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January 29, 2010

04-SF-101-8.2/9.2
04-163744
SARRA-Q101(153)N

Addendum No. 3

Dear Contractor:

This addendum is being issued to the contract for CONSTRUCTION ON STATE HIGHWAY IN THE CITY AND COUNTY OF SAN FRANCISCO FROM 1.3 MILE TO 0.3 MILE SOUTH OF THE ROUTE 101/1 SEPARATION.

Submit bids for this work with the understanding and full consideration of this addendum. The revisions declared in this addendum are an essential part of the contract.

Bids for this work will be opened on Friday, February 26, 2010, instead of the original date of Wednesday, February 3, 2010.

This addendum is being issued to set a new bid opening date as shown herein and to revise the Notice to Bidders and Special Provisions, the Federal Minimum Wages with Modification Number 46 dated 01/22/10.

In the Special Provisions, Section 4, "BEGINNING OF WORK, TIME OF COMPLETION, AND LIQUIDATED DAMAGES is revised as attached.

In the Special Provisions, Section 10-1.01, "ORDER OF WORK," the following three paragraphs are added after the third paragraph:

"Lincoln Blvd from McDowell to Banks St. shall be closed only for Stage 1 work to construct the SB Battery Tunnel, Retaining Walls A, B, 8, and construction of permanent Lincoln Blvd roadway as shown on the plans. Simultaneous closure of Lincoln Blvd from McDowell to Banks St and Halleck Street from Mason to Lincoln Blvd is not allowed.

Halleck St from Mason St to Lincoln Blvd shall be closed completely only at the beginning of Stage 2 work and only if the permanent Lincoln Blvd roadway as shown on the plans is completed and opened to public traffic. Simultaneous closure of Halleck Street from Mason to Lincoln Blvd and Lincoln Blvd from McDowell to Banks St is not allowed.

Marshall St. from Mason St to Gorgas Ave may be closed completely only at the beginning of Stage 2 work and only if the permanent Lincoln Blvd roadway as shown on the plans is completed and opened to public traffic. Simultaneous closure of Marshall St. from Mason St to Gorgas Ave and Lincoln Blvd from McDowell to Banks St is not allowed."

In the Special Provisions, Section 10-1.49, "EARTHWORK," the fifth paragraph is deleted.

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In the Special Provisions, Section 10-3.32, "BATTERY SUBSTATION AND TUNNEL WORK," the following subsection is added after the subsection "REDUNDANT POWER SUPPLY CONTROLLER".

"PAYMENT

The contract lump sum price paid for Battery substation and tunnel work shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in Battery substation and tunnel work, complete in place, including training, manuals and testing, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer."

In the Special Provisions, Section 10-4.01, "COMMISSIONING AND INITIAL OPERATIONS SUPPORT," is added as attached.

To Bid book holders:

Inquiries or questions in regard to this addendum must be communicated as a bidder inquiry and must be made as noted in the Notice to Bidders section of the Notice to Bidders and Special Provisions.

Indicate receipt of this addendum by filling in the number of this addendum in the space provided on the signature page of the Bid book.

Submit bids in the Bid book you now possess. Holders who have already mailed their book will be contacted to arrange for the return of their book.

Inform subcontractors and suppliers as necessary.

This addendum, attachments and the modified wage rates are available for the Contractors' download on the Web site:

http://www.dot.ca.gov/hq/esc/oe/project_ads_addenda/04/04-163744

If you are not a Bid book holder, but request a book to bid on this project, you must comply with the requirements of this letter before submitting your bid.

Sincerely,

ORIGINAL SIGNED BY

REBECCA D. HARNAGEL
Chief, Office of Plans, Specifications & Estimates
Office Engineer
Division of Engineering Services

Attachments

SECTION 4. BEGINNING OF WORK, TIME OF COMPLETION, AND LIQUIDATED DAMAGES

The 1st working day is the 10th day after contract approval.

