## LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY
### SPECIFICATIONS
#### TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>DIVISION 1 SECTION</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 11 00</td>
<td>SUMMARY OF THE WORK</td>
</tr>
<tr>
<td>01 11 01</td>
<td>DESIGN-BUILD SUMMARY</td>
</tr>
<tr>
<td>01 12 19</td>
<td>METRO (OWNER) - FURNISHED MATERIAL &amp; EQUIPMENT INTERFACE</td>
</tr>
<tr>
<td>01 14 05</td>
<td>METRO (OWNER) - DIRECTED STOPPAGES</td>
</tr>
<tr>
<td>01 20 00</td>
<td>PRICE AND PAYMENT PROCEDURES</td>
</tr>
<tr>
<td>01 29 73</td>
<td>SCHEDULE OF VALUES</td>
</tr>
<tr>
<td>01 29 76</td>
<td>COST/SCHEDULE INTEGRATION SYSTEM</td>
</tr>
<tr>
<td>01 31 03</td>
<td>DESIGN MANAGEMENT REQUIREMENTS</td>
</tr>
<tr>
<td>01 31 19</td>
<td>PROJECT MEETINGS</td>
</tr>
<tr>
<td>01 31 30</td>
<td>INTERFACE WITH OTHER JURISDICTIONS</td>
</tr>
<tr>
<td>01 31 31</td>
<td>UTILITY COORDINATION</td>
</tr>
<tr>
<td>01 31 32</td>
<td>RAILROAD CROSSINGS FOR CONSTRUCTION ROADS</td>
</tr>
<tr>
<td>01 32 23</td>
<td>GRADES, LINES AND LEVELS</td>
</tr>
<tr>
<td>01 32 33</td>
<td>PHOTOGRAPHIC DOCUMENTATION</td>
</tr>
<tr>
<td>01 33 00</td>
<td>SUBMITTAL PROCEDURES</td>
</tr>
<tr>
<td>01 35 14</td>
<td>OPERATING SYSTEM INTERFACE</td>
</tr>
<tr>
<td>01 35 23</td>
<td>WORKSITE SAFETY REQUIREMENTS</td>
</tr>
<tr>
<td>01 35 29</td>
<td>HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES FOR CONTAMINATED SITES</td>
</tr>
<tr>
<td>01 35 35</td>
<td>WATER POLLUTION CONTROL</td>
</tr>
<tr>
<td>01 35 43</td>
<td>ENVIRONMENTAL PROCEDURES FOR HAZARDOUS MATERIALS</td>
</tr>
<tr>
<td>01 35 53</td>
<td>WORKSITE SECURITY REQUIREMENTS</td>
</tr>
<tr>
<td>01 35 63</td>
<td>SUSTAINABILITY PLAN</td>
</tr>
<tr>
<td>DIVISION 1 SECTION</td>
<td>TITLE</td>
</tr>
<tr>
<td>--------------------</td>
<td>-----------------------------------------------------</td>
</tr>
<tr>
<td>01 35 66</td>
<td>GREEN CONSTRUCTION POLICY</td>
</tr>
<tr>
<td>01 35 69</td>
<td>LEAD-RELATED CONSTRUCTION WORK</td>
</tr>
<tr>
<td>01 35 70</td>
<td>ASBESTOS-RELATED CONSTRUCTION WORK</td>
</tr>
<tr>
<td>01 35 91</td>
<td>HISTORIC TREATMENT PROCEDURES</td>
</tr>
<tr>
<td>01 35 95</td>
<td>PUBLIC INFORMATION AND COMMUNITY RELATIONS</td>
</tr>
<tr>
<td>01 43 10</td>
<td>PROJECT QUALITY PROGRAM REQUIREMENTS – DESIGN/BUILD</td>
</tr>
<tr>
<td>01 43 20</td>
<td>PROJECT QUALITY PROGRAM REQUIREMENTS – DESIGN/BID/BUILD</td>
</tr>
<tr>
<td>01 43 38</td>
<td>FIELD SAMPLES AND MOCK-UPS</td>
</tr>
<tr>
<td>01 45 20</td>
<td>GENERAL MATERIALS TESTING PROGRAM REQUIREMENTS</td>
</tr>
<tr>
<td>01 50 00</td>
<td>TEMPORARY FACILITIES AND CONTROLS</td>
</tr>
<tr>
<td>01 51 23</td>
<td>TEMPORARY AND POST CONSTRUCTION VENTILATION</td>
</tr>
<tr>
<td>01 52 13</td>
<td>CONSTRUCTION FACILITIES</td>
</tr>
<tr>
<td>01 53 05</td>
<td>TEMPORARY DECKING SYSTEMS</td>
</tr>
<tr>
<td>01 53 16</td>
<td>TEMPORARY PRECAST CONCRETE DECK</td>
</tr>
<tr>
<td>01 55 13</td>
<td>TEMPORARY ACCESS ROADS AND PARKING AREAS</td>
</tr>
<tr>
<td>01 55 26</td>
<td>CONTROLLING TRAFFIC (METRO-FURNISHED-TCP)</td>
</tr>
<tr>
<td>01 55 27</td>
<td>CONTROLLING TRAFFIC (CONTRACTOR-FURNISHED-TLR)</td>
</tr>
<tr>
<td>01 55 28</td>
<td>CONTROLLING TRAFFIC</td>
</tr>
<tr>
<td>01 56 19</td>
<td>CONSTRUCTION NOISE AND VIBRATION CONTROL</td>
</tr>
<tr>
<td>01 56 23</td>
<td>TEMPORARY BARRIERS</td>
</tr>
<tr>
<td>01 56 26</td>
<td>CONSTRUCTION FENCING (WOOD)</td>
</tr>
<tr>
<td>01 56 28</td>
<td>CONSTRUCTION FENCING (CHAIN LINK)</td>
</tr>
<tr>
<td>01 56 39</td>
<td>SHRUB AND TREE PROTECTION</td>
</tr>
</tbody>
</table>
### SPECIFICATIONS

#### TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>DIVISION 1 SECTION</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 57 13</td>
<td>TEMPORARY EROSION AND SEDIMENTATION CONTROLS</td>
</tr>
<tr>
<td>01 57 19</td>
<td>TEMPORARY ENVIRONMENTAL CONTROL</td>
</tr>
<tr>
<td>01 58 13</td>
<td>PROJECT SIGNAGE</td>
</tr>
<tr>
<td>01 66 00</td>
<td>PRODUCT STORAGE AND HANDLING REQUIREMENTS</td>
</tr>
<tr>
<td>01 71 13</td>
<td>MOBILIZATION</td>
</tr>
<tr>
<td>01 71 24</td>
<td>PRECONSTRUCTION SURVEYS</td>
</tr>
<tr>
<td>01 71 43</td>
<td>PERMITS, LICENSES, AND AGREEMENTS</td>
</tr>
<tr>
<td>01 71 45</td>
<td>NEW UTILITY SERVICES</td>
</tr>
<tr>
<td>01 74 00</td>
<td>CLEANING</td>
</tr>
<tr>
<td>01 74 19</td>
<td>WASTE MANAGEMENT AND DISPOSAL</td>
</tr>
<tr>
<td>01 78 23</td>
<td>OPERATION AND MAINTENANCE DATA</td>
</tr>
<tr>
<td>01 78 39</td>
<td>AS-BUILT DRAWINGS AND CURRENT STATUS DOCUMENTS</td>
</tr>
<tr>
<td>01 78 43</td>
<td>SPARE PARTS, ILLUSTRATED PARTS CATALOG AND REPLACEMENT MATERIALS</td>
</tr>
<tr>
<td>01 78 55</td>
<td>SAFETY AND SECURITY CERTIFICATION</td>
</tr>
<tr>
<td>01 79 00</td>
<td>DEMONSTRATION AND TRAINING</td>
</tr>
</tbody>
</table>
SECTION 01 11 00

SUMMARY OF WORK

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Constructing that portion of Metro Rail Project titled *(TBD)*, complete including, testing, commissioning startup and putting the system into a Revenue Operation.

B. Coordinate Work of this Contract with adjacent contracts and other contractors on this construction site, as specified in Section 01 11 01 – Design-Build Summary.

C. Work Not Included: Refer to Section 01 11 01 – Design-Build Summary.

D. Work by Others: Refer to Section 01 11 01 – Design-Build Summary.

1.02 RELATED SECTIONS

A. General Conditions (GC)

B. Special Provisions (SP)

C. Section 01 11 01: Design-Build Summary

D. Section 01 33 00: Submittal Procedures

E. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)

1.03 REFERENCES

A. Standard Specification for Public Works Construction (SSPWC), Latest Edition

B. Los Angeles Department of Water & Power (LADWP)

C. Los Angeles Department of Public Works (LADPW), where applicable
   1. Bureau of Engineering (BOE):
      a. Brown Book
      b. Standard Plan S.610

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).
1.05 SUBMITTALS
   A. Refer to Section 01 33 00 – Submittal Procedures, for submittal requirements and procedures.
   B. Summary of Project Understanding and Construction Planning.
   C. Interface requirement with Public Works and other governing agencies.
   D. Interface requirements with adjacent contractors with a milestone date for completion of Work performed by others.

1.06 DEFINITIONS
   A. “As indicated”: Plan, elevation, sections, details and general notes shown on approved contract drawings, shop drawings, and working drawings Approved for Construction by Metro or its designee and as specified herein.

1.07 REGULATORY REQUIREMENTS
   A. Work is referenced in various Sections to conform with the latest edition and supplements of the Standard Specification for Public Works Construction (SSPWC) as adopted by the local agencies or other governing agency.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 CONTRACTOR'S DUTIES
   A. Construct Work in accordance with Contract Documents including actions specified below:
      1. Except as otherwise specified, furnish and pay cost for the following:
         a. Labor, superintendence, and products.
         b. Construction supplies, equipment, tools, machinery, and materials.
         c. Utilities required for construction.
         d. Other facilities and services necessary to properly execute and complete the Work.
   B. Pay costs of legally required sales, consumer, gross receipt and use taxes, and governmental fees and permits.
   C. Provide and pay for off-site grading agreements, licenses and permits, except those permits listed in Section 01 71 43 Permits, Licenses and Agreements.
D. Perform Work in accordance with applicable codes, ordinances, rules, regulations, orders, and other legal requirements of governmental bodies and public agencies, including Metro. Modify above-mentioned services under permit of cognizant city, state or county agency.

E. Maintain order, safe practices, and proper conduct among the Contractor's and subcontractors' employees. Metro or its designee may require that disciplinary action be taken against an employee for disorderly, improper or unsafe conduct. Should an employee of the Contractor be dismissed from his duties as a result of that employee's misconduct, incompetence, or unsafe practices, or combinations thereof, do not employ that employee for duration of the Contract.

F. Coordinate prosecution of Work with those public utilities, governmental bodies, private utilities and other contractors performing Work on, and adjacent to, the Worksite; eliminate or minimize delays in Work and conflicts with those utilities, bodies and contractors. Schedule governmental Work, private utility and public utility Work, which rely upon survey points, lines and grades established by Contractor, to occur immediately after those points, lines and grades have been established. Confirm coordination measures for each individual case with Metro or its designee by memorandum.

G. Perform Work as specified, and in a timely manner. Submit schedule of Work which will be performed at times other than during the normal eight-hour Working day, daylight hours, and five-day Working week, to Metro or its designee for review and acceptance not less than 48 hours in advance of those times. Construction operations will normally be confined to those hours between dawn and dusk. Approval to Work at night may be obtained after Contractor presents a written program outlining special precautions to be taken to control the extraordinary hazards presented by night Work. Include supplementary lighting of Work areas, availability of medical facilities, security precautions, and noise limitations.

H. Maintain access to, and visibility of, fire hydrants, police call boxes, fire alarm boxes, standpipe connections, and traffic control devices.

I. Maintain vehicular access to building delivery areas and driveways and safe access to pedestrian walkways.

J. Salvage material on the Worksite; reuse salvaged material if approved by Metro or its designee.

3.02 CONTRACTOR'S USE OF WORKSITE

A. Confine Worksite operations to areas permitted by law, ordinances, permits, and Contract Documents.

B. Consider safety of Work and of people and property on, and adjacent to, Worksite when determining amount, location, movement and use of materials and equipment on Worksite.
C. Do not load worksite or use equipment and products which would endanger integrity of Work.

D. Properly protect products stored on Worksite.

E. Relocate stored products which interfere with operations of Metro, governmental bodies, public and private utilities, and other contractors.

F. Secure additional storage and Work areas needed for operations.

G. Coordinate scheduling of Work to be performed on private property with Metro or its designee, to minimize inconvenience to property owner and tenants.

H. Protect general public and residents from construction-related activities; do not unduly inconvenience those persons by construction activities. Comply with traffic control requirements of governing agency.

I. If Contractor wishes to have utilities temporarily relocated for his own convenience, arrange with utility owners and pay for Work.

J. Restrict construction operations to areas within Right-of-Way Lines, Temporary Construction Line, Permanent Drainage Easement Line, Temporary Slope Easement Line, and Construction Staging Area as indicated. If no additional easements are indicated, restrict construction operations for permanent drainage facilities to Permanent Drainage Easement. Do not use temporary easement areas for purposes other than those for which originally acquired. Use only those areas bearing the notation "Temporary Construction Area," "Construction Staging," or "Storage," for activities related to Work. Use of Worksite to be exclusive and complete, except as indicated.

END OF SECTION 01 11 00
PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Providing labor and materials for installing and testing Metro (Owner) – Furnished Equipment for a complete operational system.

B. Coordination with other Metro Contractors that are undertaking furnishing and installation of equipments under a separate contract.

C. Providing labor and materials for infrastructure required for Metro furnished and installed equipment.

D. Work includes:
   1. Obtaining equipment or materials from Metro’s storage area.
   2. Inspecting equipment or materials.
   3. Rigging, seating, and installing equipment or materials in place.
   4. Furnish and install supports, piping, underground conduits, ductwork, electrical connections or other necessary ancillary work to connect the material or equipment to the Work.
   5. Field installing, testing, adjusting and calibrating equipment. Adjusting equipment or otherwise correcting deficiencies as directed by Metro or its designee.
   6. Maintaining materials-in-place or equipment until integrated testing and final acceptance of the Work by Metro or its designee.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures

B. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)

C. Section 10 14 10: Signs

D. Section 10 14 26: Station Markers

E. Section 10 14 33: Illuminated Signs and Edge Lights

F. Section 23 05 93: Testing, Adjusting, and Balancing
G. Section 23 09 00: Controls and Instrumentation for HVAC Systems
H. Section 26 08 00: Test Support/Start-Up
I. Section 26 09 18: Controls and Instrumentation
J. Section 26 12 00: Auxiliary Power Transformers, Dry-Type
K. Section 26 24 19: Motor Control Centers
L. Section 26 33 00: 480 Volt Switchboard
M. Section 26 33 53: Uninterruptible Power Supply

1.03 REFERENCES
A. National Fire Protection Association (NFPA):
   1. NFPA 90A - Installation of Air-Conditioning and Ventilating Systems

1.04 QUALITY ASSURANCE
A. Comply with Project Quality Program Requirements (see 1.02 above).

1.05 SUBMITTALS
A. Refer to Section 01 33 00 – Submittal Procedures, for submittal requirements and procedures.
B. Test procedures, except where submitted under another Section, such as Section 23 05 93 – Testing, Adjusting and Balancing.
C. Test results, except where submitted under another Section, such as Section 23 05 93 – Testing, Adjusting and Balancing.
D. Verification of installation signed by Field Representative. In accordance with Article 3.02, paragraph B.
E. Material Safety Data Sheets (MSDS): Manufacturer’s Material Safety Data Sheets for each type of material used in Work.

1.06 DEFINITIONS
A. “As indicated”: Plan, elevation, sections. Details and general notes shown on approved contract drawings, shop drawings and working drawings Approved for Construction by Metro or its designee and as specified herein.

PART 2 – PRODUCTS
2.01 METRO (OWNER) – FURNISHED EQUIPMENT

A. Items furnished by Metro are described in various Specification Sections, and will be available to Contractor as required by Construction Schedule. Metro will provide installation drawings and instructions for Metro (Owner) – furnished equipment.

B. The list provided in Articles 2.01 C and 2.01 D is a hypothetical list of equipment that could be furnished and installed by Metro; or the equipments that will be Metro furnished and Contractor installed. Actual list of such equipment will be crafted based on Project needs and requirements established in the Contract Documents.

C. The following equipment will be furnished and installed by Metro:

1. Contract ( ) - Ventilation Equipment:
   a. Axial fan motor units, including transition pieces and flexible connections.
   b. Motor operated dampers.
   c. Sound attenuators.
   d. Templates frames, anchors and screens associated with above equipment.

2. Contract ( ) - Air Handling Equipment:
   a. Filters.
   b. Station air handling units.
   c. Traction power substation supply fans.
   d. Motor operated dampers.
   e. Templates, frames and anchors associated with above equipment.

3. Trackwork Installation: Requires access to station and trainway and temporary ventilation.

4. Automatic Train Control: Require access to the Train Control and Communications Room, trainway, and other parts of station, and temporary ventilation.

5. Traction Power Installation: Requires access to traction power substation, trainway, and other parts of station, and temporary ventilation.

6. Radio System: Requires access to station and trainways.

7. Communications Installation and Gas Monitoring and Seismic Detection Procurement: Installs gas detection, seismic detection closed-circuit television, Automatic Train Control (ATC) and Supervisory Control and Data Acquisition (SCADA) System, fire and emergency management equipment; variable message signs; and partial installation of public address system (remainder of public address system installation is under this Contract). The Communications Installation Contractor will require access to station and trainway.

8. Passenger Vehicle: Requires access to trainway.

9. Auxiliary Vehicles: Requires access to trainway.

10. Operational Graphics: Requires access to station and trainway areas.
11. Art in Transit: Requires access to station public areas and other parts of station.

12. Fire Suppression Equipment: Requires access to station and trainway.

13. Uninterruptible Power Supply (UPS) System: Requires access to battery, electrical, train control and communications, and other rooms.

14. Fare Collection Equipment, inclusive of Ticket Vending Machines: Requires access to station public areas.

15. Telephone: Requires access to station and trainway.

16. Los Angeles City Department of Water and Power (DWP): Requires access to the incoming electric power room and related battery and relay rooms and other parts of station.

D. The following equipment will be furnished by Metro, and installed by the Contractor:

1. Contract (    ) - Signs and Graphic.
2. Contract (    ) - Illuminated Signs and Edge Lights.
   a. UPS assembly.
   b. Storage battery and racks.
4. Contract (    ) - Station Electrical Procurement.
   a. Auxiliary Power Transformer.
   b. Switchgear.
   c. Motor control centers.
5. Public Address:
6. Contract (    ) – Radio System
7. Contract (    ) – Communications
8. Contract (    ) – Traction Power Substation (TPSS)
9. Contract (    ) - Trackwork Material
10. Contract (    ) - Transit Passenger Information System

E. Systemwide Contracts Documents will be available to Contractor for review. Review documents to ascertain labor and materials required to install Metro (Owner) – furnished equipment and testing of installed equipment including integrated testing and final acceptance of Work.

2.02 MATERIALS FURNISHED UNDER THIS CONTRACT

A. Provide items including control and monitoring devices, indicators required for local and remote operation, electrical wiring, conduits, pipes, fittings, ductwork, equipment anchors, seismic bracing, equipment pads, embedded angles and plates, and miscellaneous mechanical and electrical hardware as indicated and as specified under
PART 3 – EXECUTION

3.01 SEQUENCING AND SCHEDULING

A. Inspect Metro (Owner) – Furnished items, which will be made available at Metro’s storage facility, and report damaged and defective items which are unacceptable for Work. Pick up acceptable products and transport to Worksite; unload, uncrate and store items at Worksite, and protect from exposure to elements and from damage. Repair to Metro's satisfaction, or replace, items damaged and install, connect, finish and test items as indicated.

B. Refer to Section 26 33 53 – Uninterruptible Power Supply, for special requirement on equipment delivery and installation of Contract (    ) - Uninterruptible Power Supply System equipment. Refer to Section 26 33 00 – 480 Volt Switchboard; Section 26 12 00 – Auxiliary Power Transformers - Dry-Type; and Section 26 24 19 – Motor Control Centers, for special requirements on equipment delivery and installation of Contract (    ) - Station Electrical Procurement. Refer to Contract Drawings for installation information for Public Address System.

C. Be responsible for coordination of equipment delivery from Metro’s storage facility or from manufacturer within a 50 mile radius. Obtain non-delivered equipment and be responsible for installation, performance testing, inspection and system operational testing. Make arrangements with Metro or its designee, and with equipment manufacturers and subcontractors regarding placement, installation, start-up and testing.

3.02 INSTALLATION

A. Supply labor and equipment required to unload and transport equipment, and furnish installation and interfacing components (not supplied with equipment) necessary for complete operational systems. Provide access, install access doors in accordance with NFPA 90A for duct-mounted smoke detectors and coordinate locations with Metro or its designee. Provide direct access to public address speakers for maintenance and inspection.

B. Install Metro (Owner) – Furnished equipment in accordance with manufacturer's instructions and installation manuals. Services of a field representative, when requested by Metro or its designee, will be provided during installation of equipment and connection of interfacing components, pipes, fittings and electrical hardware to verify installation and interfacing components are in compliance with manufacturer's specifications.

3.03 START-UP AND ACCEPTANCE
A. Obtain Metro acceptance of material installation workmanship.

B. After equipment is installed and ready for start-up, notify Metro or its designee that equipment and system components served are ready for initial operation. Perform start-up procedures in accordance with manufacturer's instructions.

3.04 TESTING AND BALANCING

A. Perform balancing of complete underplatform exhaust and smoke exhaust systems, and make adjustments to ductwork as required.
   1. Do not adjust blades of smoke exhaust and underplatform exhaust fans.
   2. Do not operate smoke exhaust or underplatform exhaust fans without written authorization signed by Metro or its designee.

B. Perform balancing of complete air supply and Traction Power Substation (TPSS) ventilation systems, and with concurrence of Metro or its designee, make adjustments to equipment as required.

C. Take air flow, pressure, and motor power (volts and amperage) measurements of the emergency fan systems. Do not make any adjustments to the emergency fan system. Do not operate the emergency fans without written authorization signed by Metro or its designee and unless Metro or its designee is present.

D. Perform testing, adjusting and balancing in accordance with Section 23 05 93 – Testing, Adjusting and Balancing, as modified above.

E. Perform testing and adjusting of controls in accordance with Sections 23 09 00 – Controls and Instrumentation for HVAC Systems, and Section 26 09 18 – Controls and Instrumentation.

F. Perform testing and adjusting of auxiliary power transformer, switchgear, motor control centers and uninterruptible power supply in accordance with Section 26 08 00 – Test Support/Start Up.

G. During interface testing, modify equipment or otherwise correct deficiencies as directed by Metro or its designee.

3.05 FIELD QUALITY CONTROL

A. Perform testing in accordance with manufacturer's instructions and applicable codes and standards. Do not begin testing until procedures have been accepted by Metro or its designee. Notify Metro or its designee 72 hours in advance of test. Submit test reports to Metro or its designee. Have tests witnessed by Metro or its designee.

B. Refer to Section 26 33 53 – Uninterruptible Power Supply, for special requirements on Field Quality Control of Contract (   ) - Uninterruptible Power Supply System.

C. Refer to Section 23 05 93 – Testing, Adjusting and Balancing for the special
requirements on Field Quality Control of Contract (   ) - Ventilation Equipment, and Contract (   ) - Air Handling Equipment.

D. Refer to Section 10 14 10 – Signs, Section 10 14 33 – Illuminated Signs and Edge Lights and Section 10 14 26 – Station Markers, for special requirements of Contract (   ) - Signs and Graphics, and Contract (   ) - Illuminated Signs and Edge Lights.

E. Refer to Division 26 - Electrical, for special requirements on Field Quality Control of Contract (   ) - Station Electrical Procurement.

END OF SECTION 01 12 19
SECTION 01 14 05

METRO – DIRECTED STOPPAGES

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Metro or its designee may, at any time, direct Contractor to cease the Work or any part of the Work for a specified period of time and go on a standby basis if Excluded Hazardous Waste Operations are needed which would interfere with progress of Work, and for other reasons Metro or its designee deems fit and sufficient. Metro-Directed Stoppage of one part of the Work may cause a stoppage in an adjacent part of the Work; the decision to designate stoppage in the adjacent part of the Work will be at the sole discretion of Metro. Do not include allowances for these stoppages in Contractor’s CPM schedule. If any of the requirements of this Section conflict with those of General Condition, Article entitled, “Suspension”, then said General Conditions article shall prevail.

1.02 RELATED SECTIONS

A. Section 2: Contract Document Includes General Conditions
B. Section 01 33 00: Submittal Procedures
C. Section 01 35 29: Health, Safety, and Emergency Response Procedures for Contaminated Sites
D. Section 01 35 43: Environmental Procedures for Hazardous Materials
E. Section 31 20 00: Earthwork
F. Section 31 23 19: Dewatering
G. Section 31 71 19: Excavation by Tunnel Boring Machine

1.03 REFERENCES (Not Used)

1.04 QUALITY ASSURANCE (Not Used)

1.05 SUBMITTALS

A. Refer to Section 01 33 00 - Submittal Procedures, for submittal requirements and procedures.

B. Records of Metro-Directed Stoppage and reinstatement of Work.
1.06 DEFINITIONS

A. Hourly Standby: Is an hourly period resulting from Metro-Directed Stoppages that requires Contractor to maintain full Work capacity to immediately resume the Work following the effective time and date of a notice to proceed.

B. Daily Standby: Is a daily period resulting from Metro-Directed Stoppages that requires Contractor to maintain labor, plant and equipment at a readiness level sufficient to maintain tunnel, Worksite, and equipment and to resume the Work within 24 hours from receiving Metro’s notice to proceed.

C. Equitable Adjustment: Is an adjustment in the Contract Price or Contract Time for Metro-Directed Stoppages. Equitable adjustments will be made in accordance with General Conditions' article entitled “Suspension”.

1. The Hourly Standby is for short duration Metro-Directed Stoppages including waiting for Metro or its designee’s identification of hazardous/contaminated materials. Hourly Standby item can be used in more than one heading at same time.

2. The Daily Standby is for longer duration delays when full excavation crew need not be present, but when essential services such as ventilation, lighting, gas testing, and dewatering must be maintained. Daily Standby item can be used in more than one heading at same time. Daily means a full 24 hours.

D. Potential Excluded Operations: Handling of unforeseen findings during execution of the Work, that will be performed by Metro or other contractors.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 CONTRACTOR’S RESPONSIBILITIES

A. Under Hourly Standby, maintain operations at normal full strength and continue ancillary activities except those directed to cease by Metro or its designee. Resume normal operations immediately upon direction by Metro or its designee.

B. Under Daily Standby, unless directed otherwise, maintain sufficient labor, plant, equipment and systems including, but not limited to, dewatering, lighting, gas testing and ventilation to maintain a standby condition. Resume normal operations within 24 hours from receiving Metro’s notice to proceed.

C. During periods of Hourly Standby or Daily Standby, allow Metro or its designee full access to Worksite.

D. Notify Metro or its designee, in writing, immediately upon encountering reasonably suspected Potential Excluded Operations. Specify in written notice particular locations at Worksite that may be affected by Potential Excluded Operations. Justify suspicion in written notice. Lack of reasonable justification is grounds for denial of payment.
E. Upon Contractor's discovery of Potential Excluded Operations, continue Work in unaffected areas. Within 24 hours after Contractor notifies Metro or its designee of Potential Excluded Operations, meet with Metro or its designee to plan the Work in the affected area so as to mitigate any negative impact to schedule and minimize any increase in cost.

F. Cooperate with any contractor selected by Metro or its designee to perform Excluded Hazardous Waste Operations.

G. Perform tests on quality of air in Work environment and physical condition of Workers as part of the Work, to the extent required in Section 01 35 29 – Health, Safety, and Emergency Response Procedures for Contaminated Sites.

**3.02 METRO’S RESPONSIBILITIES**

A. Upon receipt of written notice of Potential Excluded Operations, Metro or its designee's will, at Metro's cost, perform tests deemed necessary to confirm presence of Gas Casings, USTs, Asbestos, Hazardous Substances, or other hazardous/contaminated materials to determine location and extent, and to define Excluded Hazardous Waste Operations required. Metro has sole right and obligation to perform tests described in foregoing sentence.

**3.03 NO BASIS FOR CHANGE**

A. Delays from following circumstances do not entitle Contractor to Hourly Standby or Daily Standby, or compensation for change, delay or differing site condition, or to time extension for meeting milestone dates:

1. Discovery, including sampling, monitoring, investigating, removal, remediation, clean up, or disposal of Contractor-Generated Hazardous Waste.

2. Notification by Contractor to Metro of possible need for Excluded Hazardous Waste Operations, where Contractor does not have reasonable cause to suspect Gas Casings, Underground Storage Tanks (USTs), Asbestos, Hazardous Substances, or other hazardous/contaminated materials requiring Excluded Hazardous Waste Operations.

3. Discovery, including sampling, monitoring and investigating Hazardous Substances in soils required to be excavated, transported, and stored as part of the Work, as specified in the Contract Document, including but not limited to, Section 01 35 29 - Health, Safety, and Emergency Response Procedures for Contaminated Sites; Section 01 35 43 – Environmental Procedures for Hazardous Materials; Section 31 20 00 - Earthwork; and Section 31 71 19 – Excavation by Tunnel Boring Machine.

4. Discovery, including sampling, monitoring and investigating Hazardous Substances in groundwater as specified in Section 31 23 19 – Dewatering.

5. Discovery notification that an existing Contaminated Soil or Contaminated Groundwater condition is found that would require Hazardous Waste Operations or Excluded Hazardous Waste Operations because condition was exacerbated by Contractor or presence of Contractor-Generated Hazardous Waste.
PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Specifications for measurement and payment as they apply to the Work, and includes provisions applicable to lump sum prices, unit prices, and allowances, as indicated.

1.02 RELATED SECTIONS

A. Section 01 29 73: Schedule of Values
B. Section 01 33 00: Submittal Procedures
C. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)

1.03 REFERENCES (Not Used)

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).

1.05 SUBMITTALS

A. Refer to Section 01 33 00 – Submittal Procedures, for submittal requirements and procedures.
B. Applications for Payment.

1.06 DEFINITIONS (Not Used)

1.07 LUMP-SUM MEASUREMENT

A. Lump-sum measurement will be for the entire item, unit of work, structure, or combination thereof, as specified herein and as indicated in the Contract Schedule of Quantities and Prices.

1. Progress payments for lump-sum items or amounts in accordance with a well-balanced, detailed program of payment-apportioning in the Schedule of Values, prepared by the Contractor and submitted to Metro or its designee for approval. Such payment-apportioning may require modifications during the Contract term, as determined by Metro or its designee.
2. The Schedule of Values for each lump-sum item shall show fixed definable and measurable quantities where possible and unit prices therefore as developed and assigned by the Contractor to the different features of the Work and major subdivisions thereof. The summation of extensions of quantities and unit prices and related costs shall equal the amount of the lump-sum price in the Contract Schedule of Quantities and Prices.

