O&M After Construction. Developer shall submit six (6) hardcopies and six (6) CD's of the O&M Plan for each of the following submittals to the Department for review and comment:

A) Draft O&M Plan to be submitted no later than ninety (90) days prior to the scheduled date of NTP 2;

B) Final O&M Plan to be submitted no later than thirty (30) days prior to the scheduled date of NTP 2; and

C) Within forty five (45) days prior to the beginning of each Fiscal Year after NTP 2, Developer shall update the O&M Plan to indicate changes to operating protocols, agreements and interactions with other entities, and to indicate the revised operating requirements for equipment.

Developer shall be required to operate and maintain the Project in full compliance with the procedures and standards outlined in the O&M Plan and in the Contract Documents.

3.2. Department's Audit and Access to Records

The Department will have the right to perform periodic audits of Developer's O&M Records in accordance with the Contract Documents to verify that the O&M Work meets the minimum performance requirements specified in Tables 4.1 and 4.2 of Volume II, Division II Section 4.

3.3. Department Inspection and Testing

The Department, at the Department's discretion, may perform periodic inspections and testing of Developer's or Developer-Related Entities' O&M Work to verify that the O&M Work meets the minimum performance requirements specified in Tables 4.1 and 4.2 of Volume II, Division II Section 4. The Department will exercise any rights and remedies under the Contract Documents if the minimum performance requirements are not met.

3.4. O&M Meetings

Developer shall have quarterly meetings with the Department to discuss the O&M Work. The items to be discussed shall include, but not be limited to:

A) O&M Work for the previous quarter, including Incidents/Emergencies and Incident Response coordination, Closures and Permitted Closures;

B) Calculation of the Availability Payment, Milestone Payment, assessment of Noncompliance Points, Construction Noncompliance Events, O&M Noncompliance Events, Closures, Construction Closures and any other pertinent information related to payment adjustments and Noncompliance Points calculation per the Contract Documents; and

C) Anticipated O&M Work for the next quarter, including but not limited to Planned Maintenance, Renew Work and Permitted Closures.

The Department may request a meeting at any time to discuss O&M Work-related issues, accidents and other operations and maintenance aspects of the Project. Developer shall be required to actively participate in other meetings as directed by the Department. Developer shall conduct incident debriefings to review lessons learned and best practices. Developer shall be required to attend quarterly meetings with the Department's Operations Division. The purpose of these meetings will be to review any safety and traffic operations issues or requests on the Project.

3.5. Permits Coordination and Inspection

Developer shall inspect all construction activities resulting from approved permits issued by or to the Department and Developer within the O&M Limits. In the O&M Plan, Developer shall include a Permit Coordination and Inspection Plan which details the coordination and inspection process of permits approved by the Department. Developer shall demonstrate knowledge and understanding of all applicable rules and regulations and provide the necessary personnel to provide permit inspection for the following permits including, but not limited to:

A) Bus Stops, Shelters, and Benches;

B) Highway Beautification and Landscape Management;

C) Regulation of Encroachments Over State Rights of Way;

D) Utilities Installation or Adjustment;

E) Building Moving Permit Regulations;

F) Building Permits for Stabilization;

G) Temporary Closing and Special Use of State Roads;

H) Drainage Connections;

I) State Highway System Connection Permits;

J) State Highway System Access Management Classification System and Standards; and

K) General Use Permits.

Developer shall coordinate with the Department any Permitted Closures that are required as part of this permit work. Inspections shall comply with all State and Federal requirements. Developer shall maintain inspection records for all activities related to the inspections of permit work assigned by the Department. These inspection records shall be included in the monthly maintenance reports.

4. MANUALS AND GUIDELINES

Where Submittals are required under the Manuals and Guidelines, these Submittals shall be subject to the Department's review and comment as Developer's and the Department's rights and obligations with respect to delivery, review and comment regarding such Submittals shall be as set forth in Section 3.3 of the Agreement, the time period for such review and comment shall be as stated in Section 3.3 of the Agreement, and the overall Submittal process shall be as generally stated in Section 3.3 of the Agreement, unless otherwise stated in the Contract Documents, excluding Volume III Manuals and Guidelines.

Sections one (1) through nine (9) of the Department's Standard Specifications shall not apply to the Project, unless otherwise stated in the Contract Documents, excluding Volume III Manuals and Guidelines of the Contract Documents.

All review and oversight functions, except for review of Submittals, identified in the Department's Manuals and Guidelines as being the responsibility of the Department, including an employee or agent of the Department, shall be the responsibility of Developer, unless otherwise indicated in the Contract Documents, excluding Volume III Manuals and Guidelines of the Contract Documents, or otherwise mutually agreed by Developer and the Department.

5. THIRD PARTY STAKEHOLDER INTERACTIONS

5.1. Presidio Trust

The Presidio Trust is the primary agency responsible for the majority of the area immediately surrounding the Project. The Presidio Trust is also the primary landowner affected by Work to be performed by the Developer. As such, the Developer shall interface with the Presidio Trust in respect of the Works to be returned to the Presidio Trust at Substantial Completion or Final Acceptance. Developer shall in addition to the design submittals required under this Article, consult the Presidio Trust on all design matters as they related to Works to be returned to the Presidio Trust at Substantial Completion. The process for such consultation shall be as follows:

A) Developer shall send all correspondence regarding design of elements to be returned to the Presidio Trust required by the Contract Documents to the Department.

B) The Department will convey all correspondence requiring submission to the Presidio Trust to the appropriate representatives of the Presidio Trust within five (5) days of receipt from Developer.

C) Provided that Developer's design meets the requirements of the Contract Documents, the Department will seek to obtain the views, comments, requests, recommendations, or approvals from the Presidio Trust within thirty (30) days of receipt of the correspondence by Presidio Trust.

On or before Substantial Completion and Final Acceptance as appropriate the Developer shall furnish to the Department a letter of confirmation that all works to be returned to the Presidio Trust satisfy all the requirements of all agreements, permits and the Contract Documents.

5.2. Golden Gate Bridge, Highway & Transportation District Interrelationship with Developer

All approaches, requests, correspondence, or submittals made to the Golden Gate Bridge, Highway & Transportation District (GGBHTD) will be made by the Department on Developer's behalf. Section 3.2.3.2 of the Agreement shall apply to all such approaches, requests or submittals.

As part of the process for obtaining approval from GGBHTD to enter and construct upon GGBHTD property, the design of the works within the GGBHTD permit area must be approved by the GGBHTD. The process for obtaining this approval is set forth below.

(A) The Department will convey all correspondence requiring submission to the GGBHTD to the appropriate representatives of the GGBHTD within five (5) days of receipt from Developer including the appropriate design submissions in accordance with this Article.

(B) Provided that Developer's design meets the requirements of the Contract Documents, the Department will seek to obtain the views, comments, requests, recommendations or approvals from the GGBHTD within thirty (30) days of receipt of the submission by GGBHTD.

(C) The Department will forward to Developer all written responses, correspondence, documents, comments, requests, recommendations, approvals and disapprovals within five days after the Department receives the same from GGBHTD.

6. PERSONNEL

6.1. Developer's Supervisory Personnel

Developer shall maintain a competent Project Manager or one of its Department-approved designees at the Site at all times while Work is in progress to act as Developer's agent. Such supervisory personnel must be competent and capable of properly interpreting the Contract Documents and be thoroughly experienced in the type of work being performed. Such supervisory personnel must have the full authority to receive instructions from the Department and to execute the orders or directions of the Department and direct any Developer or Developer-Related Entity activity necessary to comply with the Contract Document.

6.1.1. Project Executive

The Project Executive is the individual designated and engaged by Developer and approved in writing by the Department in the position to take overall responsibility for the Project and who will act as a single point of contact on all matters on behalf of Developer.

6.1.2. Project Manager

The Project Manager is the individual designated by Developer and approved in writing by the Department in the position to take full responsibility for the execution of the Work.

6.1.3. Quality Manager

The Quality Manager is the individual retained by Developer with the authority and responsibility for quality management system-related activities for all Work, including the establishment and maintenance of, and compliance with the Quality Plan. The Quality Manager must have defined authority for ensuring the establishment and maintenance of the Project Management Plan and reporting to the Department on the performance of the Project Management Plan, irrespective of his/her other responsibilities.

6.1.4. Emergency Supervisor

Developer must provide a responsible person, who speaks and understands English fluently, and who is available at, or reasonably near, the Site on a twenty four (24) hour basis, seven days a week. Developer shall designate this person as the point of contact for emergencies and in cases that require immediate action to maintain traffic or to resolve any other problem that might arise. Developer shall also submit, by certified mail, the phone numbers and names of personnel designated to be contacted in cases of emergencies, along with a description of the project location, to the California Highway Patrol and all other local law enforcement agencies.

6.2. Developer's Lead Design Personnel

6.2.1. Architect of Record

The Architect of Record is the Architect registered in the State of California that approves architectural documents on behalf of Developer.

6.2.2. Engineer of Record (EOR)

The Engineer of Record is the Professional Engineer registered in the State of California retained by Developer or the Lead Engineering Firm that performs the design and analysis, and is responsible for the preparation of the Design Documents. This designation also applies to the Shop Drawing checker and certifier retained by Developer or the Lead Engineering Firm regardless of whether that party is normally the Engineer of Record or a Specialty Engineer.

6.2.3. Geotechnical Engineer

The Geotechnical Engineer is a person employed by Developer who is an experienced and qualified geotechnical engineer registered in the State of California.

6.2.4. Landscape Architect

The Landscape Architect is a person employed by Developer who is licensed to practice landscape architecture in the State of California.

6.2.5. Arborist

The Arborist shall be certified by the International Society of Arboriculture with knowledge and experience in each of the following, including but not limited to:

A) Tree and shrub identification, inventory and plant appraisal methodology;

B) City tree protection ordinances related to Right of Way (ROW) for transportation projects;

C) Tree protection measures;

D) Tree transplanting procedures;

E) Hazard tree identification and removal;

F) Identification of State of California-listed prohibited noxious weeds and restricted noxious weeds and the application of weed control or removal methods; and

G) Erosion Control.

6.2.6. Survey Manager

The Survey Manager shall be a licensed Professional Land Surveyor in the State of California. The Survey Manager shall manage all Developer survey activities associated with the Project and shall be responsible for directing and reviewing all Developer survey work and be the point of contact for all survey activities.

6.2.7. Utility Coordination Manager

Developer shall engage a Utility Coordination Manager to provide engineering design expertise. The Utility Coordination Manager shall manage all utility coordination and utility design activities.

6.2.8. Tunnel Systems Designers and Suppliers

The Lead Tunnel Ventilation System Designer shall have a minimum of ten (10) years continuous and current experience in the design and testing of tunnel ventilation systems and be licensed as a Professional Engineer in the State of California.

The Lead CFD engineer shall have a minimum of eight (8) years continuous and current experience in the use of CFD software and its application to TVSs.

The Tunnel FSS Specialist shall be a registered Professional Engineer in the State of California and a full member of the Society of Fire Protection Engineers.

The fire alarm and detection system provider shall meet the following requirements:

A) Nationally recognized company specializing in fire alarm and detection systems with a minimum twenty (20) years experience in fire alarm and detection systems;

B) Obtain a certificate from the SFM to conduct acceptance and confidence testing of fire alarm systems; and

C) Employ factory trained and NICET Level IV certified technicians.

6.2.9. SCADA System Provider

The SCADA system provider shall meet the following requirements:

A) The Lead SCADA System Specialist shall be a licensed Professional Electrical Engineer in the State of California.; and

B) The Lead SCADA System Specialist shall be regularly engaged in the design and installation of the type and complexity of system specified and shall have served in a similar capacity for at least three systems of the size and complexity of systems required for the Project.

6.2.10. Electrical System Designer

The Lead Electrical Designer shall be a licensed Professional Electrical Engineer in the State of California. The Lead Electrical Designer shall have served in a similar capacity for at least three systems of the size and complexity of systems required for the Project.

6.2.11. Lighting System Designer

The Lighting System Designer shall be a licensed Professional Electrical Engineer in the State of California and shall have served in a similar capacity for at least three systems of the size and complexity of systems required for the Project.

6.2.12. Tunnel Mechanical Designer

The Tunnel Mechanical Designer shall be a licensed Professional Mechanical Engineer in the State of California and shall have served in a similar capacity for at least three systems of the size and complexity of systems required for the Project.

6.2.13. Commissioning Agent

The Commissioning Agent provided by Developer shall not be an employee of Developer or any Developer Related Entity. The Commissioning Agent shall be independent of the installing personnel or equipment suppliers for the Project. The Commissioning Agent shall maintain an unbiased approach to problem solving and conflict resolution. In addition the Commissioning Agent shall be certified as an independent Commissioning Agent/Agent by the AABC Commissioning Group (ACG) BCx or Certified Building Commissioning Professional (CBCP) by Association of Energy Engineers.

Developer shall furnish a copy of the Commissioning Agent's certifications to the Department within thirty (30) days of signing.

6.3. Developer's Lead Construction Personnel

6.3.1. Construction Project Manager

The Construction Project Manager shall be an individual with experience as a project manager on at least two highway transportation projects each having a construction value more than $100 million.

6.3.2. Superintendant

The Superintendant shall be an individual with experience as a superintendent on at least two highway transportation projects each having a construction value more than $100 million.

6.4. Developer's Lead Environmental Personnel

6.4.1. Cultural Resources Compliance Manager (CM)

Developer shall designate a Cultural Resources Compliance Manager (CM), who meets the Secretary of the Interior's Professional Qualification Standards, to keep the TOP informed and consult with them on all matters that involve historic built resources, landscape features, and buried resources, including, but not limited to, results of monitoring, Project changes that might affect cultural resources, and construction methods that might affect cultural resources. The CM must meet the qualifications of a historian, architectural historian or archaeologist as set forth in the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (36 CFR 44738-9.) The CM must have experience at the Project Manager level (or equivalent) with a minimum of five years experience in accordance with the above provision. The CM must have experience of acting as a project manager on a project with a minimum construction cost of one hundred fifty million dollars ($150m) and have a minimum of five (5) years experience of undertaking the roles set out for the CM.

6.4.2. Water Pollution Control Manager (WPCM) and/or SWPPP Preparer

This person is responsible for preparation and compliance with the NPDES permit, and has a minimum of twenty four (24) hours of Department approved storm water management training or Certification as a Certified Professional in Erosion and Sediment Control (CPESC).

6.4.3. Certified Erosion Control Supervisor

The Certified Erosion Control Supervisor oversees the installation and maintenance of all temporary and permanent erosion and sediment control during the life of the Project, and also prepares erosion control inspection reports. This person has knowledge of applicable Permit requirements, and has experience with application processes, design standards, specifications, and special provisions for storm water facilities, and the selection, design, and implementation of temporary and permanent best management practices.

6.4.4. Independent Acoustical Engineer

The Independent Acoustical Engineer develops the Noise Control Plan, monitors compliance with the Noise Control Plan and noise levels during construction, and has at least three (3) years of demonstrated experience in noise engineering. The Independent Acoustical Engineer shall be an independent firm not related to any other Developer-Related Entity.

6.4.5. Environmental Monitoring Lead

The Environmental Monitoring Lead coordinates monitoring activities, manages/schedules Biological Monitors, coordinates with agencies, and provides environmental training to all construction personnel. This person possesses at least five (5) years of experience in the fields of environmental project coordination and permitting.

6.4.6. Biological Monitor

The Biological Monitor conducts field surveys and prepares monitoring memorandum and detailed reports. This person possesses a four (4) year college degree in Biology or

Environmental Sciences and a minimum of one year's experience in the applicable biological wildlife surveys/monitoring or botanical surveys/monitoring.

6.4.7. Vibration Monitoring and Analysis Lead

The person who is responsible for the vibration monitoring and analysis must be a Professional Engineer or Geologist, must have received a Bachelor of Science or higher degree from a qualified program in engineering, physics or geology offered by an accredited university or college, must have five (5) years experience in vibration monitoring and control, and must have demonstrated substantial and responsible experience in preparing and implementing construction vibration monitoring plans and analyzing vibration impacts in an urban setting.

6.4.8. Archaeologist

Developer shall designate an Archaeologist on an as-needed basis to provide expertise in monitoring construction activities that may impact cultural resources throughout the duration of the Project. Specifically the Archaeologist should be on site when any excavation is taking place. The Archaeologist shall be a qualified and experienced professional with the following experience:

A) Has performed the duties of a "Principal Investigator," as set forth in the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (36 CFR 44738-9.); and

B) Possesses a graduate degree in archaeology, anthropology or a closely related field, or an undergraduate degree in one of these same subjects with at least five (5) years experience in construction monitoring, and a data recovery project or a project involving substantial analysis and reporting of excavated data. Archaeological Monitor

6.4.9. Archaeological Monitor

Developer shall designate Archaeological monitors who shall have expertise in the identification of the historical and prehistoric artifacts that are likely to be found at the Presidio as outlined in the Archaeological Treatment Plan.

6.4.10. Architectural Historian

Developer shall designate an Architectural Historian on an as-needed basis to provide expertise in monitoring construction activities that may affect built historic resources and completing the mitigation of adverse effects to historic properties throughout the Project. The Architectural Historian shall be a qualified and experienced professional with the following experience:

A) Meets the qualifications of an Architectural Historian as set forth in the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (36 CFR 44738-9.);

B) Possesses a graduate degree in historic preservation, architecture, or a closely related field; and

C) Has three (3) years of demonstrable experience in accordance with the provisions of the above standards and has experience conducting conditions assessments and architectural monitoring for construction projects.

6.4.11. Other Required Developer Personnel

A Certified Industrial Hygienist licensed by American Board of Industrial Hygiene shall approve the Hazardous Waste Operations Safety and Health Program.

All Asbestos-related work shall be performed by a properly licensed Asbestos Abatement Contractor or subcontractor, certified by the Contractors State License Board (CSLB) and registered with the Department of Industrial Relations, Division of Occupational Safety and Health Cal/OSHA.

Developer shall contact the Presidio Trust Safety and Occupational Health Manager, at 415-748-0059 or the Presidio Trust Environmental Program Manager, at 415-561-4259 when any work involving asbestos is planned or when asbestos is encountered.

Exhibit Division I # 01

Certificate Seq.

No...

Conceptual Design Certificate

Form of Certificate to be used for certifying the Conceptual Design of the Works.

1. Element of the Works ……

1.1 Description of the element of the Works.

……

……

1.2 We certify that the conceptual design of [.....] (name and element of Construction):

1.2.1 has been prepared to accord with the Contract Documents and the Contractor's Construction proposals and Developer's construction, operations and maintenance proposals with the exception of ……[here detail proposed change];

1.2.2 has been accurately translated into drawings whose unique numbers are [.....];

1.2.3 has been undertaken in accordance with the quality systems in force.

Signed:

For Lead Engineering Firm

Name .....

Company .....

Date .....

Signed .....

1.3 We certify that the conceptual design of [.....] (name and element of Construction):

1.3.1 has been prepared to accord with the Contract Documents and the Contractor's Construction Proposals with the exception of ……[here detail proposed change];

For Contractor

Name .....

Company .....

Date .....

Signed .....

1.4 We certify that the conceptual design of [.....] (name and element of Construction):

1.4.1 has been prepared to accord with the Contract Documents and Developer's construction, operations and maintenance proposals with the exception of ……...……[here detail proposed change];

For Developer

Name .....

Company .....

Date .....

Signed .....

Exhibit Division I # 02

Certificate Seq.

No...

Intermediate Design Certificate

Form of Certificate to be used for certifying the Intermediate Design of the Works.

1. Element of the Works ……

1.1 Description of the element of the Works.

……

……

1.2 We certify that the intermediate design of
[.....]
(name and element of Construction):

1.2.1 has been prepared to accord with the Contract Documents and the Contractor's Construction proposals and Developer's construction, operations and maintenance proposals with the exception of
…….
[here detail proposed change];

1.2.2 has been accurately translated into drawings whose unique numbers are
[.....];

1.2.3 has been undertaken in accordance with the quality systems in force.

Signed:

For Lead Engineering Firm

Name .....

Company .....

Date .....

Signed .....

1.3 We certify that the intermediate design of [.....] (name and element of Construction):

1.3.1 has been prepared to accord with the Contract Documents and the Contractor's Construction Proposals with the exception of ……[here detail proposed change];

For Contractor

Name .....

Company .....

Date .....

Signed .....

1.4 We certify that the intermediate design of [.....] (name and element of Construction):

1.4.1 has been prepared to accord with the Contract Documents and Developer's construction, operations and maintenance proposals with the exception of ……[here detail proposed change];

For Developer

Name .....

Company .....

Date .....

Signed .....

Exhibit Division I # 03

Certificate Seq.

No...

Final Design Certificate

Form of Certificate to be used for certifying the Final Design of the Works.

1. Element of the Works ……

1.1 Description of the element of the Works.

……

……

1.2 We certify that the final design of [.....] (name and element of Construction):

1.2.1 has been prepared to accord with the Contract Documents and the Contractor's Construction proposals and Developer's construction, operations and maintenance proposals with the exception of ……[here detail proposed change];

1.2.2 has been accurately translated into drawings whose unique numbers are [.....];

1.2.3 has been undertaken in accordance with the quality systems in force.

Signed:

For Lead Engineering Firm

Name .....

Company .....

Date .....

Signed .....

1.3 We certify that the final design of [.....] (name and element of Construction):

1.3.1 has been prepared to accord with the Contract Documents and the Contractor's Construction Proposals with the exception of ……[here detail proposed change];

For Contractor

Name .....

Company .....

Date .....

Signed .....

1.4 We certify that the final design of [.....] (name and element of Construction):

1.4.1 has been prepared to accord with the Contract Documents and Developer's construction, operations and maintenance proposals with the exception of ……[here detail proposed change];

For Developer

Name .....

Company .....

Date .....

Signed .....

Exhibit Division I # 04

Certificate Seq.

No...

Design Check Certificate

Form of Certificate to be used by the checker for certifying the checking of the Design Works.

1. Element of the Works ……

1.1 Description of the element of the Works.

……

……

1.2 We certify that the final design of [.....] (name and element of Construction):

1.2.1 has been prepared to accord with the Contract Documents

1.2.2 has been accurately translated into drawings whose unique numbers are [.....];

.

Signed:

For checker

Name .....

Company .....

Date .....

Signed .....

Exhibit Division I # 05

Certificate Seq.

No...

Release for Construction Certificate

Form of Certificate to be used for certifying the Release for Construction of elements of the Design Works.

1. Element of the Works ……

1.1 Description of the element of the Works.

……

……

1.2 We certify that the following design that has been released for construction [.....] (name and element of Construction):

1.2.1 has been prepared to accord with the Contract Documents and the Contractor's Construction proposals and Developer's construction, operations and maintenance proposals with the exception of ……[here detail proposed change];

1.2.2 has been accurately translated into drawings whose unique numbers are [.....];

1.2.3 has been undertaken in accordance with the quality systems in force.

Signed:

For Lead Engineering Firm

Name .....

Company .....

Date .....

Signed .....

1.3 We certify that the following design that has been released for construction [.....] (name and element of Construction):

1.3.1 has been checked and found to accord with the Contract Documents

For checker

Name .....

Company .....

Date .....

Signed .....

1.4 We certify that the following design that has been released for construction [.....] (name and element of Construction):

1.4.1 has been prepared to accord with the Contract Documents and the Contractor's Construction Proposals with the exception of ……[here detail proposed change];

For Contractor

Name .....

Company .....

Date .....

Signed .....

1.5 We certify that the following design that has been released for construction [.....] (name and element of Construction):

1.5.1 has been prepared to accord with the Contract Documents and Developer's construction, operations and maintenance proposals with the exception of ……[here detail proposed change];

For Developer

Name .....

Company .....

Date .....

Signed .....

Exhibit Division I # 06

Certificate Seq.

No...

Temporary Works Certificate

Form of Certificate to be used for certifying the Design of elements of the Temporary Works.

1. Element of the Temporary Works ……

1.1 Description of the element of the Temporary Works.

……

……

1.2 We certify that the design of [.....] (name and element of Temporary Works):

1.2.1 has been prepared to accord with the Contract Documents and the Contractor's Construction proposals and Developer's construction, operations and maintenance proposals with the exception of ……[here detail proposed change];

1.2.2 has been accurately translated into drawings, procedures and method statements whose unique numbers are [.....];

1.2.3 has been developed such that it will not damage, distress, impact or otherwise cause detriment to the permanent Works.

1.2.4 has been developed so as not to endanger the general public, road users, staff of the Department, the Department's agents and those of other stakeholders including the Presidio Trust and the Transportation Authority together with the workforce of all Developer Related Entities

1.2.5 has been designed so as not to pose any threat to adjacent properties or cultural or environmentally important sites

1.2.6 has been undertaken in accordance with the quality systems in force.

Signed:

For Temporary Works Designer

Name .....

Company .....

Date .....

Signed .....

1.3 [.....] (name and element of Temporary Works):

1.2.1 has been prepared to accord with the Contract Documents and the Contractor's Construction proposals with the exception of ……[here detail proposed change];

For Contractor

Name .....

Company .....

Date .....

Signed .....

1.4 We certify that the design of [.....] (name and element of Temporary Works):

1.5.1 has been prepared to accord with the Contract Documents and Developer's construction, operations and maintenance proposals with the exception of ……[here detail proposed change];

For Developer

Name .....

Company .....

Date .....

Signed .....

Exhibit Division I # 07

Certificate Seq.

No...

Temporary Works Check Certificate

Form of Certificate to be used by the checker for certifying the checking of the Temporary Works Design.

1. Element of the Temporary Works ……

1.1 Description of the element of the Temporary Works.

……

……

1.2 We certify that the design of [.....] (name and element of Construction):

1.2.1 has been prepared to accord with the Contract Documents

1.2.2 has been accurately translated into drawings whose unique numbers are [.....];

.

Signed:

For checker

Name .....

Company .....

Date .....

Signed .....

Exhibit Division I # 08

Certificate Seq.

No...

Temporary Works Erection Certificate

Form of Certificate to be used by the Contractor for certifying the erection of the Temporary Works.

1. Element of the Temporary Works ……

1.1 Description of the element of the Temporary Works.……..

……

1.2 We certify that the design of ..... ……

(Name and element of Temporary Works)

as described in Temporary Works Certificate No …….. and Temporary Works Check Certificate No ..... ……..has been satisfactorily translated into the erection of ..... (Name and element) and the setting out and the materials and workmanship used, including testing, are in compliance with the requirements of the Contract Documents.

For Contractor

Name .....

Company .....

Date .....

Signed .....

1.3. We have seen the Contractor's documentation referring to the above-named element of temporary works erection, and have so far as we deemed it necessary witnessed the erection thereof, and have found no discrepancy between the documentation and the element of temporary works as designed.

Signed:

For Temporary Works Designer

Name .....

Company .....

Date .....

Signed .....

1.4. We certify that from our audit of the quality control procedures there is no reason to suspect that the element of temporary works has not been carried out in accordance with the Contract Documents.

For Developer

Name .....

Company .....

Date .....

Signed .....

Exhibit Division I # 09

Certificate Seq.

No...

Construction Certificate

Form of Certificate to be used by the Contractor for certifying the Construction of the Works.

1. Element of the Works ……

1.1 Description of the element of the Works.

……

……

1.2 We certify that the design of ..... ……

(Name and element of Temporary Works)

as described in Release for Construction Certificate No ……...has been satisfactorily translated into the Construction of ..... (Name and element) and the setting out and the materials and workmanship used, including testing, are in compliance with the requirements of the Contract Documents.

For Contractor

Name: .....

Company .....

Date: .....

Signed .....

1.3. We have seen the Contractor's documentation referring to the above-named element of the Works, and have so far as we deemed it necessary witnessed the construction thereof, and have found no discrepancy between the documentation and the element of Works as designed.

Signed:

For Lead Engineering Firm

Name: .....

Company .....

Date .....

Signed .....

1.4. We certify that from our audit of the quality control procedures there is no reason to suspect that the element of the Works has not been carried out in accordance with the Contract Documents.

For Developer

Name .....

Company .....

Date .....

Signed .....

Presidio Parkway Project
Public-Private Partnership Agreement
Volume II (Technical Requirements)

DIVISION II

SECTION 1 - PROJECT DESCRIPTION AND LIMITS

Final

January 3, 2011

TABLE OF CONTENTS

1. GENERAL 1
2. PROJECT DESCRIPTION 1
3. CONSTRUCTION PHASING 2
4. ELEMENTS OF PHASE II CONSTRUCTION 3
4.1. Structures 3
4.2. Roadway 5
4.2.1. Parking 5
4.2.2. Demolition 6
4.3. Governmental Approvals 6
4.4. Geotechnical 6
4.5. Aesthetics/Landscaping 6
4.6. Intelligent Transportation Systems 6
4.7. Utilities 7
4.8. Tunnel Systems 7
5. OPERATIONS AND MAINTENANCE 7
6. HANDBACK 7

1. GENERAL

The Presidio Parkway Project (formerly the Doyle Drive Replacement Project) reconstructs approximately 1.6 miles of existing Doyle Drive (Route 101), south of the Golden Gate Bridge in San Francisco, California. The highway provides a vital transportation link between the North Bay Area counties and the San Francisco Peninsula.

Doyle Drive, originally built in 1936, is structurally and seismically unsafe and must be replaced. When constructed, the Presidio Parkway will improve structural, seismic and traffic safety while also creating a roadway that reduces impacts to biological, cultural and natural resources; respects the Project setting within a national park, the National Historic Landmark District and surrounding neighborhoods; and meets community needs.

A Record of Decision was signed by FHWA for the Department's Doyle Drive Final Environmental Impact Statement / Report (FEIS/R) in December of 2008. The Presidio Parkway, known as the "Refined Presidio Parkway" alternative in the FEIS/R was unanimously identified as the Preferred Alternative for advancement to implementation. The FEIS/R outlines in more detail the specific goals and objectives of the Project.

2. PROJECT DESCRIPTION

The Presidio Parkway Project entails replacement of the existing Doyle Drive with a new six-lane facility and a southbound auxiliary lane. The new facility will incorporate wide landscaped medians and continuous shoulders and will be mostly contained within the Presidio of San Francisco. To minimize impacts to Park Presidio, the footprint of the new facility will include a large portion of Doyle Drive's existing footprint east of the Veterans Boulevard (Park Presidio) interchange.

Starting from the north end of the Project, an at-grade section of highway will continue southward from approximately Merchant Road, where the Golden Gate Bridge toll plaza lanes converge to six lanes. The six-lane parkway will split and continue southward at grade for approximately 0.25 miles before reaching a major interchange with U.S. Route 1, Veterans Boulevard (Park Presidio interchange). From the split southward, the Project's southbound and northbound lanes are divided for almost the entire length of the Project. The southbound and northbound sides of the parkway will traverse separate viaduct structures, pass through separate tunnels and, when at grade, will be divided by a landscaped median.

The Park Presidio interchange will be completely reconstructed as part of the Project. The existing exit ramp from southbound Doyle Drive to Veterans Boulevard will be replaced with standard exit ramp geometry and widened to two lanes. The existing exit ramp from northbound Doyle Drive will be improved to provide standard exit ramp geometry. The northbound Veterans Boulevard connection to northbound Doyle Drive will be rebuilt similar to the existing direct connector ramp configuration with improved exit and entrance geometry.

At the approximate point where the southbound U.S. Route 1 off-ramp diverges from the southbound Presidio Parkway lanes, the Presidio Parkway will become a viaduct approximately 1,280 feet long – the "Presidio Viaduct." This viaduct will extend over Crissy Field Avenue and then run at grade for a short distance before entering a tunnel at the north end of the San Francisco National Cemetery. The shallow cut-and-cover tunnels will extend approximately 850 feet past the cemetery to east of Battery Blaney. The Presidio Parkway will then continue towards the Main Post in an open depressed roadway with a landscaped median.

From Building 106 (Band Barracks) a second set of cut-and-cover tunnels approximately 1,020 feet long will extend south of (and underneath) Halleck Street. The Parkway will then rise slightly on a low-level causeway approximately 400 feet long over the site of the proposed Tennessee Hollow restoration and Girard Road. East of Girard Road, the facility will return to existing grade north of the Gorgas warehouses and connect to Richardson Avenue, where the northbound and southbound lanes will rejoin each other. At this point, the median will end.

The Project will also include a diamond interchange for direct access to the Presidio and Marina Boulevard at the southern end of the Project. Exhibit 2.1 #01 shows the approximate locations of these major Project elements. The Indicative Preliminary Design contains more detail with respect to the approximate bounds of each element of the Project. The majority of the construction works extend from mainline Station SB 33+46 +/- in the south to mainline Station SB 118+79 +/- in the north, including transitions to existing facilities, as identified in Appendix A to this Section.

Exhibit 2.1 # 01 Approximate location of major Project elements

3. CONSTRUCTION PHASING

The Project is being reconstructed in two phases using different delivery methods; Phase I by a traditional design-bid-build approach and Phase II by Public-Private Partnership (P3) using a design/build/finance/ operate/maintain (or DBFOM) model.

The Department is implementing four contracts with other parties, which are identified throughout the Contract Documents as “Phase I Construction” (Contracts 1 through 4). These contracts are underway and involve reconstruction of certain portions of the Project described above under a traditional design-bid-build approach and the design and construction work related to the Outfalls. At the completion of Phase I Construction (expected to be the end of 2011), all traffic will be on either new structures or detour roads that meet seismic standards, thus achieving seismic safety.

For reference, the specific elements of Phase I Construction include:

- Contract 1 – Advanced environmental mitigation prior to construction activities (wetland creation, biological mitigation, tree removal, plant material collection, propagation, and cultural recordation) primarily for Phase I Construction.

- Contract 2 – Utility relocation prior to construction activity primarily for Phase I Construction, including private utility relocation for items owned by the Presidio.
- Contract 3 – Construction of southbound Presidio Viaduct and ramps and an electrical substation and the southern portion of the Park Presidio Interchange.
- Contract 4 – Construction of the southbound Battery Tunnel, the at-grade detour, permanent roadway sections, and retaining walls #6 and #8. Upon completion of Contract 4, the Battery Tunnel will be constructed to its interim condition accommodating traffic during Phase II Construction. Contract 4 also includes opening of the at-grade detour to public traffic and demolition of the low viaduct from approximately the east end of the National Cemetery to the eastern limit of the project (excluding foundation and debris removal).

The remainder of the Project, herein described as Phase II Construction, will be implemented as outlined in the Contract Documents. The major work elements of Phase II Construction are:

- Demolition of the existing viaduct structures.
- Construction of the Main Post tunnels and construction of the northbound Battery Tunnel with related roadwork including fill over the tunnels.
- Reconstruction of the Girard interchange.
- Demolition of the existing High Viaduct and construction of the new northbound Presidio Viaduct. Construction of the northern portion of the Park Presidio interchange, and the northbound roadway to the western limits of the Project.
- New and restored landscaping within the TCE in accordance with Volume II, Division II, Section 3.
- Site restoration work in accordance with Volume II, Division II, Section 3 to return the TCE to their pre-existing condition prior to commencement of Phase I works as required in the Contract Documents.
- Historic preservation work including restoration and relocation of Building 201 and stabilization of Building 228.
- All applicable and/or required utility relocations.

Each of the two phases has been split into respective construction components, and is subject to specified maintenance requirements, as detailed in the Technical Requirements.

4. ELEMENTS OF PHASE II CONSTRUCTION

4.1. Structures

The actual design of the structures shall be based upon the requirements of the Contract Documents. The structures to be constructed during Phase II based upon the Indicative Preliminary Design are as follows:

Girard Road Intersection Bridge - The Girard Road intersection bridge and road structures includes the Girard Road Undercrossing NB (Bridge Number 34-0165R), Girard Road Undercrossing SB (Bridge Number 34-0165L), and the Girard Road roadway – (Bridge Number 34-0166).

Girard Road Undercrossing NB Bridge - The Girard Road Undercrossing NB Bridge (34-0165R) begins at station "NB" 45+25+/- and ends at station "NB" 47+49+/- with a total bridge length of approximately 220 feet. The bridge will span Girard Road below and accommodate two traffic lanes along the "NB" line.

Girard Road Undercrossing SB Bridge - The Girard Road Undercrossing SB Bridge (34-0165L) begins at station "SB" 45+31 +/- and ends at station "SB" 47+56 +/- with a total bridge length of approximately 230 feet. The bridge will span Girard Road below and accommodate three traffic lanes along the "SB" line.

Girard Road -Retaining Wall - The Girard Road roadway (Bridge Number 34-0166) begins at station "G1" 62+50 +/- and ends at station "G1" 68+25 +/- with a total length of approximately 600 feet.

Tennessee Hollow NB Bridge - The Tennessee Hollow NB Bridge (34-0164R) begins at station "NB" 48+49 +/- and ends at station "NB" 52+60 +/- with a total bridge length of approximately 410 feet. The bridge will accommodate two lanes along the "NB" line and one lane from the Girard NB Ramp.

Tennessee Hollow SB Bridge - The Tennessee Hollow SB Bridge (34-0164L) begins at station "SB" 48+14 +/- and ends at station "SB" 52+04 +/- with a total bridge length of approximately 390 feet. The bridge will accommodate three lanes along the "SB" line.

Girard NB – Ramp Bridge - the Girard NB – Ramp Bridge (34-0167) begins at station "GN" 48+90 +/- and ends at station "GN" 50+86 +/- with a total bridge length of approximately 200 feet. The bridge will accommodate two lanes at the beginning of the bridge merging into one lane at the end of the bridge where the traffic switches onto the Tennessee Hollow NB Bridge.

Gorgas Ramp - The Gorgas Ramp (34-0168) begins at station "DOY3" 51+33 +/- and ends at station "DOY3" 53+08 +/- with a total bridge length of approximately 170 feet. The bridge serves as a two lane off-ramp to Girard Road.

Northbound Main Post Tunnel - Cut-and-cover tunnel (Bridge Number 34-163R) beginning at station NB 53+95 and ending at station NB 63+95.

Southbound Main Post Tunnel - Cut-and-cover tunnel (Bridge Number 34-0163L) beginning at station SB 54+05 and ending at station SB 65+00.

Northbound Battery Tunnel - Cut-and-cover tunnel (Bridge Number 34-0161R) beginning at station NB 76+00 and ending at station NB 84+55.

Southbound Battery Tunnel – Completion of tunnel roof and commissioning of the ventilation fans.

Northbound Presidio Viaduct - The northbound viaduct (Bridge Number 34-0157R) begins at station NB 87+17 +/- and ends at station NB 101+16, and has an approximate length of 1,280 feet and a height that varies from approximately 65 to 115 feet above the ground surface. The northbound viaduct will accommodate three lanes of traffic and was formerly referred to as the Northbound High Viaduct.

Southbound Presidio Viaduct – Restore facility to final configuration (saw cut additional deck constructed during Phase I work on the northside to accommodate traffic and remove barrier from approximate station 93+20 to west end station #101+75 of Bridge Number 34-0157L). Install ST-10 type barrier from approximate station #93+20 to 101+75 on bridge and Abutment 7 retaining wall, and from approximate

station 101+75 to 103+65 at-grade. The Southbound Presidio Viaduct was formerly referred to as the Southbound High Viaduct.

Veterans Off-Ramp – Ramp (Bridge Number 34-0159) beginning at station "DOY 2" BB 99+98.47 and ending at station "DOY 2" EB 101+95.47.

Hook Ramp – Complete retaining walls 1a, 1b, 2a & 2b and NB bridge along DOY 2 line and related embankment work, including a permanent railing on top of walls not completed under Phase I. Remove temporary wall and buttress.

Developer or Developer Related Entity shall also design, construct, test, and commission all Tunnel Systems.

Certain historical buildings will be directly impacted by the Project, including but not limited to stabilization of Presidio Building 228 and the rehabilitation and relocation of Presidio Building 201.

4.2. Roadway

The Project constitutes a complex parkway development with varying lane configurations to accommodate existing and future traffic.

The realignment and reconstruction of a number of cross streets along with curbs, sidewalks, cross walks, signals etc. is included in Phase II Construction, including, but not limited to work on Halleck Street which will be built over the south end of the Main Post tunnels and Girard Road.

For construction purposes, Developer or Developer Related Entity shall use only those Haul Routes prescribed in the Presidio Trust Right of Entry Agreement and shown in Appendix 5-D of the Agreement. Developer shall restore all Haul Routes and Temporary Construction Easements to their pre-existing condition prior to commencement of Phase I works as required in the Contract Documents.

4.2.1. Parking

The Preferred Alternative from the EIS/R impacts parking in and around the Project. The Presidio Trust Right of Entry Agreement lays out requirements for temporary parking during construction and permanent parking upon completion. Based on Presidio Trust Right of Entry Agreement, Developer shall provide the following parking in both the temporary and permanent condition, with striping details to be confirmed with the Presidio Trust in accordance with Volume II, Division I, Article 5.

	Number of Spaces			Additional Remarks *	
Parking Area	**Existing Condition**	**Temporary Condition**	**Permanent Condition**	**Temporary Condition**	**Permanent Condition**
Mason Street Warehouses Area	146	150	370		Parking location #1 - re-configure the reduced area. Parking location #2 - construct new surface lot that will provide 218 spaces. Parking location #4 - coordinate with the Department and Presidio Trust to provide 102 spaces (in consideration of the Trust's redevelopment Project in the vicinity).

* Developer shall restore all impacted parking locations to original conditions prior to Phase I commencement unless noted otherwise.

4.2.2. Demolition

Developer shall demolish the existing High Viaduct and low viaduct structures, restore the Southbound Presidio Viaduct to its final configuration (saw cut additional deck constructed during Phase 1 Construction), then remove debris and restore detour routes after traffic is in its final configuration.

The low viaduct structures will be demolished as part of Phase I Construction, however Developer shall remove all foundations and debris.

All foundations of structures outside the permanent easement defined in Appendix 5 to the Agreement to be removed shall be removed to a depth of at least six (6) feet below grade.

4.3. Governmental Approvals

Prior to issuance of the RFP, the Department has undertaken certain efforts and activities to secure certain Governmental Approvals. Except as otherwise provided Developer shall be solely responsible for compliance with the requirements of the Governmental Approvals as well as securing and obtaining all remaining Governmental Approvals, including any revision, modification, amendment, supplement, renewal or extension thereof required in connection with the Project or the Work.

4.4. Geotechnical

It is anticipated that there will be significant geotechnical challenges, particularly in relation to groundwater conditions. While the Department has made available as Reference Documents the results of previous geotechnical investigations, Developer shall determine and address all geotechnical issues. This includes development of two alternate mitigation options to stabilize existing ground beneath the relocated historic Presidio Building 228.

4.5. Aesthetics/Landscaping

Developer shall promote a consistent aesthetic “theme” for the entire Project corridor. The theme shall be consistent with the historical character-defining features of the Project while integrating the roadway into the Presidio National Historic Landmark District landscape, in accordance with the Programmatic Agreement and associated architectural criteria.

In accordance with the Programmatic Agreement, the aesthetic theme shall protect and enhance each landscape area through which the Project passes and shall address all roadway elements in such a way as to recognize the historic association of the Project to the Golden Gate Bridge and Presidio while addressing the new facility’s association with the park.

While certain preliminary aesthetic and architectural renderings are included in the Indicative Preliminary Design and Technical Requirements, Developer or Developer Related Entity shall be responsible for complying with all standards included in the Contract Documents and coordinating with local agencies, to provide the required project elements including landscape, hardscape, grading, planting and irrigation, weed control, erosion control, hazard tree control, and plant establishment.

4.6. Intelligent Transportation Systems

Developer or Developer Related Entity shall be responsible for the design, construction, integration, and maintenance of the new and permanent intelligent transportation systems (ITS). This ITS will include a

fiber optic communication network subsystem, future ramp meter subsystem, traffic monitoring subsystem, traffic signal subsystem, video image vehicle detection system (VIVDS), microwave video detection system (MVDS), loop detection, X (Changeable, Variable, or Extinguishable) message signs (XMS), highway advisory radio (HAR), closed circuit television (CCTV) cameras, security cameras, public address, incident detection, call boxes and visibility sensors. Developer shall provide a facility from which Developer shall control, manage and monitor tunnel and intelligent transportation systems for the duration of the Operating Period. Developer shall also provide a secondary system and equipment at the Department's facilities prior to Substantial Completion and Developer shall transfer control of the systems but not the Developer's facility to the Department at the Termination Date.

4.7. Utilities

Developer shall be responsible for the coordination, scheduling, negotiations and agreements, permitting, reviews, cost, and the design and construction activities associated with any required utility provisions and adjustments. The Department will cause PG&E to provide the required secondary power feed and Developer shall provide a second substation to accommodate this secondary power.

4.8. Tunnel Systems

All tunnel systems, including fixed fire suppression, ventilation, electrical, and communications systems shall be installed in the three tunnels that are part of the Phase II Construction. In addition, Developer shall close the southbound Battery Tunnel constructed as part of Phase I Construction, and equip it with jet fans for maintaining a tenable environment for fire and life safety as part of Phase II Construction.

5. OPERATIONS AND MAINTENANCE

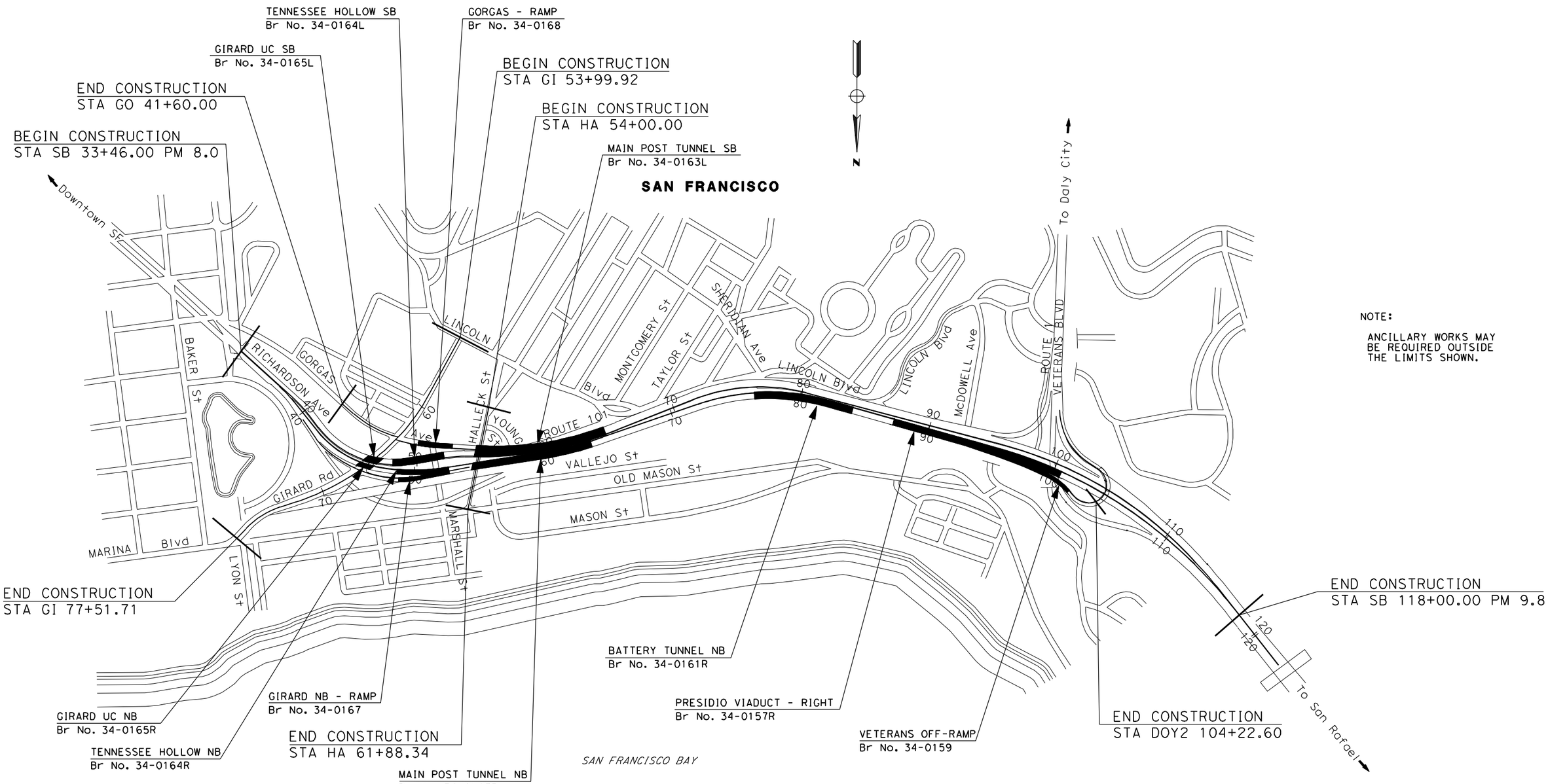
Developer or Developer Related Entity shall perform O&M During Construction from NTP 2 and O&M After Construction, as set out forth in the Contract Documents.

6. HANDBACK

Developer shall return the Project to the Department at the Termination Date in a condition acceptable to the Department as defined in the Contract Documents. The Department will require Developer to plan and prepare for any remedial works required to meet the Handback Requirements, procedures for which are set out forth in the Contract Documents.

Attachment A: Approximate Project Limits

PRESIDIO PARKWAY PROJECT, PUBLIC PRIVATE AGREEMENT
VOLUME II (TECHNICAL REQUIREMENTS)
DIVISION II SECTION I APPENDIX A
MAJOR PROJECT LIMITS



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TIME PLOTTED => 4:32:35 PM

Presidio Parkway Project
Public - Private Partnership Agreement
Volume II (Technical Requirements)

DIVISION II

SECTION 2 – NOT USED

Final
January 3, 2011

Section Not Used

Presidio Parkway Project
Public - Private Partnership Agreement
Volume II (Technical Requirements)

DIVISION II

SECTION 3 – DESIGN AND CONSTRUCTION SPECIFICATIONS

Final
January 3, 2011

TABLE OF CONTENTS

1. GENERAL 1
2. LAND SURVEYING 2
2.1. General 2
2.2. Administrative Requirements 2
2.2.1. Laws, Standards and Specifications 2
2.2.2. Coordination 3
2.3. Design Requirements 3
2.3.1. Survey Control Requirements 3
2.3.2. Preservation of Survey Monuments 3
2.3.3. Prepare Base Maps and Plan Sheets 3
2.3.4. Survey Records and Reports 3
2.4. Construction Requirements 3
2.4.1. Construction Surveys 3
2.5. Land Surveying Deliverables 4
2.5.1. General Requirements 4
2.5.2. Survey Records 4
2.5.3. Survey Reports 4
3. ENVIRONMENTAL 5
3.1. General 5
3.2. Administration Requirements 5
3.2.1. Laws, Standards and Specifications 5
3.2.2. Water Quality 8
3.2.3. Erosion and Vegetation Control 9
3.2.4. Wetlands 9
3.2.5. Biological Resources 9
3.2.6. Hazardous Materials 10
3.2.7. Unexploded Ordnance (UXO) 11
3.2.8. Cultural Resources Technical Requirements 11
3.2.9. Treatment Oversight Panel (TOP) Function and Interrelationship with Developer 12
3.2.10. Coordination/Compliance 13
3.2.11. Further Obligations that commence Pre-Construction 14
3.2.12. Utility Relocations 19
3.2.13. Biannual Reports 19
3.2.14. Public Interpretation Banners and Temporary Construction Signs 19
4. SUSTAINABILITY 20

4.1. General 20
5. ROADWAY 21
5.1. General 21
5.2. Administration Requirements 21
5.2.1. Laws, Standards and Specifications 21
5.3. Design Requirements 22
5.3.1. Roads 22
5.3.2. Miscellaneous Elements 24
5.3.3. Project-Specific Design Standards 24
5.3.4. Temporary Works 25
5.3.5. Fencing 25
5.3.6. Slopes and Retaining Walls 25
5.3.7. Pavement Design 25
5.4. Construction Requirements 27
5.4.1. Clearing and Grubbing 27
5.4.2. Early Start of Rough Grading 27
5.4.3. Construction Requirement Deliverables 28
5.5. Drainage 28
5.5.1. Standards 28
5.5.2. References 29
5.5.3. Drainage Analysis 29
5.5.4. Drainage Plans 31
5.5.5. Drainage Deliverables 31
5.6. Traffic Control 31
5.6.1. Administrative Requirements 32
5.6.2. Traffic Control Analysis 32
5.6.3. Traffic Management Plans 33
5.6.4. Traffic Control Restrictions 34
5.6.5. Other Design Requirements 34
6. GEOTECHNICAL 35
6.1. General 35
6.2. Administrative Requirements 35
6.2.1. Laws, Standards and Specifications 35
6.2.2. Geotechnical Execution Plan 38
6.2.3. Additional Subsurface Investigation and Laboratory Testing 38
6.3. Design Requirements 39

6.3.1. Foundations 39
6.3.2. Embankment and Slope Stability 40
6.3.3. Settlement (Immediate/Consolidation and Seismic) 40
6.3.4. Lightweight Fill Materials 41
6.4. Retaining Walls 41
6.5. Utilities 41
6.6. Construction Requirements 41
6.6.1. Earthwork 41
6.6.2. Groundwater Monitoring Wells 41
6.7. Geotechnical Deliverables 42
6.7.1. Geotechnical Design Report 42
6.7.2. Foundation Design Reports 42
7. AESTHETICS 43
7.1. General 43
7.2. Design Requirements 43
7.2.1. Lighting 43
7.2.2. Fencing 43
7.2.3. Sign Structures 43
7.2.4. Railings 44
7.2.5. Tunnel 44
7.2.6. Walls and Abutment Surfaces 44
7.2.7. Northbound Presidio Viaduct 45
7.2.8. Tennessee Hollow Causeways and Other Structures and Facilities 45
8. STRUCTURES 46
8.1. General 46
8.2. Administrative Requirements 46
8.2.1. Laws, Standards and Specifications 46
8.3. Design Requirements 47
8.3.1. Bridge Design 47
8.3.2. Tunnel Design 47
8.3.3. Seismic Design Provisions 48
8.3.4. Performance Levels 48
8.3.5. Component Performance 49
8.3.6. Exclusions and Potential Restrictions 50
8.4. Existing Structures 51
8.4.1. Phase I Construction Structures 51

8.4.2. Phase I Structures 51
8.4.3. Historic Structures 51
8.4.4. Removal and Retention of Existing Structures 51
8.5. Other Proposed Structures 51
8.5.1. Miscellaneous Structures 51
8.6. Structures Deliverables 52
9. PAVEMENT MARKING AND SIGNING 53
9.1. General 53
9.2. Administrative Requirements 53
9.2.1. Laws, Standards and Specifications 53
9.3. Requirements 54
9.4. Pavement, Marking and Signing Deliverables 55
10. SIGNALIZATION 56
10.1. General 56
10.2. Administrative Requirements 56
10.2.1. Laws, Standards and Specifications 56
10.2.2. Signalization 57
10.2.3. Signal Design and Operational Analysis 58
10.2.4. Traffic Signal Design 59
10.2.5. Traffic Analysis Methodology 59
10.2.6. Traffic Analysis for Maintenance of Traffic 59
10.2.7. Traffic Analysis for Year of Substantial Completion 60
10.2.8. Traffic Analysis for the period 10 years after the end of Term 61
10.2.9. Electrical Service 61
10.2.10. Electrical Design 61
11. LIGHTING 63
11.1. General 63
11.2. Administrative Requirements 63
11.2.1. Laws, Standards and Specifications 63
11.3. Design Requirements 64
11.4. Construction Requirements 66
11.5. Lighting Deliverables 67
12. LANDSCAPING 68
12.1. General 68
12.2. Administrative Requirements 69
12.2.1. Laws, Standards and Specifications 69

12.3. Landscape Design Requirements 72
12.3.1. Vegetation Preservation Plans 72
12.4. Construction Requirements 73
12.4.1. Vegetation Preservation 74
12.4.2. Noxious Weed Control 75
12.4.3. Landscape Grading Construction 76
12.4.4. Irrigation Construction 77
12.4.5. Hardscape Construction 77
12.4.6. Landscape Lighting Construction 78
12.4.7. Landscape Planting Construction 78
12.5. Allowance Landscaping. 79
12.6. Deliverables 81
13. NOT USED 82
14. INTELLIGENT TRANSPORTATION SYSTEMS 83
14.1. General 83
14.2. Administrative Requirements 83
14.2.1. Laws, Standards, and Specifications 83
14.3. Performance Requirements 84
14.3.1. Design Calculations 84
14.3.2. Specific Design Calculations 84
14.3.3. Functional Requirements 84
14.3.4. Coordination with Adjacent Projects 85
14.3.5. ITS Commissioning 85
14.3.6. ITS Testing 85
14.4. Design Requirements 86
14.4.1. Traffic Monitoring System 86
14.4.2. Vehicle Detection System 86
14.4.3. Ramp Metering System 87
14.4.4. Vehicle Detection System 87
14.4.5. Signal Standard 87
14.4.6. Vehicle Signal Heads 87
14.4.7. Closed Circuit Television (CCTV) Camera System 88
14.4.8. Communication System 89
14.4.9. Centralized Hub Operations and Maintenance Center (OMC) 91
14.4.10. Changeable message sign (CMS) system 92
14.4.11. Variable message sign (VMS) system 92

14.4.12. Extinguishable message sign (EMS) system 93
14.4.13. Highway Advisory Radio (HAR) system 94
14.4.14. Tunnel portal traffic signals 94
14.4.15. Public Address System (PAS) 94
14.4.16. Security System 95
14.5. Construction Requirements 95
14.6. ITS Deliverables 96
14.6.1. Testing 96
14.6.2. Stand-Alone Test 97
14.6.3. Subsystem Test 98
14.6.4. System Operational Test 98
15. UTILITIES 99
15.1. General 99
15.2. Design Requirements 99
15.2.1. Public Utility Conditions 99
15.2.2. Private Utility Conditions 99
15.2.3. Utility Adjustment Work 99
15.2.4. Betterments 101
15.2.5. Utility Agency / Owner Contacts 101
15.2.6. Utility Coordination Personnel 101
15.2.7. Location of Existing Utilities 102
16. TUNNEL SYSTEMS 103
16.1. General 103
16.2. Administrative Requirements 103
16.2.1. Laws, Standards and Specifications 103
16.3. Fire and Life Safety Systems 105
16.3.1. Tunnel Fire and Life Safety Systems Requirements 105
16.3.2. Emergency Egress - General 111
16.3.3. Fire Safety - General 111
16.4. Tunnel Ventilation Systems (TVS) 112
16.4.1. General 112
16.5. Tunnel Fire Suppression Systems 114
16.5.1. General 114
16.6. Fire Detection and Alarm 116
16.6.1. General 116
16.6.2. Monitoring and Control 116

16.6.3. Design Requirements 116
16.7. SCADA System 117
16.7.1. General 117
16.7.2. Design requirements 118
16.8. Electrical Systems 120
16.8.1. General 120
16.8.2. Design Requirements 120
16.9. Illumination 125
16.9.1. General 125
16.9.2. Design Requirements 125
16.9.3. Lighting Analyses 126
16.9.4. Tunnel Lighting System Design 126
16.9.5. Sign Lighting System 129
16.9.6. Lighting Systems Commissioning 129
16.10. Tunnel Drainage 130
16.10.1. General 130
16.10.2. Design Requirements 130
16.10.3. Drainage Components and Piping Design 130
16.11. Mechanical Systems for Miscellaneous Facilities 130
16.11.1. General 130
16.11.2. Ventilation System Design 131
16.11.3. Plumbing & Drainage 132
16.11.4. Miscellaneous Fire Protection Systems Construction 132
16.11.5. Ancillary Facility Fire Protection Systems Commissioning 132
16.12. Tunnel Systems Deliverables 132
16.12.1. General 132
17. COMMISSIONING 134
17.1. General 134
17.2. Definitions 134
17.3. Reference Documents 134
17.4. Qualifications 134
17.5. Scheduling 135
17.6. Commissioning Team and Coordination 135
17.6.1. Commissioning Agent Responsibilities 135
17.6.2. Developer's Responsibilities 135
17.7. Meetings 136

17.7.1. Commissioning Scoping Meeting 136
17.8. Commissioning Plan 136
17.9. Non-Conformance to Performance Verification Requirements 136
17.10. Operations and Maintenance (O&M) Training 137
17.11. Testing 137
17.11.1. System Verification Checks (SVCs) 137
17.11.2. Functional Performance Tests (FPTs) 137
17.11.3. Final System Integration Test 137
17.11.4. Reports Submittal 137

1. GENERAL

Developer shall design and construct the Project in accordance with the requirements of the Contract Documents using qualified and trained personnel as outlined in the Contract Documents.

Developer shall verify all existing and available information; understand all applicable rules, regulations, codes, standards, agreements, permits, and approvals; and develop all pertinent reports, plans, specifications, quality control and quality assurance procedures as outlined in the Contract Documents and in the approved Project Management Plan. Developer shall construct the Project in accordance with the Design Documents and applicable specifications including utility relocations per Utility and Third Party Agreements.

In addition Developer shall coordinate design and construction activities with the Department where there is a need to interface with the parties engaged by the Department to undertake the Phase I Construction.

2. LAND SURVEYING

2.1. General

Developer shall perform all work necessary to meet the requirements associated with land surveying, including secondary horizontal and vertical control surveys, subsequent mapping, bridge surveys, utility surveys, soil boring surveys, construction surveys, as-built surveys, and all other land surveying services necessary to complete the Project.

The Department will perform all primary horizontal and vertical control surveys and make such information as may be required by Developer available to Developer within thirty (30) days of NTP1. If subsequent primary control surveys are required Developer shall provide the Department with seven (7) days notice and the Department will undertake such surveys and provide survey results to Developer within ten (10) days in a format reasonably acceptable to Developer.

The Department will perform all right of way engineering, right of way surveys except right of way flagging as defined in chapter 12 of the Department's Survey Manual and all land surveying associated with right of way engineering close-out activities and right of way monumentation.