The first paragraph and second paragraph, item number 2, of Section 8-1.03 "Beginning of Work" will not apply. Submit a written notice 24 hours before beginning work.

Do not start work at the job site, except for measuring controlling field dimensions and locating utilities, until the Engineer approves your submittal for:

1. Time-scaled logic diagram (Critical Path Method).
2. Traffic Management Plan (TMP).
3. Temporary Access Plans (TAP).

In addition to the above submittals, do not start work at the job site, except for measuring controlling field dimensions and locating utilities, until you submit:

1. Notice of Materials To Be Used.
2. Contingency plan for reopening closures to public traffic.
3. Written statement from the vendor that the order for electrical material has been received and accepted by the vendor. The statement must show the dates that the materials will be shipped.
4. Written statement from the vendor that the order for structural steel has been received and accepted by the vendor. The statement must show the dates that the materials will be shipped.

You may start work at the job site before the 10th day after contract approval if:

1. You obtain required approval for each submittal before the 10th day
2. The Engineer authorizes it in writing

The Department grants a time extension if a delay is beyond your control and prevents you from starting work at the job site on the 1st working day.

Phase 1 work is defined as completion of all work as shown in the Contract Components including shifting traffic onto the detour as shown on the pavement delineation (detour) plans except Initial Operations Support and beginning of maintenance and repositioning of the Quickchange Moveable Barrier System.

Phase 2 work is defined as completion of bridge removal, finishing roadway, demobilization of all equipment and materials and restoration of all areas occupied by the Contractor to original conditions.

Phase 3 work is defined as completion of Initial Operations Support and maintenance and repositioning of the Quickchange Moveable Barrier System.

Complete the Phase 1 and Phase 2 work within 605 working days.

Complete the work, including Phase 3 work, within 725 working days.

Liquidated damages for Phase 1 and Phase 2 work is defined in Section 8-1.07, "Liquidated Damages" of the Standard Specifications, starting on the 1st day after exceeding 605 working days and until Phase 1 and Phase 2 work is complete.

If all work, except Phase 3 work, is complete and the total number of working days has expired, liquidated damages are \$950 per day.

The working day is defined as follows:

The working day: Time measure unit for work progress. A working day is any day except:

1. Special event days as listed in the Special Event Days table in this special provision.
2. A day when you cannot perform work on the controlling activity for at least 50 percent of the day with at least 50 percent of the normal labor and equipment due to any of the following:
 - 2.1. The Engineer's direction to suspend the controlling activities for reasons unrelated to your performance
 - 2.2. An unanticipated event not caused by either party such as:
 - 2.2.1. Act of God (Pub Cont Code § 7105)
 - 2.2.2. Act of a public enemy
 - 2.2.3. Epidemic
 - 2.2.4. Fire
 - 2.2.5. Flood
 - 2.2.6. Governor-declared state of emergency
 - 2.2.7. Landslide
 - 2.2.8. Quarantine restriction
 - 2.3. An issue involving a third-party, including:
 - 2.3.1. Industry or area-wide labor strike
 - 2.3.2. Material shortage
 - 2.3.3. Freight embargo
 - 2.3.4. Jurisdictional requirement of a law enforcement agency
 - 2.3.5. Workforce labor dispute of a utility or non-highway facility owner resulting in a utility or non-highway facility reconstruction not described and not solely for the Contractor's convenience

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 in the Special Event Days table of this special provision:

Special Event Days

Presidio Event	Date of Event
Special Olympic Polar Bear Run	4th Thursday in February
Emerald Nuts Across the Bay 12k	2nd Sunday in March
US Half Marathon – Spring Half	2nd Saturday in April
Girl Scout Golden Gate Bridging Ceremony	2nd Saturday in May
Pre-Memorial Day Events	Saturday before Memorial Day
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
July 4th Observance	July 4
Avon 2 Day Walk	2nd Saturday and Sunday in July
San Francisco Marathon	Last Sunday in July
Aloha Festival Event	1st Saturday and Sunday in August
Film in the Fog	Last Saturday in September
Susan G. Komen 3-Day Breast Cancer Walk	1st Friday, Saturday and Sunday in October
Juvenile Diabetes Walk	1st Saturday in October
KNBR Bridge to Bridge Run	1st Sunday in October
Fleet Week/Blue Angels Performances	2nd or 3rd Saturday and Sunday in October
Seismic Challenge	3rd Saturday and Sunday in October
Nike Marathon	3rd Sunday in October
HDSA Walkathon	4th Saturday in October
Rival 10 Run	2nd Saturday and Sunday in November
US Half Marathon	2nd or 3rd Sunday of November

INCENTIVES AND DISINCENTIVES

Incentive payments and disincentive deductions apply to the completion of the work specified in the Incentive / Disincentive table.

Comply with "Maintaining Traffic" and "Closure Requirements and Conditions" of these special provisions.

Incentive payments and disincentive deductions are independent of liquidated damages and damages specified in "Closure Requirements and Conditions" of these special provisions.

Complete the work specified within the time specified in the Incentive / Disincentive table starting on the day specified. If you complete the work within the specified time, you will receive the incentive shown for each day less than the time specified. If you do not complete the work within the specified time, the Department will deduct the disincentive shown for each day needed to complete the work.

Incentive / Disincentive

Work	Start of Work	Time of Completion (Working Days)	Incentive Payment per Day	Disincentive Deduction per Day
Phase 1	1st working day	545	\$50,000	\$50,000

Total incentive payment will not exceed \$5,300,000.

Total disincentive deduction will not exceed \$5,300,000.

10-4.01 COMMISSIONING AND INITIAL OPERATIONS SUPPORT

GENERAL

The Contractor shall perform systems and equipment commissioning in the presence of the Engineer. The commissioning shall verify tunnel systems and equipment are fully functioning in conformance with the details shown on the plans and the requirements specified in these special provisions.

The tunnel systems and equipment to be tested and commissioned shall at a minimum include the following for tunnel, roadways and Battery Substation:

- A. Fire protection systems, including:
 - 1. Fixed fire protection system - stand-pipe system.
 - 2. Fixed fire protection system - deluge sprinkler
 - 3. Linear heat detectors
 - 4. Manual fire alarm boxes (pull stations)
 - 5. Fire alarm control panels
 - 6. Fire alarm control panel remote annunciators
 - 7. Fire department hose connections
 - 8. Heat detectors and smoke detectors

- B. Electrical systems, including:
 - 1. Lighting systems.
 - 2. Medium voltage switchgear.
 - 3. Electrical metering, monitoring, and control systems.
 - 4. Motors.
 - 5. Medium voltage automatic transfer switches.
 - 6. Medium voltage transformers.
 - 7. Low voltage transformers.
 - 8. Primary power system cabling.
 - 9. Secondary power system cabling.
 - 10. Ground fault systems.
 - 11. Service switchboard.
 - 12. Circuit breaker panelboards.
 - 13. Motor control centers.
 - 14. UPS systems and battery capacity test.
 - 15. Transit voltage surge suppression (TVSS) systems.
 - 16. SCADA system

- C. Special systems, including:
 - 1. Security access system.
 - 2. Carbon Monoxide (CO) monitoring, calibration and control systems.
 - 3. Tunnel drainage system
 - 4. Substation HVAC equipment.

- D. Traffic Operations System (TOS) / Tunnel Traffic Control System (TTCS), including:
 - 1. Variable message signs.
 - 2. Closed circuit television (CCTV) systems.
 - 3. Vehicle detection stations

- E. Communications systems, including:
 - 1. Network communications system.
 - 2. Serial communications system.
 - 3. Fiber optic systems.
 - 4. Radio rebroadcast systems.
 - 5. Call Box
 - 6. Communication link from Battery Substation to the Temporary Operations and Maintenance Center (TOMC).

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 the Commissioning Agent and Contractor and approved by the Engineer.