3. Applications for progress payments will be based on the approved Schedule of Values and from the approved progress schedule, reflecting the progress which occurred during the payment period as approved by Metro or its designee.

1.08 MEASUREMENT OF QUANTITIES FOR UNIT PRICES

A. Measurement Standards: Work to be paid for at a Contract unit price per unit measurement, as indicated in the Contract Schedule of Quantities and Prices, will be measured by Metro or its designee in accordance with United States Standard Measure. A ton shall consist of 2,000 pounds avoirdupois.

B. Measurement by Weight:

1. Reinforcing steel, steel shapes, castings, miscellaneous metal, metal fabrications, and similar items to be paid for by weight shall be measured by scale or by handbook weights for the type and quantity of material actually furnished and used.

2. Unless shipped by rail, material to be measured and paid for by weight shall be weighed on sealed scales regularly inspected by the California State Division of Measurement Standards or its designated representative, furnished by and at the expense of the Contractor. All weighing, measuring, and metering devices shall be suitable for the purpose intended and shall conform to the tolerances and specifications as outlined in the California Code of Regulations, Title 4, Chapter 9, and Division 5.

3. Provide or utilize platform scales of sufficient size and capacity to permit the entire vehicle or combination of vehicles to rest on the scale platform while being weighed. Combination vehicles may be weighed as separate units provided they are disconnected while being weighed. Costs incurred as a result of regulating, adjusting, testing, inspecting, and certifying scales shall be borne by the Contractor.

4. A licensed weigh master shall weigh all materials weighed on scales furnished by the Contractor. Metro or its designee may be present to witness the weighing and to check and compile the daily record of such scale weights. However, in any case, Metro or its designee will require that the Contractor furnish weight slips and daily summary weigh sheets. In such cases, furnish a duplicate weight slip or a load slip for each vehicle weighed and deliver the slip to Metro or its designee at the point of delivery of the material.

5. If the material is shipped by rail, the certified car weights will be accepted, provided that only actual weight of material will be measured and not minimum car weights used for assessing freight tariff. Car weights will not be acceptable for material to be passed through mixing plants. Material to be measured by weight shall be weighed separately for each bid item under which it is to be paid.
6. Trucks used to haul material being measured by weight shall be weighed empty daily and at such additional times as Metro or its designee may require. Each truck shall bear a plainly legible identification mark. Metro or its designee may require the weight of the material verified by weighing empty and loaded trucks on such other scales as Metro or its designee may designate.

C. Measurement by Volume:

1. Measurement by volume will be by the cubic dimension indicated in the contract Schedule of Quantities and Prices. Method of volume measurement will be by the unit volume in place or removed as estimated from the Contract Drawings or as Specified.

2. When material is to be measured on a volume basis and it is impractical to determine the volume by the specified method of measurement, or when requested by the Contractor in writing and accepted by Metro or its designee in writing, the material may be weighed in accordance with the requirements specified for weight measurement. Such weights will be converted to volume measurement for payment purposes. Factors for conversion from weight measurement to volume measurement will be determined by Metro or its designee and shall be agreed to by the Contractor before such method of measurement of quantities will be accepted.

D. Measurement by Area: Measurement by area will be by the square dimensions shown on Contract Drawings or indicated in the Contract Schedule of Quantities and Prices, or as specified. Method of square measurement will indicated on the plan view shown on Contract Drawings or as specified by Metro or its designee.

E. Linear Measurement: Linear measurement will be by the linear dimension listed on Contract Drawings or indicated in the Contract Schedule of Quantities and Prices. Unless otherwise indicated, items, components, or work to be measured on a linear basis will be measured at the centerline of the item in place.

F. Field Measurement for Payment:

1. Metro or its designee will compute all quantities of Work performed by the Contractor on a unit-price basis, for purposes of payment applications.

2. The Contractor shall assist Metro or its designee in the taking of measurements by providing all equipment, workers, and survey crews as required to measure quantities in accordance with the provisions for measurement specified herein and in Section 01 35 94 – Construction Engineering. Unless otherwise specified, all quantities shall be calculated using dimensions shown on the Approved for Construction (AFC) drawings. No allowance will be made for specified tolerances.

1.09 VALUES OF UNIT PRICES

A. Refer to Contract General Condition Article “Increased or Decreased Quantities”.

1.10 ALLOWANCES

A. Refer to Contract Special Provision Article “Provisional Sums”.
1.11 CONTRACT PAYMENTS

A. Refer to Contract Document entitled “Compensation and Payment”.

B. Work which is not clearly delineated in the Contract Documents to be under a particular line item in the Contract Schedule of Quantities and Prices (SQ&P) shall be automatically assigned to one of the lump-sum Construction items in the SQ&P by the Contractor, so that all items of work, regardless of their characteristics or anonymity, are included in the Contract Price. Additional compensation will not be made for such Work items that do not clearly fall under listed line items in the SQ&P.

1.12 REJECTED, EXCESS, OR WASTED MATERIALS

A. Quantities of material wasted or disposed of in a manner not called for under the Contract or quantities of material that falls under any the following categories will not be considered for additional compensation:

1. Rejected loads of material, including material rejected after it has been placed by reasons of the failure of the Contractor to conform to the provisions of the Contract.

2. Material not unloaded form the transporting vehicle.

3. Material placed outside the lines indicated on the Contract Drawings or established by Metro or its designee.

4. Material remaining on hand after completion of the Work, will not be paid for, and such quantities shall not be included in the final total quantities.

5. Loading, hauling, and disposing of rejected material.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 01 20 00
PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Preparing and submitting a Schedule of Values which is based on the Contract Schedule of Quantities and Prices (SQP), as referenced in Compensation and Payment Article – ‘Progress Payments’. Should the Schedule be affected by Change Orders, Contractor shall prepare and submit an updated Schedule of Values.

B. Schedule of Values for On-site Material: Detailed cost breakdown for materials that will be temporarily stored before being installed, and for which Contractor may seek partial payments.

C. Contractor will be furnished a copy of the Metro's required Construction Code of Accounts. These codes are the basis for reporting to Metro monthly status of scheduled activities within line items of the Contract Schedule of Quantities and Prices.

1.02 RELATED SECTIONS

A. Section 01 20 00: Price and Payment Procedures

B. Section 01 33 00: Submittal Procedures

1.03 REFERENCES (Not Used)

1.04 QUALITY ASSURANCE (Not Used)

1.05 SUBMITTALS

A. Refer to Section 01 33 00 – Submittal Procedures, for submittal requirements and procedures.

B. Schedule of Values as indicated in Compensation and Payment Article, Progress Payments.

C. Identify items in Schedule of Values and Material Allowances with Construction Code of Accounts and Line Item number from Schedule of Quantities and Prices,

D. Upon request by Metro or its designee, support values given with data which will substantiate correctness of values.

E. Schedule of Values will be used only as a basis for Contractor’s Application for Progress Payment.

1.06 DEFINITIONS (Not Used)
1.07 REVIEW AND RE-SUBMITTAL

A. If review by Metro or its designee indicates changes to the Schedule of Values are required; revise and resubmit Schedule of Values in same manner as original Schedule of Values was prepared and submitted.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 PREPARING SCHEDULES OF VALUES

A. Break down line item amounts identified in the Contract Schedule of Quantities and Prices as follows:
   1. Delivered cost of product, with taxes paid
   2. Total installation cost, with overhead and profit

B. Break down costs of each lump sum and unit price line item to the list of major products and major operations for which Contractor is seeking to receive progress payments to recover the amount for that line item.

3.02 PREPARING SCHEDULE OF ON-SITE MATERIAL ALLOWANCES

A. Provide separate schedules of unit prices, one for products that will be stored on the Worksite and one for products stored off the Worksite. Schedules shall show quantities and types of products that will be stored.

B. Allowances consist of only the net cost of the product, the cost of delivery and unloading at the storage site, and the cost of sales taxes.

END OF SECTION 01 29 73
PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Developing and maintaining an accurate cost/schedule integration system in sufficient
detail to show a logical sequence in which the Contractor proposes to carry out all Work
required under this Contract. It is the Contractor’s responsibility to effectively plan,
schedule, manage, and execute the Work in accordance with Contract Documents.

B. Contractor shall generate cost/schedule integration system products using the schedule
software program in use by Metro. Metro uses Primavera P6 Release 7.0 or later. Metro
will provide an electronic file that will contain a Primavera P6 schedule development
template on or before Contract Notice to Proceed at Notice of Award.

C. Contractor shall submit a hard copy and include a Compact Disc (CDR or CD-ROM),
electronic write-protected computer generated back-up copy of the 120 Day Schedule,
Baseline CPM Schedule, Current CPM Schedule and any other schedule submittals (i.e.
Time Impact Analysis-TIA). The schedules shall be submitted in the native Primavera file
format, and PDF files of required bar chart reports shall be included. The Primavera files
on the compact disc shall be made directly from Primavera P6 Release 7.0 or later, and
shall contain all files of the schedule that can be imported by Metro for its evaluation and
analysis. It is the Contractor’s responsibility to ensure that all schedule submittals will be
calculated in the Metro P6 database without variance from hardcopies or electronic
PDF’s submitted for review. Any variance from printed reports or electronic PDF’s from
the Contractor’s P6 environment to the calculated schedule dates within Metro’s P6
production database will be cause for rejection of the submittal.

D. Contractor shall incorporate Contract milestones into the Baseline CPM Schedule, as
defined within the Contract Special Provisions, ‘Appendix A - Work Completion
Schedule’. These include, but are not limited to substantial completion, punchlist
completion, furnished equipment availability dates, and right-of-way access matrix
availability dates, as described in the Contract. These are unique zero duration activities
containing corresponding dates and logic ties. Designate these activities as start or finish
milestones and utilize constraints of "start on or after" or "finish on or before". Each
milestone activity will constrain its dependent Work. Assume Notice to Proceed (NTP) is
given at day zero for calculation of constraint dates for milestones. The use of date
constraints is only allowed for the specific milestones that are defined in the contract
specifications or as directed by Metro. The use of float suppressing date constraints
including ‘start on’, ‘finish on’, ‘mandatory start’, and ‘mandatory finish’ are not allowed
within the schedule.

E. Float is not for exclusive use or benefit of either Metro or Contractor but is an expiring
resource available to both parties on a nondiscriminatory basis. Float is used by either
party, as needed to meet Contract milestone dates. Contract time extensions for
Contract performance will be granted only to the extent that delays or disruptions to
affected Work paths exceed total float along those paths of the Current CPM Schedule Update in effect at time of delay or disruption. These delays or disruptions must also cause end date of Work to exceed current Contract date or milestone date and be beyond control and without fault or negligence of Contractor or any subcontractor at any tier. If delays or disruptions impact an already negative float path, Contractor will not receive a time extension unless activity with highest negative float is driven even further negative. Pursuant to the float sharing requirements of the Contract, it is acknowledged that third party caused time savings, such as critical path submittals returned in less time than allowed by the Contract, that result in a savings of time to the Contract duration shall offset any potential third party caused delays.

F. Use of float suppression techniques such as preferential sequencing or logic, special lead/lag logic restraints, and extended activity times or durations shall be submitted with written justification to obtain Metro approval. Use of float time disclosed or implied by use of alternate float suppression techniques shall be shared to proportionate benefit of Metro and the Contractor. Use of any network technique solely for purpose of suppressing float will be cause for rejection of schedule submittal.

G. Planning Units: Primavera P6 Release 7.0 scheduling software supports schedule planning units of Hours, Days, Weeks or Months. The standard time unit applied to the cost/schedule integration system is defined as days. A day as defined within Primavera P6 Release 7.0 will span eight hours from 8AM to 5PM for all scheduled activities. Contractor will verify that all schedule start and finish dates reflect these requirements. This requirement will apply to both calendar and working days. If for any reason the Contractor will be executing the work for activities beyond the standard specified workday (i.e. Multiple Shifts, planned Overtime), the Contractor will assign a project specific activity code as per the schedule electronic template to the affected activities. All schedule activities which meet these criteria will be readily identifiable in the Contractor schedule and the Contractor bears the burden to accurately identify all schedule activities which meet this criteria. Upon submission of any schedule update, Metro will have the ability to effectively identify (filter) for such activities for review and analysis. Failure to accurately identify such activities accurately may result in rejection of the current schedule submittal.

H. Schedule Network: Use Retained Logic CPM Precedence Diagram Method of scheduling. When activities are worked out of sequence compared to the logic of the Baseline CPM Schedule, this logic will need to be revised as necessary in schedule update submissions. All logic revisions must be explained in the written narrative.

I. Analyze in detail activities included in CPM Schedule to determine activity time durations in units of project Working days. Base durations on engineering and design resources, drawing/quantity production rates, submittal review periods, procurement lead time and duration, manufacturing times, labor (crafts), equipment, and materials required to perform each activity on a normal Work day basis. No on-site activity shall have duration of over 20 Working days except non-construction activities such as submittals, procurement and delivery of materials or equipment, and concrete curing. All design and on-site construction activities will be shown in their cost loaded state, except those activities specifically identified under this Section. Durations shall be the result of definitive manpower planning by the Contractor to perform Work in consideration of Contract defined on-site Work conditions.
J. In preparing the Baseline CPM Schedule, the Contractor shall consider the nature and complexity of each design submittal and shall allow ample time for review, revisions or corrections. Under no circumstances will an extension of time be allowed for any design submittal for which a re-submittal is required and re-submittal time was not originally scheduled. If a CPM Schedule submittal places an extraordinary labor demand on the technical reviewing staff of Metro or any jurisdictional third party, the CPM Schedule submittal will be rejected. The Contractor shall then prioritize the criticality of submittals, revise and resubmit the CPM Schedule submittal.

K. Professional Scheduler/Project Control Engineer: Employ a Full-Time Professional Scheduler/Project Control Engineer with critical path method scheduling knowledge using Primavera P6 Release 7.0 or later, and a minimum of ten years experience using automated scheduling systems involving one or more projects of similar scope, time, and cost. Within ten calendar days of Contract award, submit to Metro the Professional Scheduler/Project Control Engineer’s resume of experience including three professional references that have had experience with the individual. Metro has the right to refuse to accept the Professional Scheduler/Project Control Engineer based upon lack of experience of similar Work as required in this Specification. If Metro refuses to accept Professional Scheduler/Project Control Engineer proposed, the Contractor is to provide within ten calendar days of this rejection another Professional Scheduler/Project Control Engineer meeting experience requirements.

1.02 RELATED SECTIONS

A. Section 01 20 00: Price and Payment Procedures
B. Section 01 33 00: Submittal Procedures
C. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)
D. Appendix A - Cost/Schedule Integration System. Metro will provide to Contractor on or before Contract Notice to Proceed Contract Special Provisions, Appendix A – Work Completion Schedule.

1.03 REFERENCES (Not Used)

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).

1.05 SUBMITTALS

A. Refer to Sections 01 33 00 – Submittal Procedures, for submitting work product specified in Part 2 – Products, of this specification.

1.06 DEFINITIONS (Not Used)
PART 2 – PRODUCTS

2.01 DESCRIPTION

A. Submit one original and one copy of items unless specified otherwise. Provide submittals specified in this Section to Metro for review and approval. Submittals will include the following:
   1. 120 Day Schedule
   2. Schedule of Values
   3. Baseline CPM Schedule
   4. Current CPM Schedule Updates
   5. Schedule Reviews (Metro)
   6. Pay Estimate Schedule
   7. Cash Flow Curves
   8. Progress Curves
   9. Written Narrative and Variance Reports
   10. Notification of Delay
   11. Time Impact Analysis
   12. Early Completion Schedule
   13. Three Week Rolling Bar Chart Schedule
   14. As-Built Schedule

PART 3 - EXECUTION

3.01 120 DAY SCHEDULE

A. Contractor to submit the 120 Day Schedule containing the first 120 day submittals, permits, equipment procurement and summary design and construction activities with Contractor's intended sequencing of Work within 30 calendar days after Notice of Award. Schedule shall contain Contractor's detailed activities for first 120 calendar days following Notice to Proceed (NTP). Include activities and milestones that will or may affect or be affected by activities of Metro, utilities, and other third parties. Update the approved 120 Day Schedule monthly and submit until specified Contractor's Baseline CPM Schedule is approved. Include summary bars that reflect the balance of Work to be performed for remaining Interim and Contract completion milestones.

B. Describe Contractor's approach to mobilization, procurement, design and construction during first 120 calendar days, including crew sizes, equipment and material delivery, site access, submittals and permits.

C. Submit the 120 Day Schedule in accordance with PART 1 – GENERAL.
# Submittal Frequency of Required Project Control Documents

<table>
<thead>
<tr>
<th>Description of Product</th>
<th>Reporting Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Within 5 Calendar Days</td>
</tr>
<tr>
<td>1. 120 Day Schedule</td>
<td>X*</td>
</tr>
<tr>
<td>2. Schedule of Values</td>
<td>X* (partial) X (final)</td>
</tr>
<tr>
<td>3. Baseline CPM Schedule</td>
<td>X</td>
</tr>
<tr>
<td>4. Current CPM Schedule</td>
<td>X</td>
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<td>5. Schedule Reviews (Metro)</td>
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<td>6. Pay Estimate Schedule</td>
<td>X</td>
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<td>7. Cash Flow Curves</td>
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<td>8. Progress Curves</td>
<td>X</td>
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<tr>
<td>9. Written Narrative and Variance Reports</td>
<td>X* X X</td>
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<tr>
<td>10. Notification of Delay</td>
<td>X</td>
</tr>
<tr>
<td>11. Time Impact Analysis**</td>
<td>X</td>
</tr>
<tr>
<td>12. Early Completion Schedule</td>
<td>N/A</td>
</tr>
<tr>
<td>13. Three Week Rolling Bar Chart Schedule</td>
<td>Submitted on a weekly basis</td>
</tr>
<tr>
<td>14. As-Built Schedule</td>
<td>60 Calendar Days after Project Substantial Completion</td>
</tr>
</tbody>
</table>

*After Notice of Award where indicated  
**Following Notification of Delay
3.02 SCHEDULE OF VALUES

A. Contractor to submit “partial” Schedule of Values for design and construction within 30 calendar days after Notice of Award. Identify value of Work planned for first 120 calendar days following NTP. Allocate applicable Contract costs to Contractor's detailed activities. Allocate Schedule of Values to activities to be performed in first 120 calendar days after NTP. Cost information will be allocated to discrete activities using the 'Expenses' tab in P6 as an expense item named 'Budget'. Cost Loaded activities to satisfy this requirement will have only one cost associated with the line item. Multiple costs allocated to a single activity will warrant rejection of the schedule. All cost loaded activities will utilize unique project level activity codes for ‘project task’ and ‘bid item’. These project specific activity codes will be identified in the Primavera P6 schedule development template provided by Metro.

B. Contractor to submit a “complete” Schedule of Values; a breakdown of Contract price into individual cost accounts and into individual activities detailed by Contractor in Baseline CPM Contract Schedule, within 45 calendar days after NTP. Cost information will be allocated to discrete activities using the 'Expenses' tab in P6 as an expense item named ‘Budget’. Cost Loaded activities to satisfy this requirement will have only one cost associated with the line item. Multiple costs allocated to a single activity will warrant rejection of the schedule. All cost loaded activities will utilize unique project level activity codes for ‘project task’ and ‘bid item’. These project specific activity codes will be identified in the Primavera P6 schedule development template provided by Metro.

C. Submit schedule layout reports sorted by project-specific activity codes for ‘project task’ and ‘bid item’. Schedule of values format and content shall be in compliance with layouts and report specifications as indicated within the Primavera P6 schedule development template provided by Metro.

3.03 BASELINE CPM SCHEDULE

A. Submit breakdown of Contract price into individual activities detailed by Contractor in Baseline CPM Contract Schedule, within 45 calendar days after NTP. A cost loaded activity will have only one line item on the expenses tab and each of these cost loaded activities will have an assigned unique project level activity code for ‘project task’ and ‘bid item’. The cost loaded Baseline CPM Schedule is to contain detailed activities and intended sequencing of Work included in the Contract. The cumulative amount of cost loaded Work activities shall equal total Contract award price.

B. Contractor to include a time phased bar chart, based on Work days, as well as computer generated reports. Construct to show the order in which the Contractor proposes to carry out Work, to indicate restrictions of access, and availability and use of access and to show availability of Work areas, and availability and use of manpower, materials and equipment. Also include any schedule activities affected by any specified access dates that interface with other contractors and Third Party Agencies. Use the Baseline CPM Schedule to plan, schedule, coordinate and execute the Work under the Contract (including activities of subcontractors, equipment vendors, and suppliers). Provide Metro with written confirmation of concurrence of major (five percent or more of Contract
amount) trade Subcontractors and Suppliers with Baseline CPM Schedule, revisions and updates.

C. Contractor to provide Metro with a means to monitor and follow progress of all phases of Work, comply with limits imposed by scope of Work, with contractually specified interim milestones and completion dates, and with constraints, restraints or sequences included in the Contract. A Primavera P6 schedule development template will be provided by Metro. The schedule development template shall indicate activity ID and calendar naming conventions, project-specific activity codes, Work Breakdown Structure (WBS), schedule layouts and reports to be utilized by the Contractor. Degree of schedule detail required shall include factors to the satisfaction of Metro, including, but not limited to, the following:

1. Master list of submittals, reviews and all other requirements as referenced in Section 01 33 00 – Submittals Procedures.
2. Contract interim milestones and Contract completion date, substantial completion dates, constraints, restraints, sequences of Work indicated;
3. Type of Work to be performed, and sequences;
4. Purchases, manufacture, tests, delivery, and installation activities for major materials and equipment, and a separate list of major material items of equipment for which the Contractor intends to seek payment before installation;
5. Deliveries of Metro furnished goods and/or materials, if any, in accordance with dates or schedule windows of such times set forth in the Contract;
6. Approvals and permits required by regulatory agencies or other third parties;
7. Schedules for Subcontractor’s Work, including but not limited to, engineering, design services, and systems;
8. Assignment of responsibility for performing specific activities, including engineering, design, and procurement management services;
9. Access and availability to Work areas;
10. Identification of interfaces and dependencies with preceding, concurrent and follow on construction by other Contractors and Third Party Agencies;
11. Cost loading for cost utilizing expenses;
12. Actual tests, submission of test reports, and approval of test results;
13. Testing, training, and assistance required under the Contract;
14. Punch list and final cleanup;
15. Identification of manpower, material, or equipment restrictions, as well as any activity requiring unusual shift Work, such as two shifts, six day weeks, specified overtime, or Work at times other than a Standard Work Day; and
16. Any cost, schedule summary organization, Work Breakdown Structure (WBS) or activity code designation requested by Metro.
17. Unique activity identification as required by Metro for each detailed activity.
D. Cost sums and unit quantity sums of cost loaded activities shall equal Contract award amounts plus approved Change Order/Modification amounts. Assign General Requirement costs not specifically assigned to Work activities to level of effort activities representing entire Contract duration. Budget will be loaded utilizing expenses and shall be coded using project-specific activity codes for ‘project task’ and ‘bid item’. Budget shall equal approved Contract award amounts plus approved Change Order/Modification amounts. Approved activity budget dollar value shall equal forecast dollar value. Submittal items may only be paid for out of General Requirements pay item.

E. Baseline CPM Schedule minimum activity requirements are as follows:

1. Activity Descriptions: Briefly convey scope and location of Work indicated.

2. Activities: Discrete items of Work accomplished under Contract that provide measurable and recognizable parts of Work. Indicate Contractor's best estimate for original durations, early dates, late dates, logic ties, constraint dates, and total float. Schedule activities in the sequence which Contractor intends to perform Work.

3. Include as Contract deliverables, submittal and approval of permit applications and variances, design milestone deliverables and approvals, samples of materials, Shop Drawings, Working Drawings, Inspection and Test Plans, Safety and Security Plans, and Site Traffic Control Plans. Include activities of Metro that may affect progress as well as those of affected utility companies and other similarly involved third parties. Include activities in the Baseline CPM Schedule as stipulated in the Contract.

4. Include the following activity sequence for major material and equipment procurement: Submittal Preparation; Review for Approval; and Fabricate/Deliver. Divide procurement items that may contain multiple submittals occurring at different time intervals into separate sequences that can be tracked on an individual basis. Include a minimum original duration of 30 calendar days in Review-for-Approval activities. Include a minimum duration of 30 calendar days for re-review. Re-submittal activities shall contain submittal preparation activities for other material and equipment procurement (non-major). Submit for Metro's review and approval, a listing of proposed activity codes, code values and titles.

5. Work Activities:
   a. Show duration in Workdays and include costs, where applicable.
   b. Durations of 20 Working days or less except for non-construction activities such as procurement of materials, or fabrication of equipment. Should a Work activity require more than 20 Working days, subdivide Work activity to define appropriate Work items.

6. Cost load activities for installation and testing of materials and equipment.

7. Critical paths defined as the sequence(s) of activities with the least amount of float.

8. Failure to include any element of Work required for performance of the Contract in the Baseline CPM Schedule will not excuse Contractor from completing Work required to achieve milestone completion, notwithstanding approval of Baseline CPM Schedule submittals.

9. The Contractor needs to disclose in detail how the weather delays caused by rain, as specified in the Special Provisions of the Contract, will be incorporated into the CPM Schedule. The Contractor must keep a current "weather delay registry" that would be
reviewed and agreed to by both parties during the Current CPM Schedule submittal process.

F. Submit the Baseline CPM Schedule in accordance with PART 1 – GENERAL.

3.04 CURRENT CPM SCHEDULE UPDATES

A. Initially, upon approval of the Baseline CPM Schedule, establish the Current CPM Schedule. Thereafter, update the Current CPM Schedule monthly with Data Date designated by Metro. A list of data dates will be provided by Metro on or before Notice to Proceed. Use updated Current CPM Schedule for subsequent planning, scheduling, managing, monthly progress payments, statusing of the master list of submittals and execution of Work to be accomplished.

B. Participate with Metro in periodic meetings, at least monthly, on dates directed by Metro for purposes of reviewing changes to schedule logic and Project status. At meeting held prior to Data Date, provide preliminary updated Current CPM Contract Schedule that forecasts Project status through the Data Date and contains actual start and actual finish dates for activities in progress or completed, remaining durations of activities in progress, percent complete, earned value of cost-loaded activities, logic changes, new or deleted activities, and new Change Orders/Modifications.

C. Submit a standalone portion of the network (fragnet), if current progress reflects negative float of minus 30 calendar days or more for a Contract milestone activity, as indicated by most recent Current CPM Contract Schedule. Show activities affected, date delay or disruption occurred or how productivity rates were impacted and unmitigated impacts to schedule caused by delay or disruption. Submit similar fragnet showing Contractor’s plan to mitigate delay or disruption and subsequent impacts to the schedule. Provide written narrative describing circumstances which caused delay or disruption and methodology used to determine extent of delay or disruption. Submission of such fragnet does not constitute permission to proceed with plan. Execute some or all of the following remedial actions, and submit a recovery schedule that may include:

1. Increase construction manpower in such quantities and crafts as necessary to eliminate the backlog of Work.

2. Increase the number of Work hours per shift, shifts per Work day, Work days per week, the amount of construction equipment, or combination of the foregoing to eliminate the backlog of Work.

3. Reschedule the Work in conformance with the Specification requirements.

4. Before implementing any of the above actions, notify and obtain acceptance from Metro. If such actions are accepted, incorporate revisions before next update.

D. Addition of equipment or construction forces, increasing Work hours or other methods, manner, or procedure to return to contractually required completion date will not be considered justification for a Change Order, nor be treated as acceleration where the need for a recovery schedule has been caused by the Contractor and/or its Subcontractors or Suppliers, at any tier.
E. When the Contractor receives a Change Order/Modification, or delays are experienced by the Contractor and a time extension is requested, submit to Metro Delay Notification followed by a written Time Impact Analysis illustrating the influence of each change or delay on the Contract milestone completion date, utilizing the Current approved CPM Schedule. Include in each Time Impact Analysis a fragnet demonstrating how the Contractor proposes to incorporate the Change Order/Modification or delay into the Current CPM Schedule. The fragnet shall contain a sequence of new and/or activity revisions that are proposed to be added to the Current CPM Schedule in effect at the time change or delay is encountered, to demonstrate influence or delay and method for incorporating the delay, and its impact into the schedule as they are encountered.

1. Each Time Impact Analysis shall demonstrate estimated time impact based on events of delay, date of Change Order/Modification given to the Contractor, status of design or construction at that point in time, and event time computation of activities affected by change or delay. Event times used in analysis shall be those included in latest version of the Current CPM Schedule, in effect at time change or delay was encountered.

2. Notify Metro within five calendar days of becoming aware of a delay and submit a Time Impact Analysis within ten calendar days after notification. If the Contractor does not submit a Notification of Delay and Time Impact Analysis for a specific Change Order/Modification or delay within the specified period of time, the Contractor will be deemed to have irrevocably waived rights to additional time and cost.

3. Because float time within Current CPM Schedule is jointly owned, it is acknowledged and agreed by the Contractor that Metro caused delays on the project may be offset by Metro caused time savings (including, but not limited to: submittals on critical path returned in less time than allowed for in the Contract, approval of substitution requests which result in a savings of time along the critical path for the Contractor). In such an event, the Contractor will not be entitled to receive an extension of time or delay compensable damages until Metro caused time saving is exceeded and Contract Substantial Completion milestone dated is also exceeded.

4. Metro will accept or reject each Time Impact Analysis. Upon approval, a copy of a Time Impact Analysis signed by Metro, will be returned to the Contractor for incorporation into the schedule.

5. Upon mutual agreement by both parties, incorporate fragnets illustrating the influence of Change Orders/Modifications and delays into the Current CPM Contract Schedule during first update after agreement is reached.

6. If a Change Order/Modification causes no delay/impact, incorporate the Work into the Current CPM Schedule Update submittal as new activities after discussion with Metro concerning how a change will be placed into proposed revised CPM Schedule. After an official Change Order/Modification has been issued for Work, add it to the schedule. Change Orders/Modifications added to the schedule are cost loaded with corresponding cost account, activity description, and costs. The activity ID identifies the number of the change.

7. Time extensions may not be incorporated into schedule for changes or delays without an approved Change Order/Modification. Zero duration activities may be added until time extensions are executed. Upon execution of a Change
Order/Modification specific to time extension or revised completion dates, incorporate the revisions in accordance with the Change Order/Modification.

8. Submit revised Current CPM Schedule within seven calendar days of request, if the Current CPM Schedule no longer represents Contractor’s actual prosecution of Work.

3.05 SCHEDULE REVIEWS (Metro)

A. Metro will review and respond to scheduling submittals within 14 calendar days after submittal. Submit a revised schedule within seven days after receipt of Metro’s response if Metro requires changes or additional information.

3.06 PAY ESTIMATE SCHEDULE

A. As back-up for the Application for Progress Payments, prepare schedule of activities for all design and construction Work to be done and show status of completion. Payment will be made off the cost loaded schedule as activities are completed. Progress for payment shall be derived from the progress for Current CPM Schedule Update. Pay Estimate Schedule format and content shall be in compliance with layouts and report specifications as indicated within the Primavera P6 schedule development template provided by Metro. Refer to Article 3.14.