2.2. Administrative Requirements

2.2.1. Laws, Standards and Specifications

All of the land surveying work performed by Developer or Developer Related Entities shall be conducted in accordance with the requirements of California Statutes, the standards, and specifications listed below. In the event of a conflict among the standards relating to land surveying, the order of precedence shall be as set forth below, unless otherwise specified

2.2.1.1. Standards

PRIORITY	ENTITY	TITLE
1	Department	Surveys Manual
2	Department	Standard Specifications, (May 2006 Edition)
3	Department	Standard Plans, U.S. Customary Units, (May 2006 Edition)
4	Department	Caltrans Code of Safe Surveying Practices
5	Department	Safety Manual
6	Department	Plans Preparation Manual – US Customary Units (English)
7	Department	CADD Users Manual – US Customary Units (English).
8	Federal Geographic Data Committee (FGDC)	Geospatial Positioning Accuracy Standards, Part 3. National Standards for Spatial Data Accuracy.

2.2.2. Coordination

Developer shall designate a Survey Manager for the Project. The Survey Manager shall manage all survey activities associated with the Project and shall be responsible for directing and reviewing all Developer and Developer Related Entity survey work and be the point of contact for all survey activities.

2.3. Design Requirements

2.3.1. Survey Control Requirements

2.3.1.1. Survey Control

Developer shall document the use of existing survey control networks and the establishment of any subsequent survey control networks that will be used in conjunction with the Project. These records shall include survey control monument locations, types, accuracy values, adjustment results, and establishment methods.

2.3.1.2. Survey Control Datum

The horizontal survey datum used for the Project shall be the California Coordinate System of 1983 (CCS83 (1991.35)) as described in the Public Resources Code, Sections 8801 et. seq.

The vertical survey datum shall be the California Orthometric Heights of 1988 as described in the Public Resources Code, Section 8890 et. seq.

2.3.2. Preservation of Survey Monuments

2.3.2.1. Public and Private Land Survey Monuments

Developer shall locate and preserve the location of all previously established survey monuments located within the Project Right of Way.

2.3.3. Prepare Base Maps and Plan Sheets

Developer shall conduct all tasks necessary to complete all mapping for the Project. This shall include all planimetric, topographic, design, utility, centerline alignment, and base maps necessary to complete the Project.

2.3.4. Survey Records and Reports

Developer and all Developer Related Entities shall maintain neat, accurate, and complete documentation for all land survey work performed. These records shall include all calculations, mapping, staking notes, and field crew daily diaries. Developer shall prepare a formal survey report for all survey calculations related to survey control networks, design surveys, and construction surveys. The intent of each report is to document and perpetuate the information and rationale used to perform the land surveying task.

2.4. Construction Requirements

2.4.1. Construction Surveys

Developer shall perform all construction surveying necessary for the Project.

2.5. Land Surveying Deliverables

In addition to those defined in Volume II, Division I, Article 2 Developer shall specifically provide the following.

2.5.1. General Requirements

Developer shall index and submit all calculations, notes, computer files, raw data, project reports, meeting notes, correspondence, digital images, maps, corner records, records of survey, aerial photogrammetric products, centerline alignment maps, and other maps and related items as part of the Work.

Deliverables shall be submitted in both hardcopy where appropriate (i.e., electronic measurement raw data should only be provided in electronic format) and electronic format at the completion of each activity. Electronic data submitted shall be compatible with the Department's software and operating systems current at the time of the survey. Mapping shall conform to the Department's Plans Preparation Manual and the Department's CADD Users Manual. GIS deliverables shall adhere to the Department's Standards and the National Spatial Data Infrastructure (NSDI) requirements.

2.5.2. Survey Records

Survey records shall be delivered in both hardcopy and electronic file format to the Department within sixty (60) days of completion of the survey work.

2.5.3. Survey Reports

Each survey report shall be submitted to the Department within sixty (60) days of the completion of each survey regardless of the type of survey performed.

The report shall be in a hardcopy format and also in electronic file format when possible. The reports shall include information related to the source data used, the calculations performed, and the data produced as part of the survey process. The Department will provide the format specifications of each report type at NTP 1. Each report shall be reviewed and signed by the Survey Manager.

3. ENVIRONMENTAL

3.1. General

Developer shall plan, design, construct and manage the Project in accordance with the requirements set forth in the Contract Documents. Should Developer's or Developer Related Entities' design result in impacts that warrant the need for new or extended environmental analysis, Developer shall be responsible for the preparation of a Supplemental EIS/EIR and any subsequent requirements for related Governmental Approvals.

Developer shall designate personnel who have thorough knowledge and understanding of all environmental aspects of the Project including actions necessary to comply with the ROD, the Contract Documents, applicable Laws and Governmental Approvals.

3.2. Administration Requirements

Throughout the development of the Indicative Preliminary Design and environmental documentation for the Project, extensive coordination with project partners and stakeholders, regulatory agencies, and the general public has occurred. The extensive coordination efforts led to the development of a consensus on the Indicative Preliminary Design and subsequent key project mitigations and commitments as outlined in the Programmatic Agreement, Record of Decision, and Mitigation Monitoring Plan. A detailed tracking of the commitments is contained in the Commitment Tracking Database that has been developed for the Project and included in the Reference Documents. Developer shall assume responsibility for the continued development and maintenance of the Commitment Tracking Database and provide a copy of the database to the Department every quarter.

3.2.1. Laws, Standards and Specifications

Developer shall design and construct the project-specific requirements relating to environmental compliance in accordance with the Governmental Approvals, permits, standards and requirements below.

If there is any conflict in standards, the order of precedence shall be as set forth below, unless otherwise specified. However, if the Developer's Submittal has a higher standard, then adhere to the Submittal standard.

If there is any unresolved ambiguity in standards, it is Developer's responsibility to obtain clarification from the Department before proceeding with design and/or construction.

Use the most current version of each listed standard as of the initial publication date of this RFP unless modified by a Department Change.

3.2.1.1. Standards

PRIORITY	ENTITY	TITLE
1	FHWA	Record of Decision
2	Various	Programmatic Agreement
3	Various	Final Environmental Impact Statement/ Report FEIS/R
4	Department	Department-Obtained Permits, Agreements and/or Approvals (404, 401, BETP, ATP, BMP)
5	Department	Standard Environmental Reference
6	Department	Standard Special Provisions
7	Department	2006 (US Customary Standard) Plans Including New Standard Plans
8	Department	Design-Build Modifications to the Standard Specifications for Construction
9	Department	Standard Specifications (May 2006 Edition)
10	Department	Construction Site Best Management Practices (BMPs) Manual
11	Department	Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual
12	Secretary of Interior	Standards for the Treatment of Historic Properties: with guidelines for the Preservation, Rehabilitation, Restoration and Reconstruction
13	Secretary of Interior	Standards and Guidelines for Archaeological Documentation

3.2.1.2. Additional Standards Applicable for Works to be returned to the Presidio Trust at or prior to Final Acceptance

The following standards shall also be utilized in the design and construction of all works to be returned to the Presidio Trust on or before Final Acceptance.

CODE AREA	ADOPTED CODE
Building	2009 IBC - International Building Code 2009 IEBC - International Existing Building Code 2009 IRC - International Residential Code 2007 California Building Code
Electrical	2008 NEC – National Electrical Code (NFPA 70)[1]
Mechanical	2009 IMC - International Mechanical Code
Plumbing	2009 IPC - International Plumbing Code
Accessibility	More Stringent of 2009 IBC -International Building Code or Applicable Federal Law*[2]
Energy	2009 IECC – International Energy Conservation Code; CA Title 24, 2008

CODE AREA	ADOPTED CODE
	Standards - California Energy Code
Fire Prevention	2009 IBC and IFC; 2009 UFC (NFPA 1) - Uniform Fire Code; any other NFPA code relative to the project
Fire and Life Safety	2009 NFPA 101 Life Safety Code; any other NFPA codes relative to the project
Historic Building	2007 California State Historic Building Code – Title 24, part 8

[1]The National Electrical Code is recognized by the International Code Council (ICC).
[2]Provided that where the California State Historical Building Code or the International Existing Building Code allows for an exception that is not available under the International Building Code, such exceptions shall remain available for building activity in Area B (of the Presidio) so long as the implementation of such exception is not inconsistent with federal law.
*Accessibility standards regarding Outdoor Developed Areas and are currently under legal review.

For current sustainable building requirements, consult the LEED requirements for non-residential buildings referenced in the Presidio Trust Design and Construction Guidelines. For residential buildings, apply the Build It Green, GreenPoint Rated System. Consult the Permitting Office for details.

For bulletins and special conditions, see the Presidio Trust Permitting Department.

<u>For projects in various stages of development:</u>

Formerly adopted codes shall be used under these conditions:

A) Projects that have commenced the Trust Design Review process prior to 7/01/10 are to continue using the former set of codes unless the tenant/ Developer desires to use the new set and the Trust agrees to same in writing. (Note: a change in specified codes may require a modification to an existing letter of intent, DA or lease).

B) Trust-developed projects that have commenced the Design Review process prior to 7/01/08 shall continue to use the former codes unless mutually agreed between the Trust and the A/E.

Newly adopted codes shall be used under these conditions:

A) For projects in pre-development (or in earlier stages of development) without an executed letter of intent, lease agreement, or which have not started the Trust Design Review process, the new set of codes shall be used.

B) For Trust-developed projects which have yet to begin design, the new set of approved codes shall be used.

Set of codes to apply is optional under these conditions:

A) For Trust projects in the conceptual or schematic design phase, the design team shall use the new set of applicable codes unless a determination is made that the new code would cause excessive revisions or create hardships, financial or otherwise.

B) For those projects that have gone through significant design*, but have no executed letter of intent, DA or lease, the decision of which set of codes to use should be determined by mutual agreement between the Trust and the tenant/Developer and that decision should be incorporated into the executed letter of intent, DA or lease.

*Significant design means that the plans are developed to the degree that implementing the new code list would cause revisions and create hardships, financial or otherwise.

3.2.1.3. References

Developer shall use the references listed below as supplementary guidelines for all environmentally related analysis, design and construction.

AGENCY	TITLE
Department	Surveys Manual
Department	Ready To List and Construction Contract Award Guide (RTL Guide)
Department	Construction Manual
Department	California Test Methods
U.S. Army Corps of Engineers	Wetlands Delineation Manual
Presidio Trust	Vegetation Management Plan
Presidio Trust	Presidio Trust Management Plan
Presidio Trust	Policy for Waste Minimization in Construction and Demolition

Developer shall be responsible for all required commitments of the Project including those contained in the permits. Should changes to current Project commitments be required, Developer shall be responsible for coordinating with appropriate Project stakeholders and regulatory/permitting agencies and preparing the necessary Reevaluation/Addendum or Supplemental EIS/R as appropriate.

3.2.2. Water Quality

Developer shall prevent erosion and sedimentation from entering into surface waters via the use of erosion control devices and other Best Management Practices. Should groundwater dewatering be required, Developer shall obtain necessary permits and approvals for dewatering.

Developer shall be responsible for preparing a Stormwater Pollution Prevention Plan per the requirements of the Stormwater Pollution Prevention Plan and Water Pollution Control Program Preparation Manual, the National Pollutant Discharge Elimination System Permit, and the Regional Water Quality Control Board NPDES Department Statewide Stormwater Permit. This plan shall be prepared and submitted to the Department for Review and Comment no later than thirty (30) days prior to NTP 2. Developer or any Developer Related Entity shall not commence any activities on site until Developer has received, and if required, acted upon the comments of the Department. Developer shall be responsible for all reporting required in

connection with the water quality permits and shall provide copies of all such reports to the Department. Developer and all Developer Related Entities shall comply with the NPDES permit.

3.2.3. Erosion and Vegetation Control

As part of the Stormwater Pollution Prevention Plan, Developer shall set out the measures that will be implemented to prevent and control erosion. Developer shall be responsible for the installation and maintenance of all temporary and permanent erosion and sediment control measures required throughout the entire Term. Developer shall prepare Erosion Control Inspection Reports and submit them quarterly to the Department until Final Acceptance, and annually thereafter through the Operating Period.

Developer and all Developer Related Entities shall comply with Presidio Trust Executive Order 13112 to prevent and control the spread of invasive species in the Project area.

3.2.4. Wetlands

All mitigation for Project wetland impacts identified in the U.S. Army Corps of Engineers Section 404 Permit and Regional Water Quality Control Board Section 401 Permit will be the responsibility of the Department. The Department and the Trust agreed to additional success criteria for Project mitigated wetland sites in addition to the success criteria listed in the USACE Section 404 Permit and in the RWQCB Section 401 Permits. The additional success criteria are described in the General Wetland Monitoring Plan and will be the responsibility of the Department to implement.

Should Developer's or any Developer Related Entities design, construction, or operations increase the impacts to wetlands, additional permitting, amendments to existing permits, and mitigation measures specified within such additional or amended permits shall be the responsibility of Developer.

Developer shall coordinate with the Presidio Trust and all agencies, including the Regional Water Quality Control Board and U.S. Army Corps of Engineers, through the Department, prior to developing any site specific mitigation plans in accordance with Volume II, Division I, Article 2 and Article 5.

3.2.5. Biological Resources

A Natural Environment Study (NES) for Doyle Drive Replacement Project is provided as a Reference Document.

The NES and the Final Environmental Impact Statement/Report (FEIS/R) for the Doyle Drive Replacement Project indicate that there is potential for a number of special-status plant or animal species (not threatened or endangered) to reside or migrate into the construction corridor. Avoidance measures for the Project are described in the Doyle Drive Replacement Project Biological Monitoring Plan. Developer and all Developer Related Entities shall implement the requirements contained in the FEIS/R and Biological Monitoring Plan.

Developer shall be responsible for protection of all threatened and endangered species, special-status plant and animal species, and sensitive biological communities located within the Project ROW. Developer and all Developer Related Entities shall comply with measures for nesting

birds as outlined in the Migratory Bird Treaty Act (MBTA) and for special-status birds as provided in the Biological Monitoring Plan.

Should Developer expand the Project beyond the Project ROW, mitigation for any impacts for areas outside of the Project ROW, including species protected under Section 7 of the Federal Endangered Species Act or the California Department of Fish and Game shall be the responsibility of Developer. Developer shall coordinate Section 7 consultation with the USFWS, prepare technical studies for biological assessment for proposed activities, and comply with all conditions of the USFWS Biological Opinion, or conditions established by the USFWS during any consultation.

Developer and all Developer Related Entities shall follow Department Standard Specifications and Standard Special Provisions for ESA installation.

3.2.6. Hazardous Materials

The Project is located within the Presidio National Park, which was a military installation until 1994. Due to its military past and the age of the facilities, a number of Hazardous Materials sites may be located within the Project ROW. Developer shall be responsible for the removal, handling, transportation and disposal, if any, of Hazardous Materials from the Project. Developer shall coordinate with the Department prior to the removal, handling, transportation and disposal of any contaminated soil, groundwater, drilling mud and/or any other Contaminated Material. Developer and all Developer Related Entities shall handle any hazardous materials encountered during the course of the Project in accordance with the Contract Documents.

Developer shall coordinate activities with the Presidio Trust through the Department and shall furnish all necessary Design Documents to the Department in order to facilitate this coordination.

Developer shall prepare a Hazardous Waste Operations Safety and Health Program for Hazardous Waste Management that meets Federal, State, and local laws and requirements.

Developer shall submit to the Department a site specific Health and Safety Plan (HASP) as Part of the Hazardous Waste Operations Safety and Health Program, and as defined in CCR Title 8, Section 5192(1)(B), thirty (30) days prior to NTP 2.

Developer shall distribute the HASP to all employees, all Developer Related Entities and any other persons who may be required to visit the Project as part of their duties and that could potentially be exposed to Hazardous Materials. All such persons shall be required to read the HASP, sign a compliance agreement, and abide by all provisions of the HASP.

Developer and all Developer Related Entities shall comply with the Department of Toxic Substances Control's (DTSC) Variance in handling aerially deposited lead (ADL) material and recognizing the purpose of "SB14 Hazardous Waste Source Reduction." DTSC's Lead Variance cannot be invoked to reuse ADL contaminated soil within the Project boundaries and Presidio. However, the Variance can be invoked to reuse ADL contaminated soil from the Project elsewhere outside the Presidio.

Lead abatement work, if required, shall only be performed by a Contractor certified by the Department of Health Services and in accordance with all Federal, State, and local laws and requirements.

3.2.7. Unexploded Ordnance (UXO)

The project falls within the boundary of the Presidio of San Francisco, a former military base. Unexploded ordnance (UXO) has been found adjacent to the work area. Developer shall ensure that any worker engaged by Developer or any Developer Related Entity on the Project who may have cause to be performing soil disturbance activities, from pulling weeds and landscaping to conducting excavations, must be informed of the potential for encountering UXO, including bullet cartridges, grenades and cannon balls. Before undertaking any work within the Project ROW, Developer shall organize for the Presidio Trust Safety and Occupational Health Manager to provide Environmental and Safety/UXO Awareness Training.

The Environmental and Safety/UXO Awareness training shall be held at San Francisco Presidio and shall include training sessions for cultural and biological resources as well as UXO. All workers employed by any Developer-Related Entity that in the course of performing their duties will have cause to enter the Project ROW must attend a UXO training session. UXO training will be managed in accordance with the Golden Gate National Recreation Area Standard Operating Procedure, #814, (October 2004), as amended.

If any UXO is discovered, Developer and all Developer Related Entities shall immediately stop work, move a safe distance away from the UXO and control access to that location. Developer shall inform the Department of the discovery of any potential UXO as soon as possible and no later than within one (1) hour of such discovery. Developer shall contact the Presidio Trust Safety and Occupational Health Manager, at 415-748-0059 or the Presidio Trust Environmental Program Manager, at 415-561-4259 within one (1) hour of such discovery. Developer and all Developer Related Entities may continue to work in areas deemed by the Presidio Trust to be safe and unaffected by the discovery of the UXO.

3.2.8. Cultural Resources Technical Requirements

Developer shall designate a Cultural Resources Compliance Manager (CM) within thirty (30) days of NTP 1. The CM must meet the qualifications of a historian, architectural historian or archaeologist as set forth in Volume II, Division I of these Technical Requirements. All Cultural Resource related Work shall be coordinated by the CM.

Developer's CM shall prepare monitoring reports in accordance with the requirements of the Archaeological Treatment Plan and Built Environment Treatment Plan and submit these to the Department. The Department will forward these reports to the Treatment Oversight Panel (TOP).

Developer's CM shall prepare and submit to the Department for review and comment semi-annual status reports in accordance with the schedule for submittal in the Programmatic Agreement from NTP1 until Final Acceptance. The Department will have thirty (30) days to review and comment on these reports.

Developer shall designate on an as-needed basis an Archaeologist meeting the Secretary of the Interior's professional qualifications standards to provide expertise in monitoring construction

activities that may impact cultural resources throughout the duration of the Project. The Archaeologist shall be fully conversant with the requirements and obligations of the Archaeological Treatment Plan. Developer shall comply with all the requirements of all applicable third party agreements. In preparing all monitoring plans and procedures Developer shall incorporate the terms of the April 2010 Draft Doyle Drive Cultural Resources Monitoring Manual to the extent feasible and applicable.

Developer shall also designate an Architectural Historian meeting the Secretary of the Interior's professional qualifications standards to provide expertise in monitoring construction activities that may affect built historic resources and completing the mitigation of adverse effects to historic properties throughout the Project. Additional experts shall be retained as necessary to fulfill mitigation obligations, such as, but not limited to, photographers for HABS/HAER/HALS, or historical architects to design stabilization of historic buildings.

3.2.9. Treatment Oversight Panel (TOP) Function and Interrelationship with Developer

The TOP includes professionally qualified representatives from the National Park Service, Presidio Trust, the Department for FHWA, and SFCTA. All approaches, requests or submittals made to the TOP will be made by the Department on Developer's behalf.

Developer's CM shall inform the Department of all matters that involve historic built resources, landscape features, and buried resources, including, but not limited to, results of monitoring, project changes that might affect cultural resources, and construction methods that might affect cultural resources. The Department will keep the TOP informed and consult with the TOP on all matters brought to its attention by Developer's CM.

While the TOP will retain authority regarding all Programmatic Agreement compliance, Developer shall deal solely with the Department. The Department will give appropriate instructions to Developer based on TOP communications. Developer shall only follow instructions from the Department. Developer shall provide to the Department all documentation and resources necessary to demonstrate compliance with the stipulations of the Programmatic Agreement and treatment plans to the Department, and work with the Department to demonstrate compliance to the TOP. The TOP will generally:

A) Meet monthly; Developer's CM shall attend monthly meetings to be scheduled by the Department;

B) Review Built Environment Treatment Plan /Historic Property Treatment Plan for the Built Environment (BETP), Archaeological Treatment Plan (ATP), MIP and other compliance efforts and send any requests for change to the Department for consideration and if Department deems appropriate in consultation with the TOP and other signatories of the PA, the Department will instruct Developer to make such changes in accordance with the Agreement;

C) Review design for conformance with the Architectural Criteria Report and make an assessment of potential effects. ;

D) Review all documentation that may include, but is not limited to Historic American Building Survey (HABS), Historic American Engineering Record

(HAER), Historic American Landscape Survey (HALS), Historic Survey Reports (HSRs), Condition Assessment Reports (CARs), Archaeological Survey Report (ASRs), Finding of Effects (FOEs), monitoring reports, archaeological reports, semi-annual reports, as required under by the Contract Documents;

E) Assist the Department to coordinate communication with State Historic Preservation Office (SHPO) and all PA signatories;

F) Review and approve qualifications of the specialists described in this Article 3 of Division II, and those in Article 6 of Volume II, Division I. Any comments, requests, or approvals will be given to the Department. After review, the Department will inform the Developer of the comments received and if required instruct Developer how to act upon the TOP's comments, requests, or approvals. Developer should note the obligation that Developer and all Developer Related Entities shall comply with the requirements of the ROE and PA at Developer's expense; and

G) Review and approve qualifications of Developer Related Entities working on historic properties, including but not limited to, building stabilization/ restoration/ rehabilitation, masonry, and building moving and storage. Any comments, requests, recommendations, or approvals will be given to the Department. After review, the Department will inform and if necessary instruct Developer how to act upon the TOP's comments, recommendations, requests, or approvals. Developer should note the obligation that Developer shall comply with the requirements of the ROE and PA at Developer's expense.

Developer shall send all correspondence regarding environmental compliance for the TOP required by the Contract Documents to the Department.

The Department will convey all correspondence requiring submission to the TOP to the appropriate representatives of the TOP within five (5) days of receipt from Developer.

Provided that Developer's and all Developer Related Entities design meets the requirements of the Contract Documents, the Department will seek to obtain the views, comments, requests, recommendations, or approvals from the TOP within thirty (30) days of receipt of the correspondence by the TOP.

The Department will review and forward the comments of the TOP to the Developer within five (5) days from receipt of any comments.

3.2.10. Coordination/Compliance

During design Developer's CM shall analyze the effects of each design element as it relates to historic properties and report, develop, and implement any required mitigation as required by the Contract Documents. Such analysis shall be included with the design submissions detailed in Volume II, Division I, Article2.

Developer's CM shall be responsible for ensuring that all measures and requirements developed to avoid, minimize and/or mitigate adverse effects to the Presidio National Historic Landmark

District, as described in the PA, the BETP and ATP are followed. Tasks vary throughout design, construction, and post-construction activities.

3.2.11. Further Obligations that commence Pre-Construction

Commencing at NTP 1, Developer shall ensure that the following are completed in accordance with the PA, treatment plans, and all other subsequent agreements and documents that describe the treatment of historic resources. In cases where Developer or any Developer Related Entity identifies project design elements requiring changes in the Area of Potential Effects (APEs) or new Section 106 compliance, Developer or any Developer Related Entity identifies archaeological site or feature, or Developer or any Developer Related Entity identifies potential for previously unidentified built environment impact, Developer shall immediately notify the Department

Developer shall review the design of the Works to:

A) Ensure the design meets Architectural Criteria guidelines;

B) Identify design modifications needed to avoid any additional adverse effects;

C) Identify when project elements extend outside of the current APE and recommend extent to which the APE needs to be expanded;

D) Identify when the design cannot avoid additional adverse effects to resources and identify measures to be followed in the treatment plans or make further recommendations for minimization or mitigation; and

E) Coordinate consultation with the TOP through the Department.

In consultation with the Department, Developer's CM shall determine what additional studies are needed when new potential effects are identified, including but not limited to Addendum or Supplemental ASRs or HRERs, FOEs, , CARs, HSRs. Where such additional studies result from any Developer proposals that depart from the already approved elements of the Project, then the studies shall be the Developer's responsibility. Should the Finding of Effects determine that the effects will be adverse, the TOP will determine mitigation, in consultation with the SHPO and ACHP, that may include, but shall not be limited to, HABS, HAER, HALS. The fulfillment of mitigation obligations shall be the Developer's responsibility.

Developer shall ensure that existing CARs for buildings within two hundred (200) feet of the construction are adequate for anticipated construction activities. Where additional CARs are required these shall be considered to be part of the Works and shall be undertaken by Developer and shall be the Developer's responsibility. Developer shall be responsible for 3-D scans of buildings that were not previously scanned by the Department, if they are within two hundred (200) feet of construction. Any additional buildings scanned shall be scanned using the same kind equipment or equipment of similar technology to that used by the Department.

Developer is responsible for ensuring that stabilization, as necessary, of buildings within two hundred (200) feet of the construction is performed and for ensuring that these buildings will not be damaged by construction activities. Stabilization will follow the Secretary of the Interior's

Standards for the treatment of historic properties. Developer may propose other protection methods to ensure that the buildings will not be affected.

Conditions Assessments have not been completed for buildings 210, 222, 223, 227, 229, 1161, 1162, 1163, 1169, 1063, 1167. Developer shall complete conditions assessments for these buildings, and for any another buildings not previously assessed and identified as being within two hundred (200) feet of any construction activity . These assessments shall follow the format of previous assessments and include 3-D laser scans similar to the other scans undertaken. Developer shall prepare a predicted vibration analysis based on distance, soil type, and construction activities for all buildings within 200 feet of construction activities.

This work shall be conducted in accordance with the BETP, Section 7.2, Pre-Construction Conditions Assessments, Section 7.1.2, Vibration Studies and Proposed Protective Measures, and Section 7.1.3, Appropriate Demolition and Construction Methods. Developer shall consult with the Department and TOP in accordance with Article 3.2.9 .

To gain access to any Presidio Trust building within the Temporary Construction Easements, Developer shall provide 45 days notice to the Department. Developer shall obtain access to buildings outside the Temporary Construction Easement by permit from the Presidio Trust in accordance with the process in Volume II, Division I, Article 2.

If any temporary or permanent stabilization works proposed by Developer or any Developer Related Entity are likely to result in adverse effects Developer shall undertake a Finding of Effect at Developer's expense.

3.2.11.1. Gorgas Warehouses buildings 1063, 1163, 1162, 1161

Developer shall undertake an investigation of the crawl spaces of these Gorgas Street warehouses to determine if they lack structural integrity and need to be stabilized prior to vibration-inducing activity including routine operations of the Project. It is the responsibility of Developer to stabilize these buildings. Developer shall report the findings to the Department, the TOP, and Presidio Trust following the procedures set out in Volume II, Division II, Section 3, Article 3.2.9 and Volume II, Division I, Article 5. Should it be determined that any or all of these buildings are in need of stabilization, then Developer shall submit detailed proposals and designs in accordance with Volume II, Division I, Article 2, Volume II, Division II, Section 3, Article 3.2.9 and Volume II, Division I, Article 5. If Developer or any Developer Related Entity proposes a treatment that is temporary, Developer shall design the treatment to ensure there will be no loss of original material that forms part of the building.

Because these are historic buildings, Developer shall employ architects and engineers with demonstrable experience of working with historic buildings and applying the Secretary of the Interior's Standards for the treatment of historic properties. Developer shall obtain the approval from the Department and the TOP in accordance with Article 3.2.9 above for any Developer Related Entity not previously approved by the Presidio Trust employed or engaged on any work associated with historic buildings before undertaking any work on or related to these buildings. Such approval to not be unreasonably withheld.

3.2.11.2. Surveys and Monitoring

Developer shall monitor buildings within two hundred (200) feet of construction activities and implement any works necessary to stabilize buildings that exhibit signs of distress and repair any damage caused as a result of the activities of Developer or any Developer Related Entity.

3.2.11.3. Protection Measures and Monitoring

Developer and all Developer Related Entities shall implement measures, as appropriate, to protect buildings, structures and cultural landscape features throughout the Term. Developer shall implement protection measures and prepare and implement a monitoring plan for all buildings and other historic resources that are in close proximity to the Project but are not anticipated to be impacted by demolition or construction activities. Developer shall send this plan and details of the protection measures to the Department and the Department will forward to the TOP for review following the process described in Article 3.2.9 above.

Developer shall protect the cemetery fence during the construction works in the vicinity of the Battery Tunnels. Developer shall also maintain all protective measures already in place, including, but not limited to, the barriers around archaeology site SFr6/26 and the geoweb on top of the horse dip.

In consultation with the Department and other stakeholders, Developer shall establish a list of landscape features that are to be avoided, protected or salvaged. Developer shall be responsible for implementing measures to ensure that the prescribed treatment of the items identified is followed. It is possible that, as a result of Developer's or a Developer Related Entities design, additional features will be identified that will require protection. Developer's CM shall review the design, locate and include the items to be protected on the project plans, and propose protective measures to the Department. The Department will forward these plans to the TOP for review and comment following the process set out in Article 3.2.9 above.

Developer's CM shall also develop a built resources monitoring protocol and reporting process and submit to the Department for review and comment by the Department and TOP following the process described in Article 3.2.9 above.

3.2.11.4. Elevation Surveys and Monitoring

Developer shall list the buildings proposed for elevation surveys, regardless of past surveys, and provide it to the TOP through the Department for concurrence that the list is complete in accordance with the process set out in Article 3.2.9 above. Developer shall then follow the elevation survey requirements outlined in the BETP.

Should a building's elevation change, Developer and all Developer Related Entities shall follow response and treatment procedures and requirements as set out in the BETP. Any treatment will need to be proposed to the Department and the TOP, in accordance with Article 3.2.9 above, prior to any action being taken unless it is necessary to immediately stabilize the building to prevent additional failure. Depending upon the effects and treatment, additional signatories of the PA may also need to be consulted. This consultation will be undertaken by the TOP.

3.2.11.5. Develop Deep Soil Mixing Archaeology Plan

During Phase 1 Construction cement deep soil mixing (CDSM) was utilized.. This method was not contemplated during development of the Archaeological Treatment Plan which relies heavily on monitoring to observe historic resources during construction before they are impacted.

Should Developer choose to use this method of construction, an archaeological identification and mitigation plan shall be prepared. This plan shall be submitted to the Department and the TOP for review and comment following the process set out Article 3.2.9 above. The plan shall define the identification and mitigation efforts to be implemented and these shall be commensurate with the extent to which CDSM is employed, the volume of CDSM area proposed, and the potential archaeological sensitivity in the areas proposed for CDSM.

Developer shall be responsible for any additional surveys and identification of resources, determinations of effects on cultural resources, and the development and implementation of mitigation efforts as a result of any design changes and refinements that result in additional potential effects to cultural resources within the established APEs, and/or necessitate the expansion of the current APEs. All such implementation of Section 106 activities must be submitted to the Department and TOP for review and comment following the process set out in Article 3.2.9 above. The TOP will determine if additional signatories of the PA should be notified.

3.2.11.6. Re-assessment of Potentially Impacted Buildings

Developer shall undertake additional assessments of previously assessed buildings. such as 649, 650, 651, and 654 and any others determined to be in proximity to the new Presidio Viaduct and the to-be-demolished High Viaduct based on the proposed construction and design details for Phase II Construction. Additional buildings in other areas that are within two hundred (200) feet of Phase I Construction that were not stabilized may need to be stabilized or otherwise protected due to design or construction methods to be implemented as part of the Phase II Construction and Developer shall undertake such assessments and protective measures.

3.2.11.7. Building 201 and the Halleck Street Streetscape

The PA and the BETP stipulate that the upper story of Building 201 be removed, moved and protected during construction, then moved back to its original location on Halleck Street and rehabilitated in a manner that preserves as much of the building's historic fabric as possible. When this was determined, it was assumed that the change in elevation of the building, which will be sitting on top of the Main Post tunnel, would not be visually significant and that the change in the Halleck Street streetscape would be mitigated by returning the building to its original location. Subsequent design considerations put that portion of Halleck Street at a much higher level than previously thought. Therefore the mitigation outlined in the PA may not be the best solution for the treatment of Building 201, Building 228, across the street from 201, and the retention of the Halleck Street streetscape. Three options are now being considered, however the final determination is contingent upon Developer's design of Halleck Street, the Main Post tunnel, and Gorgas Avenue. The strong preference is for Building 201 to be returned to the original position as initially contemplated.

Developer will be provided a preliminary FOE, considering three options: place the building back as planned, move the building south of its original location so that the original elevation is retained, or not put the building back at all. Developer shall be responsible for completing this assessment when the final elevation of Halleck Street is determined. This shall include several simulated views of each of the options. An assessment and proposal for Building 201 relocation shall be prepared by Developer and submitted to the Department. The Department will forward the proposal to the TOP for review and recommendation of which option should be implemented. Because this is may be an adverse effect that will be different to that described in the original and first addendum FOE, the TOP will consult with other signatories of the PA.

The Department will instruct Developer on how to proceed based on the TOP's recommendation. Developer shall implement the mitigation directed by the Department. If the top floor of the building is to be retained, Developer shall be responsible for moving it, mothballing it, returning it to the determined location, and rehabilitating it. Also Developer shall salvage the bottom floor in consultation with the Presidio Trust salvage team in accordance with Volume II, Division I, Article 2 and Volume II, Division I, Article 5. Guidance is provided in Sections 7.4.3, 9.2, and 9.3.1 of the BETP, and professional qualifications required for these tasks are in Section 6.3.3 of the BETP. If the building is not to be put back, it is to be salvaged based on direction from the Department, in consultation with the Presidio Trust salvage team in accordance with Volume II, Division I, Article 2 and Volume II, Division I, Article 5.

3.2.11.8. Building 228

Developer shall be responsible for the stabilization of Building 228 and the stone retaining wall just north of the building.

A Historic Structures Report (HSR) has been written without final recommendations on proposed stabilization technique. The TOP has determined that two stabilization plans shall be developed, pending a geotechnical study of the stability of the soil on which it sits, and a foundation study. Developer shall be responsible for conducting these studies, and designing the two stabilization plans which shall be submitted in accordance with Volume II, Division I, Article 2 and Volume II, Division I, Article 5 and to the TOP in accordance with Article 3.2.9 above.

Both plans will include a temporary stabilization design to be implemented prior to construction in the area, and a permanent stabilization and foundation repair plan, should the temporary stabilization prove to be inadequate by Developer's Geotechnical Engineer. Developer shall also consider the hazardous waste remediation schedule that the Presidio Trust is undertaking in the area.

3.2.11.9. Battery Slaughter

Developer shall be responsible for implementing the mitigation put forth in the Battery Slaughter FOE.

3.2.11.10. Battery Tunnel

The preliminary FOE and mitigation plan for Battery Tunnel is based on current preliminary design and shall be revisited by Developer when design of the northbound Battery Tunnel is finalized. Should further engineering design change the possible scenarios or effects on the

batteries, Developer shall revise the FOE as necessary. Should the battery be adversely affected, the Developer shall be responsible for all required mitigation measures.

3.2.12. Utility Relocations

Developer shall complete all investigations and monitoring work during construction in accordance with all the requirements of the Contract Documents. In preparing all monitoring plans and procedures Developer shall incorporate the terms of the April 2010 Draft Doyle Drive Cultural Resources Monitoring Manual to the extent feasible and applicable.

3.2.13. Biannual Reports

Developer shall prepare biannual reports for as long as the PA is in effect and provide them to the Department. The Department will provide the reports to the TOP for Review and Comment as set out in 3.2.9. Comments will be provided to Developer by the Department. Once approved by the TOP, Developer shall deliver a final report to the Department for distribution to the PA signatories. Developer shall follow the guidance found in the PA and Section 4.5.1 in the BETP.

3.2.14. Public Interpretation Banners and Temporary Construction Signs

Developer shall be responsible for maintenance of the public interpretation "banners" already placed on construction fences along the project corridor for the duration of construction. Developer is responsible for six public interpretation signs which shall be replaced if stolen or damaged (including graffiti).

4. SUSTAINABILITY

4.1. General

Forty five (45) days prior to NTP3 Developer shall submit to the Department for review and comment a Sustainability Management Plan for the construction period in accordance with the requirements set forth in these Contact Documents.

The Sustainability Management Plan shall be in accordance with Article 1.5.5 of Division I, of Volume II. Developer shall deliver monitoring reports every 6 months to the Department no later than the 30th day of each 6 month period for review and comment.

The Sustainability Management Plan and monitoring reports shall address all major construction-related activities.

5. ROADWAY

5.1. General

Developer shall design and construct all roadways in accordance with the requirements set forth in the Contract Documents.

5.2. Administration Requirements

5.2.1. Laws, Standards and Specifications

Developer shall perform Roadway Work in accordance with the relevant requirements of the standards listed below.

If there is any conflict in standards, the order of precedence shall be as set forth below, unless otherwise specified. However, if the Developer's Submittal has a higher standard, then adhere to the Submittal standard.

If there is any unresolved ambiguity in standards, it is Developer's responsibility to obtain clarification from the Department before proceeding with design and/or construction.

Use the most current version of each listed standard as of the initial publication date of this RFP unless modified by a Department Change.

5.2.1.1. Standards

PRIORITY	ENTITY	TITLE
1	Department	Highway Design Manual (HDM)
2	AASHTO	A Policy on Geometric Design of Highway and Streets
3	Department	Standard Special Provisions
4	Department	Standard Specifications (May 2006 Edition)
5	Transportation Research Board	Highway Capacity Manual
6	AASHTO	Roadside Design Guide
7	Department	Project Development Procedures Manual (PDPM)
8	Department	Standard Plans U.S. Customary Units, (May 2006 Edition)

5.2.1.2. References

Use the references listed below as supplementary guidelines for the design of the roadway and/or freeway system. These publications have no established order of precedence.

AGENCY	TITLE
Department	Plans Preparation Manual US Customary Units (English)
Department	CADD Users Manual – US Customary Units (English).
Various	Final Environmental Impact Statement/ Report FEIS/R

AGENCY	TITLE
National Cooperative Highway Research Program (NCHRP)	Report 350-Recommended Procedures for the Safety Performance Evaluation of Highway Features
Department	Ready to List and Construction Contract Award Guide (RTL Guide)

5.3. Design Requirements

5.3.1. Roads

The following defines the appropriate limits for the work:

ROADWAY	DETAIL	NUMBER OF LANES
NB Mainline	From Gorgas Ave. to Girard Off-Ramp	3
NB Mainline	From 600' past Girard Off-Ramp to 1100' past Girard Off-Ramp: transition	3/2
NB Mainline	From end of transition to Girard On-Ramp	2
NB Mainline	From Girard On-Ramp to HWY1 NB On-Ramp	3
NB Mainline	From HWY1 to NB On-Ramp to end of Project approx. 420' south of existing Toll Plaza	5
NB Off-Ramp to Girard Rd.	From NB Mainline to Girard Rd.	1
NB On-Ramp from Girard Rd.	From Girard Rd. to 300' on ramp	2
NB On-Ramp from Girard Rd.	From 300' from Girard Rd. to On-Ramp NB Mainline	1
NB Off-Ramp to HWY1	From gore nose to 200' past the gore nose	1
NB Off-Ramp to HWY1	From 200' past the gore nose to 400' past the gore nose	1
NB Off-Ramp to HWY1	From 400' past the gore to end of construction on the ramp	1
NB On-Ramp from HWY1	From end of construction Phase I (done by Others) approximate 1000' to NB Mainline	2
SB Mainline	From Gorgas Ave. to Girard Rd. Off-Ramp	3
SB Mainline	From Girard Rd Off-Ramp to west portal of Southbound Battery Tunnel	4
SB Mainline	From HWY1 Off-Ramp to End of Project approx. 420' south of existing Toll Plaza	4
SB Off-Ramp to Girard Rd.	From SB Mainline to 350' past gore nose	2
SB Off-Ramp to Girard Rd.	From 350' past gore nose to 430' past gore	2/3
SB Off-Ramp to Girard Rd.	From 430' past gore nose to Girard Rd.	3

ROADWAY	DETAIL	NUMBER OF LANES
Gorgas Ave.	From Girard 500' along Gorgas Ave	2 (1 each direction)
Girard Rd.	From Lincoln Blvd. to Gorgas Ave.	2 (1 each direction)
Girard Rd.	From Gorgas Ave. to NB On- and Off-Ramp	2/3 going north 1 going south
Girard Rd.	From NB On- and Off-Ramp to 200' past the NB On- and Off-Ramp (going south)	2 going north 2 going south
Girard Rd.	From 200' past the NB On- and Off-Ramp (going south) to 400' past the NB On- and Off-Ramp (going south)	2 going north 2/1 going south
Girard Rd.	From 400' past the NB On- and Off-Ramp (going south) 700' past the NB On- and Off-Ramp (going south)	2 going north 1 going south
Girard Rd.	From 700' past the NB On- and Off-Ramp (going south) to 1300' past the NB On- and Off-Ramp (going south)	2 going north 1/2 going south
Girard Rd.	From 1300' past the NB On- and Off-Ramp (going south) to Marina Blvd.	2 each direction
Edie Rd.	From Edie Rd. to Girard Rd.	2
Halleck St.	From Lincoln Blvd. to Old Mason St.	1 each direction
*All descriptions are approximate. *Table does not include transitions from existing lanes, lane widths and approach to project. *Lane 1 – Inside Lane, Lane numbering from left to right		

Developer shall design and construct all roadway elements according to the Department's Standards and Standard Special Provisions. These include but are not limited to horizontal alignment, vertical alignment, superelevation, cross slopes, lane widths, shoulder widths, medians, driveways, sidewalks, cross walks, curb and gutter, clear zone, side slopes, and cut and fill slopes. This Project has additional specific requirements for some of these elements, which are given in this section.

The alignment, profile/grade and super elevation of mainline have been established by the Department based on requirements set forth in the FEIS/R, agreement with the Presidio Trust and other Project constraints. Developer shall review all of the constraints prior to design development to ensure compliance. If the proposed alignment, profile/grade or super elevation will vary from those established Developer shall submit to the Department for review and comment.

Developer shall design all the elements associated with mainline highway and other roadways in accordance with the criteria established in the Contract Documents. Some elements of the design developed in the preliminary design may not meet these design requirements. For these variances, mandatory design exceptions have already been approved by the Department and

FHWA and are described below. Developer shall submit any further mandatory design exceptions for approval by the Department in its sole discretion and for the approval of FHWA ninety (90) days prior to the anticipated commencement of construction.

Developer is discouraged from creating additional mandatory design exceptions, since there is no assurance that they will be approved by the Department or FHWA. If Developer's design creates additional design exceptions, Developer shall demonstrate on a case-by-case basis and on a cumulative basis that substantial benefits to the Project and the public would result from Developer's recommendation for design exceptions. Any additional exceptions requested by Developer will be subject to the Department approval in its sole discretion and approval of the FHWA. Developer shall comply with the Design Exception Process as stated in Chapter 21 of the Project Development Procedures Manual (PDPM)

The design exception request shall be submitted to the Department for their review and comment. The Department requires forty five (45) days for this process. Thereafter the Department will consult with FHWA for approval on the 13 controlling criteria if required (See Index 108.3 of the Highway Design Manual). This process could take six (6) months and Developer shall furnish all support and information required by the Department in discussions with FHWA.

Department-approved packages covering the Exceptions to Advisory Design Standards and Exceptions to Mandatory Design Standards already incorporated in the Indicative Preliminary Design are included in the Reference Documents.

5.3.2. Miscellaneous Elements

Developer shall prepare all necessary engineering studies and applicable design reports to justify all roadway elements used in the Project. Roadway elements shall include sidewalks, driveways, curbs, crosswalks, etc. All of which shall be in compliance with applicable ADA requirements.

Lane configurations at signalized intersections shall not reduce lane widths, number of lanes per movement or eliminate any movements from existing configurations as shown on the Indicative Preliminary Design.

5.3.3. Project-Specific Design Standards

Developer shall follow the Project-specific design standards for specific roadways shown in the following tables.

DESIGN STANDARDS	FREEWAY MAINLINE
Jurisdictional System	California Department of Transportation
Functional Class	Freeway
Access Control	Full
Highway Type	Multi-Lane Divided, Urban Section
Design Vehicle	STAA
Terrain	Urban

DESIGN STANDARDS	FREEWAY MAINLINE
Projected Posted Speed	45 mph
Proposed Design Speed	50 mph for mainline 40 mph for ramps
Shoulder Bus Use	No
Median Type	Landscape median

5.3.4. Temporary Works

Developer shall design all temporary roadway facilities to comply with the geometric design and construction requirements as that of the permanent roadway facilities. Developer shall furnish all necessary design documents and obtain all necessary permits for temporary traffic detours, temporary realignments of existing local roadways, and access roads affected by Project construction. Developer shall coordinate the design of these elements with the Department, the Presidio Trust and affected local agencies in accordance with Volume II, Division I, Article 2 and Volume II, Division I, Article 5.

Developer shall obtain approval from the Department in its sole discretion prior to constructing any temporary entrance/exit ramps and Developer shall perform any associated engineering, documentation, and coordination required by any approved temporary entrance/exit ramps.

5.3.5. Fencing

Developer shall maintain a consistent approach on the Project to that being installed as part of the Phase I Construction. If Developer opts to install a fence that differs from the fence approved for use in the Phase1 Construction, Developer shall obtain written approval from the Department in its sole discretion and, through the Department, the Presidio Trust in accordance with Volume II, Division I, Article 2 and Volume II, Division I, Article 5.

5.3.6. Slopes and Retaining Walls

Developer shall design and construct slopes and retaining walls in accordance with appropriate Department Standard and Standard Special Provisions and the Contract Documents.

5.3.7. Pavement Design

Developer shall design and construct mainline pavements according to the Department and AASHTO standards. Developer shall extend the full depth pavement section for the entire width including shoulders. The pavement includes roadway pavement; access ramps from and to the interchanges; incidental shoulder paving, all required improvements to local streets and relocated streets, parking lots, bus stops, driveways and bike paths.

For the main line and ramps within the Operating Period O&M Limits, Developer shall be responsible for preparing either a continuously reinforced Rigid Pavement Design (PCC) or an asphalt concrete (A/C) pavement as set out in Table 5.1. Developer shall submit the design in accordance with the requirements of Volume II, Division, I Article 2 and with the submissions include a layout plan which indicates the pavement design locations/limits.

For local roads and ramps Developer shall design all such roadways outside the Operating Period O&M Limits and Developer shall submit the design in accordance with the requirements of

Volume II, Division I, Article 2 and Volume II, Division I, Article 5 and with the submissions include a layout plan which indicates the pavement design locations/limits.

Developer shall design and construct parking lots, driveway, trails, foot paths and cycle ways etc. in accordance with appropriate local Agency/Jurisdiction requirements or as defined herein.

Milling and resurfacing on cross roads and ramps outside the Operating Period O&M Limits shall be designed based on the following parameters:

A) the limits of milling and resurfacing for local roads shall extend beyond the curb return or to the limits of construction Work required to affect a smooth transition, whichever is greater. Developer shall adhere to the minimum applicable pavement design standards for milling and resurfacing; and

B) Equivalent Single Axle Load (ESAL) information to be used for the development of the pavement design shall be determined by Developer.

Developer shall restore all Haul Routes affected by Phase I Construction and Phase II Construction prior to Substantial Completion in accordance with the Presidio Trust Right of Entry Agreement and the Contract Documents.

TABLE 5.1 PAVEMENT DESIGN RESTRICTIONS

Station to Station		Alignment Line	A/C or PCC
Start	Finish		
SB 33+43	SB 45+25	Southbound	A/C
SB 45+25	SB104+80	Southbound	PCC
SB104+80	SB 118+00	Southbound	A/C
NB 33+43	NB 45+25	Northbound	A/C
NB 45+25	NB 104+80	Northbound	PCC
NB 104+80	NB 118+00	Northbound	A/C
DOY 5 93+00	DOY 5 93+75	Rte 1 SB Ramp	A/C
DOY 5 93+75	DOY 5 98+00	Rte 1 SB Ramp	PCC
DOY 5 98+00	DOY 5 110+20	Rte 1 SB Ramp	A/C
DOY 4 97+00	DOY 4 98+75	Rte 1 NB Ramp	A/C
DOY 4 98+75	DOY 4 102+00	Rte 1 NB Ramp	PCC
DOY 4 102+00	DOY 4 122+09	Rte 1 NB Ramp	A/C
DOY 3 48+60	DOY 3 57+82	Ramp to Gorgas	PCC
DOY 2 95+60	DOY 2 108+00	NB 101 to SB Rte 1	PCC
DOY 2 108+00	DOY 2 113+00	NB 101 to SB Rte 1	A/C
DOY 1 40+17	DOY 1 45+00	NB 101 on Ramp	A/C

DOY 1 45+00	DOY 1 54+56	NB 101 on Ramp	PCC
GO 42+69	GO 48+00	Gorgas Road	A/C
GI 54+00	GI 62+00	Girard Road	A/C
GI 62+00	GI 69+00	Girard Road	PCC
GI 69+00	GI 77+52	Girard Road	A/C
VT 110+00	VT 120+40	VT Line	PCC
VT 120+40	VT 121+87	VT Line	A/C
VT 121+87	VT 123+75	VT Line	PCC

Note stationing is approximate

5.4. Construction Requirements

5.4.1. Clearing and Grubbing

Clearing and grubbing Work shall not start without a Storm Water Pollution Prevention Plan (SWPPP) and a Traffic Management Plan (TMP) that have been reviewed and commented upon by the Department. Refer to Drainage section and Maintenance of Traffic section, respectively.

5.4.2. Early Start of Rough Grading

In order for Developer to proceed with the rough grading of a portion of the Project, Developer shall have previously released for construction specific pertinent items of the design. These items include, but are not limited to, the information described below:

A) vertical alignment;

B) typical sections;

C) related elements of the drainage system;

D) related elements of the Final Biological Monitoring Plan. Refer to Drainage section.

E) subsurface geotechnical explorations and recommendations;

F) slope stability analysis and recommendations;

G) preliminary structure general plan;

H) settlement monitoring program;

I) construction specifications (for fills);

J) environmental clearance; and

K) Traffic Management Plan (TMP).

5.4.3. Construction Requirement Deliverables

In addition to those defined in Volume II, Division I, Article 2 Developer shall specifically provide the following.

5.4.3.1. Roadway Plans

Developer shall prepare all necessary roadway plans in full-scale format (22" x 34") with typical sections, tabulations, and notes. The plans will include all the sheets necessary to convey the intent and scope of the Project for the purposes of construction.

5.5. Drainage

Developer shall design and construct drainage elements in accordance with the specifications, the Doyle Drive Replacement Project License to Enter and Conduct Utility Relocations and the Contract Documents.

5.5.1. Standards

Developer shall design and construct the drainage systems in accordance with the relevant requirements of the standards.

If there is any conflict in standards, Developer shall adhere to the standard with the highest priority. If Developer's Proposal has a higher standard than any of the listed standards, adhere to the Proposal standard.

If there is any ambiguity in standards, it is Developer's responsibility to obtain clarification from Department before proceeding with design and/or construction.

Use the most current version of each listed standard as of the initial publication date of this RFP unless modified by a Department Change.

PRIORITY	ENTITY	TITLE
1	Department	Highway Design Manual
2	Department	Bridge Design Specifications
3	Department	Bridge Design Aids
4	Department	Bridge Design Details
5	Department	Bridge Design Practice
6	Department	Standard Special Provisions
7	Department	Standard Specifications
8	Department	Standard Plans
9	Department	Construction Site Best Management Practices (BMPs) Manual
10	California Regional Water Quality Control Board	Standards
11	Department	Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual

PRIORITY	ENTITY	TITLE
12	Department	Storm Water Quality Handbook: Project Planning and Design Guide
13	Department	Construction Manual
14	Department	Design Information Bulletin DIB 83-01 Caltrans Supplement to FHWA Culvert Repair Practices Manual (Updated 10-02-2006)
15	FHWA	Hydraulic Engineering Circular Number 21 (HEC-21) Design of Bridge Deck Drainage Systems

5.5.2. References

Use the references listed below as supplementary guidelines for the drainage systems analysis and design. These publications have no established order of precedence.

ENTITY	TITLE
AASHTO	Roadside Design Guide
AASHTO	Model Drainage Manual
Department	Ready-To-List and Construction Contract Award Guide (RTL Guide)
Department	Fish Passage Design for Road Crossings
FHWA	Hydraulic Design and Procedures Publications

5.5.3. Drainage Analysis

Developer shall be responsible for designing the drainage and stormwater management systems and water quality treatment systems. All design work shall be in compliance with the Department's Highway Design Manual, the standards of the California Regional Water Quality Control Board, and all applicable permits. The effort by Developer shall include the engineering analysis necessary to design any or all of the following: cross-drains, french drains, pump plants, outfalls, storm sewers, water quality features, temporary drainage, and other drainage systems and elements of systems as required for a complete analysis.

A) The Stormwater Drainage Report, Technical Advice Reports, Storm Water Data Report and Drainage Plans are included in the Reference Documents. Developer shall design the drainage system to:

1) convey a minimum twenty five (25)-year recurrence interval storm event as determined from the Department's Highway Design Manual;

2) maintain or amend portions of existing storm drainage networks that cross or run alongside the proposed Roadway as necessary and as accepted by the owner of the networks;

3) treat all stormwater runoff from the Project to meet the requirements of the approvals and permits;

4) verify that the existing Presidio Trust outfalls to the San Francisco Bay and or the new outfalls to be provided by the Department can convey the twenty five (25)-year recurrence interval storm event (or other event per appropriate Department and approving authority standards) and upgrade or provide

appropriate measures to restrict or contain runoff to the capacity of the outfalls as necessary;

5) not increase flooding or cause flooding in either the temporary configuration or the ultimate condition of the Project; and

6) determine the exact number and locations of drainage basins, outfalls and water management facilities (retention/detention areas, BMPs etc.).

B) As part of the design and construction of the stormwater treatment/attenuation facilities, Developer shall include, but not be limited to:

1) review of any permit documentation for the Project;

2) coordination with the Regional Water Quality Control Board (RWQCB) and local permitting agencies as necessary;

3) preparation of construction plans documenting the permitted systems functional design criteria;

4) submission of permit applications and supporting data for the proposed construction plans related to the drainage design and progress with all appropriate agencies and third party stakeholders.

5) Developer addressing any Requests for Additional Information (RAI's) required to obtain all necessary permits;

6) determination of existence of current drainage issues including, but not limited to, flooding, erosion and sedimentation;

7) Developer checking of all existing cross drains to determine capacity, condition and design life prior to tapping in to or using any existing system as part of the proposed drainage system. Flood flow requirements will be determined in accordance with Department's standards; and

8) Developer consideration of optional culvert materials in accordance with the Department's Standards. If an optional pipe is used, an analysis shall be required demonstrating that the required design service life will be obtained. The actual material used must be identified in the Design Documents.

All existing drainage pipes that are not used shall be removed or abandoned in place. All existing drainage pipes within the Project limits that are to be abandoned in place shall be filled with flowable fill per Department Standard and Standard Special Provisions.

Stormwater runoff from roadways and bridges shall be contained within closed drainage systems which convey the runoff to the downstream stormwater management facilities.

All existing drainage pipes/culverts within the Construction Period O&M Limits but out with the Operating Period O&M Limits that are to remain in use are to be desilted and be free of any debris at the completion of construction activities.

Outfalls of adjacent drainage systems or properties shall be maintained in the final design and throughout construction.

5.5.4. Drainage Plans

Special consideration shall be given to the drainage system when developing the construction phases. Positive drainage must be maintained at all times utilizing existing, temporary and/or permanent drainage systems. Developer shall be solely responsible to ensure that positive drainage is maintained at all times for all Project areas and that the construction activities do not adversely affect offsite drainage. Documentation of temporary drainage analysis, including necessary calculations, shall be submitted as part of the Drainage Design Documentation.

Developer shall prepare plan sheets, notes, and details as per the Department's Plans Preparation Manual. It is noted that for this Project, the Department has determined that the Drainage Maps will not be included within the plan sets, but rather, will be included within the Final Drainage Design Report. Developer shall include final Drainage Maps in the Final Drainage Design Report.

A Preliminary Drainage Design Report is required to document Developer's drainage design for the Project. The plan shall present design assumptions including hydrology, proposed location and sizes of major outfalls, open channels, detention ponds, and cross culverts. The plan shall be the basis for Developer's design of any proposed drainage structures and systems and shall include construction and operations and maintenance assumptions. The report shall detail runoff treatment proposals and pollution control measures and approach to permit compliance. Developer shall submit the Preliminary Drainage Design Report for review and comment by the Department before commencing with Final Drainage Design Report and Stormwater Data Report.

5.5.4.1. Stormwater Pollution Prevention Plans

Developer is responsible for the design of erosion and sediment protection. Developer shall prepare an erosion control plan that complies with the Stormwater Pollution Prevention Plan as required by the National Pollutant Discharge Elimination System (NPDES). Developer shall refer to the Department's Storm Water Pollution Prevention Plan and Water Pollution Control Program (WPCP) Preparation Manual. Detailed limits of the erosion control items will be necessary. This plan shall be submitted for review and comment by the Department along with Developer's Certification at least twenty eight (28) days prior to beginning construction activities.

5.5.5. Drainage Deliverables

In addition to those defined in Volume II, Division I, Article 2 Developer shall provide the Department with three copies of the Preliminary and Final Drainage Design Reports. The Drainage Reports shall be a record set of all drainage computations, both hydrologic and hydraulic. Developer shall include data to support computations..

5.6. Traffic Control

Developer shall design and manage traffic in accordance with the following and the Contract Documents.

5.6.1. Administrative Requirements

Developer shall perform the Work in accordance with the requirements of the standards listed by priority below.

If there is any conflict in standards, adhere to the standard with the highest priority. However, if Developer's Proposal has a higher standard than any of the listed standards, adhere to the Proposal standard.

If there is any unresolved ambiguity in standards, it is Developer's responsibility to obtain clarification before proceeding with design and/or construction.

Developer shall use the current version of each listed standard as of the RFP issue date unless modified by a Department Change.

5.6.1.1. Standards

PRIORITY	ENTITY	TITLE
1	Department	Draft Presidio Parkway Transportation Management Plan (TMP) Guidelines
2	Department	Technical Memoranda
3	Department	California Manual on Uniform Traffic Control Devices
4	Department	Standard Special Provisions
5	Department	2006 (US Customary Standard) Plans Including New Standard Plans
6	Department	Design-Build Mortifications to the Standard Specifications for Construction
7	Department	Standard Specifications, (May 2006 Edition)
8	Department	Highway Design Manual
9	AASHTO	A Policy on Geometric Design of Highways and Streets
10	AASHTO	Roadside Design Guide, 3rd Edition
11	Department	Ramp Meter Design Manual

5.6.1.2. References

Use the references listed below as supplementary guidelines for the maintenance of traffic. These references are not mandatory for Developer.

ENTITY	TITLE
Transportation Research Board	Highway Capacity Manual

5.6.2. Traffic Control Analysis

Developer shall prepare and utilize a Traffic Management Plan. The Traffic Management Plan shall set out how Developer intends to move vehicular, bicycle and pedestrian traffic through and across the works during all phases of construction for all elements of Work and in all areas under

Developer's control. The Traffic Management Plan shall include, but not be limited to, construction phasing, drainage structures, signalization, lighting, ditches, front slopes, back slopes, drop offs within clear zone, emergency response measures, measures for first responders and emergency service access to and passage through the Works, accommodation of transit operations and traffic monitoring sites. The Traffic Management Plan shall address coordination with other construction projects within and adjacent to the Project limits and other road operators with facilities that adjoin the works. The plan shall include a detailed sequence of construction that describes how the Project will be implemented. Developer shall submit the plan to the Department for review and comment forty five (45) days prior to implementing any traffic control. As part of the review, the Department will provide the TMP to the Presidio Trust and Golden Gate Bridge Highway and Transportation District for review and comment in accordance with Volume II, Division I, Article 5. The Department if necessary will recommend changes to be made to the TMP, based on its own review and that of the Presidio Trust and Golden Gate Bridge Highway and Transportation District.

5.6.3. Traffic Management Plans

Developer shall conform to the provisions in Sections 7-1.08 "Public Convenience", Section 7-1.09 "Public Safety", and Section 12 "Construction Area Traffic Control Devices" of the Department Standard Specifications. Detailed Traffic Control Plans shall be developed. Developer shall prepare plan sheets, notes, and details as per the Department's Highway Design Manual and the California Manual of Uniform Traffic Control Devices (CMUTCD). Developer shall prepare additional plan sheets such as cross sections, profiles, drainage structures, retaining wall details and temporary sheet piling as necessary for proper construction and implementation of the Traffic Management Plan.

The Traffic Management Plans shall address adjustments to existing signing and placement of additional signs (including overhead signing) and pavement markings as necessary to accommodate construction phasing, lane closures and lane shifts. Developer shall remove or cover any existing or proposed signs that conflict with the Traffic Control Plans. When the conflict no longer exists, Developer shall restore the sign to its original position or intended position. Developer shall provide, operate and maintain changeable message signs (CMS) as necessary for maintenance of traffic. A minimum of two (2) CMS should be used for all crossovers, crossroads, and lane closures for each direction. The CMS signs shall be in place two (2) weeks prior to the start of any Work items affecting vehicular and pedestrian traffic. CMS signs shall be posted two (2) weeks ahead of lane closures and one (1) mile ahead of a construction site. Developer shall notify the Public Information Consultant (PIC) two (2) weeks prior to any lane closures.

At locations of temporary crossovers, lane shifts or other locations where headlight glare may affect opposing traffic, Developer shall install glare screens on temporary barrier wall between opposing traffic to shield the headlight glare.

A full time certified maintenance of traffic supervisor shall be on site when Developer or any Developer Related Entity is working and shall be on call for emergencies.