The initial operations support work period shall be the number of working days specified for initial operations support work in these special provisions and shall begin after Phase 1 work has been completed and testing and integration of all systems has been completed..

The time required for initial operations support work shall be considered as included in the total time limit specified for the contract.

DEFINITIONS

Commissioning.- Commissioning is the process to certify to the Engineer that systems, equipment, mechanical and electrical controls, and special systems are functioning together in a composite manner as shown on the plans and as specified in these special provisions.

Commissioning Agent. - The Commissioning Agent is a designated agency or person hired by the Contractor for the commissioning process. The Commissioning Agent communicates, directs and coordinates the day-to-day commissioning activities, and does not take an oversight role.

REFERENCE DOCUMENTS

The following are accepted industry guidelines for the commissioning process. 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
- C. BCx – Building Commissioning Guidelines

QUALIFICATIONS

The Commissioning Agent provided by the Contractor shall not be an employee of the Contractor. 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:

- A. 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. The Contractor shall furnish a copy of the Commissioning Agent's certifications to the Engineer within 30 days after contract approval.
- B. Possess knowledge of the systems, including the design, optimization, installation, operations, acceptance testing, training and maintenance.
- C. Possess experience in management, leadership, system technologies and the construction process.

- D. Have documented experience with field construction. The Contractor shall finish a copy the Agent's resume to the Engineer within 30 days after contract approval.
- E. Demonstrated ability to organize many specific activities into a coherent Commissioning Plan.
- F. Communication skills, both written and verbal.
- G. Proficiency in documentation.
- H. Experience in working with multidisciplinary teams.
- I. Experience in writing and directing functional performance tests.
- J. At least 10 years of commissioning experience with the types of building, HVAC, fire protection, and control systems included in this project.

SCHEDULING

The Commissioning Agent shall:

- A. Provide the initial schedule of primary commissioning events/milestones at the initial commissioning scoping meeting.
- B. Work with the Contractor to schedule and maintain the integrated schedule with the commissioning activities.
- C. Provide a minimum of two weeks notice to the Contractor for scheduling commissioning activities.
- D. Adjust the commissioning schedule as construction progresses and more detailed schedules are available from the Contractor. The Contractor shall integrate all commissioning activities into the master schedule. All parties shall address scheduling problems and make necessary notifications in a timely manner in order to expedite the commissioning process.

COMMISSIONING TEAM AND COORDINATION

The members of the Commissioning Team consist of the Commissioning Agent, the Contractor's Project Manager, appropriate subcontractors (Mechanical, Electrical, Fire-Protection, Security Systems, Controls, Communication Systems), and any other subcontractors or suppliers of equipment. In addition, Caltrans will designate up to 5 (add more if needed) representatives who shall be members of the commissioning team.

The Office of the State Fire Marshal may participate in commissioning of fire protection and alarm systems. The Commissioning Agent shall prepare a Commissioning Plan to supplement the team, roles, responsibilities and communication protocols defined in this section.

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 the Engineer , with copies provided to the Contractor.

Responsibilities include:

- A. Plan, organize and lead the commissioning team
- B. Provide Commissioning Plan
- C. Convene commissioning team meetings
- D. Provide Project-specific construction checklists and commissioning process test procedures
- E. Verify the execution of commissioning process activities
- F. Prepare and maintain the Commissioning Issues Log and tracking of issues resolution.
- G. Prepare and maintain completed Construction Commission Checklist Log.
- H. Provide input to the construction schedule on the commissioning activities and their sequence.
- I. Witness systems, assemblies, equipment, and component startup.
- J. Compile test data, inspection reports, and certificates, include them in the systems manual and Commissioning Report

Contractor's Responsibilities

Contractor's Representatives shall participate in and perform commissioning process activities including, but not limited to, the following:

- A. Attend commissioning team meetings.
- B. Integrate, maintain, and coordinate commissioning process activities with construction schedule.
- C. Review and accept system verification checklists (SVC) checklists provided by the Commissioning Agent.
- D. Review and accept commissioning process test procedures provided by the Commissioning Agent.
- E. Statement of Readiness – The Contractor shall 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.
- F. Complete commissioning process test procedures.
- G. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
- H. Cooperate with the Commissioning Agent for resolution of issues recorded in the Commissioning Issues Log.
- I. Ensure cooperation and participation of sub-contractors as applicable.
- J. Ensure participation of major equipment manufacturing in appropriate start-up, testing and training activities.
- K. 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.