3.07 CASH FLOW AND PROGRESS CURVES

A. Cash Flow:

1. Submit with the initial Baseline CPM Schedule a Cash Flow Curve of expected progress payments over the performance period. Plot curve using costs assigned to activities in the Baseline CPM Schedule.

2. Update the curve with actuals from the approved monthly Application for Progress Payment and forecast progress payments and submit monthly to Metro. The total approved progress payments and forecast progress payments must equal Contract amount including Change Orders/Modifications. Derive updated curve from updated Current CPM Schedule.

B. Progress Curves:

1. Submit progress curves with CPM Schedule updates. Show with the curves the cumulative scheduled percent complete of each phase, time-scaled in calendar days from NTP to Contract completion. Derive schedule, actual, and forecast progress from Cash Flow Curve. Update progress curves with each monthly update of the Current CPM Contract Schedule. Include schedule, actual and forecast progress, plotted as a time-scaled curve from 0 to 100 percent.

3.08 WRITTEN NARRATIVE AND VARIANCE REPORTS

A. Include a “stand-alone” narrative of sufficient detail to explain basis of Contractor’s submittal with each schedule submittal and the following:
1. 120 Day Schedule and Baseline CPM Schedule Submittals: Explain determination of activity durations and describe Contractor’s approach for meeting Contract milestone dates. Include as a minimum: basis and assumptions used in preparing submittal, including crew sizes, equipment requirements, and anticipated delivery dates; restraints; critical path activities; production rates; activities requiring overtime or additional shifts; holidays and other non-Work days; potential problem areas; permits; coordination required with Metro, railroads, utilities and other parties; and long lead delivery items requiring more than 30 calendar days from order to delivery. Identify Work items that may be expedited by use of overtime or additional shifts. Identify and explain sequencing and other constraints such as manpower, material, and equipment. Include listing of holidays and special non-Work days.

2. CPM Schedule Update Submittals: State in narrative, identification of significant schedule progress during the reporting period including progress along the critical path, progress against Contract milestones this period in terms of days ahead of or behind allowable dates, and discuss the status of major Contract material and equipment procurement. Specific requirements of narrative are as follows:
   a. If updated CPM Schedule indicates an actual or potential delay to Contract completion date or interim milestone dates as specified under the Contract or modified by Change Order/Modification, identify causes of delays, disruptions and interruptions and provide explanation of Work affected and proposed corrective action to meet milestone dates involved or to mitigate potential delays or disruptions.
   b. Explain any significant schedule variances from the Baseline CPM Schedule. Explain any schedule changes, including changes to the logic sequence or activity durations and the impacts to the overall Contract. Discuss any Contract schedule concerns and issues and recovery plans (if required). Explain why any activities forecast, in previous schedule update, to be started or completed during the current update period have not started or completed.
   c. Identify by activity number and description, activities in progress and which activities are scheduled to be completed during the next update period.
   d. Identify by activity number and description, activities to be started during the month following the report period. Show Contractor’s forecast early and late start and finish dates.
   e. Discuss added Change Order/Modification Work items. Also identify any proposed schedule change orders submitted during the last reporting period.
   f. Submit an automated database schedule analysis comparison report that identifies the changes made between the previous month Current CPM Schedule and the current month Current CPM Schedule. List activities started or completed during the reporting period and list all changes made to the logic or planned durations.
   g. Submit a Daily Data Monthly Weather Report showing precipitation levels. Refer to Article 3.10.

B. Variance Reports: Submit a monthly comparison of consecutive updated Current CPM Schedules. Include:
   1. Activity I.D. number code and description
2. Previous scheduled early start/finish dates.
3. Current scheduled early start/finish dates.
4. Working days remaining to complete the activity.
5. Percentage complete of the activity.
6. Remaining total float of each activity.

3.09 NOTIFICATION OF DELAY AND TIME IMPACT ANALYSIS

A. Notify Metro within five calendar days of becoming aware of a delay and submit a Time Impact Analysis within ten calendar days after notification. If the Contractor does not submit a Notification of Delay and Time Impact Analysis (TIA) for a specific Change Order/Modification or delay within the specified period of time, the Contractor will be deemed to have irrevocably waived rights to additional time and cost. Refer to Articles 3.04.C and 3.04.E.

B. Subject to the requirements of Contract General Condition entitled Extension of Time, Time extensions will be granted only to the extent that equitable time adjustments for activity or activities affected exceed total or remaining float along critical path of activities at time of actual delay, or at time Change Order/Modification was issued. Concurrent Delays along the critical path of activities are considered (where applicable) in the review of TIA submittals.

C. Submit the Time Impact Analysis schedules in accordance with PART 1 – GENERAL.

3.10 WEATHER DELAYS CAUSED BY RAIN

A. Definition: Severe weather as referred to in the Article entitled EXTENSION OF TIME, in the General Conditions is set forth and defined as follows: The Contractor will not be entitled to a time extension due to rain days less than or equal to the number of rain days indicated in the Monthly Rainfall chart below.

<table>
<thead>
<tr>
<th>Month</th>
<th>Number of Work Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>5</td>
</tr>
<tr>
<td>February</td>
<td>6</td>
</tr>
<tr>
<td>March</td>
<td>4</td>
</tr>
<tr>
<td>April</td>
<td>2</td>
</tr>
<tr>
<td>May</td>
<td>1</td>
</tr>
<tr>
<td>June</td>
<td>1</td>
</tr>
<tr>
<td>July</td>
<td>0</td>
</tr>
<tr>
<td>August</td>
<td>0</td>
</tr>
<tr>
<td>September</td>
<td>0</td>
</tr>
<tr>
<td>October</td>
<td>1</td>
</tr>
<tr>
<td>November</td>
<td>1</td>
</tr>
<tr>
<td>December</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>25</strong></td>
</tr>
</tbody>
</table>
B. The number of rain days expected to occur each month during the performance of the contract is quantified in the chart. Severe weather means the unforeseeable occurrence of more rain days during a month than the number of rain days expected to occur for that month as indicated in the chart. The number of rain indicated in the chart is based on a five day Standard Work Week.

1. The Contractor shall account for the above rain days in the Baseline CPM Schedule. In the event the Contractor works a regularly scheduled workweek other than five days per week, the above numbers shall be multiplied by the ratio of the actual average number of work days per week divided by five work days.

C. Calculation: Rain is defined as precipitation greater than 0.10” over a 24 hour period as measured by the National Weather Service, Los Angeles International Airport location and occurring during a scheduled work day. Rain occurring during a day not scheduled as a work day will not constitute an actual rain day for purposes of determining entitlement to a time extension for severe weather. The number of work days identified on the table above shall be utilized only for the associated month and may not be added to or carried over to any subsequent month.

D. Time Extension: For purposes of determining whether the Contractor is entitled to a time extension for severe weather, the number of rain days as indicated in the Monthly Rainfall chart per month shall be compared to the number of actual rain days occurring during the same month. A request for time extension will not be granted unless the number of actual rain days occurring during the month exceeds the number of rain days allowed for the month as indicated in Monthly Rainfall chart and the critical path of the CPM Schedule is impacted. The activities on the critical path must be directly impacted by severe weather. Other activities on the critical path that are not directly impacted will not be considered.

1. Except for a time extension due to severe weather allowed pursuant to this Article and the Article entitled EXTENSION OF TIME, in the General Conditions, the Contractor shall not be entitled to a time extension for any subsequent delay impacts resulting from rain if the contractor fails to provide reasonable rain impact mitigation to avoid subsequent delay impacts resulting from rain. Reasonable rain impact mitigation measures include, but are not limited to, temporary grading, sandbagging, and pumping of flooded areas. Subsequent delay impacts resulting from rain include, but are not limited to, effects such as ponding and flooding.

3.11 EARLY COMPLETION SCHEDULE

A. Early Completion Schedule: Contractor agrees that in the event a proposed early completion schedule (or any subsequent update) which is found to be acceptable by Metro, indicating a duration which is less than time allowed by Contract for completion of Work or of interim milestone, Contract completion time shall only be shortened by a Change Order/Modification to equal Contractors proposed Baseline CPM Schedule duration.

3.12 THREE WEEK ROLLING BAR CHART SCHEDULE
A. Three Week Rolling Bar Chart Schedule: Submit a weekly manpower/construction report and progress schedule listing activities completed and in progress for the previous week and the activities scheduled for the succeeding two weeks that is produced from the Current CPM Schedule. The Three Week Rolling Bar Chart Schedule shall include all activities scheduled including: activity ID, description, start and finish, total float, original duration, remaining duration, percent complete, responsible party performing the work and pertinent remarks as to activity status.

3.13 AS-BUILT SCHEDULE

A. As-Built Schedule: As-Built Schedule is to be submitted within 60 calendar days after project substantial completion. The As-Built Schedule shall be certified by the Contractor's Professional Scheduler/Project Control Engineer and Contractor's Project Manager as to how the Contract was executed. Submittal and approval of the As-Built Schedule will be a condition precedent to reduction/release of any Contract retention.

3.14 PHYSICAL PROGRESS MEASUREMENT

A. This Section is intended to inform Contractor how Metro will calculate "Physical progress". Physical progress will be measured as the sum of earned dollar values of activities identified as representing physical construction divided by "Physical Progress Budget." Activities and physical progress budget will be developed by Metro. Physical progress budget is equal to the contract value and is defined as summed dollar values of cost loaded activities identified as representing physical construction in approved cost loaded Baseline CPM Schedule. Determine percent complete for cost-loaded activities as follows: For design activities, the Contractor will prepare and Metro will approve a schedule of values for said Work. For activities loaded with Contract unit quantities, calculate percent complete by dividing units of Work in place by total units of Work forecast. For activities loaded with lump sum costs, calculate percent complete by estimating percent of Work in place. Only activities representing physical progress (Work in place) will be included in physical progress calculation. Approval of design drawings by Metro will qualify as physical progress for activities connected with design. Physical costs will be used as a basis for physical progress measurement.

B. Monthly Application for Progress Payment schedule submission “pay estimate”, showing updated activity, and cost data in accordance with requirements of this Section and the Contract, and an updated Current CPM Schedule, will be the basis upon which progress payments and requests are reviewed for approval by Metro. All Work activities shall be coded for responsibility and shall be distinguishable between the prime Contractor and subcontractors, inclusive of baseline work, Contract modifications and retention withheld in accordance with Contract Terms and Conditions. The Application for Progress Payment will be processed in accordance with the terms in the Contract Document COMPENSATION AND PAYMENT PROVISIONS.

END OF SECTION 01 29 76
PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Requirements for management of Design Work relating to the development of design products during the course of the Project.

B. The Designer may perform production design Work in the Los Angeles area or elsewhere. However, the design personnel designated as Key Personnel shall be in the Integrated Project Management Office (IPMO) provided by the Design Builder for the duration of the design for which they are responsible.

C. The Preliminary Engineering Plans show only a preliminary design for the Project. These drawings and the supporting electronic files are included to illustrate the general scope of improvements. Verify all information prior to use.

D. Any recommended design changes by the Design Builder shall not impair the essential functions, uses, and characteristics of the Project, such as safety, capacity, traffic operations, durability, desired appearance, maintainability, environmental protection, drainage, and other permitted constraints.

1.02 RELATED SECTIONS

A. Section 01 11 01: Design Build Summary

B. Section 01 31 01: Project Management and Coordination Requirements

C. Section 01 31 31: Utility Coordination

D. Section 01 33 00: Submittal Procedures

E. Section 01 43 10: Project Quality Program Requirements - Design/Build

F. Section 01 78 39: As-Built Drawings and Current Status Documents

1.03 REFERENCES

A. California Code of Regulations (CCR), Title 24, Part 2, California Building Code (CBC)

B. U.S. Department of Transportation (USDOT):
   1. Federal Transit Administration (FTA) - ADA Standards for Transportation Facilities
1.04 QUALITY ASSURANCE

A. Comply with Section 01 43 10 – Project Quality Program Requirements - Design/Build.

1.05 SUBMITTALS

A. Refer to Sections 01 33 00 – Submittal Procedures, for submittal requirements and procedures.

1.06 DEFINITIONS

A. “Approved for Construction” - Final design drawings Approved for Construction by Metro.

B. "Design Unit": A distinct portion of the Project whose design is performed as a contiguous, integrated unit.

C. "Major Temporary Works": Components of the Project that are designed and constructed for temporary use during construction that have a significant effect on the Permanent Works, such as temporary support of excavation, falsework and formwork, etc.

D. "Permanent Works" - Physical components of the Project that comprise the final Project.

E. "Responsible Unit Engineer": California-licensed Professional Engineer who will sign and seal the Final Project Design Documents and As-Built Drawings for which the Engineer is in ‘responsible charge’ of the design.

F. “Third Party”: See General Conditions Section 1.2 of the Design Build Contract, DEFINITIONS.

Note: Definitions of other terms used in the General Requirements are found in the General Conditions of the Contract.

1.07 CONTRACTOR RESPONSIBILITIES

A. Perform the Design Work in accordance with the details as defined in the Contract documents, subject to Metro’s review and comment.

B. Design Builder shall provide Design Quality Control Procedures for Design Work in accordance with Section 01 43 10 – Project Quality Program Requirements - Design/Build.

C. Manage the Design, Construction Documents and Design Quality Control (QC) of the Work, including the interface with construction to ensure timely identification, discussion and resolution of design issues.

D. Coordinate with and obtain necessary approvals from authorities and municipalities having jurisdiction for roadways and right of way related to shutdowns, temporary detours and traffic diversions, temporary utility relocations, temporary sidewalk closures, bicycle and pedestrian detours, haul routes, stormwater management,
working hour restrictions, and permit requirements issued by permitting agencies.

E. Coordinate with and obtain necessary approvals from utility owners including local municipalities having jurisdiction for utilities in accordance with Section 01 31 31 – Utility Coordination, including but not limited to shutdowns, temporary diversions, temporary relocations, temporary roadway closures for utility work, stormwater management, and working hour restrictions.

F. Ensure that the Designer properly checks and certifies the Design Work and certifies implementation of Design QC Procedures in accordance with the provisions of Section 01 43 10 – Project Quality Program Requirements - Design/Build.

G. Assign qualified personnel to perform the services required herein in accordance with Contract, including Key Personnel; Character of Employees; Working Conditions, of the Contract.

1.08 CONTRACTOR’S DESIGN ORGANIZATION AND OBLIGATIONS

A. Designer:

1. The Design Builder shall appoint a suitably qualified and experienced Designer, which may be a consultant or an in-house Design team, to undertake the Design of the permanent components and the major temporary components of the Project. The Design Builder shall require the Designer to have or establish an office in the IPMO and maintain all necessary representation throughout the duration of the Contract to ensure the Designer can meet all its obligations under the Contract.

2. The Designer may perform production Design Work in the IPMO or elsewhere. However, Design personnel designated as Key Personnel in accordance with the Contract or replacements approved by Metro or its designee shall be in the IPMO for the duration of the Design and as required to provide specified support during construction.

3. The Designer shall prepare a Design Work Plan (DWP) that, in addition to other requirements in this Section, at a minimum addresses the items listed below. The DWP shall be approved by the Design Manager and the Design Builder prior to submittal to Metro for review.

   a. Design Management Approach for preparation of design Contract documents, including but not limited to drawings, plans, specifications, calculations, studies and reports. Design Management Approach shall also address, at a minimum, team organization, location where different elements of the work will be performed, and proposed submittals for each Design Unit. The approach shall describe the design preparation processes in full detail and provide the necessary verification activities.

   b. Project design criteria, including other agency and owner specific criteria for elements of Work not under Metro jurisdiction such as City Facilities and utilities to be designed by the Design Builder;

   c. Applicable codes and standards;

   d. Methods of analysis used to complete elements for the design, which shall
consider such items as:

1) Structural geometry and modeling components.
2) Materials and material properties.
3) Member properties.
4) Loading intensities.
5) Foundation loads.
6) Structural boundary conditions.
7) Sub-soil interaction to support the loads from above.
8) Effects of seismicity.
9) Effects of fatigue.
10) Durability and maintenance requirements.
11) Details of required Quality Assurance procedures, monitoring, and controls.
12) Local (city, county, state) Jurisdiction and Regulatory requirements including Federal and State Accessibility regulations referenced in Article 1.03.

e. Computer software and its validation.
f. Interface requirements including but not limited to:
   1) Metro Systems Facilities installation planning and procedures for interface with Civil/Structural components
   2) Station and Campus facilities interface with Civil/Structural/Systems components
   3) Interface with concurrent work including other Metro active projects.
g. Constructability including construction staging planning and procedures.
h. Sustainability.
i. Aesthetics.
j. Environmental Compliance and status reporting.
k. Existing and Proposed Utility removal, protection, and abandonment procedures, including defining potential impacts to the Project or the utility owners.
l. Trackway design and installation constraints evaluation and plan.
m. Roadway design and installation constraints evaluation and plan.
o. Systems integration including Systems-to-Systems integration and Civil-to-Systems integration.
p. The DWP shall reference the Project Design Quality Manual and other documents, as appropriate.

4. Metro will require approval of designs for facilities owned and operated by non-Metro entities, by the owner of the facility, prior to approving the Final Design.
B. Design Manager:

1. The Design Builder shall assign a Design Manager to manage all Work performed by the Design Builder's Design Team. The Design Manager shall be in the IPMO for the Design Work and shall be present as required thereafter to manage Design Support During Construction, Design changes, and completion of As-Built Drawings. The Design Builder's Design Manager shall meet the qualification and experience requirements as specified in the Contract.

2. The Design Manager and staff working under the direct supervision of the Design Manager shall conduct an assessment and evaluation of Design such that the Design Manager and Design Builder can certify to Metro that the Design satisfies the Contract requirements, including the following requirements shall verify through design review that design complies with Contract requirements including the following:
   a. Accuracy.
   b. Adequacy.
   c. Conformance to standards of practice.
   d. Compliance with Technical Requirements, including applicable codes and standards.
   e. Cost effectiveness.
   f. Durability.
   g. Quality.
   h. Fitness for purpose and function as specified and implied in the Contract.

3. When design units are finalized for submittal to Design-Builder for construction, The Design Manager shall certify that design satisfies Contract requirements include such written certification for all Work being subjected to a Design review as required by Paragraph 1.13 and in accordance with Section 01 43 10 – Project Quality Program Requirements - Design/Build.

4. The Design Manager's activities shall include, at a minimum, assessment and evaluation of the following:
   a. Design reports.
   b. Analytical approach.
   d. Specifications for conformity to and implementation of Contract Technical Requirements.
   e. Design Drawings and Shop Drawings.
   f. Major temporary components' effect on permanent components.
   g. Field Design changes.
   h. Design approvals for materials and procedures.
   i. As-Built Drawings for conformity with final Design and Contract Technical Requirements.
Effectiveness and completeness of Quality Control and Quality Assurance reviews.

C. Responsible Engineers and Architects:

1. The Design Manager shall designate and assign an Engineer of Record or Architect of Record for each Contractor-designated Design Unit. The Engineer of Record shall sign and seal or directly delegate responsibility for signing and sealing Design reports, Design Drawings, Shop Drawings and Specifications, and Final Design Calculations for the assigned Design Unit(s).

2. Engineers of Record and Architects of Record shall be located and work in the IPMO as necessary to coordinate the Work on assigned Design Units and as required to provide specified support during construction. The Engineer of Record and the Architect of Record shall be present in the IPMO for and shall attend all Design reviews for assigned Design Unit(s).

D. Design Quality Control (QC) Engineer Manager:

Quality assurance requirements are defined in Section 01 43 10 Project Quality Program Requirements. These requirements shall be implemented by the Design Builder and imposed on all sub-tier design organizations. If the Design Builder outsources the design to an outside design firm, then that organization shall have its own parallel Quality Assurance Manager and staff interfacing with the Design Builder’s quality organization. It is the intention of Metro that Quality Assurance Requirements and coverage be maintained and exercised over all aspects of the contract including sub-tier organizations. When outside design organizations are used, appropriate interface procedures shall be established by the Design Manager to assure that the required design criteria are available to the appropriate outside design organizations when required to perform design, and that checking and review procedures are implemented to assure that design deliverables provided by outside design organizations are properly checked and reviewed prior to incorporation into project design documents. Design Quality requirements are defined in Section 01 43 10 Project Quality Program Requirements. These requirements shall be implemented by the Design Builder and imposed on all sub-tier design organizations. If the Design Builder outsources the design to an outside design firm, then that organization shall designate a Design Quality Manager (DQM) to manage the implementation of the Project Design Quality Manual (PDQM). The design organization structure shall be depicted on an organizational chart in the PDQM. The design organization may implement a unified design quality program applicable to all design sub-consultants in lieu of individual quality programs for each sub-consultant. The PDQM shall include a description of the interface with the Design Builder’s organization. It is the intention of Metro that Design Quality requirements and coverage be maintained and exercised over all aspects of the Contract including sub-tier organizations. When outside design organizations are used, appropriate interface procedures shall be established by the Design Manager to assure that the required design criteria are available to the appropriate outside design organizations when required to perform design, and that checking and review procedures are implemented to assure that design deliverables provided by outside design organizations are properly checked and reviewed prior to incorporation into project design documents.
E. Responsible Charge:

1. The design professional of record (Architect or Engineer) shall personally supervise the Work on the plans, specifications, reports and calculations to the degree that they are satisfied that the Work is completed in a proper and professional manner consistent with the Standard of Care of the Industry and in accordance with the Design Quality Plan [Design Quality Plan] Project Design Quality Manual. This level of review shall be considered “Designer’s internal checks” where such language is used in these specifications.

F. Design Professional: Registered design professionals shall be currently licensed in the State of California, as Architects, or Engineers within their respective discipline.

1.09 DESIGN UNITS

A. The Design Builder shall package all Design information and Design Drawings for the Work into separate Design Units. Each Design Unit shall comprise similar and coherent significant parts of the Contract that can be checked and reviewed as a self-contained package with due consideration for accommodating interfaces with other Project components and other active projects in the Project work area.

B. The Design Builder shall submit revisions to the information provided in response to this Article in writing to Metro or its designee concurrent with the monthly Progress.

1.10 DESIGN WORK PLAN AND DESIGN MOBILIZATION WORKSHOP

A. The Design Builder shall prepare and submit a written Design Work Plan within 30 Days of Notice to Proceed (NTP) for review and approval by Metro or its designee.

1. The Plan shall present the proposed Design Unit descriptions, including the scope, limits and interfaces of the Design Work within each Design Unit and with other active projects in the Project corridor, analysis approach(es), sequencing and schedules of Design Reviews.

2. Planned review submittals, including specific information to be reviewed, level of review requested, planned review dates (measured from NTP date(s)), and the description of completeness represented by each review.

3. Identification of the Engineer of Record for each Design Unit or portion thereof.

4. Locations where Design Work will be performed.

5. The Plan shall describe the level of Design that the Designer will accomplish for each of the planned Design Units at each of the stages of Design development. Statements of percent complete will not be acceptable. Design Builder shall provide a description and checklist for each Design Unit clearly identifying the Design product that will be reviewed.

6. The Plan shall also describe the Design Builder’s process for resolving issues raised by review comments and non-conformance reports and for reporting results to Metro or its designee.

7. Design Work Plan and requirements for maintenance of traffic and access shall be directly coordinated to ensure constructability of the design unit as proposed and
shall comply with requirements in Section 01 55 27 – Controlling Traffic (Contractor Furnished TLR). A statement verifying said coordination had occurred shall accompany each Design Review Submittal.

8. Design Work Plan shall include Quality Control processes, procedures, checklists and other information necessary to manage the quality of the design process and production of the design documents in accordance with Section 01 43 10 – Project Quality Program Requirements – Design/Build. Submittal of design documents shall include documentation that the Design Quality Plan was followed. This standard will be enforced by Metro through reviews, surveillances and audits of the work by Metro Project Quality Assurance Staff. Failure to comply with the quality requirements shall be cause for Metro to issue a notice to suspend work.

B. Within 45 Days of NTP, Metro will arrange and conduct a Design Mobilization Workshop at the IPMO to familiarize the Designer's personnel and Metro (and affected third parties, if invited by Metro or the Design Builder) review personnel with the Design concepts, issues, status, and review procedures as outlined in the Design Builder's Design Work Plan.

C. Metro and Design Builder shall jointly develop the agenda of the workshop and how it will be organized (e.g. by Design Unit and Engineering discipline).

D. The intent of the Design Mobilization Workshop is to allow the Design Builder to finalize the Design Work Plan, and to make the subsequent Design reviews more effective and efficient for all parties.

E. All agreements, schedules, and understandings reached during the Design Mobilization Workshop shall be documented in writing in the Design Work Plan, which shall be approved in writing by the Design Builder and Metro.

1.11 RELATIONSHIP OF EARLY CONSTRUCTION STARTS TO DESIGN DEVELOPMENT AND REVIEW

A. It is the intent of Metro to allow construction to begin on a Design Unit prior to completion of Final Design, except as otherwise noted.

B. Construction on any Design Unit may begin at any time after approval of the design units Readiness for Construction Design submittal. Construction may progress in increments determined by the Contractor, at the Contractor's risk, provided each increment of construction is covered by Design Drawings and Specifications that have been reviewed, approved by Metro, per the requirements for Readiness for Construction noted in this Section.

1.12 STAGES OF DESIGN DEVELOPMENT

A. The Design Builder shall make a comprehensive Design check and Design review for each Design Unit at the stages of Design development specified herein. Submittals shall be prepared and submitted in the order in which they are specified below. Prerequisite submittals shall have been accepted or approved by Metro as noted herein before making any of the subsequent submittals.
B. The following are the six stages of Design development:
   1. Definitive Design.
   2. Interim Design (as required and deemed necessary).
   3. Readiness for Construction.
   4. Final Design.
   5. Approved for Construction Drawings and Specifications.

C. The intent of each stage of Design development and Design review is to:
   1. Verify that the Design complies with the Contract Technical Requirements and
      previously agreed upon modifications thereto.
   2. Allow components of Design Units to be released for construction.
   3. In the case of reviews of Shop Drawings, to allow construction to continue.

D. Design reviews or Design checks shall be completed as specified herein and in Section
   01 43 10 – Project Quality Program Requirements - Design/Build for each Design Unit
   (and for each component or element within a Design Unit) at each stage of Design
   development, and as defined in the approved Design Quality Plan Project Design

1.13 DESIGN REVIEWS

A. Design Workshops:
   1. Design workshops, and "over-the-shoulder" reviews are means to facilitate interim
      design discussions between the Design Builder, Metro and other project
      stakeholders. The intent of the workshops are to provide and discuss "real-time"
      comments, ensure a continued and uniform consistency in the quality of the Work
      and inform Metro and project stakeholders of design progress and direction. Design
      Workshops are encouraged to be scheduled by the Design Builder early in the
      design development process for each Design Unit or groups of similar Design Units.
   2. Design Workshop agendas will be approved in advance of the meeting by Metro and
      the Design Builder and will typically include:
      a. Describe planned design approach, assumptions for analyses, anticipated
         changes to preliminary design concepts, and proposed additional exploration
         and/or field work planned.
      b. Describe planned design and construction interfaces associated with the Design
         Unit(s), including interfaces with other design units and design disciplines, utility
         owner works, and interfaces with other active contracts.
      c. Describe major elements requiring focused review or for which early or on-going
         discussions would simplify or expedite the formal review process.
      d. Schedule for completion and submittal to Metro of the various stages of design
         development forthcoming.
   3. Metro reserves the right to schedule a Design Workshop to address the above
issues at any time during the design process, with a frequency as needed but not to exceed one meeting per month per Design Unit.

B. Pre-Submittal Workshops:

1. Within 14 Days, but in no case less than 3 Days prior to a submittal of a Design Unit for formal review, Design Builder shall conduct a meeting at the IPMO to present the forthcoming review package to Metro. Design Builder shall describe the Design Unit and level of completion to be submitted, the desired focus of the review, the specific list of information that will be provided in the package requiring review, and specific areas of the Design Unit that are incomplete. Multiple Design Units may be addressed in pre-submittal workshops.

2. The Design Builder or Metro may invite other Project stakeholders to participate.

C. Design Review Meetings:

1. Design Review Meetings may be called by the Design Builder or by Metro, and shall be conducted by the Design Builder in the Project offices or at other locations in the Project vicinity as mutually agreed. Metro will provide written and verbal comments in accordance with the requirements of this specification at the meeting. The Design Builder shall document the meetings and disposition of comments and responses as a result of the Design Review Meeting. Comments shall be assembled by the Design Builder and responded to using Design Review Comments form provided to Metro.

2. Follow up Design Review Meetings to address issues not resolved at the initial Design Review Meetings may be called by either the Design Builder or Metro. The entity calling the meeting shall establish the agenda for said meeting. Follow up Design Review Meetings may address more than one design review package.

3. In addition to the Design Builder and Metro in attendance, the Design Builder or Metro may invite other Project stakeholders to participate.

4. The Design Builder shall make available all applicable Design Drawings, Specifications, calculations, design reports, test data and other information supporting and justifying the design solution presented for review at Design Review.

5. For Design Reviews including systems Work, in addition to the information listed above, the Design Builder shall at a minimum:
   a. For system design submittals, include application software, and system or subsystems comprising an assembly or arrangement of equipment, devices, and components to accomplish a function.
   b. For equipment design submittals, include product design development, product data, catalog cuts, and samples.
   c. For installation design submittals, include design depicting installation of components, assemblies, equipment, rooms and houses.

6. Review Comments:
   a. The Design Builder shall address and resolve Metro’s and third party comments in consultation with Metro and the third party. A copy of third party comments
shall be forwarded to Metro by the Design Builder. Final resolution of comments must be approved by both the Design Builder and Metro.

b. Design Review comments from such reviews shall be recorded on Design Review form provided by Metro.

c. The Design Builder shall address and resolve all design review comments to the satisfaction of Metro prior to submitting the subsequent Design Review Package.

D. Definitive Design Review:

1. The Design review of Definitive Design shall be the first Design review after NTP and is intended to verify that the Design concepts proposed by the Design Builder meet Contract Technical requirements including identification of proposed changes to designs shown on the Design Drawings at the time of Award of the Contract.

2. If approved in writing by Metro, the Definitive Design review and the Readiness for Construction review may be combined.

3. The Definitive Design review shall verify the following:

   a. The Design concepts governing future Design development are defined consistent and in conformance with Contract Technical requirements.

   b. The Design concepts are substantiated and justified by adequate site investigation and analysis.

   c. Final Right-of-Way (ROW) requirements.

   d. The specific standards applicable to the proposed concepts are identified and appropriate.

   e. The proposed Design concepts are constructible.

   f. The design interfaces have been successfully coordinated with other design units, utility relocations and other project related activities.

   g. The availability of required materials/equipment.

   h. The Design meets Project quality requirements and required Design QC procedures have been followed.

4. The Definitive Design review involving systems Work, also commonly known as conceptual design, shall also include text or reports with supporting diagrams or sketches covering Design Builder's understanding of the Contract requirements including technical, operational, and other functional requirements, and general product information on major items of equipment.

5. If the Definitive Design is amended subsequent to the Definitive Design review, the Design Builder shall re-check and re-certify the Design as an additional Definitive Design review. The Design Builder will not be entitled to an increase in Contract price or a time extension for the re-check and recertification except when the amended Design results from a Change Order requested by Metro, subject to the Contract.