Developer shall provide a transition with temporary asphalt to all bridges and existing roadways during the traffic control phasing to eliminate bumps at high speeds. The transition length shall be not less than seventeen (17) feet for each one (1) inch in height.

Developer shall be responsible for the design and construction of all temporary signalization as necessary to accommodate vehicular, bicycle and pedestrian traffic for each phase of the Project. Refer to the section on Signalization for additional information on temporary signalization.

Transit stops affected by construction of the Presidio Parkway shall be maintained. If a transit stop is impacted by the construction, a temporary stop shall be accommodated. Developer shall coordinate any temporary relocation with the transit provider.

5.6.4. Traffic Control Restrictions

Developer shall develop a Lane Closure Analysis for all phases of traffic control for the Department's review and comment. In the event of any changes during construction, Developer shall be required to revise the analysis and re-submit to the Department for review and comment prior to implementation of any changes in the field.

5.6.5. Other Design Requirements

A minimum offset of two (2) feet shall be provided between the travel lane and any temporary barriers or barricades used on the Project.

6. GEOTECHNICAL

This section provides requirements for geotechnical investigations, analysis, design, oversight, and construction. Geotechnical design and construction recommendations shall be provided and/or approved by a registered geotechnical engineer licensed in the State of California for all elements of the Work.

6.1. General

Developer shall be responsible for all geotechnical engineering analyses, recommendations, design and reporting. Developer shall employ an experienced and qualified geotechnical engineer registered in the State of California, referenced herein as Developer's Geotechnical Engineer. Developer's Geotechnical Engineer shall be responsible for providing all geotechnical recommendations and geotechnical engineering analyses in accordance with the Project's geotechnical design criteria and the Contract Documents.

The Project's geotechnical design criteria provided in this section shall be considered as the minimum acceptable and are not considered to include all possible conditions that may be encountered in the final design selected by Developer. Developer's Geotechnical Engineer shall be responsible for determining if more stringent criteria are appropriate and/or required by applicable codes, manuals, or other references to be addressed as part of the final design. Where conflicts occur in requirements between documents, the most stringent requirement shall apply.

Previous geotechnical investigation information, records, and preliminary reports are included in the Reference Documents.

6.2. Administrative Requirements

6.2.1. Laws, Standards and Specifications

Developer shall perform the geotechnical Work in accordance with the requirements of the standards listed below

If there is any conflict in standards, the order of precedence shall be as set forth below, unless otherwise specified. However, if the Developer's Proposal has a higher standard, then Developer shall adhere to the Proposal standard.

If there is any unresolved ambiguity in standards, it is Developer's responsibility to obtain clarification from the Department before proceeding with design and/or construction.

Developer shall use the current version of each listed standard as of the initial publication date of this RFP unless modified by a Department Change.

6.2.1.1. Standards

PRIORITY	AGENCY	TITLE
1	Department	California Amendments to the AASHTO LRFD Bridge Design Specifications
2	AASHTO	LRFD Bridge Design Specifications
3	Department	Special Provisions

PRIORITY	AGENCY	TITLE
4	Department	Standard Plans U.S. Customary Units, (May 2006 Edition)
5	Department	Design-Build Modifications to the Standard Specifications for Construction
6	Department	Standard Specifications(May 2006 Edition)
7	Department	Seismic Design Criteria
8	Department	Division of Engineering Services (DES) Memo to Designers 3-1 Deep Foundations
9	Department	Division of Engineering Services (DES) Memo to Designers 5-20 Foundation Report / Geotechnical Design Report Checklist for Earth Retaining Systems
10	Department	Division of Engineering Services (DES) Memo to Designers 1-35 Foundation Recommendation and Reports
11	Department	Division of Engineering Services (DES) Memo to Designers 20-1 Seismic Design Methodology
12	Department	Division of Engineering Services (DES) Memo to Designers 4-1 Spread Footings
13	Department	Division of Engineering Services (DES) Memo to Designers 20-10 Surface Fault Rupture Displacement Hazard Investigations
14	Department	Division of Engineering Services (DES) Memo to Designer 20-12 Site Seismicity for Existing and Temporary Bridges carrying Public Vehicular Traffic
15	AASHTO	LRFD Bridge Construction Specifications
16	Department	Soil and Rock Logging, Classification, and Presentation Manual
17	Department	Guidelines for Preparing Geotechnical Design Reports
18	Department	Guidelines for Structures Foundation Reports
19	Department	Bridge Construction Records and Procedures
20	AASHTO	Standard Specifications for Transportation Materials and Methods of Sampling and Testing
21	Department	California Test Methods
22	Department	Doyle Drive Replacement Project, License to Enter and Conduct Geotechnical Investigation, Exhibit No. 1, October 2007, Prepared by Department and Arup PB JV
23	ASTM	D3740 Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
24	ASTM	D1452 Standard Practice for Soil Exploration and Sampling by Auger Borings
25	ASTM	D1586 Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils
26	ASTM	D1587 Standard Practice for Thin-Walled Tube Sampling of Soils for Geotechnical Purposes
27	ASTM	D3550 Standard Practice for Thick Wall, Ring-Lined, Split Barrel, Drive Sampling of Soils

PRIORITY	AGENCY	TITLE
28	ASTM	D4220 Standard Practices for Preserving and Transporting Soil Samples
29	ASTM	D6151 Standard Practice for Using Hollow-Stem Augers for Geotechnical Exploration and Soil Sampling
30	ASTM	D6519 Standard Practice for Sampling of Soil Using the Hydraulically Operated Stationary Piston Sampler
31	ASTM	D7015 Standard Practices for Obtaining Intact Block (Cubical and Cylindrical) Samples of Soils
32	ASTM	D2113 Standard Practice for Rock Core Drilling and Sampling of Rock for Site Investigation
33	ASTM	D5079 Standard Practices for Preserving and Transporting Rock Core Samples
34	ASTM	D5782 Standard Guide for Use of Direct Air-Rotary Drilling for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices
35	ASTM	D5783 Standard Guide for Use of Direct Rotary Drilling with Water-Based Drilling Fluid for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices
36	ASTM	D5876 Standard Guide for Use of Direct Rotary Wireline Casing Advancement Drilling Methods for Geoenvironmental Exploration and Installation of Subsurface Water-Quality Monitoring Devices
37	ASTM	D5778 Standard Test Method for Electronic Friction Cone and Piezocone Penetration Testing of Soils

6.2.1.2. References

Use the references listed below as supplementary guidelines for the geotechnical subsurface exploration, analysis, and design.

ENTITY	TITLE
FHWA	Checklist and Guidelines for Review of Geotechnical Reports and Preliminary Plans and Specifications
AASHTO	Manual of Subsurface Investigations
FHWA	Geotechnical Engineering Circular No 5, Evaluation of Soil and Rock Properties
FHWA	Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes
FHWA	Geotechnical Engineering Circular No. 2, Earth Retaining Systems
FHWA	Manual for Design & Construction of Soil Nail Walls
FHWA	Geotechnical Engineering Circular Number 4, Ground Anchors and Anchored Systems
FHWA	Design and Construction of Driven Pile Foundations, Volumes I and II
FHWA	Handbook on Design and Construction of Drilled Shafts Under Lateral Load

ENTITY	TITLE
FHWA	Drilled Shafts: Construction Procedures and Design Methods
NCHRP	Synthesis 360, Rock-Socketed Shafts for Highway Structures Foundations
American Petroleum Institute	Recommended Practice for Planning, Design and Constructing Fixed Offshore Platforms – Working Stress Design

6.2.2. Geotechnical Execution Plan

Before commencing any investigation or any geotechnical design activities, Developer shall prepare and submit for review and comment a Geotechnical Execution Plan (GEP) that includes, but is not limited to:

A) review of previously published information;

B) proposed geotechnical analysis and design methodologies;

C) geotechnical design and construction issues;

D) planned geotechnical design methodologies;

E) assessment of potential foundations for bridges, retaining walls, tunnel structures, and sign structures;

F) assessment of potential ground improvement treatments to mitigate consolidation and seismic settlements and liquefiable soils;

G) planned subsurface investigations; and

H) schedule

Developer shall submit the Geotechnical Execution Plan to the Department for review and comment fifteen (15) days prior to commencing any proposed investigation or design activity.

6.2.3. Additional Subsurface Investigation and Laboratory Testing

Developer shall complete the subsurface investigations and laboratory testing before the completion of the final design and prior to commencement of construction of any element of the Project. Developer shall be solely responsible for determining the need for, and for obtaining, all additional subsurface explorations and laboratory tests required for final design and for the interpretation of all existing data.

Developer shall obtain all required exploration/excavation permits from the Presidio Trust and other affected land owners prior to performing any exploration borehole, CPT, or in-situ test requiring excavation or drilling. Permits shall be obtained from the Presidio Trust, through the Department.

Additional field investigations shall be performed in accordance with the guidelines, manuals, and standards, but not limited to those listed above

Developer shall perform all laboratory tests in accordance with the California Test Methods (CTM), Manual of Tests, or ASTM Standards.

6.3. Design Requirements

Developer shall be responsible for all geotechnical design and for ensuring that all criteria for slope stability, settlement (consolidation and seismic), ground improvement treatment(s), and lightweight fill materials are clearly defined and addressed in the design.

6.3.1. Foundations

Developer shall design foundations for structures such that all foundation deformations are within acceptable limits to meet the performance requirements over the Design Life of the structure. Developer shall use acceptable foundations for the various roadway elements with the exception of Timber piles. Typical requirements for installation of driven piles and cast in place piles are listed below.

6.3.1.1. Driven Pile Foundations

Pile installation shall comply with the Department's Standard Specifications. Developer's Geotechnical Engineer shall establish driving, testing, monitoring and construction criteria and confirm compliance of the constructed Works with these criteria.

Developer shall be responsible for the following:

A) Installing Embedded Data Collectors (EDCs) in all test piles and providing clear and safe access for the Department to monitor the test pile EDC data if the Department wishes to do so;

B) Provide at least forty eight (48) hours notice to the Department prior to driving test piles; and

C) Upon completion of the test pile program, and at least seven (7) days prior to beginning production pile driving, Developer shall submit the proposed pile lengths, proposed driving criteria, dynamic testing data, and engineering analyses to the Department. The submission to the Department shall include the following electronic files (on Windows compatible CD ROM or DVD): pile driving simulation input data results (GRL WEAP, PDPWAVE or equivalent), pile driving monitoring data (PDA data and PDIPLOT data or equivalent) and pile driving analysis results (including the input data and results of signal matching using CAPWAP, DLTWAVE or equivalent), PDA data and PDIPLOT data.

If the Developer plans to utilize driven precast pre-stressed concrete or steel piles in addition to all the other obligations contained in the Contract Documents, Developer shall require a vibration monitoring plan. Refer to Volume II, Division I for Noise and Vibration Monitoring requirements. .

Developer shall submit foundation certification packages to the Department in accordance with Volume II, Division I, Article 2.

6.3.1.2. Cast in Place Piles

Pile installation shall comply with the Department's Standard Specifications and Standard Special Provisions. The Geotechnical Engineer shall establish testing, monitoring and construction criteria and confirm compliance of the constructed Work with these criteria.

A) Cast-in-place concrete piles shall consist of one of the following:

1) Steel shells driven permanently to the required nominal resistance and penetration and filled with concrete, Cast-in-Steel Shell (CISS);

2) Steel casings installed permanently to the required penetration and filled with concrete, Concrete in Drill Hole (CIDH);

3) Drilled holes filled with concrete (CIDH); and

4) Rock sockets filled with concrete (CIDH).

B) The Department reserves the right to observe and perform independent verification and independent assurance testing on any piles during any phases of the foundation operation.

6.3.2. Embankment and Slope Stability

The factor of safety for slope stability analysis of new or modified cut and fill slopes, including approach embankments shall not be less than 1.5 under static loading conditions for all possible failure modes.

Where existing cut and fill slopes are modified, the modified cut and fill slopes shall be in accordance with the Department's Standard Specifications and Standard Special Provisions.

All new or modified cut and fill slopes shall be constructed using materials that are certified clean of environmental contaminates and asbestos, meeting the Presidio Trust reuse criteria, and be suitable for landscape planting.

All new or modified cut and fill slopes shall be provided with adequate protection against erosion and shallow slope movement.

6.3.3. Settlement (Immediate/Consolidation and Seismic)

Foundations of Structures shall be designed such that their total and differential settlements are within acceptable limits defined in Volume II, Division II, Section 3, Article 8 – Structures and compatible with the function and performance requirements of the Structures over their Design Life.

The total and differential settlements of road embankments and pavement surfaces over a forty (40) year period following the Substantial Completion Date shall be such that the ride and cross-slope requirements are within acceptable limits, ponding and sheeting of water is prevented, positive pavement drainage is maintained, the function of storm drains and ditches is preserved, the operations and maintenance criteria set out in Volume II, Division II, Section 4 are adhered to and the handback criteria set out in Volume II, Division II, Section 5 shall be achieved.

Settlement requirements are for both consolidation type and deformation caused by design seismic events.

6.3.4. Lightweight Fill Materials

All lightweight fill materials shall be adequately protected in terms of wheel loads, groundwater, weather, fire resistance, flotation under flood conditions, fuel and chemical spills and from rodents.

Flotation forces corresponding to inundations of the fill to the one hundred (100) year flood level shall be considered in the design of lightweight fills.

Shredded rubber tires shall not be used for lightweight fill.

Imported borrow (lightweight aggregate) shall meet the Department's Geotechnical Non-Standard Special Provisions. Expanded Polystyrene (EPS) lightweight fills shall meet the following requirements:

A) EPS shall be supplied in the form of blocks and shall meet the Department's Geotechnical Non-Standard Special Provisions (Lightweight Fill: EPS Block);

B) EPS blocks shall be fully wrapped with a fuel resistant geomembrane that meets the Department's Geotechnical Non-Standard Special Provisions (Geomembrane: Gasoline Resistant, use with LWF EPS); and

C) EPS blocks shall have a minimum three (3) foot granular cover vertically and horizontally.

6.4. Retaining Walls

Retaining walls shall be designed and constructed in accordance with appropriate Department Standards and Standard Special Provisions.

6.5. Utilities

Developer shall ensure that all existing utilities are adequately protected during construction and in the final configuration. Developer and all Developer Related Entities shall comply with the requirements of the Utility Owner and all applicable agreements.

6.6. Construction Requirements

6.6.1. Earthwork

All earthwork requirements shall be in accordance with the Department's Standard Specifications, Section 19.

6.6.2. Groundwater Monitoring Wells

Developer shall contact the Department immediately if any monitoring wells are encountered within the Project ROW that have not been grouted to coordinate the proper abandonment of the wells. Developer shall decommission abandoned wells in accordance with the Contract Documents.

6.7. Geotechnical Deliverables

In addition to those defined in Volume II, Division.I, Article 2 Developer shall specifically provide the following.

6.7.1. Geotechnical Design Report

Developer's Geotechnical Engineer shall prepare a Geotechnical Design Report (GDR) for the Project.

The Geotechnical Design Report (GDR) shall be prepared, sealed and submitted as part of the design submittal requirements included in Volume II, Division I, Article 2. The GDR shall define the geotechnical conditions as evaluated from field and laboratory test data and used in the development of the geotechnical design. The GDR shall address design recommendations and construction considerations for site specific topics, including, but not limited to, site specific seismic design criteria, ground improvement method(s), excavations, embankments, use of lightweight fills, corrosion potential of soils and groundwater, standard retaining systems, culvert foundations, minor structure foundations, and vibration measurements, control and criteria requirements to avoid damage to nearby historical structures.

6.7.2. Foundation Design Reports

Developer's Geotechnical Engineer shall prepare foundation reports in accordance with the Department's Guidelines for Preparing Foundation Reports. Foundation Design Reports shall be prepared, sealed, and submitted to the Department as part of the design submittal requirements included in Volume II, Division I, Article 2. A separate Foundation Report (FR) shall be submitted for:

A) each bridge structure;

B) each retaining wall structure; and

C) each tunnel structure

The foundation design reports as a minimum shall include, but not be limited to:

A) subsurface conditions;

B) engineering analysis including seismic analysis;

C) scour evaluation;

D) erosion evaluation;

E) seismic recommendations;

F) foundation recommendations; and

G) construction considerations.

The foundation recommendations shall include design parameters, foundation types, foundation design elevations, and recommended ground improvement measures, stability of retaining wall structures and embankment slopes and seismic performance criteria.

7. AESTHETICS

7.1. General

FHWA has developed a Programmatic Agreement (PA) and the PA outlines the treatment of historic properties that will be affected by the undertaking. Stipulations prescribe two historic-property treatment plans to be completed, one plan to encompass treatments for impacts on archaeological resources, the Archaeological Treatment Plan (ATP), and one to identify treatments for effects on the built environment and cultural landscape, the Built-Environment Treatment Plan (BETP). As part of the BETP, architectural criteria have been developed to guide the design of the new facility in a manner that is reminiscent of the historic character-defining features while integrating the roadway in the Presidio National Historic Landmark District landscape.

7.2. Design Requirements

Developer shall base the design on the Doyle Drive Architectural Criteria Report except for the following specific items:

7.2.1. Lighting

The location of light poles along the mainline and off ramps shall match the stationing as shown in the table in Volume II, Division II, Section 3, Article 11 – Lighting.

All light fixtures along the mainline and off ramps shall be painted International Orange as defined by Federal Standard 595C Number 12197 and match the custom-made light fixture that is included in Phase I Construction.

All luminaries along the mainline and off ramps shall be consistent with the luminaries included in Phase I Construction.

7.2.2. Fencing

The fence around the Project Right of Way shall be consistent with the architectural fence that was approved for use in Phase I Construction.

7.2.3. Sign Structures

Bridge Mounted, Barrier Mounted and Overhead Sign Structures shall be designed according to Volume II, Division II, Section 3, Article 8 – Structures and be consistent with the concept incorporated into the Phase I Construction. .

All Variable Message Signs (VMS) sign structures located outside the tunnel portals shall be consistent with the VMS sign structure that was installed on the southbound Presidio Viaduct as part of the Phase I Construction.

Developer shall prepare a concept to integrate sign structures for roadway and VMS signs prior to the entrance to Southbound Main Post Tunnel and submit to the Department as part of the design submission process set out in Volume II, Division I, Article 2..

7.2.4. Railings

Railings shall be a mounted or modified ST-10 as used in the Phase I Construction. Railing on the south side between Stations 54+50 and 87+20 shall be mounted. The color of the railings shall be International Orange as defined by Federal Standard 595C Number 12197 along the Presidio Parkway corridor and green within the interchange. The exact specification for the green paint shall be agreed upon with the Department and Presidio Trust before painting commences. The transition arrangements are shown on the drawings RL 1 to RL 3 attached to this Section of the Technical Requirements.

Railing termini and transition from the orange to green colored railing shall be as used in Phase I Construction.

Aesthetically treated railing screening devices shall be developed in coordination with the Presidio Trust to mitigate vehicle headlight trespassing onto sensitive resources such as, but not limited to the Quartermaster Reach area and forested areas. Treatment concepts shall make use of, but not limited to perforated panels mounted in between horizontal and vertical openings in the ST-10 railing. Consultation with the Presidio Trust shall be in accordance with procedure set out in Volume II, Division I, Article 5.

7.2.5. Tunnel

7.2.5.1. Tunnel Portals

The tunnel portal aesthetics shall be consistent with Phase I Construction. Developer shall submit aesthetic concept and detailed layout plans to the Department in accordance with the requirements of Volume II, Division I, Article 2 and to the Presidio Trust in accordance with Volume II, Division I, Article 5. Such submissions shall be made no later than one hundred and twenty (120) days in advance of ordering any materials or undertaking any construction associated with the construction of the tunnels.

7.2.6. Walls and Abutment Surfaces

7.2.6.1. Retaining Wall Finishes and Treatments

Retaining walls facing internal to the Presidio Parkway shall be consistent with the fractured fins that are used on retaining walls along the Northbound Presidio Parkway to the Southbound Hwy 1 ramp as part of the Phase I Construction.

Retaining walls facing areas of the Presidio shall follow the design concepts already implemented as part of the Phase I Construction. The design concepts make use of evenly spaced vertical pylons and pilasters with battered intermediate wall surfaces. The top of wall edge treatment shall follow the treatment concept implemented in the Phase I Construction. The surface treatment of the wall shall match the formliner selected for the Phase I Construction.

7.2.6.2. Abutment Finishes and Treatments

Abutment finishes shall follow the design concepts implemented in the Phase I Construction. The design concepts make use of vertical pylons and pilasters with battered intermediate wall surfaces. The surface treatment of the abutment, shall match the formliner selected for the Phase I Construction.

7.2.6.3. Halleck Street Retaining Wall Treatment

The east side of Halleck Street was conceptually designed to have a retaining structure that supports Halleck Street adjacent to the marsh restoration area. This retaining wall will also house the portals for the Main Post Tunnels. The design concept and surface finish shall follow the requirements for retaining walls facing areas of the Presidio described in 7.2.6.1.

7.2.7. Northbound Presidio Viaduct

The northbound Presidio Viaduct aesthetics shall be consistent with the southbound Presidio Viaduct

7.2.7.1. Structure Column Treatments

The northbound Presidio Viaduct columns shall be consistent with the southbound Presidio Viaduct.

7.2.7.2. Steel Fins

The southbound Presidio Viaduct design utilizes steel fins. The northbound Presidio Viaduct design, placement and appearance shall be consistent with the southbound Presidio Viaduct.

7.2.7.3. Edge treatment

The northbound Presidio Viaduct edge treatment design, placement and appearance shall be consistent with the southbound Presidio Viaduct.

The light connection to the northbound Presidio Viaduct at its edge shall be consistent with the southbound Presidio Viaduct.

7.2.8. Tennessee Hollow Causeways and Other Structures and Facilities

The aesthetics of the Tennessee Hollow Causeways bridges and other structures and facilities shall be developed in accordance with the Programmatic Agreement.

The design concept for the Tennessee Hollow Causeways bridges and the Northbound and Southbound bridges over Girard Road shall follow the edge treatment design, placement and appearance and shall be consistent with the design concept implemented for the Presidio Viaducts.

The columns shall be elliptical in form.

The abutment treatment and finishes shall follow the design concept for abutments implemented in the Phase I Construction.

The retaining wall treatment and finishes shall follow the design concept for retaining walls facing areas of the Presidio already implemented as part of the Phase I Construction.

8. STRUCTURES

8.1. General

This section establishes the design and construction requirements for the bridges, tunnels, retaining walls, and miscellaneous structures.

The Indicative Preliminary Design has been developed following the type selection process of the Department. All type selection support documents and the Indicative Preliminary Design have been made available for information only as Reference Documents. Developer shall prepare and submit to the Department type selection documentation for all bridge structures for Review and Comments prior to beginning detailed design.

8.2. Administrative Requirements

8.2.1. Laws, Standards and Specifications

Developer shall perform Structures Work in accordance with the relevant requirements of the standards listed below.

If there is any conflict in standards, the order of precedence shall be as set forth below, unless otherwise specified. However, if the Developer's Proposal has a higher standard, then Developer shall adhere to the Proposal standard.

If there is any unresolved ambiguity in standards, it is Developer's responsibility to obtain clarification from the Department before proceeding with the design and construction.

Developer shall use the current version of each listed standard as of the initial publication date of this RFP unless modified by a Department Change.

8.2.1.1. Standards

PRIORITY	ENTITY	TITLE
1	AASHTO	LRFD Bridge Design Specifications, 4th Edition and applicable Interim Revisions
2	Department	California Amendments to AASHTO LRFD Bridge Design Specifications – Latest Edition
3	Department	Bridge Design Specifications (LFD Version, April 2000)
4	Department	Bridge Design Aids
5	Department	Bridge Design Details
6	Department	Bridge Design Practice
7	Department	Bridge Memo to Designers
8	Department	Bridge Standard Detail Sheets
9	Department	Seismic Design Criteria
10	Department	Structural Detailing Standards
11	Department	Standard Plans
12	Department	Standard Specifications
13	Department	Standard Special Provisions
14	Department	Bridge Deck Construction Manual
15	Department	Falsework Manual
16	Department	Foundation Manual

PRIORITY	ENTITY	TITLE
17	Department	Office of Special Funded Projects Information and Procedures Guide
18	AASHTO /AWS	Structural Welding Code – steel, D1.1
19	AASHTO /AWS	Bridge Welding Code, D1.5
20	Department	Prestress Manual, a Guide for Field Inspection of Cast in Place Tensioned Structures.
21	Department	Trenching and Shoring Manual
22	Department	Outline of Field Construction Practices
22	Department	Plans Preparation Manual
23	AASHTO	Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals
24	NFPA	502 Standard for Road Tunnels, Bridges and other Limited Access Highways

8.3. Design Requirements

8.3.1. Bridge Design

Developer shall design all bridge structures to meet or exceed all design criteria as outlined in the Contract Documents. In addition to design loadings, Developer shall design the bridges for construction loadings if they are to be used as part of Haul Routes. The Engineer of Record shall ensure all submittals comply with the intent and requirements set forth in the Contract Documents. For column locations, see Reference Documents.

New bridges over existing roadways, clear spans and vertical clearances shall meet or exceed existing conditions.

Developer shall design all bridges and bridge elements in accordance with AASHTO LRFD requirements for marine environment and shall be consistent with the Phase I design.

8.3.2. Tunnel Design

Developer shall design the Tunnels to meet or exceed all design criteria as outlined in the Contract Documents. The Tunnel design shall include at a minimum the effects of construction-related loads along with all temporary and permanent loading conditions (including backfill loads) on the structures in the permanent condition and the temporary loads during construction condition. The Engineer of Record shall review all submittals (tunnel shoring system, working drawings etc.) to ensure compliance with the intent and requirements set forth in the Contract Documents.

The Developer shall design all tunnel elements in accordance with AASHTO LRFD requirements for marine environment and shall be consistent with the Phase I design.

8.3.3. Seismic Design Provisions

8.3.3.1. Design Approach

The seismic design of the structures shall be based on the Department-Seismic Design Criteria, AASHTO-LRFD Standard, and Project-Specific Structure Design Criteria.

The Project is categorized as a 'Recovery Route' as designated by the Department. The seismic design of the structures shall be performed using site-specific ground motions for two performance levels, namely the Safety Performance Level and the Functionality Performance Level.

The performance-based seismic design criteria shall conform to deformation-based design, using appropriate material strain limits established for the project. The general seismic performance parameters that govern the design of this 'Recovery Route' are as follows:

A) *Serviceable* performance after a seismic event requires immediate full traffic access after a short period of inspection or minor repairs. A maximum delay of seventy two (72) hours is permitted. See Functionality Evaluation Earthquake (FEE) performance level in Table 8.2.;

B) *Repairable* performance after a seismic event requires limited immediate access for emergency vehicles, with only repairable damage. Upon repair (maximum of seven (7) days), the facility shall support full traffic access. "Repairable Damage" can be defined as allowing moderate inelastic response to occur. Concrete cracking, reinforcement yield, and spalling of cover concrete is expected at this level of inelastic response. The extent of damage should be sufficiently limited to permit restoration of the structure to essentially the pre-earthquake condition without replacement of any portion of the structures. See FEE performance level in Table 8.2.; and

C) *No-Collapse* performance three (3) days after the seismic event requires structure stability for public safety in accordance with ductility demand and capacity values documented in the SDC. See Safety Evaluation Earthquake (SEE) performance level in Table 8.12.

8.3.4. Performance Levels

The seismic design of the structures shall be based on two performance levels: *Safety* and *Functionality,* corresponding to the 'Upper' and 'Lower' level earthquake events which are designated: SEE, and FEE, respectively. Table 8.2 summarizes the performance requirements under the dual-level seismic loading criteria.

TABLE 8.2 MINIMUM SEISMIC PERFORMANCE LEVELS

DESIGN EARTHQUAKE	PERFORMANCE LEVEL
Functionality Evaluation Earthquake (FEE)	Functionality Performance Level Repairable-to-Serviceable damage, with or without traffic restrictions Immediate access to emergency vehicles following inspection
Safety Evaluation Earthquake (SEE)	Safety Performance Level Significant damage / No-Collapse: life safety assured Limited Service

Per the guidelines adopted by the Department and the return period risk determined for the project, site-specific hazard analyses shall be performed to establish the design response spectra and ground motions for the SEE and FEE as follows:

A) Safety Evaluation Earthquake (SEE) – The *upper level* event to be used for the design shall be based on the acceleration response spectrum (ARS) derived from the envelope of the median (50th percentile) deterministic Maximum Credible Earthquake (MCE) ARS and a probabilistic hazard ARS for an event with a mean return period of one thousand (1,000) years (i.e., 7.5% probability of exceedance in seventy five (75) years); and

B) Functionality Evaluation Earthquake (FEE) – The *lower level* event to be used for the design shall be based on a probabilistic hazard ARS for an event with a mean return period of one hundred and eight (108) years (i.e., 50% probability of exceedance in seventy five (75) years).

Seismic performance requirements of structures under construction shall meet the Department's requirements for temporary bridges or bridges under temporary conditions carrying public vehicular traffic. Developer shall refer to the Department's Division of Engineering Services (DES) Memo to Designer 20-12 Site Seismicity for Existing and Temporary Bridges carrying Public Vehicular Traffic.

8.3.5. Component Performance

The performance-based design requirements on the primary components of the lateral and load resisting systems of the structures are categorized in Table 8.3, in terms of displacement ductility and capacity-protected designations. The structural design of the bridge structures shall consider limiting the seismic demand on critical components under high combined axial, shear, and bending loads (such as foundations), employing the principles of capacity-protection design, where plastic hinging is confined to predetermined locations and components in the load path.

TABLE 8.3 COMPONENT PERFORMANCE CATEGORY

COMPONENT PERFORMANCE CRITERIA				
	FUNCTIONAL EVALUATION EARTHQUAKE (FEE)		SAFETY EVALUATION EARTHQUAKE (SEE)	
COMPONENT	DUCTILE [1]	CAPACITY-PROTECTED [2]	DUCTILE [1]	CAPACITY-PROTECTED [2]
Bridge Superstructures		X		X
Retaining Walls	X		X	
Footings		X	X	
Piles		X	X	
Columns	X		X	
Tunnel Roof Slab		X		X
Tunnel Invert Slab		X		X
Tunnel Walls	X		X	
Bulkheads		X	X	

Notes:
1 Deformation based measure of inelastic behavior evaluated using strain-based section analyses.
2 D/C ≤ 1.0 for protected components, compare component demands from governing seismic analyses including plastic hinging of ductile components and soil-structure interaction. Overstrength flexure strength of adjacent ductile components if applicable (per the Department requirements) shall be used for demand (D). Component Capacity (C) refers to nominal component strength.

Inelastic response shall be limited to specific flexural components (with circular solid confined cores using hoops) and special lateral load resisting sub-systems which have been detailed to accommodate ductile plastic hinging.

The design of flexural members shall ensure that the shear capacities of the members are greater than the plastic shears corresponding to the associated plastic moments at the member extremities to ensure formation of ductile plastic hinges.

8.3.6. Exclusions and Potential Restrictions

The following exclusions and restrictions shall apply to the bridge and tunnel structures:

A) no timber piles shall be utilized for foundation design;

B) the type and use of driven piles shall comply with the noise and vibration threshold requirements established for the Project and outlined in the Contract Documents;

C) the northbound Presidio Viaduct bridge structure type and span arrangement shall be compatible with the adjacent southbound Presidio Viaduct constructed as part of the Phase I Construction; and

D) the northbound Battery Tunnel structure type and configuration shall be compatible with the southbound Battery Tunnel constructed as part of the Phase I Construction.

8.4. Existing Structures

8.4.1. Phase I Construction Structures

Developer shall modify the Phase I Construction Structures to the Project's final configuration as part of Phase II Construction.

8.4.2. Phase I Structures

The design documents pertinent to the Phase I Construction are provided as part of the Reference Documents together with pertinent Contract Change Orders for the Phase I Construction.

8.4.3. Historic Structures

Historic structures adjacent to or within the Project ROW shall be protected or remediated as outlined in the Contract Documents.

8.4.4. Removal and Retention of Existing Structures

Where not incorporated into the permanent works, all existing structures shall be removed as part of the Project. The demolition of these structures shall be carried out per all the requirements of the Department's Standard Specifications and the Contract Documents If Developer plans to incorporate existing structures or elements of existing structures into the permanent work, Developer shall evaluate the adequacy and functionality of the elements and provide an assessment to the Department for review and comment as part of the design submittal process set out in Volume II, Division I, Article 2.

8.5. Other Proposed Structures

8.5.1. Miscellaneous Structures

Miscellaneous structures include, but are not limited to, the following structure types:

A) Facilities for utilities;

B) Bridge-mounted signs;

C) Barrier-mounted signs on structures;

D) Overhead sign structures;

E) Culverts and drainage structures;

F) Pumping plants; and

G) Reinforced concrete boxes.

Miscellaneous structures shall be designed and constructed in accordance with Department Standards and Standard Special Provisions.

8.6. Structures Deliverables

In addition to the requirements of Volume II, Division I, Article 2 Developer shall specifically provide the following:

A) Pile driving logs location at the completion of the operation for each location of bridges, retaining walls and sound walls;

B) Report of falsework clearance;

C) Cast In Drilled Holes (CIDH) Pile Quantity and Drilling Record;

D) Test Result Summary sheet for couplers;

E) Pre-Stressing Monitoring for concrete structures;

F) Pre-Stressing Calibration Monitoring Sheet for concrete structures;

G) Notice of Change in Clearance or Bridge Weight Rating;

H) Notice of Change in Vertical or Horizontal Clearance;

I) Joint Movement calculations for type “B” seals and Joint Seal Assemblies;

J) Column Guying plans;

K) Falsework plans;

L) Structures As-built Plans and Specifications;

M) Bridge demolition plans; and

N) Final bridge deck profile, and Final Tunnel roadway deck and top of tunnel profiles.

9. PAVEMENT MARKING AND SIGNING

9.1. General

Developer shall furnish the design and construct all traffic control signing and pavement markings in accordance with applicable Department and local agency standards and the Contract Documents. Department Standards and Standard Special Provisions shall be used for all traffic control signing and pavement markings on the State Highway. All permanent Traffic Control Signing and Pavement Marking Plans shall be submitted to the Department in accordance with the requirements of Volume II, Division I, Article 2 and to the Presidio Trust where appropriate in accordance with Volume II, Division I, Article 5.

Pavement delineation work shall include designing, installing, modifying, or removing striping and pavement markings. Developer shall prepare pavement delineation plans that show edge striping, lane line striping, arrows, legends, and pavement markings consistent with the needs of the Project. Developer shall design all temporary pavement delineation to comply with the same design and construction requirements as that of the permanent delineation. Developer shall prepare all necessary engineering studies and applicable design reports to justify all the project pavement delineation elements used in the Project.

Developer shall develop a signing plan for the Project which includes all necessary guide, warning, supplemental, sequential and regulatory signs for the mainlines, ramps, interchanges, arterials, and any other roadway affected by the Project. The signing plan shall provide for modifications to signing outside the limits of the Project that are rendered inaccurate, ineffective, confusing or unnecessary by the Project. The modification shall include the addition, removal or alteration of signs and appurtenances

Signing plans shall include layouts showing the locations of ground mounted and overhead signs, special sign details, and structural and foundation requirements. Developer shall coordinate the requirements for electrical services.

Road signs that are mounted on structures shall be a Department standard cantilever sign structure.

All ground mounted sign poles shall be equipped with breakaway features.

It shall be Developer's responsibility to obtain clarification on any unresolved ambiguity prior to proceeding with the final design and construction

9.2. Administrative Requirements

9.2.1. Laws, Standards and Specifications

Developer shall design and construct the signing and pavement marking in accordance with the requirements of the standards listed below.

If there is any conflict in standards, the order of precedence shall be as set forth below, unless otherwise specified. However, if Developer's Proposal has a higher standard, then Developer shall adhere to the Proposal standard.

If there is any unresolved ambiguity in standards, it is Developer's responsibility to obtain clarification from the Department before proceeding with design and/or construction.

Developer shall use the current version of each listed standard as of the initial publication date of this RFP unless modified by a Department Change.

9.2.1.1. Standards

PRIORITY	ENTITY	TITLE
1	Department	California Manual on Uniform Traffic Control Devices (CA MUTCD)
2	Department	Highway Design Manual
3	Department	Standard Special Provisions
4	Department	Standard Plans U.S. Customary Units, (May 2006 Edition)
5	Department	Design-Build Modifications to the Standard Specifications for Construction
6	Department	Standard Specifications, (May 2006 Edition)
7	Department	Sign Specifications
8	Department	HOV Guidelines for Planning, Design and Operations
9	AASHTO	A Policy on Geometric Design of Highways and Streets
10	AASHTO	Standards Specifications for Structural Support for Highway Signs, Luminaires and Traffic Signals, 4th Edition with 2002, 2003 and 2006 Interms
11	AASHTO	Roadside Design Guide
12	Department	Plans Preparation Manual
13	Department	CADD Users Manual

9.3. Requirements

Developer shall design, furnish, and install all components of a pavement delineation system necessary to provide a complete and functional system that meets the following performance requirements:

A) Provide for the orderly and predictable movement for all traffic;

B) Provide such guidance and warnings as needed to ensure the safe and informed operation of individual elements of the traffic stream;

D) All pavement markings, permanent or temporary, where no longer required for traffic demarcation shall be completely removed as per Department Standard Plans and Standard Specifications;

E) The signing plan developed by Developer shall be consistent with the style and intent of the signing plan developed for the Phase I Construction;

F) All Overhead Sign Structures shall be illuminated with lights mounted on the structure, as shown in the Department Standard Plans;

G) All Overhead Sign Structures shall meet the vertical clearance requirements over the entire length of the pavement and shoulders as specified in the Department's MUTCD, Highway Design Manual and the Contract Documents; and

H) Sign sheeting on sign panels shall be high intensity or better.

9.4. Pavement, Marking and Signing Deliverables

In addition to those defined in Volume II, Division I, Article 2 Developer shall specifically provide the following:

Developer shall submit the following plans to the Department and the Presidio Trust as appropriate as part of the submissions required in Volume II, Division I, Article 2 and Article 5:

A) All permanent traffic control signing and pavement marking plans.

10. SIGNALIZATION

10.1. General

Developer shall prepare any necessary Signalization Plans in a full-scale format with quantity tabulations and notes as per the Department's Plans Preparation Manual.

10.2. Administrative Requirements

10.2.1. Laws, Standards and Specifications

10.2.1.1. Standards

Developer shall design and construct Signals in accordance with the requirements of the standards listed below.

If there is any conflict in standards, the order of precedence shall be as set forth below, unless otherwise specified. However, if Developer's Proposal has a higher standard, then Developer shall adhere to the Proposal standard.

If there is any unresolved ambiguity in standards, it is Developer's responsibility to obtain clarification from the Department before proceeding with design and/or construction.

Developer shall use the current version of each listed standard as of the initial publication date of this RFP unless modified by a Department Change.

PRIORITY	ENTITY	TITLE
1	Department	Manual on Uniform Traffic Control Devices (CA MUTCD)
2	Department	Highway Design Manual
3	AASHTO	Highway Capacity Manual
4	Department	Signal, Lighting and Electrical Systems Design Guide
5	Department	Signal Design Detail Sheets
6	Department	Ramp Meter Design Manual
7	Department	Standard Special Provisions
8	Department	2006 (US Customary Standard) Plans Including New Standard Plans
9	Department	Design-Build Modifications to the Standard Specifications for Construction
10	Department	Standard Specifications
11	AASHTO	Roadside Design Guide
12	Department	Signals, Lighting and Electrical Systems (ES Sheets)
13	Department	CADD Users Manual
14	Department	Plans Preparation Manual

10.2.1.2. References

Developer shall use the references listed below as supplementary guidelines for the design and construction of signalization.

ENTITY	TITLE
Department	New Policy and Directives (Pavement Delineation and Singing)
Department	Ready To List and Construction Contract Award Guide (RTL Guide)
Department	Reference Sheets for Structural Design Aids Overhead and Roadside Signs
Department	Standard Highway Signs
EIA	Electronic Industries Alliance (EIA) Standards
NCHRP	Report 350-Recommended Procedures for the Safety Performance Evaluation of Highway Features
NEMA	National Electrical Manufacturers Association (NEMA) Standards
TIA	Telecommunications Industries Association (TIA) Standards

10.2.2. Signalization

New signals are to be designed and installed by Developer at the following intersections:

A) Richardson Ave. and Lyon St.;

B) Girard Rd. and Lincoln St.;

C) Girard Rd. and Southbound Off-Ramp;

D) Girard Rd. and Northbound On and Off-Ramp, and

E) other locations as required by Developer's design,

No signals shall be installed on the main line.

As a minimum, the design of all signals shall comply with the most current Department District 4 Traffic Signal Amendments, the Department's Signal, Lighting and Electrical Systems Design Guide and the Department's Manual of Uniform Traffic Control Devices (MUTCD) In addition to the requirements of Volume II, Division I, Article 2 and Article 5 the signal design, details and installation shall be submitted to the Department for review and comment sixty (60) days prior to ordering constructing or installing any signalization equipment. An outline of specific signalization requirements are as follows:

A) provide for the orderly and predictable movement of all traffic;

B) provide such guidance and warnings as needed to ensure the safe and informed operation of individual elements of the traffic stream;

C) the Traffic Signal systems shall be designed to provide for the efficient movement of traffic in both the year of Substantial Completion and ten (10) years after the end of the Term;

D) develop signal timing plans that optimize traffic flows and provide signal coordination with adjacent intersections and arterial roads, consistent with the regional parameters developed as part of the Advanced Traffic Management System (ATMS). Signal timing plans shall be developed using state-of-the-art software to optimize traffic flows and provide signal coordination with adjacent intersections. Developer shall be responsible for making field-timing adjustments as necessary;

E) pedestrians and cyclists will be accommodated as per the Department's MUTCD;

F) be fully tested and documented as meeting the Contract requirements;

G) Developer shall design and install warranted traffic signals, both permanent and temporary, for staged construction, as necessary. Developer shall also design and implement modifications to existing traffic signals as a result of Developer's design. The traffic signal designs and modifications shall be completed in accordance with the current Department Standards and Standard Special Provisions;

H) provide temporary traffic signals at any location that currently has traffic signals and that are removed for roadway construction or locations that are required to facilitate maintenance of traffic;

I) Developer shall be responsible for designing and implementing any temporary traffic signal timing or for any phasing required for traffic management during construction; and

J) Developer shall submit any proposed timing or phasing changes, including any temporary signal head placement, to the Department and other local agencies as appropriate for review and comment at least twenty one (21) days in advance of making any such changes. Developer is responsible for all work to implement the temporary changes, including programming the controller and relocating signal heads.

Developer shall provide, implement and fine-tune signal timing plans for all new signals, modified signals and interconnected signals.

10.2.3. Signal Design and Operational Analysis

Developer shall prepare signal design plans and operational timing plans and conduct traffic signal warrant analyses at all locations where a traffic signal is proposed. Developer shall develop, collect and project the traffic data required for the warrant analysis.

The signal design shall include documentation establishing the basis of designs of new and replacement traffic signals, signal timing methodology, and capacity and traffic level of service (LOS) analysis. The design shall include appropriate supporting calculations. Developer shall:

A) Develop year of Substantial Completion and for the year ten (10) years after the end of the Term traffic volumes. These designs and projections shall as a minimum include the following information:

1) Placement of intersection physical equipment;

2) Lane geometry and turning bay lengths; and

3) Accommodation of pedestrians.

B) For year of Substantial Completion and for the year ten (10) years after the end of the Term:

1) Engineering calculations to support signal design;

2) Capacity and LOS analysis for individual intersections;

3) Signal timing plans for individual intersections;

4) Phase sequencing for individual intersections;

5) Full timing plan databases for new and replacement signals; and

6) Engineering calculations to support phasing and timing plans.

C) For year of Substantial Completion

1) Basic timing Plans for signals within half (1/2) mile of any new and replacement signals; and

2) Coordination of timing plans with adjacent signal and arterial timing plans.

10.2.4. Traffic Signal Design

Developer shall design intersections and traffic signals that optimize vehicle level of service, minimize delay, and accommodate pedestrians and cyclists as necessary. If Developer determines, in its preliminary studies, that the levels of service for year of Substantial Completion and for the year ten (10) years after the end of the Term cannot be achieved within the defined Project Right of Way Limits, Developer shall advise the Department and recommend proposed solutions. The Department will evaluate the proposed solutions with Developer by assessing the cost, time, and impacts of acquisition or obtaining access rights of additional right of way, and determine whether to proceed with any proposed solution or instruct Developer to maximize the LOS within the Project Right of Way.

10.2.5. Traffic Analysis Methodology

Developer shall calculate the traffic volumes and movements for individual intersection capacities based on the Highway Capacity Manual. Developer shall determine the optimal traffic signal timing for a group of closely spaced intersections based on a computer simulation or optimization model.

The following traffic signal analysis programs and techniques are typically used by the Department. Although use of these specific computer programs will not be required, if Developer proposes the use of any other programs and techniques, these shall be submitted in advance by Developer for review and comment by the Department:

A) Traffic signal capacity, cycle length, split timing, and level of service: Synchro, HCM/Cinema;

B) Traffic signal coordination timing, including optimal cycle length, phase sequence, and offsets: Synchro; and

C) Complex signal coordination, queuing, and turn bay storage: SimTraffic, CORSIM, VISSIM.

10.2.6. Traffic Analysis for Maintenance of Traffic

The purpose of the traffic analysis is to document in Maintenance of Traffic the adequacy of the traffic signal system, roadway geometry, and lane configuration during construction.

Developer shall undertake a traffic analysis of the proposed changes to individual intersections including traffic capacity and level of service analysis for the weekday a.m. and p.m. peak hours for the period from NTP 3 to Substantial Completion. Developer shall conduct traffic signal coordination and queuing analyses for construction conditions to document that intersection spacing and turn bay lengths are adequate to avoid queuing problems that would degrade level of service. Developer shall submit this analysis to the Department for review and comment at least sixty (60) days before commencing any construction works.

10.2.7. Traffic Analysis for Year of Substantial Completion

Developer shall undertake the development of all traffic signal phase sequencing and timing parameters necessary to provide an optimal signal operation during all hours of the day at the year of Substantial Completion. Developer shall include capacity and signal coordination calculations in the analysis. Developer shall:

A) Prepare the complete database required to program controllers for new and replacement signals, including:

1) Phase data, including minimum green, maximum green, extension, yellow, all-red, and pedestrian timing;

2) Detector parameters;

3) Time-of-day, day-of-week, and week-of-year plan selection;

4) Cycle length;

5) Splits and phase sequences;

6) Offsets;

7) System detector volume and occupancy weighing;

8) Traffic responsive plan selection criteria; and

9) Pre-emption timing parameters.

B) Include timing plans and coordination of all signals within half (1/2) mile of new or replacement traffic signals.

C) Coordinate timing plans with adjacent intersections and arterials outside of the half (1/2) mile limit to provide optimal traffic flow through the interchange area.

D) Recommend to the Department changes to signal coordination timing parameters at locations where changes may improve the traffic operations. Supply timing plans, which shall include:

1) Time of day, day of week, and week of year plan selection;

2) Cycle length;

3) Splits and phase modes;

4) Offsets;

5) System detector volume and occupancy weighing; and

6) Traffic responsive plan selection criteria.

Developer shall program all traffic control equipment for new and replacement traffic signals and provide all additional timing plans and coordination parameters. All timing and coordination data will be subject to review and comment by the Department prior to Developer turning on new traffic signals. Developer should allow fourteen (14) days for such a review by the Department. Following the turn on of new traffic signals, Developer shall conduct an operational check and fine-tuning of the traffic signal timing.

10.2.8. Traffic Analysis for the period 10 years after the end of Term

The purpose of this traffic analysis is to document the adequacy of the traffic signal system, roadway geometry, and lane configuration for the period ten (10) years after the end of Term. The traffic analysis of individual intersections shall include traffic capacity and level of service analysis for the weekday and weekend a.m. and p.m. peak hours.

Developer shall conduct traffic signal coordination and queuing analyses for this year to document that intersection spacing and turn bay lengths are adequate to avoid queuing problems that would degrade level of service.

10.2.9. Electrical Service

Intersection safety lighting shall be designed and constructed in accordance with the Department's Standards and Standard Special Provisions.

Electrical service for all elements shall be standard 120/240-volt (V) service. Developer shall be responsible for obtaining new or modified electrical services and telephone service points, including all applications and permits required from the serving utility company, and XY standard forms in the case of new telephone services.

Separate service conduits shall be used for lighting circuits, Traffic Monitoring Systems (TMS), Ramp Metering Systems (RMS), Closed Circuit Television (CCTV), and from the service cabinet meter to the load. Large conduits with inner ducts to route the conductors for these separate circuits will not be acceptable.

Developer shall be responsible for all electrical utility costs of the new or modified system, unless otherwise stated.

10.2.10. Electrical Design

10.2.10.1. Electrical Design Concept Meeting

Developer shall take an inventory of all the existing electrical elements in the Project. Developer shall schedule an electrical concept meeting to present a layout of the in-place and proposed electrical systems on the Project.

A) Electrical design plans for all electrical design systems shall conform to the following requirements:

1) Existing electrical systems shall be shown;

2) Identified power sources shall be shown on the plans clearly indicating the respective source locations (regardless of the design segment). Terminated

conduit run with the note "service location as part of other segment" shall not be acceptable; and

3) Equipment numbers shall correspond to their post mile location. Northbound numbering shall be even numbered.

B) The following electrical elements may be in the same service cabinet and on the same meter, but each shall have a separate circuit breaker:

1) Traffic monitoring stations;

2) CCTV;

3) Fiber optic (F 10) data node;

4) Irrigation;

5) Highway safety lightings; and

6) Photoelectric controls.

A separate electrical service meter in a service cabinet shall be provided for changeable message sign (CMS) and communication hubs.

A separate electrical service meter in a service cabinet shall be provided for variable message sign (VMS) and communication hubs.

All appurtenances shall comply with the horizontal clearance requirements in the Highway Design Manual.

Developer shall schedule the meeting to take place at least sixty (60) days prior to ordering, installing or constructing any elements of the electrical design.

11. LIGHTING

11.1. General

Developer shall prepare all necessary lighting plans in a full-scale format with tabulations and notes as per the Department's Highway Design Manual.

11.2. Administrative Requirements

11.2.1. Laws, Standards and Specifications

11.2.1.1. Standards

Developer shall design and construct the Lighting within the Project ROW in accordance with the requirements of the standards listed below. All lighting that is installed along Trust local roadways shall adhere to the Trust specified requirements set forth in this document.

If there is any conflict in standards, the order of precedence shall be as set forth below, unless otherwise specified. However, if Developer's Proposal has a higher standard, then adhere to the Proposal standard.

If there is any unresolved ambiguity in standards, it is Developer's responsibility to obtain clarification from the Department before proceeding with design and/or construction.

Developer shall use the current version of each listed standard as of the initial publication date of this RFP unless modified by a Department Change.

PRIORITY	ENTITY	TITLE
1	Department	Highway Design Manual
2	Department	CADD Data Standards (Lighting Cell Library)
3	Department	Signal, Lighting and Electrical Systems Design Guide
4	Department	Standard Special Provisions
5	Department	2006 (US Customary Standard) Plans Including New Standard Plans
6	Department	Design-Build Modifications to the Standard Specifications for Construction
7	Department	Standard Specifications (May 2006 Edition)
8	Department	Plans Preparation Manual US Customary Units (English)
9	ANSI	Illuminating Engineering Society of North America Roadway Lighting ANSI Approved Standards, Guides and Documents
10	AASHTO	Roadway Lighting Design Guide

11.2.1.2. References

Use the references listed below as supplementary guidelines for the design and construction of lighting.

ENTITY	TITLE
Department	New Policy and Directives (Pavement Delineation and Signing)
Department	Ready To List and Construction Contract Award Guide (RTL Guide)
Department	Reference Sheets for Structural Design Aids Overhead and Roadside Signs
Department	Standard Highway Signs
EIA	Electronics Industries Alliance (EIA) Standards
IESNA	Lighting Handbook
NCHRP	Report 350-Recommended Procedures for the Safety Performance Evaluation of Highway Features
NEMA	National Electrical Manufacturers Association (NEMA) Standards
National Parks Service	Lighting Standards
TIA	Telecommunications Industries Association (TIA) Standards

11.3. Design Requirements

Developer shall design, furnish, construct and install all components of a roadway lighting system necessary to provide a complete and functional system that meets the following performance requirements:

A) Durable;

B) Light fixtures along the mainline shall mirror the fixtures being introduced in the Phase I Construction;

C) Provide uniform coverage at intersections and interchanges to create a safe and comfortable environment for those who use the facility;

D) Avoid light pollution and light trespass outside of the corridor;

E) Avoid disability or discomfort glare to users;

F) Provide for ease of maintenance and of servicing; and

G) Lighting shall minimize light pollution, light trespass, glare and promote "dark skies".

Developer shall also design, furnish and construct all components of a roadway lighting system for all temporary lighting required during the construction of the Project, including all detours.

A schematic lighting layout for the mainline has been developed in coordination with the Presidio Trust and the National Park Service, through the Department. The majority of the light locations have been accepted by all parties; Developer shall obtain concurrence from the National Park Service, through the Department, and the Presidio Trust on the currently unresolved light locations that are indicated as ‘pending’ in the table below.

STATION	STATUS	STATION	STATUS
NB 34+31	Location approved	SB 33+64	Location approved
NB 35+66	Location approved	SB 34+99	Location approved
NB 37+01	Location approved	SB 36+34	Location approved
NB 38+40	Location approved	SB 37+69	Location approved
NB 39+77	Location approved	SB 39+03	Location approved
DOY1 41+34	Location approved	SB 40+71	Location approved
NB 43+46	Location approved	SB 42+49	Location approved
GN 51+31	Location approved	SB 44+34	Location approved
GN 52+53	Location approved	SB 50+87	Location approved
GN 53+75	Location approved	SB 52+07	Location approved
NB 64+73	Location approved	SB 53+25	Location approved
NB 65+93	Location approved	DOY3 50+65	Location approved
NB 67+13	Location approved	DOY3 52+34	Location approved
NB 68+58	Location approved	DOY3 53+80	Location approved
NB 70+04	Location approved		
NB 71+50	Location approved		
NB 72+98	Location approved		
NB 74+31	Location approved		
NB 75+44	Location approved		
NB 85+08	Location approved		
NB 86+28	Location approved		
NB 87+48	Location approved		
DOY2 96+44	Location approved		
DOY2 98+18	Location approved		
NB 99+70	pending		
DOY2 102+35	Location approved		
NB 101+25	pending		
NB 103+00	pending		
NB 104+76	pending		
NB 106+51	pending Suggestion to be moved to a position opposite of SB 107+52		
NB 108+26	Location approved		
DOY4 109+05	Location approved		
DOY4 120+79	Location approved		
NB 113+38	Location approved		
NB 115+14	Location approved		
NB 116+91	Location approved		

For all newly-constructed Presidio Trust local roads within the TCE, Developer shall provide local road lighting providing illumination levels conforming to Illuminating Engineering Society of North America (IESNA) standards for applicable land use as defined in Volume II, Division II, Section 3, Article 12 of these Technical Specifications and the area settings such as urban (LZ3 – medium (commercial/industrial)), residential (LZ2 – low (residential)) or rural and natural settings (LZ1 – dark (park or rural)).

Lighting for local roads shall be energy efficient and comply with applicable provisions of California Title 24. Lighting shall minimize light pollution, light trespass, glare and promote "dark skies".

Local roadway lighting to be provided by Developer shall be a complete exterior lighting system installation including but not be limited to fixtures and mounting devices and related footings, lamps, conductors, raceways, boxes, circuiting and controls, power supply and means of disconnect, and all other appurtenances necessary for a complete and fully functioning system and shall be integrated with existing local road systems however it should be completely independent of the system being provided on highway 101, highway 1 and the ramps leading to and from these routes.

The local roadway lighting shall accommodate future connection to, or expansion of systems as may be identified by The Presidio Trust. Developer shall base the lighting system for the local roadways on following Trust requirements:

Lamp - Type	• HID or LED
Lamp – Color	• Warm white light similar in Color Rendering Index value to High Pressure Sodium light sources (CRI 22) • Correlated Color Temperature (CCT) range of 2200K to 3000K
Fixtures	• Energy efficient • Low glare • Shielded light sources • Full cutoff where adjacencies warrant • Vandal resistant • Corrosion resistant • Finish and color to match poles
Poles	• Corrosion resistant • Powder coat painted • Trust approved ‘black’, aluminum or stainless steel
Light fixture heights	• Pedestrian pole-type lights: 12’ to 16’ • Parking and two-lane roadways and intersections: 15’ to 25’ • 3+ lane roadways and intersections: 25’ to 35’

11.4. Construction Requirements

Developer shall provide lighting for all roadway facilities constructed and or operated and maintained by Developer. The design shall provide, as a minimum, the light levels required by

the Department Highway Design Manual and the Department Signal, Lighting and Electrical Systems Design Guide.

Developer shall be responsible for any adjustments needed to the crossroad lighting system affected by the Project. Developer shall coordinate with the Department, municipality and/or maintaining agency having jurisdiction in the area.

11.5. Lighting Deliverables

In addition to those defined in Volume II, Division I, Article 2 Developer shall specifically provide the following.

A Master Lighting Plan shall be submitted to the Department as well as the Presidio Trust for review and comment at least sixty (60) days prior to ordering, constructing or installing any element of the lighting system in accordance with Volume II, Division I, Article 2 and Article 5.

12. LANDSCAPING

12.1. General

Developer shall undertake all Work necessary to meet the requirements for Allowance Landscaping including landscape, hardscape, grading, planting and irrigation, the creation of landscape and irrigation plans demonstrating preservation and protection of existing vegetative assets, noxious weed control, erosion control, hazard tree control, and plant establishment. In addition to the requirements of Volume II, Division I, Article 2 Developer shall coordinate with the local agencies, to ensure that the appropriate design methods, procedures, plan preparation, analysis methodology, review/comment processes, approval procedures, specifications and construction requirements are met.

Using the requirements of the Contract Documents, third party agreements, permits and approvals and if deemed appropriate by the Developer the Indicative Preliminary Design the Developer shall progress and complete the Allowance Landscaping design and assist the Department in obtaining the approval of the Presidio Trust where appropriate to the Allowance Landscaping design. Once the Allowance Landscaping design is complete and accepted where appropriate by the Presidio Trust then the design and associated specifications will be incorporated into the Contract Documents as a Department Change.

The Developer shall, per the requirements set forth in the Presidio Trust Right of Entry Agreement, construct New Landscaping where Restored Landscaping is precluded.

The Developer shall, per the requirements set forth in the Presidio Trust Right of Entry Agreement, restore or design and construct in the areas from east to west below

A) The Palace of Fine Arts parking lot and any contiguous land bounded by Girard Road to the northwest, the Richardson to Girard ramp to the south and the TCE to the east.

B) The area northeast of the Gorgas Warehouses bounded by Southbound 101 and the TCE.

C) The area north of Building 1029 bounded by Girard to the east, the southbound to Girard off-ramp to the north, the Quartermaster Reach boundary to the west and the TCE line to the south.

D) The areas along Gorgas Avenue bounded by its intersection with Richardson Ave. to the east, Girard Road to the north, and the TCE.

E) The areas along Girard Road bounded by its intersection with Marina Blvd to the east, Lincoln Blvd to the southwest, the Quartermaster Reach boundary to the northwest, and the TCE.

F) In the vicinity of the Main Post Tunnel to the eastern portals of the Battery Tunnel, the area north of the toe of slope of the recreated Main Post Bluff to the TCE, except for areas destroyed by the removal of the Building 605.

G) The areas on top of the Main Post Tunnels including Halleck Street and the eastern Main Post Tunnel portals bounded by the Quartermaster Reach boundary to the east, the Main Post Tunnel western portals to the west, and the toe of slope of the recreated Main Post Bluff.

H) The areas in the vicinity of Retaining Wall No. 8, the median between the Northbound and Southbound roadways, and the fill section north of the Northbound roadway bounded by the Main Post and Battery Tunnel portals and the TCE.

I) The areas on top of the Battery Tunnels including areas in the vicinity of the eastern High Viaduct abutments and Battery Tunnel Substation bounded by the Battery Tunnel portals and the TCE.

J) The areas west of the eastern High Viaduct abutments, in the vicinity of the Cavalry Stables, bounded by the TCE.

K) The areas in the vicinity of the Park Presidio Interchange bounded by the Cavalry Stables area to the east, Lincoln Blvd adjacent to the Golden Gate Bridge Toll Plaza to the west, and the TCE.

Developer shall note that native planting for the Project shall be collected and propagated on the Presidio. Additional planting required for the Project shall be contract grown in the quantities to assure acceptable plants are available at installation. Developer shall refer to the Trust's Vegetation Management Plan (VMP), for further information.

12.2. Administrative Requirements

12.2.1. Laws, Standards and Specifications

12.2.1.1. Standards

Developer shall design and construct the landscape, hardscape, grading, planting and irrigation elements within the Operating Period O&M Limits in accordance with the requirements of the standards listed by priority below.

If there is any conflict in standards, the order of precedence shall be as set forth below, unless otherwise specified. However, if Developer's Proposal has a higher standard, then Developer shall adhere to the Proposal standard.

If there is any unresolved ambiguity in standards, it is Developer's responsibility to obtain clarification from the Department before proceeding with design and/or construction.

Developer shall use the current version of each listed standard as of the initial publication date of this RFP unless modified by a Department Change.