The Contractor's personnel along with designated representatives may witness activities and verify results, and these activities may be separate from the Commissioning Agent witnessed tests and resulting reports.

Caltrans and Operations and Maintenance (O&M) Contractor Responsibilities

The Operations and Maintenance Contractor will operate the Battery Tunnel during the detour phase.

Caltrans' representatives (including operation and maintenance personnel) and the O&M Contractor responsible for operating the tunnel during Detour Phase shall participate in and perform commissioning process activities including, but not limited to, the following:

- A. Attend commissioning team meetings.
- B. Attend testing meetings.
- C. Participate in training in operation and maintenance of systems, subsystems, and equipment.
- E. Demonstration of operation of systems, subsystems, and equipment
- F. At the end of initial operations support, Caltrans and the O&M contractor shall take over responsibility for operations and maintenance of the tunnel and its systems.

MEETINGS

Commissioning Scoping Meeting

Within 60 Calendar Days after contract approval, 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.

The Commissioning Agent shall provide and distribute meeting minutes and the revised Commissioning Plan to all parties in attendance at the commissioning scoping meeting.

Additional Meetings

Other meetings shall be planned and conducted by the Commissioning Agent as construction progresses. The purpose of these meetings is to cover coordination, monitor progress, identify issues and deficiencies, and resolve issues relating to the commissioning with the Contractor and its particular subcontractors and relevant manufacturer representatives.

These meetings shall be held as frequently as required, but not less than once per month, until the final 6 months prior to completion of Phase 1 work, when the meetings shall be held not less than twice per month. The Commissioning Agent shall produce and distribute meeting minutes to all parties.

COMMISSIONING PLAN

The Agent shall submit a Commissioning Plan to the Engineer for review and approval 4 weeks in advance of the first proposed test. System commissioning shall not begin until the completion and acceptance of all utilities at the Battery Substation. System commissioning shall not begin until the TOMC is on-site, operational and manned by the O&M Contractor.

The Commissioning Plan shall detail the implementation of the commissioning process. The Commissioning Plan, submitted to the Engineer for review and approval, shall include the following:

- A. Scope of Commissioning - This section describes the overall commissioning process, and lists all equipment, systems, and interfaces to be commissioned.
- B. The commissioning team - The plan lists all members of the commissioning team, identified by individual name and corporate identity or by functional identity (e.g. general contractor, mechanical contractor, etc.) and describes their roles and responsibilities.
- C. Reference documents - These shall include the drawings and specifications for the project. In addition, published standards or guidelines relevant to commissioning requirements will be referenced.
- D. Commissioning meetings - Describe the purpose and number of commissioning meetings.
- E. System-specific details - For each system to be commissioned, the Commissioning Plan shall include the details listed below. The plan shall also identify the required testing sequence, progressing logically from equipment, to sub-systems, to systems, to interactions between systems.
 1. Equipment readiness - Describe the system verification checks to be carried out prior to start-up, and include specific checklists.
 2. Equipment and system start-ups - Describe the step-by-step start-up procedure for each system and piece of equipment. This information is contained in the same checklist as the system verification (or pre-start) checks. If the specification requires that the manufacturer's authorized technician perform the start-up, then the plan shall require that a copy of the completed and signed manufacturer start-up form be included with the start-up checklist in the final documentation.
 3. Data on specific equipment being installed.
 4. Functional performance tests (FPTs) - Detail the tests needed to demonstrate correct operation under all modes of operation, and include the applicable pass/fail criteria. The Commissioning Agent must witness all FPTs to verify results.
 5. Acceptance - List the criteria for completion of the commissioning process. These shall include verification of functional performance for all systems, proposed system integration tests and O&M manuals, as well as other project-specific criteria.
- F. Caltrans O&M staff and O&M Contractor orientation and training - Describe the intended program for O&M staff orientation, training and demonstration. Training sessions shall be videotaped.
- G. Documentation requirements - List all documentation required for the final commissioning report. The Commissioning Plan itself shall form the basis of this documentation, which shall include:
 1. A document reference list
 2. Descriptions of each system, including a sequence of operations
 3. Completed and signed system verification, start-up and functional performance test checklists documenting, on a system-by-system basis, all checks and tests carried out, and the results.
 4. Retests of all unacceptable results
 5. Training documentation, including an agenda for each scheduled session, a list of attendees, and videotape requirements.
 6. Comprehensive O&M data.