   Refer also to Design Variations and Exceptions specified in this Section.

E. Interim Design Reviews:
1. The Design Builder may choose to hold Interim Design Reviews for certain Design Units (and for component(s) or element(s) within a Design Unit) for a complex element of the Work, where more frequent and in-depth review and comment by Metro is deemed necessary or desirable by the Design Builder. The Design Builder shall schedule such interim reviews at a time when the Definitive Design review comments have been addressed and resolved prior to Readiness for Construction Reviews.

2. For systems Work, Interim Design reviews, also referred to as Preliminary or Typical System Submittals in the Technical Specifications, at a minimum shall consist of:
   a. For systems design, submit designs depicting typical arrangements, circuits, and details for general (non site-specific) application.
   b. For installation design, submit mounting and installation details, non-site specific, for components, hardware, and cabinets.
   c. For room layout design, submit layouts and details incorporating the requirements shown on the Design Drawings and the following additional requirements:
      1) Room dimensions
      2) Height, width and depth of equipment and equipment cabinets
      3) Raceway layouts
      4) Room and cabinet grounding layout
   d. Additional Interim, Preliminary, or Typical systems submittal requirements indicated in the Technical Specifications.

3. The Design Builder shall review the interim Design and submit the design for review and comment and approval by Metro.

4. The Design Builder and Metro shall use the Interim Design Review(s) to verify that the concepts and parameters established and represented by Definitive Design are being followed and that Contract requirements continue to be met.

5. The Design Builder shall specifically highlight, check, and bring to the attention of changes to information presented at Definitive Design Review.

F. Readiness for Construction Review:

1. The Design Builder shall present the information for Readiness for Construction review to Metro for review and comment and approval by Metro. The Design Builder shall schedule such interim Readiness for Construction reviews at a time when the Definitive Design review comments and Interim Review comments, as applicable, have been addressed and resolved prior to Ready for Construction Reviews.

2. The Design Builder and Metro shall use the Design review(s) of Readiness for Construction to verify that the concepts and parameters established and represented by Definitive Design are being followed and that Contract requirements continue to be met.

3. For systems Work, Readiness for Construction design reviews, also referred to as Final or as Site Specific System submittals in the Technical Specifications, at a minimum shall consist of:
a. For systems design, include further design development of the interim design (typical system design) for site and equipment specific application. This review shall be conducted only after approval of the applicable interim design (typical system design) submittals. Where applicable, Submittals in this stage may include the same Submittals as those made during the interim design (typical systems design) submittal but updated to incorporate site-specific information and details.

b. For installation design, Submittals shall consist of design depicting site-specific installation details. Equipment design Submittals shall have been approved for all applicable equipment prior to submittal of Readiness for Construction (site-specific) design for a particular location.

c. Additional systems Final, Site Specific, and installation submittal requirements indicated in the Technical Specifications.

4. The Design Builder shall specifically highlight, check, and bring to the attention of the changes to information presented at Interim Design (if applicable) and Definitive Design.

G. Final Design Review:

1. The Design Builder shall schedule and conduct a pre-submittal workshop for each final Design package when the Design Drawings and Specifications for a Design Unit are 100% complete.

2. The Design Builder shall submit the final Design for acceptance by Metro.

3. The Design Builder shall ensure that all Metro and Third Party comments from the Readiness for Construction review have been addressed to the satisfaction of Metro and shall specifically highlight, check, and bring to the attention of Metro any changes to information presented at previous Design reviews.

H. Shop Drawings and Record Drawings: Design Builders attention is directed to this Section for requirements pertaining to Shop Drawings and As-Built Drawings, respectively.

1.14 SCHEDULE FOR DESIGN CHECKS, REVIEWS, AND SUBMISSION OF CHECKED DESIGN

A. The Design Builder shall schedule and conduct Design reviews to meet the Design and construction needs of the Project Progress Schedule.

1. Design Builder shall allow 30 Days for Metro review and comment of each design submittal in the Project Progress Schedule. Said 30 Day review period shall include reviews by and comments from local municipalities.

2. The Design Builder shall coordinate third party utility design and correlated reviews directly with the reviewing entity in accordance with Section 01 31 31 – Utility Coordination. Design Builder shall reflect agreed upon review times and processes in the Project Progress Schedule. Documentation of the schedule coordination, and it's correlation to the Design Unit design reviews, shall be included in each Design Review submittal.
3. It is recognized and anticipated that the Design review process and frequency, duration, and intensity of Design reviews may vary with the complexity of the individual Design Units and the associated construction activities.

4. The duration of Design reviews shall be discussed between Metro and Design Builder during the Pre-Submittal workshop and verified and may be modified by mutual agreement during the course of the Project.

5. In the event the Pre-Submittal workshop requirement is waived by Metro for a planned design review, the Design Builder shall give written notice of scheduled Design reviews to Metro at least one week prior to submitting the design unit for review.

6. The design review schedule shall be divided into two groups, Facilities Design and Systems Design, and incorporated into the Submittal Schedule as specified in Section 01 33 00 – Submittal Procedures.

7. The Design Builder shall include the agreed Design review schedule for all Design Units (including their components and elements) as part of the Project Progress Schedule. The Design review schedule shall be reviewed monthly until Design Work is complete.

8. The Design Builder shall not schedule more than two concurrent Facilities Design reviews, nor two concurrent Systems Design Reviews, nor more than three Design Unit Reviews in total, without Metro's written concurrence.

B. Submissions for Design Review(s). The Design Builder shall submit checked Designs for specified Design Review submittals in accordance with Section 01 43 10 – Project Quality Program Requirements - Design/Build.

1. Submissions shall be complete for each Design Unit, but may be combined for multiple Design Units at any one time upon the Metro’s written concurrence.

2. The Design Builder shall submit each Design Unit for review and approval in accordance with the Project Progress Schedule.

3. Except for Record Drawings, design review "submissions" shall mean the Design Drawings, Specifications, reports and calculations and required documentation as specified in these Contract Documents including but not limited to environmental compliance documentation, Maintenance of Traffic and Access (MOTA) documentation, and utility design and schedule approvals, assembled in the format specified and in sufficient number of copies to accommodate those attending and participating in the Design review(s).

4. The Design Builder shall provide additional copies or portions of the submittal as requested by Metro for review by those not attending the design review meetings.

C. For each Design Unit designated by the Design Builder, the Design Builder shall include Design checks and Design reviews as defined in the approved Design Quality Plan and such additional reviews as may arise as indicated herein.

C. The Design Builder shall allow time for Metro's participation (including invited Stakeholders) and input to any Design review conducted by the Design Manager in accordance with the approved Design Work Plan. The Design Builder shall incorporate this schedule into the Design Builder's Project Progress Schedule and report progress.
and updates in the monthly updates.

D. The Design Builder shall keep Metro up to date on exact timing of reviews and Readiness for Construction Design reviews through the weekly progress meetings.

1.15 DESIGN CHANGES AND REVISIONS

A. The Design Builder shall deal with any changes to the Design initiated by the Design Builder and already checked by the Designer and certified by the Design Manager as an entirely new Design.

B. The Design Builder shall not be entitled to any increase in the Contract price or extension of time in such circumstances, except as permitted by the Contract.

C. Design changes may occur prior to or during construction or may occur after designs are released for construction, and may be initiated by the Design Builder or Metro.

D. For all Design changes requiring calculations, the Designer shall conduct a documented check of all calculations, with appropriate QC reviews per the approved Design Quality Plan.

D. All Design changes requiring alteration of Design documents released for construction shall undergo all review procedures included for original Design documents in the Design Builder's Quality Plan Project Design Quality Manual and Technical Specifications Section 01 43 10 Project Quality Program Requirements - Design/Build.

1.16 DESIGN CHECKS, CERTIFICATIONS, AND REVIEWS

A. The Designer's organization shall check all Design documents (drawings, plans, specifications, calculations, and reports) produced by the Design Builder's organization. The Design Builder's QC Manager shall certify that these documents have been checked in accordance with Contract requirements and the Design Builder's approved Design Quality Plan.

A. The Design Builder shall conduct and complete the Design checks, certifications, and reviews for each Design Unit in accordance with the approved Design Quality Plan Project Design Quality Manual. Metro will participate in the review and provide comments on the Design prior to the Design Builder releasing Designs for construction. Metro comments must be addressed and resolved to the satisfaction of Metro prior to releasing the Design(s) Approved for Construction.

B. Design Builder's Independent Design Checks:

1. The Design Builder shall carry out independent Design checks of permanent components, major temporary components, and effects of temporary components on the permanent components by senior engineers not involved in the production of the Design being reviewed who have equal or greater qualifications and experience as the Engineer of Record for the Design being checked.

2. Independent Design checks shall include, at a minimum, design assessment and analytical checks as specified herein.
3. Design Assessment:
   a. Design assessment shall be the review of general compliance with the requirements of the contract, taking into consideration the proposed method of construction, and shall, at a minimum, cover the following areas as applicable:

   1) Loads.
   2) Codes and standards
   3) Methods of analysis
   4) Computer software and its validation
   5) Interface requirements
   6) Maintenance requirements
   7) Materials and material properties
   8) Durability requirements
   9) Fatigue performance
   10) Hydrology, Hydraulics and drainage
   11) Design Flows

4. Analytical Check:
   a. The independent Design check shall include an independent analytical check using separate calculations (and without reference to the Designer's calculations) to establish the structural adequacy and integrity of critical project elements structural members and system components. This shall at a minimum include, but is not limited to, the following:

   1) The structural geometry and modeling
   2) Material properties
   3) Member properties
   4) Loading intensities
   5) Verifications of design flows, velocities, capacities

C. Design Reviews of Resubmittals:

   1. The Design Builder's time and cost impacts of revisions arising from the Metro's and third party participation in Design reviews of resubmittals necessitated by the Design Builder's non-compliance with Contract requirements shall be borne by the Design Builder, including the cost to Metro for review of the resubmittal.

D. Design Reviews Conducted by the Design Builder's Design Manager.

   1. The Design Builder shall notify and invite Metro and affected third parties to participate in all Design reviews conducted by the Design Manager. Metro may also invite third parties and affected utility owners to participate. Metro or its designee provides comments and issues Design Discrepancy-Correction Reports.

   2. For Design reviews conducted by the Design Manager the Design Builder's QC Manager shall provide a Design review report for each Design Unit at the conclusion
of each Design review. The Design review report will identify any actions arising from the review. The report shall note comments requiring corrective action. The Design Builder’s QC Manager shall send the design comments to the Designer and a copy to Metro or its designee.

2. The Design Builder shall conduct Design reviews in the offices of the Designer or Design Builder in the Project vicinity. The Responsible Engineer and any specialists with significant input to the Design or review shall be present. The Design Builder shall make available all drawings, copies of calculations, reports, or other items pertinent to the Design review.

E. As-Built Drawing and Specification Review:

1. As-Built Drawings and Specifications shall incorporate complete information that defines the Work as constructed to meet the Contract requirements.

2. The Design Builder shall submit As-Built Drawings and Specifications complete for each Design Unit to Metro or its designee for review and approval in accordance with this Section.

3. Metro review of the As-Built Drawing Package will be one of the processes to determine if the Project has been designed and constructed in accordance with Contract requirements and to see if As-Built Drawings and Specifications comply with Contract requirements.

4. The Design Builder shall make all corrections noted in the review of As-Built Drawings and Specifications and resubmit the corrected As-Built Drawings and Specifications to Metro or its designee for review and written approval.

5. As-Built Drawings and Specifications shall clearly identify changes from the accepted Final Design Plan.

F. Design Review of Major Temporary Components:

1. **Conduct design review of Major Temporary Works that represent complex structures and that potentially may affect safety, quality and durability of Permanent Works.**

   a. **Review includes effect of Major Temporary Works on Permanent Works, with Metro and Third Parties participating in review.**

   1.b. If design of Major Temporary Works is being produced by design organization, include design in Final Design Unit review package and it shall undergo formal review as part of Design Unit documents. The Design Manager shall conduct a Design review of major temporary components that represent complex structures elements and that potentially can affect the safety, quality, and durability of the permanent components and/or the public while the Temporary Components are "active".

2. **If Design Builder or construction sub-contractor produces Major Temporary Works design documents after Design Unit documents have been approved and distributed, then Major Temporary Works design documents must undergo separate formal review with Metro.**

   2.a. **Check, review and certify Major Temporary Works Documents**
in accordance with this Section prior to their being issued for construction. The review shall include the effect of the major temporary components on the permanent components.

3. Secure necessary permits, clearances, and closures from government agencies prior to construction. The Design Builder shall invite Metro to participate in the review. Metro or the Design Builder may invite affected stakeholders to participate in the review(s).

G. Readiness for Construction:

1. The Contractor may start construction of any element of the permanent components only after all the following items have occurred:

   a. The Design Manager and Design Quality Manager have certified the design unit per the requirements of 01 43 10, Project Quality Program Requirements Design/Build. The Designer has conducted its Design QC checks throughout the Design process in compliance with the Design Quality Plan and certifies in writing that the Design is complete to the appropriate level or stage of review, checked, and ready to be released for construction.

   b. TheDesign Manager has issued a written certification of the following:

      1) Design checks have been completed
      2) Work conforms to Contract requirements
      3) Any deviations or Design exceptions have been approved in writing by Metro
      4) Design QC activities are following the Design Builder's Design Quality Plan.

   b. The Responsible Engineer has signed all drawings prepared under his/her direction. For those drawings and documents included in the submittal that are prepared by a manufacturer, supplier, or other persons not under his/her direct supervision, the Responsible Engineer will affix a stamp that indicates the Design shown on the sheet or document conforms to the overall Design and Contract requirements;

   c. The Design Builder has verified the following:

      1) Design has undergone constructability review and is constructible as represented
      2) Shop Drawings and related documents for the portion of the Project to be constructed are complete and checked in accordance with this Specification
      2) The Design and drawings for Maintenance of Traffic and Access (MOTA) and stormwater BMP's and environmental measures applicable to the Work are complete
      3) Adequate stakes, lines, and monuments necessary to control the Work have been established on the site
      4) Metro or its designee provided review and approval regarding the Design and applicable MOTA and stormwater BMP's and environmental requirements.

   d. All outstanding issues and comments from Definitive, Interim, and Readiness for Construction Design reviews have been resolved and completed to Metro’s
satisfaction.

2. Metro or its designee’s review and approval will not constitute final approval or acceptance of the Design or subsequent construction.

3. The Contractor may proceed with construction on the Project at the Contractor’s risk to the extent Work is covered by relevant Design documents that have been processed as shown in Figure 1.16-1, herein. Prior to construction proceeding further, the Contractor shall complete the next stage of Design and Design review and submission.

H. All Design reviews shall include a comment and resolution process where unresolved comments are discussed and a written action plan and schedule for resolution of unresolved comments is developed. The Design Manager will lead the process.

1. Comment Resolution: Metro and stakeholder comments from Design reviews will be recorded and transmitted to the Design Builder. The Design Builder shall record its proposed disposition and response to each comment and meet with Metro to resolve outstanding comments and dispositions. Final disposition and resolution will be documented.

2. Metro will indicate its review of submittals for approval and the action taken (approval and non approval) by means of its review stamp. Refer to Section 01 33 00 – Submittal Procedures.

1.17 REQUESTS FOR DEVIATION

A. All requests for deviation from specified standards shall be submitted to Metro for review and approval using Metro’s Request for Deviation form. Requests for deviation from Standards for facilities owned and operated by entities other than Metro will be reviewed and approved by the appropriate facility owner or operator.

B. Requests for deviation shall be approved by Metro and the Facility owner/operator in writing before the affected Design Units will be released for construction.

1.18 DESIGN SUPPORT DURING CONSTRUCTION

A. Design Builder is responsible for ensuring technical integrity of design.

1. Responsibility includes review and approval of construction submittals.

A—2. Provide for responsible architect or engineer (Designer of Record) to review and approve construction submittals for technical adequacy prior to construction. The Design Manager shall verify during construction that the conditions actually encountered are consistent with the Design and related Design Drawings, Shop Drawings, and Specifications. The Designer shall prepare necessary adjustments in the Design Drawings, Shop Drawings, and Specifications, and the Design Builder shall obtain required Metro review and approval by Metro or its Designee.

B. Reviews:
1. The Design Manager shall verify any such changes are checked in accordance he approved Design Quality Plan.

2. The Design Manager shall certify the change in writing as meeting the Contract Technical requirements. The Design Builder shall retain copies of the Design Manager's written certifications and submit the certifications to Metro or its designee.

B. Provide verification by Design Builders DM during construction that conditions actually encountered are consistent with approved Design Drawings and Project Specifications. The Design Builder through its Designer shall incorporate the adjustments in the Record Drawings and Specifications.

1.19 SHOP DRAWINGS

A. The Design Builder shall check, review, and certify Shop Drawings in accordance with the Design Quality Plan Project Design Quality Manual prior to their being issued for construction.

1. Metro will notify the Design Builder of Shop Drawings that require it will review based on the approved Final Designs. The Design Builder shall notify Metro at least two weeks prior to the anticipated date when such Shop Drawings will be ready for review. Metro or the Design Builder may invite affected third parties to participate in reviews of Shop Drawings.

2. Within seven days of completion of a Shop Drawing review, the Design Builder shall submit copies of the final reviewed and approved Shop Drawings to Metro for record purposes.

B. Refer to Sections 01 33 00 – Submittal Procedures, for additional requirements for the Shop Drawing development and review.

Metro will inspect and perform QA program reviews based on the approved Design Drawings, independent of Shop Drawings. Adequate information for these reviews shall be shown on the final approved Design Drawings.

1.20 AS-BUILT RECORD DESIGN

A. The Design Builder shall submit the As-Built Final Record Drawings and Specifications for each Design Unit as a single integrated package incorporating all Design Units for review and approval by Metro, in accordance with Section 01 78 39 – As-Built Drawings and Current Status Documents. Design Builder shall keep As-Built Drawings up to date, and accessible for Metro review, at all times.

B. The Designer shall certify that the As-Built Drawings accurately reflect the field changes and are in conformance with the approved final design.

1.21 QUANTITY ESTIMATES

A. To facilitate determining sampling and testing requirements, the Design Builder shall
provide quantity estimates for the Work. The quantity estimates shall be in units that facilitate sampling and testing (i.e., the units shall be consistent with the units used to determine frequency of sampling and testing). For example, if "x" numbers of compaction tests are specified to be taken for every "y" cubic yards of embankment, the quantity estimate would need to be in cubic yards of embankment.

### 4.22 DESIGN DOCUMENTATION

**A. Progress Tracking:** The Contractor shall include Engineering and Design progress and changes in its project progress schedule (including Work on any Design change) in the monthly updates.

**B. The Design Builder shall prepare and maintain weekly records of Design activities using forms acceptable to Metro or its designee.**

**C. Final Design Report:** Upon completion of the final Design for each Design Unit, including all its components and elements, the Design Manager shall notify the Design Builder, with a copy to Metro or its designee, of any outstanding monitoring report issues or unresolved review comments.

### 1.22 DESIGN DRAWINGS, SHOP DRAWINGS, SPECIFICATIONS, AND DESIGN REVIEWS

**A.** During the design process, the Design Builder shall develop Specifications and Design Drawings based on the Contract documents that are applicable to the specific materials, products, equipment, procedures, and methods that the Contractor intends to use.

1. The Contract documents establish the minimum standards of quality and define requirements that the design and construction must satisfy.

2. All Specifications, Design Drawings and Shop Drawings shall be developed using English units of measurement in common use in the United States.

3. During the Design reviews the Design Drawings and Specifications will be evaluated by Metro, with support from project stakeholders, to determine if they meet the Contract requirements.

**B. Drawings:** The Work shall be performed in accordance with the details as shown on the Design Drawings prepared by the Designer and those Shop Drawings prepared by the Design Builder.

1. It shall be solely the Design Builder's responsibility to provide Shop Drawings of such a nature as to develop a finished product in accordance with Design Drawings, Specifications, and Contract requirements.

2. The Contractor shall verify pertinent dimensions in the field prior to conducting a Shop Drawing review the as-found field conditions prior to preparing the Design. Participation in the review of the Design Builder's Design Drawings and Shop Drawings by Metro or its designee (or third parties, if invited by Metro or the Design Builder) shall not relieve the Contractor of the responsibility for the satisfactory completion of the Work.

3. Shop Drawings shall be reviewed and approved in writing by the Designer before
beginning the construction work and shall not thereafter be amended or altered without prior written approval of the Designer and Metro or its designee’s review and approval.

4. All final Design Drawings shall be signed and stamped/sealed by the appropriate Responsible Engineer or Architect.

C. Design and Record Drawings Format and Organization. The Contractor shall organize and format Design and As-Built Drawings in accordance with Metro CADD drafting standards.

D. CADD Standards: CADD formatting for Design and As-Built Drawings shall conform to Metro Rail Design Criteria CADD Standards.

D. Specifications:

1. The Design Builder shall prepare Specifications based on Contract requirements in conformance with Metro Standard Specifications and Metro Contract Specification requirements. The Design Builder shall prepare specifications to cover all the work to be performed.

2. Specifications will be reviewed by the Design Builder and Metro during Design reviews to verify that the Specifications provide a level of quality that meets or exceeds the Contract requirements and are suitable and appropriate to control the Work.

3. Development of Specifications will not require a change order provided that they specify requirements that are of equal or greater quality than those presented in the Contract documents. The Design Builder shall be responsible for demonstrating that the Specifications meet or exceed the standard of quality established by the specifications in the Contract documents. Any deviation that results in lesser quality will require Metro approval and may require the execution of a change order. Metro shall determine, at its sole discretion, if the Specifications meet the Contract requirements.

4. Specifications shall define the type and frequency of material and job control QC sampling and testing to be conducted for the Work covered by a Specification.

1.23 DESIGN SUBMITTALS

A. Requirements: Construction Documents shall include Design Drawings, Specifications, design analyses and calculations, Design Calculation Reports, design reports, and other documents related to design, which are required for performing and completing the Contract requirements.

1. Design Drawing sets shall be bound in volumes unless excepted by Metro or its designee. Volumes shall consist of the following elements:

   a. Protective cover and backing sheets with the title of the volume printed on the cover sheet in two inch high letters.

   b. A device for binding the left hand edges of the drawings designed so that drawings may be easily added or removed.

   c. Design Drawings shall be submitted half size printed on bond paper. Each sheet
shall be labeled "half size."

2. Submittals' Packaging and Markings: Documents shall be in bound sets, indexed, numbered, and clearly marked to indicate date of issue and stage of development and revision level.

2. As specified in the Contract, participate in Metro's Collaboration System. The Design Builder may continue with the design work, pending receipt of submittals' review comments, at its own risk.

1.24 DESIGN CALCULATION REPORTS

A. Design calculations shall be submitted in the form of a report (Design Calculation Report) containing the design calculations along with the relevant criteria including codes, assumptions, input data, explanations and conclusions. Design calculation reports shall meet the following requirements regarding format and content.

1. Cover Page: The cover page shall contain, at a minimum, the Contract name and number, the report title, date, submittal number, the name of the department/subcontractor originating the report, and the name and signature of a registered professional engineer in the discipline relevant to the subject matter.

2. Formulas and Calculations: All formulas shall be furnished with a unique numerical identifier for the purpose of referencing.

3. In design calculations done by hand, all formulas shall be expressed first in symbolic notation, before substituting constants and variables with numerical values.

4. In design calculations done by a computer program, name and version of the program used, the formulas being used by the program and the calculation algorithm shall be provided.
   a. For finite element software the additional items must be provided: Renderings of the modeled structure.
   b. The renderings shall provide node numbers, member numbers, plate and element numbers as needed to visualize the modeled structure.
   c. Design input shall be provided listing member indices, basic load cases, load combinations, boundary constraints, internal connectivity/releases, material selections and assignments, and member orientations as needed for review and evaluation.
   d. Sufficient analysis output and post secondary element design shall be included to demonstrate that the analysis and design satisfy the contract requirements.

5. Constants and Coefficients: The values of empirical constants and coefficients shall be stated and justified. If a range of values is associated with a given coefficient, the Design Builder shall provide the rationale for using the selected value.

6. References to Manuals, Handbooks and Other Publications: Pertinent pages containing referenced paragraphs, formulas, graphs, tables, and similar data from books, manuals and other publications shall be copied and provided in an Appendix to the Design Calculation Report. References from codes such as the California Electrical Code (CEC) and the California Building Code (CBC) need not be included in the Appendix.
7. Descriptive Explanations. Design Builder shall furnish adequate explanations for all calculations included in the Design Calculation Report. At a minimum the following information shall be provided:
   a. Explain the design methodology being used and state its source.
   b. State the assumptions inherent in the methodology or implicit in the input data set. Explain how these assumptions relate to the Project, and what the implications are in terms of performance, reliability and safety for the Design Unit, system or device being designed.
   c. Identify any simplifications or short cuts in the calculation procedure, and assess their impact on the accuracy of the results.
   d. Explain the choice of numerical values for empirical coefficients and tolerances.
   e. State the criteria used for evaluation of the results. Explain how and why the results conform to the requirements in the Contract Documents.

4.26 THIRD PARTY REVIEWS AND APPROVALS

   A. Unless otherwise noted in the Contract Documents, Third Party reviews and approvals, for elements of work within their jurisdiction, will be coordinated by Metro. The Design Builder or Metro may invite the Third Parties to participate in design reviews, meetings, workshops, and other coordination activities. The Design Builder shall furnish Metro with materials as requested to help expedite and streamline the review and approval process of facilities requiring approvals by Third Parties.

PART 2 — PRODUCTS (Not Used)

PART 3 — EXECUTION (Not Used)

END OF SECTION 01 31 03
SECTION 01 31 19

PROJECT MEETINGS

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Attendance by Contractor, its Project Manager or Superintendent, Safety Engineer, Design Engineer and others as required, at meetings scheduled by Metro for collection and dissemination of information related to Contract.

1.02 RELATED SECTIONS

A. Section 01 35 23: Worksite Safety Requirements
B. Section 01 35 53: Worksite Security Requirements
C. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)

1.03 REFERENCES (Not Used)

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).

1.05 SUBMITTALS (Not Used)

1.06 DEFINITIONS

A. Safety and Security Contact: A short story or anecdote which highlights a safety or security issue or tip. The topic may be related to work, home, or other activities.

ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Contractor shall prepare minutes of each meeting and distribute them to each of the participants.
   2. Contractor shall notify Metro of proposed safety and security meetings. Metro will advise Contractor about Contract-related safety and security information, safety and security meetings and safety and security-related issues.

PART 2 – PRODUCTS (Not Used)
PART 3 – EXECUTION

3.01 GENERAL REQUIREMENTS

A. In compliance with Metro’s Safety 1st Program, all meetings held as part of the completion of the Work shall begin with a Safety and Security Contact. Safety and security issues shall then be the first item of substance discussed as part of each meeting’s agenda. Introductions of attendees and review/approval of the minutes of previous meetings may be conducted between the Safety and Security Contact and the discussion of safety and security issues.

3.02 DESIGN MEETINGS

A. Conduct weekly design progress meetings with Metro’s technical staff and third parties as required to assess performance of the Work.

3.03 PRE-DESIGN/PRE-CONSTRUCTION MEETINGS

B. A Pre-construction Meeting will be scheduled by Metro after receipt of required signed Contract Documents, before issuing Notice to Proceed. Purpose of the meeting is to introduce Metro’s Representatives for Project Management, Safety, Security and Quality Assurance to their counterparts in Contractor’s organization and to establish lines of communication between these representatives.

3.04 SPECIAL MEETINGS

A. Special Meetings between Metro and Contractor will be scheduled by Metro throughout course of construction as Metro deems necessary.

3.05 INITIAL DESIGN/CONSTRUCTION MEETING

A. Initial Construction Meeting will be scheduled by Metro not more than seven working days after the effective date of the Notice to Proceed.

B. Metro will distribute notice of meeting, along with agenda of subjects to be addressed.

C. Agenda Part 1 (Metro or its designee – presented items):
   1. Safety and Security Contact
   2. Review of safety and security issues, programs, goals and objectives.
   3. Review and discuss responsibilities and authorities of Metro, and its consultants.
   4. Review Equal Employment Opportunity (EEO) and affirmative action requirements along with Public Affairs functions.
   5. Review requirements of labor provisions stipulated by U.S. Department of Transportation (DOT).
6. Review and discuss laws, codes, traffic regulations, permit requirements of public agencies and their regulations.

7. Review Quality Assurance and Inspection issues, programs, goals and objectives.


9. Discuss monthly estimate cut-off dates and progress payments.

10. Discuss schedule and cost control.

11. Discuss partial and final payments.

12. Discuss Public Affairs procedures.

D. Contractor’s Project Manager/Superintendent, Lead Safety Representative, Quality Manager, EEO Office, Subcontractor Representatives, and Public Affairs representatives shall attend meeting.

E. Agenda Part 2 (Contractor-presented items):

1. Introduce Contractor’s representatives, and briefly describe each person’s responsibilities.

2. Introduce Contractor’s Safety and Security Program, goals and objectives.

3. Introduce Contractor’s Project Quality Control and Assurance Program, goals and objectives.

4. Distribute and discuss list of major Subcontractors, sequence of critical Work, and tentative schedule of construction.

5. Discuss submittals and required reports.

6. Discuss use of office, storage areas, construction areas and temporary easements.

7. Define housekeeping procedures.

8. Discuss construction methods.


10. Discuss coordination and notification for utility Work.

11. Discuss deliveries and priorities of major equipment.

12. Discuss breakdown of lump sum items.

13. Discuss Construction Progress Schedule.

3.06 INITIAL SAFETY, SECURITY, AND QUALITY ASSURANCE MEETING

A. Initial Safety, Security and Quality Assurance Meeting will be scheduled by Metro no later than seven working days after initial construction meeting.

B. Agenda:
1. Safety and Security Contact

2. Metro to discuss timely submittal of Contractor’s Worksite Safety and Security Requirements and Injury Prevention Plans required under Sections 01 35 23 – Worksite Safety Requirements, to be approved by Metro prior to the Contractor commencing Work upon Section 01 35 53 – Worksite Security Requirements, and introduce Metro’s construction safety staff.

3. Metro to discuss submittal of Contractor’s Security plan as required by Section 01 35 53 – Worksite Security Requirements.

4. Metro will review and discuss Quality Control, inspection, and coordination of Work with Metro’s system as a whole, and introduce Metro’s Quality Assurance/Quality Control (QA/QC) staff.

5. Contractor shall present plans for compliance with Safety and Quality Assurance requirements, including, but not limited to, job site safety and injury prevention, emergency response and medical aid plans, job site safety staff, job site security measures, and Quality Assurance Plans.

6. Metro will review and discuss Metro’s insurance requirements, incident reporting procedures and provide emergency contact list.

3.07 CONSTRUCTION PROGRESS MEETINGS

A. Construction Progress Meetings will be scheduled by Metro bi-weekly and more often as necessary for competent and timely execution of Contract.

B. Perform the following:

1. Distribute notices of meetings before such meeting, to Subcontractors engaged in construction, and those expected to be engaged in Work before next scheduled meeting, and to Metro.