PRIORITY	ENTITY	TITLE	LOCATION WHERE STANDARD APPLIES
1	Department	Highway Design Manual (HDM)	Within the O&M Limits
2	Department	Standard Special Provisions	Within the O&M Limits
3	Department	Standard Plans U.S. Customary Units, (May 2006 Edition)	Within the O&M Limits
4	Department	Design-Build Modifications to the Standard Specifications for Construction	Within the O&M Limits
5	Department	Standard Specifications	Within the O&M Limits
6	Department	Construction Site Best Management Practices (BMPs) Manual	Within the O&M Limits and within the TCE limits
7	Department	Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual	Within the O&M Limits and within the TCE limits
8	Department	Project Development Procedures Manual (PDPM)	Within the O&M Limits
9	Department	Plant Setback and Spacing Guide	Within the O&M Limits
10	Department	Landscape Architecture Program PS&E Guide	Within the O&M Limits
11	Department	Plans Preparation Manual US Customary Units (English)	Within the O&M Limits
12	Department	CADD Users Manual US Customary Units (English).	Within the O&M Limits
13	Presidio Trust	Presidio Trust Management Plan	Within the O&M Limits and within the TCE limits
14	Presidio Trust	Presidio Trails and Bikeways Master Plan & Environmental Assessment	Within the O&M Limits and within the TCE limits
15	Department	Maintenance Manual	Within the O&M Limits
16	Department	Construction Manual	Within the O&M Limits and within the TCE limits
17	Department	California Test Methods	Within the O&M Limits

PRIORITY	ENTITY	TITLE	LOCATION WHERE STANDARD APPLIES
18	Department	Ready to List and Construction Contract Award Guide (RTL Guide)	Within the O&M Limits
19	California Building Standards Commission	2007 California Building Code, Title 24 and all updates	Within the O&M Limits and within the TCE limits
20	University of California Cooperative Extension California Department of Water Resources	The Landscape Coefficient Method And WUCOLS III* 2000	Within the O&M Limits and within the TCE limits
21	American Concrete Institute	Specifications for Structural Concrete for Buildings	Within the TCE Limits excluding areas within the O&M limits
22	International Code Council	International Building Code (Latest Edition)	Within the TCE Limits excluding areas within the O&M limits
23	Public Rights-of-Way Access Advisory Committee	Public Rights Of Way Accessibility Guide (PROWAG)	Within the O&M Limits and within the TCE limits
24	United States Access Board	American Barriers Act Accessibility Standards (ABAAS)	Within the O&M Limits and within the TCE limits
25	Department	Department Approved Chemical List	Within the O&M Limits

12.2.1.2. References

Developer may use the references listed below as supplementary guidelines for the design and construction of the landscaping and irrigation elements as appropriate.

ENTITY	TITLE	LOCATION
ISOA	International Society of Arboriculture Guide for Plant Appraisal	Within the O&M Limits and within the TCE limits
AASHTO	A Guide for Transportation Landscape and Environmental Design	Within the O&M Limits and within the TCE limits
FHWA	Title 23 Code of Federal Regulations (and Non Regulatory Supplements) Chapter 1, Part 752 Landscape and Roadside Development	Within the O&M Limits and within the TCE limits

ENTITY	TITLE	LOCATION
Presidio Trust	South Access to the Golden Gate Bridge Architectural Criteria Report August 2008	Within the O&M Limits and within the TCE limits
American Iron and Steel Institute	Industrial Steel Specifications for Fence-Posts, Gates and Accessories	Within the O&M Limits and within the TCE limits
National Association of Architectural Metal Manufacturers (NAAMM)	Architectural Metal Handbook, latest edition	Within the O&M Limits and within the TCE limits
Council of Tree and Landscape Architects	Guide for Establishing Values of Trees	Within the O&M Limits and within the TCE limits
Presidio Trust	Presidio Trust Roads & Grounds IPM Program	Within the O&M Limits and within the TCE limits
Presidio Trust	Presidio Trust Weed Management Guidelines	Within the O&M Limits and within the TCE limits
Outdoor Access Board	Accessibility Guide for Outdoor Developed Areas (AGODA)	Within the O&M Limits and within the TCE limits
Department	Doyle Drive Tree Removal Plan	Within the O&M Limits and within the TCE limits
Department	Project Plans for Plant Collection, Salvaging and Propagation	Within the O&M Limits
Presidio Trust	Vegetation Management Plan	Within the O&M Limits and within the TCE limits
Presidio Trust	"Draft" Soil Management Guidelines 2008	Within the O&M Limits and within the TCE limits
Presidio Trust	Technical Requirements for Forested Areas, dated May 31, 2009	Within the O&M Limits and within the TCE limits
IESNA	IESNA Lighting Handbook, 9th Edition	Within the O&M Limits and within the TCE limits
Presidio Trust	Presidio Trails and Bikeways Master Plan and Environmental Assessment, July 2003	Within the O&M Limits and within the TCE limits

12.3. Landscape Design Requirements

Developer shall design, prepare all necessary documentation, furnish, construct and install all necessary components of the landscaping.

12.3.1. Vegetation Preservation Plans

Developer shall use all applicable references and standards as guidelines for the preservation, design and construction of the landscape together with other manuals and standards as

appropriate. Developer shall prepare a report which inventories each tree within the project limits listing its species, approximate size, location and condition. Developer shall identify, and mark in the field, the location and names of all existing trees, shrubs or groundcovers to be preserved and protected as environmental assets within the entire Project Limits. The report and plan shall include:

A) Tree and Vegetation Inventory Plan;

B) Noxious Weed Control Plan;

1) During the design phase, Developer shall identify and map areas of noxious weeds to be removed or controlled in accordance with the requirements established by The Department, the Presidio Trust, the California Department of Agriculture, and other local jurisdictions, including counties, municipalities and watersheds, and record the locations of these areas on a Noxious Weed Control Plan. The plan shall define methods used to control noxious weeds at each location; and

2) Developer shall contact the Presidio Trust to determine if any areas of biological control exist within the Project limits in accordance with Volume II, Division I, Article 5. If the Presidio Trust does have controls in place, Developer shall indicate them on the Noxious Weed Control plan. Developer shall utilize methods of noxious weed control that will not adversely impact other jurisdiction's biological control efforts.

C) Tree and Vegetation Preservation, Protection and Removal Plan;

1) The Tree and Vegetation Preservation, Protection and Removal Plan shall indicate the temporary construction easement, permanent easement, access control fence and the proposed Project impacts on vegetative assets, including any impacts on vegetative assets outside of the Project limits; and

2) Developer shall identify hazard trees (those trees that are defective and have the potential to cause property damage or human injury) to be removed or portions of trees that are hazardous and record the locations of those trees on the Tree and Vegetation Preservation, Protection and Removal plan.

D) The report shall be submitted to the Department sixty (60) days before Developer commences any work on or adjacent to the Project Right of Way and in any event no later than 120 days after NTP1; and

E) The Department will consult with the TOP and provide comments to Developer in accordance with the process set out in Article 3.2.9 of this Section 3 of Division II.

12.4. Construction Requirements

Standards set forth by the Presidio Trust must be adhered to throughout the project. Landscaping within the Project ROW shall also adhere to the Department's Standards. If the two standards are in conflict, Developer shall obtain clarification from the Department before proceeding with the design.

12.4.1. Vegetation Preservation

Vegetation Preservation shall include but not be limited to the following:

A) prior to the start of construction, Developer shall place temporary tree protection fencing according to the Department's Standard Specifications and Standard Special Provisions at Environmentally Sensitive Areas, to protect any plants or plant areas designated to be preserved and protected in the Tree and Vegetation Preservation, Protection and Removal plan;

B) tree protection and maintenance work shall be performed by qualified tree specialists at the direction of an Arborist approved by the Department henceforth to be referred to as "Arborist". Arborist shall recommend any treatment, materials, and labor required to ensure the good health of the trees. Tree specialists employed by the Developer shall be responsible for implementing said treatment, materials and labor;

C) Developer shall remove the temporary tree protection fencing after approval by Landscape Architect;

D) Developer shall remove hazard trees, or remove portions of those trees that are hazardous using methods that prevent damage or injury to nearby vegetative assets and in compliance with Tree Vegetation Preservation, Protection Removal Plan;

E) clearing, grubbing, and earthwork operations shall not be performed in areas where existing irrigation facilities are to remain in place until existing irrigation facilities have been checked for proper operation in conformance with the provisions in "Existing Highway Irrigation Facilities" of the standard specifications;

F) tree removal shall follow Doyle Drive Tree Removal Plan prepared by the Department for Phase 1 Construction;

G) Developer shall restore grades of area affected by removal to existing lines and levels following tree removal;

H) all existing trees and other vegetation to remain within the TCE shall be protected from damage;

I) all trees and other vegetation to remain on site shall be protected from all trades working on the job and it shall be Developer's responsibility to insure that all Subcontractors are aware of and held responsible for any damage to existing trees;

J) Developer shall be liable for all damages and necessary repairs to all existing trees, including trunk branches or roots. Repairs are to be made at the direction of the Arborist in consultation with the Presidio Trust in accordance with Volume II, Division I, Article 5

K) Developer shall be responsible and liable for all unauthorized cutting, destroying, and damaging of existing trees, shrubs and groundcovers, including damage due to careless operation;

L) parking of equipment or vehicles, or storage of oil, gas, chemicals, or construction materials of any kind shall not be allowed within the drip line of any existing trees;

M) signs, wires, or any other type of obstruction shall not be attached to trees;

N) trenching and filling under the drip line of trees is to be avoided; if because of limiting site conditions, trenching under the drip line is necessary, trenches are to be hand-dug under supervision of the Arborist, and major roots retained intact;

O) Developer shall not permit poisoning of trees or soil by disposing of paint, petroleum products, dirty water or other deleterious materials on or around roots;

P) Developer shall provide temporary tree protection fencing for every existing tree designated to remain and shall fence off under the dripline of the tree wherever possible. When this is not possible, because of construction requirements, the fence perimeter shall be a minimum of ten (10) feet in radius from the tree trunk for all trees 12" in caliper or greater, or when measured twelve (12) inches or less in caliper the protective fencing shall be installed at a minimum of four (4) feet in radius around the entire tree;

Q) temporary tree protection fence shall consist of metal stakes (a minimum of four (4) feet above grade) placed four (4) feet o.c. and covered with an interwoven 4' high snow fencing or equivalent;

R) Developer shall be responsible for all supplemental watering and feeding of existing trees to offset loss of root system as a result of excavation or new construction. Said supplemental watering and feeding shall consist of periodically injecting liquid fertilizer with a minimum 3-inch long probe operated by a 150 psi pressure system. The quantity of water and fertilizer shall be sufficient to offset the root loss suffered by the trees;

S) Arborist shall be present on the site when excavations and compactions are made near existing trees;

T) existing plant materials impacted by construction areas shall be maintained by Developer;

U) any tree designated to remain which is damaged or destroyed due to Developer's or any Developer Related Entities' negligence or failure to provide adequate protection shall be compensated for in accordance with the industry standard of values, using "tree caliper" method (greatest trunk diameter measured 30 inches above ground); and

V) trees and shrubs killed or damaged by construction work to the extent that they have lost their original form, shall be removed from the site and replaced in kind and size at Developer's expense.

12.4.2. Noxious Weed Control

Developer shall remove noxious weeds or treat areas designated for noxious weed control to eliminate noxious weeds. Maps indicating locations of areas of noxious weed control shall be prepared and maintained by Developer throughout the duration of construction. Developer shall

prepare a plan for treatment and control of noxious weeds and create an acceptable plant pallet that shall prevent the spread or reintroduction of invasive plant species. Developer shall consult with the Department Presidio Trust and Department will consult the TOP in accordance with Volume II, Division II, Section 3, Article 3.2.9 and Volume II, Division I, Article 2 and Article 5 on this plan.

Developer shall maintain a register of all project pesticide application records. Further Developer and all Developer Related Entities shall conform to the following:

A) clean all earth-moving equipment and vehicles of dirt, mud, and seed residue before using it or bringing it onto the Project site. Certify that all equipment has been cleaned using high-pressure water blasting or steam-cleaning methods;

B) clear the work area of weeds before disturbing soil. Eradicate weeds with selective herbicides recommended for those weed species and only use herbicides on the approved lists of the Department and Presidio Trust;

C) minimize soil disturbance outside the slope stake limits. Monitor and control any disturbed area from weed invasion, and re-vegetate the disturbed areas;

D) monitor gravel, rock, borrow, and imported topsoil being used on the Project for weeds and control weed growth with pre-emergent herbicides; and

E) after planting, Developer shall eradicate all weeds within the entire project limits by use of pre-emergent, selective, and nonselective herbicides. Developer shall monitor erosion control practices to prevent weed invasion in disturbed areas. If using chemical weed control, it must be applied by a licensed applicator in accordance with Trust requirements. Developer shall ensure that the product will not damage or kill the surrounding desirable plant material. If necessary, Developer shall use hand pulling to eliminate weeds in these areas.

12.4.3. Landscape Grading Construction

Landscape grading shall include but not be limited to the following:

A) all high points, low points, or grade breaks on concrete surfaces shall have a smooth curve. Hardscape shall not be built to a point;

B) Developer shall conform the new grades within the TCE limits to the existing grades without damaging the existing grasses, trees, or existing paving to remain, along the limit line. Any damage to these areas shall be repaired at Developer's own expense;

C) Developer shall notify the underground service alert (U.S.A.) at 800-227-2600, P.G.&E. and all other utilities 48 hours prior to commencement of work;

D) new water line and irrigation lines shall be sleeved under paving where necessary; and

E) Developer shall ensure that the landscape grading is coordinated with other plans prepared for this project.

12.4.4. Irrigation Construction

Irrigation construction shall include but not be limited to the following:

A) Developer shall provide a durable, fully automatic system which includes programmable controls. The system shall be efficient, promote healthy plant growth, water conservation and may run on reclaimed water. The system shall meet all The Presidio Trust and all applicable Health and Safety regulations. The irrigation system shall be maintained by the Presidio Trust out with the O&M limits and shall be maintained by Developer within the O & M Limits;

B) Developer shall exercise care when working in areas adjacent to existing planting and irrigation that is to remain as part of the permanent Works. Existing trees, shrubs, lawns and other plant materials to remain shall be protected at all times. Irrigation lines servicing existing planting areas to remain shall be cut and temporarily capped during demolition and restored to full operation. Developer shall provide temporary irrigation in these areas until irrigation can be fully restored. Existing plant material shall be maintained in a healthy condition. Developer shall consult with the Presidio Trust and their maintenance staff for irrigation requirements in areas where new construction affects existing irrigation that is to remain; and

C) all Work shall be in full accordance with the latest rules and regulations of the Safety Orders of the Division of Industrial Safety, the Uniform Plumbing Code and other applicable State or local codes or regulations. Nothing on the Plans or in the specifications shall take precedence over the requirements of said rules and regulations.

12.4.5. Hardscape Construction

Hardscape construction shall include but not be limited to the following:

A) all paving materials shall be designed and installed per Geotechnical Engineer's recommendations to prevent potential settlements;

B) all paving materials and associated materials shall be installed to conform with all applicable requirements of the Department Specifications and Presidio Trust;

C) all landscape concrete work shall be installed to conform with all applicable requirements of the Department Specifications and Presidio Trust;

D) Developer shall adhere to all standards related to metal fencing and gates construction;

E) Developer shall adhere to all standards related to fasteners, hardware, finishes, paint, galvanizing, bonderizing, welding and steel related to all landscape metal fabrications or installation;

G) Developer shall adhere to all standards related to welding that occurs within the landscape construction scope;

H) all site furniture elements including manufacture, fabrication, installation, placement and surrounding setting shall meet all applicable standards for accessibility under ADA, unless otherwise permitted by the Presidio Trust in accordance with Volume II, Division I, Article 5

I) site furnishings mounting hardware/anchors to be stainless steel, typical. Install per manufacturer's specifications unless otherwise permitted by the Presidio Trust in accordance with Volume II, Division I, Article 5; and

K) Developer shall install fence, rail and guardrails where required by applicable code and additionally where required to provide for worker and public safety.

12.4.6. Landscape Lighting Construction

Landscape lighting construction shall be as set forth in IESNA Lighting Handbook, 9th Edition, and as set forth in IESNA Recommended Practices, RP-33-99 Lighting for Exterior Environments.

12.4.7. Landscape Planting Construction

Landscape planting construction shall be in accordance with but not limited to the following:

A) Developer shall comply with the Presidio Trust planting requirements and refer to The Presidio Trust VMP;

B) plants must be obtained from sources as approved by the Presidio Trust in accordance with Volume II, Division I, Article 5, Developer shall be responsible for delivery and storage of plant materials. Plant materials shall be protected from damage and deterioration during delivery and storage;

C) all proposed planting soil and all sub grade soils to receive planting soils overburden shall be tested and evaluated by the certified Agricultural Testing Laboratory for physical compatibility and agricultural suitability and fertility prior to placement;

D) all plants furnished and installed shall be from Trust Approved Grower(s), and shall meet all requirements governing the propagation, growing and transport of plant material established by law or regulation. The Presidio Trust reserves the right to limit contractors involved with the collection of propagules within the Park to Trust Approved Growers with demonstrated experience and expertise in the collection and handling of native plants and propagules;

E) the Presidio Trust reserves the right to require the Developer to obtain Native Plants from the Presidio Nursery;

F) all off-site plants are subject to State of California Agricultural Department inspection and must be certified as disease and pest free prior to shipment to the Presidio;

G) all plants are subject to Presidio Trust inspection and rejection at any point in time from initial propagation until end of warranty period;

H) unless otherwise approved by the Presidio Trust all areas to be planted, and not specified to be covered by provision of erosion control matting, meshes, or hydroseeding shall receive a wood chip or decorative mulch with underlying weed barrier; and

I) all areas subject to clearing or ground disturbance that will not be paved shall be planted;

1) non-turf areas planted with predominately woody plants shall be planted with plants of sufficient size and spacing density to achieve complete planter bed coverage within no more than three growing seasons;

2) areas to be planted with predominately herbaceous plants shall be planted to achieve complete planter bed coverage within no more than two growing seasons; and

3) turf areas to be fully planted with sod and underlain with rodent mesh.

12.4.6.2 Submittals

Developer shall provide the following submittals for the Presidio Trust review and obtain approval prior to commencement of Work in accordance with Volume II, Division I, Article 5:

A) proposed growers list - listing of proposed growers indicating growing ground location(s), along with plant types and quantities per type to be grown at each location;

B) plant collection schedule - detailed schedule of plant collection activities proposed, along with detailed description of collection means and methods for each location and plant type sourced within the Presidio;

C) plant propagation schedule - detailed schedule of plant propagation and growing activities proposed. Develop schedule to allow sufficient time for plant material to reach required size specifications prior to shipment to, or planting on site;

D) test reports and inspection records - copies of all original written test reports and inspection records for all tests and inspections performed as may be required by the Presidio Trust or other agency with jurisdiction; and

E) certification disease and pest free - copies of all original written inspection records issued by the State of California Agricultural Department.

12.5. Allowance Landscaping.

Allowance Landscaping consists of Landscaping and Hardscaping as follows:

Landscaping:

A) Landscaping design;
B) The provision, planting, seeding, mulching and cultivation of trees, shrubs, grass, turf and other vegetation required to meet the obligations of the Contract Documents;
C) Topsoiling;
D) Final grading of any growth medium required to prepare the land for planting; and
E) The provision of all irrigation systems required to provide water to the areas of vegetation provided as part of the landscaping but not including areas of restoration where no such system previously existed;

Hardscaping (where required by the Contract Documents):

A) Hardscaping design;
B) The provision of trails, cycleways and footpaths, but not the provision of surface streets or road works;
C) The provision of ancillary features required to enhance the landscaped areas, such as trash bins, seats, benches and picnic tables; and
D) The provision on trails, cycleways and footpaths of lighting fixtures, but not the provision of the Utilities.

Exclusions:

Allowance Landscaping does not include the following:

A) Any clearance works necessary to prepare the site for landscaping;
B) Any structural elements including retaining walls, buildings and bridges not specifically identified as part of Hardscaping
C) Environmental bunds and noise barriers
D) Any road works including sidewalks and all associated features including curbs, gutters and safety measures such as barrier and fencing;
E) The provision or restoration of car parks or car parking areas;
F) Any drainage works except the provision of irrigation systems to areas of landscaping
G) Restoration, rehabilitation or refurbishment of haul and access roads;
H) Any provision, replacement or relocation of Utilities;
I) Protection, restoration, rehabilitation or refurbishment of any buildings;
J) Embankment fill or cuttings required for the construction, operation or maintenance of Doyle Drive, ramps or cross streets but including earthworks required to recreate historic bluffs;
K) Restoration or recreation of wetland habitats except for rough grading at Tennessee Hollow;
L) Temporary works unless directly and demonstrably required to support the provision of elements constituting Allowance Landscaping

M) Any landscape or hardscape works in additional areas of land required by Developer outside the original TCE limits presented in Appendix 5-B, such as but not limited to additional Project Right of Way or lands Developer identifies pursuant to Section 4.4.2 of the Agreement. and

N) Maintenance and preservation of landscaping and hardscaping.

12.6. Deliverables

Developer shall include all landscaping works as part of the design and construction certification process defined in Volume II, Division I, Article 2.

13. NOT USED

14. INTELLIGENT TRANSPORTATION SYSTEMS

14.1. General

Developer shall design and construct the Intelligent Transportation Systems (ITS) elements in accordance with the requirements set forth in the Contract Documents.

The ITS elements to be installed for the Project include but are not limited to the following:

A) Ramp metering (RM) system;

B) Traffic monitoring system;

C) Communication system;

D) Changeable message sign (CMS) system;

E) Variable message sign (VMS) system;

F) Extinguishable message sign (EMS) system;

G) Highway Advisory Radio (HAR) system;

H) Tunnel portal traffic signals;

I) Closed circuit television (CCTV) camera system;

J) Incident detection system;

K) Public Address System (PAS);

L) Security System; and

M) Radar speed feedback signs.

14.2. Administrative Requirements

14.2.1. Laws, Standards, and Specifications

14.2.1.1. Standards

Developer shall perform ITS Work in accordance with the relevant requirements of the standards listed below.

If there is any conflict in standards, the order of precedence shall be as set forth below, unless otherwise specified. However, if the Developer's Proposal has a higher standard, then Developer shall adhere to the Proposal standard.

If there is any unresolved ambiguity in standards, it is Developer's responsibility to obtain clarification from the Department before proceeding with design and/or construction.

Developer shall use the most current version of each listed standard as of the initial publication date of this RFP unless modified by a Department Change.

PRIORITY	ENTITY	TITLE
1	Department	Manual on Uniform Traffic Control Devices(MUTCD)
2	Department	Signal, Lighting and Electrical Systems Design Guide
3	Department	Standard Plans U.S. Customary Units, (May 2006 Edition)
4	Department	Standard Specifications (May 2006 Edition)
5	Department	Ramp Meter Design Manual
6	Department	Transportation Electrical Equipment Specifications (TEES);
7	Department	Fiber Optics Design Guidelines
8	Department	Highway Design Manual
9	Texas Transportation Institute	Intersection Video Detection Manual
10	NFPA	70 National Electric Code
11	FHWA	National ITS Architecture

14.3. Performance Requirements

14.3.1. Design Calculations

The design calculations prepared by Developer shall be checked and include: purpose, basis, references, methodology, example use of equations, data, results, conclusions, and summary. The calculations shall be submitted to the Department as part of the process defined in Volume II, Division I, Article 2. This requirement shall apply to both manual and computer generated calculations.

Documentation of computer programs used in the preparation of calculations shall also be submitted to the Department. Documentation shall include, as a minimum:

A) verification procedures and test cases;

B) description of limitations and intended use; and

C) algorithms used as basis of calculations.

14.3.2. Specific Design Calculations

Design calculations prepared by Developer shall be provided to the Department to permit evaluation of the specified electrical equipment and the systems' designs. Design calculations shall include, but not be limited to, the following:

A) load analysis;

B) wiring selection; and

C) loop inductance.

14.3.3. Functional Requirements

The fully operational ITS shall support the following functions:

A) efficient movement of traffic in and around the Project;

B) video based traffic monitoring and incident detection;

C) motorist alerts to incidents by means of Variable Message Signs (VMS), Changeable Message Signs (CMS), Extinguishable Message Signs (EMS), Traffic Signals, Public Address (PA), and an AM/FM radio override system;

D) monitoring and data collection of traffic conditions using vehicle sensors;

E) communications with emergency services such as fire, police and emergency medical services; and

F) communication with the Department [and other highway authorities] in respect of incident response.

14.3.4. Coordination with Adjacent Projects

Developer shall obtain the ITS design plans for all adjacent projects, and determine the coordination requirements for continuous functioning of the ITS equipment for the Project. Developer shall adjust the design and construction schedule accordingly to coordinate the installation of the required components, while continuously maintaining the ITS system.

14.3.5. ITS Commissioning

Developer shall prepare a written commissioning plan that consists of individual equipment performance and quality assurance tests, factory acceptance tests (FATs) and system acceptance tests (SATs) as well as a complete installation testing plan that assures that all ITS systems function and operate as intended.

Developer shall be responsible for all control room and field testing of the various ITS Systems to verify that all systems operating modes function as intended.

14.3.6. ITS Testing

Developer shall coordinate ITS testing with the Department. Prior to any testing, Developer shall provide thirty (30) days notice to the Department.

Developer or the Developer related Entity employed to test and commission the ITS shall have current training and certification on all testing equipment used. Developer shall provide documentary evidence that the instruments used for testing have been calibrated in accordance with the instrument manufacturer's specifications within the last twelve (12) months. Developer shall have all testing equipment calibrated annually for the duration of the Agreement.

Developer shall have in its possession a certification of test device calibration in accordance with the American National Standards Institute (ANSI) guidelines. The testing device shall measure electrical and insulation characteristics of power and signal control cables, and calibration documentation of optical cable test equipment.

Developer shall provide a schedule for all testing so that the Department may observe the testing. Times and locations for all tests shall be provided to the Department a minimum of seven (7) days in advance of any test.

Developer shall develop all ITS testing procedures and pass/fail requirements. The Department may observe any tests and will audit test results.

14.4. Design Requirements

14.4.1. Traffic Monitoring System

A) Developer shall provide permanent traffic monitoring stations at the following approximate locations:

a. Northbound and southbound 101 mainline STA 101 114+75;

b. Southbound Route 1 ramps STA 1 102+70;

c. Southbound 101 mainline STA 101 85+60;

d. Northbound 101 mainline STA 101 84+40;

e. Northbound 101 mainline STA 101 75+80;

f. Southbound 101 mainline STA 101 65+20;

g. Northbound 101 mainline STA 101 63+80;

h. Southbound 101 mainline and off-ramp STA 101 54+20;

i. Northbound 101 mainline STA 101 54+00; and

j. Northbound and southbound 101 mainline STA 101 34+30.

B) Developer shall provide temporary traffic monitoring stations at the following approximate locations:

7) Southbound 101 mainline STA 101 112+60;

8) Southbound 101 mainline STA 101 102+50;

9) Southbound 101 mainline STA 101 86+40; and

10) Southbound 101 mainline STA 101 76+30.

Developer may choose among three types of detection to support the traffic monitoring stations as follows.

14.4.2. Vehicle Detection System

14.4.2.1 Loop Detection

Developer shall incorporate loop detection to support traffic monitoring. Type A inductive loops shall be used for mainline and ramp detection, including exit ramp and queue detection.

14.4.2.2Video Image Vehicle Detection (VIVD)

Design of VIVD shall be in accordance with the Intersection Video Detection Manual. The number of controller cabinet assemblies shall be minimized by maximizing the number of traffic monitoring stations that can be controlled per cabinet assembly.

The VIVD system shall have separate image-processing algorithms for daytime and nighttime conditions. The image-processing algorithm shall also be capable of discerning shadows cast by vehicles onto video detection zones on adjacent lanes and filter out or eliminate the false calls.

Location of video detection cameras shall minimize the amount of occlusion caused by vehicles on adjacent lanes. The distance between the camera and controller cabinet shall not exceed 500 feet.

Vehicle detection zones shall be provided for each lane of traffic.

14.4.2.3 Microwave Vehicle Detection (MVD)

Developer use of a Microwave Vehicle Detection system is subject to review and comment by the Department.

14.4.3. Ramp Metering System

Developer shall plan, design and provide a ramp meter system to include mainline and ramp detection, ramp queue detection, advance ramp meter warning signs and signal standards complete with signal heads at the following locations:

A) Northbound Route 1 to northbound Route 101;

B) Developer shall provide mainline and ramp detection, ramp queue detection and signal standard foundation for a future ramp meter system at the following locations;

1) Northbound Route 1 to southbound Route 101 (two type 1 signal foundations); and

2) Girard Road to northbound Route 101 (one mast arm signal foundation).

The ramp meter equipment shall be designed according to the Department's Ramp Meter Design Manual.
Any future ramp monitoring systems shall be planned, designed, and installed by Developer.

14.4.4. Vehicle Detection System

Developer shall incorporate loop detection to support the ramp meter system. Type A inductive loops shall be used for mainline and ramp detection, including exit ramp and queue detection. Three (3) demand loops per lane shall be used for ramp detector loops. Number of, location and spacing of loops shall be in accordance with the Ramp Meter Design Manual.

14.4.5. Signal Standard

Developer shall have the option of using Type 1 or mast-arm standard for mounting signal heads for the signalized approach to the ramp meter. The signal standards shall be located in accordance with the Ramp Meter Design Manual.

14.4.6. Vehicle Signal Heads

The vehicle signal heads shall meet the design requirements of the Department's Manual on Uniform Traffic Control Device. The size, location, and number of signal sections used shall be

in accordance with the Ramp Meter Design Manual. The use of programmed visibility signal heads shall be considered where applicable in accordance with the Ramp Meter Design Manual.

14.4.6.1. Advance Warning Devices

Advance warning devices shall be provided to warn motorists that the ramp metering is operational. Design requirements for advance warning devices shall be in accordance with the Ramp Meter Design Manual. Extinguishable message sign (EMS) shall be used with flashing beacons and shall display "METER ON" and "PREPARE TO STOP" messages. Refer to Section 14.4.12 for the design requirements for EMS. Advance warning devices shall be provided at a minimum to the following ramp meter approach:

A) Girard to 101 northbound.

14.4.6.2. Controller Assembly

Controller cabinet shall be Type 334 and shall include all equipment to provide a functional ramp metering system in accordance with the Ramp Meter Design Manual and specifications in the Transportation Electrical Equipment Systems TEES. One controller cabinet assembly shall be installed for each entrance ramp. Refer to the Ramp Meter Design Manual and the Signal, Lighting and Electrical Systems Design Guide for guidance on location of the controller cabinets and power requirements.

14.4.6.3. Communications

Design requirements for the ramp metering communications system shall be in accordance with the Ramp Meter Design Manual. Refer to the Section 14.4.8 below for design requirements associated with communications systems.

14.4.7. Closed Circuit Television (CCTV) Camera System

The CCTV camera system shall be designed in accordance with the Department's Signal, Lighting and Electrical Systems Design Guide.

Developer shall provide CCTV systems as follows:

A) Roadway surveillance system along the mainline and interchanges at approximately 3000 feet intervals;

B) Roadway surveillance system within the tunnels at approximately 1300 feet intervals; and

C) Incident detection system within the tunnels at approximately 650 feet intervals. Refer to Incident Detection System below for related requirements.

Traffic surveillance cameras shall be color pan-tilt-zoom type, ceiling mounted inside the tunnel and pole or structure mounted outside of the tunnel. Incident detection cameras shall be color fixed view type, ceiling mounted inside the tunnel. Cameras shall employ Digital Signal Processing (DSP) that can produce color images during bright conditions and high sensitivity monochrome images during dark conditions.

The CCTV camera system shall consist of camera assemblies, zoom lens, pan-tilt-zoom (PTZ) units (for surveillance cameras), environmental enclosures, associated mounting hardware and

brackets, support structure and foundations (if necessary), AC/DC adaptors, camera control cabinets (if necessary), MPEG4 H.264 part 10 (Motion Picture Experts Group) stand-alone video encoders and 19" rack mounted decoding modules and all other accessories and components required to functionally complete installation and operate the CCTV system. The encoders and decoders shall have the capability to retrieve the IP address of their own unit as well as the corresponding encoder or decoder for automatic recovery in the event of a power disruption. Developer shall also furnish any equipment necessary to install the components, connections, and splices to create a fully-functioning and operable system.

CCTV camera assembly mounting height and location for each camera site shall be selected to provide the specified coverage, field-of-view, taking into account maintenance of the CCTV assemblies from the ground.

Cameras shall be monitored, managed and controlled by Developer. Also camera images shall be capable of concurrent viewing by the Department at the Department's facilities if the Department elects to do so. Developer shall not rely on any such monitoring by the Department.

The field-to-central control video transmission shall be full motion color video capable of transmitting 30 images per second.

Digital video recording capabilities shall be provided for all CCTV cameras. A minimum of seven days of storage at the resolution and frame rate generated by the camera is required for each camera view.

14.4.8. Communication System

The communications system shall be an open-architecture, non-proprietary, real-time multimedia communications network that is digital fault-tolerant. The communications system shall consist of a backbone network using multi-strand single mode fiber optic cable, a transmission control protocol/Internet protocol (TCP/IP) protocol and an Ethernet physical layer protocol and a distribution network.

Communication hardware typically consists of modems, servers, network connections, cables, connectors, and switches.

Developer shall furnish and install new fiber optic cable for the Project and shall provide a temporary fiber optic cable system, if required, to provide a continuous and complete operation of the ITS distribution and transmission system.

A) Developer shall perform the following:

1) Ensuring the existing communications functionality during the construction period at all times, except for outages pre-approved by the Department;

2) Designing and constructing a fully-functioning and operable communications network to serve the highway ITS components along the Project;

3) Proposing solutions to achieve design objectives based on the Department's functional, technical, operational, and maintenance requirements;

4) Developer shall deploy standalone shelters, as necessary, to house any communications or ITS hub equipment. Developer shall be responsible for the design, engineering, furnishing and installing the building(s) and communications infrastructure per the requirements of the Contract Documents; and

5) While Developer shall be responsible for the full operation and control of the ITS field devices, Developer shall provide the Department with real-time, unrestricted remote access to any and all data and video collected by ITS devices located on the facility.

B) Developer shall submit detailed network diagrams depicting the interconnections of the fiber optic backbone cable and distribution network for the interconnection of the systems described herein. Developer shall submit these plans and diagrams to the Department for review and comment thirty (30) days prior to ordering, installing or constructing any of the system at a minimum, the diagram should include:

1) Port counts and types of all switches; and

2) Buffer tube and fiber optic strand usage.

Developer shall not substitute, apply any part, or attach any piece of equipment contrary to the manufacturer's recommendations and standard practices.

All communications cables and devices must be outdoor rated and hardened to withstand the elements in which they will be installed.

14.4.8.1. Backbone Communications

Developer shall develop and integrate the backbone network on a one (1) Gigabit Ethernet (GbE) network. The GbE network shall support all video, data and voice transmissions between the project systems and Developer's management center. The physical fiber connection shall be completely redundant to allow for signal survivability in case one of the existing or proposed multi-strand fiber optic cables is severed.

Developer shall design and build an underground fiber optical conduit and cable subsystem consisting of multi-strand, single mode fiber optic cables placed in two separate conduits within the project right-of-way. Developer shall utilize at least a seventy two (72) strand single mode fiber optic cable as the backbone.

Developer shall ensure that the backbone network posses, at a minimum, the following characteristics:

A) The hub sites and/or Developer management center must be lined together on dedicated, directly connected fiber optic pairs at a minimum of 1 Gb connection. No individual field devices shall be connected to the backbone network fiber optic pairs; and

B) Developer shall only use devices that employ industry standard Ethernet components complying with Institute of Electrical and Electronics Engineers (IEEE) standards for communications.

Developer shall locate backbone fiber optic cable conduit systems with consideration to access, maintainability, and forward compatibility on the freeway side of sound walls and right of way fences. Developer shall minimize the number of transverse crossings of the roadway. Developer shall place the fiber optic trunk cable in conduit. Cable vaults shall not be placed within paved areas.

When fiber optic backbone cable parallels overhead electrical transmission lines, Developer shall locate the fiber optic cable as far from the transmission lines as possible. Developer shall not place the fiber optic cable within a ditch or near culvert clean-out areas.

All fiber optic cable shall be designed and routed through pull boxes. Fiber optic cable shall not be routed through junction boxes.

Refer to 16.8.2.3 for roadway raceway system requirements.

14.4.8.2. Access Network

The access network is the connection between a field device and the fiber optic backbone. The access network may consist of a combination of fiber optic cables, copper cables, wireless connections, or leased communications.

When proposing a fiber optic connection, Developer shall utilize twelve (12) strand single mode fiber optic cable drops to facilitate connectivity between backbone fiber optic and proposed ITS devices along the facility.

When proposing a copper connection, Developer shall utilize Category 5e/6 unshielded twisted pair (UTP) cable.

When proposing a wireless connection, Developer may use microwave, optical laser, or WiFi methods. Developer is responsible for any licensing required for a wireless solution and shall, through the Department, obtain agreement with the Presidio Trust for any mast placement in accordance with Volume II, Division I, Article 5.

Developer may propose a wired or wireless leased connection. Developer shall be responsible for any costs associated with installation and recurring charges until the end of the Term.

14.4.9. Centralized Hub Operations and Maintenance Center (OMC)

A) Developer shall be the responsible entity for all tunnel safety and control, and traffic management aspects, including communications with the emergency services.

B) Developer shall establish a new Operations and Maintenance Center (OMC) from which it will operate monitoring and control of the tunnels' and associated highways' systems. Developer should note that no provision has been agreed with

the Trust for the location of any such facility within the Presidio in accordance with Volume II, Division I, Article 5.

C) Developer shall provide in the OMC necessary hardware and software to integrate with existing Southbound Battery Tunnel SCADA system located in existing Temporary Operations and Maintenance Center (TOMC). All the data and software at TOMC SCADA system are to be completely duplicated in the OMC.

D) Developer shall provide high security fiber-optic communications' links from its OMC to both the Department's Tunnel Operations and Maintenance Center at Caldecott Tunnel and Traffic Monitoring Center at District 4 Headquarters and equip both centers with a workstation and appropriate software (tunnel or traffic-related) to duplicate that provided in the OMC. The workstations will be manned by the Department's staff at the Department's discretion.

E) Developer's OMC shall be regarded as the Primary Control Center for the Presidio Parkway; however, a facility shall be provided such that, when deemed necessary by the Department, the Department shall have the ability to override the decisions/actions of Developer's Operations' staff.

14.4.10. Changeable message sign (CMS) system

Developer shall provide CMS at the following approximate locations:
Northbound 101 mainline STA 101 36+70.

14.4.11. Variable message sign (VMS) system

The design of the VMS shall be in accordance with the Department's Standards and Standard Special Provisions.

A) Developer shall provide VMS at the tunnel portals and approximately five hundred (500) feet in advance of the tunnel portals at the following approximate locations:

1) Southbound 101 mainline and on-ramp STA 101 92+00 (2 VMSs);
2) Southbound 101 mainline STA 101 85+20;
3) Northbound 101 mainline STA 101 76+50;
4) Northbound 101 mainline STA 101 71+50;
5) Southbound 101 mainline STA 101 69+60;
6) Southbound 101 mainline STA 101 64+60;
7) Northbound 101 mainline STA 101 54+30; and
8) Northbound 101 mainline and on-ramp STA 101 48+30 (2 VMSs).

B) The VMS shall provide two lines of eighteen (18) inch text at least ten characters across. All VMS displays shall use light emitting diode (LED) technology. The VMS shall be compliant with NTCIP 1203 Object Definitions for Changeable Message Signs:

C) The VMS master control software shall provide the following functions:

1) Ability to control the display of any character present on a sixty four (64) character keyboard, both upper and lower case, and the display of chevron and arrow symbols;

2) Ability to maintain and display a master message library;

3) Ability to pre-program the display message by time of day, day of week, day of year, or control strategy;

4) Ability to program display of messages with static text, messages with alternating text, messages with moving chevron displays, and blinking messages;

5) Ability to monitor the sign system, including providing for communications to check conflict alarms;

6) Ability to monitor sign message at all times;

7) Ability to accommodate the designed signs plus adequate reserve for additional signs; and

8) Ability to provide for status reports and message logging in the TOC and to send status reports, message logging, historical database, and menu screens as well as to provide for parameter storage and downloading/uploading to controllers.

D) The VMS shall be capable of interfacing with the local control software and implementing the functions described in the software. The VMS local control software shall provide the following functions:

1) Ability to allow for the sign face to display any number of alphanumeric messages individually, sequentially, and in a blinking mode and for the sign to be capable of displaying any character present on a sixty four (64) character keyboard, both upper and lower case;

2) Ability to perform sign diagnostics, including monitoring LED outages and software conflicts, performing communication checks, displaying current control strategy, and running test pattern displays on the sign face and sending the information to the TOC. Diagnostics shall be accessible from the local controller via a keyboard interface or handheld or laptop diagnostic computer;

3) Ability to preprogram messages that reside at the local controller;

4) Ability to receive control commands and the current traffic control strategy in effect from the central computer; and

5) Ability to monitor software conflicts and to detect and prohibit the display of incorrect messages.

14.4.12. Extinguishable message sign (EMS) system

LED EMS shall be provided at the following approximate locations:

A) HAR EMS NB Route 1 STA 107+30.

B) HAR EMS NB Route 101 STA 36+75.

C) HAR EMS SB Route 101 STA 114+00.

D) RM EMS NB Route 1 STA 97+30.

E) RM EMS NB Route 1 STA 104+00 (2 ramps). and

F) RM EMS NB Route 1 STA 106+50.

14.4.13. Highway Advisory Radio (HAR) system

The design of the HAR system shall be in accordance with the Department's Signal, Lighting and Electrical Systems Design Guide.

14.4.14. Tunnel portal traffic signals

Portal Traffic Signals shall be furnished and installed at the tunnel entrance portals to control traffic entering each tunnel. The portal traffic signals shall be used in conjunction with other ITS component systems to indicate closure of the tunnel in the event of an emergency or tunnel closure, in order to prevent additional traffic from entering in accordance with NFPA 502.

The traffic signals shall be designed in accordance with the California MUTCD and the Department's Signal, Lighting and Electrical Systems Design Guide.

Portal traffic signal heads shall be twelve (12) inch diameter, light emitting diode (LED) signal modules over the center line of each lane in accordance with the MUTCD.

The signal indications shall be red ball, yellow ball, and green through-arrow.

Design and operation of the portal traffic signals shall be in conformance with the Department's Signal, Lighting and Electrical Systems Design Guide and the MUTCD, latest edition.

Design of the portal traffic signals shall be coordinated with the VMS system to ensure coordinated and uniform control of traffic.

Design of portal traffic signal system shall include static signs and pavement markings to indicate stopping location outside of portal entrance.

Portal closure traffic signals shall be monitored and controlled from Developer's operations control room. Manual control of the system shall also be provided at the controller cabinet location in the field.

14.4.15. Public Address System (PAS)

A PAS shall be provided within the tunnels for the purpose of providing information and instructions to motorists. The information and instructions to people shall be intelligible voice communications.

The PAS will be operated by the responding agencies during a tunnel emergency to instruct motorists once they have exited their vehicles.

Tunnel operators and emergency personnel shall be able to send voice messages (live and pre-recorded) to these areas from the tunnel operations center.

The PAS shall be integrated with the tunnel fire alarm and detection network. Proprietary PAS that cannot integrate with the tunnel fire alarm and detection systems shall not be accepted. The system shall include all required control panels, speakers, amplifiers and wiring. The PAS shall utilize fiber optic cable to interconnect the various control panels.

The PAS performance, selection, installation, and operation shall be in accordance with the requirements of NFPA 70 National Electrical Code, NFPA National Fire Alarm and Signaling Code 72 and the requirements of these design criteria.

The PAS provider shall be a nationally recognized company specializing in PAS for a minimum duration of ten (10) years and shall maintain a service organization within fifty (50) miles of the Project location.

Developer shall employ the services of an acoustical specialist for the design of the PAS. Developer shall provide a system that employs a larger quantity of low powered speakers in order to provide intelligibility within the tunnel environment.

The PAS shall allow the voice communications to be initiated manually by an operator or automatically be sensors or other systems. The voice messages shall be live voice or pre-recorded.

The PAS shall offer a library of scripted responses to various emergency events. Developer shall work with the Department and the responding agencies to develop the responses to the various emergency events.

Developer shall work with the Department and the responding agencies to develop the zoning of the PAS. The zoning shall be based on a detail risk assessment. At a minimum, each roadway shall be divided into two zones and the egress corridor shall also be a minimum of two zones.

PAS field equipment including speakers shall be rated for wet corrosive environments. Speakers at the tunnel roadways shall be recessed and shall not project beyond the face of the wall into the tunnel clear zone.

PAS wiring shall be supervised for integrity.

14.4.16. Security System

Additional maintenance/security cameras are required within the tunnels for the Bay Area Security Enhancement (BASE) program and shall be designed and installed pursuant to the BASE requirements.

14.5. Construction Requirements

Developer shall design the ITS system as a whole before installation of any individual field component, including temporary and permanent ITS systems. Developer shall notify the

Department a minimum of five (5) days in advance of staking locations for ITS devices. Developer shall not make final connections of the newly-installed or temporary ITS components to the existing system until after review and comment by the Department.

14.6. ITS Deliverables

In addition to those defined in Volume II, Division I, Article 2 Developer shall specifically provide the following:

A) Developer shall provide the following submittals as part of the system design process;

B) manufacturer's data, including catalogued product literature, technical data sheets, catalog cuts, and supporting calculations for all system equipment;

C) design plans, typical details, shop drawings for equipment, including wiring diagrams, photo sensor wiring and mounting details, and sign case ventilation and mounting details;

D) stand-alone test plan for each subsystem. These tests shall include but not be limited to test results from executed test procedure plan including reviewer and time and date plan was executed;

E) System Engineering Management Plan detailing the overall plan for the software and hardware configuration, integration and coordination of the subsystems into the TOS;

F) equipment operating and maintenance manuals; and

G) warranties and guarantees for system equipment components and spare field replacement units protecting against defects and/or failure in design, materials, and workmanship.

14.6.1. Testing

A) All equipment, material, communications and software furnished by Developer shall be tested to determine conformance with the Contract Documents and delivery of a fully operational system at Substantial Completion. At a minimum, the tests shall include:

1) Stand-alone test;

2) Subsystems test;

3) System operational test;

4) Developer shall submit test procedure plans for the stand-alone, subsystems, and system operational tests to the Department for review and comment; and

5) Developer shall perform the tests, document the results, and supply all necessary test equipment.

B) At a minimum, the test procedures shall include:

1) A step-by-step outline of the test sequence to be followed, showing a test of every function of the equipment or system to be tested;

2) A description of the expected operation outputs and test results;

3) An estimate of the test duration and a proposed test schedule;

4) A data form to be used to record all data and quantitative results obtained during the test;

5) A description of any special equipment, setup, manpower, or conditions required for the test;

6) Details of test setup/takedown; and

7) Details of all simulated data inputs, if required.

The tests shall be conducted in the presence of a Department representative, Monday through Friday between 8:00 a.m. and 5:00 p.m., unless otherwise permitted by the Department. If the equipment or systems fail any part of the test, the entire test shall be repeated.

Developer shall furnish and maintain all test equipment and services and shall notify the Department of the time, date and place of each test at least fourteen (14) days prior to the date the test is planned.

Systems shall be fully constructed prior to the commencement of any testing.

14.6.2. Stand-Alone Test

Developer shall prepare stand-alone test procedure plans for each subsystem components and submit for the Department's review and comment. The test plan shall incorporate all tests required by Department Standard Specifications and Standard Special Provisions.

Following the field installation, but prior to connection with the rest of the TSCS system, Developer shall conduct the stand-alone test plan for each subsystem.

The test shall exercise all stand-alone (non-network) functional operations of the equipment installed and demonstrate compliance with the Project requirements, all applicable standards, manufacturer specifications, and design plans.

The stand-alone test shall be conducted for each subsystem component in the field at the local field controller/cabinet for that subsystem component.

If a unit fails to pass its stand-alone test, it shall be corrected or replaced, and the test repeated until proven successful.

14.6.3. Subsystem Test

Developer shall prepare subsystem test procedure plans for each subsystem components and submit for the Department's review and comment. The test plan shall incorporate all tests required by Department standards and specifications.

Each subsystem shall be tested from the operations control room.

In the event of a failure of a subsystem test, the problem shall be corrected and the test shall then be restarted.

14.6.4. System Operational Test

Developer shall prepare system operational test procedure plans and submit for the Department's review and comment.

After all of the equipment has been installed in accordance with the applicable requirements, specifications, and plans, and each subsystem has been tested and acknowledged by the Department to be operating properly, a system operational test shall be conducted by Developer to validate the operational characteristics of the entire TSCS system when integrated.

15. UTILITIES

15.1. General

Developer shall verify the location of all existing utilities. All design and construction by the Developer shall adhere to the Contract Documents.

Developer shall ensure that the applicable Department and Presidio Trust standards, policies, procedures and design criteria are followed for utility coordination and design.

Developer shall be responsible for redesign, permitting and relocation of utilities that are in conflict with the proposed construction. Developer shall be responsible for all utility coordination efforts. These coordination efforts shall include, but are not limited to; permitting, review, construction oversight, initiating, drafting, negotiating; and executing all necessary legal agreements; administering utility coordination meetings and ensuring that all necessary permits are acquired.

15.2. Design Requirements

15.2.1. Public Utility Conditions

For Utilities owned by a local agency, Developer shall be responsible for the following: all Utility Work; Incidental Utility Work required for the Project; all Utility Work assigned to Developer; and all other requirements of this Section.

15.2.2. Private Utility Conditions

For Utilities owned by the Presidio Trust, Developer's Work shall include all Incidental Utility Work required for the Project and all other requirements of this Section and shall be in accordance with the Doyle Drive Replacement Project License to Enter and Conduct Utility Relocations.

15.2.3. Utility Adjustment Work

A) All Utility Adjustment Work shall require cooperation between Developer and the Utility Agencies/Owner (UAO). Developer shall be responsible for all coordination with the affected UAOs in order to accomplish the Utility Adjustment Work. In the discharge of its coordination responsibilities, Developer shall:

1) Provide to the UAO's, as soon as practical an estimated schedule for their respective utility work and notify the UAO's of any significant changes to the schedule as soon as practical;

2) Keep UAO's fully informed of Project Schedule and changes that affect or may affect their facilities;

3) Consider UAO's needs for the allocation of resources for design, materials procurement, and outage requirements needed to perform their Utility Adjustment Work;

4) Keep uninterrupted service to UAO's customers or coordinate unavoidable interruptions with the UAO; and

5) Avoid multiple utility relocations of the same utility.

B) All Utility Adjustment Work shall be done in accordance with approved Utility Work Permits. For the utility design, relocation, or construction, a legal agreement and/or a Utility Work Schedule between Developer and UAO shall be drafted detailing responsibility and pertinent areas such as construction specifics, cost, schedules, etc. In addition, all utility services shall be maintained unless alternate service or temporary interruptions are coordinated in such a manner that is acceptable to the UAO.

C) Preparation and submission of the following documents are the sole responsibility of Developer:

1) Meeting Agendas and Minutes;

2) Utility Work Plan;

3) Utility Tracking Report;

4) Conflict Matrix;

5) Coordination of Permit Applications;

6) Coordination of Utility Work Schedules;

7) Master Utility Relocation Plan; and

8) Utility Certification.

D) Developer shall submit a Utility Work Plan as part of the response that sets forth Developer's plan to coordinate all utilities for the Project. Developer's Utility Work Plan shall include the following requirements at a minimum:

1) A detailed description of Developer's plan to identify and locate utilities during the Project;

2) A detailed description of Developer's plan to coordinate activities with each UAO during the Project;

3) A detailed description of Developer's plan to coordinate activities with the UAO's on unknown or newly discovered utilities during the Project; and

4) A description of Developer's plan to meet with the UAOs and keep them informed of Developer's schedule related to Utility Adjustment Work.

E) Developer shall maintain a Utility Tracking Report to track coordination and the disposition of impacted utilities. The Utility Tracking Report shall contain the following information for each UAO at a minimum:

1) The name of the UAO with contact information;

2) A brief description of the impacted utility by size and type;

3) The location/limits of the utility, by station and offset based upon the Project;

4) The proposed disposition of the utility and the date such disposition was approved by the UAO;

5) The party responsible for performance of such Utility Adjustment Work;

6) The nature of the Utility Owner's existing right of occupancy of the right of way for such Utility;

7) The scheduled start and completion dates for construction of the Utility Adjustment Work;

8) The actual start and completion dates for construction of the Utility Adjustment Work;

9) The status of construction for the Utility Adjustment Work, including percentage complete; and

10) Such other information as the Department and the Presidio Trust may request.

Developer shall submit the Utility Tracking Report and updates on a monthly basis to the Department and the Presidio Trust and affected UAO's.

15.2.4. Betterments

Replacements for any impacted utilities shall be designed and constructed to provide service at least equal to that offered by the existing facilities (unless the UAO specifies a lesser replacement), but shall not include any betterments, unless added to the Utility Adjustment Work through a Utility Agreement between the UAO and Developer. Utility Agency/Owners may request the Department to permit Developer to perform additional Utility Adjustment Work relating to Betterments at the UAO's expense. Developer shall provide all coordination, including all definitive cost estimates and billing information necessary to address requested Betterments.

15.2.5. Utility Agency / Owner Contacts

Listed below, but not limited to, are UAO's that are known to own facilities within the area of the Project

. Utility Type / Facility Type	OWNER
Sanitary Sewer	Presidio Trust
Water	Presidio Trust
Storm Drain	Presidio Trust
Communication Lines	Presidio Trust, AT&T
Gas	PG&E, Presidio Trust
Electrical	PG&E, Presidio Trust

15.2.6. Utility Coordination Personnel

Developer may employ more than one individual or utility engineer to provide utility coordination and engineering design expertise. Developer shall employ and identify a Utility

Coordination Manager responsible for managing all utility coordination and utility design activities.

Developer's Utility Coordination Manager shall be responsible for, but not limited to, the following:
.

A) Ensuring utility coordination and design is conducted in accordance with the Department's standards, policies, procedures and design criteria;

B) Assisting the Engineer of Record in identifying/coordinating all existing utilities;

C) Anticipated relocations, and new installations;

D) Scheduling utility meetings, keeping and distributing minutes of all utility meetings, and ensuring expedient follow-up on all unresolved issues;

E) Distributing all plans, conflict matrices and changes to affected utility owners and ensuring this information is properly coordinated;

F) Identifying and coordinating the completion of any utility owner agreement that is required for reimbursement, or accommodation of the utility facilities associated with Project;

G) Review of all Utility Work Schedules for accuracy and resolution of the utility conflicts;

H) Obtaining and maintaining USA North of Central/Northern California and Nevada dig clearance;

I) QA Review of construction plans prior to construction activities for completeness;

J) Acquisition/procurement of any required easements as required by the Utility Adjustment Work; and

K) Provide monthly updates to the Department.

15.2.7. Location of Existing Utilities

Locations of such utilities, along with other utilities that may exist but whose locations are not clear, shall be verified by Developer with the utility companies or agencies prior to the start of construction.

Although the Indicative Preliminary Design depicts utility locations, actual locations are to be confirmed by Developer. Developer is required to verify all locations, in accordance with California Statute. Developer shall contact USA North of Central/Northern California and Nevada at 811/1-800-227-2600 and coordinate with each UAO prior to any and all Work impacting utilities.

16. TUNNEL SYSTEMS

16.1. General

Developer shall design, procure, install, construct, test and commission Mechanical, Electrical and Plumbing Systems (MEP) for tunnels, roadways and the tunnel ancillary facilities required to complete the Project.

This Section describes minimum design criteria for MEP elements of work on the Project and submission requirements.

The MEP systems to be installed in the Project tunnels include but are not limited to, the following:

A) Fire Life Safety System (FLS);

B) Tunnel Ventilation System (TVS);

C) Fire Suppression System (FSS);

D) Fire Detection and Alarm;

E) Supervisory Control and Data Acquisition (SCADA);

F) Electrical;

G) Lighting; and

H) Tunnel Drainage.

Several of the individual MEP systems function together to form the FLS System. The FLS is to be provided to protect the tunnel users in the event of an emergency in the tunnel.

16.2. Administrative Requirements

16.2.1. Laws, Standards and Specifications

16.2.1.1. Standards

The MEP systems shall be designed in accordance with the standards listed below.

If there is any conflict in standards, the order of precedence shall be as set forth below, unless otherwise specified. However, if the Developer's Proposal has a higher standard, then Developer shall adhere to the Proposal standard.

If there is any unresolved ambiguity in standards, it is Developer's responsibility to obtain clarification from the Department before proceeding with design and/or construction.

Developer shall use the current version of each listed standard as of the initial publication date of this RFP unless modified by a Department Change.

PRIORITY	ENTITY	TITLE
1	NFPA	502 Standard for Road Tunnels, Bridges and Other Limited Access Highway
2	AASHTO	Roadway Lighting Design Guide
3	AASHTO	Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals
4	AASHTO	Roadside Design Guide
5	ANSI/IEEE	80 Guide for Safety in AC Substation Grounding
6	ANSI/IEEE	81 Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System
7	Department	Highway Design Manual
8	Department	Signal, Lighting and Electrical Systems Design Guide

16.2.1.2. References

ENTITY	TITLE
International Commission on Illumination (CIE)	88 Guide for the Lighting of Road Tunnels and Underpasses
EIA	Electronic Industries Alliance Standards and Technical Problems
FHWA	Traffic Control Systems Handbook
IEEE	Standard 730 Software Quality Assurance Plan
IEEE	Standard 830 Recommended Practice for Software Requirements
IEEE	Standard 1012 Software Verification and Validation
IEEE	Standard 1016 Recommended Practice for Software Design Descriptions
IESNA	RP-8 Roadway Lighting
IESNA	RP-22 Tunnel Lighting
IESNA	LM-50-99 Photometric Measurement of Roadway Lighting Installations
IESNA	LM-71-96 Photometric Measurement of Tunnel Lighting Installation
IESNA	Lighting Handbook
IESNA	RP-19 Roadway Sign Lighting
ITE	Traffic Engineering Handbook
NFPA	502: Standard Road Tunnels, Bridges and Other Limited Access Highways and its Referenced Standards and Codes
ANSI	C2-81 National Electrical Safety Code
NFPA	10 Standard for Portable Fire Extinguishers
NFPA	13 Installation of Sprinkler Systems
NFPA	14 Installation of Standpipe and Hose Systems
NFPA	20 Installation of Stationary Pumps for Fire Protection
NFPA	24 Installation of Private Fire Service Mains and Their Appurtenances
NFPA	25 Inspection, Testing and Maintenance of Water-Based Fire Protection System

ENTITY	TITLE
NFPA	30 Flammable and Combustible Liquid Code
NFPA	70 National Electric Code
NFPA	72 National Fire Alarm and Signaling Code
NFPA	90A Installation of Air Conditioning and Ventilating Systems
NFPA	101 Life Safety Code
NFPA	110 Emergency and Standby Power Systems
NFPA	220 Types of Building Construction
NFPA	241 Safeguarding Construction, Alteration and Demolition Operations
NFPA	251 Standard Methods of Tests of Fire Resistance of Building Construction and Materials
NFPA	1600 Disaster/Emergency Management and business Continuity Programs
NFPA	1963 Fire Hose Connections
NFPA	2001 Clean Agent Fire Extinguishing Systems
NIST	SP 800-82 Guide to Industrial Control Systems (ICS) Security
TIA/EIA	FOTP 455-171A Attenuation by Substitution Measurements for Short-Length Multimode Graded-Index and Single Mode Optical Fiber Cable Assemblies
TIA/EIA	FOTP 455-61A Measurement of Fiber or Cable Attenuation Using an Optical Time-domain Reflectometer (OTDR)
UL	1971 Signaling Devices for the Hearing Impaired.

16.3. Fire and Life Safety Systems

The California Department of Forestry and Fire Protection Office of the State Fire Marshal (SFM) assisted in developing design standards for the Southbound Battery Tunnel such that it will meet or exceed the requirements of NFPA Standard 502. Developer shall design the Main Post Tunnels, the Northbound Battery Tunnel, and any remaining components of the Southbound Battery Tunnel required as part of the Project so that they all meet or exceed the requirements of NFPA and the Contract Documents, including but not limited to the following fire and life safety criteria.

A) Minimum Design Fire Heat Release Rate of one hundred (100) MW, as defined in NFPA 502;

B) Design Fire Growth Rate is “ultra-Fast” as defined by NFPA 92B.

C) Installation of a Fixed Fire Fighting System; and

D) Automatic Fire Detection system is required for the tunnels and substations.

16.3.1. Tunnel Fire and Life Safety Systems Requirements

Developer shall prepare a FLS Strategy Report that shall be submitted for approval by the Authority Having Jurisdiction (AHJ) before the completion of the Intermediate Design Submittal. The FLS Strategy Report shall describe how Developer’s design complies with:

A) FLS Design Criteria;

B) Applicable NFPA standards; and

C) Local fire safety codes and ordinances;

The SFM is the AHJ as defined by NFPA 502, for the Project in matters related to FLS. Developer shall also coordinate design and construction activities with the Presidio Fire Department and the City of San Francisco Fire Department.

The minimum Tunnel Fire and Life Safety System requirements are set out in the table below. Developer shall note that the design requirements for the Project may differ from those established for the Phase I Construction, Southbound Battery Tunnel (SBBT). Agreements on SBBT design requirements and criteria were reached with AHJs on the basis of providing combinations of specific life safety systems, full time tunnel monitoring, and/or emergency response capabilities.

Table Definitions:

1) TBDD – Shall be determined by Developer means the design criteria and requirements for the system is to be determined by Developer and Developer is responsible for obtaining all required approvals by the AHJ.
2) Provided – means the system is provided for SBBT;
3) Required – means Developer shall provide this system.
4) TOS – Traffic Operating System.

*-Refer to Intelligent Traffic System Section for this system's requirements.