H. Schedule - Shall consist of a sequence of events, with an elapsed time allowance for each activity. Typical schedule events include:

1. Site inspections
2. Site meetings
3. Resolution Tracking Forms (RTFs)
4. System Verification Checklists (SVCs)
5. System Start-ups
6. Functional Performance Tests (FPTs)
7. Operations staff orientation, training and demonstration.

NON-CONFORMANCE TO PERFORMANCE VERIFICATION REQUIREMENTS

Should equipment, system components, and associated controls be incorrectly installed or malfunction during all of the Commissioning activities, correct deficiencies, re-verify equipment and components within the non-functional system and, include related systems as deemed required by the Commissioning Agent or Engineer, to ensure effective performance.

In addition, non-conformance issues discovered by the Engineer, the O&M Contractor 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 Engineer or Commissioning Agent.

Costs of additional tests, inspections, and corrective work incurred as a result of incorrectly installed or malfunctioning equipment or systems shall be borne by the Contractor.

OPERATIONS AND MAINTENANCE (O&M) TRAINING

The Commissioning Agent coordinates and schedules O&M training with the Contractor, and the Engineer. The Contractor notifies sub-contractors, suppliers and manufacturer's representatives, and plans the training program according to project specifications. The Engineer is responsible for scheduling the Caltrans' O&M personnel and the O&M Contractor personnel for planned orientation, training and demonstration sessions.

Responsibility for the actual training program is shared by the Commissioning Agent, the Contractor and major equipment suppliers.

The Commissioning Agent is responsible for the videotaping and documentation of O&M training and demonstration sessions. Video recording permits existing O&M staff to review training material, and new staff to receive the same information provided at the original sessions, including questions posed and answers given. Video offers consistency in training and represents a key value-added component of the commissioning process.

The O&M training program shall include:

- A. Design intent
- B. System limitations
- C. Start-up and shut-down procedures
- D. Modes of control and operation sequences
- E. Detailed review of the information and organization of the O&M manual
- F. Complete listing of contractors and manufacturer contact information
- G. Detailed instructions on the control system
- H. Recommended procedures for effective operational monitoring including trending and graphics features for SCADA systems
- I. Routine preventative maintenance procedures as specified by the designer or recommended by the manufacturer
- J. Provisions for safety shutdowns, emergency conditions, and interfaces with SCADA, TOS and life-safety systems.

TESTING

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 the Contractor. Documentation of these checks depends on project specifications. The Commissioning Agent prepares SVCs as part of the Commissioning Plan.

Contractor shall commence with testing of the complete equipment with all ancillaries when properly installed and connected in its final working arrangement at site. The Contractor 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, conduct further tests after rectification of the fault, over at least two successive and separate periods with no further fault occurring.

The Contractor shall provide suitable and approved test equipment, instruments and layout for the purpose of the tests or rectification of faults found during testing.

The Contractor shall have all instruments calibrated before and after tests by an approved laboratory.

The Contractor shall provide all consumable parts, replacements, and the like, required during the tests.