2. Have designated personnel listed in Initial Construction Meeting attend.

C. Agenda

1. Safety and Security Contact

2. Introduce new attendees and areas of responsibility.

3. Review minutes of previous meetings, amend minutes if necessary, and approve minutes.


5. Quality issues.

6. Public affairs.

7. Third party coordination.

8. Analyze Work accomplished since previous meeting, coordination of Work with other Contracts, offsite fabrication problems, product delivery problems, submitted schedule slippages, problems arising from proposed changes, and other circumstances which might affect progress of Work.
9. Discuss sequence of Work on critical path, and schedule of construction using Progress Schedule.
10. Discuss observations, problems, quality, and employee work-related standards.
11. Discuss coordination of utility Work.
12. Discuss changed conditions, associated costs, time extensions and other relevant subjects as required.
13. Discuss corrective measures to maintain construction schedule when necessary.
14. Discuss upcoming scheduled Work.
15. Discuss three-week construction schedule.

D. Answer inquiries, requests for information or requests for solutions of problems presented during such meetings. When possible, during meeting; resolve those issues that are not answered during previous meetings. Document and deliver in person or by email to the person requesting information within 7 calendar days of close of the meeting. Record answers provided orally at meetings in the meeting minutes.

3.08 SPECIALIZED DESIGN AND CONSTRUCTION PERFORMANCE MEETINGS

A. Conduct weekly technical meetings with Metro’s technical staff to assess performance of the Work.

B. Contractor shall supply all data to Metro in advance of the technical meeting.

3.09 TOOL BOX MEETINGS

A. Conduct Tool Box meetings in compliance with Section 01 35 23 – Worksite Safety Requirements, and Metro approved Contractor’s job-specific Injury and Illness Prevention Program.

READINESS REVIEW MEETINGS

A. Participate in Readiness Review meetings in accordance with Project Quality Program Requirements (see 1.02 above).

END OF SECTION 01 31 19
PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Requirements for interface activities between the Contractor and jurisdictions not specifically addressed in other specification sections.

B. Interface activities extend from the Contractor's Notice to Proceed (NTP) through Final Acceptance of the Project.

C. Other jurisdictions shall include all jurisdictions not specifically addressed in other sections of Division 01. These jurisdictions shall include but are not limited to Caltrans, Local County Water District, California Public Utilities Commission (CPUC), and Local Public Utilities Commission, Local Cities, Counties, and other Municipalities.

D. The portions of the Work that will require interface with other jurisdictions include, but are not necessarily limited to, the following:

1. Obtaining and complying with each jurisdictions' standards, requirements, reviews, permits, unless noted differently in the Special Permitting Process as referenced in Section 01 71 43 Permits, Licenses and Agreements, for construction and related activities for Work within and adjacent to each jurisdictions right-of-way.

2. Inspections of portions of Work that are within each jurisdiction's right-of-way or easements and require compliance with codes and ordinances of each jurisdiction.

3. Requests for assistance from each jurisdiction's police department or jurisdictional department / agency for traffic signal modifications, street closures, site security requirements and similar activities required to protect the public and maintain the security of Worksite locations, Metro property at Worksite locations, and materials and equipment.

4. Clarifications of each jurisdiction's Standards that apply to the Work.

5. Participation in discussions with each jurisdiction at Project meetings to facilitate coordination of the jurisdiction's requirements, the Contractor's requests and the progress of the Work.

6. Obtain all other governmental approvals required for timely execution of Work.

1.02 RELATED SECTIONS

A. Section 01 31 03: Design Management Requirements

B. Section 01 31 19: Project Meetings

C. Section 01 31 31: Utility Coordination
D. Section 01 33 00: Submittal Procedures
E. Section 01 35 23: Worksite Safety Requirements
F. Section 01 35 53: Worksite Security Requirements
G. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)
H. Section 01 50 00: Temporary Facilities and Controls
I. Section 01 55 26: Controlling Traffic (Metro-Furnished TCP)
J. Section 01 55 27: Controlling Traffic (Contractor-Furnished TLR)
K. Section 01 55 28: Controlling Traffic
L. Section 01 74 00: Cleaning
M. Section 01 74 19: Waste Management and Disposal
N. Section 01 35 43: Environmental Procedures for Hazardous Materials
O. Section 01 35 91: Historic Treatment Procedures

1.03 REFERENCES (Not Used)

1.04 QUALITY ASSURANCE
A. Comply with Project Quality Program Requirements (see 1.02 above).

1.05 SUBMITTALS
A. Comply with Section 01 33 00 – Submittal Procedures, for submittal requirements and procedures.

1.06 DEFINITIONS (Not Used)

1.07 PROJECT REQUIREMENTS
A. The Contractor’s Work will be subject to inspection by the jurisdiction’s representative(s) for work under the authority’ geographical boundary of said jurisdiction. The Contractor shall keep Metro informed of any request or requirements by other jurisdictions.

B. For Traffic Control Plans required to perform the Work as specified herein, and Sections 01 50 00 – Temporary Facilities and Controls, 01 55 26 – Controlling Traffic (Metro-Furnished TCP), 01 55 27 – Controlling Traffic (Contractor-Furnished TLR), and 01 55 28 – Controlling Traffic.
C. For response requirements in case of citations, warnings or safety and security violations, refer to Technical Specifications Section 01 35 23 – Worksite Safety Requirements, and 01 35 53 – Worksite Security Requirements.

D. Excavation within Other Jurisdictions’ right-of-way shall be performed in accordance with each Jurisdiction’s regulations and governances, and conditions included in the applicable Permit.

E. For Requirements related to hours of work within and adjacent to Other Jurisdiction’s right-of-way, refer to Technical Specifications Section 01 11 00 – Summary of Work for allowable work hours within the controlling Municipality.

F. No Work is permitted on the following holidays or time frames:
   1. New Year's Day
   2. Memorial Day
   3. Independence Day
   4. Labor Day
   5. Thanksgiving
   6. Christmas Day
   7. Holiday Moratoriums (no lane closures or street work allowed between Thanksgiving and January 7th of each year unless waived by the local jurisdiction)

G. Unless approved by Metro or its designee, all Work shall adhere to the specifications and other jurisdiction’s permits and ordinances including but not limited to noise, vibration and dust control requirements.

H. Traffic Handling Design Drawings will be reviewed and approved by the local City, County, or both within which the Work is being performed. The Contractor is required to include the approved traffic handling drawings in the construction permit application process to the other jurisdictions covered by this specification.

I. The Contractor shall return all improvements, per local standards and codes, on or about Worksite and adjacent property which are not shown to be altered, removed or otherwise changed to conditions which existed prior to starting performance of Work under the Contract.

1.08 PROJECT REQUIREMENTS FOR CALTRANS

A. For interfaces with or Work impacting Caltrans Contracts, the Contractor is required to contact appropriate authority having jurisdiction.

B. For interfaces with or Work impacting Contract, Contractor is required to coordinate with all agencies, municipalities, and Caltrans.

1.09 PROJECT REQUIREMENTS FOR LOCAL WATER DISTRICTS
A. For excavations, soil borings, potholing, monitoring well installations/abandonments/demolitions, within local County, Contractor is required to contact appropriate local Water District.

1.10 PROJECT REQUIREMENTS FOR CITIES

A. For interfaces with or Work impacting City Contracts, the Contractor is required to contact appropriate authority having jurisdiction.

1.11 PROJECT REQUIREMENTS FOR COUNTY

A. For interfaces with or Work impacting County Contracts, the Contractor is required to contact appropriate authority having jurisdiction.

1.12 PROJECT REQUIREMENTS AS IT RELATES TO AGREEMENTS WITH THIRD PARTIES

A. Contractor shall comply with all conditions and requirements as set forth in each of the attached Agreements between Metro and that Third party as it relates to Contractors Work.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 01 31 30
PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Contractor's responsibilities as they relate to existing utilities, and the manner in which utilities are to be protected, supported in place, relocated, and coordinated into the Work.

B. Requirements for coordination between the Contractor and Work performed by Utility Owners.

C. Interface activities extend from the Contractor's final design activities through the completion of construction.

D. The portions of the Work that will require coordination with Utility Owners includes, but are not necessarily limited to, the following:
   1. Verifying that Utility Owners are in compliance with all agency permits prior to start of utility relocation work. The Contractor shall provide copies of all agency permits obtained by the Utility Owner to Metro.
   2. Traffic Control Plan (TCP) preparation, compliance with TCP provisions and submittal of requests for plan modification, requiring City approval during the course of the Work. Changes to the TCP indicated on the Design Drawings must be approved by Agency having jurisdiction.
   3. Inspections of portions of Work that are within the City right-of-way and require compliance with the codes and ordinances of local jurisdictions.
   4. Requests for assistance from local City Police Departments, or other local jurisdictions, where required by the Municipality, for street closures, site security requirements and similar activities required to protect the public and maintain the security of Worksite locations, and materials and equipment. Costs associated with this assistance shall be borne by the Contractor as incidental to the Work.
   5. Clarifications of the Utility Standards and City's Standards that apply to the Work.
   6. Facilitating discussions with the Utility Owners at Project meetings to coordinate City requirements, address Contractor's requests, and track the progress of the Work, to include oversight of construction as required by Metro. The Contractor shall be responsible for developing meeting minutes and tracking all correspondence and progress with Utility Owners and providing copies to Metro.
   7. Coordination with utility owners for new installations, relocations, temporary support and support and protection in place of their infrastructure.
   8. Coordination with utility owners for routine maintenance and emergency repairs.
1.02 RELATED SECTIONS

A. Section 01 31 19: Project Meetings
B. Section 01 33 00: Submittal Procedures
C. Section 01 35 23: Worksite Safety Requirements
D. Section 01 35 53: Worksite Security Requirements
E. Section 01 43 10: Project Quality Program Requirements - Design/Build or
   Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build
   (as applicable)
F. Section 01 55 26: Controlling Traffic (Metro-Furnished TCP)
G. Section 01 55 27: Controlling Traffic (Contractor-Furnished TLR)
H. Section 01 55 28: Controlling Traffic
I. Section 01 50 00: Temporary Facilities and Controls
J. Section 01 71 43: Permits, Licenses, and Agreements
K. Section 01 71 45: New Utility Services
L. Section 01 74 00: Cleaning
M. Section 01 74 19: Waste Management and Disposal
N. Section 01 35 43: Environmental Procedures for Hazardous Materials

1.03 REFERENCES (Not Used)

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).

1.05 SUBMITTALS

A. Refer to Section 01 33 00 – Submittal Procedures, for submittal requirements and
   procedures.

1.06 DEFINITIONS

A. Local Jurisdictions: Cities, County, State and all other governmental agencies having
   jurisdiction.

1.07 PROJECT REQUIREMENTS
A. The Contractor shall coordinate activities which include, but are not limited to the following:
   1. Safety, flagging, and roadway worker protection
   2. Construction and maintenance access
   3. Staking
   4. Alignment verification via field survey prior to backfill of all utility lines
   5. Obtaining record drawings from the Utility Owners
   6. Tracking schedule

B. Contractor shall coordinate all Work interfaces with other entities such as Contractors in the Project area. The exercise of the right reserved by Metro to permit other contractors and persons to do work in or about the Contract area does not in any way relieve the Contractor from liability for loss and damage to the Work due to or resulting from Contractor's operations.

C. The Contractor shall coordinate its design with the design of the Utility Owner to ensure full compatibility of design and constructability of the Project, including conforms, interfaces, traffic impacts, property access, and schedule adherence.

D. Metro will decide disputes regarding performance of Work, access to the site, cleaning up of the site, and priority of performance between various contractors working for Metro within the Contract area and in adjacent areas.

E. Contractor shall coordinate with the Utility Owners, within the Project area, that are performing Work in connection with the Project. Contractor shall permit free and clear access to Metro, Utility Owners, Private Owners, and staff of local jurisdictions for purposes of inspections, maintenance, relocations, and construction of new facilities.

F. The relocation of utility facilities will take place prior to or throughout the duration of this Contract as identified in the Contract Documents. The Contractor shall be responsible for the coordination of its activities with affected Utility Owners and Agencies.

G. The Contractor shall coordinate directly with the Utility Owner or Agency and shall furnish a copy to Metro of the information related to relocation of utilities as such information is updated. The Contractor shall notify Metro of all activities that may affect the requirements of the Utility or Agency Cooperative Agreements.

H. The Contractor may propose a utility design change for designs completed following the commencement of the Work by submitting a written proposal to Metro and the Utility Owner. The proposal shall contain the following:
   1. An explanation outlining the purpose of the proposed change to the Utility Design (Utility Design Change).
   2. An itemization of the specific relevant portion(s) of the Utility Owner's Design that will be changed if the proposal is approved;
   3. A Schedule Analysis showing anticipated redesign, reviews, and construction dates indicating the final approval date from Metro and the Utility Owner which must be
4. A reasonably detailed cost estimate, certified by the Contractor to be true and complete, comparing the estimated cost of performing the Work without the requested design change with the cost impact if it were approved.

5. The Utility Owner may grant or deny in its sole discretion any changes proposed by the Contractor.

I. The Utility Owner shall have no obligation to approve any Utility Design Change. The Contractor has the burden of satisfying Metro and the Utility Owner that the proposed change(s) to the Utility Design is (are) acceptable including:

1. Is equivalent in safety with the relevant original Utility Design.
2. Is recognized as good industry practice.
3. Will not cause any material increase in operating and life-cycle costs for Metro or the Utility Owner.
4. Is reasonably likely to achieve the estimated cost impact, including any savings.

J. If the Contractor's Utility Design Change proposal is approved by Metro and the Utility Owner, the Contractor shall be responsible, at its sole cost and expense, for implementing the approved Utility Design Change and ensuring that any affected Work is performed in compliance with the Contract Documents and Metro Master Agreement with the Utility Owner. The Contractor shall ensure that there is no impact to the Construction Schedule. If the Design Change proposal is not approved, Contractor shall be responsible to maintain Contract Milestones and Construction Schedule.

K. Refer to Section 01 71 45 – New Utility Services, for Contractor's responsibilities with respect to new utility services to the Project.

1.08 UTILITIES DESIGNED AND CONSTRUCTED BY CONTRACTOR

A. The Contractor is responsible for the design and construction of several utility relocations as outlined in the Contract Documents. The Contractor shall incorporate the Utility Owner's requirements into the Project.

B. The Contractor shall coordinate all his Work with the work performed by Utility Owners. The Work shall be in accordance with the provisions of Metro agreements with local Utility Owners and agencies provided in the Contract Documents.

1.09 UTILITIES DESIGNED/CONSTRUCTED BY UTILITY OWNER

A. The relocation of utility facilities by Utility Owners will take place prior to and throughout the duration of this Contract as identified in the Contract Documents. For utility work performed prior to the Work commencing, designs and as-builts shall be provided to the Contractor for their use.

B. The Contractor shall coordinate directly with the utility Owner and shall furnish copies to Metro of this information as such information is updated. The Contractor shall notify Metro of all activities, which may affect the requirements of the Utility Agreements or the
Contractor's Work.

C. The Contractor shall coordinate with Utility Owners performing construction within the Project area and will provide work windows for those relocated utilities that are integrated with Contractor's schedule.

D. The Contractor, for his means and methods, shall be responsible for the relocation of all other utilities not identified in the Contract Documents.

PART 2 — PRODUCTS (Not Used)

PART 3 — EXECUTION (Not Used)

END OF SECTION 01 31 31
SECTION 01 31 32

RAILROAD CROSSINGS FOR CONSTRUCTION ROADS

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Furnishing, installing, maintaining and removing railroad grade crossings for construction access roads.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures

B. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)

1.03 REFERENCES (Not Used)

1.04 QUALITY CONTROL

A. Comply with Project Quality Program Requirements (see 1.02 above) and the following.

B. Provide materials and construction and maintenance methods to satisfy the requirements of the involved railroad and California Public Utilities Commission (CPUC), adequate for the loading, density of traffic and weather conditions expected at grade crossings during the construction period.

1.05 SUBMITTALS

A. Refer to Section 01 33 00 – Submittal Procedures, for submittal requirements and procedures.

B. Working Drawings for installation of grade crossings at railroads, stamped with Railroad's approval and signature of Chief Engineer.

C. Letter of Permission for Construction of access road crossing existing Railroad from Railroad authorities.

D. Letter from Railroad accepting condition of property after removal of railroad grade crossing.

E. CPUC Decision on the proposed Construction Road Crossing existing Railroad.
F. Material Safety Data Sheets (MSDS): Manufacturer’s Material Safety Data Sheets for each type of material used in work.

1.06 DEFINITION (Not Used)

1.07 REGULATORY REQUIREMENTS

A. Requirements of Regulatory Agencies: Obtain permits required by governing authorities for temporary easements across property other than that of Metro; pay costs of such temporary easements.

PART 2 – PRODUCTS

2.01 MATERIALS

A. As required by Railroad.

PART 3 – EXECUTION

3.01 GRADE CROSSING DESIGN

A. Design grade crossings at railroad tracks in conformance with Railroad's engineering and construction requirements and applicable CPUC General Orders.

3.02 PERMISSION TO CONSTRUCT

A. Obtain Letter of Permission to Construct from Railroad's engineering or traffic department.

3.03 MATERIAL REMOVAL

A. After completion of construction, remove materials utilized for building railroad grade crossing without damaging railroad property.

3.04 LETTER OF ACCEPTANCE


END OF SECTION 01 31 32
PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Establishing grades, lines and levels, excepting primary control monuments and bench marks indicated on Survey Control Monumentation Drawings.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures

B. Section 01 43 10: Project Quality Program Requirements - Design/Build or
Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build
(as applicable)

1.03 REFERENCES (Not Used)

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).

B. All surveys performed for right of way, grading, alignments and profile grades shall be under supervision and direction of a Professional Land Surveyor licensed in the State of California.

1.05 SUBMITTALS

A. Refer to Sections 01 33 00 – Submittal Procedures, for submittal requirements and procedures.

1.06 DEFINITIONS (Not Used)

PART 2 – PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 CONSTRUCTION LINES AND GRADES

A. Metro has established horizontal and vertical primary control for Work.

1. If it becomes necessary to remove or disturb a primary control point, notify Metro or its designee before removing or disturbing control point.
2. If, in opinion of Metro or its designee, primary stakes, monuments, marks or points are carelessly or willfully disturbed by Contractor, cost to Metro or its designee of replacing such stakes, monuments, marks or points will be charged against Contractor and be deducted from payment for Work.

3. Additional compensation or extension of time will not be granted for suspending the Work to enable Metro to reestablish primary controls. The Contractor may install additional control points for his own purposes at no additional cost to Metro.

B. Proceed from controls established by Metro or its designee to make surveys and layouts as necessary to conform to requirements of Contract Documents.

1. Make surveys for proper performance of Work in accordance with applicable standards and procedures established by Federal Geodetic Control Committee’s Specifications to support classification, standards of accuracy, and general specifications of geodetic control surveys, dated July 1975 and revised June 1986.

2. Notify Metro or its designee of classification and standards selected to perform Work to assure uniformity of surveys between Contractor and Metro or its designee.
   a. As part of such surveys, furnish, establish and maintain in good order survey control points required for completion of Work, subject to acceptance of Metro or its designee as to their location, sufficiency and adequacy.
   b. Such acceptance by Metro or its designee shall not relieve Contractor of responsibility for accuracy of survey Work.

C. Furnish skilled labor under supervision of a registered Civil Engineer or Land Surveyor, licensed in California, including, but not limited to, instrument platforms, ladders, other temporary structures, special lights or groups of lights and electric power as necessary for making and maintaining points, lines and grades in connection with surveys performed by Metro or its designee.

D. Obtain acceptance of Metro or its designee on major survey control points set by Contractor before laying out building settlement reference points and cast-in-place concrete control.
   1. Minimum of 72 hours advance notice is required.

END OF SECTION 01 32 23
PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Stages of construction.

B. Quality and quantity of photographs.

C. Identification of photographs.

D. Video recordings.

E. Disputes, and potential claims.

1.02 RELATED SECTIONS

A. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)

1.03 REFERENCES (Not Used)

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).

B. Digital photographs shall be stored on a server that is backed up at least once a week. Digital photographs shall be in pdf, jpg or tif format and of sufficient size to provide reasonable clarity no less than 500kb per photograph.

1.05 SUBMITTALS (Not Used)

1.06 DEFINITIONS (Not Used)

1.07 CONSTRUCTION PHOTOGRAPHS

A. The Contractor shall take photographs at all construction milestones and at each of the following stages of construction:

1. Baseline photographs and video recordings should be taken within 60 days of NTP and prior to undertaking design. Photographs and video should be updated during design as conditions change;
2. Before commencement of clearing and demolition and upon completion of clearing and demolition;
3. Monthly during performance of the Work; and
4. Upon completion of the Work.
5. Anytime a problem arises that may result in a Notice of Potential Claim and the problem can be illustrated by photographs.

B. Furnish at least three different views or vantage points of each milestone and stage of construction. Furnish no less than 100 photographs each week until completion of the Work. Location of views shall be as approved by Metro or its designee.

C. Submit eight (8) aerial photographs showing the progress of Work on a quarterly basis.

D. Submit monthly a set of progress photos showing Construction progress. The number of photos shall adequately depict Construction activities of actual work that took place that month.

1.08 IDENTIFICATION OF PHOTOGRAPHS

A. The following information shall be typed on the back of each print furnished and for each digital photograph furnished in a manner approved by Metro or its designee.
1. Title of Contract and Contract Number;
2. Identification of subject shown;
3. Station point of camera and direction of view;
4. Time and date taken.

1.09 VIDEO RECORDINGS

A. The Contractor shall provide video recordings of all construction milestones and the following events:
1. Start of construction including clearing and demolition operations, as applicable;
2. Highlights of all formal inspections; and
3. Highlights of the final inspection and acceptance by the District.

B. Video recording shall be submitted on standard 120 mm digital video disk (DVD-R, 4.7 GB, Optical disk). Video shall be formatted for playback in a standard DVD player as may be conveniently purchased in the United States.

C. Video recordings shall include a complete, clearly spoken narration of the events being photographed. Also, video recordings shall include an unobtrusive time and date indicator on the film, accurately depicting the time and date when the photography was performed.
D. The DVD shall be labeled with the same identifying information specified above for photographs. In addition, the narration of each recording shall lead off with this same identifying information.

1.10 DISPUTES AND POTENTIAL CLAIMS

A. In the event a problem arises or dispute occurs which may result in a Notice of Potential Claim under Articles of the General Conditions and the problem or dispute can be illustrated by photographs and video recordings, the Contractor shall provide such photographs and video media.

1.11 STORAGE AND ACCESS

A. The Contractor shall be required to maintain the Construction photographs and video on a shared drive or website that is accessible to Metro or its designee.

B. Construction photographs shall be stored on one accessible location and kept current. Construction photographs shall be downloaded and placed on the server within 4 days.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 01 32 33
PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Requirements and procedures for submitting documents defined herein, for review and approval by Metro or its designee. Metro maintains right and responsibility to review submittals for quality control effectiveness, timeliness, certification, and compliance with Contract Documents and Metro Rail Design Criteria.

1.02 RELATED SECTIONS

A. Section 01 29 76: Cost/Schedule Integration System
B. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)
C. Section 01 78 23: Operating and Maintenance Data
D. Section 01 78 39: As-Built Drawings and Current Status Documents
E. Section 03 30 00: Cast-In-Place Concrete
F. Section 26 08 00: Test Support/Start-Up

1.03 REFERENCES

A. Metro Rail Design Criteria CADD Standards
B. American National Standards Institute (ANSI):
   1. ANSI Y14 Series - American Drafting Standards
C. Metro Rail Design Criteria – All 13 Sections

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).
B. Prepare Design Drawings, Shop Drawings, Working Drawings and record documents to high standards of quality as set forth in referenced standards specified in Article 1.03. Refer to section 01 78 39 - As-Built Drawings and Current Status Documents; for marking drawings for preparation of As-Builts and Project Record Documents.
1.05 SUBMITTALS

A. Design Documents: As defined in General Conditions Article Glossary of Terms. Include a narrative description of the file organization and a drawing list including file name, drawing number, and sheet number, if applicable.

B. Shop Drawings: As defined in General Conditions Article Glossary of Terms.

C. Working Documents: Contractor's plan for temporary equipment or structures such as decking, temporary bulkheads, support of excavation, support of utilities, ground water control, and forming and falsework; and for such other Work as may be required for construction but do not become an integral part of permanent Work.

1. Submit working drawings signed and stamped, and associated calculations as required by Specification Sections for temporary Work which will not become part of permanent structures included in this Contract.


3. Have Working Drawings prepared, stamped and signed by registered engineer of the involved discipline, currently licensed as a professional engineer in the State of California.

4. Verify field measurements and coordinate with pertinent Contract Drawings from other Contracts, where applicable.

5. Do not begin Work for which Working Drawings and associated calculations are required until drawings and calculations have been reviewed by Metro or its designee; Metro’s exceptions, if any, have been addressed, and submittals have been returned to Metro with the required Contractor's and Engineer of Record's approval stamps and signatures.

6. Distribute copies of Working Drawings and calculations after Metro or its designee’s review and, if required, its approval.

D. Engineering Calculations: Where required by these specifications, signed and stamped by the Engineer of Record, registered engineer licensed in the State of California for the involved discipline. Prepare calculations, required by specifications Sections on 8-1/2 inches by 11 inches sheets. When calculations accompany drawings in a submittal, the body of the calculations must contain cross-referencing to the individual drawing to which the page of the calculations pertain.

E. Permits, Third Party Inspection Reports, Third Party Sign-offs: Documentation that provides verification of third party permission to Work and approval of Work during Construction and at Project Completion.

F. Certifications and Documentation: As identified in the specifications, certificates or certified test results that demonstrate proof of compliance with Specifications for products, materials, equipment, systems, and qualifications of personnel, manufacturers, fabricators and installers. Documentation required by Contract Documents including miscellaneous items such as delivery tickets, batch tickets and bills of materials.
G. Test Procedures and Reports: Provide Test procedures for review and Approval by Metro or its designee before commencement of testing.
   1. Provide test reports in approved format for review by Metro or its designee or Third Party.
   2. Refer to Specification Section 26 08 00 - Test Support/Start-Up, and those individual Sections relating to specific mechanical and electrical equipment for further testing requirements.

H. Manufacturer/Product Data: Standard schematics and drawings, stamped calculations and product data, and manufacturer's literature, catalog cuts, and Material Safety Data Sheets (MSDS), for each type of material used in Work.
   1. Modify manufacturers' standard schematic drawings to delete information which is not applicable to the Contract. Supplement standard information with additional information applicable to this Contract.
   2. Modify manufacturers' standard catalog cuts, brochures, diagrams, schedules, performance charts, illustrations, calculations, and other descriptive data to delete information that is not applicable to the Contract. Failure to comply with this requirement will result in rejection of the submittal. Indicate dimensions, clearances, performance characteristics, capacities, wiring and piping diagrams, controls, and other information as required.
   3. Modify manufacturer's printed installation, erection, application and placing instructions to delete information that is not applicable to the Contract.
   4. Include appropriate information as required herein.
   5. Submit Certificates of Compliance for those products called out in the Contract Documents not later than 30 days before products are installed. Have copy of certificate accompany the product for which the certificate is prepared. Include on the certificate:
      a. Affirmation that the product complies with respective requirements indicated.
      b. Submittal date, Contractor's name and address, Contract Title and Number, product represented and its location in the Contract, producer's name, product trade name and catalog number, place of product origin, test date, testing organization's name and address, and quantity of the product furnished.
   6. Signature of an officer or other authorized representative of the manufacturer or producer.

I. Permanent Materials Data, Mock-ups, and Samples:
   1. Submit samples of sizes and quantities to clearly illustrate full color range and functional characteristics of products and materials, including attachment devices. Indicate country of origin.
   2. Erect field samples and mock-ups at the Worksite as specified in these specifications, submitting substitutions, at locations acceptable to Metro or its designee.
   3. Include appropriate information and have product data accompany samples.
4. Right is reserved to require submission of samples or site mock-ups of any material whether or not such material has been previously approved for use elsewhere on the Project.

J. Operation and Maintenance Manuals: Operations and maintenance manuals for equipment and systems as specified in Section 01 78 23 - Operation and Maintenance Data.

K. The Contractor shall submit and obtain approvals from the appropriate departments of the City and County of Los Angeles and all other third parties.

L. Construction Schedule: Refer to Section 01 29 76 - Cost/Schedule Integration System for submittal requirements.

1.06 DEFINITIONS – (Not Used)

1.07 SUBSTITUTIONS

A. Substitutions consists of preparing, submitting, amending and updating lists of products or methods of construction which the Contractor proposes to furnish and install instead of those indicated.

B. Propose substitutions in accordance with provisions indicated and include documentation on methods of construction, materials, products and supplies which are proposed for substitution instead of items shown or methods indicated or implied in the Contract Documents.

C. Equipment, material or products proposed as alternates or proposed due to commercial unavailability of a listed product, material or item of equipment, will not be considered as a substitution.

D. Substitutions indicated, or implied, on Shop Drawings or product data submittal will not be considered unless a request for substitution has been submitted in conformance with this Section.

E. The list of materials, products and supplies, and the list of methods of construction for substitution of those indicated will be considered only if those requests have been submitted. Approval of substitute items or methods will be only for characteristics and the use named in the approval. This approval will not be interpreted as a modification of Contract Documents, nor to establish approval of products and methods for other portions of Metro's System. Approval of a substitution does not relieve the Contractor of responsibility of fulfilling requirements of the Contract Documents. Metro or its designee will judge quality and suitability of substitute items or methods and its decision is final. If use of substitute products or methods involves redesign of other parts of the Work, perform redesign and submit for approval by Metro or its designee. Bear the cost and time of redesign and include the direct cost of evaluating substitutions by Metro or its designee.

F. Include the following information with documentation for materials, products and supplies:
1. Complete data substantiating compliance of proposed substitution with requirements of the Contract Documents.

2. Identification of materials, products or supplies, including manufacturer's name, address, catalog name and number.

3. Installation characteristics, installation drawings and manufacturer's literature, including product description, performance and test data, and reference standards if pertinent.

4. Name and address of projects on which the product was used under similar circumstances, and date of installation.

5. Itemized comparison of proposed substitution with the item specified. Include in a tabular form differences in materials, size, finish, estimated life, estimated maintenance, availability of spare parts and repair services, energy consumption, performance capacity, salvageability and manufacturer's warranties.


7. Accurate cost data for the proposed substitution in comparison with the product specified.

8. Equitable adjustment and credit which the Contractor proposes to offer Metro.

9. When applicable or requested by Metro or its designee, provide off-the-shelf samples of the specified item and the proposed substitution.

G. Certify the following when making a request for substitution:

   1. Personally investigate the proposed item and determined it to be equivalent, or superior, to that indicated; and update information as new or different data becomes known to him.

   2. Furnish the same warranty for substitution as for the product specified.

   3. Coordinate installation of the accepted substitution into the Work, and make those changes, subject to acceptance by Metro or its designee, required for the Work to be complete in all respects.

   4. Waive claims for additional cost and time related to the substitution.

   5. Provide complete cost data, including related costs and time, except the costs of Metro or its designee's for redesign or review of the Contractor's design.