TABLE 16.1 OF TUNNEL FIRE AND LIFE SAFETY SYSTEMS REQUIREMENTS

TUNNEL SYSTEM	SUB SYSTEM	TUNNEL			
		SOUTHBOUND BATTERY	NORTHBOUND BATTERY	SOUTHBOUND MAIN POST	NORTHBOUND MAIN POST
TUNNEL LENGTH ASSUMPTIONS		**960'**	**LESS THAN 1000', TBDD**	**MORE THAN 1000', TBDD**	**MORE THAN 1000', TBDD**
Fire Detection	Manual Fire Alarm Box	Provided	Required	Required	Required
	Automatic Fire Detectors	Provided, Linear Heat Detector	Required	Required	Required
	Remote Fire Control Panel at Portals	Provided	Required	Required	Required
	Tunnel Fire Control Panel in Substation	Provided	Provided	Required	Required
	Substation Fire Control Panel	Provided	Provided	Required	Required
Communications	Call Box *	Provided	Required	Required	Required
	2-Way Radio*	Provided	Required	Required	Required
	AM/FM Override – HAR*	Provided	Required	Required	Required
CCTV	Maintenance	Not Required	Required	Required	Required
	TOS*	Provided	Required	Required	Required
	BASE*	Provided	Required	Required	Required
Traffic Control	Traffic Signal over each lane at entry portals	Provided	Required	Required	Required

TABLE 16.1 OF TUNNEL FIRE AND LIFE SAFETY SYSTEMS REQUIREMENTS

TUNNEL SYSTEM	SUB SYSTEM	TUNNEL			
		SOUTHBOUND BATTERY	NORTHBOUND BATTERY	SOUTHBOUND MAIN POST	NORTHBOUND MAIN POST
TUNNEL LENGTH ASSUMPTIONS		**960'**	**LESS THAN 1000', TBDD**	**MORE THAN 1000', TBDD**	**MORE THAN 1000', TBDD**
	Lane Use Signal*	Not Required	TBDD	TBDD	TBDD
	Reversible Traffic Flow	TBDD	TBDD	TBDD	TBDD
	VMS - at Entrance Portal*	Provided	Required	Required	Required
	VMS – 500' Upstream from traffic signal	Provided	Required	Required	Required
	Portal Gates	Not Required	Not Required	Not Required	Not Required
	TOS SCADA*	Provided	Required	Required	Required
Fire Protection	Fire Standpipe	Provided	Required	Required	Required

TABLE 16.1 OF TUNNEL FIRE AND LIFE SAFETY SYSTEMS REQUIREMENTS

TUNNEL SYSTEM	SUB SYSTEM	TUNNEL			
		SOUTHBOUND BATTERY	NORTHBOUND BATTERY	SOUTHBOUND MAIN POST	NORTHBOUND MAIN POST
TUNNEL LENGTH ASSUMPTIONS		**960'**	**LESS THAN 1000', TBDD**	**MORE THAN 1000', TBDD**	**MORE THAN 1000', TBDD**
	Utility Water Supply Source	Presidio Trust	Presidio Trust	Presidio Trust and/or SFPUC	Presidio Trust and/or SFPUC
	Fire Hydrants	Provided at both portals	Required	Required	Required
	Fire Department Connections	Provided at both portals	Required	Required	Required
	Fire Hose Valve Connections	Provided	Required	Required	Required
	Fire Pump	Not Required	Not Required	TBDD	TBDD
	Portable Fire Extinguishers	Provided	Required	Required	Required
	Fixed Fire Suppression System	Deluge Sprinkler, at 0.20 gal/min/ft2, minimum	Required	Required	Required
	Fixed Fire Suppression System	Manual and automatic, local and remote on and off control	Required	Required	Required
	Fixed Fire Suppression System	Sized for two zone operation	Required	Required	Required
Emergency Ventilation	Mechanical Ventilation system	Required, Developer to Provide	Required	Required	Required

TABLE 16.1 OF TUNNEL FIRE AND LIFE SAFETY SYSTEMS REQUIREMENTS

TUNNEL SYSTEM	SUB SYSTEM	TUNNEL			
		SOUTHBOUND BATTERY	NORTHBOUND BATTERY	SOUTHBOUND MAIN POST	NORTHBOUND MAIN POST
TUNNEL LENGTH ASSUMPTIONS		**960'**	**LESS THAN 1000', TBDD**	**MORE THAN 1000', TBDD**	**MORE THAN 1000', TBDD**
	Type	4 Jet Fans @ 506 LBF Thrust, each. Developer to provide	TBDD	TBDD	TBDD
	Fan Reversibility	Not Required	TBDD	TBDD	TBDD
	Fan Redundancy	Not Required	TBDD	TBDD	TBDD
Design Fire	Fire Heat Release Rate	100 MW**	TBDD	TBDD	TBDD
	Fire Growth Rate	Ultra Fast, per NFPA 92B	TBDD	TBDD	TBDD
	Structural Analysis	Non-RWS Curve**	TBDD	TBDD	TBDD
	Structural Analysis	Air Temperature of 860oF at concrete surface**	TBDD	TBDD	TBDD
	Adverse Wind at Portal	12 mph	12 mph	12 mph	12 mph
Drainage System		Slot Drain	TBDD	TBDD	TBDD
Hydrocarbon Detection		Not Required	Not Required	TBDD	TBDD
Tunnel Atmosphere Monitoring	Carbon Monoxide	Provided	Required	Required	Required
	Oxides of Nitrogen	Not Required	Not Required	Not Required	Not Required
	Visibility/Haze	Not Required	Not Required	Not Required	Not Required
Replacement Air System		Not Required	TBDD	TBDD	TBDD
Tunnel Egress	Emergency Exits	Not Required	TBDD	TBDD	TBDD

TABLE 16.1 OF TUNNEL FIRE AND LIFE SAFETY SYSTEMS REQUIREMENTS

TUNNEL SYSTEM	SUB SYSTEM	TUNNEL			
		SOUTHBOUND BATTERY	NORTHBOUND BATTERY	SOUTHBOUND MAIN POST	NORTHBOUND MAIN POST
TUNNEL LENGTH ASSUMPTIONS		**960'**	**LESS THAN 1000', TBDD**	**MORE THAN 1000', TBDD**	**MORE THAN 1000', TBDD**
	Exit Identification	Provided	Required	Required	Required
	Cross Passageway	Not Required	Not Required	TBDD	TBDD
Electrical	Emergency Lighting, with UPS	Provided	Required	Required	Required
	Tunnel Systems SCADA	Provided	Required	Required	Required
	Dual Source	Provided	Provided	Required	Required
	Back-up Generators	TBDD	TBDD	TBDD	TBDD
Emergency Response Plan	Plan Submittal	Required	Required	Required	Required
** Based on installing a water-based fixed FSS.					

16.3.2. Emergency Egress - General

Developer shall provide sufficient exiting capacity from all areas of the Tunnel Systems for occupants to evacuate to a point of safety in a tenable environment, in accordance with relevant codes and the requirements of NFPA 502 and NFPA 101.

16.3.3. Fire Safety - General

Developer shall specify a design fire size and fire growth rate for incidents in the tunnels as this forms the basis of the risk assessment and the provision of protective measures. Developers design fire criteria are subject to approval by the AHJ.

All aspects of the proposed fire prevention and control measures for the Tunnel Systems shall be submitted by Developer to the AHJ for approval. Final design proposals shall be subject to the approval of the relevant AHJ.

A) The following equipment shall be provided by Developer in the vicinity of the principal Fire Department response point for each tunnel portal and substation:

   1) A local fire alarm system annunciator panel to control tunnel ventilation fans and deluge sprinklers;

2) A lock box containing keys necessary for access to all ancillary buildings and remote annunciator panel boxes; and

3) Presidio Fire Department connections for the sprinkler and standpipe.

B) Developer shall design and provide smoke detectors throughout all equipment rooms, offices and Ancillary Building areas.

C) Developer shall design the computerized emergency response system such that the tunnel operator will be assisted by a menu of predefined emergency operation procedures. These procedures are required to avoid unnecessary evacuation and tunnel closure in the event of false alarms. Where the operator does not acknowledge the fire alarm signal within the time delay period, initiation of a tunnel closure shall be automatic by means of traffic signals and VMS at the entrance portal and a tunnel closure message on the HAR.

D) Developer shall provide a fire alarm system that shall be a fully addressable system with automatic transmission of alarm events to Developer's Tunnel Control Room, OMC and the TOMC.

E) Developer shall provide smoke control systems using the following design criteria:

1) The design of smoke control systems shall allow a tenable environment within the evacuation path for occupants;

2) The design fire scenario shall be considered a single fire scenario;

3) Minimum smoke clear height of 2.5 m; and

4) System control shall be both automatic and manual.

F) PVC pipes are prohibited in tunnels, with the following exception:

1) PVC pipes used as ground water drains that do not have a connection to the tunnel interior.

16.4. Tunnel Ventilation Systems (TVS)

16.4.1. General

Developer shall be responsible for detailed design, procurement, supply, installation, painting, labeling, adjusting, testing, balancing and commissioning of all TVS.

16.4.1.1. Design Requirements

The TVS shall be designed by Developer to meet the following criteria:

A) System's ability to manage in-tunnel air quality during normal and congested five (5) mph traffic conditions;

B) System's ability to control the flow of heat and smoke from Developer's design fire in accordance with NFPA 502;

C) System's ability to operate without violation of governing ambient air quality regulation; and

D) So that the pollution concentrates do not exceed the criteria set out below.

Developer shall provide fans that comply with the Department's Standards and Standard Special Provisions for Tunnel Jet Fans.

16.4.1.2. Pollutant Concentrations

Developer shall design the TVS such that the pollutant levels in the tunnel do not exceed the following criteria:

TABLE 16.2 POLLUTANT LEVELS

POLLUTANT	LIMITING VALUE
Carbon Monoxide (CO)	120 ppm for up to 15 minutes 65 ppm for up to 30 minutes 45 ppm for up to 45 minutes 35 ppm for up to 60 minutes

Developer shall furnish and install tunnel environmental monitoring equipment/sensors at a minimum of three suitable locations throughout each tunnel, to monitor and record the tunnel atmosphere/environment for Carbon Monoxide.

16.4.1.3. Southbound Battery Tunnel Jet Fan Requirements

Developer shall provide, install, test and commission four tunnel jet fans and shall provide spares, monitoring equipment, motor control centers, fan mounting brackets, motor starters, SCADA integration and wiring that meet or exceed the following performance requirements and comply with the requirements of the Standard Special Provisions for Tunnel Ventilation Fans located within these Contract Documents.

TABLE 16.3 OF SOUTHBOUND BATTERY TUNNEL JET FAN PERFORMANCE REQUIREMENTS

MINIMUM THRUST IN FORWARD DIRECTION, LBF	MINIMUM OUTLET VELOCITY, FPM	NOMINAL FAN DIAMETER, INCH	MAXIMUM NAMEPLATE HP	MAXIMUM RPM	VOLTS	PHASE	HERTZ
506	8125	55	150	1780	480	3	60

16.4.1.4. Developers acceptance of Contract No. 4 Tunnel Systems Work

Developer shall attend Phase I Construction Commissioning Meetings. Developer shall review the Phase I Construction, Commissioning Report and inspect the relevant equipment installation.

Developer shall verify/validate the existing designs, design calculations, code compliance, and NFPA compliance of the installation.

16.4.1.5. Tunnel Ventilation Control System

Developer shall design and construct the tunnel ventilation control system such that the fans can be operated and monitored at Developer's Tunnel Control Center, at both the Substations, and from any remote operations control location, via the tunnel SCADA System.

16.5. Tunnel Fire Suppression Systems

16.5.1. General

Developer shall develop and construct a Fire Suppression System (FSS) for the Project. Elements of work shall include, but are not limited to, the following:

A) Fixed Water-Based Fire-Fighting Systems;

B) Manual Fire-Fighting Systems; and

C) Fire Extinguishers.

Tunnel FSS shall be designed, constructed, and integrated with other FLS systems to produce systems that provide functionality, durability, ease of maintenance, and safety. Tunnel FSS shall conform to the requirements of NFPA 502 as the primary standard for design. Local building and fire codes shall be adhered to during design to ensure full compliance of tunnel FSS.

16.5.1.1. System Configuration

Developer shall design, furnish, test and commission the tunnel FSS. General design assumptions and system requirements at a minimum shall include:

A) Available water service pressure from local utility for fixed water-based fire-fighting systems' hydraulic calculations shall be reduced 10 psi across the water supply curve as determined from required hydrant flow tests to account for fluctuation in domestic demands;

B) Available water service pressure from local utility for manual fire-fighting systems' hydraulic calculations may be taken as full system pressure available from local utility determined from required hydrant flow tests;

C) A permanent water service supply connection from the local water utility shall be provided at both portals of all tunnels;

D) Main piping for the tunnel FSS shall be located in a utility duct bank, separate from electrical ductbanks;

E) A separate main piping for tunnel fixed water-based fire fighting systems and manual fire-fighting systems;

F) Obtain approval of tunnel FSS design from the AHJ; and

G) Roadway vehicle clearance envelope shall be maintained free of piping and appurtenances.

In general, piping shall slope to natural drain points, for example, deluge valves, spray nozzles, hose valves etc. The need for secondary drain devices (manual or automatic) is to be avoided where feasible.

16.5.1.2. Fixed Water-Based Fire-Fighting Systems

Design requirements for the roadway fixed water-based fire-fighting systems include:

A) Deluge sprinkler system extending from portal to portal for the tunnels;

B) Deluge valves capable of remote activation and shutoff and reset;

C) Deluge sprinkler system arranged in zones comprising the full tunnel width;

D) Systems sized to allow simultaneous discharge of any two adjacent deluge zones;

E) Systems designed to deliver a minimum water application design density of 0.20 gpm/ft^2;

F) Feature automatic deluge zone discharge in response to signals received from the automatic fire detection system in the tunnel;

G) Be capable of being manually operated from multiple remote locations including the Tunnel Control Center, Substations from the local Fire Alarm Control Panel (FACP) and Remote Annunciators Panels located at each portal;

H) Operationally, the systems shall provide a delay from the time a signal is received from the automatic fire detection system to the time of discharge for the deluge sprinkler system in accordance with NFPA 72 for Positive Alarm Sequence; and

I) As a minimum each sprinkler system shall have two Fire Department Connections, one at the Northbound Entrance Portal and one at the Southbound Entrance Portal of both the Battery and the Main Post Tunnels. Each will also be provided with external four (4) way Fire Department connections to permit pressurization by Fire Department apparatus.

16.5.1.3. Manual Fire-Fighting System

Design requirements for the manual fire-fighting system include:

A) A Class I fire standpipe system to provide water for manual fire fighting operations throughout the road tunnel;

B) As a minimum each standpipe system shall have at least one connection to the permanent water supply and two Fire Department connections, one at the Northbound Entrance Portal and one at the Southbound Entrance Portal of both the Battery and the Main Post Tunnels. Each connection to the permanent water supply shall be provided with external two (2) way Fire Department connections to permit pressurization by Fire Department apparatus;

C) Fire hose valve cabinets shall be spaced along each roadway at maximum two hundred and fifty (250) foot intervals. Cabinet locations shall be coordinated with deluge zone spacing. Layout of cabinets shall mimic the layout for the Southbound Battery Tunnel; and

D) Each cabinet shall include two, 2½-inch hose valves. The cabinets shall also contain two, 2½” to 3” threaded hose adaptors for use by the San Francisco Fire Department. The standpipe system shall be sized to provide a minimum of seven hundred and fifty (750) gpm at one hundred (100) psi residual pressure at the hydraulically most remote hose connection. Pressure provided by Fire Department pumper trucks connecting to Fire Department connections at portals may be considered to be available for the purpose of hydraulic calculations. Assume a pumper truck pressure boost of one hundred and fifty (150) psi.

16.5.1.4. Portable Fire Extinguishers

Portable fire extinguishers shall be provided in accordance with the requirements of NFPA 502;

16.5.1.5. Temporary Facilities during Construction

Developer shall determine if a temporary tunnel standpipe system shall be required during construction.
If required the following minimum requirements shall apply:

A) Developer shall be required to submit an Installation and Test Plan;

B) The standpipe shall have a four-way FDC located within one hundred (100) feet of a fire hydrant; and

C) Developer shall be required to hydrostatically test the system after every two hundred and fifty (250) feet of new pipe is added. The tests shall be witnessed by The Presidio Trust. Test pressure shall be fifty (50) psi greater than the maximum piping system pressure during the flow conditions stated above.

16.6. Fire Detection and Alarm

16.6.1. General

The tunnel fire detection and alarm system performance, installation, and operation shall be in accordance with Chapter 8 of NFPA 72 Supervising Station Fire Alarm Systems. The fully operational tunnel fire detection and alarm system shall support the following functions:

A) Automatic Heat Detection for Tunnel Roadways;

B) Suppression Release Manual Means of Fire Detection at Tunnel Roadways;

C) Fire Detection at Substation and Tunnel Ancillary Spaces;

D) Tunnel FSS Monitoring; and

E) Fire Alarm Network.

16.6.2. Monitoring and Control

16.6.3. Design Requirements

16.6.3.1. General

Tunnel FSS shall conform to the requirements of NFPA 502 as the primary standard for design. Local building and fire codes shall be adhered.

All devices, equipment and components relating to the tunnel fire detection and alarm system shall be listed by Underwriters Laboratories, Inc. UL and/or approved by Factory Mutual Research Corporation (FM), for detection system signaling purposes.

16.6.3.2. Fire Alarm Control Panels (FACPs)

FACPs shall be addressable type and UL listed for fire suppression. The Individual Tunnel FACPs should be co-located with a grouping of the tunnel fixed fires suppression deluge valves. Each Individual Tunnel FACP that is part of the fire alarm network shall provide all required functions for a length of tunnel including automatic heat detection for tunnel roadways, fire

detection at ancillary spaces, suppression release for tunnel roadway, supervision of FSS valves, mass notification system functions, annunciation, and communication with the SCADA system.

Each FACP shall communicate to a SCADA PAC via an Ethernet communication link. The FACPs shall communicate alarm, supervisory, and trouble signals to the PAC.

16.6.3.3. Manual Deluge Control Panels/Remote Annunciator Panels

As a minimum, manual deluge control panels shall be located at each tunnel Substation, at each tunnel portal, Developer's Tunnel Control Center and OMC. These panels shall provide a graphic annunciator of all tunnel deluge zones and shall provide manual deluge and abort switches for all tunnel deluge valves. Alarm LED shall be included per zone.

16.6.3.4. Tunnel Roadway Automatic Heat Detectors

Non-fixed temperature 4-wire, analog heat sensing type linear type heat detector that initiates alarm at 115 degrees Fahrenheit shall be installed over the center of each traffic lane. The linear heat detection system zones shall be arranged to match the tunnel fixed FSS zones. Each zone shall include two separate linear heat detector circuits installed in a "cross zone" configuration.

16.6.3.5. Automatic Smoke Detectors

Automatic smoke detectors shall be provided at the tunnel equipment rooms.

16.6.3.6. Automatic Heat Detectors

Automatic heat detectors shall be provided at the tunnel equipment rooms. They shall be 135 degrees Fahrenheit fixed temperature and addressable.

16.6.3.7. Duct Smoke Detectors

For the exhaust ducts, addressable, photo-electric duct smoke detectors shall be provided.

16.6.3.8. Tamper Switches and Flow Switches

Tamper switches, and flow switches shall be provided for the FSS valves and piping including the fixed FSS, the standpipe system and other sprinkler systems. Addressable modules shall be utilized to make these devices or groups of devices addressable.

16.7. SCADA System

16.7.1. General

A SCADA system shall be provided for the tunnel mechanical/electrical/ancillary building facilities for the Project.

A) The SCADA system designed and provided by Developer shall provide monitor and control functionality for the following systems:

1) Tunnel ventilation system;
2) Tunnel storm water drainage;
3) FSS;
4) Tunnel emergency lighting;
5) Electrical distribution; and

6) Tunnel portal traffic signals and VMS.

B) The SCADA system shall provide "monitor only" functionality for the following systems:

1) Tunnel call box;

2) Carbon monoxide monitoring;

3) Fire alarm and detection;

4) Communications systems;

5) Substation building systems; and

6) CCTV – Maintenance Cameras (not ITS/TOS or BASE).

16.7.2. Design requirements

16.7.2.1. General

A comprehensive SCADA system shall be designed to permit monitoring and controlling of the tunnel mechanical, electrical and ancillary building systems. The design of major mechanical and electrical equipment includes provision for communications, control, and indication, via normally-open and normally-closed contacts, transducers, and auxiliary relays, to provide control/indication. The SCADA shall be organized to function as a stand-alone system.

The architecture of the SCADA system shall employ a fail-safe network topology. Each programmable automation controller (PAC) shall be designed with a redundant "hot-standby" configuration, capable of a seamless transfer of data upon a failure of the main processor. Additionally, PACs shall be equipped with redundant power supplies.

The SCADA system shall employ a universal remote input/output network protocol, allowing different networkable devices the ability to communicate with the programmable automation controller. Remote input/output (RIO) cabinets shall be distributed throughout the tunnel in order to minimize "hard-wired" cable runs between field devices and the SCADA system. Each remote input/output cabinet shall be designed to accommodate the required number of points for digital input (DI), digital output (DO), analog input (AI), and other data modules as needed, with an additional fifty percent (50%) spare of each point type (DI, DO, AI, etc). The remote input/output cabinet shall be housed in a NEMA 4 X cabinets sized to accommodate the required number of input/output modules (including spares).

The design of the SCADA system shall be coordinated with the design of other disciplines such that the design performance and assumptions are not compromised, impacted, or degraded due to the final design of other disciplines.

16.7.2.2. Tunnel Ventilation Control System

Developer shall design and construct the tunnel ventilation control system such that the ventilation system can be operated and monitored remotely at both, the local and remote operation control room via the SCADA.

16.7.2.3. Operation Control Rooms

SCADA system shall be monitored and controlled from both the local and remote operations control rooms as described below.

16.7.2.4. Local Operations Control Room

Developer's Tunnel Control Center is the local operations control room and shall be used as the primary point of control for the tunnel mechanical, electrical, and ancillary building systems.

16.7.2.5. Remote Operations Control Room

The remote operations control room shall be located at the OMC and TMC and shall provide the backup control function for the tunnel mechanical, electrical, and ancillary building SCADA system in the event the local operations control room is not operational.

16.7.2.6. Computer System Architecture

The SCADA system shall be serviced by a separate server and constructed around a robust SCADA software system. This shall serve as the central collection and control point for all tunnel mechanical, electrical and ancillary building field hardware.

16.7.2.7. Operator Interface

Developer shall provide operator interface for the SCADA system. This interface shall contain all the screens, reports, data stores and processes required for the tunnel control room operators to perform the required operating and reporting functions including the following functions:

A) SCADA alarm notification and acknowledgement;

B) SCADA system device control;

C) Incident and event tracking and logging;

D) Incident and event notification logging.

E) The ability for the control center operator to group several secondary alarms or events to a dependant higher level alarm or event;

F) SCADA system actions tracking and logging;

G) Control center operator actions tracking and logging; and

H) Operational reports generation.

16.7.2.8. Operator Computer Station

The operator computer workstation shall provide the primary means for the operator to monitor and control all tunnel mechanical/electrical and ancillary building systems.

Developer shall provide at least two dedicated operator computer workstations at both the remote operations control room and the local operations control room. Developer shall also provide at least one backup workstation at both the remote operations control room, and the local operations control room to be used in the event that the primary workstation computer is inoperable.

16.7.2.9. Coordination with Phase I Construction

Turning the operating and monitoring from TOMC over to OMC. Developer shall provide necessary hardware and software to integrate with the SCADA system located in Temporary Operations and Maintenance Center (TOMC) and a fully operational and integrated SCADA system to control both Battery Tunnels and Main Post Tunnels. Developer shall prove to the Department by demonstration and testing that the SCADA system is fully functioning and operating at Developer's Tunnel Control Center before removing the TOMC from service. Developer shall insure all the data and software at TOMC SCADA system are completely duplicated in the new system. A detailed system integration and migration plan shall be submitted to the Department for review and comment prior to construction.

SCADA Communications Network. Developer shall provide wired and wireless connection for SCADA network communications with the public network for system redundancy purpose. Developer shall refer to Phase I Construction Contract No 4 Drawing No. E-54 for SCADA network system design.

Interface with fire detection and alarm system. Developer shall ensure that the design of system interface between Fire Alarm System and SCADA System is fully in compliance with AHJ requirement. Developer shall refer to Phase I Construction Contract No 4 Drawing No. E-61 (Addendum No. 2) for SCADA and Fire Alarm System interface design.

Interface with OMC and TMC. Developer shall provide for a communications/data link between Presidio Parkway facilities and the OMC and the TMC.

16.8. Electrical Systems

16.8.1. General

This section describes the design criteria to be used for the designing, procuring, testing and commissioning of the electrical systems for the tunnel, roadway, and the tunnel ancillary facilities for the Presidio Parkway Project.

16.8.2. Design Requirements

16.8.2.1. Primary Distribution System for Tunnels

Electrical power for the Project will be supplied by the Department through Pacific Gas & Electric (PG&E) and directly through PG & E through multiple feeders. PG&E will provide the fifteen (15)kV service cables and duct systems to designated interface locations. All design Work relating to the utility services shall be performed in accordance with the prevailing PG&E requirements. The primary distribution system shall be designed such that the primary of each substation can obtain power from either of two separate utility sources. For double-ended substations, this requirement shall be interpreted to mean that the two respective transformers shall normally be connected to take service from different utility services. In addition, fifteen (15)kV feeders will be routed through tunnel duct bank and manhole systems to effect full capacity fifteen (15)kV ties between the Substations at each tunnel. It shall also be consistent with the Battery Substation System and features.

Specific Design Calculations. Design calculations shall be prepared by a California Licensed Electrical Engineer and shall include, but not be limited to, the following:

A) System fault evaluation;

B) Load analysis;

C) Primary switchgear and power transformer selection;

D) Incoming and feeder wiring selection;

E) Power factor evaluations and power factor correction selection basis;

F) Relay settings and coordination curves; and

G) Relay Function Configuration.

Standby Switchboard A 480/277 Volt standby switchboard shall be provided. It shall be indoor type, metal-enclosed, self-supporting structure. Switchboard shall be of compartmentalized design with individually mounted devices in the distribution sections. It shall accommodate the various low voltage protective devices, such as molded case circuit breakers and draw-out type air circuit breakers together with all associated meters, relays, instrument transformers, control power transformers and other accessories to provide a complete and operable assembly. The switchboard shall comply with all applicable provisions of UL 891 and NEMA PB-2.

Design for the standby power systems shall include the auxiliary devices (transducers, contacts, interposing relays, etc.) necessary to interconnect the required monitoring, control and alarm functions to the SCADA system.

Uninterruptible Power Supplies. Uninterruptible Power Supplies (UPS) shall be provided so that uninterruptible electrical power is provide to the following system:

A) Traffic Operations System (TOS) equipment;

B) Communications, SCADA , and fire detection and alarm systems;

C) Selected tunnel roadway, utility room, cross passage and egress stair lighting; and

D) Selected building lighting.

The UPS units shall be designed to operate "on line" such that when normal power fails, the batteries will provide power for a designated period through the inverter output. If a UPS malfunctions, a static switch shall automatically connect the load directly to the normal supply while simultaneously opening the inverter-output circuit breaker. A maintenance by-pass shall be provided to manually transfer the load to the normal supply for routine service or maintenance of the UPS.

Design calculations shall be prepared in accordance with the applicable requirements for each UPS application. The calculations shall establish the UPS rating, and battery size, battery charger size, and also identify significant parameters affecting the proper selection of the UPS unit for the intended load.

16.8.2.2. Grounding and Lightning Protection

All systems and equipment shall have grounding and lightning protection provisions incorporated into the design. Applicable codes and standards are listed in the applicable specifications sections.

Lightning protection systems and equipment shall be installed, where required, to provide protection of persons, equipment and facilities against the hazards posed by lightning. The lightning protection system shall comply with the requirements of a UL "Master Label System" and NFPA 78, "Lightning Protection Code."

16.8.2.3. Roadway Raceway Systems

This section establishes the basic design criteria for raceway systems for roadways including tunnels, roadway sections, open roadways, elevated highways, and associated ancillary spaces and cross passages.

The systems shall include underground and exposed raceways in roadways and also incoming and outgoing raceways from roadways to associated buildings. The raceway systems shall consist of duct lines encased in concrete or exposed conduits, and provided with manholes, handholes or pull boxes as the means of accessibility for cable installation and subsequent maintenance. All electrical conductors within such accessible enclosures shall be completely fireproofed. The raceway systems shall consist of separated sets of duct runs for different service classifications. This will permit alternate service cable to be installed with the assurance that if one cable fails, service can be maintained on the other. The raceway system(s) shall comply with the more stringent requirements of NFPA 70, ANSI C2, all pertinent Department Manuals and Guidelines, and all applicable local codes.

Ductbanks shall have a continuous slope downward toward manholes, handholes, or pull boxes, and away from buildings, with a pitch of not less than three inches in 100 feet. Where grades are flat or crest between manholes, a single slope will usually require too much depth in one of the manholes. In this event, slope the ducts from the crest area to both manholes. The duct lines shall be constructed of individual conduits encased in concrete. Conduits shall be separated by a minimum concrete thickness of two inches. Raceways shall be routed in straight lines to the maximum extent possible. Bends, where required, shall be of the long radius type, consistent with other determining factors. Include a minimum of 50 percent spare ducts for future expansion and/or required modifications. Spare ducts shall be provided with a pulling wire. Dead end ducts shall be capped and left with sufficient length to allow for future continuation.

16.8.2.4. Power Systems Studies

Developer shall furnish short circuit studies, protective device evaluation studies, protective device coordination studies and relay settings, and arc flash study. The studies shall be stamped by an independent registered professional electrical engineer registered in the State of California. The studies shall include, but not be limited to, portions of the electrical distribution system from the 12.47kV normal power source or sources, to and including the 480V distribution system, and down to the 120VAC level. Normal system connections and those which result in maximum fault current conditions shall be included in the study.

Developer shall coordinate with the Department and PG&E in obtaining short-circuit data and submit these reports to the Department.

16.8.2.5. Bay Area Security Enhancement (BASE) and Maintenance Closed Circuit Television (CCTV)

Two CCTV independent systems shall be provided as a means of visually monitoring traffic flow and verifying reported incidents from the operations control room. Cameras shall be located to provide 100% coverage of the entire tunnel roadway network. These CCTV systems are independent of, and in addition to, the ITS/TOS CCTV system

BASE Cameras. Developer shall provide all embedded conduits, junction boxes, niche space, and electrical power for the installation of the BASE cameras in the tunnels. A third party shall install the cameras, wiring and remainder of the system.

Maintenance Cameras. Developer shall provide a CCTV system to permit monitoring of the tunnel by Developers tunnel operators and for monitoring at the OMC.

Camera Types. Maintenance tunnel cameras shall be heavy duty pan, tilt and zoom (PTZ) capability. NEMA 4X rated, barrel type color cameras shall be used within the tunnel and approaching roadways. Cameras shall have the following additional attributes:

A) Solid state design;

B) Vandal resistant enclosure;

C) Automatic focus lenses with auto-iris;

D) PTZ controllable from the control rooms;

E) No blooming when facing headlights;

F) Low light black and white mode; and

G) Digital “flipping” function.

Cameras shall be mounted to provide vibration-free images on the monitors in the control room. Where cameras must be mounted on towers, the towers and enclosures must be designed to withstand a 100 mph wind load and still maintain a usable image.

Maintenance Camera Operation. PTZ functions for cameras shall be operated by an integral, on-board, microprocessor based controller compatible with the camera, enclosure, and CCTV system from the OMC. The controller shall operate the following functions:

A) Pan, tilt and zoom;

B) Auto focus;

C) Auto iris; and

D) Two preset pan/tilt positions, minimum.

The system shall be capable of saving video from all CCTV cameras for a period of three years. This video shall be stored in a secure location and in a format that is mutually agreed upon with the Department.

Developer's Tunnel Control Center shall be provided with a video wall with the ability to perform desktop functions of the local CCTV workstations along with displaying the live video.

The CCTV system shall allow a "master/slave" configuration of control of the workstations located at the local operations control room ("master") and the remote operations control room ("slave"). The capability to pass control from the "master" to the "slave shall be available.

Incident Detection System (IDS). The IDS shall continuously analyze the video from the Maintenance CCTV cameras in the tunnels, trigger an alarm when an incident is detected, and provide the operators with incident data so that the severity of the incident can be assessed quickly and a response can effectively be implemented. When an alarm is received from the IDS or the SCADA, the image on the operators monitor shall automatically switch to the CCTV that has the best view of the incident

The IDS shall provide detection of the following:

A) Pedestrians;

B) Congestion (queue);

C) Stopped vehicle;

D) Wrong way vehicle;

E) Visibility (smoke); and

F) Debris/cargo.

16.8.2.6. Access Control (AC) and Intrusion Detection (ID)

Access Control. Developer shall AC and intrusion detection (ID) systems to control the movement of persons through site areas, facilities, secure areas, buildings, and vehicle parking facilities.

Intrusion Detection. The security system shall be provided to detect intruders and controlling access to selected areas. Events generated by the AC & ID will be transmitted to both the remote and local operations control rooms for a directed response. The AC & ID systems shall be combined to form a single fully integrated system.

Developer shall determine the need for installation of an intrusion detection device on any building, door/access way to an area based on the following criteria:

A) Any area to which the entry by unauthorized persons could cause severe disruption/delay to operation of the tunnel; and

B) Any area to which the entry by unauthorized persons could result in severe personal injury to those persons.

C) Project buildings based on the type of facility. The intrusion detection portion of the system shall be designed so that it will:

D) Have a high probability of detecting any intrusions at all protected locations and shall send corresponding signals to the local intelligent field module for processing;

E) Monitor the status and condition of all devices in the intrusion detection portion of the system;

F) Annunciate system status, alarm, and diagnostic information using text and graphics at the local and remote operations control room locations;

G) Have a minimum 25% spare capacity of detection points and indication outputs;

H) Protect equipment in public accessible areas; and

I) Be integrated with the closed circuit television system in order to visually detect intruders upon alarm notification.

Annunciation Requirements. Primary annunciation for the intrusion detection portion of the system will be at both the remote and local operations control rooms.

Alarm annunciation will include the following information, presented in an intuitive, user friendly, graphical interface:

A) Location of alarm;

B) Address of device;

C) Nature of alarm (i.e. type of detection);

D) Time and date;

E) Panel from which alarm was received; and

F) Priority of alarm.

16.9. Illumination

16.9.1. General

Developer shall perform all Work necessary to meet the requirements for temporary and permanent illumination for the Project. Design Requirements to complete the design phase of work shall include, but are not limited to, the following:

A) Tunnel roadway lighting systems – This is defined as the lighting system for the Eastbound and Westbound tunnel roadways in their entirety from portal to portal; and

B) Sign lighting systems – This is defined as the lighting of fixed signs, when required, for both inside and outside the tunnel.

16.9.2. Design Requirements

Developer shall prepare a tunnel lighting design package. The package shall include drawings, cross-sections, elevations, details, control diagrams, luminaire information and shop drawings,

supporting laboratory test reports; and lighting analyses illustrating the design meets the current requirements of RP-22. All final design documents shall have been reviewed and stamped by a registered professional engineer licensed in the state of California.

16.9.3. Lighting Analyses

Developer shall complete Lighting Calculations as defined in RP-22 to include the following:

A) Roadway Luminance and Illuminance analyses;

B) Tunnel wall illuminance shall be calculated;

C) Veiling Luminance (VL, Glare) calculations shall be provided for each grid of points;

D) Sign lighting: Illuminance and luminance values for vertical sign face;

E) Calculation data shall include output illustrating, luminaire locations and mounting heights; luminaire types; wattage and quantities of each type;

F) Calculations shall account for the light loss factor (LLF) based on a 1 year cleaning cycle; and

G) A life-cycle analysis demonstrating the lighting system's estimated cost to operate and maintain for a 30 year period.

16.9.4. Tunnel Lighting System Design

This Section establishes the basic design requirements for the tunnel lighting which shall be designed to simplify the visual task of approaching the tunnel, be glare free and meet uniformity criteria. With the luminaires positioned in a logical manner serving as a visual guide to lead the motorist's eye through the tunnel, the tunnel lighting shall provide adequate daytime illumination in the threshold, so that motorists can drive a vehicle safely and efficiently at the design speed conditions.

16.9.4.1. Performance Requirements

The design and installation of the tunnel roadway lighting systems shall meet the following requirements:

A) Be a symmetrical tunnel lighting system. Lighting systems such as "pro-beam" and "counter-beam" lighting shall not be acceptable;

B) Employ linear type luminaires throughout the tunnel and supplemented with point source luminaires in the tunnel threshold and transition lighting zones. Linear luminaires are defined as those luminaires installed as a continuous row and provide a continuous light pattern;

C) The use of point source luminaires that develops a "scalloped" lighting pattern shall not be acceptable for the interior zone and night time illumination levels;

D) The use of fluorescent lamps will not be acceptable. Luminaire sources shall be Electrodeless or HID;

E) Provide the necessary levels of emergency egress illumination while connected to an emergency power supply;

F) Utilize quality materials, maximize energy conservation and minimize annual maintenance costs; and

G) Include all required tunnel lighting control systems for automatic and manual control of the lighting levels throughout the tunnel.

16.9.4.2. Design Parameters

The calculation methodology of the tunnel lighting system shall be based on the most current version of ANSI/IES RP-22. Developer shall also incorporate the follow design parameters:

A) A safety rating number (SRN) of five (5) shall be used, which results in a ratio of Lth/Lseq = 1.41;

B) Daytime traffic volume shall be considered to be greater than twenty four thousand (24,000) AADT;

C) Where two travel roadways converge forming a gore or merge area the tunnel roadway luminance levels shall increased fifty (50) percent throughout the taper; and

D) It should be noted that NFPA 502 requires that fire and life safety electrical systems be designed and installed to resist lateral forces induced during an earthquake and continue to function after the event.

16.9.4.3. Tunnel Lighting Luminaire Requirements

The linear luminaire for the nighttime (Level 1) and daytime (Level 2) luminaires utilizing HPS or Induction type lamps and the supplemental luminaires for the Threshold and Transition Zones being a point source HPS design shall incorporate the follow features:

A) All luminaires within the tunnel must be watertight and corrosion resistant to protect their interiors from periodic high-pressure (100 psi) wash downs of the tunnel;

B) Luminaires must be able to operate within the manufacturers expectations at an ambient temperature of forty (40) deg C;

C) The overall size and location of the luminaires shall keep the luminaires outside the dynamic traffic envelope;

D) All luminaires used within the tunnel areas must be UL listed for wet locations and for direct spray applications and have an IP65 rating or better;

E) Linear luminaires shall provide a minimum efficiency of sixty eight (68) percent. Point source luminaires shall provide a minimum efficiency of sixty four (64) percent;

F) HPS light sources shall have a minimum life of forty thousand (40,000) hours and shall be “Eco” friendly type (low mercury) and non-cycling;

G) When installed in the fixture, Induction Lamps to have an average rated life of one hundred thousand (100,000) hours with a Kelvin temperature not to exceed four thousand one hundred (4100)° K;

H) HPS and Induction lamps shall be Toxicity Characteristic Leaching Procedure (TCLP) compliant;

I) Tunnel luminaires shall have the ability to be removed, maintained, and re-lamped without the use of any tools;

J) All tunnel luminaire external hardware shall be AISI Type 316 stainless steel; and

K) All mechanisms supporting the luminaires shall be designed to withstand the ANSI 132.2 vibration test and shall meet all local seismic ratings and requirements. The mounting system shall be comprised of mechanical anchors, Type AISI Type 316 stainless steel threaded rods, and a minimum of 12 gauge Type AISI Type 316 stainless steel mounting channels.

16.9.4.4. Tunnel Lighting Control System

The use of lighting controls enables the tunnel lighting system to adapt to changing daylight conditions while reducing unnecessary energy consumption. A luminance sensor based Programmable Lighting Control (PLC) system shall be employed to improve lighting control. Lighting control panels for each direction of travel shall switch tunnel lighting proportionally to accommodate changing exterior ambient light level conditions. A typical lighting control switching scheme is depicted in Table 16.4.

A luminance sensor, lighting contactors, controller, and a controller cabinet are the necessary components of a lighting control system. A luminance sensor (L_{20} type meter shall be used) measures the luminance of the portal in the direction of traffic. The sensor sends an analog signal to the controller and the corresponding output level is switched on or off using the lighting contactors, depending on the frequency received.

TABLE 16.4 - THE CONTROL SCHEME

CONTROL LEVEL	ILLUMINATION LEVEL AS A PERCENT OF MAXIMUM	SENSOR SETTING – CD/M^2	
		ON INCREASING LIGHT	OFF DECREASING LIGHT
1	4	0 – 50	35 – 0
2	10	50 – 200	180 – 35
3	35	200 – 800	700 – 180
4	60	800 – 4,000	3,800 – 700
5	100	4,000 – Above	Up to – 3,800

Developer shall install the tunnel roadway lighting luminance sensors on a lighting pole at the tunnel approach approximate 1 SSSD from the tunnel portal.

16.9.4.5. Tunnel Lighting Fixture Circuiting

Fixtures on opposite sides of the tunnel shall be supplied by separate electrical panel boards. These separate panel boards shall, in turn, be connected to switchgear busses normally energized from alternate electrical services. Luminaires shall be connected to alternate phases of the circuit to ensure that if one phase is lost, only thirty three (33) percent of the total lighting fixtures served by the three phase circuit are affected; also that loads are balanced. To prevent the tunnel

from being cast suddenly into complete darkness by simultaneous loss of power from all utility power sources, or in cases of emergency the appropriate number of evenly spaced fixtures in a row of luminaires on the nighttime level circuit shall be connected to an emergency power supply circuit.

16.9.5. Sign Lighting System

Tunnel interior signs shall be illuminated from above the face of the sign. If required due to Developers construction activities, guide signs outside of the tunnel portal, shall be illuminated only if warranted in accordance with the Department. All sign lighting luminaires must be positioned far enough back to ensure no flux is directly reflected into the eye of the driver.

16.9.5.1. Performance Requirements

All signs shall be externally illuminated in accordance with the following criteria:

A) Luminance - ninety six (96) candelas per square meter minimum (sixty five (65) percent maintained reflectance)

B) lluminance – forty (40) lms/ft2 (400 Lux) minimum

The maximum to minimum uniformity ratio on the sign face shall not exceed 4 to 1. The maximum illumination gradient produced (difference between points) on the sign face shall be two (2) to one (1).

16.9.5.2. Sign Luminaires

The sign lighting luminaires shall incorporate the following characteristics:

A) Luminaires used for sign lighting shall utilize LED technology as the light source;

B) Color temperature shall be a maximum of four thousand one hundred (4100) K;

C) LED light sources shall have a minimum life of seventy thousand (70,000) hours at forty (40) deg C ambient operating temperature;

D) Luminaires bodies shall be constructed of either stainless steel or extruded aluminum that has a zinc rich undercoat and a polyester powder coat paint finish baked on to ensure against chipping and cracking;

E) Luminaires shall be UL listed for wet locations and have an IP65 rating or better;

F) All external hardware shall be AISI Type 316 stainless steel;

G) Luminaires shall be located so that they do not interfere with sign visibility for drivers of any type of vehicle; and

H) Sign lights outside the tunnel shall be controlled via photo controls. Sign lights inside the tunnel shall be “ON” at all times.

16.9.6. Lighting Systems Commissioning

Developer shall prepare a commissioning plan that consists of individual equipment performance and quality assurance testing, as well as a complete installation testing plan that assures that all systems function and operate as intended. The tunnel lighting system shall also be tested in accordance with the requirements of IESNA-LM-71.

16.10. Tunnel Drainage

16.10.1. General

Developer shall design and construct a tunnel drainage systems that meets the criteria specified herein. The tunnel roadway drainage system is required to collect water inflow that results from tunnel washing, FSS, and normal seepage that is anticipated based upon the water tightness of the tunnel structure(s). The drainage system is also necessary to prevent spills of hazardous or flammable liquids from propagating along the length of the tunnel. The tunnel electrical pit drainage system shall collect water seepage into pits and conduit located beneath the tunnel roadway. A system shall be provided to divert water collected during tunnel washing operations to a holding structure where it will be removal by truck for off-site treatment.

16.10.2. Design Requirements

Developer shall be responsible for the final design, installation and construction of the tunnel roadway drainage systems and determination of its capacity; however the system shall conform to the relevant standards and references.

The design of the tunnel drainage system shall conform to the following minimum criteria:

A) Water inflow from the FSS;

B) Water inflow from tunnel washing operations; and

C) Additional inflow to account for portal area runoff shall be calculated based upon the total accumulation of water from a 50 year rain storm of ten minute duration onto a paved or impervious area equivalent to the width of the portal approach roadway over a distance equal to half the transverse slope divided by the longitudinal slope times the portal width in feet.

16.10.3. Drainage Components and Piping Design

The tunnel drainage collection system includes, but is not limited to, Type 316 Stainless Steel linear slotted drain inlets, the associated hardware, piping, manholes, junction boxes, flexible connections, and cleanouts. The drains are to be designed for a minimum of AASHTO HS-20 truck loading. The slotted drain inlets shall be located on the transverse low side of the roadways and shall be located outside of all lanes of vehicular traffic.

16.11. Mechanical Systems for Miscellaneous Facilities

16.11.1. General

This section establishes the design and construction criteria to be used for the mechanical systems including Heating Ventilation and Air Conditioning (HVAC), plumbing & drainage and FSSs, as required for the Project ancillary facilities. The ancillary facilities include the Main Post Substation, TOMC and other tunnel related ancillary spaces such as cross passages, tunnel mechanical/electrical utility rooms, and other similar spaces as required.

16.11.1.1. Design Requirements

The design of the HVAC systems shall place an emphasis on energy conservation and the energy consumption and efficiency requirements of the California Building Code California's Energy

Efficiency Standards for Residential and Nonresidential Buildings Title 24, Part 6, of the California Code of Regulations shall be met.

16.11.1.2. Space Design Requirements

Developer's final facilities program and architectural design will identify and define the Project's ancillary facilities and other spaces required for the Project. Developer shall identify and describe these spaces including their type, function, equipment content, and occupancy status to determine the necessary HVAC, plumbing, and fire protection system design requirements.

16.11.1.3. Environmental Design Criteria

The ambient outdoor design conditions to be used are to be based upon the Climatic Design Information provided by American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Handbook, Fundamentals, for the San Francisco Airport location.

The following indoor design conditions shall be used:

A) Summer season/air conditioned spaces:

1) Control rooms: 78 ºF db, 45% relative humidity (RH);
2) Electrical rooms: 104 ºF db maximum, 50% RH;
3) Equipment/storage/janitor rooms: 104 ºF db;
4) Day and conference rooms: 78 ºF db, 50% RH;
5) Corridors/toilets/locker rooms: 78 ºF db, 50% RH;
6) Summer season/ventilated spaces;
7) Pump stations: 104 ºF db; and
8) (Tunnel low point, transfer & stormwater).

B) Winter season:

1) Control rooms: 70 ºF db, 45% RH;
2) Electrical rooms: 55 ºF db;
3) Battery rooms: 55 ºF db;
4) Equipment/storage/janitor rooms: 55 ºF db;
5) Day and conference rooms: 70 ºF db; and
6) Corridors/toilets/locker rooms: 70 ºF db.

16.11.2. Ventilation System Design

Ventilation systems shall be provided where necessary to maintain the desired environment for equipment operation and maintenance personnel. The system shall consist of air supply and/or exhaust fans and ductwork as required. Ventilation systems shall incorporate duct systems as appropriate and shall consider nearby intake/exhaust areas, neighboring facilities, and maximum sound levels permitted in the area. Fan ratings shall be based from test performed in accordance with the test code of the AMCA and shall bear the AMCA label.

16.11.3. Plumbing & Drainage

The plumbing and drainage shall be designed in accordance with the requirement of the California State Building Code. The Main Post Substation's plumbing system shall be capable of supplying the required quantity of domestic (hot and cold) water for the various utilities, provide disposal of sanitary waste and storm water, and shall include any sanitary water treatment if necessary. Developer shall include in the Main Post Substation a toilet facility that shall also be provided with a janitor's sink.

16.11.4. Miscellaneous Fire Protection Systems Construction

The ancillary facility fire protection systems shall be procured, installed and constructed in a complete manner and shall include all of the components necessary to provide a complete and operable system that is in accordance with the criteria specified in this performance specification. The ancillary facility fire protection systems include, but are not limited to, fire pumps, piping, sprinklers, hangers, miscellaneous appurtenances, hardware, etc, and other components systems as necessary. The ancillary facility fire protection systems must be installed and constructed with the requirements of other related performance specifications as applicable that are a part of the design criteria documents.

16.11.5. Ancillary Facility Fire Protection Systems Commissioning

Developer shall develop a commissioning plan that consists of individual equipment performance and quality assurance tests, as well as a complete installation testing and commissioning plan that assures that the system functions and operates as intended and in accordance with all applicable codes and standards. Developer shall prepare a commissioning plan and field test procedures and submit to the State Fire Marshal, Department for review and approval sixty (60) days prior to commencement of any testing.

16.12. Tunnel Systems Deliverables

In addition to those defined in Volume II, Division I, Article 2 Developer shall specifically provide the following.

16.12.1. General

Design and construction submissions shall be made as set out below.

A) Tunnel Systems Criteria and Principles Report

B) FLS Strategy Report

C) The Design Submissions shall include but not limited to the following:

1) Concept Design;

2) Preliminary Design;

3) Final Design;

4) Construction Drawings and Specifications; and

5) As-built Drawings Submission.

D) Preliminary Design Submission shall comprise:

1) Preliminary FLS Report;
2) Preliminary TVS Report;
3) Preliminary FSS Report;
4) Preliminary Water Supply System;
5) Preliminary Sanitary Drainage System;
6) Preliminary Tunnel Drainage System
7) Preliminary Lighting (Illumination) Systems;
8) Preliminary MEP Design; and
9) Preliminary Combined Services Drawing/Structural, Electrical and Mechanical (CSD/SEM) Submission.

E) Final Design Submission shall comprise:

1) Final Design Status Report;
2) Final FLS Report;
3) Final TVS Design;
4) Final FSS;
5) Final Water Supply;
6) Final Sanitary Drainage System;
7) Final Tunnel Drainage;
8) Final Lighting System;
9) Final CSD/SEM;
10) Final MEP; and
11) Testing and commissioning plan for each element of the works.

F) All Final Design documents shall be checked, stamped and signed by Profession Engineers licensed in the State of California.

17. COMMISSIONING

17.1. General

Developer shall perform systems and equipment commissioning in the presence of the Department. Successful completion of the commissioning tests is a necessary requirement to achieve Substantial Completion.

The Project systems and equipment to be tested and commissioned shall at a minimum include the roadway and tunnel signalization systems, all ITS elements including Traffic and Ramp Monitoring, CCTV and Communications Systems, Fire and Life Safety Systems, Tunnel Ventilation System, Fire Suppression System, Tunnel Lighting System and the SCADA system

After installation and testing of all elements of the tunnel and roadway systems, the systems shall be tested and integrated into a complete system. The testing and integration of all systems shall follow a test plan and procedure prepared by Developer and its designated representative, hereinafter called the Commissioning Agent, and subject to review and comment by the Department.

17.2. Definitions

Commissioning - Commissioning is the process to certify to the Department that systems, equipment, mechanical and electrical controls, and special systems are functioning together in a composite manner.

Commissioning Agent - is a designated agency or person hired by Developer and approved by the Department for the commissioning process. The Commissioning Agent communicates, directs and coordinates the day-to-day commissioning activities, and does not take an oversight role. Its work is subject to the QA/QC standards established for the overall Project.

17.3. Reference Documents

Developer shall follow the practices set out in the following unless otherwise agreed in their Commissioning Plan. Proposed deviation from this specification shall be in accordance with one or more of these guidelines.

A) GSA – General Service Administration Commissioning Guidelines;

B) ACG – Associated Commissioning Group Guidelines; and

C) BCx – Building Commissioning Guidelines.

17.4. Qualifications

The Commissioning Agent provided by Developer shall not be an employee of Developer or any of its partners, subcontractors, or related companies. The Agent shall be independent of the installing personnel or equipment suppliers for this Project. The Commissioning Agent must maintain an unbiased approach to problem solving and conflict resolution. In addition the Commissioning Agent shall be certified as an independent Commissioning Agent/Agent by the AABC Commissioning Group (ACG) BCx or Certified Building Commissioning Professional (CBCP) by Association of Energy Engineers.

Developer shall furnish a copy of the Commissioning Agent's certifications to the Department within thirty (30) days after NTP1.

17.5. Scheduling

The Commissioning Agent shall provide the initial schedule of primary commissioning events/milestones at the initial commissioning scoping meeting, and thereafter work with Developer to schedule and maintain the integrated schedule with the commissioning activities.

17.6. Commissioning Team and Coordination

The members of the Commissioning Team consist of the Commissioning Agent, Developer's Engineer of Record, appropriate subcontractors, the operator and any other subcontractors or suppliers of equipment.

The Office of the State Fire Marshal will participate in commissioning of fire protection and alarm systems. The Commissioning Agent shall prepare a draft Commissioning Plan to supplement the team, roles, responsibilities and communication protocols defined in this section and submit it to the Department for Review and Comment one hundred and twenty (120) days after NTP.

17.6.1. Commissioning Agent Responsibilities

The Commissioning Agent plans, directs and coordinates the commissioning process and activities; writes the Commissioning Plan and documents performance testing results. All reports and findings are sent directly to Developer, with copies provided to the Department.

17.6.2. Developer's Responsibilities

Developer's Representatives shall participate in and perform commissioning process activities including, but not limited to, the following:

A) Integrate, maintain, and coordinate commissioning process activities within the construction schedule.

B) Review and accept system verification checklists (SVC) checklists provided by the Commissioning Agent.

C) Review and accept commissioning process test procedures provided by the Commissioning Agent.

D) Provide the Commissioning Agent a written statement of readiness, certifying that systems, sub-systems, equipment, and associated controls are ready for testing, manufacturer's checklists are completed, and SVCs are completed.

E) Complete commissioning process test procedures.

F) Evaluate performance deficiencies identified in test reports and, in collaboration with the entity responsible for system and equipment installation, recommend corrective action.

G) Cooperate with the Commissioning Agent for resolution of issues recorded in the Commissioning Issues Log.

H) Ensure cooperation and participation of sub-contractors as applicable.

I) Ensure participation of major equipment manufacturers in appropriate start-up, testing and training activities.

J) Prior to start-up, inspect, check and confirm the correct and complete installation of all equipment and systems for which system verification checklists are included in the Commissioning Plan. Document the results of all inspections and checks on the checklists and sign them. If deficient or incomplete work is discovered, ensure corrective action is taken and re-check until the results are satisfactory and the system is ready for safe start-up.

17.7. Meetings

17.7.1. Commissioning Scoping Meeting

Within 60 days after NTP2, the Commissioning Agent shall schedule, plan, and conduct a commissioning scoping meeting with the entire commissioning team in attendance. The scoping meeting shall address the tunnel systems to be commissioned, including commissioning requirements, and completion and start-up schedules.

Information gathered from this meeting will allow the Commissioning Agent to prepare the Commissioning Plan.

17.8. Commissioning Plan

The Agent shall submit a final Commissioning Plan to Developer for review and approval 90 days prior to the first proposed test. System commissioning shall not begin until the completion and acceptance of all utilities.

The Commissioning Plan shall detail the implementation of the commissioning process. The Commissioning Plan, submitted to Developer for review and approval, shall include a full list of equipment to be tested, the sequences of such testing, and the nature of the System Verification Checks to be performed.

17.9. Non-Conformance to Performance Verification Requirements

Should equipment, system components, and associated controls be incorrectly installed or malfunction during all of the Commissioning activities, Developer shall correct deficiencies, re-verify equipment and components within the non-functional system and, include related systems as deemed required by the Commissioning Agent or Developer, to ensure effective performance.

In addition, non-conformance issues discovered by Developer, any Developer Related Entity, the Engineer of Record and Commissioning Agent during any separated witnessing or testing shall be recorded in the Commissioning-log, corrected, and may be retested at the request of the any of the parties.

Costs of additional tests, inspections, and corrective work incurred as a result of incorrectly installed or malfunctioning equipment or systems shall be borne by Developer.

17.10. Operations and Maintenance (O&M) Training

The Commissioning Agent coordinates and schedules O&M training with Developer. Developer shall notify sub-contractors, suppliers and manufacturer's representatives, and Developer shall plan the training program according to the project specifications. Developer shall schedule with the Department meetings for planned orientation, training and demonstration sessions.

Responsibility for the actual training program lies with Developer.

17.11. Testing

17.11.1. System Verification Checks (SVCs)

SVCs ensure that individual systems have been installed properly, conform to the specifications and are ready for safe start-up. The responsibility for carrying out these checks, as well as any corrective action, lies with Developer.

Developer shall perform all the necessary tests to prove that equipment has been properly installed and adjusted. In the event of any part of the equipment failing these tests, Developer shall conduct further tests after rectification of the fault, over at least two successive and separate periods with no further fault occurring.

At least 4 weeks in advance of any particular site testing, Developer shall submit to the Department details of the test equipment intended for the testing for review and comment.

17.11.2. Functional Performance Tests (FPTs)

The functional performance tests insure that the various individual commissioned systems operate cohesively as a whole. The Commissioning Agent shall direct, witness and document the results of the FPTs of all systems commissioned. Developer operates the systems as directed by the Commissioning Agent so that FPTs, as documented in the Commissioning Plan, can be completed. The applicable sub-contractors shall participate, along with other relevant commissioning team members.

17.11.3. Final System Integration Test

The Final System Integration Test requires the integrated simultaneous operation of all tunnel systems and equipment for 5 consecutive days without failure.

Integration test consists of operating all of the systems and equipment including, demonstrating the emergency response for a vehicle fire in the tunnel. Local emergency services providers may participate in these demonstrations.

Completion of this test is a prerequisite for achieving Substantial Completion.

17.11.4. Reports Submittal

The Commissioning Agent shall compile, organize and index the commissioning data for each system and equipment. The Report shall be submitted to Developer and the Department within 10 days after successful conclusion of the Final System Integration Test.