At least 4 weeks in advance of any particular site testing, the Contractor shall submit to the Engineer details of the test equipment intended for the testing for approval.

Functional Performance Tests (FPTs)

The functional performance tests insure that the various individual commissioned systems operate cohesively as a whole, this shall include the TOMC after the integration of the tunnel systems has been demonstrated. The Commissioning Agent shall direct, witness and document the results of the FPTs of all systems commissioned. The Contractor 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. The Contractor may have to override normal control operation or parameters to simulate specific test conditions, and set up trend-logs to provide a record of system responses to test actions. FPTs shall progress from individual items of equipment and sub-systems, to complete systems, to interfaces between systems, depending on the scope of the Commissioning Plan. This test progression helps to isolate the cause of problems while confirming correct operation of smaller portions of the installation, before moving on to tests involving larger systems or interfaces between systems.

Final System Integration Test:

The Final System Integration Test requires the integrated simultaneous operation of all tunnel systems and equipment, including the Temporary Operations and Maintenance Center, for 5 consecutive days without failure before the beginning of Stage 2 work as shown on the plans. In addition, the Final System Integration Test must begin a minimum of 15 days prior to the beginning of Stage 2 work as shown on the plans. Contractor and State forces may be asked to provide simulated traffic.

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.

Initial Operations Support Period

The initial operations support period (IOSP) is a 180 day period of tunnel system operations once the tunnel is open to public traffic after completion of phase 1 work. During the IOSP the Contractor shall demonstrate that the tunnel systems exhibit stable and reliable performance, without failure.

The Contractor shall ensure that all equipment is maintained in operable condition during the IOSP and shall troubleshoot, diagnose, identify, isolate, and resolve all electrical, mechanical, hardware, software, SCADA and firmware problems and inconsistencies.

Upon notification of a tunnel system failure the contractor shall be on site ready to diagnose and repair tunnel systems within 4 hours.

If the total number of traffic lanes through the tunnel are reduced, or traffic is detoured, because of tunnel systems failures for each 10-minute interval, or fraction thereof beyond 4 hours from the time of notification the Department will deduct the amount per interval shown in section 10-1.39 Closure Requirements and Conditions, Late Reopening of Closures from moneys due or that may become due the Contractor under the contract. Damages are limited to 5 percent of project cost per occurrence.

Upon notification of a system failure the 180 day IOSP period will be halted. The IOSP period will be restarted from the point where halted after repairs are complete and all Tunnel systems have been operated for 7 consecutive days without failure.

There will be no suspension of contract time when the IOSP period is halted due performance failures of the tunnel system and liquidated damages will accrue.

The Contractor shall bear all costs for maintenance, testing and repair of the tunnel systems during the IOSP period caused by the contractor's actions, workmanship, systems, hardware, software, firmware or equipment failures.

Reports Submittal

The Commissioning Agent shall compile, organize and index the following commissioning data for each system and equipment into labeled, indexed and tabbed, three-ring binder manuals and submit to the Engineer, to be included with the Operation and Maintenance (O&M) manuals. Three copies of the manuals shall be submitted to the Engineer.

The Commissioning Report shall include a narrative description of systems, equipment, and components for each division of the specifications commissioned. In addition, the commissioning report shall include, but will not be limited to:

- A. Executive Summary
- B. Manufacturer's checklists.
- C. Issues Log (log of commissioning findings and resolution).
- D. System Verification Checklists.
- E. Functional Performance Tests.
- F. Functional Performance Test summaries
- G. Site Observation Reports
- H. Submittal Reviews
- I. O&M Manuals Reviews
- J. As-Built Drawings Reviews
- K. O&M Training Documentation
- L. Start-Up Documentation
- M. Commissioning Plan
- N. Commissioning Progress Reports
- O. List of Acronyms and Abbreviations

PAYMENT

Full compensation for commissioning and initial operations support shall be considered as included in the contract lump sum price paid for battery substation and tunnel work and no separate payment will be made therefor.