   6. Provide log detailing efforts to obtain specified products before efforts to obtain proposed substitution.

H. Include the following information in documentation for construction methods:

   1. Detailed description of proposed methods.

   2. Working Drawings illustrating the methods.

I. Itemized comparison of proposed substitute methods with methods shown, with product implied or specified. Include differences in estimated time for execution, labor, materials; revisions to construction process; and cost.
1.08 CHANGES

A. Proposed by Contractor to items listed in approved submittals will not be permitted unless those changes have been submitted and accepted in writing, by Metro or its designee.

PART 2 - PRODUCTS

2.01 MASTER LIST OF SUBMITTALS

A. Identify submittals, including Contractor Drawings as required and determine date on which each submittal is required in conformance with schedules specified in Section 01 29 76 - Cost/Schedule Integration System.

1. Within 30 days after effective date of Notice To Proceed, furnish a master list of submittals required by Specifications and Contract Drawings, with corresponding submittal dates which match milestones listed in detailed contract schedule from Section 01 29 76 - Cost/Schedule Integration System. Allow for not less than 30 day cycles for review of each submittal by Metro or its designee. Note the individual Specification Sections may indicate longer lead for Metro review before Work may begin.

2. Furnish List of Deliverables in electronic formats as described in Article 2.02.

3. Do not start Work on items until required submittals are reviewed and Approved.

2.02 SUBMITTAL FORMAT AND INSTRUCTIONS

A. Submit project data electronically in following formats:

1. Drawing files in Adobe PDF (searchable, non-scanned wherever possible) 11x17 page format.

2. E-mail, letters, spreadsheets, and charts in Microsoft Office format (. Outlook, word, Excel, PowerPoint) and Adobe PDF (searchable, non-scanned wherever possible).

3. Other documents, pictures, graphs, and like items, in Adobe PDF (searchable, non-scanned wherever possible) format (tif or jpeg as an alternative).

B. Los Angeles County Metropolitan Transportation Authority (Metro) has deployed Program Management Information System (PMIS) to facilitate project tracking, administration and management reporting.

1. System utilized latest version of Oracle Primavera software that has been configured to support project reporting requirements of Metro.

   a. Manage project administration, document control, cost and change management using Oracle Primavera Contract Management.

   b. Manage project scheduling using Oracle Primavera P6 scheduling format.

   c. In some instances, project collaboration, document submittals and schedule updates may be done through Oracle Primavera ePPM (P6 web) or Metro specific custom data entry system.
2. Prepare and manage project documents, including but not limited to, Requests for Information (RFIs) Requests for Change (RFCs), submittals, change proposals, and other required deliverables in document being printed in searchable (non-scanned wherever possible) Adobe PDF format.

3. Submit documents to Metro using Contract Management Interface (CMI) via web (address to be provided)

4. Input RFIs and RFCs directly into CMI.

5. Contractor will be provided with instructions and training for submitting documents through CMI.

6. Contractor will be issued a log in name and password by Metro for access to CMI.

C. Drawings: Show following information:
   1. Title block.
   2. Drawing title, date and revision dates, scale, and consecutive drawing number.
   3. Contract title and number.
   4. Drawing number using codes in attached.
   5. Contract drawings cross-referenced to Shop Drawings and vice versa.

D. Design Drawings:
   1. Create drawings in accordance with Metro CADD Standards.
   2. Drawing size 22” x 34”, unless otherwise approved by Metro.
   3. Title block including title of drawing and engineering contractor and sub-contractor logo and or identification, firm address, phone and fax numbers.
   4. Drawing title, date and revision dates, scale and consecutive drawing numbers.
   5. Contract title and number.
   6. Project number.
   7. Drawing number using codes in attached Appendix A.
   8. Professional Engineer Seal, expiration date, and signature of a registered engineer, currently licensed in the State of California for the involved discipline.
   9. Design drawing requirements for City or County and Third Party jurisdiction shall comply with their standards and requirements.

E. Submittals:
   1. Names of Contractor, subcontractors, suppliers, manufacturers and, when applicable, the Professional Engineer Seal, expiration date, and signature of a registered engineer, currently licensed in the State of California for the involved discipline.
   2. Identification of product by description, model number, style number, serial number or lot number, and finish numbers.
   3. Subject identification by section of Specification and paragraph number.
4. Relation to adjacent structures or materials.
5. Field dimensions, clearly identified as such.
6. Applicable standards, such as ASTM or Federal Specification numbers.
8. Contractor's stamp, signed and dated, certifying:
   a. Submittal complies with Contract requirements.
   b. Verification of field measurements.
   c. Verification of subcontractors Work for accuracy.
   d. Compatibility of the Work shown thereon with affected trades and other Contracts.
9. Submittals to Third Parties shall comply with their standards and requirements.

F. Action Block: Include blank space, five inches, in lower right corner, just above title block, in which Metro or its designee may indicate action taken. Shop Drawings without this space will be returned, without review for compliance.

G. Make submittals, including subsequent submittals, sufficiently in advance so review may be made by Metro or its designee at least 30 calendar days before commencement of related Work.

H. Unless specified otherwise, transmit submittals at least 30 calendar days before commencement of related Work. If For Record Only Submittals are transmitted less than 30 calendar days before commencement of related Work, obtain Metro or appropriate Third Party having jurisdiction approval prior to commencement of Work. For Review and Approval Submittals, do not start Work until required submittals are approved by Metro or appropriate Third Party having jurisdiction.

I. Allow 30 calendar days for review of each submittal by Metro or its designee, City or Third Party for scope of Work within Third Party’s jurisdiction.

J. Ship submittals prepaid, by overnight express delivery or hand carry to Metro.

K. Accompany submittals with a Submittal Transmittal Form containing the following information:
   1. Contractor's name, address, telephone number and for home office or field office.
   2. Submittal number based on section of Specification and Article number.
   3. Contract title and number.
   4. Supplier's, manufacturer's or subcontractor's name, address and telephone number.
   5. Subject identification.
   6. Identification of deviations from Contract documents, if any, for which the Contractor seeks approval.
   7. Copy of subcontractor's or supplier's transmittal to Contractor.
8. List of all city agencies or Third Parties receiving copies.

L. Provide sufficient data with subsequent submittals initiated by the Contractor for consideration of corrective procedures for review. Make subsequent submittals in the same manner as initial submittals.

M. Illegible, incomplete, or partial submittals will be returned to the Contractor without review.

N. Substitution or Deviations: Clearly indicate on both the transmittal letter/cover sheet and the affected document (including all affected pages and drawings) "SUBSTITUTION" or "DEVIATION" in 1/2-inch minimum size diagonal letters.

2.03 QUANTITIES

A. The number of items submitted shall be at least:
   1. Documents: Six for documents larger than 11 x 17 inches, unless otherwise specified.
   2. Others: One copy each, unless otherwise specified.

PART 3 - EXECUTION

3.01 CONTRACTOR'S REVIEW

A. Review submittals, stamp and sign as reviewed and approved, before submission to Metro or its designee. Failure to comply with this requirement will result in immediate return of submittal without review.

3.02 METRO'S REVIEW

A. Submittals will be reviewed for conformance to requirements of Contract Documents.
   1. Review of separate item will not constitute review of assembly in which the item functions.
   2. Review will not relieve Contractor from his responsibility for accuracy of submittals, conformity of submittals to requirements indicated, compatibility of described product with contiguous products and rest of system, or for prosecution and completion of Contract in accordance with Contract Documents.

B. Review stamp will be affixed, action block will be marked, and stamp will be signed, name printed and dated. Stamp lettering to have 1/8-inch minimum size printing.

C. Action block stamp marks have following meanings:
   1. The mark "APPROVED": Is an approval, and it means every illustration and description appears conform to respective requirements of Contract Documents. Fabrication, assembly, manufacture, installation, application and erection of the illustrated and described product may proceed; submittal need not be resubmitted.
2. The mark “APPROVED AS NOTED; NO RESUBMITTAL REQUIRED”: Is an approval, and it means every illustration and description appears to conform to respective requirements of Contract Documents upon incorporation of reviewer's corrections.

a. If Contractor accepts corrections then fabrication, assembly, manufacture, installation, application and erection of illustrated and described product may proceed. Submittals so marked need not be resubmitted. Show reviewers' corrections on As-Built Drawings in accordance with Section 01 78 39 – As-Built Drawings and Current Status Documents.

b. If Contractor challenges validity of reviewer's exception, no Work on this issue will be allowed until there is a written resolution to the challenge. Show the reviewer's corrections on AS-Built Drawings in accordance with Section 01 78 39 - As-Built Drawings and Current Status Documents, once disagreements are resolved.

3. The mark “REJECTED, REVISE AND RESUBMIT”; Is rejection, and it means submittal is deficient to the degree that a reviewer cannot correct submittal with reasonable degree of effort, has not made thorough review of submittal, and the submittal needs revision and is to be corrected and resubmitted, within 30 calendar days for review.

4. The mark “RECORD ONLY”: Means submittal was not reviewed for approval and was received for information only.

D. One marked up electronic copy of submittal will be returned to Contractor within 30 calendar days after submittals have been received.

3.03 CONTRACTOR'S RESPONSIBILITIES

A. Coordinate each submittal with requirements of Work. Place particular emphasis upon ensuring each submittal of one trade is compatible with other submittals of that trade and submittals of other trades.

B. Approval by Metro or its designee of submitted Drawings and associated calculations does not relieve Contractor from responsibility for errors or omissions in Drawings and associated calculations, or from deviations from the Contract Documents, unless such deviations were specifically called to attention of Metro or its designee in Letter of Transmittal submitted with Drawings. The Contractor is responsible for correctness, accuracy and completeness of drawings, for shop fits and field connections, dimensions and quantities and for results obtained by use of such drawings.

C. Distribution of Submittals after Review: Distribute prints of approved submittals, bearing Metro or its designee's stamp and signature, to concerned subcontractors, suppliers and fabricators; and to concerned members of Contractor's Workforce.

D. Contractor's liability to Metro, in case of deviations in submittals from requirements of Contract Documents, is not relieved by Metro or its designee's review and Approval of submittals containing deviations, unless Metro expressly approves deviations by issuing Change Notice.
E. Do not start Work for which submittals are required until submittals bearing stamp of Metro or its designee, and signatures indicating review and approval, have been received.

F. Before making submittals, ensure products are available in quantities required by the Contract.

G. Verify field measurements, catalog numbers and similar data.

H. Resubmittals: Make any corrections required by Metro and resubmit for Approval. Direct specific attention in writing, on resubmitted drawings/documents to revisions other than the corrections by Metro on previous submittal. In addition, all changes from previously submitted documents shall be clearly highlighted to indicate the changes.

I. Coordinate with Cities and Third Parties having jurisdiction.

J. Design and construct Work within City and Third Party jurisdictions complying with their standards, requirements, and specifications.

### 3.04 SUBSTITUTIONS

A. Substitutions indicated, or implied, on Shop Drawings or product data submittal will not be considered unless request for substitution has been submitted in conformance with this Section.

B. List of materials, products and supplies, and list of methods of construction for substitution of those indicated will be considered only if those requests have been submitted. The following requirements must be noted for substitutions:

1. Approval of substitute items or methods will be only for characteristics and use named in the approval.
2. This approval will not be interpreted as modification of Contract Specifications or Contract Drawings, nor to establish approval of products and methods for other portions of the Work.
3. Approval of a substitution does not relieve Contractor of responsibility of fulfilling requirements of Contract Documents.
4. Metro or its designee will judge quality and suitability of substitute items or methods and its decision is final.
5. If use of substitute products or methods involves redesign of other parts of Work, perform redesign and submit for approval by Metro or its designee.
6. Bear cost of redesign and include direct cost of evaluating substitutions by Metro or its designee.

C. Include the following information with documentation for materials, products and supplies:

1. Complete data substantiating compliance of proposed substitution with requirements of Contract Documents.
2. Identification of materials, products or supplies, including manufacturer's name, address, catalog name and number.

3. Installation characteristics, installation drawings and manufacturer's literature, including product description, performance and test data, and reference standards if pertinent.

4. Name and address of projects on which product was used under similar circumstances, and date of installation.

5. Itemized comparison of proposed substitution with item specified. Include in tabular form differences in materials, size, finish, estimated life, estimated maintenance, availability of spare parts and repair services, energy consumption, performance capacity, salvage ability and manufacturer's warranties.


7. Accurate cost data for proposed substitution in comparison with the product specified.

8. Equitable adjustment and credit which the Contractor proposes to offer Metro.

9. When applicable or requested by Metro or its designee, provide off-the-shelf samples of specified item and proposed substitution.

D. Certify the following when making request for substitution:

1. The Contractor has personally investigated the proposed item and determined it to be equivalent, or superior, to that indicated and updated the information as new or different data becomes known to Contractor.

2. Furnish same warranty for substitution as for product specified.

3. Coordinate installation of the approved substitution into Work, and make those changes, subject to approval by Metro or its designee, required for Work to be complete in all respects.

4. Waive claims for additional costs related to substitution.

5. Provide complete cost data, including related costs, except costs of Metro or its designee's redesign or review of Contractor's design.

6. Provide log detailing efforts to obtain specified products before efforts to obtain proposed substitution.

E. Include following information in documentation for construction methods:

3. Detailed description of proposed methods.


5. Itemized comparison of proposed substitute methods with methods shown, with product implied or specified. Include differences in estimated time for execution, labor, materials, revisions to construction process, and cost.

END OF SECTION 01 33 00
APPENDIX A – DRAWING CODES: Use Drawing Codes indicated in the following Tabulation for development of Drawings.

<table>
<thead>
<tr>
<th>DISCIPLINE</th>
<th>CONTRACT DRAWING</th>
<th>STANDARD DRAWING</th>
<th>DIRECTIVE DRAWING</th>
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PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Metro Rail Operations Instructions for Track Allocation/Work Permit Process.

1.02 RELATED SECTIONS

A. Section 01 35 23: Worksite Safety Requirements
B. Section 01 35 53: Worksite Security Requirements

1.03 REFERENCES

A. Code of Federal Regulations, Title 29, Chapter XVII, Parts 1910 and 1926 (FED/OSHA);
B. Title 8 California Code of Regulations (CAL/OSHA);
C. Title 26 California Code of Regulations (CAL/EPA);

1.04 QUALITY ASSURANCE (Not Used)

1.05 SUBMITTALS (Not Used)

1.06 DEFINITIONS

A. Metro Operating System: Facilities, equipment and installations that are essential for normal revenue operation, including the Metro trackway and equipment therein, traction power facilities, train control rooms, communications equipment, ventilation equipment, and other equipment and elements of infrastructure essential for normal revenue operation.

B. Revenue Hours: Hours during which passenger carrying trains operate as defined by the current schedule and which may be modified by Operations Control Center (OCC).

1.07 WORK ON EXISTING RIGHT OF WAY

A. In addition to any other requirements of the Contract Documents, construction of this Project will be coordinated with revenue service operations of the LA Metro’s Rail Transit System (Metro Rail Operations Control Department). Metro Rail Operations operating conditions are in effect and rail vehicles will be in revenue service daily from approximately 3:30 a.m. continuous until approximately 1:30 a.m. the next day, seven
days a week. Contractor shall obtain and become familiar with the current "Daily Metro Rail Operations Schedule" and any revisions issued during the term of this Contract.

B. Contractor will cause all Work to be performed with regard to time, place and manner so that Metro Rail Operations scheduled revenue service is not disrupted unless expressly provided otherwise herein. All work performed by Contractor or its subcontractors of any tier in the vicinity of the existing track and facilities shall be in accordance with Metro Rail Operations Instructions for Track Allocation/Work Permit Process as outlined in Attachment A to this specification.

C. It is Contractor's responsibility to apply for and secure the Track Allocation/Work Permit for each and every shift of Limited or Full Access construction, as defined below. If Contractor fails to comply with this requirement, and/or if Contractor or its subcontractors of any tier violate the terms of the Track Allocation Permit, Metro will issue a Stop Work Order to Contractor. The Stop Work Order will be in effect until such time as a Track Permit is secured and/or the violation is corrected. Any delays or costs associated with this requirement shall be borne by Contractor. The Contractor will provide all safety measures and personnel required by Metro. This includes adhering to all wayside protection rules and requirements.

D. During hours of revenue service, Contractor and/or its subcontractors of any tier will be allowed Limited Access to any track area with Metro Rail Operations revenue service operations through the Project site. Limited Access construction is defined as work more than 10-feet from centerline of the operating track, or any work that includes equipment within 10-feet of the Overhead Contact System or Third Rail. Limited Access construction shall be coordinated daily with Metro Rail Operations through the Track Permit procedure. Contractor shall comply with National and State regulations and Metro Rules and Procedures at all times. Contractor personnel are forbidden to use cell phones within 10 feet of any active track. Violation may result in immediate and permanent removal of violating personnel from the Project.

E. During the hours when Metro Rail Operations is not in operation, approximately 1:30 a.m. to 3:30 a.m. daily, Contractor and/or its subcontractors of any tier may be permitted access to the existing track and facilities in the construction area, depending upon availability of resources and the needs of other work, such as train testing and maintenance. Any Work performed on the existing track structure and facilities during Non-Revenue hours will be restored by Contractor to complete operating conditions prior to the resumption of scheduled revenue service. Work shall be coordinated each and every time with Metro Rail Operations through the Track Allocation Permit procedures.

F. Contractor and its subcontractors, regardless of tier, shall not perform any Work that will require an unscheduled disruption of service at any time. All Work shall be performed with sufficient labor, materials, and standby equipment to ensure that unscheduled service disruptions do not occur.

1.08 SAFETY REQUIREMENTS

A. Comply with Code of Federal Regulations, Title 29, Chapter XVII, Parts 1910 and 1926 (FED/OSHA); Title 8 California Code of Regulations (CAL/OSHA); Title 26 California Code of Regulations (CAL/EPA); and any additional Project site rules Metro imposes
pertaining to safety, health, fire and environmental protection identified within the Project Safety Plan; trade association safety standards; and equipment and materials instructions including material safety data sheet, if any. In the event standards conflict, the standard providing the highest degree of protection will prevail.

B. Metro Safety training will be required for all Contractor personnel associated with the construction of any segment that requires Track Allocation/Work Permits. Contractor is solely responsible for compliance with all Federal Railroad Administration training requirements. Contractor shall take special precautions necessary to provide safe conditions for persons working in proximity to Metro’s rail operations.

1.09 COOPERATION WITH METRO RAIL OPERATIONS

A. Metro Rail Operations staff will communicate directly with Contractor if conditions deemed to be an emergency exist. Under emergency conditions, life or property is in immediate danger of loss. Should an emergency condition occur, Contractor shall follow the directions of Metro Rail Operations staff without hesitation.

B. The application for issuance of Track Allocation/Work Permits where necessary to safe-out electrical equipment or overhead catenary, shall be coordinated directly between Contractor and Metro Rail Operations Control staff. Contractor shall maintain the Track Allocation/Work Permit documentation at the work site. Failure to produce the required documentation when requested will result in the cessation of Work until the documentation is produced. No exceptions will be allowed, and the time for completion will not be extended if Work is stopped for the foregoing reason.

C. Failure to complete the work within the allocated timeframe and hand the tracks back to Metro for safe revenue service is a serious violation of this Contract. Metro shall assign liquidated damages of up to $3,000 per hour to be compensated by the Contractor for bus-bridging service.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 35 14
### Track Allocation Request

**ALL TRACK REQUESTS DUE BY CLOSE OF BUSINESS MONDAY**  
**OFFICE FAX:** (323) 563-5068

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**Notes:**
- Requests must be submitted by close of business on Monday for the upcoming week.
- Contact details for office and mobile phone are provided for communication.
- Power down status can be indicated as YES or NO.
- Crew size is indicated as a number.
TRACK ALLOCATION / WORK PERMIT PROCESS

All work on or in close proximity to Metro Rail Property must receive prior approval from the Rail Operations Control Department of Metro. This Track Allocation / Work Permit process must be complied with to ensure the safety of outside contractors, Metro employees, and Metro customers. Metro Rail Operations Control Work Permits will be issued for approved work. Failure to meet all the requirements listed below will delay the approval of requested work.

SUBMITTAL

- Track allocation request forms must be submitted no later than the Monday (5:00 PM) PRIOR to the week (Sunday through Saturday) of requested/projected work start date.
- Single Tracking requests must be submitted 2 weeks in advance and Mr. Brandon Farley must be included in the notification. Mr. Farley can be reached at 213 922-6319 or email at FARLEYB@metro.net.
- Requests may be submitted up to one month in advance of requested/projected start date.
- Request forms must be filled out completely and provide necessary information: Start/end time of work, dates of requested work, detailed description of work / testing, description of all types of equipment to be used.
- Work requests affecting ADA compliance, ambient noise and/or requiring single tracking must be submitted a minimum of two (2) weeks prior to requested start date for scheduling purposes and public notification.
- Track allocation requests must be submitted for each week of work until completion of work or project.
- Submit Track Allocation Request forms to Jose Serrano via Fax or E-mail:
  - E-mail: serranoj@metro.net OR
  - Fax: 323 563-5068
- Submitting a Track Allocation request does not guarantee that approval for work will be authorized.
• It is imperative to know that last minute Track Allocation requests (if not submitted in advance as required by this process) may not be approved depending on the urgency of the work, availability of manpower to support the work, and how it may impact service.

• When requesting power down, it’s important to document (in your request form) the appropriate substation(s), breakers, sectionalization, switches etc., that will affect the area where you are proposing to perform your work. This must be done during the Track Allocation Meeting, in order to determine if the request can be granted. This will eliminate any last minute requests through Control at the actual time work is to begin.

• Work being conducted on or about Metro rail lines (mainline tracks, yard tracks, storage tracks, or any Metro tracks under construction) without proper notification will be subject to work being stopped immediately with all personnel and equipment cleared of the right of way.

**SUPPORT**

• Requests for support with trains and train operators will be the responsibility of the individual submitting the request. Confirmation will be **required upon submittal of your request**.

• For train operator or vehicle support, or RTOS for flag support, contact the appropriate individual as listed below:

  Red Line Transportation Manager: 213.922.3220  
  Red Line Fleet Services Manager: 213.922.3304  
  Blue Line Transportation Manager: 310.816.5530  
  Blue Line Fleet Services Manager: 310.816.5504  
  Green Line Transportation Manager: 310.643.3849  
  Green Line Fleet Services Manager: 310.643.3804  
  Gold Line Transportation Manager: 323.224.4001  
  Gold Line Fleet Services Manager: 323.224.4032

• Requests requiring public notification must be directed to Community Relations representatives with a minimum of two (2) weeks notice as listed below:

  Wilbur Babb; Community Relations Mgr. (213) 922-4955  
  (213) 305-8800 cell phone

• Requests for support from other Metro departments will be addressed at the Track Allocation Meeting: Track, Traction Power, Signals, Rail Communications, Facilities Maintenance, SCADA, and Field Supervisors.
MEETING ATTENDANCE

- A representative for the person/agency/department requesting Track Allocation shall attend the Track Allocation meeting on the Wednesday prior to the work start date. Track Allocation is only granted on a weekly basis. Representative must attend Allocation Meeting and submit a Track Allocation Form (Must be received by Metro Track Allocation no later than Monday 5:00 P.M.) each week until project is finished.

- **Meetings are held on a weekly basis.** Meeting location and times:

  - **Red Line /Gold Track Allocation Meeting:** 08:00 a.m.
  - **Blue/Green Line Track Allocation Meeting:** 08:30 a.m.

Rail Operations Control
2000 E. Imperial Highway
Instruction Room, Second Floor
Los Angeles, 90059

- All Track Allocation Requests will be discussed at the Track Allocation Meeting. The Track Allocation Coordinator will grant or decline the request based upon information received, support required and availability of personnel, impact to service and other work requests.

SAFETY TRAINING / ID BADGE

- All members of the work crew will be required to attend Metro safety training.

- Safety training is only conducted in English. Ability to understand and speak English is required for Safety certification. No translation or interpreters may be used.

- Two Rail Safety classes are available weekly and a picture ID is required. Prior reservation is required and the class registration information is as follows:

  - **Tuesday, 07:00 am – 10:00 am**
    - Division 11-Blue Line Yard
    - 4350 E. 208th St, Transportation Training Room
    - Long Beach, CA 90810
    - Contact – Willard Johnson 310-816-5597; johnsonw@metro.net

  - **Wednesday, 07:00 am – 10:00 am**
    - Division 20-Red Line Yard
    - 320 S. Santa Fe Ave, Room 224
    - Los Angeles, CA 90013
    - Contact – Linda Leone 213-922-3224; leonel@metro.net

- Safety ID badges will be issued upon successful completion of the safety training.

- Crew members will be required to wear Metro Safety Badges at all times while performing work on or near Metro property.
WORK PERMIT

• Metro Work Permits will be issued for approved work.

• To obtain Metro Work Permits, contact the appropriate Rail Controllers a minimum of two hours prior to scheduled start time of work.

  Blue Line Control: 323 563-5015  
  Green Line Control: 323 563-5298  
  Red Line Control: 323 563-5290  
  Gold Line Control: 323 563-5055  
  Expo Line Control: 323 563-5095

• Sign work permit and fax back to Controller: 323 563-5241

• Each member of the crew must have a signed copy of the permit in his or her possession at all times.

• Upon arrival at approved work location, the work crew leader must contact the appropriate Controller to activate the Work Permit.

• Work crew leader must notify the appropriate Controller each time crews move to a different work location if multiple work locations are noted on work permit.

• The Rail Controller will authorize work crew to begin work after all safety requirements are satisfied.

• Work permits must be activated at the beginning of each day and de-activated at the end of each day's work.

• Assure that all personnel and equipment (including flagging equipment) are clear of the mainline prior to contacting Control to cancel your work permit.

ADDITIONAL INFORMATION

EMERGENCIES

Emergencies occurring after Track Allocation may necessitate the revoking of approved work. Urgent repairs, maintenance, or abnormal operations are some conditions, which may require modification to approved work.

Incidents occurring while work is in progress could also necessitate the immediate removal of a work crew from a work area.

All work crews are expected to immediately comply with Control’s instructions. Request for an explanation of removal may be addressed to the ROC Manager or Track Allocation Coordinator.
RULES AND PROCEDURES

- All work shall be performed in accordance with Metro Light and Heavy Rail Operations Rules and Procedures.

- Restrictions and protective equipment will be required per applicable rules.

- Violation of Rail Operations Rules or Procedures may result in the cancellation of a Work Permit.

- Personnel must be in proper position (facing oncoming train) and location when providing hand signals to approaching trains. When flagging the use of proper equipment (yellow flag, green flag, red flag, and flashlight) is essential in providing information to train operators. Flaggers, Lookouts and Work Crew Coordinators must not be assigned any other duty and cannot engage in or assist with any work.

RESTRICTIONS

- Power down may be required when working within 10-feet of Overhead Catenary System (Blue/Green/Gold Line). Power down and grounding of the Contact Rail (Red Line) is required when working at track level. Remote power down may be required for work being done in close proximity to the Overhead Catenary System or Contact Rail.

- Wayside Worker Protection is the protection provided to employees or contractors to enhance their safety while working on or about the Metro Rail Lines in accordance with the Metro Rail Operating Rules. This protection includes both “On Track Protection” – a method of protecting personnel on the right of way (ROW) that affects train movement, and “Safety Watch” – a method of protecting personnel on the ROW that does not affect train movement. On Track Protection and Safety Watch requirements are determined by the applicable Rail Rule Book and SOPs.

- Work crew leader must assure that proper flagging protection for Flag Protected Slow Zones or Flag Protected Work Zones are in place (if required) prior to activating your work permit to begin work. This must be assured through proper communications with Metro personnel (Track Inspector, Field Supervisor, Traction Power or Signal Personnel) supporting your work. Proper placement of flags and the appropriate protection is required for the intended work to be performed.

- Wayside System personnel (track, signal, traction power etc.) will be provided Wayside Worker Protection with limits or blocks when performing inspections, and it will be your responsibility to contact Control once you arrive at the end of your limits in order to establish a new work limit/block. You are not allowed to begin your work until all trains (Code 1) have been contacted. You will be responsible for providing protection for yourself against all train movement when working on or about Metro
rail lines.
CONTACTS

Rail Operations Control Manager:

John Johnson  323.563.5010
Fax:  323.563.5068
Email:  johnsonjo@metro.net

Track Allocation Coordinator:

Jose R. Serrano:  323.563.5024
Fax:  323.563.5068
E-mail:  serranoj@metro.net

Rail Operations Control  24 hours, 7 days

Assistant Manager-Control  323.563.5022
Blue Line Control  323.563.5015
Green Line Control  323.563.5298
Red Line Control  323.563.5290
Gold Line Control  323 563-5055
EXPO Line Control  323 563-5095
SECTION 01 35 23

WORKSITE SAFETY REQUIREMENTS

(This specification is designed for any Metro Construction Project. There are several portions of this specification where one of three parallel paragraphs will be chosen based on the Project Scope of Work. In addition, most all contracts will require the Construction Safety and Security Manual (Version 4). Any editing of this baseline to conform to a particular Project Scope must be completed and approved by the Director, Construction Safety.)

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Minimum requirements for Contractor’s Construction Safety Program. Requirements in this section are NOT stand alone and shall be taken in conjunction with the requirements of the Metro Construction Safety and Health Manual, Revision 4. Requirements include but are not limited submittals, personnel, equipment, behaviors and work site conditions.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures
B. Section 01 35 53  Worksite Security Requirements
C. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)
D. Section 01 55 26  Controlling Traffic (MTA Furnished TCP)
E. Section 01 55 27  Controlling Traffic (Contractor Furnished TCP)
F. Section 01 55 28  Controlling Traffic
G. Section 07 13 19: Hydrocarbon-Resistant Membrane for Cast-in-Place Concrete
H. Construction Safety and Security Manual, Revision 4

1.03 REFERENCES

A. American National Standards Institute/International Safety Equipment Association (ANSI/ISEA):
   1. ANSI/ISEA 107 - High-Visibility Safety Apparel and Hardwear
B. City of Los Angeles:
C. County of Los Angeles Department of Health Services:
   1. Emergency Medical Services Agency, EMT Information

D. State of California, Division of Occupational Safety and Health (Cal/OSHA):
   1. California Code of Regulations (CCR) Title 8 – Industrial Relations et seq.

E. California Code of Regulations (CCR); Title 24:
   1. Part 3 - California Electrical Code (CEC)
   2. Part 9 - California Fire Code (CFC)

F. U.S. Department of Labor, Occupational Safety and Health Administration (OSHA):
   1. Code of Federal Regulations (CFR) Title 29, Part 1910 (Occupational Safety and Health Standards) et seq.,

G. National Fire Protection Association (NFPA):
   1. NFPA 70 - National Electrical Code (NEC)

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).

B. Contractor shall comply with the requirements of this Section, as interpreted by Metro.
   1. Strict compliance with the requirements of this section as well as the applicable regulations, as determined by Metro Director, Construction Safety, shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by the Contractor nor shall it be relied upon to form the basis of any claim.
   2. Compliance with determinations by Metro shall not relieve the Contractor from other obligations imposed by law or regulation nor serve as the basis of request for change to increase the cost of the Work.

C. Compliance with the requirements of this section is subject to both announced and un-announced review.
   1. Issues found to be non-compliant shall be addressed by the Contractor on a schedule agreed to by Metro and the Contractor.