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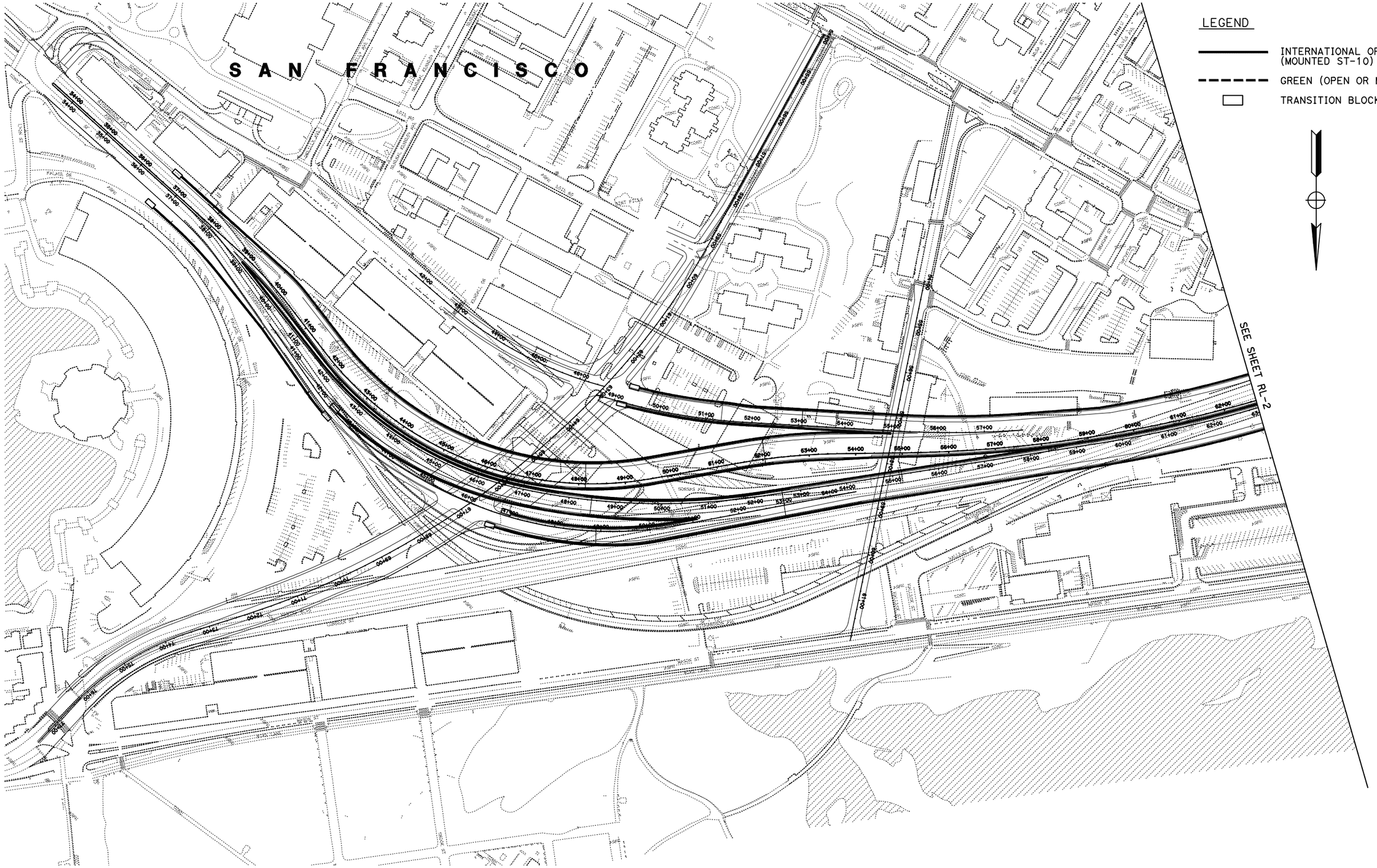

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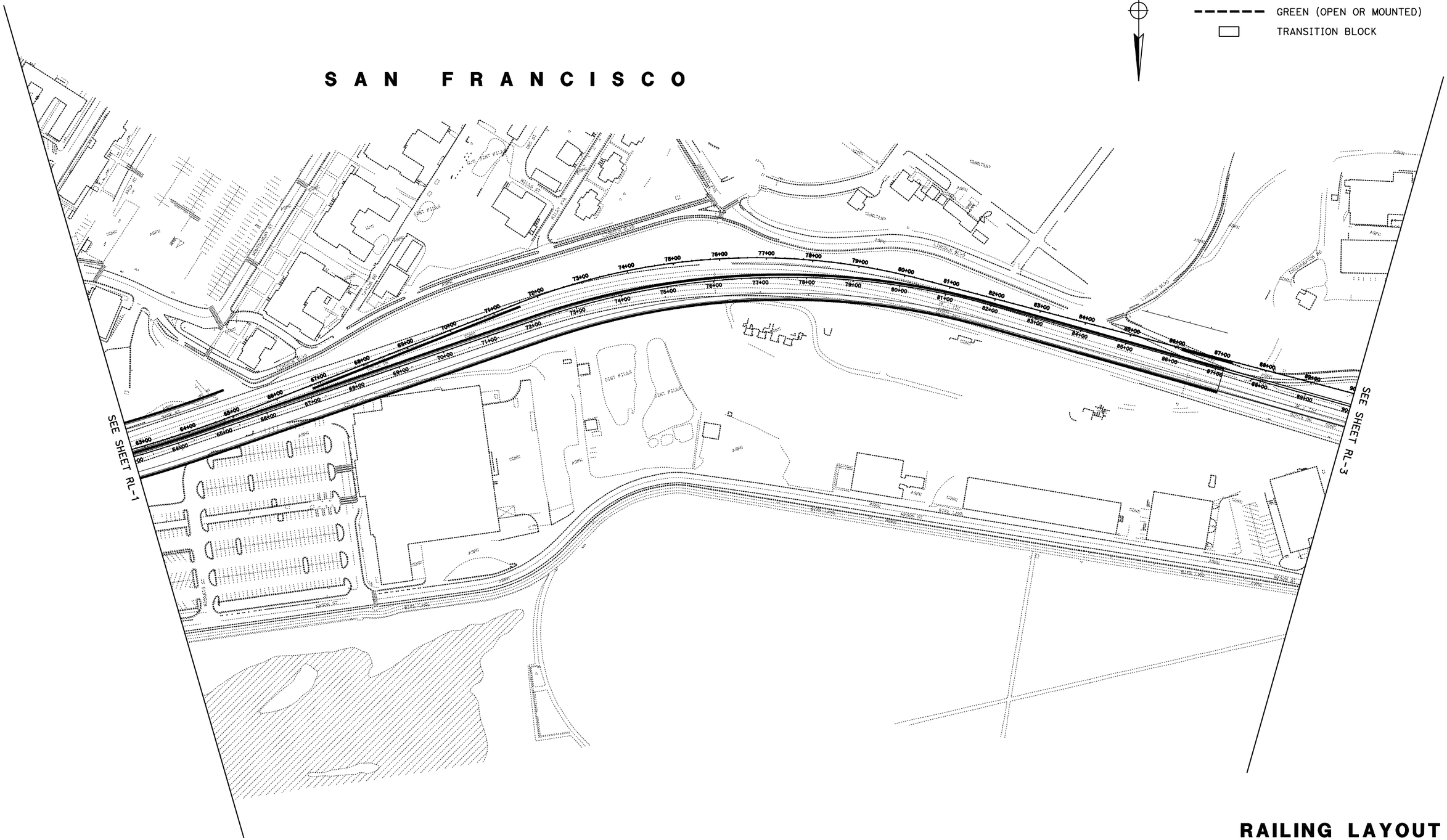

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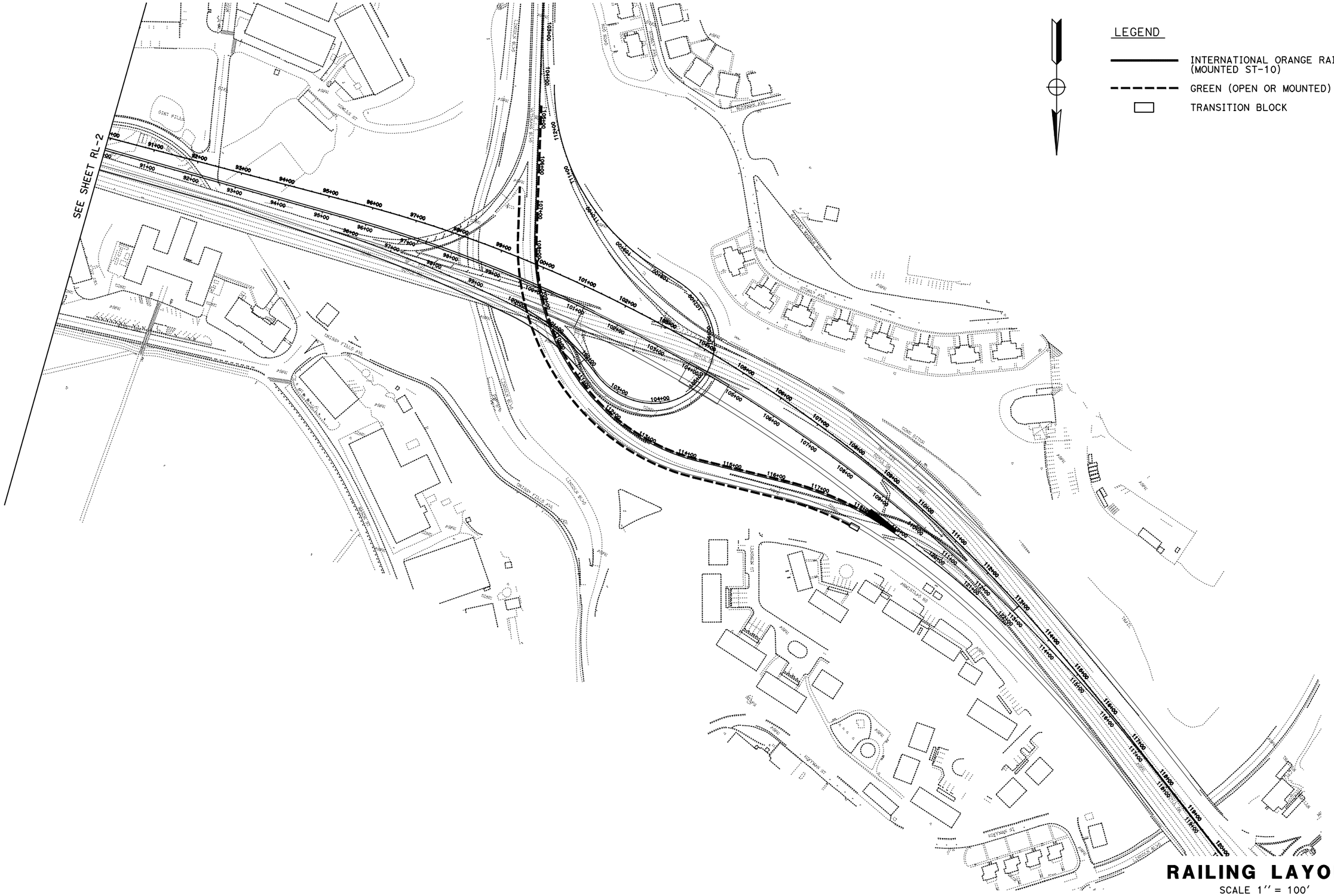

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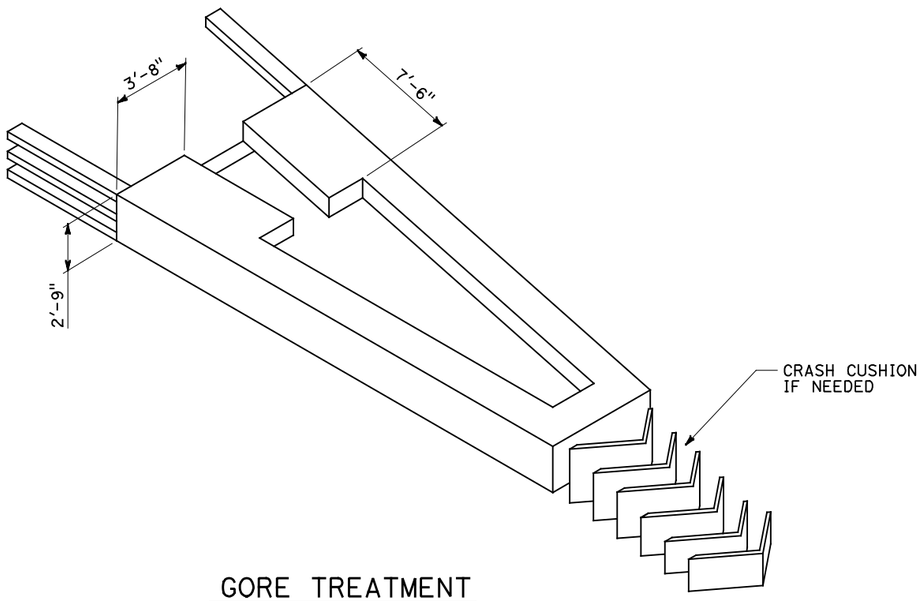

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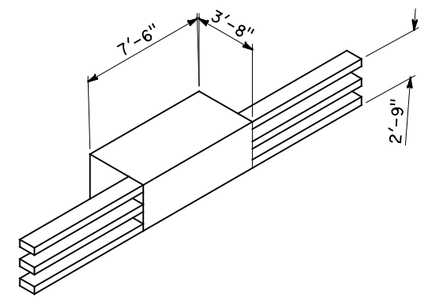

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Presidio Parkway Project
Public-Private Partnership Agreement
Volume II (Technical Requirements)

DIVISION II

SECTION 4 – OPERATIONS AND MAINTENANCE REQUIREMENTS

Final

January 3, 2011

1. GENERAL OBLIGATIONS 1
1.1. Manuals and Guidelines 2
1.2. O&M Reference Documents 2
1.3. Performance Measures 2
1.3.1. Noncompliance Point System 2
1.3.2. Construction Noncompliance Events 2
1.3.3. O&M Noncompliance Events 2
1.4. Operations & Maintenance Plan 2
1.4.1. Operations & Maintenance Manuals 4
1.4.2. Safety Plan 6
1.4.3. Transition Plan 7
1.5. Maintenance Responsibilities During Construction 7
1.7. O&M Annual Reports 9
1.8. Renewal Work Plans 9
1.8.1. Renewal Work Plan 9
1.8.2. Renewal Work Reports 10
1.9. Emergency Reporting 10
1.10. Contaminated Materials/Fuel Spills 11
1.11. Utilities 11
1.12. Project Element Monitoring 11
1.13. Staff Conduct and Appearance 11
1.14. Sustainability Management Plan for the O&M Period 12
1.15. Use of Pesticides 12
2. MAINTENANCE REQUIREMENTS 12
2.1. Roadway Maintenance Requirements 12
2.1.1. Routine Maintenance 12
2.1.2. Planned Maintenance Scheduling and Permitted Closures 12
2.1.3. Renewal Work 13
2.1.4. Compliance Work 14
2.2. Bridge Inspections and Maintenance 14
2.2.1. Bridge Inspections 14
2.2.2. Bridge Maintenance 15
2.3. Other Structures Inspection and Maintenance 17

2.4. ITS Systems Maintenance 17
2.4.1. General 17
2.4.2. Troubleshooting Work, Repair, and Parts and Materials 18
2.4.3. Existing Communication Links 18
2.4.4. ITS Maintenance Service Descriptions 18
2.5. Tunnel Systems Maintenance 20
2.5.1. General 20
2.5.2. Troubleshooting Work, Repair, and Parts and Materials 21
2.5.3. Tunnel Maintenance Service Descriptions 21
3. OPERATIONS REQUIREMENTS 23
3.1. ITS Operations 24
3.1.1. ITS System Monitoring and Availability 24
3.1.2. Network and Utility Services 24
3.1.3. Data and Video Sharing 25
3.1.4. ITS Standards 25
3.2. Traffic Incident Management 25
3.2.1. Event Process 26
3.2.2. Traffic Incident Management Plan 27
3.2.3. Communications/Media Relations 27
3.3. Maintenance of Traffic (MOT) 27
3.3.1. Traffic Management Plan 28
3.3.2. Moveable Barriers 29
3.4. Traffic Operation Systems (TOS) 30
3.5. Emergency Management 30
3.5.1. Emergency Response Plan 31
3.5.2. Specific Developer Responsibilities for Governor Declared Emergencies 32
3.5.3. Specific Developer Responsibilities for Other Emergencies 33
3.6. Traffic Operations 33
3.6.1. Lane Closures 34
3.7. Tunnel Escorts 34
3.8. Tunnel Operations 34
3.9. Tunnel Systems/Devices 35
3.9.1. SCADA System 35

3.9.2. Fixed Fire Suppression and Fire Standpipe Systems 36
3.9.3. Tunnel Fire Extinguishers 36
3.9.4. Tunnel Ventilation System 36
3.9.5. Tunnel Air Quality Monitoring System 36
3.9.6. Tunnel CO Levels 37
3.9.7. Fire Alarm System 37
3.9.8. Primary/Normal Electric Power System 37
3.9.9. Tunnel Lighting System 38
3.9.10. Tunnel Lighting Controls Luminance Sensor 38
3.9.11. Tunnel Emergency Lighting System 38
3.9.12. Tunnel Liner 39
3.10. Tunnel Closure Criteria 39
3.11. Integrated Maintenance Management System (IMMS) 39
4. MINIMUM REQUIREMENTS SUBJECT TO CONSTRUCTION NONCOMPLIANCE EVENTS 39
4.1. Construction Noncompliance Events with Temporary Cures 40
4.2. Notification of Construction Noncompliance Events and Construction Closures 40
5. MINIMUM REQUIREMENTS SUBJECT TO O&M NONCOMPLIANCE EVENTS 41
5.1. Routine Maintenance and Inspection Performance Measures 41
5.1.1. Level of Service Program 41
5.1.2. Maintenance and Inspection Performance Requirements 42
5.2. Mandatory Spares 42

1. GENERAL OBLIGATIONS

The goal of the Department is to ensure that the Project is managed, maintained and operated in a manner that is consistent with Best Management Practice. For the duration of the Term, Developer shall operate and maintain the Project within the O&M Limits.

Developer shall establish a self-monitoring program in order to ensure a safe and reliable roadway system with the main objective of maximizing public safety, reliability and roadway availability. Developer shall coordinate, plan, and perform the O&M Work required under the Contract Documents in a manner that will provide safe conditions for the operations and maintenance staff and the traveling public using the Project, while minimizing traffic disruptions.

The scope of the O&M Work to be completed by Developer shall include, but shall not be limited to, the following:

A. providing for the maintenance and operations of the Project within the O&M Limits for the duration of the Term;

B. providing for the Renewal Work for the Project;

C. providing first responder incident/emergency response and emergency repair; and

D. Provide 24 hours per day 7days per week monitoring at all operation and maintenance centers under the control of the Developer.

The Project shall be available twenty (24) hours per day, seven days per week. Developer shall provide the appropriate staff levels for these hours of operation and be available to assume these responsibilities from NTP 2 through the end of the Term.

The O&M Work will be subject to all requirements set forth in Table 4.1 for O&M During Construction and Table 4.2 for O&M After Construction. The Cure Periods shown in Tables 4.1 and 4.2 will begin either upon notification to Developer, or upon Developer's detection of substandard condition, whichever occurs first. Noncompliance Points will be assessed for Noncomplinaces in Tables 4.1 and 4.2 as shown below.

O&M/ Construction Noncompliance Event Classification	Points
A	1
B	2
C	3
D	4
E	5

1.1. Manuals and Guidelines

Developer shall comply with the most recent versions of the following Manuals and Guidelines and all other Contract Documents:

A. The Department's Maintenance Manual Volume I

B. The Department's Maintenance Manual Volume II

C. The Department's Level of Service Handbook (LOS2000)

D. California Manual on Uniform Traffic Control Devices

E. Presidio Trust Roads & Grounds IPM Program

F. Weed Management Guidelines: Presidio Area B Native Plan Community Zone

1.2. O&M Reference Documents

A list of all other Manuals and Guidelines pertaining to O&M Work has been provided in Volume III.

1.3. Performance Measures

1.3.1. Noncompliance Point System

The occurrence of Noncompliance can trigger Noncompliance Points, as well as monetary damages, under the system set forth in the Contract Documents. Noncompliance with the minimum performance requirements identified in Tables 4.1 and 4.2 for O&M During Construction and O&M After Construction shall be assigned Noncompliance Points as described in Section 6 of the Agreement.

1.3.2. Construction Noncompliance Events

Construction Noncompliance Events result from the failure to meet the minimum requirements set forth in Table 4.1 within the O&M Limits.

1.3.3. O&M Noncompliance Events

O&M Noncompliance Events result from the failure to meet the minimum requirements set forth in Table 4.2 within the O&M Limits.

1.4. Operations & Maintenance Plan

Developer shall develop and submit an O&M Plan which shall include the Operations Manual and Maintenance Manual for the O&M Work. The O&M Plan shall initially address O&M During Construction and be updated during the last annual update cycle prior to Substantial Completion to address O&M After Construction.

Developer shall submit the draft O&M Plan to the Department for review and comment ninety (90) days prior to NTP 2. Developer shall submit the final O&M Plan to the Department for

review and comment thirty (30) days prior to NTP 2. The O&M Plan shall be completed in accordance with the requirements set forth in this Section. Within forty five (45) days prior to the beginning of each Fiscal Year after NTP 2, Developer shall update the O&M Plan and submit it to the Department for review and comment.

The O&M Plan for all O&M Work for O&M During Construction and O&M After Construction shall include at the minimum the following:

A. overview description of all roadway assets, facilities, ITS systems, tunnel systems and equipment within the O&M Limits to be operated and maintained by Developer;

B. description of Developer's approach to inspection, Routine Maintenance, Planned Maintenance and other maintenance services;

C. a staff organization chart and staffing plan including all positions, qualifications, training and certification processes, work locations, and work hours, contact details required for the O&M Work;

D. details of contractors employed to undertake O&M Works;

E. Developer's self-monitoring processes, including a list of the procedures to be used for all activities associated with the Routine Maintenance, Planned Maintenance and other maintenance services, Renewal Work, ITS systems and tunnel systems, including monitoring, response to Emergency, and Incident Response requirements as detailed in Tables 4.1 and 4.2;

F. method of tracking, reporting and calculating Noncompliances, including Construction Noncompliance Events and O&M Noncompliance Events, Noncompliance Points, Construction Closures and Closures, including Permitted Closures and Permitted Construction Closures, Construction Noncomplinace Adjustments, and O&M Noncompliance Adjustments;

G. Developer's approach to quality management and assurance;

H. description of Developer's approach to safety and security for the O&M Work;

I. description of Developer's approach and assumptions for the Renewal Work and equipment/vehicle replacement, including life cycles and Renewal Work Schedule;

J. operating procedures, including monitoring, for the Project's ITS systems and tunnel systems;

K. description of Developer's approach to meeting the quarterly and annual Level of Service Handbook (LOS2000) rating requirements;

L. description of Developer's approach to coordinate with the Department for all permit and inspection process;

M. description of Developer's approach to obtaining all Governmental Approvals required for the O&M Work including any revision, modification, amendment, supplement, renewal or extension thereof;

N. description of Developer's approach to response to Emergency, and Incident Response, including coordination with required third parties;

O. a list of the facilities, including any off-site storage or maintenance facilities that will be used by Developer;

P. a list of vehicles, tools, spare parts and incident response and other major equipment furnished by Developer to support the O&M Work;

Q. the O&M Work activities planned for next 12 months, on a monthly basis; and

R. guidelines and procedures for the efficient, coordinated and consistent implementation of the Safety Plan, Transition Plan, Permit Coordination and Inspection Plan, Traffic Management Plan, Traffic Incident Management Plan, Escort Service Plan and Emergency Response Plan.

1.4.1. Operations & Maintenance Manuals

1.4.1.1. Operations Manual

Developer shall develop and submit, as part of the O&M Plan, a detailed Operations Manual based on the O&M Work. This Operations Manual shall be submitted to meet the requirements set forth in the Contract Documents and shall include information regarding the procedures for O&M During Construction and O&M After Construction. The Operations Manual shall be used by Developer's operations staff and shall be updated in accordance with the requirements set forth in this Section to indicate the operations requirements for the roadway assets, equipment and systems as they are revised, upgraded and/or replaced. The Operations Manual shall be complete and include, at a minimum, the following requirements:

A. a list of operations procedures and protocols, including a schedule of routine operations tasks and the required frequency;

B. a contact list of the various entities and agencies, including the Department, that the operations staff will require coordination with, including their contact information (contact person, address, e-mail address, telephone numbers, website address);

C. a contact list of Developer's key staff who will be coordinating with the Department and other various entities and agencies, including their contact information (contact person, address, e-mail address, telephone numbers, website address);

D. operating protocols, agreements and interactions with other entities such as the Department, municipalities, police, fire and any other similar Governmental Entities;

E. copies of all operations forms and checklists, including Construction Noncompliance Event and O&M Noncompliance Event logs, Noncompliance logs related to the performance of the O&M Work, and Closures and Construction Closures logs, including Permitted Closures and Permitted Construction Closures;

F. policies and procedures for handling personal injury or public safety concerns;

G. steps and procedures for coordinating with third parties and managing traffic during third party events;

H. establish procedures for external communications; and

I. approach and procedures to response, remediation and clean-up efforts associated with fuel spills, hazardous materials or other contamination causing events.

1.4.1.2. Maintenance Manual

Developer shall develop and submit as part of the O&M Plan, a detailed Maintenance Manual based on the O&M Work. This Maintenance Manual shall be submitted to meet the requirements set forth in the Contract Documents and shall include information regarding the maintenance procedures for O&M During Construction and O&M After Construction. The Maintenance Manual shall be used by Developer's maintenance staff and shall be updated in accordance with the requirements set forth in this Section to indicate the maintenance requirements for the roadway assets, equipment and systems as they are revised, upgraded and/or replaced. The Maintenance Manual shall be complete and include the following minimum requirements:

A. a list of Routine Maintenance and Planned Maintenance procedures and required frequencies for all roadway assets, landscaped areas, ITS systems and tunnel systems;

B. a logical system breakdown of all roadway assets, ITS systems and tunnel systems, including facilities equipment and systems and the levels of maintenance to be provided by Developer's staff;

C. list of the Project's major systems and equipment manufacturers/vendors, including their contact information (contact person, address, telephone numbers, website address and e-mail address);

D. list of Contractors used to perform any roadway assets, landscaped areas, ITS systems and tunnel systems maintenance services and the identification of the services expected to be provided; Roadway assets, ITS systems and tunnel systems routine and preventative maintenance tasks and the required frequencies;

E. diagnostic procedures for equipment and systems;

F. spare parts inventory procedures for all roadway assets, ITS systems and tunnel systems;

G. systems, software and equipment manufacturer's O&M manuals;

H. copies of all as-built drawings, when available and applicable as required by Division II, Section 3, that detail the Elements of the O&M Work and Renewal Work to be provided and the physical limits or boundaries of the O&M Work, including wiring diagrams, schematic drawings, logic block diagrams, assembly and disassembly drawings clearly identifying the components;

I. copies of all inspection forms, checklists, etc.; and

J. a summary listing of all maintenance tasks for all roadway assets, ITS systems and tunnel systems categorized by system/discipline. Standard service manuals for commercially available equipment and products shall be acceptable only if the equipment provided is standard off-the-shelf equipment without any custom features or functions. Custom equipment and systems shall have custom O&M manuals that include detailed information that addresses the custom features of the equipment provided and shall include drawings. The non-applicable portions of standard manuals shall be neatly encircled and cross hatched to clearly indicate that these sections are not applicable.

1.4.2. Safety Plan

Developer shall perform all O&M Work in a manner to ensure the safety of the public and Developer's and Developer Related Entities employees in accordance with all applicable Laws and safety standards. Developer shall develop a Safety Plan that includes staff training, safety procedures and protocols to address the hazardous conditions associated with the O&M Work. The Safety Plan shall address Developer's approach to meeting all the requirements set forth below and shall be included in the O&M Plan.

A. Developer shall ensure the safety of all its personnel and shall maintain the safety required and provide safety equipment and procedures for the protection of employees and the public throughout the area(s) of the applicable O&M Limits;

B. Developer shall ensure that all equipment used shall be maintained in a safe and efficient manner in accordance with all Laws, safety organizations, regulations and guidelines pertaining to providing the required services; and

C. Developer shall follow all safety requirements outlined in the National Electric Safety Code (NESC), the Occupational Safety and Health Administration (OSHA), Cal/OSHA, and any standards or practices for safe installation or maintenance of required equipment per the Contract Documents.

1.4.3. Transition Plan

As part of the initial O&M Plan, Developer shall present a transition plan and submit it for review and comment to the Department. The transition plan shall detail how Developer shall work with the Department to ensure a seamless transfer of O&M responsibilities.

1.5. Maintenance Responsibilities During Construction

Developer shall conduct the O&M Work on the Project at all times from NTP2 regardless of whether NTP3 has been issued and whither actual construction activities are in progress or not. Developer shall include in its O&M Plan a detailed description of the maintenance work within a construction area. Table 4.1 shows Project Elements that shall be maintained by Developer and the minimum performance requirements applicable from NTP 2 to Substantial Completion for O&M During Construction. Further, Developer shall be required to respond to any incident, emergency or event with the appropriate qualified staff, equipment and support personnel required to meet the minimum performance requirement as detailed in Table 4.1 and if needed, correct a failure to meet such minimum performance requirements within the applicable Cure Period.

1.6. O&M Monthly Reports

Developer shall deliver the O&M Monthly Report to the Department no later than the 7th day of each month. The format of the O&M Monthly Report shall be submitted to the Department by Developer for review and comment. The report shall allow the Department to readily verify the calculations necessary for all payments per the Contract Documents. Developer shall prepare the monthly reports in electronic format and each report shall contain as a minimum the following information:

A. a summary of the Planned Maintenance activities for the upcoming month;

B. a summary of the maintenance performed and completed for the previous month and confirmation that Developer performed all O&M Work in accordance with the Contract Documents;

C. a summary of the Planned Maintenance that was not completed for the month, including the reasons for the incompletion of the Planned Maintenance and a summary of deferred days for each deferred item;

D. summary of the maintenance activities performed for the previous month beyond the Planned Maintenance activities for that month;

E. detailed results of all Planned Maintenance and other maintenance work that was performed during the month;

F. summary of results from the latest quarterly and annual Level of Service Handbook (LOS2000) rating if occurring in the past month;

G. summary of landscape maintenance activities;

H. summary of inspected bridges including detailing the bridge repairs and associated maintenance activities;

I. summary of Noncompliance Points assessed including details of each assessment;

J. summary of Construction Noncompliance Events, and O&M Noncompliance Events, including details of each occurrence, the steps taken to remedy the Events, the time taken to remedy, and the changes (if any) made to the O&M Plan based upon the events;

K. summary of Closures, Construction Closures, Permitted Closures and Permitted Construction Closures for the past month including details describing the location and duration;

L. a summary of the status of the Project for the month identifying all Closures, Construction Closures, and explaining as applicable for each Construction Closure whether it is a Permitted Construction Closure, and for each Closure whether it is an Unavailability Event or a Permitted Closures;

M. details on all instances of Construction Noncompliance Events and O&M Noncompliance Events, describing at a minimum: the commencement time, duration, details regarding the cure of such Construction Noncompliance Events and O&M Noncompliance Events, and the status of the Event as of the end of the month;

N. operator event log data including all operator actions and event details for traffic and systems events, security incidents, weather incidents, and the details of Developer's incident response including response time data, response records, etc.

O. Developer's Incident Response logs including a time based report of all actions and activities performed by Developer;

P. detailed results of all inspections, assessments and testing activities, including the related procedures, forms, etc.;

Q. monthly ITS and tunnel systems performance reports; and

R. summary of all ITS systems and tunnel systems activities including:

1) system availability reports/system uptime matrix ;

2) preventative maintenance plan and progress ;

3) device location ;

4) date and time of failure ;

5) description of failure or issues and impacts ;

6) report of failure source;

7) technician responding ;

8) arrival time at device location ;

9) site conditions noted (e.g., weather, accident, fire) ;

10) actions taken (successful or otherwise) ;

11) date and time of resolution ;

12) spare parts used: type, model, serial and control number ;

13) photo documentation (digital only) ;

14) replaced parts: type, model, serial and control number;

15) action for replaced parts (e.g., in-house repair, return to factory) ;

16) general notes ;

17) Mean Time Between Failure (MTBF); and

18) Mean Time Between Repair (MTBR).

1.7. O&M Annual Reports

On an annual basis, Developer shall create a consolidated O&M Annual Report. The O&M Annual Report shall summarize all of the activities associated with O&M Work for the year, the actual maintenance performed for the year, and confirmation that Developer performed all O&M Work in compliance with the Contract Documents.

Developer shall deliver the O&M Annual Report to the Department no later than the 30th day of each Fiscal Year for review and comment. The O&M Annual Report shall be completed in accordance with the requirements set forth in this Section. Developer's O&M Annual Report shall contain the following information:

A. a summary of all O&M Monthly Reports from the preceding year;

B. statement of all adjustments to the O&M Monthly Reports from the preceding year (if any); and

C. a summary of the information requested by the Department (corrected if necessary), by month during the preceding year (if any).

1.8. Renewal Work Plans

Developer shall produce the following plans and reports related to Renewal Work.

1.8.1. Renewal Work Plan

Developer shall submit the five (5) -year Renewal Work Plan to the Department for review and comment forty five (45) days prior to NTP 2. The Renewal Work Plan shall be completed in accordance with the requirements set forth in this Section. Within 45 days of the beginning of

each Fiscal Year after NTP 2, Developer shall update the Renewal Work Plan and submit it to the Department for review and comment.

The Renewal Work Plan shall include the following, at a minimum:

A. Renewal Work Schedule of rehabilitation works to be conducted over the following five years including anticipated timing of each planned work on an annual basis;

B. results of asset condition inspections that have been used to develop the Renewal Work Plan; and

C. planned approach to each renewal project

1.8.2. Renewal Work Reports

Beginning from NTP 2, Developer shall deliver the Renewal Work Report, including any as-built drawings, to the Department no later than the July 31st of each Fiscal Year for review and comment. The Renewal Work Report shall be completed in accordance with the requirements set forth in this Section. The Renewal Work Report shall, at minimum, include the following:

A. a summary of the preceding year's completed Renewal Works performed, including the location, the type of work performed for each Element listed on the Renewal Work Schedule and any other component, including the dates of commencement and completion and the final cost (for both the specific task and for all Renewal Work performed during the Calendar Year);

B. any updated inventory data as a result of the Renewal Work; and

C. a list of any work which was included in the previous year's Renewal Work Schedule, but was not conducted and an explanation of why Developer did not conduct this Renewal Work.

1.9. Emergency Reporting

Developer shall provide to the Department a detailed damage report after the occurrence of an Emergency, natural or otherwise. Emergencies include, but are not limited to fires, Contaminated Materials and other spills, seismic events, or terrorist actions. This report shall include, but not limited to, an individual site analysis with the following information:

A. date and time of Emergency event;

B. cause and description of damage (third party information, if applicable);

C. description of failure or issue and system impacts;

D. site conditions noted;

E. photo documentation (digital only); and

F. damaged asset list.

The damage report by Developer shall include all impacted Project Elements. This work shall be coordinated by Developer with the Department to establish time frames for these reports to be delivered to the Department depending on the severity of the Emergency, but shall not exceed twenty four (24) hours following conclusion of the Emergency.

1.10. Contaminated Materials/Fuel Spills

Developer shall respond to any Contaminated Material or fuel spill event that originates within the O&M Limits. Developer shall provide all qualified staff with the appropriate levels of training and certification and equipment necessary to mitigate impacts that contain contamination and manage all cleanup operations and any monitoring of the affected area(s) in accordance with all Laws and Governmental Approvals. Upon the release of Contaminated Materials, time is of the essence. Developer shall be required to respond promptly to assess the affected area(s), contain and mitigate the contamination, clean-up the affected area(s) and inform the Department. Developer shall further develop a comprehensive plan for the long-term cleanup and monitoring of any contaminated materials as needed. This shall be submitted to the Department for review and comment. Tables 4.1 and 4.2 detail the minimum performance requirements for Contaminated Materials or fuel spill events.

1.11. Utilities

Developer shall coordinate with all utility providers and provide payment of all utility costs generated within the O&M Limits necessary to meet all of the O&M requirements set forth in the Contract Documents for O&M During Construction and O&M After Construction, with the exception of lighting costs as specified in Division II, Section III, 15 – Utilities.

1.12. Project Element Monitoring

The Department may conduct a condition survey for and all Project Elements in accordance with the Department's Level of Service Handbook (LOS2000) at any time. These condition surveys would serve as a quality control check of Developer in order to ensure that Developer is consistently monitoring the condition of Project Elements in accordance with the Contract Documents.

1.13. Staff Conduct and Appearance

Developer shall ensure all persons engaged in O&M Work shall exercise sound judgment in carrying out their duties and conduct themselves in such a manner that will reflect favorably upon the Department. The Department also reserves the right to require removal of any person engaged in O&M Work from the Project who cannot perform his or her duties or who damages the reputation of the Department. Developer shall ensure that all persons engaged in O&M Work shall:

A. wear clean and neat uniforms;

B. wear a picture ID; and

C. be well groomed and courteous at all times.

1.14. Sustainability Management Plan for the O&M Period

Thirty (30) days after Substantial Completion Date Developer shall submit to the Department for review and comment a revised Sustainability Management Plan that takes into account the change in activities from construction to operations and maintenance.

Developer shall deliver annual monitoring reports to the Department no later than the 30th day of each Fiscal Year for review and comment.

Developer shall update the Sustainability Management Plan every five (5) years during the O&M period to enable application of new Best Management Practice and shall be completed in accordance with the requirements set forth in this Section.

The revised Sustainability Management Plan and all subsequent updates shall address all major operations and maintenance activities including renewal work.

1.15. Use of Pesticides

Developer shall use pesticides in accordance with all Laws and Governmental Approvals, permits, and regulations as set forth in Tables 4.1 and 4.2. Developer shall comply with all Department standards inside the Operating Period O&M Limits and all Presidio Trust standards outside the Operating Period O&M Limits.

2. MAINTENANCE REQUIREMENTS

2.1. Roadway Maintenance Requirements

O&M During Construction and O&M After Construction will be subject to all requirements and Cure Periods set forth in Table 4.1 and Table 4.2 for areas within the O&M Limits.

2.1.1. Routine Maintenance

Developer shall provide all Routine Maintenance activities within the O&M Limits to maintain a safe and reliable roadway system. Developer shall provide properly trained staff to perform all Routine Maintenance activities.

Developer shall coordinate Permitted Closures and Planned Maintenance with the Department a minimum of two weeks in advance of the Permitted Closure. Developer shall notify the Department immediately when closing any Traffic Lane for an unplanned lane closure when the circumstances arise.

2.1.2. Planned Maintenance Scheduling and Permitted Closures

Developer shall prepare Planned Maintenance Schedules on a monthly and annual basis in accordance with the requirements set forth in this Section and the Contract Documents. The Planned Maintenance Schedules shall describe, for each section within the O&M Limits, all of

the Planned Maintenance for the given period. These schedules shall include the expected dates, locations, times, and durations of each Planned Maintenance activity.

A lane closure for a Planned Maintenance activity will be deemed a Permitted Closure only if traffic analysis performed by Developer indicates that a Traffic Backup will not occur. If a Traffic Backup does occur during the execution of a Planned Maintenance activity as a result of the activity, the activity shall be discontinued and rescheduled at a later time, to the extent feasible. Prior to undertaking any Planned Maintenance Activity, Developer shall prepare a contingency plan to expedite reopening of closed lanes in the event of a Traffic Backup.

Developer may schedule Planned Maintenance for specific Traffic Lanes or portions of Traffic Lanes for any time between 11:00 PM and 6:00 AM on the nights of Sunday, Monday, Tuesday, Wednesday and Thursday into the mornings of Monday, Tuesday, Wednesday, Thursday and Friday each week, provided that:

A. Developer shall make reasonable efforts to close only one Traffic Lane on any given portion of roadway when performing Planned Maintenance;

B. maintenance work, including Planned Maintenance that results in the closure of 2 out of 3, 3 out of 4 or 4 out of 5 Traffic Lanes of the Project will not be a Permitted Closure, except with prior concurrence from the Department. No Planned Maintenance work shall involve the closure of all Traffic Lanes on any portion of the Project;

C. to the extent that Planned Maintenance involves Permitted Closures, Developer shall implement and execute such Permitted Closures in accordance with the lane closure and traffic management requirements and procedures in accordance with Appendix T10 of the Department's Maintenance Manual Volume I; and

D. any Planned Maintenance activity and traffic lane closures outside the hours stated above shall be at the sole discretion of the Department.

Notwithstanding the foregoing, in the event that any Traffic Lane is the subject of a Permitted Closure, and a Closure that is not a Permitted Closure occurs in the lanes remaining in service, then the lanes subject to the Permitted Closure also shall be deemed to be subject to a Closure which is not a Permitted Closure.

2.1.3. Renewal Work

Developer shall diligently perform Renewal Work as and when necessary to maintain compliance with all required performance measures and standards. Developer shall perform Renewal Work according to the Contract Documents, Governmental Approvals and all applicable Laws. Developer shall use the Renewal Work Schedule, as updated from time to time, as a guide for scheduling and performing Renewal Work.

2.1.3.1. Renewal Work Schedule

Developer shall prepare and submit annually to the Department for its review and comment a Renewal Work Schedule for the next five Fiscal Years. The Renewal Work Schedule shall set forth, by Element:

A. the estimated Design Life;

B. the estimated Residual Life;

C. a brief description of the type of Renewal Work anticipated to be performed at the end of the Element's Residual Life;

D. the estimated cost in current Fiscal Year dollars of such Renewal Work;

E. the total estimated cost in current Fiscal Year dollars of Renewal Work in each of the years Renewal Work is anticipated to be performed under the Renewal Work Schedule; and

F. a schedule of anticipated closures and work windows for the performance of the Renewal Work covered by the Renewal Work Schedule during the upcoming five Fiscal Years and in accordance with the Contract Documents.

2.1.4. Compliance Work

If Developer is required to perform Compliance Work, Developer shall exercise commercially reasonable efforts to perform such work concurrently with previously scheduled Planned Maintenance. If the Compliance Work cannot be performed concurrently, Developer may schedule additional Planned Maintenance for Compliance Work in consultation with the Department and subject to the requirements for Planned Maintenance Scheduling set forth in this Section.

2.2. Bridge Inspections and Maintenance

2.2.1. Bridge Inspections

Developer shall conduct bridge inspections within the O&M Limits in accordance with all Laws and Governmental Approvals. Developer shall retain an engineer that at a minimum:

A. is a Professional Engineer or has at least ten years of bridge inspection experience; and

B. has successfully completed a Federal Highway Administration (FHWA) approved comprehensive bridge inspection training course.

Developer shall create inspection reports in a format consistent with the Department's Integrated Maintenance Management System. Developer shall furnish the Department an original signed and sealed bridge inspection report and a color copy within 60 days after completion of each inspection report, as part of the O&M Monthly Report submittal. As a part of bridge inspection

duties, Developer shall determine if a review of the current load rating capacity is warranted for each inspection. If warranted, Developer shall perform revised bridge load rating analyses.

Developer shall immediately notify the Department verbally if field observations reveal deficiencies sufficiently critical to warrant immediate and substantial traffic restriction or closing of the bridge. Developer shall confirm the verbal notification with a written notification within four hours. Developer shall maintain all bridge records at all times in preparation for audit reviews. Developer shall ensure bridge inspectors attend appropriate bridge inspection training as provided by the Department. The Department may provide, as guidance, quality control checklists/criteria to Developer. The Department may perform quality assurance audits using these checklists by inspecting bridges that have been previously inspected by Developer and by reviewing the inspection records for conformity with the Department's findings.

2.2.2. Bridge Maintenance

Developer shall perform Routine Maintenance, minor bridge repair and major repairs, including collision damage repairs, defined as follows:

A. Routine Maintenance: The preservation and upkeep of a structure, including all its appurtenances, in its original condition (or as subsequently improved) insofar as practical. Routine Maintenance includes any activity intended to maintain an existing condition or to prevent deterioration. Examples include but are not limited to: cleaning, lubrication, spot painting, dirt and debris removal, and application of protective systems.

B. Repair of minor damage: Minor repairs include any activity intended to correct the effects of minor material deterioration by restoring the damaged member. Minor repairs are generally defined as repairs to bridge elements that are structurally sound (i.e., no loss of strength), but may have minor section loss, cracking, spalling, or scour. Minor repairs are typically unanticipated maintenance work as identified by Developer's bridge inspectors. Minor damage repair work includes but is not limited to:

1) damaged or misplaced clearance markers;

2) damaged or missing advisory and warning signs;

3) scaled or deteriorated paint on timber railings and curbs;

4) damaged or deteriorated railings and curbs;

5) uneven or cracked approach and deck surfacing;

6) broken or loose timber decking;

7) accumulated drift adjacent to bents and piers;

8) minor erosions;

9) accumulated dirt or debris on decks, near stringer ends at supports, adjacent to bearings, and on chords of trusses;

10) plugged drains;

11) settlement or roughness of approach;

12) fire hazards; and

13) faulty electrical contact.

C. Repair of major damage: Some damages are considered major because they affect structural stability of an entire span, thus requiring underpinning of the span or supplementing of the member before removal. Others are included in this group because the cause of the damage, and thus the measures needed to correct the damage, are numerous and varied requiring structural or other technical advice, or the damage may cause equipment failure. Conditions requiring major repairs include loss of section, deterioration, spalling, or scour that affect the strength of the structure. Developer shall perform engineering analysis to determine the extent of the lost strength. Major damage repair work includes, but is not limited to:

1) bent or damaged steel beams, girders, or truss members;

2) cracked or spalled concrete members, other than curb and railing;

3) crushed or decayed timber stringers, caps, posts or piles;

4) broken or weakened chord members of failed truss joints;

5) unusual looseness or vibration of truss members;

6) defective bearings on substructure or in deck at expansion joints;

7) settled bents or piers;

8) major erosion or scour;

9) lack of paint on steel members, other than curb and railing;

10) extensive fire damage;

11) excessive noise or vibration from operating machinery;

12) lack of lubricant in machinery bearings; and

13) loose bolts.

D. Rehabilitation: The improvement or betterment of a structure, including all its appurtenances, to a condition meeting or exceeding current design standards, insofar as practical shall be considered Renewal Work.

E. Bridge Painting: Developer shall maintain all paint systems on structures to the original condition as intended in the design. Spot painting is only acceptable for active corrosion areas as a preventive measure. For aesthetic reasons, the paint system shall always be of uniform color and appearance.

The Department may periodically perform quality assurance reviews by inspecting bridge repairs and maintenance activities recently completed by Developer. In addition, the Department may perform field reviews of completed work for quality and completeness of the repair. All bridge records shall be made available to the Department for review at any time during the Term upon at least forty eight (48) hours notice.

2.3. Other Structures Inspection and Maintenance

Other structures such as tunnels, drainage, and retaining walls shall be inspected and maintained in accordance with the provisions set forth in Tables 4.1 and 4.2.

2.4. ITS Systems Maintenance

2.4.1. General

The scope of ITS systems maintenance shall include any activities necessary to comply with the uptime performance requirements for all ITS system components set forth in Table 4.1 and Table 4.2.

All equipment and component parts that are furnished shall be new, unused and shall otherwise meet all requirements of the Contract Documents. All parts shall be of high quality workmanship and no part or attachment shall be applied contrary to the manufacturer's recommendations or standard practice. Developer shall maintain and have readily available an up to date inventory of all ITS equipment and/or parts. The inventory shall contain, at a minimum:

A. Manufacturer;

B. Model number;

C. Descriptive name;

D. Manufacturer serial number;

E. Spare or newly ordered part;

F. Location where installed including stationing, if possible;

G. Date of purchase;

H. Date of repair;

I. Date when scrapped;

J. Calibration status & date;

K. Manufacturer’s routine maintenance schedule; and

L. Warranty status if applicable.

2.4.2. Troubleshooting Work, Repair, and Parts and Materials

Upon the observation or a notification of a malfunction or problem with the ITS system, the Developer shall dispatch qualified personnel to provide diagnostic and troubleshooting services as required, to identify the problem and, if possible, perform minor repairs to fix the problem while at the site.

Developer shall conduct the minor repairs that are needed during Developer's diagnostic work. Minor repairs include, but are not limited to, replacement of any spare parts in the current spare parts inventory, reset of electric, electronic or electromechanical devices, reset of the device or PC/PLC controllers, reset programs, replace missing screws or clamps, loose connection of any wires, cables, or harnesses, replacement of fuses and/or circuit breakers.

Developer shall conduct Routine Maintenance and repair or replace damaged, missing or malfunctioning equipment in order to maintain the system operation and functionality in order to meet the requirements set forth in Table 4.1 and Table 4.2.

Developer shall provide replacement parts as needed for the maintenance of the ITS system. The replacement part shall be the latest compatible technology, equal to or better in function and quality to meet or exceed the original equipment manufacturer's standards for the existing system component or equipment, and by its use, does not cause a system upgrade. Developer shall maintain inventory control of all replacement equipment.

2.4.3. Existing Communication Links

Developer shall protect any existing communication links within the O&M Limits. If any communication link is damaged by Developer or the public, it is the responsibility of Developer to repair or replace the damaged communications equipment (fiber optic cable, conduit, pull boxes, splice cabinets, hubs, etc.). Damaged fiber optic cable may be temporarily spliced to restore communications; however, any damaged fiber optic cable will be replaced from termination point to termination point with the same type of cable as set forth in Tables 4.1 and 4.2.

2.4.4. ITS Maintenance Service Descriptions

Developer shall provide the following ITS emergency maintenance, non-scheduled maintenance, and Routine Maintenance services as part of the overall Project infrastructure maintenance program. The response time is defined as the time allowed Developer to mobilize its personnel, equipment, tools, parts, and materials at the work site. Developer shall notify the management center when the maintenance actions have been completed and describe any resulting operational restrictions.

2.4.4.1. Emergency Maintenance Repair

Emergency maintenance response will be required when: a device or component of the device, results in the complete failure to critical operational elements of the ITS system; or any ITS system infrastructure item that is in a condition that is unsafe and/or may present a life threatening condition. Typical emergency maintenance response will be required for, but not be limited to:

A. system-wide communication outage;

B. structural failure or potential structure failure due to Incident or weather damage;

C. message being stuck on an electronic message sign;

D. fiber/cable cuts, electrical risks, or potential fire risks;

E. incident detection system failure; and

F. traffic signal failure.

Developer's maintenance staff shall arrive at the facility within 10 minutes during the hours of 6:00 AM to 7:00 PM, Monday through Friday, and within one hour at all other times outside these hours, once Developer detects or is notified of the emergency maintenance related system failure.

Upon arrival at the site, Developer shall update the Department of the status of the emergency maintenance. Developer shall then analyze the situation and develop an estimate of the time required for repairs and analyze if a lane or roadway closure is necessary. Developer shall determine if the repair should be initiated immediately or if the situation should be monitored through High Priority Hours and repaired during Low Priority Hours. If the repair time will exceed two hours, Developer shall notify the Department immediately and begin preparation of a contingency plan. A work-around should be considered if it would not negatively impact any part of the Project operations. Developer shall notify the Department when the maintenance actions have been completed and describe any resulting operational restrictions.

2.4.4.2. Non-Scheduled Maintenance Work

Non-scheduled maintenance will be required when a device or component of the device, has failed and must be repaired in order for the ITS system to function as required. Developer's maintenance staff shall arrive at the work site within twenty four (24) hours once Developer detects or is notified of the non-scheduled maintenance related system failure.

Upon arrival at the site, Developer shall update the Department of the status and estimated time required for repairs. If the repair time will exceed twenty four (24) hours, Developer shall notify the Department immediately and begin preparation of a contingency plan. A work-around should be considered if it would not negatively impact any part of the Project operations. Developer shall notify the Department when the maintenance actions have been completed and describe any resulting operational restrictions.

2.4.4.3. Routine Maintenance Work

Developer shall perform all Routine Maintenance within the periodic intervals as recommended and specified by the equipment manufacturer, and based on the equipment's operating condition over the duration of the Term. Routine Maintenance shall consist of Developer performing necessary inspections, electrical and mechanical tests and repairs of the device sites to maintain the ITS system.

Developer shall provide a standard Routine Maintenance schedule/checklist of the items to be checked or changed on the ITS system. Such plans shall be updated periodically to reflect any future system renewals during the Term. Developer shall submit a sample Routine Maintenance schedule/checklist for review and comment by the Department.

Power and communications service runs shall be kept cleared for easy recognition of the pull boxes and easy access to the service run. Dirt, plants, weeds, etc. shall be removed from pull box covers. The areas surrounding the controller cabinet's utility service poles, camera/device poles, and sign structures shall be mowed/trimmed and free of insects (i.e. ants, bees, etc.). The interior of all ITS controller and system cabinets shall be free of excess dust, dirt, debris, cobwebs, etc. The exterior of the ITS system devices shall be cleaned quarterly. This service shall be performed in conjunction with the Routine Maintenance.

Developer shall ensure that the cable plant markers are in place and that they are in good condition. This service shall be provided each as part of the Routine Maintenance, for each marker, for the entire ITS system. If a need arises for Developer to purchase replacement cable plant markers, these markers shall be similar to the existing markers and Developer shall ensure that the same markings are used to identify the cable route.

2.5. Tunnel Systems Maintenance

2.5.1. General

The scope of tunnel systems maintenance shall include any activities necessary to comply with the uptime performance requirements for all tunnel system components set forth in Table 4.1 and Table 4.2.

All equipment and component parts that are furnished shall be new, unused and shall otherwise meet all requirements of the Contract Documents. All parts shall be of high quality workmanship and no part or attachment shall be applied contrary to the manufacturer's recommendations or standard practice. Developer shall maintain and have readily available an up to date inventory of all tunnel systems equipment and/or parts. The inventory shall contain, but not be limited to, at a minimum:

A. Manufacturer;

B. Model number;

C. Descriptive name;

D. Manufacturer serial number;

E. Spare or newly ordered part;

F. Location where installed including stationing, if possible;

G. Date of purchase;

H. Date of repair;

I. Date when scrapped;

J. Calibration status and date;

K. Manufacturer's routine maintenance schedule; and

L. Warranty status if applicable.

2.5.2. Troubleshooting Work, Repair, and Parts and Materials

Upon the observation or a notification of a malfunction or problem with the tunnel system, it is Developer's responsibility to dispatch qualified personnel to provide diagnostic and troubleshooting services as required, to identify the problem and, if possible, perform minor repairs to fix the problem while at the site.

Developer shall conduct the minor repairs that are needed during Developer's diagnostic work. Minor repairs include, but are not limited to, replacement of any spare parts in the current spare parts inventory, reset of electric, electronic or electromechanical devices, reset of the device or controllers, reset programs, replace missing screws or clamps, loose connection of any wires, cables, or harnesses, replacement of fuses and/or circuit breakers.

Developer shall conduct Routine Maintenance and repair or replace damaged, missing or malfunctioning equipment in order to maintain the system operation and functionality in order to meet the requirements set forth in Table 4.1 and Table 4.2.

Developer shall provide replacement parts as needed for the maintenance of the tunnel system. The replacement part shall be the latest compatible technology, equal to or better in function and quality to meet or exceed the original equipment manufacturer's standards for the existing system component or equipment, and by its use, does not cause a system upgrade. Developer shall maintain inventory control of all replacement equipment.

2.5.3. Tunnel Maintenance Service Descriptions

Developer shall provide the following tunnel system emergency maintenance, non-scheduled maintenance, and Routine Maintenance services as part of the overall Project infrastructure maintenance program. The response time is defined as the time allowed Developer to mobilize its personnel, equipment, tools, parts, and materials at the work site. Developer shall notify the management center when the maintenance actions have been completed and describe any resulting operational restrictions.

2.5.3.1. Emergency Maintenance Repair

Emergency maintenance response shall be provided by Developer twenty four (24) hours per day, seven (7) days per week, every day of the year when:

A. a device or component of the device, results in the complete failure to critical operational elements of the tunnel systems; or

B. any tunnel system infrastructure item that is in a condition that is unsafe and/or may present a life threatening condition.

Typical emergency maintenance response will be required for, but not be limited to:

A. system-wide communication outage;

B. structural failure or potential structure failure due to Incident or weather damage;

C. fiber/cable cuts, electrical risks, or potential fire risks;

D. incident detection system failure;

E. variable message signs that close the tunnel; and

F. traffic signal failure.

Developer's maintenance staff shall arrive at the facility within ten (10) minutes during the hours of 6:00 AM to 7:00 PM, Monday through Friday, and within one (1) hour at all other times outside these hours, once Developer detects or is notified of the emergency maintenance related system failure.

Upon arrival at the site, Developer shall analyze the situation and develop an estimate of the time required for repairs and analyze if a lane or roadway closure is necessary. Developer shall determine if the repair should be initiated immediately or if the situation should be monitored through High Priority Hours and repaired during Low Priority Hours. If the repair time will exceed two hours, Developer shall notify the Department immediately and begin preparation of a contingency plan. A work-around should be considered if it would not negatively impact any part of the Project operations. Developer shall notify the Department when the maintenance actions have been completed and describe any resulting operational restrictions.

2.5.3.2. Non-Scheduled Maintenance Work

Non-scheduled maintenance will be required when a device or component of the device, has failed and must be repaired in order for the tunnel systems to function as required. Developer's maintenance staff shall arrive at the work site within twenty four (24) hours once Developer detects or is notified of the non-scheduled maintenance related system failure.

Upon arrival at the site, Developer shall update the Department of the status and estimated time required for repairs. If the repair time will exceed twenty four (24) hours, Developer shall notify the Department immediately and begin preparation of a contingency plan. A work-around should be considered if it would not negatively impact any part of the Project operations. Developer

shall notify the Department when the maintenance actions have been completed and describe any resulting operational restrictions.

2.5.3.3. Routine Maintenance Work

Developer shall perform all Routine Maintenance within the periodic intervals as recommended and specified by the equipment manufacturer, and based on the equipment's operating condition over the duration of the Term. Routine Maintenance shall consist of Developer performing necessary inspections, electrical and mechanical tests and repairs of the device sites to maintain the tunnel systems.

Developer shall provide a standard Routine Maintenance schedule and checklist of the items to be checked or changed on the tunnel systems. Such plans shall be updated periodically to reflect any future system renewals during the Term. Developer shall submit a sample Routine Maintenance schedule/checklist for review and comment by the Department.

The interior of all tunnel system controllers and cabinets must be free of excess dust, dirt, debris, cobwebs, etc. The exterior of the tunnel systems devices shall be cleaned quarterly. This service shall be performed in conjunction with the Routine Maintenance in order to minimize traffic disruption.

3. OPERATIONS REQUIREMENTS

Developer shall operate the Project within the O&M Limits with the main objectives of maximizing safety and reliability, minimizing disturbances to Users, and protecting the environment. Developer shall provide the appropriate number of properly trained operations staff to perform the operating duties specified herein. The O&M Work will be subject to all requirements set forth in Table 4.1 and Table 4.2.

Developer shall maintain at all times staffing levels required to ensure the Project's operating requirements are met. A minimum of one staff member assigned by Developer shall be fully certified by the manufacturer in the maintenance and repair of the deployed device model, qualified and trained to handle all System requirements for O&M During Construction and O&M After Construction.

Throughout O&M During Construction and O&M After Construction, the Department will conduct reviews of the various phases of Developer's operation. Developer shall cooperate and assist the Department throughout this review process.

For O&M During Construction, Developer shall manage all ITS and tunnel operations at the temporary facility located adjacent to the Southbound Battery Tunnel substation. For O&M After Construction, Developer shall procure, install, configure, operate, maintain and support its own permanent management center that is completely separate from the Department. This permanent management center may be physical or virtual but will handle the operations and maintenance of all ITS and tunnel systems, including monitoring. The Department will require data to support

their regional operations, but the Department will not manage that data. Developer shall push the required data from its management center to the Department's District 4 facilities.

3.1. ITS Operations

Developer shall use the data from the monitoring systems to satisfy the requirements in Table 4.1 and Table 4.2 and in the O&M Monthly and Annual Reports. The performance measures reported shall be the accountability assessment of Developer's overall performance. The Department will have the right to disseminate any and all data and video collected by ITS systems located on the Project.

Due to the prospect of continuous technology evolution, the Department will likely adopt new ITS standards and substantial revisions of the existing ITS standards during the Term. If at any time the Department revises and/or adopts new ITS standards and upgrades, replaces or changes it's ITS systems and infrastructures, Developer shall do the same in accordance with the new ITS standards, and the same will constitute Mandatory Technology Enhancements. Developer shall perform these Mandatory Technology Enhancements on an implementation schedule compatible with the Department's implementation schedule.

3.1.1. ITS System Monitoring and Availability

Developer shall develop a system uptime matrix and submit it as part of the O&M Monthly Reports. The matrix shall include all device systems and subsystems for all existing ITS devices, and temporary and the permanent ITS deployments, including but not limited to a fiber optic communication network subsystem, traffic monitoring subsystem, traffic signal subsystem, video image vehicle detection system (VIVDS), microwave video detection system (MVDS), loop detection, X (Changeable, Variable, or Extinguishable) message signs (XMS), highway advisory radio (HAR), AM/FM rebroadcast/override, closed circuit television (CCTV) cameras, security cameras, 800 MHz radio, public address, incident detection, roadway weather information system (RWIS), security system, call boxes and visibility sensor

Developer's ITS operating procedures shall indicate the operational status of each ITS system device and shall create an event to indicate when each device is inoperable and an event to indicate when each ITS system device has returned to service. The system event log and timeline for this system shall be included in the reports. This matrix shall be included with the O&M Monthly Report and as a stand-alone annual report documenting the total uptime and percentage available (ex: 99.99%) for that year per device with a weighted average for the total equipment percentage reported. Downtime related to incidents or natural disasters shall be recorded separately from all other ITS system failures.

3.1.2. Network and Utility Services

Developer shall deploy, operate and maintain a Geographic Information System (GIS) and relational database based fiber optic network management software such as OSP Insight or similar. Developer shall populate the database and update promptly the latest detailed

information about Developer's fiber optic network. Developer shall have the necessary equipment and personnel capable of performing various types of fiber optic repair needed in the field including, but not limited to: mid-span fiber splicing, fiber trunk splicing, OTDR testing, fiber enclosure /fiber distribution panel installations, and terminations.

3.1.3. Data and Video Sharing

Developer shall provide to the Department in real time all ITS data collected as well as all live streaming video. Real time shall be defined as the transmission of data and video by Developer to the Department within one second of collection by Developer. Developer shall not record video obtained through the use of ITS cameras without prior written permission from the Department.

Developer shall not provide data or live video feeds to any person, organization or entity without prior written permission from the Department.

3.1.4. ITS Standards

Developer shall perform the O&M Work in accordance with the requirements of the standards listed by priority below. If there is any conflict in standards, adhere to the standard with the highest priority. However, if Developer's submittal has a higher standard than any of the listed standards, Developer shall adhere to the higher submittal standard. If there is any unresolved ambiguity in standards, it is Developer's responsibility to obtain clarification before proceeding with O&M Work and Renewal Work.

Intelligent Transportation Systems Standards and Requirements		
Priority	Agency	Title
1	Department	Traffic Manual
2	Department	2006 Revised and New Standard
3	Department	Standard Plans May 2006
4	Department	Build Modifications to the Standard Specifications for Construction
5	Department	Standard Specifications
6	Department	Construction Manual
7	Department	Technical Memoranda
8	Department	Plans Preparation Manual
9	AASHTO	Roadside Design Guide

3.2. Traffic Incident Management

Developer shall detect and respond to all traffic or roadway-related incidents in the project and tunnel roadways as set forth in Tables 4.1 and 4.2. This includes all required notifications, traffic and facility controls systems activations and the arrival, on the scene of the incident, of appropriate equipment and personnel from Developer's field response team for the incident level.

Developer shall log and record the sequence of all actions taken by all in response to the incident. This policy will apply to incidents and events that impede or have the potential to impede the flow of traffic through the tunnel and is designed to promote quick response to incidents in the tunnel and to ensure that the tunnel roadway is open and available for traffic.

3.2.1. Event Process

Developer shall have four basic tasks with regard to incident response:

A) incident detection;

B) confirmation and gathering of information;

C) notification; and

D) response,

as described below:

3.2.1.1. Incident Detection

Incidents can be detected either by Developer or by various external sources, such as motorists or law enforcement.

3.2.1.2. Confirmation and Gathering of Information

Confirmation by Developer may be accomplished primarily through the use of the CCTV camera system. Design of the system will facilitate the confirmation process by automatically providing Developer with location information, such as mile marker or other relevant location information, that be confirmed via CCTV camera coverage or by response staff in the field. Design of the system will also include automatic camera selection, where CCTV coverage of a detected incident is automatically provided from the nearest camera in the vicinity of the incident and displayed at Developer's traffic operations center.

3.2.1.3. Notifications

Developer will notify the appropriate emergency response personnel of the detected incident. These notifications may include the Department, California Highway Patrol (CHP), United States Park Police, National Park Service Rangers, Presidio Fire Service, San Francisco Fire Department and other third parties as appropriate.

3.2.1.4. Response

Responses to incidents will involve both automatic system responses and manual actions invoked by Developer. Automatic system responses include any actions initiated by the various hardware and software systems that do not require direct intervention by Developer. These actions shall be predetermined to invoke the appropriate system based response for the situation at hand.

Manual responses include any actions initiated by Developer in response to an incident. Developer shall manually prepare and activate response plans in accordance with established procedures in response to a detected and confirmed incident.

3.2.2. Traffic Incident Management Plan

Developer shall provide a Traffic Incident Management Plan for dealing with major accidents and incidents. The objective of the plan is to make sure that Developer has the available resources to respond to the requests from the Department, CHP, and other designated agencies for first response, vehicle recovery and clearance services. The need for additional trucks and heavy equipment shall be jointly determined at the Incident scene by CHP and Developer's representatives.