1.05 SUBMITTALS

A. Refer to Sections 01 33 00 – Submittal Procedures, for submittal requirements and procedures.

B. Submittals and re-submittals, when required, shall be considered within the original scope of this Contract and shall be submitted in accordance with Metro accepted submittal schedule so as to not delay the performance of Work by the Contractor.
C. The refusal of Metro or its designee to issue permission to perform Work upon the Worksite, either prior to Work beginning or during the Contractor's performance of the Work, due to the Contractor's failure to submit listed safety submittals, or due to Metro rejection of unacceptable submittals, shall not constitute a basis for any claim of delay, interference, disruption or other similar types of claims.

D. Approved submittals shall be revised and resubmitted as changes in conditions warrant or upon request of Metro.

E. Upon receiving notice of award of this Contract, the Contractor shall prepare and submit for review the submittals listed as 1, 2, 3 and 4 below and shall not receive permission to perform Work upon the Worksite for this Contract or any Work order there under, until Metro or its designee has returned the submittals as “Accepted”.

F. Items listed in paragraphs 5 to 15 below shall be submitted by the Contractor for review and acceptance by Metro or its designee upon request or as indicated during the pre-construction meeting.

G. For each item listed below, general information, minimum requirements and guidance to assist in the preparation of each submittal is found in the Construction Safety and Security Manual (CSSM), Section 8 – REQUIREMENTS AND GUIDELINES FOR SUBMITTALS. The corresponding sections of the CSSM are also indicated below.

2. Staffing Plan: Submit work shifts, after hours coverage and other details for the staffing of positions required by this specification. (CSSM 8.3.A.2)
3. Job Hazard Analyses (JHA) Master List for each construction operation or activity. (CSSM 8.3.A.3)
4. Qualifications and certifications of individuals who will serve as Qualified or Competent Persons. (CSSM 8.3.A.4)
5. Fall Protection Program: Include details of procedures, equipment and training. (CSSM 8.3.A.5)
6. Hazardous Waste Operations and Emergency Response (Hazwoper) Health and Safety Plan (HASP). Prior to performing any work which involves the removal, disturbance or other activity related to Hazardous Waste Operations, submit the work specific Health and Safety Plan (HASP) as well as training documentation for affected workers. (CSSM 8.3.A.6)
7. Excavation Action Plan - for any excavation activities for which a protective system is required by CCR, Title 8 – Section 1541.1(a). (CSSM 8.3.A.7)
8. Provide annual and four year certifications for any cranes operated on the Worksite by the Contractor and or subcontractors of any tier. (CSSM 8.3.A.8)
9. Critical Lift Plans: Before making a Critical Lift, a Critical Lift Plan shall be prepared and submitted by the crane operator, lift supervisor, rigger or other qualified person and Approved by Metro. (CSSM 8.3.A.9)
10. Qualified riggers and signalers - Submit a list of qualified riggers and signalers to Metro for review and acceptance. The submittal shall include a description of each candidate’s experience and qualifications. (CSSM 8.3.A.10)

11. Energy Isolation Program (Lock Out, Tag Out): Include details of procedures, equipment and training. (CSSM 8.3.A.11)

12. Written Compressed Air Safety Program for employees working in compressed air environment. (CSSM 8.3.A.12)

13. Tunnel Construction Track Maintenance Plan in compliance with CCR Title 8, Tunnel Safety Orders. (CSSM 8.3.A.13)


15. Injury and Incident Reports: The Contractor shall report to Metro immediately upon becoming aware of an incident or injury, illness involving an employee of the project (including Metro or third party staff) or a member of the public. (CSSM 8.3.A.15)
   a. By the 10th calendar day of each month of the contract, the Contractor shall submit for review and record injury and work hour statistics on the form provided by Metro.

16. Materials Hazards Communication Program – Submit a plan for the coordination and exchange of Material Safety Data Sheets (MSDS) for products used as part of this work. (CSSM 8.3.A.16)

1.06 DEFINITIONS

A. Terms defined in this section are defined at the time of first use.

1. Refer also to the list of definitions in the Construction Safety and Security Manual which is part of this Contract.

1.07 ADMINISTRATIVE REQUIREMENTS

A. The Contractor shall establish, implement and maintain an effective Injury and Illness Prevention Program in accordance with California Code of Regulations (CCR), Title 8, Section 3203.
   1. The Contractor is solely responsible for keeping its records and seeing that its subcontractors records are updated and accurate.

B. The Contractor shall comply with CCR, Title 8, as well as all other federal, state, and local regulations, statutes and codes applicable to its operations.
   1. Strict compliance with all applicable regulations as determined by Metro or its designee shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by Contractor, nor shall it be relied upon to form the basis of any claim.
   2. Compliance with determinations by Metro or its designee shall not relieve the Contractor from other obligations imposed by law or regulation nor serve as the basis of request for change to increase the cost of the Work.
C. The Contractor shall comply with requirements of this Section.
   1. Compliance with all parts of this Section shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by the Contractor nor shall it be relied upon to form the basis of any claim.

D. Comply with both CCR, Title 8, and the Code of Federal Regulations (CFR) Title 29.
   1. Where the State and Federal regulations have differing requirements, the Contractor shall comply with that which is more stringent as determined by Metro or its designee.
   2. The Contractor shall have full responsibility for maintaining conditions which are free from recognized hazards that are likely to cause physical harm to its employees.

   1. Compliance with the Construction Safety and Security Manual shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by the Contractor nor shall it be relied upon to form the basis of any claim.

F. Air Quality Testing: Perform air quality testing by qualified individuals.
   1. Maintain a record of the date, time and location of tests and levels of contaminants and signature of tester.
   2. Make all records, including printouts, and independent testing laboratory analyses of jobsite samples, available for review by Metro or its designee upon request.

G. Conform to Los Angeles City Fire Department (LAFD) Fire Code or the requirements of the authority having jurisdiction for the establishment of a fire watch in areas where welding operations and flame cutting are performed.
   1. In areas of the Work regulated by CCR, Title 8, Tunnel Safety Orders, conform to those requirements for Work which produces heat or sparks.
   2. Continuous air monitoring at the site of the heat or spark producing by a Cal/OSHA Certified Underground Gas Tester is required and shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by the Contractor nor shall it be relied upon to form the basis of any claim.

H. Comply with the requirements of CCR, Title 8, Section 5192 – Hazardous Waste Operations and Emergency Response, with respect to the handling of hazardous or contaminated wastes and mandated specialty training and health screening.

I. The Earth Pressure Balance tunneling machine (EPB) or Tunnel Boring Machine (TBM) shall be constructed and operated per the Manufacturers’ specifications.
   1. Any deviation, modification regarding these specifications shall be approved in writing by the Manufacturer and Metro prior to use.

J. Comply with CCR, Title 8, Division 1, Chapter 4, Subchapter 3 - Compressed Air Safety Orders.
1. Contractor compliance with the requirements of CCR, Title 8 – Compressed Air Safety Orders shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by the Contractor nor shall it be relied upon to form the basis of any claim.

1.08 WORKSITE CONDITIONS

[(Note to specifier: this paragraph may be marked "Not Used" if the scope of work precludes any Work in the vicinity of an Metro operating rail system)]

A. Underground Classification:

1. The underground soil conditions for the Work under this Contract have been classified by Cal/OSHA, Mining and Tunneling Unit as (complete as received).

2. Contractor compliance with the requirements of CCR, Title 8 – Tunnel Safety Orders as related to Underground Work classified Potentially Gassy shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by the Contractor nor shall it be relied upon to form the basis of any claim.

[(Note to specifier: The following paragraph may be marked "Not Used" if the scope of work precludes any Work in the vicinity of a Metro’s existing operating rail transit system)]

B. Operating Rail Systems:

1. Portions of the Work are in the vicinity of Metro’s existing operating rail transit system.
   a. Contractor’s employees who will encounter operating trains and/or conduct Work near traction power systems energized to 750 volts DC shall attend safety training classes conducted by Metro.
   b. Conform to a Work Permit Program for clearance to Work on or adjacent to active tracks and to provide for the de-energization of the traction power contact system.

2. Safety training classes will be held by Metro at a date and location to be announced at the pre-construction meeting.
   a. Contractor personnel without safety training will not be permitted onto portions of the Worksite adjacent to the operating system.
   b. Trained personnel will be issued an identification badge indicating that they have successfully completed training.
   c. This badge shall be worn at all times when on the Worksite.
   d. Contractor personnel found on the Worksite without a valid safety identification badge shall be expelled from the Worksite and may be subject to prosecution for trespassing.

3. Details of the Work Permit and Track Allocation procedures will be discussed at the pre-construction meeting.

4. Contractor’s personnel operating hi-rail vehicles or other on-track equipment over Metro’s rail lines shall attend the class on hi-rail equipment operation, safety and Metro’s Book of Rules and Procedures.
a. Personnel operating hi-rail vehicles shall attend refresher or update training as designated by Metro.

C. Metro has developed a Hazard Communication Program which contains a list of Material Safety Data Sheets (MSDS) for hazardous substances known to be present at each operational location.

1. Contractor shall confirm with local management the location of the site specific Hazard Communication Program, MSDS inventory and individual MSDS.

2. Contractor shall maintain a current list of all hazardous substances that will be used in Worksite operations.

3. Unless the Contractor provides, in writing, an alternate method to be used to provide Metro employees access to Material Safety Data Sheets, copies of all Material Safety Data Sheets for substances appearing on the hazardous substance list shall be readily available at the Worksite.

D. Contractor’s employees shall comply with all posted traffic safety regulations while operating motor vehicles upon Metro properties.

1. Employees walking or working in areas subject to vehicular or construction equipment traffic shall wear retro-reflective safety vests that comply with the version of the (ANSI/ISEA) Standard 107 in force on the date of Notice To Proceed.

PART 2 – PRODUCTS

2.01 CONSTRUCTION EQUIPMENT AND TOOLS

A. Select and operate construction and personal protective equipment and tools in conformance with requirements of this Section and in accordance with the manufacturer’s specifications for the equipment or tools’ intended use.

B. Equipment: Equipment, tools and or other items used to complete the Work shall be inspected by the Contractor to insure compliance with applicable regulatory standards.

1. Equipment, tools and or other items are subject to periodic inspection by Metro.

2. The Contractor shall promptly remove equipment rejected by Metro as not conforming to the requirements of this Section.

3. This removal shall be considered within the original scope of this Contract and the Work shall be completed in such a manner so as to not delay the schedule for performance of Work by Contractor nor shall the removal serve as the basis of request for change to increase the cost of the Work or be relied upon to form the basis of any claim.

C. Metro has established a program by which equipment, tools and other items used to complete the Work shall be removed from service when it has been determined that the equipment, tools and other items present a potential for unintended injury when used as directed by the manufacturer.

1. A tag with a prominent red and black message including the word "DANGER" may be utilized by Metro.
a. This tag shall be known as a "Red Tag."

b. The tag will be signed by Metro staff person, dated and note the specific reasons for the rejection.

2. Any equipment, tool and or other item so tagged shall not be used to complete the Work until the condition noted on the tag has been corrected and the tag has been removed by the person who affixed the tag or their designee.

3. Any person who ignores, removes, damages or otherwise tampers with a Metro Red Tag shall be immediately removed from the Work by the Contractor and shall not return to the project without the written permission of the Construction Safety Manager or an authorized designee.

4. Additional information regarding this program is found in the Construction Safety and Security Manual, Section 5.

D. Special Safety Equipment: Where necessary for conformance with requirements of this Section, the Contractor shall provide special safety equipment and persons qualified to operate special safety equipment to ensure the safety of the Worksite.

1. Such special safety equipment may include but is not limited to air quality measuring and monitoring equipment, noise measuring and monitoring equipment and other measuring devices related to industrial hygiene.

2. Compliance shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by the Contractor nor shall be relied upon to form the basis of a claim for delay.

3. Equipment shall be used in accordance with the respective manufacturer’s design, directions, and intended use.

E. Electrical installations for construction activities shall conform to NFPA 70 (NEC) and or the California Electric Code (CEC), whichever is more stringent, in force on the date of Notice To Proceed for electrical installations.

1. Underground electrical installations in areas classified by the State of California, Division of Occupational Safety and Health, Mining and Tunneling Unit, shall comply with the requirements of CCR, Title 8 – Tunnel Safety Orders and be acceptable to Metro and the Cal/OSHA, Mining and Tunneling Unit.

F. Electrical equipment and tools to be used on the Worksite, shall be listed by at least one of the following USA testing facilities:

1. Underwriters Laboratories, Inc. FM Global, or Electrical Testing Laboratories (ETL). Any electrical tool or equipment which is not listed by at least one of the above testing facilities shall be removed from the Worksite.

G. The Earth Pressure Balance (EPB) or Tunnel Boring Machine (TBM) shop drawings shall list all electrical equipment, raceways, components, intrinsically safety systems, and like items, and identify the specific model number being used and the testing facility’s approval numbers.

H. Equipment mounted on, attached to or associated with the operation of the EPB or TBM, such as, but not limited to, ventilation, fire suppression, piping, lighting, and like items, shall comply with applicable provisions of CCR Title 8 - Tunnel Safety Orders.
1. The acceptable protection techniques (explosion protection) for electrical and electronic equipment in hazardous (classified) locations shall be an explosion-proof and intrinsically safe system.

2.02 SAFETY EQUIPMENT

A. Personal protective and other safety equipment placed into use at the Worksite shall conform to requirements of this Section and shall include markings to show appropriate ANSI approval codes or other indications of approved usage. Equipment shall not be altered in any way without written approval by the respective manufacturer.

B. Persons entering the Worksite shall, at minimum, wear at all times the following personal protective equipment which complies with the applicable ANSI/ISEA standard in force on the date of Notice To Proceed:
   1. Hardhat, eye protection, and minimum 6 inch heavy leather work boots.
   2. ANSI/ISEA accepted 6 inch heavy leather protective footwear shall be worn by personnel exposed to foot hazards or working below grade (steel toed recreational shoes are not permitted). ANSI/ISEA accepted rubber work boots are an acceptable substitution.

[Note to Specifier: The following paragraph may be modified if the scope of Work precludes any below ground or enclosed work areas.]

C. All persons who will be entering below ground areas shall be equipped with a permissible rated hand or cap light and retro-reflective vest that comply with ANSI 107 in force on the date of Notice To Proceed. All persons who will be entering areas which lack required natural lighting shall be equipped with a hand or cap light and retro-reflective vest that comply with ANSI 107 in force on the date of Notice To Proceed to facilitate evacuation in the event of a loss of artificial lighting systems.

D. No person shall wear recreational pants (shorts) or sleeveless shirts into any work areas of the Worksite.

E. Contractor shall provide sufficient numbers of Self Contained Breathing Apparatus (SCBA) units, rated to provide at least four hours of capacity, in sufficient numbers for the Contractor’s Underground Rescue Crew. A ‘re-breathing’ type device may be used to comply with this paragraph.

F. Persons entering below ground areas which fall under the Scope of CCR, Title 8, Tunnel Safety Orders shall comply with the requirements for a personal self rescue device. In areas classified by Cal/OSHA, Mining and Tunneling Unit as Extra Hazardous or Gassy, the device shall be carried in the immediate possession of the worker. In areas classified by the Cal/OSHA, Mining and Tunneling Unit as Potentially Gassy or Non-Gassy, the device shall be either carried in the immediate possession of the worker or cached within twenty-five unobstructed feet of the workers location. Equipment Operators in any classified area may be equipped by having the device attached to the equipment in a manner that keeps the device within easy reach. In addition, Equipment Operators shall have a second device on their person during travel to and from the equipment and the entrance.

2.03 TESTING EQUIPMENT
A. Air monitoring, and air flow testing equipment used in underground or other locations where there is the potential for an explosive atmosphere, shall be “permissible” as defined, tested and certified by the Mine Safety and Health Administration Laboratory of the U. S. Department of Labor.

[Note to Specifier: The following paragraph may be marked "Not Used" if the scope of Work precludes any below ground covered areas.]

2.04 DIESEL POWERED EQUIPMENT

A. All diesel powered equipment used in underground covered areas shall be acceptable to Cal/OSHA and listed on the Contractor’s diesel permit. A copy of the Contractor's diesel permit application and issued permit shall be available for review and inspection by Metro or its designee without prior notice.

2.05 LEAD UNDERGROUND SAFETY REPRESENTATIVE OR LEAD HEAVY CIVIL SAFETY REPRESENTATIVE OR OTHER SAFETY REPRESENTATIVE

[Note to Specifier: Edit following paragraphs to conform to the scope of Work.]

A. The Contractor Lead Underground or Heavy Civil or None Safety Representative’s performance will be subject to periodic evaluation by the Metro Construction Safety Staff throughout the period of the Contract. Conclusions and recommendations of the review will be forwarded to the Resident Engineer for information or action.

1. The complete description of the duties and responsibilities of the Lead Underground or Heavy Civil or None Safety Representative’s is found in the Construction Safety and Health Manual, Revision 4, Section 1.5.C.

2.06 OTHER UNDERGROUND SAFETY REPRESENTATIVE (S) HEAVY CIVIL SAFETY REPRESENTATIVE (S) SAFETY REPRESENTATIVES (S)

A. The Contractor Underground or Heavy Civil or None Safety Representative’s performance will be subject to periodic evaluation by Metro Construction Safety Staff. Conclusions and recommendations of the review will be forwarded to the Resident Engineer for information or action.

1. The complete description of the duties and responsibilities of the Lead Underground or Heavy Civil or None Safety Representative’s is found in the Construction Safety and Health Manual, Revision 4, Section 1.5.C.

2.07 UNDERGROUND GAS TESTER

A. The Contractor Underground Gas Tester’s performance will be subject to periodic evaluation by Metro Construction Safety Staff. Conclusions and recommendations of the review will be forwarded to the Resident Engineer for information or action.

1. The complete description of the duties and responsibilities of the Lead Underground or Heavy Civil or None Safety Representative’s is found in the Construction Safety and Health Manual, Revision 4, Section 1.5.C.
2.08 FIRST AID FACILITIES

A. The location, size, furnishing and equipment shall have the acceptance of Metro and be capable of providing quiet, private communications, as well as adequate ventilation, light, heat, hot and cold running water, toilet facilities and electrical outlets.

B. Additionally, this station must also be equipped with a first-aid kit suitable to service the number of personnel assigned to the project, towels and disposable paper cups, a blood pressure cuff and stethoscope, a cot or an equivalent resting place, and other items as required by the consulting physician.

C. Staff and Duties: The contractor shall provide a full-time Emergency Medical Technician (EMT) whenever the Work is in progress. Refer to this Section for required EMT Qualifications) The EMT shall be under the direction of the Lead Safety Representative. The EMT shall maintain the First Aid Facility in the highest state of readiness at all times. The EMT may also perform safety related administrative duties as directed. All work must be performed in the designated First-Aid Facility.

D. All contractor supervisors, foremen and at least four other contractor employees shall be trained in first-aid and CPR. Copies of the certificates shall be submitted to Metro for review and acceptance.

PART 3 – EXECUTION

3.01 SAFETY PERSONNEL

[Note to Specifier : Edit the paragraphs in this per Project Scope of work.]

A. To ensure the safety of the Worksite, Contractor Safety Personnel shall not work more than eleven hours in any twenty-four hour period or more than fifty-five hours in any seven consecutive day periods. Included in the definition of Contractor Safety Personnel are the Lead Underground or Heavy Civil or None Safety Representative, other Underground or Heavy Civil or None Safety Representatives, Certified Underground Gas Testers, and Emergency Medical Technicians.

B. In the event the Contractor is performing work on more than one Contract for Metro at the same time, Contractor Safety Personnel shall not perform safety duties on more than one Contract during any twenty-four hour period.
C. The Contractor shall ensure that only those Underground or Heavy Civil or None Safety Representatives accepted by Metro for employment on the Worksite are present at the Worksite whenever Work is in progress at the Worksite. The absence of the required Underground Safety Representative shall result in the immediate stoppage of all Work at the Worksite. The Contractor is responsible for maintaining an adequate staff of safety personnel, whose qualifications have been submitted to and accepted by Metro, in order to avoid Work stoppages in the event of an expected or unexpected absence due to vacation, illness, personal emergency, resignation or termination of the assigned Safety Representative(s). Stoppage of Work at the Worksite due to the absence of qualified and accepted Underground or Heavy Civil or None Safety Representative(s), shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by the Contractor nor shall it be relied upon to form the basis of any claim.

D. Due to the inherent hazards associated with tunnel construction activities, the Contractor shall ensure that a qualified and accepted Underground Safety Representative is present in the tunnel bore whenever tunnel excavation or boring operations are underway. This may require the presence of an Underground Safety Representative in each tunnel bore at times when multiple tunnels are being excavated simultaneously. The Director, Construction Safety or designee shall make the determination based upon the effectiveness of the Contractor’s Safety Program if an Underground Safety Representative is required in each tunnel bore. Compliance with this requirement shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by the Contractor nor shall it be relied upon to form the basis of a claim for delay.

E. The Contractor’s Safety Representative(s) shall have the authority to direct immediate correction of unsafe or unhealthful conditions and, as necessary, to stop Work until appropriate corrective measures have been completed. Compliance with this provision shall be considered within the original scope of this Contract and any stoppage of Work resulting from compliance with this provision shall not delay the schedule for performance of Work by the Contractor nor shall it serve as the basis of request for change to increase the cost of the Work or be relied upon to form the basis of any claim.

F. The Contractor shall have a designated full time Lead Underground Safety Representative who is accepted by Metro for employment on the Worksite and who shall perform only safety related functions as defined in this Contract. The Lead Underground Safety Representative shall meet the following qualifications: Full-time employee of the Contractor responsible for the implementation of the contractor’s safety and health program. The individual shall possess at least five years of underground construction safety experience, be familiar with occupational safety and health laws and regulations, be currently certified as a Construction Safety & Health Technician and in first-aid and CPR by the American Red Cross or its equivalent. The Lead Underground Safety Representative shall also be currently certified by Cal/OSHA, Mining and Tunneling Division as both an Underground Safety Representative and an Underground Gas Tester.

OR The Contractor shall have a designated full time Lead Heavy Civil Safety Representative who is accepted in writing by Metro Construction Safety Staff for employment on the Worksite and who shall perform only safety related functions as defined in this Contract. The Lead Heavy Civil Safety Representative shall meet the following qualifications: A full-time
supervisory employee of the Contractor responsible for the implementation of the Contractor’s safety and health program at the Worksite. Five years heavy civil construction experience including two years of full time responsibility for construction safety programs. Current certification in good standing as a Construction Health & Safety Technician and Red Cross (or equivalent) First Aid and CPR. The Lead Heavy Civil Safety Representative must be assigned full time to the Worksite whenever Work is in progress. The Lead Heavy Civil Safety Representative shall regularly work the day shift, attend required meetings and be fully cognizant of all project-specific safety practices, processes, rules and procedures, and maintain regular contact with Metro-designated Safety Personnel.

**OR** The Contractor shall have a designated full time Lead Safety Representative who is accepted by Metro for employment on the Worksite. The Lead Safety Representative shall meet the following qualifications: A full-time supervisory employee of the Contractor responsible for the implementation of the Contractor’s safety and health program at the Worksite. The Safety Representative shall be currently certified in first-aid and CPR by the American Red Cross or its equivalent. The Safety Representative must be assigned full time to the Worksite whenever Work is in progress. The Safety Representative may be assigned non-safety related tasks provided these tasks do not interfere with successful performance of the assigned safety responsibilities. The Lead Safety Representative shall regularly work the day shift, attend required meetings and be fully cognizant of all project-specific safety practices, processes, rules and procedures, and maintain regular contact with Metro-designated Safety Personnel.

G. The Lead Underground/Heavy Civil/None Safety Representative must be assigned full time to the Worksite whenever Work is in progress. The Underground Lead Safety Representative shall regularly work the day shift, attend required meetings and be fully cognizant of all project-specific safety practices, processes, rules and procedures, and maintain regular contact with Metro-designated Safety Personnel.

H. The Contractor shall utilize Underground/Heavy Civil/None Safety Representatives for second and third shift who are accepted by Metro for employment on the Worksite and who shall perform only safety related functions as defined in this Contract. Underground/Heavy Civil/None Safety Representatives shall meet the following qualifications: Full-time employee(s) of the Contractor responsible for the implementation of the contractor’s safety and health program. The individual shall possess at least two years of underground/heavy civil/none construction safety experience, be familiar with occupational safety and health laws and regulations, be currently certified in first-aid and CPR by the American Red Cross or its equivalent, and be currently certified by Cal/OSHA, Mining and Tunneling Division as both a Underground Safety Representative and an Underground Gas Tester.

I. The Safety Representative must be assigned full time to the Worksite whenever Work is in progress. The Safety Representative may be assigned non-safety related tasks provided these tasks do not interfere with successful performance of the assigned safety responsibilities. Safety Representatives utilized by the Contractor shall be acceptable to Metro for employment on the Worksite.

*Note to Specifier: The following paragraph may be marked "Not Used" if the scope of work precludes the need for Underground Gas Testers.*
J. The Contractor shall utilize Underground Gas Testers as needed to insure compliance with the Underground Gas Testing requirements of this contract. Underground Gas Testers shall meet the following requirements: Full-time employee of the contractor familiar with the implementation of the Contractor’s safety and health program. The individual shall possess at least two years of underground construction safety experience, be familiar with occupational safety and health laws and regulations, and be currently certified by Cal/OSHA, Mining and Tunneling Division as an Underground Gas Tester.

[Note to Specifier: The following paragraph may be marked "Not Used" if the scope of work precludes any work the need for EMT’s.]

K. The Contractor shall utilize Emergency Medical Technicians in the manner required by of this Section. EMT’s employed by the Contractor shall be acceptable to Metro and meet the following requirements: Full-time employee of the contractor familiar with the implementation of the contractor’s safety and health program. The individual shall possess at least one year of underground construction experience, be familiar with occupational safety and health laws and regulations, and be currently certified by the County of Los Angeles as an Emergency Medical Technician-1A.

[Note to Specifier: The following Article may be marked "Not Used" if the scope of work precludes any work which would present atmospheric hazards.]

3.02 CONFINED SPACE OR UNDERGROUND AIR MONITORING

A. The paragraphs below apply to the monitoring of air spaces entered by workers that meet either the CCR, Title 8 definition of a Confined Space or are within the Scope of the CCR, Title 8 Tunnel Safety Orders.

1. All air monitoring activities shall conform to requirements of this Section.

2. Select and use equipment capable of providing printed logs of gas tests.

3. Operate and maintain a gas monitoring system as required by this Section. Perform air monitoring and sample analyses as required by this Section.

4. Begin testing for oxygen followed by toxic and explosive gases as soon as the excavation or drilled hole has progressed to a level of five feet below surface level.

5. Test air quality in the most stagnant portions of excavation or other work area to ensure there is no accumulation of explosive or other dangerous gases.

6. Maintain a handwritten record which includes, but is not limited to, test date, time, exact location, contaminant levels, and name of the tester. This written log is to be supplemented by the logs printed from the testing device’s memory. This written log shall be kept on file for the duration of the contract and shall be made available for review upon request.

7. At a minimum, the Tester(s) shall have the equipment needed to test for Oxygen, Carbon Monoxide, Combustible Gases, Hydrogen Sulfide and Nitrogen Dioxide.

3.03 ACCESS AND EGREESS
A. The Contractor shall provide adequate means of access to the work areas. This access may consist of ladders, scaffolds, doorways, aisles, stair towers and elevators or ramps. Means of access and egress shall be maintained in a clear and orderly manner. All access ways shall conform to the requirements of this Section.

1. When the Contractor utilizes stairways/stair-towers for access into the Work area, the Contractor shall provide stairs that are at least 3 feet wide and permit 2-way traffic.

2. The design and erection of stairways and stair-towers shall conform to manufacturer's specifications.

3. Contractor shall provide at least one route of access/egress which is of adequate size and construction to allow the manual movement of a fully loaded stokes basket, ambulance gurney, or similar device to and from the Work areas.

4. Contractors shall provide at least one route of access/egress which is adequate size and construction to allow two way traffic to and from the work areas.

5. A single route of access/egress may be constructed to comply with above.

6. Stairways/Stair Towers: During construction, stairs shall be provided on all structures that are two or more floors or more than 20 feet in height or depth.

7. Permanent stairway placement shall occur as soon as practical. Permanent stairways used for access/egress shall be equipped with hand and or stair rails in compliance with CCR, Title 24, California Building Code (CBC) and CCR, Title 8. When the permanent systems cannot be installed prior to use by workers, temporary systems which comply with CCR, Title 24, and CCR, Title 8 shall be used.

8. All parts of stairways shall be free of hazardous projections. Debris and other loose material shall not be allowed to accumulate on stairways.

9. Permanent steel stairways having hollow pan type treads and landings that are to be used prior to concrete placement shall have the pans filled with solid material to the level of the nosing.

10. Temporary stairs shall be at least 36 inches wide, and erected to the manufactures specification. Wooden treads for temporary service shall be full width of the stairs treads.

11. Riser height and tread width shall be uniform throughout any flight of stairs.

12. Elevators used for the movement of personnel from one level to another shall comply with the requirements of this Section.

[Note to Specifier: The following Article may be marked "Not Used" if the scope of work precludes any work which would present confined space hazards]

3.04 CONFINED SPACES

A. Work in confined spaces shall be completed in conformance with the requirements of this Section.
B. Perform confined space operations under the immediate supervision of a competent person as defined in CCR, Title 8 who is fully familiar with the requirements for safe entry, egress, ventilation and air monitoring procedures and capable of enforcing strict compliance.

C. Include confined space permitting system in the Contractor's written Injury and Illness Prevention Program and implement for all confined space areas on the Worksite.

D. Air samples shall be taken before any entry into the confined space and continuously throughout the work period. Maintain a handwritten record which includes, but is not limited to, test date, time, exact location, contaminant levels, and name of the tester. Air monitoring records shall be kept at the entry point of the confined space and shall be available for review upon request.

[Note to Specifier: The following Article may be marked "Not Used" if the scope of work precludes any work which would require crane operations with a rated capacity greater than 3 tons.]

3.05 CRANE OPERATIONS

A. All crane operators shall have passed the requirements of the National Crane Certification Agency for the particular crane type to be operated and copies of said certifications shall be submitted to Metro or its designee.

B. All crane operations where the load is beyond the direct view of the operator shall be observed by a signal person who can directly observe the load and be observed by the operator. The operator shall stop all load movement in the event the signal person is unable to observe the load or fails to continuously observe the load and signal the operator. Crane operations of this type are defined as a Critical Pick and require an approved submittal in compliance with this Section.

C. At a minimum each crane shall have on the crane at all time a copy of the operating manuals for the crane and for operator aids; a copy of the inspection checklist; Copies of the crane's annual and quadrennial inspection records; a copy of the most current wire rope inspection record.

D. The Contractor shall maintain a process that ensures that prior to operating cranes on the Worksite, crane operators have successfully completed testing that verifies the crane operator's ability to read and understand the load chart for the equipment to be operated. This testing may be performed by an independent certifying agency or a qualified member of the Contractor's supervisory staff who is acceptable to Metro, has a minimum of five years heavy civil construction experience, and can satisfactorily demonstrate the ability to read and understand load charts and rigging tables to the Metro or its designee when requested, without prior notice. Written records of this testing shall be maintained on the Worksite and made available to Metro for review without prior notice.