3.2.2.1. Traffic Incident Management and Clearance Requirements

Developer shall provide appropriately trained staff and equipment to enable them to respond to incidents as set out in Tables 4.1 and 4.2.

3.2.2.2. Staffing Certifications and/or Licenses

Developer shall ensure that the traffic incident management staff are trained and qualified, prior to the start of their service, to perform the following activities:

A. incident management and command;

B. advanced maintenance of traffic;

C. incident documentation and report writing;

D. emergency vehicle operation;

E. first response; and

F. handling of Contaminated Materials.

3.2.3. Communications/Media Relations

At all times, the Department will serve as the primary contact for all media relations on traffic incidents. Developer shall direct all media inquiries to the Department.

At no time will Developer staff offer the media an opinion on the cause of an Incident, supply tag numbers or detailed descriptions of vehicles involved in an Incident. Developer shall not discuss information gathered from other agencies on a scene. Media questions pertaining to incident investigations and rescue efforts will be forwarded to the agencies performing such activities. Any media requests for an interview shall be forwarded to the Department.

3.3. Maintenance of Traffic (MOT)

Developer shall perform all traffic maintenance required for the O&M Work in accordance with the requirements of the standards listed by priority below. If there is any conflict in standards,

adhere to the standard with the highest priority. However, if Developer's submittal has a higher standard than any of the listed standards, Developer shall adhere to the higher standard. If there is any unresolved ambiguity in standards, it is Developer's responsibility to obtain clarification before proceeding with the O&M Work or Renewal Work.

Maintenance of Traffic Standards and Requirements		
Priority	Agency	Title
1	Department	Transportation Management Plan (TMP) Guidelines
2	Department	Technical Memoranda
3	Department	California Manual on Uniform Traffic Control Devices
4	Department	Standard Special Provisions
5	Department	2006 Revised and New Standard Plans
6	Department	Standard Plans May 2006
7	Department	Design-Build Modifications to the Standard Specifications and Standard Special Provisions
8	Department	Standard Specifications
9	Department	Highway Design Manual
10	AASHTO	A Policy on Geometric Design of Highways and Streets,
11	AASHTO	Roadside Design Guide, 3rd Edition

3.3.1. Traffic Management Plan

Developer shall develop, implement, and maintain a Traffic Management Plan that conforms to the provisions in Sections 7-1.08 "Public Convenience", Section 7-1.09 "Public Safety", and Section 12 "Construction Area Traffic Control Devices" of the Department's Standard Specifications and includes the following items, at a minimum:

A. descriptions of the duties for all personnel with traffic management responsibilities;

B. procedures for communications and coordination with the Department's District 4 Traffic Management Center;

C. descriptions of the design methods to be used for temporary roadways and structures including lighting, signing and striping;

D. procedures to identify and incorporate the needs of emergency service providers, law enforcement entities, and other related corridor users;

E. methods and frequency of inspection and maintenance of all traffic control throughout the Project's O&M Limits;

F. descriptions of contact methods, personnel available, and response times for responses to any conditions needing attention during off-hours;

G. procedures to modify the plans as needed to adapt to current Project circumstances;

H. procedures to consult with the Department and other departments and agencies;

I. procedures to communicate TMP information to Developer's public information personnel and notify the public of maintenance of traffic issues;

J. the procedures developed in the TMP shall be used to create the MOT plans;

K. typical and critical cross-sections;

L. major phases of Work and durations/schedule;

M. sequence of construction and narrative; and

N. major road closures and durations including a lane closure analysis.

Developer shall submit the Traffic Management Plan and any updates to the Department for review and comment thirty (30) days prior to the anticipated date for the introduction of the traffic management measures covered by the plan. No traffic management measures shall be commenced until a plan has been prepared by Developer and reviewed by the Department.

Detailed Traffic Control Plans shall be developed for each phase of the construction and major maintenance operations. Developer shall prepare plan sheets, notes, and details as per the Department's Highway Design Manual and the California MUTCD. Developer shall prepare additional plan sheets such as cross sections, profiles, drainage structures, retaining wall details and temporary sheet piling as necessary for proper construction and implementation of the Traffic Control Plan.

Developer shall submit the Traffic Control Plans and any updates to the Department for review and comment thirty (30) days prior to the anticipated date for the introduction of the traffic management measures covered by the plan. No traffic management measures shall be commenced until a plan has been prepared by Developer and reviewed by the Department.

3.3.2. Moveable Barriers

Throughout O&M During Construction, Developer shall operate and maintain all moveable barriers on the Project and shall provide all equipment necessary to operate and maintain the moveable barrier in accordance with the lease provisions between the Department and the equipment provider. The moveable barriers shall be used to provide an extra lane in the peak traffic flow direction throughout the Detour phase of the Project. The moveable barriers shall be repositioned to provide an extra lane in the southbound direction of travel from 5:00 AM daily and in the northbound direction of travel from 12:00 PM daily. At the end of the O&M During Construction when the moveable barrier equipment is no longer required for the safe and efficient management of traffic the Developer shall return the equipment to the equipment provider.

3.4. Traffic Operation Systems (TOS)

Developer's traffic operators will monitor and control the TOS devices. Developer will monitor and control the following systems and devices:

A. traffic monitoring system;

B. message sign system (Extinguishable, Variable and Changeable);

C. highway advisory radio (HAR) system;

D. AM/FM Rebroadcast/Override System;

E. public Address system;

F. incident Detection System

G. roadway weather information station (RWIS) system; and

H. traffic signal system.

Developer will monitor only the functionality for the following systems:

A. vehicle Detectors;

B. security/maintenance cameras;

C. communications system; and

D. security system.

Developer shall create and submit detailed minor and major preventative procedures for each sub-system Element. The procedure shall be based on manufacturer's recommendations, and Department and industry standards. Developer shall perform visual inspection, check the operation, and monitor electronically the functionality of each of the ITS sub-system components. Developer shall regularly inspect for fatigue of materials of each system and the associated elements.

Developer shall only maintain ramps as far as the extent of new construction or to where the ramps meet a cross road, whichever is shorter. Developer shall not maintain traffic signals at these interchanges/ junctions or beyond these points.

3.5. Emergency Management

The Department categorizes Emergency Management into two classifications:

A. Governor Declared Emergencies; and

B. Other Emergencies.

For Governor Declared Emergencies, Developer shall perform pre-event preparation and provide initial response post-event to protect the traveling public from grievous hazards created by the event. For Other Emergencies, Developer shall perform all aspects of responding to the

incident/event, including pre-event preparation, post-event initial response, and post-event cleanup and repair. For both classifications of Emergency Management, Developer shall perform the following activities before every foreseeable Emergency Management incident/event:

A. contact vendors and subcontractors to verify quantity, availability, and priority of appropriate equipment and personnel (e.g., variable message boards, chainsaws, sand spreaders). Develop a complete up-to-date list of equipment resources and staging locations and of all stockpiled materials and their locations;

B. in case of possible area evacuations, prepare for implementation of contraflow, including the pre-staging of necessary contraflow resources;

C. if directed by the Department, implement contraflow and remove contraflow devices when complete; and

D. in preparation for high winds, rains, and other impending elements, secure all areas within the O&M limits associated with the O&M Work; and

For all Emergency Management activities, the Department reserves the right to take control of the incident and/or perform recovery work with its own or other contracted forces when the Department determines it is in the Department's best interest to do so.

3.5.1. Emergency Response Plan

Developer shall be fully conversant with the Department's applicable comprehensive emergency management plan as well as the FHWA and FEMA guidelines for federal reimbursement, ensure compliance with all State and Federal emergency management requirements, and administer all response and recovery efforts in accordance with the Contract Documents.

As part of the O&M Plan, Developer shall develop an Emergency Response Plan for roadway assets, ITS systems and tunnel systems that sufficiently replicate the intent of the Department's comprehensive emergency management plan. The Emergency Response Plan shall include, but not be limited to:

A. emergency communications plan with call lists;

B. procedures for Incident/event management;

C. agency & public notifications;

D. assurance of motorist safety;

E. handling of Contaminated Materials;

F. coordination with CHP and other appropriate agencies;

G. assurance of compliance with NFPA requirements for road tunnels, bridges, and other limited access highways;

H. traffic control;

I. coordination with the Department and other agencies to establish or implement pre-established detour routes;

J. maintenance of detour routes;

K. making emergency repairs;

L. debris removal;

M. evacuation/contraflow response;

N. submission of Incident/event reports; and

O. detailed organizational structure with the functions, qualifications, experience level, and contact information of staff assigned to respond to incidents/events

Developer shall comply with all the Department's plans and with all Laws concerning evacuation routes and the handling and disposal of Contaminated Materials.

Developer shall update the Emergency Response Plan annually by engaging in an iterative process of discussion with the Department whereby lessons learned from past experience can be implemented for future use.

3.5.2. Specific Developer Responsibilities for Governor Declared Emergencies

Governor Declared Emergencies are Incidents/events that prompt the Governor of California to declare a State of Emergency in response to the Incident/event. Governor Declared Emergencies will most commonly be earthquakes, wildfires, winter storms and other natural disasters, but can include smaller natural disasters/events/storms acts of God and incidents/events resulting from human interactions.

Developer shall perform the following five (5) post-event activities. The Department will not provide additional compensation to Developer for the performance of these five (5) post-event activities:

A. search all roadways covered by this contract for grievous hazards (roadway washouts/cave-ins, downed electrical lines, non-traversable bridges, etc.). This may include clearing some debris from the roadway in order to access these hazardous areas;

B. immediately respond to perform traffic control, set up safety devices, and layout established or improvised detour routes in order to protect the traveling public from grievous hazards created by the incident/event. When detour routes are required due to an incident/event occurring on a roadway covered by this contract, manage and maintain the entire detour route within the vicinity, even if the route extends onto roadways not covered by this contract (state or non-state). For portions of a detour route extending outside the State's right-of-way, coordinate detour setup and maintenance with the Department and appropriate third parties;

C. notify the Department's designated contact person immediately upon occurrence of all major incidents/events and immediately upon road closure for all roadway closures exceeding one hour. Notify the Department again upon roadway reopening;

D. inspect and perform any repairs as directed by the Department that are not eligible for Federal reimbursement; and

E. assist the Department in performing damage assessment reviews.

Developer shall not initiate or perform debris removal, cleanup, or federally reimbursable repair work necessitated by a Governor Declared Emergency Incident/event, with the exception of minimal clearing as required when searching for grievous hazards. Developer shall provide an initial damage assessment and repair plan as soon as possible after assessing the scene.

3.5.3. Specific Developer Responsibilities for Other Emergencies

Other Emergencies are Incidents/events that do not prompt the Governor of California to declare a State of Emergency in response to the Incident/event. Other Emergencies will most commonly be traffic crashes, guardrail hits, severe potholes, debris within travel lanes, attenuator hits, roadway shoulder wash-outs, roadway cave-ins, and downed light poles but can include natural disasters/events/storms acts of God and Incidents/events resulting from human interactions.

Developer shall arrive on-site, be prepared to take necessary action with necessary manpower and emergency response equipment and be available to relieve law enforcement personnel of traffic control functions.

Developer shall manage all aspects of traffic control related to an incident, including coordination with Governmental agencies when incidents impact other roadways outside the maintenance limits. When detour routes are required due to an incident within the O&M Limits, Developer shall, upon notification by the Department or other agencies, manage and maintain the portions of the detour route within the O&M Limits.

Developer shall notify the Department's designated contact person immediately upon occurrence of all major incidents or events and immediately upon road closure for all roadway closures exceeding one hour. Developer shall provide an initial damage assessment and repair plan as soon as possible after assessing the scene. Developer shall subsequently notify the Department again upon roadway reopening.

When an Incident or event causes damage to any Project Element, Developer may pursue claims against any responsible party for reimbursement of expenses incurred as per the Department's procedures.

3.6. Traffic Operations

The Department's traffic engineering and operations personnel, in conjunction with CHP, will be responsible for evaluating and reviewing safety and operations issues on the Project. When such

safety reviews are conducted, Developer shall cooperate with the Department and CHP's requests for data and provide relevant staff support where necessary. When corrections or mitigations are required based on traffic investigation outcomes, Developer shall comply with such correction or mitigation measures.

Developer shall work with the Department to resolve any issues related to revisions or modifications to:

A. advising speed limit changes on the mainline;

B. modification to any interchanges within the Project;

C. speed limit changes to the ramps within the Project;

D. signing and pavement markings improvements;

E. regulatory, overhead and ground mounted signs;

F. safety lighting;

G. interchange modifications;

H. request to experiment with new products;

I. special event coordination;

J. safety studies; and

K. fatal crash reporting.

3.6.1. Lane Closures

In response to Incidents, Developer may be required to close Traffic Lane(s), depending on the severity of the Incident and the required remediation work. If a Traffic Lane closure is required in response to an Incident, Developer shall implement and execute such closure in accordance with the lane closure and traffic management requirements and procedures in accordance with Appendix T10 of Maintenance Manual Volume I.

3.7. Tunnel Escorts

Developer shall manage all Fire Hazardous Vehicles (FHV) during the times these vehicles are permitted to use the Project in accordance with the provisions of National Fire Protection Association 502 Standard for Road Tunnels, Bridges and Other Limited Access Highways. An Escort Service Plan will be developed by Developer and presented to the Department for review and comment and inclusion in the O&M Plan. The Department may seek input from the California Department of Forestry and Fire Protection in review of the Escort Service Plan.

3.8. Tunnel Operations

Developer shall use the data to satisfy the requirements in Table 4.1 and Table 4.2 and in the O&M Monthly and Annual Reports. The performance measures reported will be the

accountability assessment of Developer's overall performance. The Department will have the right to disseminate any and all data and video collected by tunnel systems located on the Project.

3.9. Tunnel Systems/Devices

3.9.1. SCADA System

Developer's SCADA computer workstation will monitor and control the SCADA system field devices. The SCADA system will provide monitor and control functionality for the following systems:

A. intrusion detection/access control;

B. tunnel/storm water drainage;

C. tunnel ventilation;

D. fixed fire suppression system;

E. maintenance CCTV system;

F. tunnel lighting; and

G. AM/FM override.

The SCADA system provided by Developer will provide "monitor only" functionality for the following systems:

A. carbon monoxide monitoring;

B. fire alarm and detection, including linear heat detectors;

C. electrical distribution;

D. communications systems; and

E. Battery Substation building systems (HVAC).

All tunnel SCADA monitoring and control functions will be integrated into the unified operator interface.

The minimum performance requirement for the SCADA system is capability of critical functions which are defined as:

A. ability to communicate with and perform control functions/operations of all field equipment; and

B. ability to display monitored parameters of field equipment at the operator's console.

Developer's SCADA system shall indicate the operational status of each field controller and shall create an event to indicate when each is unavailable or malfunctioning. The SCADA

system shall create an event to indicate when each field controller has returned to service. The SCADA system event log and timeline for this system shall be included in the O&M Monthly Reports.

3.9.2. Fixed Fire Suppression and Fire Standpipe Systems

Developer shall provide for the periodic testing of the fire suppression and fire standpipe systems to service the Project in accordance with all Laws. In accordance with the California Fire Prevention Code and National Fire Protection Association (NFPA) 14, Developer shall conduct the initial testing and pressurizing of the system before it becomes operational. Additionally, in accordance with NFPA 24 Developer shall be required to pressure test the system every five years.

Developer shall develop procedures and protocols that are to be followed when taking sections of standpipe out of service. The procedures shall include provisions to notify and obtain approval of the City of San Francisco Fire Department and San Francisco County Fire Rescue of the proposed service interruption. The procedures shall include: identification of the segment proposed to be taken out of service, the reason for the service interruption, the time and date the standpipe section will be taken out of service, and the time and date that the standpipe section will be returned to service. Developer's procedures shall also include forms to include all of the aforementioned information in the O&M Monthly Reports.

3.9.3. Tunnel Fire Extinguishers

Developer shall maintain and inspect fire extinguishers in accordance with the requirements of NFPA 10.

3.9.4. Tunnel Ventilation System

Developer's SCADA system shall indicate the operational status of each tunnel ventilation fan in the tunnel ventilation system and Developer shall respond to a notification that a fan in unavailable. The SCADA system shall create an event to indicate when the fan has returned to service. The SCADA system event log and timeline for this system shall be included in Developer's O&M Monthly Reports.

3.9.5. Tunnel Air Quality Monitoring System

The minimum performance requirement is defined as no sensors of the air quality monitoring system are inoperable at any given time, and the air quality monitoring system shall provide the normal, full functionality to monitor the tunnel CO levels at all times.

Developer's SCADA system shall indicate the operational status of the air quality monitoring system and sensors in each tunnel and shall create an event to indicate when each sensor is unavailable. The SCADA system shall create an event to indicate when each sensor has returned to service. The SCADA system event log and timeline shall be included in Developer's O&M Monthly Reports.

3.9.6. Tunnel CO Levels

The minimum performance requirement for the air quality in the Tunnels is defined as no occurrences of CO concentration levels above thirty five (35) parts per million (ppm) over a sixty (60) minute period, forty five (45) ppm over a forty five (45) minute period, sixty five (65) ppm over a thirty (30) minute period, or one hundred and twenty (120) ppm over a fifteen (15) minute period. The CO concentration levels in the Tunnels shall be monitored continuously and a rolling, time weighted average reading shall be monitored as required as set forth in Table 4.2.

Developer's SCADA system shall indicate the CO concentration levels and shall create an event to indicate when the levels exceed these requirements. The SCADA system shall create an event to indicate when the CO levels have returned to comply with the required levels. The SCADA system event log and timeline shall be included in Developer's O&M Monthly Reports.

3.9.7. Fire Alarm System

The minimum performance requirement is defined as the following functionalities based upon the particular subsystem:

A. Manual Fire Alarm Box: Active communication link, no physical damage to box in field;

B. Automatic Fire Detectors: Active communication link, no physical damage to detectors in field;

C. Remote Fire Control Panel at Portals: Active communication link, no physical damage;

D. Tunnel Fire Control Panel in Substation: Active communication link, no physical damage; and

E. Substation Fire Control Panel: Active communication link, no physical damage.

Developer's SCADA system shall monitor the operational status of the fire alarm system and shall create an event to indicate when each component or sub-system does not meet these requirements. Developer shall implement inspection procedures to assess the physical condition of the components of the fire alarm system.

The SCADA system shall track the functionality of each fire alarm system and create an event when each system does not meet the performance requirements. The SCADA system shall create an event to indicate when each fire alarm system has returned to the required performance level. The SCADA system event log and timeline shall be included in the O&M Monthly Reports.

3.9.8. Primary/Normal Electric Power System

The minimum performance requirement for the tunnel primary/normal electric power supply system is 100% functionality of the system. The system shall be allowed to switch to standby power in the event of a loss of power; however the deciding factor regarding the application of

Noncompliance Points will be the cause of the power failure. Loss of power in the tunnel's primary electric power supply system caused by any failure of any components of the primary power system that are within the O&M Limits shall be deemed an O&M Noncompliance Event. Loss of power in the primary electric power supply system that is caused by the utility company or weather related incidents shall not trigger an O&M Noncompliance Event.

Developer's SCADA system shall indicate the operational status of the tunnel primary power system components and shall create an event to indicate when the tunnel primary power system does not have 100% functionality. The SCADA system shall track the primary power system and create an event when the primary power system does not meet these performance requirements. The SCADA system shall create an event to indicate when the primary power system functionality has returned to the required levels. The SCADA system event log and timeline shall be included in the O&M Monthly Reports.

3.9.9. Tunnel Lighting System

Developer shall monitor the lighting levels in the tunnel to assure that the design lighting levels are maintained in the tunnel at all times. Developer shall monitor the light levels in the entrance zone and the first and second interior zones of each tunnel bore.

Developer shall provide a monitoring system that measures the lighting levels in the specified zones and provides the measurement results to the SCADA system or other reporting means. The SCADA system shall compare the measured lighting levels to the lighting levels required within each zone and create an event for measured lighting levels that are below the minimum required lighting levels. The SCADA system report shall indicate the time and date of the events. The SCADA system shall create an event to indicate when the measured lighting levels have returned to compliance with the minimum required levels. The SCADA system event log and timeline for this system shall be included in Developer's O&M Monthly Reports.

3.9.10. Tunnel Lighting Controls Luminance Sensor

Developer shall perform visual inspections of the lighting control system, check and refill the cleaner fluid, clean the lens, and check the wiper operation. Developer shall repair or replace defective materials. Developer's procedures shall include the necessary forms to assess and identify the condition of the lighting controls system and its components. The inspection forms shall indicate if any performance deficiencies were found and shall indicate the time and date when they were resolved. The SCADA system event log and timeline for this system shall be included in Developer's O&M Monthly Reports.

3.9.11. Tunnel Emergency Lighting System

The exit lighting fixtures included within the tunnel and building emergency lighting systems shall be inspected to confirm they are functioning as designed. Developer shall develop inspection procedures to monitor the performance level of the emergency lighting system. Developer's procedure shall include an inspection form that indicates the areas of the emergency

lighting system inspected, the time and date of the inspection, the fault conditions found, if any. The inspection form shall indicate the fault location, and indicate the time and date that the fault was rectified. Developer shall perform the necessary inspections, tests and may use the SCADA system event log to monitor the devices within the system to assess the performance level of the emergency lighting system. The SCADA system event log and timeline for this system, if used, shall be included in the O&M Monthly Reports that are submitted to the Department.

3.9.12. Tunnel Liner

The minimum performance level required is zero severe leaks. Severe leaks are defined as any leak that has a steady or continuous stream or flow. Developer shall develop leakage inspection procedures to monitor the Tunnel liner/structure and U walls for severe leakage. Developer's procedures shall include the necessary forms to indicate the section of Tunnel inspected, the time and date of the inspection, and the conditions found. The inspection forms shall indicate if any major faults were found and shall indicate the time and date when the major debris was found, and shall indicate the time and date when the debris was removed. Developer shall submit copies of the completed forms to the Department in the O&M Monthly Reports.

3.10. Tunnel Closure Criteria

Developer will be required to close the facility if circumstances compromise the safety of Users or are necessary to protect the Project Elements. Developer shall create a tunnel closure plan that specifies the traffic control plan and communications and coordination protocol. Regardless of the circumstances, Developer shall coordinate with the City and County of San Francisco, SFCTA and the Department (which may work with other agencies) regarding tunnel closure impacts. Developer shall maintain a log of the tunnel closure periods and include the log in the O&M Monthly Reports to be submitted to the Department. The report shall include the time log of the events, the cause of the Noncompliance, and the measures taken to achieve conformance.

Developer shall determine condition as required to maintain a safe tunnel in accordance with the requirements set forth in Tables 4.1 and 4.2. However, Developer shall close the facility to the general public should the entire tunnel ventilation system be inoperable.

3.11. Integrated Maintenance Management System (IMMS)

In order to organize inventory data, the Department maintains an asset inventory database. Developer shall be required to provide complete asset inventory data to the Department in hard copy format. Developer shall provide updates every five years for the entire facility, as well as whenever changes to the inventory occur due to replacements or rehabilitation works, which shall be included in the O&M Monthly Reports.

4. MINIMUM REQUIREMENTS SUBJECT TO CONSTRUCTION NONCOMPLIANCE EVENTS

Construction Noncompliance Events are set forth in Table 4.1. The description of each performance category set forth in Table 4.1 will include

A. required tasks with a unique ID number for each;

B. minimum performance requirement;

C. the related Cure Period (if any);

D. the Interval of Recurrence (if any);

E. the Construction Noncompliance Adjustment (if any); and

F. whether the instance of Noncompliance is a Long Cure Priority Noncompliance.

Developer shall develop and detail in the O&M Plan the approach to be used in order to achieve the minimum performance requirements as detailed in Table 4.1 and implement this approach.

Developer's performance will be evaluated with respect to these minimum performance requirements specified herein; however, to acknowledge Developer's ability to utilize design innovation, there may be circumstances in which Developer's Final Design or other Project requirements impact the performance categories to be monitored or the minimum performance levels required. Developer, under these circumstances, shall submit the equivalent system and the proposed minimum performance level to the Department for its good faith approval prior to Final Acceptance.

4.1. Construction Noncompliance Events with Temporary Cures

Construction Noncompliance Events that have been rectified through the use of temporary repairs or other temporary means shall be subject to the minimum performance requirements set forth in Table 4.1 and deemed a Construction Noncompliance Event if the temporary repair or other temporary action does not meet the applicable minimum performance requirement. Developer shall develop procedures to track the rectification means of Construction Noncompliance Events to identify the rectification means as temporary or permanent and shall document such rectification means in the O&M Monthly Reports. For those Construction Noncompliance Events with temporary rectification means, Developer shall develop a plan for providing permanent rectification means.

4.2. Notification of Construction Noncompliance Events and Construction Closures

Developer shall, at a minimum, notify the Department of Construction Noncompliance Events, and Construction Closures, including unscheduled Construction Closures, within twenty four (24) hours of the event. There is no Cure Period for this fault. Developer's operations procedures shall include the process for the immediate notification to the Department of these events. Developer shall include copies of the related information to confirm compliance with this requirement in the O&M Monthly Reports.

5. MINIMUM REQUIREMENTS SUBJECT TO O&M NONCOMPLIANCE EVENTS

O&M Noncompliance Events are set forth in Table 4.2. The description of each performance category set forth in Table 4.2 will include:

A. required tasks with a unique ID number for each;

B. minimum performance requirements;

C. the related Cure Period (if any)

D. the Interval of Recurrence (if any);

E. the O&M Noncompliance Adjustment (if any); and

F. whether the instance of Noncompliance is a Long Cure Priority Noncompliance.

Developer shall develop and detail in the O&M Plan the approach to be used in order to achieve the minimum performance requirements as detailed in Table 4.2 and implement this approach.

Developer shall operate and maintain the Project in a safe manner at all times regardless of these minimum performance requirements. Developer's performance will be evaluated with respect to the minimum performance requirements specified herein; however, to acknowledge Developer's ability to utilize design innovation, there may be circumstances in which Developer's Final Design or other Project requirements impact the performance categories to be monitored or the minimum performance levels required. Developer, under these circumstances, shall submit the equivalent system and the proposed minimum performance level to the Department for its good faith approval.

5.1. Routine Maintenance and Inspection Performance Measures

5.1.1. Level of Service Program

The Level of Service Handbook (LOS2000) will be the primary tool used by the Department to evaluate the overall quality and effectiveness of Developer's routine maintenance activities on the Project. LOS2000 is a systematic and formal method of collecting data and establishing required levels of maintenance. Developer shall achieve and maintain a LOS2000 rating, using the criteria detailed in the procedures in order to ensure a uniform and consistent level of maintenance at all times. Developer shall conduct a quarterly LOS2000 rating of the overall system and individual maintenance elements. Developer shall be required to maintain the Project in order to achieve and maintain a minimum overall LOS2000 rating as required in Table 4.2. O&M Noncompliance Events Categories will be assessed quarterly on the basis for failure to meet the LOS2000 rating for the quarter as set forth in Table 4.2. The Department will certify the accuracy of each LOS2000 rating performed by Developer.

The Department and Developer shall conduct a joint annual LOS2000 rating of the overall system and individual maintenance elements, using representative sections that will be provided

by the Department. Developer shall be required to maintain the Project in order to achieve and maintain a minimum overall LOS2000 rating as required in Table 4.2. O&M Noncompliance Events Categories will be assessed annually on the basis of failure to meet the LOS rating for the year as set forth in Table 4.2. The Department will certify the accuracy of each LOS2000 rating.

5.1.2. Maintenance and Inspection Performance Requirements

Developer shall be required to perform and comply with additional maintenance and inspection requirements that are not part of LOS2000 as set forth herein. Developer shall develop and detail in the O&M Plans the approach to be used in order to achieve the minimum performance requirements as detailed in Table 4.2 for all facility Elements.

5.2. Mandatory Spares

Developer shall determine the spares required to meet its maintenance obligations under the Contract Documents. However, due to their nature and associated long lead time, Developer shall, at a minimum, store spare parts including, but not limited to, attenuator parts, guardrail panels, ITS components, tunnels systems components, regulatory signs and equipment.

TABLE 4.1 - CONSTRUCTION PERIOD O&M WORK REQUIREMENTS							
Element Category	**Required Task**	**ID**	**Minimum Performance Requirements**	**Construction Noncompliance Event Classification**	**Cure Period**	**Interval of Recurrence**	**Construction Noncompliance Adjustments (for new or recurred events) (High Priority / Mid Priority / Low Priority Hours)**
Inspection & Reporting							
O&M Plan	Initial O&M Plan	1	Submit the draft O&M Plan to the Department for review and comment 90 days prior to NTP 2.	A	N/A	24 Hours	
		2	Submit the final O&M Plan to the Department for review and comment 30 days prior to NTP 2.	A	N/A	24 Hours	
	Annual Updates to the O&M Plan	3	Within 45 days prior to the beginning of each Fiscal Year after NTP 2, update the O&M Plan and submit it to the Department for review and comment.	A	N/A	24 Hours	
O&M Monthly and Annual Reports	O&M Monthly Reports	4	Beginning from NTP 2, deliver the O&M Monthly Report to the Department no later than the 7th day of the subsequent month.	A	N/A	24 Hours	
	O&M Annual Reports	5	Beginning from NTP 2, deliver the O&M Annual Report to the Department no later than the 30th day of the subsequent Fiscal Year.	A	N/A	24 Hours	
Renewal Work Plan	Initial Renewal Work Plan	6	Submit the five-year Renewal Work Plan to the Department for review and comment 45 days prior to NTP 2.	A	N/A	24 Hours	
	Annual Updates to the Renewal Work Plan	7	Within 45 days prior to the beginning of each Fiscal Year after NTP 2, update the Renewal Work Plan and submit it to the Department for review and comment.	A	N/A	24 Hours	
Renewal Work Report	Renewal Work Reports.	8	Beginning from NTP 2, deliver the Renewal Work Report, including any as-built drawings, to the Department no later than the 30th day of the subsequent Fiscal Year.	A	N/A	24 Hours	
Emergency Reporting	Emergency Reports.	9	Provide the Department with a detailed damage report after the occurrence of an Emergency, as detailed in Section 1.9.	A	24 Hours	24 Hours	
Maintenance Patrols	Conduct maintenance patrols to detect any issues on the facility that need to be addressed.	10	Conduct a daily maintenance patrol and visual inspection of the entire facility to identify any incidents or deficiencies.	B	N/A	24 Hours	
Sustainability Management Plan	Preparation of Sustainability Management Plan.	11	Submit a sustainability program per guidance in Division I, Section 1.5.5 and Division II, Section 3, Chapter 4.	A	N/A	24 Hours	

TABLE 4.1 - CONSTRUCTION PERIOD O&M WORK REQUIREMENTS							
Element Category	**Required Task**	**ID**	**Minimum Performance Requirements**	**Construction Noncompliance Event Classification**	**Cure Period**	**Interval of Recurrence**	**Construction Noncompliance Adjustments (for new or recurred events) (High Priority / Mid Priority / Low Priority Hours)**
Flexible Pavement							
Flexible Pavement	Maintain flexible pavement at acceptable condition and level of safety for traveling public.	12	Repair all pot holes and slippage areas greater than 0.5 square feet in area and/or 1.5 inches deep.	C	24 Hours	24 Hours	
		13	Inspect pavement surface in accordance with Maintenance Manual Volume II, Section 4 for the A Family.	B	N/A	5 Days	
		14	Meet all other technical requirements for flexible pavement set forth in Maintenance Manual Volume I, Section A and Maintenance Manual Volume II, Section 4.	A	90 Days	5 Days	
Rigid Pavement and Bridge Deck							
Rigid Pavement and Bridge Deck	Maintain rigid pavement and Bridge Deck at acceptable condition and level of safety for traveling public.	15	Repair all pot holes and slippage areas greater than 0.5 square feet in area and/or 1.5 inches deep.	C	24 Hours	24 Hours	
		16	Inspect pavement surface in accordance with Maintenance Manual Volume II, Section 4 for the B Family.	B	N/A	5 Days	
		17	Meet all other technical requirements for pavement set forth in Maintenance Manual Volume I, Section B and Maintenance Manual Volume II, Section 4.	A	90 Days	5 Days	
Slopes, Drainage and Vegetation							
Vegetation Control	Continually monitor walls, slopes, and barriers for vegetation growth. Monitor roadside vegetation on shoulders, under guardrail, attenuators, and other areas.	18	Maintain tree and shrub growth to provide at least a 17 foot high clearance above all travel lanes and shoulders.	C	7 Days	24 Hours	
		19	Maintain mowable areas at a height between 3 and 6 inches.	C	7 Days	24 Hours	
		20	Use pesticides in accordance with all Laws and Governmental Approvals, permits, regulations and as set forth in the Presidio Trust Roads & Grounds IPM Program, Weed Management Guidelines: Presidio Area B Native Plant Community Zone, and Section 1.15.	D	N/A	N/A	$1,000
		21	Inspect vegetation growth in accordance with Maintenance Manual Volume II, Section 4 for the C Family.	B	N/A	5 Days	
		22	Meet all other technical requirements for vegetation control set forth in Maintenance Manual Volume I, Section C2 and Maintenance Manual Volume II, Section 4.	A	30 Days	5 Days	
Fencing	Maintain fence in acceptable condition and level of safety for the traveling public.	23	Repair or replace damaged and/or broken fences that no longer provide access control and/or a physical barrier.	C	48 Hours	24 Hours	
		24	Inspect fencing in accordance with Maintenance Manual Volume II, Section 4 for the C Family.	B	N/A	5 Days	
		25	Meet all other technical requirements for fencing set forth in Maintenance Manual Volume I, Section C5 and Maintenance Manual Volume II, Section 4.	A	30 Days	5 Days	

TABLE 4.1 - CONSTRUCTION PERIOD O&M WORK REQUIREMENTS							
Element Category	**Required Task**	**ID**	**Minimum Performance Requirements**	**Construction Noncompliance Event Classification**	**Cure Period**	**Interval of Recurrence**	**Construction Noncompliance Adjustments (for new or recurred events) (High Priority / Mid Priority / Low Priority Hours)**
Retaining Walls	Maintain retaining walls at acceptable level of safety for the traveling public (non structural damage or deterioration).	26	Inspect retaining walls in accordance with Maintenance Manual Volume II, Section 4 for the C Family.	B	N/A	5 Days	
		27	Meet all other technical requirements for retaining walls set forth in Maintenance Manual Volume I, Section C5 and Maintenance Manual Volume II, Section 4.	A	30 Days	5 Days	
	Maintain retaining walls at acceptable level of safety for the traveling public (structural damage).	28	Repair any damage to the structural integrity that creates a public safety hazard, traffic safety hazard or compromises the system..	E	24 Hours	24 Hours	$3,000
Litter and Debris							
Debris Removal	Removal of tire casings, automobile wreckage, animal carcasses, and other debris from travel lanes and shoulder.	29	Remove debris, carcasses, and other roadway obstructions in the travel lanes that constitute a safety hazard from 6:00 AM to 7:00 PM, Monday through Friday.	E	30 Minutes	15 Minutes	$5,000 / $4,500 / $0
		30	Remove debris, carcasses, and other roadway obstructions in the travel lanes that constitute a safety hazard at all other times.	E	90 Minutes	60 Minutes	$0 / $0 / $3,000
		31	Remove debris, carcasses, and other roadway obstructions on the shoulders and other areas not on the traveled way.	B	24 Hours	24 Hours	
		32	Dispose of collected litter/debris in accordance with all Laws and Governmental Approvals, permits, regulations and as set forth in Maintenance Manual Volume I, Section D1.	D	N/A	N/A	$1,000
		33	Meet all other technical requirements for debris removal set forth in Maintenance Manual Volume I, Section D1 and Maintenance Manual Volume II, Section 4.	A	30 Days	5 Days	
Litter Removal	Removal of litter within project right of way property.	34	Clean all areas with minor litter items such as cigarette ends.	A	7 Days	24 Hours	
		35	Clean all areas that have a widespread distribution of small items such as cigarette ends, as well as large items such as beverage containers and fast food packages.	B	3 Days	24 Hours	
		36	Clean all areas that are heavily littered with small and large items with accumulations along the roadway edges or other areas.	C	24 Hours	24 Hours	
		37	Dispose of collected litter/debris in accordance with all Laws and Governmental Approvals, permits, regulations and as set forth in Maintenance Manual Volume I, Section D1.	D	N/A	N/A	$1,000
		38	Inspect for litter in accordance with Maintenance Manual Volume II, Section 4 for the D Family.	B	N/A	5 Days	
		39	Meet all other technical requirements for litter removal set forth in Maintenance Manual Volume I, Section D1 and Maintenance Manual Volume II, Section 4.	A	30 Days	5 Days	

TABLE 4.1 - CONSTRUCTION PERIOD O&M WORK REQUIREMENTS							
Element Category	**Required Task**	**ID**	**Minimum Performance Requirements**	**Construction Noncompliance Event Classification**	**Cure Period**	**Interval of Recurrence**	**Construction Noncompliance Adjustments (for new or recurred events) (High Priority / Mid Priority / Low Priority Hours)**
Graffiti Removal	Continually monitor and maintain assets free of graffiti.	40	Remove graffiti if it is of an obscene nature.	B	24 Hours	24 Hours	
		41	Remove graffiti from traffic devices where it is a safety concern.	E	24 Hours	24 Hours	$3,000
		42	Remove other graffiti that is not of an obscene nature or a safety concern.	B	5 Days	24 Hours	
		43	Inspect graffiti in accordance with Maintenance Manual Volume II, Section 4 for the D Family.	B	N/A	5 Days	
		44	Meet all other technical requirements for graffiti removal set forth in Maintenance Manual Volume I, Section D1 and Maintenance Manual Volume II, Section 4.	A	30 Days	5 Days	
Contaminated Materials/Fuel Spills	Clean-up and inspection of the area impacted after a fuel spill or other contamination event.	45	Respond to the scene upon notification.	D	30 Minutes	15 Minutes	$2000 / $1600 / $1000
		46	Begin implementation of clean-up/containment efforts in accordance with the O&M Plan.	E	60 Minutes	30 Minutes	$5000 / $4500 / $3000
		47	Complete initial clean-up/containment efforts to maintain public safety in accordance with the O&M Plan and notify the Department of initial assessment of affected area(s).	E	2 Hours	60 Minutes	$5000 / $4500 / $3000
		48	Manage mitigation and clean-up efforts. Restore contaminated area to its initial condition in accordance with the O&M Plan.	D	10 Days	24 Hours	$1,000
		49	Conduct clean-up in accordance with all Laws and Governmental Approvals, permits, regulations and as set forth in Maintenance Manual Volume I, Section D5.	D	N/A	N/A	$1,000
		50	Meet all other technical requirements for fuel spills/contamination set forth in Maintenance Manual Volume I, Section D5 and Maintenance Manual Volume II, Section 4.	C	30 Days	5 Days	
Landscaping							
Landscaping	Continually monitor landscaped areas.	51	Inspect landscaped areas in accordance with Maintenance Manual Volume II, Section 4 for the E Family.	B	N/A	5 Days	
		52	Meet all other technical requirements for landscaping set forth in Maintenance Manual Volume I, Section E and Maintenance Manual Volume II, Section 4.	A	30 Days	5 Days	

TABLE 4.1 - CONSTRUCTION PERIOD O&M WORK REQUIREMENTS							
Element Category	**Required Task**	**ID**	**Minimum Performance Requirements**	**Construction Noncompliance Event Classification**	**Cure Period**	**Interval of Recurrence**	**Construction Noncompliance Adjustments (for new or recurred events) (High Priority / Mid Priority / Low Priority Hours)**
Storm water							
Drains & Drainage	Maintain drainage system in acceptable condition and level of safety for the traveling public.	53	Clear obstructed culverts, drains, ditches, inlets, etc. or sediment, vegetation and debris when they are no longer able to function properly. Conduct culvert inspection and video culverts as necessary.	C	48 Hours	24 Hours	
		54	Maintain travel lanes free of standing water of greater than one inch deep.	E	30 Minutes	30 Minutes	$5000 / $4500 / $3000
		55	Inspect drainage elements in accordance with Maintenance Manual Volume II, Section 4 for the C Family.	B	N/A	5 Days	
		56	Meet all other technical requirements for drainage elements set forth in Maintenance Manual Volume I, Section C5 and Maintenance Manual Volume II, Section 4.	A	30 Days	5 Days	
Erosion Control	Ensure that all erosion control measures are functioning as designed.	57	Ensure that all erosion control measures are functioning as designed and make repairs to any that are not.	C	30 Days	5 Days	
		58	Inspect and evaluate the adequacy of all Project elements before forecasted storms.	C	N/A	N/A	
Permits	Maintain all facilities in line with permits.	59	Comply with Governmental Approvals and permit requirements, monitoring, and reporting.	D	30 Days	5 Days	$1,000
Structures							
Major Damage	Major Damage - Temporary Repairs.	60	Restore safe travel conditions (to the extent physically feasible) for any major damage as defined in Maintenance Manual Volume I, Section H.07.	E	24 Hours	4 Hours	$3,000
	Major Damage - Permanent Repairs.	61	Begin implementation of remediation work .	D	5 Days	24 Hours	$1,000
		62	Repair major damage as defined in Maintenance Manual Volume I, Section H.07.	D	As agreed upon by Developer and	N/A	$1,000
		63	Inspect structural elements in accordance with Maintenance Manual Volume II, Section 4 for the H Family. Inspection required every two years by Structures Maintenance and Investigation.	B	N/A	5 Days	
		64	Meet all other technical requirements for structures set forth in Maintenance Manual Volume I, Section H and Maintenance Manual Volume II, Section 4.	A	30 Days	5 Days	
Minor Damage	Repair Minor Damage.	65	Repair minor damage as defined in Maintenance Manual Volume I, Section H.06, and work identified from bi-annual Structures Maintenance Investigations Bridge Report.	C	30 Days	24 Hours	

TABLE 4.1 - CONSTRUCTION PERIOD O&M WORK REQUIREMENTS							
Element Category	**Required Task**	**ID**	**Minimum Performance Requirements**	**Construction Noncompliance Event Classification**	**Cure Period**	**Interval of Recurrence**	**Construction Noncompliance Adjustments (for new or recurred events) (High Priority / Mid Priority / Low Priority Hours)**
ITS & Communications							
ITS Systems Operability	Highway Advisory Radio (HAR).	66	Maintain quarterly HAR system performance (up time) above 98%.	C	N/A	N/A	
		67	Rectify each individual HAR defect to restore full functionality.	D	24 Hours	24 Hours	$1,000
	Traffic Monitoring Stations.	68	Maintain quarterly traffic monitoring station system performance (up time) above 95%.	C	N/A	N/A	
		69	Rectify each individual traffic monitoring station defect to restore full functionality.	D	24 Hours	24 Hours	$1,000
	Message Sign System.	70	Maintain quarterly message sign system performance (up time) above 95%.	C	N/A	N/A	
		71	Rectify each individual message sign defect to restore full functionality.	D	24 Hours	24 Hours	$1,000
	Public Address System.	72	Maintain quarterly public address system performance (up time) above 95%.	C	N/A	N/A	
		73	Rectify each individual public address system defect to restore full functionality.	D	24 Hours	24 Hours	$1,000
	Incident Detection System.	74	Maintain quarterly incident detection system performance (up time) above 98%.	C	N/A	N/A	
		75	Rectify each individual CCTV camera/incident detection system defect to restore full functionality.	D	24 Hours	24 Hours	$1,000
	Traffic Signal System.	76	Maintain quarterly traffic signal system performance (up time) above 95%.	C	N/A	N/A	
		77	Rectify each individual traffic signal system defect to restore full functionality.	D	24 Hours	24 Hours	$1,000
	Security System.	78	Maintain quarterly security system performance (up time) above 98%.	C	N/A	N/A	
		79	Rectify each individual security camera/system defect to restore full functionality.	D	24 Hours	24 Hours	$1,000
	Roadway Weather Information Station System (RWIS).	80	Maintain quarterly RWIS performance (up time) above 95%.	C	N/A	N/A	
		81	Rectify each individual RWIS defect to restore full functionality.	D	24 Hours	24 Hours	$1,000
	Two-Way Radio System/800MHz/CHP.	82	Maintain quarterly Two-Way Radio /800MHz/CHP system performance (up time) above 95%.	C	N/A	N/A	
		83	Rectify each individual Two-Way Radio System/800MHz/CHP defect to restore full functionality.	D	24 Hours	24 Hours	$1,000
	Call Boxes.	84	Maintain quarterly call box system performance (up time) above 95%.	C	N/A	N/A	
		85	Rectify each individual call box defect to restore full functionality.	D	24 Hours	24 Hours	$1,000
	Ancillary Systems.	86	Maintain quarterly system performance (up time) above 95% for all other ancillary systems.	C	N/A	N/A	
		87	Rectify each individual ancillary system defect to restore full functionality.	D	24 Hours	24 Hours	$1,000
	Emergency Maintenance Repair.	88	Commence emergency repairs as defined in Section 2.4.4 from 6:00 AM to 7:00 PM, Monday through Friday.	E	10 Minutes	10 Minutes	$5000 / $4500 / $0
		89	Commence emergency repairs as defined in Section 2.4.4 at all other times.	E	60 Minutes	60 Minutes	$0 / $0 / $3000

TABLE 4.1 - CONSTRUCTION PERIOD O&M WORK REQUIREMENTS							
Element Category	**Required Task**	**ID**	**Minimum Performance Requirements**	**Construction Noncompliance Event Classification**	**Cure Period**	**Interval of Recurrence**	**Construction Noncompliance Adjustments (for new or recurred events) (High Priority / Mid Priority / Low Priority Hours)**
ITS Maintenance	Inspection, testing, maintenance, etc. of all ITS system components.	90	Conduct routine inspections, testing, and maintenance in accordance with all Laws and equipment manufacturer's recommendations.	D	10 Days	5 Days	$1,000
Existing Communication Links	Maintaining existing communication links within the O&M Limits.	91	Repair or replace damaged communications equipment (fiber optic cable, conduit, pull boxes, splice cabinets, hubs, etc.). Damaged fiber optic cable may be temporarily fusion spliced.	D	4 Hours	4 Hours	$2000 / $1600 / $1000
		92	Replaced any damaged fiber optic cable from termination point to termination point with the same type of cable.	D	90 Days	30 Days	$1,000
Electrical							
Highway Lighting	Maintain functionality of highway lighting system (only most severe Noncompliance Event	93	Maintain full functionality of 95% of highway luminaires at any given time.	A	5 Days	24 Hours	
		94	Maintain full functionality of 85% of highway luminaires at any given time.	C	48 Hours	24 Hours	
	Consecutive luminaire outages.	95	Restore functionality if three or more consecutive highway luminaires are not functioning properly.	E	24 Hours	24 Hours	$3,000
Sign Lighting	Maintain functionality of highway sign lighting.	96	Maintain full functionality of 95% of sign luminaires at any given time.	C	24 Hours	24 Hours	
Traffic Signals	Maintain functionality of traffic signals at signalized intersections.	97	Rectify all outages and/or improperly functioning signals.	D	2 Hours	60 Minutes	$2000 / $1600 / $1000
Traffic Guidance							
Pavement Markings / Delineators	Repair and replacement of line striping and pavement reflectors.	98	Inspect pavement markings/delineation in accordance with Maintenance Manual Volume II, Section 4 for the M Family.	B	N/A	5 Days	
		99	Meet all other technical requirements for pavement markings/delineation set forth in Maintenance Manual Volume I, Section M and Maintenance Manual Volume II, Section 4.	A	30 Days	5 Days	

TABLE 4.1 - CONSTRUCTION PERIOD O&M WORK REQUIREMENTS							
Element Category	**Required Task**	**ID**	**Minimum Performance Requirements**	**Construction Noncompliance Event Classification**	**Cure Period**	**Interval of Recurrence**	**Construction Noncompliance Adjustments (for new or recurred events) (High Priority / Mid Priority / Low Priority Hours)**
Signage	Maintain signs at acceptable level of safety for the traveling public.	100	Replace all missing regulatory signs and posts. All signs and posts should be plumb and level, free of functional defects, visible to the travelling public, and conform to the standards of the State Sign Shop.	C	24 Hours	24 Hours	
		101	Replace all missing warning signs and posts. All signs and posts should be plumb and level, free of functional defects, visible to the travelling public, and conform to the standards of the State Sign Shop.	C	24 Hours	24 Hours	
		102	Replace all missing guide signs and posts. All signs and posts should be plumb and level, free of functional defects, visible to the travelling public, and conform to the standards of the State Sign Shop.	B	7 Days	24 Hours	
		103	Inspect signage in accordance with Maintenance Manual Volume II, Section 4 for the M Family.	B	N/A	5 Days	
		104	Meet all other technical requirements for signage set forth in Maintenance Manual Volume I, Section M and Maintenance Manual Volume II, Section 4.	A	30 Days	5 Days	
Guardrail	Maintain guardrail at acceptable level of safety for the traveling public (non structural damage or deterioration).	105	Inspect guardrail in accordance with Maintenance Manual Volume II, Section 4 for the M Family.	B	N/A	5 Days	
		106	Meet all other technical requirements for guardrail set forth in Maintenance Manual Volume I, Section M and Maintenance Manual Volume II, Section 4.	A	30 Days	5 Days	
	Maintain guardrail at acceptable level of safety for the traveling public	107	Any damage to structural integrity that creates a traffic hazard or compromises the system to the extent it will not function properly if it was to sustain another hit.	E	24 Hours	24 Hours	$3,000
Barrier Wall	Maintain barrier walls at acceptable level of safety for the traveling public (non structural damage or deterioration).	108	Inspect barrier in accordance with Maintenance Manual Volume II, Section 4 for the M Family.	B	N/A	5 Days	
		109	Meet all other technical requirements for barrier set forth in Maintenance Manual Volume I, Section M and Maintenance Manual Volume II, Section 4.	A	30 Days	5 Days	
	Maintain barrier walls at acceptable level of safety for the traveling public	110	Any damage to structural integrity that creates a traffic hazard or compromises the system to the extent it will not function properly if it was to sustain another hit.	E	24 Hours	24 Hours	$3,000
Attenuators	Maintain attenuators at acceptable level of safety for the traveling public (non structural damage or deterioration).	111	Inspect attenuators in accordance with Maintenance Manual Volume II, Section 4 for the M Family.	B	N/A	5 Days	
		112	Meet all other technical requirements for attenuators set forth in Maintenance Manual Volume I, Section M and Maintenance Manual Volume II, Section 4.	A	30 Days	5 Days	
	Maintain attenuators at acceptable level of safety for the traveling public	113	Any damage to structural integrity that creates a traffic hazard or compromises the system to the extent it will not function properly if it was to sustain another hit.	E	24 Hours	24 Hours	$3,000

TABLE 4.1 - CONSTRUCTION PERIOD O&M WORK REQUIREMENTS							
Element Category	**Required Task**	**ID**	**Minimum Performance Requirements**	**Construction Noncompliance Event Classification**	**Cure Period**	**Interval of Recurrence**	**Construction Noncompliance Adjustments (for new or recurred events) (High Priority / Mid Priority / Low Priority Hours)**
Moveable Barrier	Shifting of moveable barrier to provide an extra traffic lane in the peak flow direction of travel.	114	Barrier is shifted when required to provide an extra travel lane in the appropriate direction in accordance with the requirements set forth in Section 3.3.2. of Division 2 Section 4	C	N/A	15 Minutes	
Storm and Other Major Damage							
Storm Maintenance / Major Damage	Response to damage caused by earthquakes, strong winds, heavy rains, slides, slip-outs and other major damage.	115	Place regulatory and warning devices, delineation signs, etc. on the facility at conclusion of event.	D	24 Hours	60 Minutes	$1,000
		116	Begin planning/implementation of remediation work.	C	24 Hours	24 Hours	
		117	Meet all other technical requirements for storm damage set forth in Maintenance Manual Volume I, Section S and Maintenance Manual Volume II, Section 4.	A	30 Days	5 Days	
Incident Response							
Incident Response	Response to sites of incidents, emergencies, accidents, and other events that that result in a condition that is unsafe and/or may present a life threatening condition.	118	Respond to scene after detection or notification.	E	10 Minutes	10 Minutes	$5000 / $4500 / $3000
	Clearing of incidents and reopening of closed travel lanes after CHP/Emergency Response Officials provide notification to begin clean-up.	119	Clear incidents that involve a breakdown, minor accident (no injuries), non-hazardous material spill or debris and result in one closed travel lane.	E	30 Minutes	15 Minutes	$5000 / $4500 / $3000
		120	Clear incidents that involve a single vehicle accident (with injuries) and result in one closed travel lane.	E	40 Minutes	20 Minutes	$5000 / $4500 / $3000
		121	Clear incidents that involve a multiple vehicle accident with multiple injuries, but no fire or fatalities and result in up to all travel lanes closed in one direction.	E	80 Minutes	40 Minutes	$5000 / $4500 / $3000
		122	Clear incidents that involve a multiple vehicle accident with multiple injuries/fatalities, with or without fire and result in up to all travel lanes closed in one direction.	E	2 Hours	60 Minutes	$5000 / $4500 / $3000
		123	Clear incidents that involve a multiple vehicle accident with multiple injuries/fatalities, with or without fire and result in up to all travel lanes closed in one direction and one or more travel lanes closed in the opposite direction.	E	4 Hours	2 Hours	$5000 / $4500 / $3000
Sustainability Management Plan Reporting							
Sustainability Monitoring and Reporting Program	Preparation of Sustainability Management Plan Monitoring Report.	124	Meet requirements as specified by Developer in the Sustainability Management Plan.	B	30 days	30 days	

TABLE 4.2 - OPERATING PERIOD O&M WORK REQUIREMENTS								
Element Category	**Required Task**	**ID**	**Minimum Performance Requirements**	**O&M Noncompliance Event Classification**	**Cure Period**	**Interval of Recurrence**	**Long Cure Priority Noncompliance?**	**O&M Noncompliance Adjustments (for new or recurred events) (High Priority / Mid Priority / Low Priority Hours)**
Inspection & Reporting								
Level of Service Rating Program	Conduct a quarterly rating in accordance with Module 4 of the Department's Level of Service Handbook (LOS2000).	1	Meet a minimum quarterly LOS2000 rating calculated in accordance with the Department's evaluation system for individual maintenance elements and overall system.	D	N/A	N/A		$1,000
	Conduct an annual rating in accordance with Module 4 of the Department's Level of Service Handbook (LOS2000).	2	Meet a minimum annual LOS2000 rating calculated in accordance with the Department's evaluation system for individual maintenance elements and overall system.	D	N/A	N/A		$1,000
O&M Plan	Initial O&M Plan.	3	Submit the draft O&M Plan to the Department for review and comment 90 days prior to NTP 2.	A	N/A	24 Hours		
		4	Submit the final O&M Plan to the Department for review and comment 30 days prior to NTP 2.	A	N/A	24 Hours		
	Annual Updates to the O&M Plan.	5	Within 45 days prior to the beginning of each Fiscal Year after NTP 2, update the O&M Plan and submit it to the Department for review and comment.	A	N/A	24 Hours		
O&M Monthly and Annual Reports	O&M Monthly Reports.	6	Beginning from NTP 2, deliver the O&M Monthly Report to the Department no later than the 7th day of the subsequent month.	A	N/A	24 Hours		
	O&M Annual Reports.	7	Beginning from NTP 2, deliver the O&M Annual Report to the Department no later than the 30th day of the subsequent Fiscal Year.	A	N/A	24 Hours		
Renewal Work Plan	Initial Renewal Work Plan	8	Submit the five-year Renewal Work Plan to the Department for review and comment 45 days prior to NTP 2.	A	N/A	24 Hours		
	Annual Updates to the Renewal Work Plan	9	Within 45 days prior to the beginning of each Fiscal Year after NTP 2, update the Renewal Work Plan and submit it to the Department for review and comment.	A	N/A	24 Hours		
Renewal Work Report	Renewal Work Reports.	10	Beginning from NTP 2, deliver the Renewal Work Report, including any as-built drawings, to the Department no later than the 30th day of the subsequent Fiscal Year.	A	N/A	24 Hours		
Emergency Reporting	Emergency Reports.	11	Provide the Department with a detailed damage report after the occurrence of an Emergency, as detailed in Section 1.9.	A	24 Hours	24 Hours		

TABLE 4.2 - OPERATING PERIOD O&M WORK REQUIREMENTS								
Element Category	**Required Task**	**ID**	**Minimum Performance Requirements**	**O&M Noncompliance Event Classification**	**Cure Period**	**Interval of Recurrence**	**Long Cure Priority Noncompliance?**	**O&M Noncompliance Adjustments (for new or recurred events) (High Priority / Mid Priority / Low Priority Hours)**
Integrated Maintenance Management System (IMMS)	Provide inventory data to the Department for incorporation into the IMMS.	12	Provide updated hard copy inventory data to the Department with each O&M Monthly Report (as changes occur) for all applicable facility elements.	A	30 Days	3 Days		
		13	Beginning from Substantial Completion, conduct a complete inventory review of all facility elements every fifth Fiscal Year and provide inventory data to the Department no later than the 30th day of each Fiscal Year in which an inventory review is conducted.	A	N/A	3 Days		
Maintenance Patrols	Conduct maintenance patrols to detect any issues on the facility that need to be addressed.	14	Conduct a daily maintenance patrol and visual inspection of the entire facility to identify any incidents or deficiencies.	B	N/A	24 Hours		
Sustainability Management Plan	Preparation of a revised Sustainability Management Plan for the O&M period.	15	Submit a sustainability program per guidance in Division I, Section 1.5.5 and Division II, Section 4 Chapter 1.14.	A	N/A	24 Hours		
Flexible Pavement								
Flexible Pavement	Maintain flexible pavement at acceptable condition and level of safety for traveling public.	16	Ride quality to be maintained at International Roughness Index (IRI) of less than or equal to 95.	C	90 Days	5 Days	Yes	
		17	Repair all cracks greater than or equal to 0.25 inches in width.	B	90 Days	5 Days	Yes	
		18	Repair all settlement/depression greater than 1.5 inches in depth over any 50 ft. length.	C	30 Days	5 Days	Yes	
		19	Repair all wheel ruts greater than 1 inch deep.	C	90 Days	5 Days	Yes	
		20	Repair drip-track ruts over 0.5 inches deep.	C	90 Days	5 Days	Yes	
		21	Repair alligator cracking in excess of 30%.	B	90 Days	5 Days	Yes	
		22	Repair all pot holes and slippage areas greater than 0.5 square feet in area and/or 1.5 inches deep.	C	24 Hours	24 Hours		
		23	Inspect pavement surface in accordance with Maintenance Manual Volume II, Section 4 for the A Family.	B	N/A	5 Days		
		24	Meet all other technical requirements for flexible pavement set forth in Maintenance Manual Volume I, Section A and Maintenance Manual Volume II, Section 4.	A	90 Days	5 Days		

TABLE 4.2 - OPERATING PERIOD O&M WORK REQUIREMENTS								
Element Category	**Required Task**	**ID**	**Minimum Performance Requirements**	**O&M Noncompliance Event Classification**	**Cure Period**	**Interval of Recurrence**	**Long Cure Priority Noncompliance?**	**O&M Noncompliance Adjustments (for new or recurred events) (High Priority / Mid Priority / Low Priority Hours)**
Rigid Pavement and Bridge Deck								
Rigid Pavement and Bridge Deck	Maintain rigid pavement and bridge deck at acceptable condition and level of safety for traveling public.	25	Ride quality to be maintained at International Roughness Index (IRI) of less than or equal to 95.	C	90 Days	5 Days	Yes	
		26	Repair all cracks greater than or equal to 0.25 inches in width.	B	90 Days	5 Days	Yes	
		27	Repair all settlement/depression greater than 1.5 inches in depth over any 50 ft. length.	C	30 Days	5 Days	Yes	
		28	Level adjacent slabs if the deviation at the joint exceeds 0.5 inches.	C	90 Days	5 Days	Yes	
		29	Repair all spalls exceeding 4 inches.	B	90 Days	5 Days	Yes	
		30	Repair all pot holes and slippage areas greater than 0.5 square feet in area and/or 1.5 inches deep.	C	24 Hours	24 Hours		
		31	Inspect pavement surface in accordance with Maintenance Manual Volume II, Section 4 for the B Family.	B	N/A	5 Days		
		32	Meet all other technical requirements for rigid pavement set forth in Maintenance Manual Volume I, Section B and Maintenance Manual Volume II, Section 4.	A	90 Days	5 Days		
Slopes, Drainage and Vegetation								
Vegetation Control	Continually monitor walls, slopes, and barriers for vegetation growth. Monitor roadside vegetation on shoulders, under guardrail, attenuators, and other areas.	33	Maintain tree and shrub growth to provide at least a 17 foot high clearance above all travel lanes and shoulders.	C	7 Days	24 Hours		
		34	Maintain mowable areas at a height between 3 and 6 inches.	C	7 Days	24 Hours		
		35	Maintain a narrow clear strip of 4 feet next to pavement edges.	B	7 Days	24 Hours		
		36	Maintain all portions of the travel lanes, shoulders, curbs, gutters, and drainage structures free of plant growth and vegetation.	C	7 Days	24 Hours		
		37	Maintain all walls, barriers, and other roadway features free of undesirable vegetative growth.	C	7 Days	24 Hours		
		38	Use pesticides in accordance with all Laws and Governmental Approvals, permits, regulations and as set forth in the Presidio Trust Roads & Grounds IPM Program, Weed Management Guidelines: Presidio Area B Native Plant Community Zone, and Section 1.15.	D	N/A	N/A		$1,000
		39	Inspect vegetation growth in accordance with Maintenance Manual Volume II, Section 4 for the C Family.	B	N/A	5 Days		
		40	Meet all other technical requirements for vegetation control set forth in Maintenance Manual Volume I, Section C2 and Maintenance Manual Volume II, Section 4.	A	30 Days	5 Days		

TABLE 4.2 - OPERATING PERIOD O&M WORK REQUIREMENTS								
Element Category	**Required Task**	**ID**	**Minimum Performance Requirements**	**O&M Noncompliance Event Classification**	**Cure Period**	**Interval of Recurrence**	**Long Cure Priority Noncompliance?**	**O&M Noncompliance Adjustments (for new or recurred events) (High Priority / Mid Priority / Low Priority Hours)**
Fencing	Maintain fence in acceptable condition and level of safety for the traveling public.	41	Repair or replace damaged and/or broken fences that no longer provide access control and/or a physical barrier.	C	48 Hours	24 Hours		
		42	Fences should be functional and free of unsightly rust and vegetation. Fences and fence posts should be plumb and tops rails should be level with no sags or deflections.	B	30 Days	5 Days	Yes	
		43	Inspect fencing in accordance with Maintenance Manual Volume II, Section 4 for the C Family.	B	N/A	5 Days		
		44	Meet all other technical requirements for fencing set forth in Maintenance Manual Volume I, Section C5 and Maintenance Manual Volume II, Section 4.	A	30 Days	5 Days		
Retaining Walls	Maintain retaining walls at acceptable level of safety for the traveling public (non-structural damage or deterioration).	45	Keep weep holes in walls open.	C	30 Days	5 Days	Yes	
		46	Prevent erosion at base on walls.	C	30 Days	5 Days	Yes	
		47	Inspect retaining walls in accordance with Maintenance Manual Volume II, Section 4 for the C Family.	B	N/A	5 Days		
		48	Meet all other technical requirements for retaining walls set forth in Maintenance Manual Volume I, Section C5 and Maintenance Manual Volume II, Section 4.	A	30 Days	5 Days		
	Maintain retaining walls at acceptable level of safety for the traveling public (structural damage).	49	Repair any damage to the structural integrity that creates a public safety hazard, traffic safety hazard or compromises the system..	E	24 Hours	24 Hours		$3,000
Litter and Debris								
Debris Removal	Removal of tire casings, automobile wreckage, animal carcasses, and other debris from travel lanes and shoulder.	50	Remove debris, carcasses, and other roadway obstructions in the travel lanes that constitute a safety hazard from 6:00 AM to 7:00 PM, Monday through Friday.	E	30 Minutes	15 Minutes		$5,000 / $4,500 / $0
		51	Remove debris, carcasses, and other roadway obstructions in the travel lanes that constitute a safety hazard at all other times.	E	90 Minutes	60 Minutes		$0 / $0 / $3,000
		52	Remove debris, carcasses, and other roadway obstructions on the shoulders and other areas not on the traveled way.	B	24 Hours	24 Hours		
		53	Dispose of collected litter/debris in accordance with all Laws and Governmental Approvals, permits, regulations and as set forth in Maintenance Manual Volume I, Section D1.	D	N/A	N/A		$1,000
		54	Meet all other technical requirements for debris removal set forth in Maintenance Manual Volume I, Section D1 and Maintenance Manual Volume II, Section 4.	A	30 Days	5 Days		

TABLE 4.2 - OPERATING PERIOD O&M WORK REQUIREMENTS

Element Category	Required Task	ID	Minimum Performance Requirements	O&M Noncompliance Event Classification	Cure Period	Interval of Recurrence	Long Cure Priority Noncompliance?	O&M Noncompliance Adjustments (for new or recurred events) (High Priority / Mid Priority / Low Priority Hours)
Litter Removal	Removal of litter within project right of way property.	55	Clean all areas with minor litter items such as cigarette ends.	A	7 Days	24 Hours		
		56	Clean all areas that have a widespread distribution of small items such as cigarette ends, as well as large items such as beverage containers and fast food packages.	B	3 Days	24 Hours		
		57	Clean all areas that are heavily littered with small and large items with accumulations along the roadway edges or other areas.	C	24 Hours	24 Hours		
		58	Dispose of collected litter/debris in accordance with all Laws and Governmental Approvals, permits, regulations and as set forth in Maintenance Manual Volume I, Section D1.	D	N/A	N/A		$1,000
		59	Inspect for litter in accordance with Maintenance Manual Volume II, Section 4 for the D Family.	B	N/A	5 Days		
		60	Meet all other technical requirements for litter removal set forth in Maintenance Manual Volume I, Section D1 and Maintenance Manual Volume II, Section 4.	A	30 Days	5 Days		
Graffiti Removal	Continually monitor and maintain assets free of graffiti.	61	Remove graffiti if it is of an obscene nature.	B	24 Hours	24 Hours		$0
		62	Remove graffiti from traffic devices where it is a safety concern.	E	24 Hours	24 Hours		$3,000
		63	Remove other graffiti that is not of an obscene nature or a safety concern.	B	5 Days	24 Hours		
		64	Inspect graffiti in accordance with Maintenance Manual Volume II, Section 4 for the D Family.	B	N/A	5 Days		
		65	Meet all other technical requirements for graffiti removal set forth in Maintenance Manual Volume I, Section D1 and Maintenance Manual Volume II, Section 4.	A	30 Days	5 Days		
Contaminated Materials/Fuel Spills	Clean-up and inspection of the area impacted after a fuel spill or other contamination event.	66	Respond to the scene upon notification.	D	30 Minutes	15 Minutes		$2000 / $1600 / $1000
		67	Begin implementation of clean-up/containment efforts in accordance with the O&M Plan.	E	60 Minutes	30 Minutes		$5000 / $4500 / $3000
		68	Complete initial clean-up/containment efforts to maintain public safety in accordance with the O&M Plan and notify the Department of initial assessment of affected area(s).	E	2 Hours	60 Minutes		$5000 / $4500 / $3000
		69	Manage mitigation and clean-up efforts. Restore contaminated area to its initial condition in accordance with the O&M Plan.	D	10 Days	24 Hours	Yes	$1,000
		70	Conduct clean-up in accordance with all Laws and Governmental Approvals, permits, regulations and as set forth in Maintenance Manual Volume I, Section D5.	D	N/A	N/A		$1,000
		71	Meet all other technical requirements for fuel spills/contamination set forth in Maintenance Manual Volume I, Section D5 and Maintenance Manual Volume II, Section 4.	C	30 Days	5 Days	Yes	

TABLE 4.2 - OPERATING PERIOD O&M WORK REQUIREMENTS								
Element Category	**Required Task**	**ID**	**Minimum Performance Requirements**	**O&M Noncompliance Event Classification**	**Cure Period**	**Interval of Recurrence**	**Long Cure Priority Noncompliance?**	**O&M Noncompliance Adjustments (for new or recurred events) (High Priority / Mid Priority / Low Priority Hours)**
Landscaping								
Landscaping	Continually monitor landscaped areas.	72	Landscaped areas and plantings are to be maintained in healthy conditions (and free of disease and pests) as originally designed and planted.	B	30 Days	24 Hours	Yes	
		73	Maintain irrigation systems free of functional defects as originally designed and installed.	B	30 Days	24 Hours	Yes	
		74	Inspect landscaped areas in accordance with Maintenance Manual Volume II, Section 4 for the E Family.	B	N/A	5 Days		
		75	Meet all other technical requirements for landscaping set forth in Maintenance Manual Volume I, Section E and Maintenance Manual Volume II, Section 4.	A	30 Days	5 Days		
Storm water								
Drains & Drainage	Maintain drainage system in acceptable condition and level of safety for the traveling public.	76	Clear obstructed culverts, drains, ditches, inlets, etc. or sediment, vegetation and debris when they are no longer able to function properly. Conduct culvert inspection and video culverts as necessary.	C	48 Hours	24 Hours		
		77	Maintain travel lanes free of standing water of greater than one inch deep.	E	30 Minutes	30 Minutes		$5000 / $0 / $0
		78	Inspect drainage elements in accordance with Maintenance Manual Volume II, Section 4 for the C Family.	B	N/A	5 Days		
		79	Meet all other technical requirements for drainage elements set forth in Maintenance Manual Volume I, Section C5 and Maintenance Manual Volume II, Section 4.	A	30 Days	5 Days		
Erosion Control	Ensure that all erosion control measures are functioning as designed.	80	Ensure that all erosion control measures are functioning as designed and make repairs to any that are not.	C	30 Days	5 Days	Yes	
Permits	Maintain all facilities in line with permits.	81	Comply with Governmental Approvals and permit requirements, monitoring, and reporting.	D	30 Days	5 Days	Yes	$1,000
Structures								
Major Damage	Major Damage - Temporary Repairs.	82	Restore safe travel conditions (to the extent physically feasible) for any major damage as defined in Maintenance Manual Volume I, Section H.07.	E	24 Hours	4 Hours		$3,000
	Major Damage - Permanent Repairs.	83	Begin implementation of remediation work .	D	5 Days	24 Hours		$1,000
		84	Repair major damage as defined in Maintenance Manual Volume I, Section H.07.	D	As agreed upon by Developer and	N/A	As agreed upon by Developer and	$1,000
		85	Inspect structural elements in accordance with Maintenance Manual Volume II, Section 4 for the H Family. Inspection required every two years by Structures Maintenance and Investigation.	B	N/A	5 Days		
		86	Meet all other technical requirements for structures set forth in Maintenance Manual Volume I, Section H and Maintenance Manual Volume II, Section 4.	A	30 Days	5 Days		

TABLE 4.2 - OPERATING PERIOD O&M WORK REQUIREMENTS								
Element Category	**Required Task**	**ID**	**Minimum Performance Requirements**	**O&M Noncompliance Event Classification**	**Cure Period**	**Interval of Recurrence**	**Long Cure Priority Noncompliance?**	**O&M Noncompliance Adjustments (for new or recurred events) (High Priority / Mid Priority / Low Priority Hours)**
Minor Damage	Repair Minor Damage.	87	Repair minor damage as defined in Maintenance Manual Volume I, Section H.06, and work identified from bi-annual Structures Maintenance Investigations Bridge Report.	C	30 Days	24 Hours	Yes	
Tunnel Systems								
Mechanical Systems Operability	Tunnel Jet Fans.	88	Maintain quarterly tunnel jet fan system performance (up time) above 98%.	C	N/A	N/A		
		89	Rectify each individual tunnel jet fan defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	CO Monitoring System.	90	Maintain quarterly CO monitoring system performance (up time) above 98%.	C	N/A	N/A		
		91	Rectify each individual CO monitoring system defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Emergency Maintenance Repair.	92	Commence emergency repairs as defined in Section 2.5.3 from 6:00 AM to 7:00 PM, Monday through Friday.	E	10 Minutes	10 Minutes		$5000 / $4500 / $0
		93	Commence emergency repairs as defined in Section 2.5.3 at all other times.	E	60 Minutes	60 Minutes		$0 / $0 / $3000
Fire Protection/Detection Systems Operability	Fixed Fire Suppression System.	94	Maintain quarterly fixed fire suppression system performance (up time) above 98%.	C	N/A	N/A		
		95	Rectify each individual fixed fire suppression system defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Fire Standpipe System.	96	Maintain quarterly fire standpipe system performance (up time) above 98%.	C	N/A	N/A		
		97	Rectify each individual fire standpipe system defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Fire Extinguishers.	98	Maintain quarterly fire extinguisher system performance (up time) above 98%.	C	N/A	N/A		
		99	Rectify each individual fire extinguisher defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Fire Alarm Pull Stations.	100	Maintain quarterly fire alarm pull station system performance (up time) above 98%.	C	N/A	N/A		
		101	Rectify each individual fire alarm pull station defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Linear Heat Detection System.	102	Maintain quarterly linear heat detection system performance (up time) above 98%.	C	N/A	N/A		
		103	Rectify each individual linear heat detection system defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Fire Alarm Control Panels.	104	Maintain quarterly fire alarm control panel system performance (up time) above 98%.	C	N/A	N/A		
		105	Rectify each individual fire alarm control panel defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Emergency Maintenance Repair.	106	Commence emergency repairs as defined in Section 2.5.3 from 6:00 AM to 7:00 PM, Monday through Friday.	E	10 Minutes	10 Minutes		$5000 / $4500 / $0
		107	Commence emergency repairs as defined in Section 2.5.3 at all other times.	E	60 Minutes	60 Minutes		$0 / $0 / $3000

TABLE 4.2 - OPERATING PERIOD O&M WORK REQUIREMENTS								
Element Category	**Required Task**	**ID**	**Minimum Performance Requirements**	**O&M Noncompliance Event Classification**	**Cure Period**	**Interval of Recurrence**	**Long Cure Priority Noncompliance?**	**O&M Noncompliance Adjustments (for new or recurred events) (High Priority / Mid Priority / Low Priority Hours)**
Electrical Power Distribution Systems Operability	Main Switchboard.	108	Maintain quarterly main switchboard system performance (up time) above 98%.	C	N/A	N/A		
		109	Rectify each individual main switchboard defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Protective Relays & Instrument Transformers.	110	Maintain quarterly protective relay and instrument transformer system performance (up time) above 98%.	C	N/A	N/A		
		111	Rectify each individual protective relay and instrument transformer defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Power Circuit Breakers.	112	Maintain quarterly power circuit breaker system performance (up time) above 98%.	C	N/A	N/A		
		113	Rectify each individual power circuit breaker defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Dry Transformers.	114	Maintain quarterly dry transformer system performance (up time) above 98%.	C	N/A	N/A		
		115	Rectify each individual dry transformer defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Motor Controls.	116	Maintain quarterly motor controls system performance (up time) above 98%.	C	N/A	N/A		
		117	Rectify each individual motor controls defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Automatic Transfer Switch.	118	Maintain quarterly automatic transfer switch system performance (up time) above 98%.	C	N/A	N/A		
		119	Rectify each individual automatic transfer switch defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Uninterrupted Power Supply System.	120	Maintain quarterly uninterrupted power supply system performance (up time) above 98%.	C	N/A	N/A		
		121	Rectify each individual uninterrupted power supply defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Substation.	122	Maintain quarterly substation system performance (up time) above 98%.	C	N/A	N/A		
		123	Rectify each individual substation defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Secondary Power Supply.	124	Maintain quarterly secondary power supply system performance (up time) above 98%.	C	N/A	N/A		
		125	Rectify each individual secondary power supply defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Emergency Maintenance Repair.	126	Commence emergency repairs as defined in Section 2.5.3 from 6:00 AM to 7:00 PM, Monday through Friday.	E	10 Minutes	10 Minutes		$5000 / $4500 / $0
		127	Commence emergency repairs as defined in Section 2.5.3 at all other times.	E	60 Minutes	60 Minutes		$0 / $0 / $3000

TABLE 4.2 - OPERATING PERIOD O&M WORK REQUIREMENTS

Element Category	Required Task	ID	Minimum Performance Requirements	O&M Noncompliance Event Classification	Cure Period	Interval of Recurrence	Long Cure Priority Noncompliance?	O&M Noncompliance Adjustments (for new or recurred events) (High Priority / Mid Priority / Low Priority Hours)
SCADA Systems Operability	Remote Input/Output Enclosures.	128	Maintain quarterly remote input/output enclosure system performance (up time) above 98%.	C	N/A	N/A		
		129	Rectify each individual remote input/output enclosure defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Field Controllers.	130	Maintain quarterly field controller system performance (up time) above 98%.	C	N/A	N/A		
		131	Rectify each individual field controller defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Emergency Maintenance Repair.	132	Commence emergency repairs as defined in Section 2.5.3 from 6:00 AM to 7:00 PM, Monday through Friday.	E	10 Minutes	10 Minutes		$5000 / $4500 / $0
		133	Commence emergency repairs as defined in Section 2.5.3 at all other times.	E	60 Minutes	60 Minutes		$0 / $0 / $3000
Security Systems Operability	Security Camera	134	Maintain quarterly security camera system performance (up time) above 98%.	C	N/A	N/A		
		135	Rectify each individual security camera defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Access Control System	136	Maintain quarterly access control system performance (up time) above 98%.	C	N/A	N/A		
		137	Rectify each individual access control defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Emergency Maintenance Repair.	138	Commence emergency repairs as defined in Section 2.5.3 from 6:00 AM to 7:00 PM, Monday through Friday.	E	10 Minutes	10 Minutes		$5000 / $4500 / $0
		139	Commence emergency repairs as defined in Section 2.5.3 at all other times.	E	60 Minutes	60 Minutes		$0 / $0 / $3000
Tunnel Air Quality	Maintain Air Quality Levels.	140	Maintain CO levels below 35 ppm for 60 minute period.	D	60 Minutes	60 Minutes		$2000 / $1600 / $1000
		141	Maintain CO levels below 45 ppm for 45 minute period.	D	60 Minutes	60 Minutes		$2000 / $1600 / $1000
		142	Maintain CO levels below 65 ppm for 30 minute period.	D	60 Minutes	60 Minutes		$2000 / $1600 / $1000
		143	Maintain CO levels below 120 ppm for 15 minute period.	D	60 Minutes	60 Minutes		$2000 / $1600 / $1000
Tunnel Washing	Washing of tunnel surfaces.	144	Wash tunnels quarterly.	D	N/A	3 Days		$1,000
Tunnel Maintenance	Inspection, testing, maintenance, etc. of all tunnel system components.	145	Conduct routine inspections, testing, and maintenance in accordance with all Laws and equipment manufacturer's recommendations.	D	10 Days	5 Days	Yes	$1,000

TABLE 4.2 - OPERATING PERIOD O&M WORK REQUIREMENTS								
Element Category	**Required Task**	**ID**	**Minimum Performance Requirements**	**O&M Noncompliance Event Classification**	**Cure Period**	**Interval of Recurrence**	**Long Cure Priority Noncompliance?**	**O&M Noncompliance Adjustments (for new or recurred events) (High Priority / Mid Priority / Low Priority Hours)**
ITS & Communications Systems								
ITS Systems Operability	Highway Advisory Radio (HAR).	146	Maintain quarterly HAR system performance (up time) above 98%.	C	N/A	N/A		
		147	Rectify each individual HAR defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Traffic Monitoring Stations.	148	Maintain quarterly traffic monitoring station system performance (up time) above 95%.	C	N/A	N/A		
		149	Rectify each individual traffic monitoring station defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Message Sign System.	150	Maintain quarterly message sign system performance (up time) above 95%.	C	N/A	N/A		
		151	Rectify each individual message sign defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Public Address System.	152	Maintain quarterly public address system performance (up time) above 95%.	C	N/A	N/A		
		153	Rectify each individual public address system defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Incident Detection System.	154	Maintain quarterly incident detection system performance (up time) above 98%.	C	N/A	N/A		
		155	Rectify each individual CCTV camera/incident detection system defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Traffic Signal System.	156	Maintain quarterly traffic signal system performance (up time) above 95%.	C	N/A	N/A		
		157	Rectify each individual traffic signal system defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Security System.	158	Maintain quarterly security system performance (up time) above 98%.	C	N/A	N/A		
		159	Rectify each individual security camera/system defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Roadway Weather Information Station System (RWIS).	160	Maintain quarterly RWIS performance (up time) above 95%.	C	N/A	N/A		
		161	Rectify each individual RWIS defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Two-Way Radio System/800MHz/CHP.	162	Maintain quarterly Two-Way Radio /800MHz/CHP system performance (up time) above 95%.	C	N/A	N/A		
		163	Rectify each individual Two-Way Radio System/800MHz/CHP defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Call Boxes.	164	Maintain quarterly call box system performance (up time) above 95%.	C	N/A	N/A		
		165	Rectify each individual call box defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Ancillary Systems.	166	Maintain quarterly system performance (up time) above 95% for all other ancillary systems.	C	N/A	N/A		
		167	Rectify each individual ancillary system defect to restore full functionality.	D	24 Hours	24 Hours		$1,000
	Emergency Maintenance Repair.	168	Commence emergency repairs as defined in Section 2.4.4 from 6:00 AM to 7:00 PM, Monday through Friday.	E	10 Minutes	10 Minutes		$5000 / $4500 / $0
		169	Commence emergency repairs as defined in Section 2.4.4 at all other times.	E	60 Minutes	60 Minutes		$0 / $0 / $3000
ITS Maintenance	Inspection, testing, maintenance, etc. of all ITS system components.	170	Conduct routine inspections, testing, and maintenance in accordance with all Laws and equipment manufacturer's recommendations.	D	10 Days	5 Days	Yes	$1,000

TABLE 4.2 - OPERATING PERIOD O&M WORK REQUIREMENTS								
Element Category	**Required Task**	**ID**	**Minimum Performance Requirements**	**O&M Noncompliance Event Classification**	**Cure Period**	**Interval of Recurrence**	**Long Cure Priority Noncompliance?**	**O&M Noncompliance Adjustments (for new or recurred events) (High Priority / Mid Priority / Low Priority Hours)**
Existing Communication Links	Maintaining existing communication links within the O&M Limits.	171	Repair or replace damaged communications equipment (fiber optic cable, conduit, pull boxes, splice cabinets, hubs, etc.). Damaged fiber optic cable may be temporarily fusion spliced.	D	4 Hours	4 Hours		$1,000
		172	Replaced any damaged fiber optic cable from termination point to termination point with the same type of cable.	D	90 Days	30 Days	Yes	$1,000
Electrical								
Highway and Tunnel Lighting	Maintain functionality of highway and tunnel lighting system (only most severe Noncompliance Event	173	Maintain full functionality of 95% of luminaires at any given time.	A	5 Days	24 Hours		
		174	Maintain full functionality of 85% of luminaires at any given time.	C	48 Hours	24 Hours		
	Consecutive luminaire outages.	175	Restore functionality if three or more consecutive luminaires are not functioning properly.	E	24 Hours	24 Hours		$3,000
Sign Lighting	Maintain functionality of highway sign lighting.	176	Maintain full functionality of 95% of sign luminaires at any given time.	C	24 Hours	24 Hours		
Traffic Signals	Maintain functionality of traffic signals at signalized intersections.	177	Rectify all outages and/or improperly functioning signals.	D	2 Hours	60 Minutes		$2000 / $1600 / $1000
Traffic Guidance								
Pavement Markings / Delineators	Repair and replacement of line striping and pavement reflectors.	178	Pavement markings and reflectors should be replaced when they are missing or have lost their effectiveness, as defined by 95% reflectivity.	B	7 Days	24 Hours	Yes	
		179	Replace all damaged or missing delineation posts/reflectors. All delineation posts and reflectors should be free of functional defects and visible to the travelling public.	B	7 Days	48 Hours	Yes	
		180	Inspect pavement markings/delineation in accordance with Maintenance Manual Volume II, Section 4 for the M Family.	B	N/A	5 Days		
		181	Meet all other technical requirements for pavement markings/delineation set forth in Maintenance Manual Volume I, Section M and Maintenance Manual Volume II, Section 4.	A	30 Days	5 Days		
Signage	Maintain signs at acceptable level of safety for the traveling public.	182	Replace all missing regulatory signs and posts. All signs and posts should be plumb and level, free of functional defects, visible to the travelling public, and conform to the standards of the State Sign Shop.	C	24 Hours	24 Hours		
		183	Replace all missing warning signs and posts. All signs and posts should be plumb and level, free of functional defects, visible to the travelling public, and conform to the standards of the State Sign Shop.	C	24 Hours	24 Hours		
		184	Replace all missing guide signs and posts. All signs and posts should be plumb and level, free of functional defects, visible to the travelling public, and conform to the standards of the State Sign Shop.	B	7 Days	24 Hours	Yes	
		185	Inspect signage in accordance with Maintenance Manual Volume II, Section 4 for the M Family.	B	N/A	5 Days		
		186	Meet all other technical requirements for signage set forth in Maintenance Manual Volume I, Section M and Maintenance Manual Volume II, Section 4.	A	30 Days	5 Days		

TABLE 4.2 - OPERATING PERIOD O&M WORK REQUIREMENTS								
Element Category	**Required Task**	**ID**	**Minimum Performance Requirements**	**O&M Noncompliance Event Classification**	**Cure Period**	**Interval of Recurrence**	**Long Cure Priority Noncompliance?**	**O&M Noncompliance Adjustments (for new or recurred events) (High Priority / Mid Priority / Low Priority Hours)**
Guardrail	Maintain guardrail at acceptable level of safety for the traveling public (non-structural damage or deterioration).	187	Guardrail is maintained to meet the design criteria and safety standards.	D	5 Days	24 Hours		$1,000
		188	Guardrail should be free of wear, unsightly rust and vegetation.	B	30 Days	5 Days	Yes	
		189	Painted rail should be free of surface defects.	B	30 Days	5 Days	Yes	
		190	Inspect guardrail in accordance with Maintenance Manual Volume II, Section 4 for the M Family.	B	N/A	5 Days		
		191	Meet all other technical requirements for guardrail set forth in Maintenance Manual Volume I, Section M and Maintenance Manual Volume II, Section 4.	A	30 Days	5 Days		
	Maintain guardrail at acceptable level of safety for the traveling public (structural damage).	192	Any damage to structural integrity that creates a traffic hazard or compromises the system to the extent it will not function properly if it was to sustain another hit.	E	24 Hours	24 Hours		$3,000
Barrier Wall	Maintain barrier walls at acceptable level of safety for the traveling public (non-structural damage or deterioration).	193	Barrier is maintained to meet the design criteria and safety standards.	D	5 Days	24 Hours		$1,000
		194	Barrier should be free of wear and vegetation.	B	30 Days	5 Days	Yes	
		195	Inspect barrier in accordance with Maintenance Manual Volume II, Section 4 for the M Family.	B	N/A	5 Days		
		196	Meet all other technical requirements for barrier set forth in Maintenance Manual Volume I, Section M and Maintenance Manual Volume II, Section 4.	A	30 Days	5 Days		
	Maintain barrier walls at acceptable level of safety for the traveling public (structural damage).	197	Any damage to structural integrity that creates a traffic hazard or compromises the system to the extent it will not function properly if it was to sustain another hit.	E	24 Hours	24 Hours		$3,000
Attenuators	Maintain attenuators at acceptable level of safety for the traveling public (non-structural damage or deterioration).	198	Attenuators are maintained to meet the design criteria and safety standards.	D	5 Days	24 Hours		$1,000
		199	Attenuators should be free of wear and vegetation.	B	30 Days	5 Days	Yes	
		200	Inspect attenuators in accordance with Maintenance Manual Volume II, Section 4 for the M Family.	B	N/A	5 Days		
		201	Meet all other technical requirements for attenuators set forth in Maintenance Manual Volume I, Section M and Maintenance Manual Volume II, Section 4.	A	30 Days	5 Days		
	Maintain attenuators at acceptable level of safety for the traveling public (structural damage).	202	Any damage to structural integrity that creates a traffic hazard or compromises the system to the extent it will not function properly if it was to sustain another hit.	E	24 Hours	24 Hours		$3,000

TABLE 4.2 - OPERATING PERIOD O&M WORK REQUIREMENTS

Element Category	Required Task	ID	Minimum Performance Requirements	O&M Noncompliance Event Classification	Cure Period	Interval of Recurrence	Long Cure Priority Noncompliance?	O&M Noncompliance Adjustments (for new or recurred events) (High Priority / Mid Priority / Low Priority Hours)
Storm and Other Major Damage								
Storm Maintenance / Major Damage	Response to damage caused by earthquakes, strong winds, heavy rains, slides, slip-outs and other major damage.	203	Place regulatory and warning devices, delineation signs, etc. on the facility at conclusion of event.	D	24 Hours	60 Minutes		$1,000
		204	Begin planning/implementation of remediation work.	C	24 Hours	24 Hours		
		205	Meet all other technical requirements for storm damage set forth in Maintenance Manual Volume I, Section S and Maintenance Manual Volume II, Section 4.	A	30 Days	5 Days		
Incident Response								
Incident Response	Response to sites of incidents, emergencies, accidents, and other events that that result in a condition that is unsafe and/or may present a life threatening condition.	206	Respond to scene after detection or notification.	E	10 Minutes	10 Minutes		$5000 / $4500 / $3000
	Clearing of incidents and reopening of closed travel lanes after CHP/Emergency Response Officials provide notification to begin clean-up.	207	Clear incidents that involve a breakdown, minor accident (no injuries), non-hazardous material spill or debris and result in one closed travel lane.	E	30 Minutes	15 Minutes		$5000 / $4500 / $3000
		208	Clear incidents that involve a single vehicle accident (with injuries) and result in one closed travel lane.	E	40 Minutes	20 Minutes		$5000 / $4500 / $3000
		209	Clear incidents that involve a multiple vehicle accident with multiple injuries, but no fire or fatalities and result in up to all travel lanes closed in one direction.	E	80 Minutes	40 Minutes		$5000 / $4500 / $3000
		210	Clear incidents that involve a multiple vehicle accident with multiple injuries/fatalities, with or without fire and result in up to all travel lanes closed in one direction.	E	2 Hours	60 Minutes		$5000 / $4500 / $3000
		211	Clear incidents that involve a multiple vehicle accident with multiple injuries/fatalities, with or without fire and result in up to all travel lanes closed in one direction and one or more travel lanes closed in the opposite direction.	E	4 Hours	2 Hours		$5000 / $4500 / $3000
Sustainability Management Plan Reporting								
Sustainability Monitoring and Reporting Program	Preparation of Sustainability Management Plan Monitoring Report.	212	Meet requirements specified by Developer in the Sustainability Management Plan.	B	90 days	90 days		

Presidio Parkway Project
Public-Private Partnership Agreement
Volume II (Technical Requirements)

DIVISION II

SECTION 5 – HANDBACK REQUIREMENTS

Final

January 3, 2011

1. HANDBACK RENEWAL WORK PLAN 1

1.1. Assessment of Condition, Performance and Residual Life 1

1.2. Renewal Work 2

1.3. Training & Transition 2

2. EXECUTION OF THE HANDBACK RENEWAL WORK PLAN 2

3. ANNUAL HANDBACK RENEWAL WORK PLAN UPDATES 3

4. HANDBACK REQUIREMENTS 3

1. HANDBACK RENEWAL WORK PLAN

Forty eight (48) months prior to the end of the Term, Developer shall submit a Handback Renewal Work Plan to the Department for approval in its good faith discretion that sets out Developer's proposed processes for:

A. Assessment of the condition, performance and residual life of the Project assets at the Termination Date;

B. Renewal Work through maintenance, repair, reconstruction, rehabilitation, restoration, renewal or replacement of Project assets such that the assets comply with the acceptance criteria that measures the condition, performance, and specified life of the respective Project assets remaining at the end of the Term;

C. Plan for the transition of operation and maintenance responsibilities to the Department and acceptance of the Project assets and operation and maintenance responsibilities upon satisfaction of the acceptance criteria; and

D. Department staff training on all O&M manuals, systems, and procedures.

Developer shall coordinate all aspects of the development of the Handback Renewal Work Plan with the Department, including conducting operation and maintenance as agreed, independent or joint inspections of the assets and performance of the acceptance tests that measure the condition, performance, and specified life of the respective Project assets remaining at the end of the Term.

1.1. Assessment of Condition, Performance and Residual Life

The Handback Renewal Work Plan shall detail the methods and tests that will be used during the condition and performance assessments, the acceptance criteria, the acceptance measures or limits that must be satisfied, and the conditions and data that will be used to calculate the residual lives of all Project assets. The Handback Renewal Work Plan shall also include the scope, schedule, detailed tests and inspection procedures, processes and evaluations required, acceptance criteria, and acceptance measures that will be used to verify and demonstrate to the Department that all facilities, equipment and systems function as specified; that they comply with the applicable codes and standards set forth in the Technical Requirements; and that they meet the life remaining requirements as specified in Table 5.1.

The test and inspection procedures detailed in the Handback Renewal Work Plan shall indicate any particular reference standards, or other information used to support the testing, inspection, and asset evaluation process, including updates to standards that occur during the Term.

Developer shall prepare the initial residual life calculation methods for each Project asset and shall utilize applicable current industry standards, manufacturer's life expectancy, equipment mean time between failures, and equipment/asset histories in addition to criteria listed in the Handback Evaluation Criteria column of Table 5.1 to determine the condition, performance and the residual life for each asset.

Developer shall use the assets identified in Table 5.1 together with any further assets incorporated into the Project as a result of Developer's final design configuration and assets in place at the time of the evaluation when determining the required inspections and tests. Developer and the Department shall mutually develop a more detailed table and proposal based

upon Developer's design configuration and Project assets in place at the time of the Handback Renewal Work Plan's preparation.

1.2. Renewal Work

The Handback Renewal Work Plan shall detail Developer's approach to maintenance, repair, reconstruction, rehabilitation, restoration, renewal and replacement of Project assets such that they meet the operational, performance, and life-remaining requirements as specified in Table 5.1, based upon Developer's design configuration and assets in place at the time of the Handback Renewal Work Plan's preparation.

Developer's Renewal Work proposals shall be developed:

- On the basis of the assessment of the operation, performance, and Residual Life of the Project assets; and
- On the assumption that the Project assets will be maintained in accordance with the O&M Requirements for the remainder of the Term.

The Handback Renewal Work Plan shall contain Developer's proposed schedule for implementation of maintenance, repair, reconstruction, rehabilitation, restoration, renewal or replacement of Project assets.

The Handback Renewal Work Plan shall contain details of the cost, the "Handback Renewal Amount," of executing the Handback Renewal Work.

The Handback Renewal Work Plan shall include any areas that are under remedial work. Developer shall retain all remediation responsibility (and liability) until such time that Developer submits to the Department a full description of the remedial work and the results of such work, and receives from the Department acceptable documentation indicating that Developer has complied with all directives and fulfilled and completed their remediation obligations as directed by the governmental entity with jurisdiction, whether it be a Federal, State, County or Local government.

1.3. Training & Transition

The third component of the Handback Renewal Work Plan shall be a Training and Transition Plan. The Training and Transition Plan shall detail how Developer will work with the Department to ensure a seamless transfer of O&M responsibilities and safe traffic operations back to the Department.

At least six (6) months prior to the Termination Date, Developer shall provide a comprehensive O&M training session for the Department's staff which shall cover in detail all operations and maintenance functions of the Project, and an on-the-job transition project plan and schedule. The training session shall include a review of certain project records as well as all O&M Manuals, and other plans and procedures. The complete curriculum for this training session shall be contained in the Training and Transition Plan component of the Handback Renewal Work Plan.

2. EXECUTION OF THE HANDBACK RENEWAL WORK PLAN

Upon receipt of approval of the Handback Renewal Work Plan by the Department, including the Renewal Work Schedule and the Handback Renewal Amount, Developer shall execute the Renewal Work in accordance with the Handback Renewal Work Plan and the Contract

Documents. All references to Works in Division II, Section 3 shall also apply to the Renewal Works.

Developer's Handback Renewal Work Plan shall be financed in accordance with the requirements of Section 5 of the Agreement.

3. ANNUAL HANDBACK RENEWAL WORK PLAN UPDATES

The Handback Renewal Work Plan shall include provisions for Annual Handback Evaluation Reports of the Project assets for the remainder of the Term. After the preparation of the first Annual Handback Evaluation Report and prior to the commencement of each year remaining in the Term, Developer, upon consultation with the Department, shall update the Handback Renewal Work Plan, as needed, to reflect changes in conditions of the Project assets or evaluation methodology determined following an inspection of the Project assets by the Department or its designee. Each subsequent Handback Renewal Work Plan prepared after the first plan shall be subject to the approval of the Department. As well as including the results from the last Annual Handback Evaluation Report, the Handback Renewal Work Plan shall include the estimated cost and schedule of implementation of the remaining Handback Renewal Work.

The successive versions of the Handback Renewal Work Plan shall incorporate the results from the last annual inspection report and include the estimated cost and a schedule of the Renewal Work (from the then-current date until the end of the Term). Developer shall submit a copy of each successive version of Handback Renewal Work Plan to the Department for approval. The Handback Renewal Work Plan shall include all Project Elements, without limitation.

4. HANDBACK REQUIREMENTS

Project assets, structures, systems and equipment shall meet the minimum Handback Requirements and criteria set forth in Table 5.1. Developer shall prepare a revised table based upon Developer's actual design configuration and Project assets as part of the Handback Renewal Work Plan.

Performance and Measurement Table Baseline

Table 5.1- Handback Requirements

TABLE 5.1 – HANDBACK REQUIREMENTS				
Asset Description	**Asset Sub System Description**	**Handback Evaluation Tasks**	**Handback Evaluation Criteria**	**Life Remaining at Handback (Years)**
Flexible Pavement	Pavement section within the O&M Limits	Flexible Pavement Condition Survey shall be conducted in accordance with Maintenance Manual Volume II, Section 4 for the A Family within 180 calendar days before the end of the Term; and Complete all tests in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	No cracks greater than or equal to 0.25 inches in width; No settlement/depression greater than 0.5 inches in depth over any 50 ft. length; No wheel ruts greater than 1 inch deep; No drip-track ruts over 0.5 inches deep; No alligator cracking, pot holes or slippage areas; and Achievement of standards in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	10 Years

TABLE 5.1 – HANDBACK REQUIREMENTS				
Asset Description	**Asset Sub System Description**	**Handback Evaluation Tasks**	**Handback Evaluation Criteria**	**Life Remaining at Handback (Years)**
Rigid Pavement	Pavement section within the O&M Limits	Rigid Pavement Condition Survey shall be conducted in accordance with Maintenance Manual Volume II, Section 4 for the B Family within 180 calendar days before the end of the Term; and Complete all tests in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	No cracks greater than or equal to 0.25 inches in width; No settlement/depression greater than 0.5 inches in depth over any 50 ft. length; No deviation at the joint of adjacent slabs exceeding 0.25 inches; No spalls, pot holes or slippage areas; and Achievement of standards in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	10 Years

TABLE 5.1 – HANDBACK REQUIREMENTS				
Asset Description	**Asset Sub System Description**	**Handback Evaluation Tasks**	**Handback Evaluation Criteria**	**Life Remaining at Handback (Years)**
Guardrail	Guardrail systems within the O&M Limits	Final inspection in accordance with Maintenance Manual Volume II, Section 4 for the M Family shall be conducted within 45 calendar days before the end of the Term; and Complete all tests in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	All guardrail systems must be within 0.75 inches of plumb and grade; Surface materials are smooth, undamaged and free of defects; Rails and terminal elements are not warped or otherwise deformed; Posts are installed square to the rail; Painted rail should be free of surface defects; and Achievement of standards in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	8 Years

TABLE 5.1 – HANDBACK REQUIREMENTS				
Asset Description	**Asset Sub System Description**	**Handback Evaluation Tasks**	**Handback Evaluation Criteria**	**Life Remaining at Handback (Years)**
Attenuators	Attenuator systems within the O&M Limits	Final inspection in accordance with Maintenance Manual Volume II, Section 4 for the M Family shall be conducted within 45 calendar days before the end of the Term; and Complete all tests in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	System is free of obstructions and fully capable of functioning as designed and intended; System components are free of damage which impairs the ability of the attenuator to serve its function; and Achievement of standards in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	8 Years

TABLE 5.1 – HANDBACK REQUIREMENTS				
Asset Description	**Asset Sub System Description**	**Handback Evaluation Tasks**	**Handback Evaluation Criteria**	**Life Remaining at Handback (Years)**
Signs and beacons	Single-post, multi-post & overhead within the O&M Limits	Final inspection and reflectivity tests shall be conducted in accordance with Maintenance Manual Volume II, Section 4 for the M Family within 120 calendar days before the end of the Term; and Complete all tests in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	No damaged or missing warning signs, guide signs, regulatory signs, or posts thereof. All signs and posts should be plumb and level, free of defects, visible to the travelling public, and conform to the standards of the State Sign Shop; and Achievement of standards in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	7 Years
		Final inventory and condition assessment shall be conducted within 90 calendar days before the end of the Term; and Complete all tests in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of	Replace sign panels that do not meet the Department's standard current at the time; No signs in a condition that includes but is not limited to the following: a) Sign that is not flat (planar) and properly oriented to the travelling public or other intended audience;	7 Years

TABLE 5.1 – HANDBACK REQUIREMENTS				
Asset Description	**Asset Sub System Description**	**Handback Evaluation Tasks**	**Handback Evaluation Criteria**	**Life Remaining at Handback (Years)**
		the Term.	b) Sign that has more than four (4) square inches or 1% (whichever is greater) of the sign panel face area containing the deficiencies; c) Sign that, in the opinion of the Department, is otherwise damaged or contains a message to the travelling public or other audience that is unclear, improper, or confusing; and Achievement of standards in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	

TABLE 5.1 – HANDBACK REQUIREMENTS				
Asset Description	**Asset Sub System Description**	**Handback Evaluation Tasks**	**Handback Evaluation Criteria**	**Life Remaining at Handback (Years)**
Striping and Markings	Striping, markings, lettering, symbols within the O&M Limits	Inspect pavement markings/delineation in accordance with Maintenance Manual Volume II, Section 4 for the M Family; and Complete all tests in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	No damaged delineation posts/reflectors; No faded, worn, debonded, damaged, non-reflective and/or missing pavement striping and markings; and Achievement of standards in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	2 Years

TABLE 5.1 – HANDBACK REQUIREMENTS				
Asset Description	**Asset Sub System Description**	**Handback Evaluation Tasks**	**Handback Evaluation Criteria**	**Life Remaining at Handback (Years)**
Drainage Systems	Drainage systems elements (side/cross drains, roadside ditches, inlets, and miscellaneous drainage structures)	Conduct a final video inspection of all drainage pipes and other drainage systems elements (side/cross drains, roadside ditches, inlets, and miscellaneous drainage structures) within 90 calendar days before the end of the Term; and Complete all tests in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	No blockages in slots or grates. Defective materials cleaned and repaired or replaced as necessary. Slot drains cleaned; No spalled or cracked concrete that has damage to structural integrity; and Achievement of standards in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	20 Years

TABLE 5.1 – HANDBACK REQUIREMENTS				
Asset Description	**Asset Sub System Description**	**Handback Evaluation Tasks**	**Handback Evaluation Criteria**	**Life Remaining at Handback (Years)**
Highway Lighting	Includes Roadway, under-deck, signing and high mast within the O&M Limits	Final inspection shall be conducted within 30 calendar days before the end of the Term; and Complete all tests in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	100% of lights must be operational; and Achievement of standards in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	N/A

TABLE 5.1 – HANDBACK REQUIREMENTS				
Asset Description	**Asset Sub System Description**	**Handback Evaluation Tasks**	**Handback Evaluation Criteria**	**Life Remaining at Handback (Years)**
High Mast Light Poles	Structural within the O&M Limits	Final inspection, including x-rays of the lighting bases, shall be conducted within 180 calendar days before the end of the Term; and Complete all tests in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	All High Mast Light Poles must be in an overall condition that is in accordance with the criteria set forth in the Department's Manuals and Guidelines current at the time of inspection; and Achievement of standards in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	15 Years
Over-Lane Sign Structures	Structural within the O&M Limits	Final inspection of over-lane sign Structures shall be conducted within 180 calendar days before the end of the Term; and Complete all tests in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	All over-lane sign structures must be in an acceptable condition according to the Department's Manuals and Guidelines current at the time of inspection; and Achievement of standards in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	15 Years

TABLE 5.1 – HANDBACK REQUIREMENTS				
Asset Description	**Asset Sub System Description**	**Handback Evaluation Tasks**	**Handback Evaluation Criteria**	**Life Remaining at Handback (Years)**
Signals	Traffic signals, housings, mountings, signal controllers and ancillary equipment within the O&M Limits	Final inspection of all structures shall be conducted in accordance with Maintenance Manual Volume II, Section 4 for the K Family within 45 calendar days before the end of the Term; and Complete all tests in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	No outages or improperly functioning signals; and Achievement of standards in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	5 Years

TABLE 5.1 – HANDBACK REQUIREMENTS				
Asset Description	**Asset Sub System Description**	**Handback Evaluation Tasks**	**Handback Evaluation Criteria**	**Life Remaining at Handback (Years)**
Bridges	Within the O&M Limits	Final inspection of all structures shall be conducted in accordance with Maintenance Manual Volume II, Section 4 for the H Family within 180 calendar days before the end of the Term; and Complete all tests in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	Overall condition rating of eighty (80) or better on the FHWA Standard Structure Sufficiency Rating scale for all Structures; and Achievement of standards in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	45 Years

TABLE 5.1 – HANDBACK REQUIREMENTS				
Asset Description	**Asset Sub System Description**	**Handback Evaluation Tasks**	**Handback Evaluation Criteria**	**Life Remaining at Handback (Years)**
Tunnels	Within the O&M Limits	Final tunnel inspection shall be conducted within 180 calendar days before the end of the Term. The following tunnel components must be replaced within one year (12 months) before the end of the Term: -Tunnel ventilation; -Tunnel lighting system; and -Tunnel Fire Life system. Complete all tests in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	Overall tunnel condition will be guided by table 4.2 of Division II Section 4 and the Department's Highway Design Manual or successor; Tunnel systems are integrated with the Department's existing Command and Control Center; and Achievement of standards in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	10 Years

TABLE 5.1 – HANDBACK REQUIREMENTS				
Asset Description	**Asset Sub System Description**	**Handback Evaluation Tasks**	**Handback Evaluation Criteria**	**Life Remaining at Handback (Years)**
Retaining Walls	Within the O&M Limits	Final inspection of all structures shall be conducted within 180 calendar days before the end of the Term; and Complete all tests in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	All walls meet necessary standards in the Department's Highway Design Manual or successor; and Achievement of standards in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	20 Years
Landscaping & Irrigation	To be determined at Handback			

TABLE 5.1 – HANDBACK REQUIREMENTS				
Asset Description	**Asset Sub System Description**	**Handback Evaluation Tasks**	**Handback Evaluation Criteria**	**Life Remaining at Handback (Years)**
Fencing	Within the O&M Limits, all fencing along or within the Project used to preserve a property boundary, control pedestrian and animal access, and maximize the safety and security of project users	Final inspection of all fencing shall be conducted within 90 calendar days before the end of the Term; and Complete all tests in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	All fencing must be within 0.75 inches of plumb and grade and repaired or replaced in accordance with the criteria set forth in the Department's Manuals and Guidelines current at the time of inspection; and Achievement of standards in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	
Other Mechanical & Electrical Systems	To be determined at Handback			

TABLE 5.1 – HANDBACK REQUIREMENTS				
Asset Description	**Asset Sub System Description**	**Handback Evaluation Tasks**	**Handback Evaluation Criteria**	**Life Remaining at Handback (Years)**
ITS	Includes all ITS subsystems, communication and ancillary components	The Developer shall purchase new hardware in the final year of the program and configure, test, deploy and deliver the fully operational system within180 days before the end of the Term. The Department will retain manufacturer warranties; and Complete all tests in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	100% of all ITS devices are operational; and Achievement of standards in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	N/A

TABLE 5.1 – HANDBACK REQUIREMENTS				
Asset Description	**Asset Sub System Description**	**Handback Evaluation Tasks**	**Handback Evaluation Criteria**	**Life Remaining at Handback (Years)**
	Software programs	Developer shall deliver the software programs updated to the most recent version, including manuals and passwords, if applicable, available from the vendor within 12 months before the end of the Term; Software licenses are to be transferred to the Department and be available to be used with out fee for a minimum of 2 years from the end of Term. The Department will have full rights to use/modify/upgrade without any restrictions; The Department will retain manufacturer warranties on the software ; and Complete all tests in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	Software is licensed and available for Department use for duration of the new ITS equipments' expected life; Control of all ITS facilities within the Project ROW is integrated into the Department's Command and Control Center; and Achievement of standards in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	N/A

TABLE 5.1 – HANDBACK REQUIREMENTS				
Asset Description	**Asset Sub System Description**	**Handback Evaluation Tasks**	**Handback Evaluation Criteria**	**Life Remaining at Handback (Years)**
Spare parts			1 year's worth of all spares and spare parts, test equipment and any custom maintenance equipment shall be delivered to the Department.	N/A
Loop Detectors	Loop with Amplifier Controllers, Controller Cabinet, Fiber Optic Cable, and other Ancillary Equipment	100% system functionality; and Complete all tests in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	Developer shall no sooner than 90 days prior to end of term demonstrate that the systems are fully functioning with no defects or failed components; All cabinets and other systems components must not show signs of corrosion; and Achievement of standards in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	N/A

TABLE 5.1 – HANDBACK REQUIREMENTS				
Asset Description	**Asset Sub System Description**	**Handback Evaluation Tasks**	**Handback Evaluation Criteria**	**Life Remaining at Handback (Years)**
All Project Aspects Not Specifically Addressed	N/A	Meet or exceed the minimum performance requirements specified in Table 4.2.; and Complete all tests in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	Curing of all deficiencies identified in the final annual O&M inspection as outlined in the O&M Plan (to be done within 180 days before the end of the Term) in accordance with the Department's current standards and procedures; and Achievement of standards in the Handback Renewal Work Plan to demonstrate the achievement of the required life remaining at the end of the Term.	N/A

Note the Developer is not required to refurbish equipment or feeds to any temporary operations and maintenance centers as part of the handback process. Such centers are not to be handed back to the Department at the end of the Term.

STATE OF CALIFORNIA

DEPARTMENT OF TRANSPORTATION

CONTRACT

NUMBER 04-1637U4

TO DESIGN, BUILD, FINANCE, OPERATE AND MAINTAIN

THE

PRESIDIO PARKWAY PROJECT

THROUGH A PUBLIC-PRIVATE PARTNERSHIP AGREEMENT

Volume III – Manuals and Guidelines

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Volume III (Manuals and Guidelines)

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TABLE OF CONTENTS

1. INTRODUCTION 1

1.1. California Department of Transportation (Caltrans) 1
1.2. American Association of State Highway and Transportation Officials (AASHTO) 3
1.3. American National Standards Institute (ANSI) 3
1.4. American Petroleum Institute (API) 3
1.5. American Society for the Testing of Materials (ASTM) 3
1.6. American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) 4
1.7. American Wood Protection Association (AWPA) 4
1.8. Bay Area Air Quality Management District 4
1.9. California Air resources Board (CARB) 4
1.10. Electronic Industries Alliance (EIA) 5
1.11. Federal Highway Administration (FHWA) 5
1.12. Illuminating Engineering Society of North America (IESNA) 5
1.13. Institute of Electrical and Electronics Engineers (IEEE) 5
1.14. Institute of Transportation Engineers (ITE) 6
1.15. International Commission on Illumination (CIE) 6
1.16. International Society of Arboriculture 6
1.17. International Standards Organization/ International Organization for Standardization (ISO) 6
1.18. National Cooperative Highway Research Program (NCHRP) 6
1.19. National Electrical Manufacturers Association (NEMA) 6
1.20. National Fire Protection Association (NFPA) 6
1.21. National Institute of Standards and Technology (NIST) 7
1.22. National Parls Service 7
1.23. Presidio Trust 7
1.24. Secretary of Interior 7
1.25. Telecommunications Industries Association (TIA) 7
1.26. Texas Transportation Institute 7
1.27. Transportation Research Board (TRB) 8
1.28. Underwriters Laboratories (UL) 8
1.29. U.S. Army Corps of Engineers (US ACE) 8
1.30. U.S. Environmental Protection Agency (EPA) 8
1.31. U.S. National Renewable Energy Laboratory (USNREL) 8

1. INTRODUCTION

The following pages provide a non exclusive list of Manuals and Guidelines to be used for the Project

1.1. California Department of Transportation (Caltrans)

- 2006 (US Customary Limits), Standard Plans, Including New Standard Plans and Revised Standard Plans
- Approved Chemical List
- Bridge Construction Records and Procedures
- Bridge Deck Construction Manual
- Bridge Design Aids
- Bridge Design Details
- Bridge Design Practice
- Bridge Design Specifications
- Bridge Memo to Designers
- Bridge Standard Detail Sheets
- CADD Users Manual – US Customary Units (English).
- California Amendments to the AASHTO LRFD Bridge Design Specifications
- California Test Methods (CTM)
- Caltrans Code of Safe Surveying Practices
- Construction Manual
- Construction Site Best Management Practices (BMPs) Manual
- Design-Build Modifications to the Standard Specifications for Construction
- Design Information Bulletin DIB 83-01 Caltrans Supplement to FHWA Culvert Repair Practices Manual (Updated 10-02-2006)
- Division of Engineering Services (DES) Memo to Designers 1-35, Foundation Recommendation and Reports
- Division of Engineering Services (DES) Memo to Designers 3-1, Deep Foundations
- Division of Engineering Services (DES) Memo to Designers 4-1, Spread Footings
- Division of Engineering Services (DES) Memo to Designers 5-20, Foundation Report / Geotechnical Design Report Checklist for Earth Retaining Systems
- Division of Engineering Services (DES) Memo to Designers 20-1, Seismic Design Methodology
- Division of Engineering Services (DES) Memo to Designers 20-10, Surface Fault Rupture Displacement Hazard Investigations
- Division of Engineering Services (DES) Memo to Designer 20-12 Site Seismicity for Existing and Temporary Bridges carrying Public Vehicular Traffic
- Doyle Drive Tree Removal Plan
- Falsework Manual

- Fiber Optics Design Guidelines
- Fish Passage Design for Road Crossings
- Foundation Manual
- Guidelines for Preparing Geotechnical Design Reports
- Guidelines for Structures Foundation Reports
- Highway Design Manual
- HOV Guidelines for Planning, Design and Operations
- Landscape Architecture Program PS&E Guide
- Level of Service Handbook (LOS2000)
- Maintenance Manual
- Manual for Quality Control and Quality Assurance for Asphalt Concrete
- Manual of Traffic Controls for Maintenance and Work Zones
- Manual on Uniform Traffic Control Devices (MUTCD)
- New Policy and Directives (Pavement Delineation and Singing)
- Office of Special Funded Projects Information and Procedures Guide
- Outline of Field Construction Practices
- Plans Preparation Manual US Customary Units (English)
- Plant Setback and Spacing Guide
- Prestress Manual, a Guide for Field Inspection of Cast in Place Tensioned Structures.
- Project Development Procedures Manual (PDPM)
- Project Plans for Plant Collection, Salvaging, and Propagation
- Ramp Meter Design Manual
- Ready To List and Construction Contract Award Guide (RTL Guide)
- Reference Sheets for Structural Design Aids Overhead and Roadside Signs
- Safety Manual
- Seismic Design Criteria
- Sign Specifications
- Signal Design Detail Sheets
- Signal, Lighting and Electrical Systems Design Guide
- Signals, Lighting and Electrical Systems (ES Sheets)
- Soil and Rock Logging, Classification, and Presentation Manual
- Standard Environmental Reference
- Standard Highway Signs
- Standard Special Provisions
- Standard Specifications, (May 2006 Edition)
- Stormwater Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual
- Storm Water Quality Handbook: Project Planning and Design Guide

- Structural Detailing Standards
- Surveys Manual
- Traffic Manual
- Transportation Electrical Equipment Specifications (TEES);
- Trenching and Shoring Manual

1.2. American Association of State Highway and Transportation Officials (AASHTO)

- A Guide for Transportation Landscape and Environmental Design
- A Policy on Geometric Design of Highway and Streets
- Bridge Welding Code, D1.5
- LRFD Bridge Construction Specifications
- LRFD Bridge Design Specifications
- Manual of Subsurface Investigations
- Model Drainage Manual
- Roadside Design Guide
- Roadway Lighting Design Guide
- Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals
- Standard Specifications for Transportation Materials and Methods of Sampling and Testing
- Structural Welding Code – steel, D1.1

1.3. American National Standards Institute (ANSI)

- C2-81 National Electrical Safety Code
- Illuminating Engineering Society of North America Roadway Lighting ANSI Approved Standards, Guides and Documents

1.4. American Petroleum Institute (API)

- Recommended Practice for Planning, Design and Constructing Fixed Offshore Platforms – Working Stress Design

1.5. American Society for the Testing of Materials (ASTM)

- D1452 Standard Practice for Soil Exploration and Sampling by Auger Borings
- D1586 Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils
- D1587 Standard Practice for Thin-Walled Tube Sampling of Soils for Geotechnical Purposes

- D2113 Standard Practice for Rock Core Drilling and Sampling of Rock for Site Investigation
- D3550 Standard Practice for Thick Wall, Ring-Lined, Split Barrel, Drive Sampling of Soils
- D3740 Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
- D4220 Standard Practices for Preserving and Transporting Soil Samples
- D5079 Standard Practices for Preserving and Transporting Rock Core Samples
- D5778 Standard Test Method for Electronic Friction Cone and Piezocone Penetration Testing of Soils
- D5782 Standard Guide for Use of Direct Air-Rotary Drilling for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices
- D5783 Standard Guide for Use of Direct Rotary Drilling with Water-Based Drilling Fluid for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices
- D5876 Standard Guide for Use of Direct Rotary Wireline Casing Advancement Drilling Methods for Geoenvironmental Exploration and Installation of Subsurface Water-Quality Monitoring Devices
- D6151 Standard Practice for Using Hollow-Stem Augers for Geotechnical Exploration and Soil Sampling
- D6519 Standard Practice for Sampling of Soil Using the Hydraulically Operated Stationary Piston Sampler
- D7015 Standard Practices for Obtaining Intact Block (Cubical and Cylindrical) Samples of Soils

1.6. American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE)

- Handbook

1.7. American Wood Protection Association (AWPA)

- T1 Treatment Standard
- U1 User Specification for Treated Wood

1.8. Bay Area Air Quality Management District

- California Environmental Quality Act Air Quality Guidelines.

1.9. California Air resources Board (CARB)

- Suggested Control Measure

1.10. Electronic Industries Alliance (EIA)

- Standards

1.11. Federal Highway Administration (FHWA)

- Checklist and Guidelines for Review of Geotechnical Reports and Preliminary Plans and Specifications
- Design and Construction of Driven Pile Foundations, Volumes I and II
- Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes
- Drilled Shafts: Construction Procedures and Design Methods
- Geotechnical Engineering Circular No. 2, Earth Retaining Systems
- Geotechnical Engineering Circular Number 4, Ground Anchors and Anchored Systems
- Geotechnical Engineering Circular No 5, Evaluation of Soil and Rock Properties
- Handbook on Design and Construction of Drilled Shafts Under Lateral Load
- Hydraulic Design and Procedures Publications
- Hydraulic Engineering Circular Number 21 (HEC-21) Design of Bridge Deck Drainage Systems
- Manual for Design & Construction of Soil Nail Walls
- National ITS Architecture
- Title 23 Code of Federal Regulations (and Non Regulatory Supplements) Chapter 1, Part 752 Landscape and Roadside Development
- Traffic Control Systems Handbook

1.12. Illuminating Engineering Society of North America (IESNA)

- Lighting Handbook
- LM-50-99 Photometric Measurement of Roadway Lighting Installations
- LM-71-96 Photometric Measurement of Tunnel Lighting Installation
- RP-8 Roadway Lighting
- RP-19 Roadway Sign Lighting
- RP-22 Tunnel Lighting

1.13. Institute of Electrical and Electronics Engineers (IEEE)

- 80 Guide for Safety in AC Substation Grounding
- 81 Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System
- 730 Software Quality Assurance Plan
- 830 Recommended Practice for Software Requirements
- 1012 Software Verification and Validation

- 1016 Recommended Practice for Software Design Descriptions

1.14. Institute of Transportation Engineers (ITE)

- Traffic Engineering Handbook

1.15. International Commission on Illumination (CIE)

- 88 Guide for the Lighting of Road Tunnels and Underpasses

1.16. International Society of Arboriculture

- Guide for Plant Appraisal

1.17. International Standards Organization/ International Organization for Standardization (ISO)

- 9001 Quality Management Systems
- 14001 Environmental Management Systems
- 14048 Environmental Management – Life Cycle Assessment

1.18. National Cooperative Highway Research Program (NCHRP)

- Report 350-Recommended Procedures for the Safety Performance Evaluation of Highway Features
- Synthesis 360, Rock-Socketed Shafts for Highway Structures Foundations

1.19. National Electrical Manufacturers Association (NEMA)

- Standards

1.20. National Fire Protection Association (NFPA)

- 10: Portable Fire Extinguishers
- 13: Sprinkler Systems
- 14: Installation of Standpipe and Hose Systems
- 20: Installation of Stationary Pumps for Fire Protection
- 24: Installation of Private Fire Service Mains and Their Appurtenances
- 25: Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems
- 30: Flammable and Combustible Liquids Code
- 70 National Electrical Code
- 72 National Fire Alarm and Signaling Code
- 90A: Installation of Air Conditioning and Ventilating Systems
- 92B: Smoke Management Systems In Malls, Atria, And Large Spaces
- 101: Life Safety Code (2009 is current edition);

- 110: Emergency and Standby Power Systems
- 220: Types of Building Construction
- 241: Safeguarding Construction, Alteration and Demolition Operations
- 251: Tests of Fire Resistance of Building Construction and Materials
- 502 Standard for Road Tunnels, Bridges and other Limited Access Highways
- 1600: Disaster/Emergency Management and Business Continuity Programs
- 1963: Fire Hose Connections
- 2001: Clean Agent Fire Extinguishing Systems

1.21. National Institute of Standards and Technology (NIST)

- SP 800-82 Guide to Industrial Control Systems (ICS) Security

1.22. National Parls Service

- Standards and Guidelines

1.23. Presidio Trust

- Policy for Waste Minimization in Construction and Demolition
- Presidio Trust Management Plan
- Presidio Trust Roads & Grounds IPM Program
- Presidio Trust Weed Management Guidelines
- Vegetation Management Plan
- Presidio Trails and Bikeways Master Plan & Environmental Assessment
- South Access to the Golden Gate Bridge Architectural Criteria Report August 2008

1.24. Secretary of Interior

- Standards and Guidelines for Archaeological Documentation
- Standards for the Treatment of Historic Properties: with guidelines for the Preservation, Rehabilitation, Restoration and Reconstruction

1.25. Telecommunications Industries Association (TIA)

- Standards
- TIA/EIA-455-171A, FOTP-171 Attenuation by Substitution Measurements for Short-Length Multimode Graded-Index and Single Mode Optical Fiber Cable Assemblies;
- TIA/EIA-455-61A, FOTP-61 Measurement of Fiber or Cable Attenuation Using an Optical Time-domain Reflectometer (OTDR).

1.26. Texas Transportation Institute

- Intersection Video Detection Manual

1.27. Transportation Research Board (TRB)

- Highway Capacity Manual

1.28. Underwriters Laboratories (UL)

- 1971 Signaling Devices for the Hearing Impaired

1.29. U.S. Army Corps of Engineers (US ACE)

- Wetlands Delineation Manual

1.30. U.S. Environmental Protection Agency (EPA)

- Architectural and Industrial Measure

1.31. U.S. National Renewable Energy Laboratory (USNREL)

- U.S. Life – Cycle Inventory Database