E. Re-certification is required for any crane involved in an incident involving but not limited to upset, overloading, side pulling, shock loading, or support failure. Re-certification and written acceptance by the manufacturer is also required for any modification to a crane. Make crane acceptance and certification records available for review by Metro or its designee without prior notice.
F. Any re-certification of a crane required for compliance with this Section shall be considered within the original scope of this contract and shall not delay the schedule for performance of Work by Contractor nor shall it be relied upon to form the basis of a claim for delay.

[Note to Specifier: The following Article may be marked "Not Used" if the scope of work precludes any work which would require lifting operations with rigging.]

### 3.06 RIGGING

A. Rigging activities, regardless of the equipment used to hoist or move the materials shall comply while the following requirements:

1. Comply with the requirements of this Section.

2. Chain Rigging: Strict compliance with the following requirements for the use of chain slings as determined by Metro or its designee, shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by the Contractor nor shall it be relied upon to form the basis of a claim for delay. Compliance with determinations by Metro or its designee shall not relieve the Contractor from other obligations imposed by law or regulation nor serve as the basis of request for change to increase the cost of the Work.

   a. Only alloyed chain shall be used as rigging.

   b. Alloy steel chain slings shall have permanently affixed durable identification stating size, grade, rated capacity, and reach.

   c. Alloy steel chain slings shall not be used with loads in excess of the rated capacities prescribed in Table N-184-1, found in 29 CFR 1910.184. Slings not included in this table shall be used only in accordance with the manufacturer’s recommendations. When used with alloy steel chains, hooks, rings, oblong links, pear-shaped links, welded or mechanical coupling links, or other attachments shall have a rated capacity at least equal to that of the chain.

   d. Job or shop hooks and links, makeshift fasteners formed from bolts and rods, and other similar attachments shall not be used.

   e. Chain shall be inspected before initial use and at least monthly thereafter. In addition to the daily inspection, a thorough periodic recorded inspection of alloy steel chain slings in use shall be made on a regular basis, to be determined on the basis of (A) frequency of sling use; (B) severity of service conditions; (C) nature of lifts being made; and (D) experience gained on the service life of slings used in similar circumstances. Such inspections shall in no event be at intervals greater than once every month. Chains shall be cleaned before they are inspected, as dirt and grease can hide nicks and cracks. The most recent inspection record for each chain shall be kept at the Worksite and made available for review upon request.

   f. Wear: If the chain size at any point of any link is less than that stated in table N-184-2, found in 29 CFR 1910.184, the sling shall be removed from service.

   g. Stretch (compare the chain with its rated length or reach.): If the length is increased 3 percent the chain must be thoroughly inspected; if the length is increased by 5 percent or more the chain shall be replaced. These percentages are considered minimum standards by Metro. Contractor shall comply with
Manufacturers Recommendations when the recommendations are more stringent than these standards.

h. Deformed (twisted or bent): Chain slings with cracked or deformed master links, coupling links, other components, or any chain in which a link assembly does not hinge freely with the adjoining link shall be replaced.

3. The rigging of loads shall be completed under the immediate supervision of a qualified rigger.

4. The fork or any other portion of an industrial forklift shall not be altered in any way to allow the attachment of a shackle or other rigging device. Rigging equipment shall not be directly supported or attached to the forks. A forklift may only be used to lift materials securely attached to pallets or when utilizing a manufacturer accepted or approved attachment that allows for the use of rigging equipment.

5. Only safety hooks, or properly moused hooks shall be used. Suspended loads shall be controlled by tag lines.

6. Hooks, shackles, wire rope, synthetic slings, and other rigging equipment subject to wear must be thoroughly inspected at regular intervals by a qualified rigger and repaired or replaced as required. Records of such inspections shall be maintained by the Contractor and made available to Metro for review upon request and without prior notice.

7. All rigging equipment which is removed from service due to wear or defect shall be either destructively discarded or returned to the manufacturer. Records of such removals shall be maintained by the Contractor and made available to Metro for review upon request and without prior notice.

8. Rigging equipment shall be inspected by a qualified rigger prior to each lift for obvious damage or defects. Equipment found to be damaged or defective shall be retired in compliance with requirements of this Section.

[Note to Specifier: The following paragraph may be marked "Not Used" if the scope of work precludes any work which would be performed with a fall exposure of 6 feet or greater.]

3.07 PROTECTION FROM FALLS

A. Comply with requirements of this Section and the following.

B. Workers exposed to a vertical fall of six feet or more to another level shall be properly protected through either a fixed barrier, personal positioning system, or personal fall arrest system. This includes hazards such as, but not be limited to: Work within 6 feet of a roof edge (regardless of pitch), skylights (at any angle), floor and wall openings, leading edges, and steel erection. No employee shall work in an unprotected manner while exposed to a vertical fall of six (6) feet or greater. The use of any system not specifically listed above requires submittal and approval of a Site and Task Specific Fall Protection Plan prior to the start of the subject Work or task.
C. Maintain the Worksite in an organized and clean manner, as accepted by Metro, to reduce the potential for slips, trips and falls. Compliance with this provision shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by the Contractor nor shall it serve as the basis of request for change to increase the cost of the Work or be relied upon to form the basis of any claim.

D. Ladders: The following restrictions apply to the use of portable ladders on Metro Worksites:
   1. Ladders shall be utilized in compliance with requirements of this Section as well as the Manufacturer’s written instructions.
   2. Only ladders constructed of non-conductive materials shall be permitted.
   3. “A” frame type ladders shall be used only on clean, smooth and level surfaces. “A” frame ladders shall not be used in place of an extension type ladders by leaning the ladder against a fixed vertical surface or similar structure.
   4. Extension ladders shall be either: secured at the top and bottom using wire or rope of suitable strength, secured at the bottom utilizing the manufacturer provided spiked feet and at the top using wire or rope of suitable strength.

   [Note to Specifier: The following Article may be marked "Not Used" if the scope of work precludes any work which would be performed with an aerial lift.]

3.08 AERIAL LIFTS

A. Aerial lifts mounted on the bed of trucks shall be installed by an authorized manufacturer.

B. Personnel who operate the aerial lifts shall be trained by the manufacturer in the safe operation of the lift.

C. All personnel shall wear and use a personal fall protection system while on the lift. The lanyard shall be anchored to the lift’s designated anchor point.

D. Aerial lifts shall only be used within the guidelines of the manufacturer.

   [Note to Specifier: The following Article may be marked "Not Used" if the scope of work precludes any work which would require excavation activities deeper than five feet or in Type C soil of any depth.]

3.09 EXCAVATIONS

A. Excavation activities shall comply with the requirements of this Section.

B. Excavation operations shall be under the immediate supervision of a Competent Person, as defined in CCR, Title 8, who is fully familiar with the requirements for safe excavation procedures and capable of enforcing strict compliance.
   1. Excavations for which a protective system is required by CCR, Title 8 – Section 1541.1(a) shall be completed in compliance with the approved Excavation Action Plan.
2. Support systems other than sloping and benching in compliance with CCR, Title 8, or where there is a vertical distance of twenty feet or more from top to bottom of the excavation, shall be designed by registered a civil engineer, licensed in the State of California.

A. The design must be reviewed by an independent Professional Engineer and submitted to Metro or its designee for review and approval prior to the start of work.

B. A copy of the support system plan shall be kept at the Worksite and be available for review by Metro or its designee without prior notice.

C. Compliance with this provision shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by the Contractor nor shall it serve as the basis of request for change to increase the cost of the Work or be relied upon to form the basis of any claim.

3.10 LOCK OUT/ TAG OUT PROCEDURES

A. Include written lock out/tag out procedures in Contractor’s Injury and Illness Prevention Program. Submit specific procedures as part of job hazard analysis submittals. At all times comply with requirements of this Section.

[Note to Specifier: The following Article may be marked "Not Used" if the scope of work precludes any work which would require hazardous waste operations that would impact Health and Safety Plan.]

3.11 HEALTH AND SAFETY PLAN

A. Comply with the requirements CCR, Title 8 Section 5192 Hazardous Waste Operations and Emergency Response, with respect to the handling of hazardous or contaminated wastes and mandated specialty training and health screening. The plan is to be revised and resubmitted as conditions warrant.

B. Comply with requirements of this section.

C. Provide training to construction personnel, subject to exposure during the course of excavation, prior to entering any excavation sites. Provide necessary yearly refresher training as required by the requirements of this Section.

3.12 HOUSEKEEPING

A. The Worksite shall be maintained in a clean and neat manner. Scrap, trash, and other refuse shall be placed in containers prior to the end of each work shift. Trash containers shall be scheduled for regular emptying or replacement. Immediate emptying or replacement shall be ordered by the Contractor in the event a container is filled prior to the scheduled emptying or replacement.

B. Graffiti or other defacement of the Project Site shall be covered or removed by Contractor within 48 hours of verbal, electronic or written notification by Metro or it’s designee to any member of Contractor’s Management staff.
C. Compliance with this provision shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by the Contractor nor shall it serve as the basis of request for change to increase the cost of the Work or be relied upon to form the basis of any claim.

[Note to Specifier: The following paragraph may be marked "Not Used" if the scope of work precludes any work which would require fuel truck operations.]

3.13 FUEL TRUCKS AND FUELING OPERATIONS

A. Prior to use, fuel trucks shall be inspected and approved by the local fire department where required. The contractor shall comply with the requirements of the City of Los Angeles Fire Department or the Authority Having Jurisdiction. All approvals must be submitted to Metro for review and acceptance and be maintained on site for review without prior notice.

1. Fuel trucks with a cargo tank capacity of 120 gallons or more shall be inspected and approved by the California Highway Patrol. All approvals must be submitted to Metro for review and acceptance and be maintained on site for review without prior notice.

2. Warning placards and signage shall be permanently affixed to each side and the rear of the vehicle in accordance with Los Angeles of Department of Transportation (LADOT) and California Vehicle Code requirements.

3. Fuel trucks shall be equipped with a fire extinguisher with a minimum rating of 20-B. The fire extinguisher shall be securely mounted to the truck and accessible for immediate use.

4. Fueling operations are prohibited below grade without a special permit from the fire department where required. The permit shall be kept on file in the contractor's office and available upon request without prior notice.

5. All equipment shall be shut down during fueling. This includes, but is not limited to, loaders, cranes, portable generators and compressors.

6. All stationary fuel and oil storage tanks shall conform to the requirements of this Section, and local fire department rules and regulations.

7. All stationary above ground storage tanks shall be equipped with a liquid resistant berm or other spill containment system capable of containing the entire volume of the storage tank without releasing liquid into the natural ground or water discharge system.

[Note to Specifier: The following Article may be marked "Not Used" if the scope of work precludes any work which would require Temporary Precast Concrete Deck.]

3.14 TEMPORARY PRECAST CONCRETE DECK

A. Decking mats shall be closely fitted together to prevent cracks between the mats.

B. Hooks for lifting and placing the deck mats and other rigging hardware shall be capable of lifting at least five times the deck mat weight.
C. When precast and concrete deck must be removed for any reason, the contractor shall provide appropriate fall prevention or protection measures at all times that the panels are removed. All personnel working within five feet of the deck opening shall be protected by a personal fall arrest system in conformance with the requirements of this Section.

D. All deck precast and concrete lifting eye holes and cracks shall be covered or filled with a suitable material, to prevent objects from falling through and to prevent pedestrians from stepping into the holes or cracks. In pedestrian walkways, material used to cover the holes and cracks shall be kept flush to prevent tripping.

[Note to Specifier: The following paragraph may be marked "Not Used" if the scope of work precludes any work which would require High Density Polyethylene.]

### 3.15 HIGH DENSITY POLYETHYLENE (HDPE)

A. HDPE membrane is combustible and especially hazardous when in close, proximity with other combustible or flammable materials. Take precautions during installation as specified in Section 07 13 19 – Hydrocarbon-Resistant Membrane for Cast-in-Place Concrete.

[Note to Specifier: The following Article may be marked "Not Used" if the scope of work precludes any work which would require Treated Timber.]

### 3.16 TREATED TIMBER

A. The contractor’s attention is directed to the fact that prior to ignition or flaming, timber treated with ammoniacal copper zinc arsenate (acza) may have a tendency to glow or smolder for an extended period of time while giving off little or no smoke. The contractor shall use extraordinary precaution when using an open flame or operations resulting in sparks or slag adjacent to or in the vicinity of treated timber and ensure strict compliance with fire watch requirements.

### 3.17 TEMPORARY TRAFFIC CONTROL ZONES

A. TEMPORARY TRAFFIC CONTROL ZONES are an area of a highway where road user conditions are changed because of a work zone and which meet the following criteria:

- The work space is located in a normally open travel lane or lanes of a highway as defined by the California Vehicle Code or is on the shoulder of a highway and encroaches into an open travel lane;
- The travel lane or lanes are closed or encroached upon in accordance with an approved Temporary Traffic Control Plan or Temporary Traffic Control Permit
- The work space is protected by Temporary Traffic Control Devices which will be removed from the travel lane or lanes at the end of the work shift.
B. CCR sections 1598 and 1599 incorporate by reference Chapter 6 of the California, MUTCD. Therefore all requirements of this section regarding the interpretation and compliance with the California Code of Regulations, Title 8 also apply to Chapter 6 of the MUTCD.

C. The work area shall be screened or otherwise protected by a Follow Vehicle. This is accomplished by placing a contractor's work truck or similar vehicle in the buffer space between the taper and the work space.

1. When the Temporary Traffic Control Zone is located on a highway with a rated speed limit of less than 40 mph, the use of a truck mounted attenuator device on the Follow Vehicle is optional per the California MUTCD.

2. When the Temporary Traffic Control Zone is located on a highway with a rated speed limit of equal to 40 MPH but less than 55 MPH, the use of a truck mounted attenuator device on the Follow Vehicle is recommended to reduce the potential for severe equipment damage or personal injury.

3. When the Temporary Traffic Control Zone is located on a highway with a rated speed limit of equal to 55 MPH or greater, a truck mounted attenuator device on the Follow Vehicle shall be used reduce the potential for severe equipment damage or personal injury.

D. FLAGGING – The flagging of traffic shall only be done by personnel who meet the requirements of CCR, Title 8 and the California MUTCD.

1. Flaggers shall be equipped as required in the California MUTCD.

2. The use of flags in lieu of a compliant Stop/Slow Paddle (sign numbers C28A(CA)/C28B(CA)) is prohibited.

3. Any individual seen using their hands to flag or direct traffic without the required Stop/Slow Paddle is subject to an immediate verbal warning and may be removed from the Project if corrective action is not immediately taken. If the worker involved was acting upon the instructions of a foreman, supervisor or other person in a leadership position, that individual will also be subject to an immediate verbal warning and may be removed from the Project if corrective action is not immediately taken.

PART 4 – CONTRACTOR RESPONSIBILITY

A. Nothing in this specification shall release or relieve the Contractor and its subcontractors and suppliers from its safety responsibilities as described above. Any time a Cal/OSHA or U.S. OSHA representative seeks access to the Worksite, the Contractor's Safety Representative on duty shall immediately contact the designated Metro Safety Representative to inform and seek direction on how to proceed. It is understood that the Worksite belongs to Metro and the Contractor has no authority to prohibit access to Cal/OSHA or U.S. OSHA representatives, except as described herein. If the Contractor's Safety Representative fails to meet any of the duties and obligations described above, the individual may be removed immediately by Metro and the Contractor and its employee shall have no recourse against Metro.
SECTION 01 35 29

HEALTH, SAFETY AND EMERGENCY RESPONSE
PROCEDURES FOR CONTAMINATED SITES

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Preparation and installation of Hazardous Waste Operations Safety and Health Program required under California Code of Regulations (CCR), Title 8, Section 5192.

B. Providing full-time Site Safety and Health Supervisor and Certified Industrial Hygienist for services specified herein

C. It is anticipated and considered part of Scope of Work that Contractor will perform Hazardous Waste Operations requiring protective gear up to and including Level C. Advise Metro if Work to be performed requires higher level of protection.

D. Work required under this Section is subject to requirements of Sections 01 35 43 – Environmental Procedures for Hazardous Materials; 01 35 69-Lead-Related Construction Work; and 01 57 19 – Temporary Environmental Control.

E. Compliance with requirements of Section 01 35 66 - Green Construction Policy Specification.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures

B. Section 01 35 23: Worksite Safety Requirements

C. Section 01 35 43: Environmental Procedures for Hazardous Materials

D. Section 01 35 66: Green Construction Policy Specification

E. Section 01 35 69 Lead-Related Construction Work

F. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)

G. Section 01 57 19: Temporary Environmental Control

1.03 REFERENCES

A. California Code of Regulations (CCR):

1. CCR, Title 8, Section 5192 et seq
B. Code of Federal Regulations (CFR):
   1. 29 CFR: Parts 1910 et seq, and 1926 et seq

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).

1.05 SUBMITTALS

A. Refer to Section 01 33 00 – Submittal Procedures, for submittal requirements and procedure.

B. Contractor shall submit an effectively written and coherent Site Specific Safety and Health Plan, as Part of the Hazardous Waste Operations Safety and Health Plan, and including current training records, as defined in CCR, Title 8, 5192(1)(B), within thirty days of receiving Notice to Proceed.

C. Provide certification and license for Hazardous Substance Removal as required in California Business and Professions Code, if the Site is listed per Section 25356 of the Health and Safety Code, Department of Health Services, or Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) National Priorities.

1.06 DEFINITIONS (Not Used)

PART 2 – PRODUCTS

2.01 MATERIALS

A. Contractor shall provide Personal Protective Equipment (PPE) and monitoring equipment to conform to the requirements set forth by Cal/OSHA and Federal OSHA.

PART 3 – EXECUTION

3.01 PREPARATION

A. Prepare Hazardous Waste Operations Safety and Health program for Hazardous Waste Operations, following Federal, State of California and local requirements including Cal/OSHA, CCR, Title 8, Section 5192 et seq., and Federal OSHA, 29 CFR, Parts 1910 et seq, and 1926 et seq. Conflicts in the requirements are resolved by most stringent to apply. Hazardous Waste Operations Safety and Health Program – Bear certification of approval by Certified Industrial Hygienist licensed by American Board of Industrial Hygiene.

B. The Site Specific Health and Safety Plan required as part of the Hazardous Waste
Operations Safety and Health Program shall include detailed Personal Protective Equipment (PPE) level definition and contamination level limits on anticipated Hazardous Substances for PPE designation.

C. Train personnel to perform Hazardous Waste Operations. The Hazardous Waste subcontractor listed at the time of the bid shall be licensed to Perform Hazardous Waste Operations in accordance with all applicable Local, State and Federal laws.

D. Information currently available on site characterization is contained in the ‘Environmental Site Assessment Reports’ and the Geotechnical and Environmental Investigation report. Examine referenced environmental documentation in preparation and fulfillment of the Hazardous Waste Operations Safety and Health Program requirements.

3.02 PERFORMANCE

A. Provide, without delay to the Work, PPE and other equipment and Materials necessary for implementation of the Hazardous Waste Operations Safety and Health Program.

B. Provide a full-time Site Safety and Health Supervisor to implement and manage the Hazardous Waste Operations Safety and Health Program. Site Safety and Health Supervisor shall meet legal requirements for training set forth in CCR, Title 8, Section 5192 (e) in addition to qualifications set forth in Construction Safety and Security Manual.

C. Provide qualified and properly trained personnel to monitor hazard to extent required from Contractor under this Section.

D. Assign PPE levels, evaluate empirical data and perform other operations required under the Hazardous Waste Operations Safety and Health Program.

E. Coordinate activities associated with Hazardous Waste Operations Safety and Health Program with Metro.

F. In the event Contractor encounters or has reason to believe that he has encountered Hazardous Substances requiring Hazardous Waste Operations on the Project; Contractor shall notify Metro or its designee first by telephone and then within 24 hours followed in writing, as directed in Section 01 35 43 - Environmental Procedures for Hazardous Materials. Upon having such verbal conversation Metro or its designee may authorize Contractor to proceed with the Hazardous Waste Operations work. If the finding of Hazardous Substances precludes the continuation of Work in that work area, Contractor shall continue Working in areas not affected thereby.

3.03 INCLUDED HAZARDOUS WASTE OPERATIONS

A. The following Work is defined as “Included Hazardous Waste Operations,” and will be included in the Contract Items listed in the Contract Documents.

B. Abatement removal, excavation, transport or disposal of Asbestos lead-containing materials, and to the extent such Work would qualify as Asbestos-Related Work and/or lead-related work.

D. Provide subcontractor (identified at the time of the bid), who is licensed and certified to perform all Hazardous Waste Operations pertaining to RCRA-Hazardous Waste, and who is also licensed to characterize, remove, transport, and dispose of Asbestos and Lead Containing Materials in accordance with all applicable local, State and Federal requirements.

E. Closure, drainage, sealing, excavation, removal, transport or disposal of Oil or gas wells or casings (Gas Casings) or Underground Storage Tanks (USTs), sumps or vaults subject to laws and regulations regarding closure, drainage, sealing, excavation, removal, transport or disposal, for protection of health, safety and environment.

F. Sampling and analytical Work required classifying or characterizing excavated soils or groundwater for the purposes of proper handling and/or disposal.

G. Compensation for any additional training costs for personnel, that is inclusive of all requirements of CCR, Title 8, Section 5912, associated with Hazardous Waste Operations will be made under the appropriate Contract Items.

H. Removal of stored Hazardous Substances upon completion or termination.

END OF SECTION 01 35 29
PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Requirements for water pollution control during construction, including preparation of Storm Water Pollution Prevention Plans (SWPPP) and installation, maintenance, inspection, removal, and documentation of Best Management Practice (BMP) measures.

B. Requirements for permanent water pollution control facilities post-construction, if required, including design and installation of storm water treatment facilities to prevent water pollution during construction of a specific Measure R Project.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures

B. Section 01 35 43: Environmental Procedures for Hazardous Materials

C. Section 01 35 63: Sustainability Plan

D. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)

E. Section 01 57 13: Temporary Erosion and Sedimentation Controls

F. Section 01 57 19: Temporary Environmental Control

1.03 REFERENCES (Not Used)

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).

1.05 SUBMITTALS

A. Refer to Section 01 33 00 – Submittal Procedures, for submittal requirements and procedures.

B. Construction Water Pollution Control:

1. Contractor shall submit to Metro all documentation necessary for coverage under the Construction General Permit, including but not limited to Permit Registration Documents (PRDs). PRD’s shall include calculations related to Risk Level, the
SWPPP, which should be prepared using with the Caltrans or California Sorthwater Quality Association (CASQA) SWPPP template, the names and qualifications of the Qualified SWPPP Practitioner (QSP) and Qualified SWPPP Developer (QSD), a certification of the SWPPP by the QSD. The documentation requested should be available prior to the commencement of the project, not prior to any earth disturbing activities. Construction mobilization activities have the potential to cause storm water pollution as well as excavation.

2. Contractor shall allow sufficient time for Metro or its designee and external agency to review SWPPP, as outlined in Section 01 33 00 – Submittal Procedures, but in no case shall submit the initial draft for review more than 60 days after Notice Proceed (LNTP). The documentation requested should be available prior to the commencement of the project, not prior to any earth disturbing activities. Construction mobilization activities have the potential to cause storm water pollution as well as excavation. Site disturbing activity may not begin until the SWPPP has been approved for use, uploaded to Storm Water Multi-Application and Reporting System (SMARTS) and a Waste Discharge Identification (WDID) Number received.

Metro will setup the SMARTS website and will be entered as the Legally Responsible Party (LRP). The Contractor will be provided the Notice of Intent (NOI) form or submittal to the State Water Resources Control Board with the applicable fee. The SWPPP shall conform to the provisions in the referenced Manuals, the requirements of the appropriate NPDES permits, including the Construction General Permit, and the Construction Specifications approved by Metro or its designee.

a. Contractor’s SWPPP shall provide a schedule for the erosion control construction site housekeeping measures and Work included in the Contract for all water pollution control measures and BMPs. The SWPPP shall also include post-construction measures which shall be coordinated with permanent measures discussed in Article 1.08 General Requirements of this Section.

b. If revisions to the SWPPP are required, as determined by Metro, the Contractor shall submit a revised plan within the time frame set forth in Section 01 33 00 – Submittal Procedures.

c. The SWPPP shall be updated and revised due to changes in the Project in accordance with the Construction General Permit. Contractor shall update the SWPPP when changes to the Project affect the site drainage patterns or potential discharge of pollutants to surface waters, groundwater, or a separate municipal storm sewer system. The change shall be recorded by amending (updating) the SWPPP in accordance with the regulatory provisions for SWPPP amendment. The SWPPP shall also be updated to incorporate new measures whenever existing measures are deemed ineffective by Metro or regulatory agency inspectors.

d. Contractor shall incorporate the "Minimum Requirements" presented in the referenced Manuals into the SWPPP. In addition to the "Minimum Requirements", the Contractor shall complete the Caltrans BMP or local city and county BMP consideration checklist, (whichever is more stringent). Checklist presented in the referenced Manuals and incorporates all BMPs required to effectively manage onsite storm water, prevent adverse impacts to water quality and avoid off-site runoff. The Caltrans or local city and county BMP (whichever is more stringent), consideration checklist shall be used for all Work.
e. The SWPPP shall also include a detailed spill prevention and response plan for any volatile and/or otherwise hazardous materials onsite.

f. Contractor shall submit the weekly storm water inspection reports required by the NPDES permits and the SWPPP to Metro no later than one week following the inspection. For potential violations of the NPDES permits, Contractor shall notify Metro and initiate corrective action, documenting activity as required by law and as outlined in Section 01 57 19 - Temporary Environmental Control.

g. Contractor shall submit all sampling and analyses results required by the NPDES permits and the SWPPP to Metro or its designee for review no later than one week following receipt of the analytical results from labs. Results from field testing of pH and turbidity shall be submitted to Metro or its designee within 72 hours of the end of a qualifying storm event, as defined by the CGP. Contractor shall sample runoff regardless of whether the total rainfall exceeds the CGP qualifying storm event, but only needs to report the readings taken during a qualifying storm. Sampling and testing of water quality (discharges) shall be performed in accordance with sampling and analysis requirements provided in Section 01 57 123 - Temporary Storm Water Pollution Control. In the event of exceedances, Contractor shall immediately notify Metro or its designee, and initiate corrective action. Documentation of such an event shall be provided to Metro or its designee in writing within 24 hours of initiating corrective action. Contractor shall utilize proper water pollution control measures to ensure that stormwater runoff does not exceed water quality limits as contained in the appropriate NPDES permit.

h. Contractor shall submit the quarterly non-storm water inspection reports required by the NPDES permits and the SWPPP to Metro or its designee for review no later than one week following the inspection or previous quarter close, whichever comes first.

i. Contractor shall prepare an Annual Report summarizing corrective actions, lab reports, sampling and analyses, and any corrective actions not implemented as per Section XVI of the Construction General Permit covering each yearly period in accordance with the permit conditions. Contractor shall submit Annual Report to Metro or its designee for review and, address Metro comments in accordance with the requirements of Section 01 33 00 – Submittal Procedures. As directed by Metro or its designee, Contractor shall upload provide the documentation to Metro for uploading the final report to the SMARTS by September 1st of each year or in accordance with permit conditions, if permit conditions differ from these data assembly and upload requirements.

j. The SWPPP shall also include requirements for notifying Metro or its designee, and conducting emergency response and cleanup in the event contaminated water reaches onsite catch basins, offsite catch basins, ditches, or creeks. All response measures shall be documented, and shall be inspected for effectiveness and maintained in good working order. Ineffective measures shall be repaired or replaced immediately at Contractor's cost and schedule expense.

k. Contractor shall notify Metro or its designee of any Regional Water Quality Control Board (RWQCB) or other stormwater regulatory inspections within 24 hours of the inspection. The Contractor shall provide written notification to Metro.
or its designee of any findings by the RWQCB, including verbal warnings.

I. Contractor shall submit working or shop drawings for any additional unit descriptions (other water pollution control measures designated by the Contractor and included in the Schedule of Values) to Metro or its designee for review and approval.

m. Site-specific Water Pollution Control Plans (Site WPC Plans) shall be included in the SWPPP Appendix and shall include site maps showing a combination of the Contract drainage, stage construction, contour grading plans, stockpile locations, construction site entrance, street sweeping plan, sanitation facilities, washout facilities, waste disposal, hazardous material storage, and water pollution control components, including location of all proposed BMPs. Contractor shall update these site maps and the Site WPC Plans to accurately show the actual site conditions at various phases of construction. The Site WPC Plans shall graphically show the use of temporary water pollution control and temporary erosion control items specified elsewhere in these Technical Documents.

C. Post-Construction Permanent Water Pollution Control:

1. Areas within City and County-owned Right of Way: Contractor shall conform to Los Angeles Municipal Separate Storm Sewer System Permit (MS4) Municipal Regional Permit requirements as applicable to the Work, including preparation and submittal of documentation necessary to verify said conformance on City and County facilities in City and County-owned right-of-way, and shall apply permanent BMPs consistent with BMPs outlined in the Local City and County Runoff Pollution Prevention Program and as applicable to the area of work. Contractor shall consider and coordinate design and implementation requirements with the construction and post-construction requirements associated with the Construction General Permit. Separate reports shall be prepared for Work within each jurisdiction. All reports and documentation shall be submitted to Metro or its designee. Documentation to be submitted includes, but is not limited to, completed calculations, design drawings, hydraulic and hydrologic reports for all storm water treatment facilities, and Construction Site Inspection Program required under the Municipal Regional Permit, as well as completed permit applications and forms, as applicable. Contractor’s attention is directed to the fact that adjustments to the required reports and documentation may be needed to address the concerns of the various regulatory agencies and individual municipalities. Contractor shall support Metro or its designee in coordination meetings, and revise design and documentation as required to comply with said permits and local requirements.

2. Project areas outside of City- and County-owned Right of Way: Contractor shall submit to Metro or its designee all documentation and any revisions necessary to satisfy Section XIII "Post Construction Standards" and APPENDIX 2 "Post-Construction Water Balance Performance Standard Spreadsheet" of the Construction General Permit. All documentation shall be submitted along with the Permit Registration Documents for the Construction General Permit and SWPPP in accordance with requirements of this Section. Documentation that may be required includes but is not limited to a completed pre and post-project water balance, including calculations, design drawings, and hydraulic and hydrologic reports quantifying all pre and post-project runoff as well as structural and non-structural
controls included in the post-construction water balance calculator. Contractor shall support Metro in regulatory agency meetings, and revise design and documentation as required to comply with said permit.

1.06 DEFINITIONS

A. BMP: Best Management Practice.

B. CASQA: California Stormwater Quality Association

C. CGP: Construction General Permit

D. NTP: Notice to Proceed

E. NPDES: National Pollutant Discharge Elimination System

F. PRD: Permit Registration Documents

G. QSD: Qualified SWPPP Developer.

H. QSP: Qualified SWPPP Practitioner

I. REAP: Rainfall Event Action Plan

J. RFP: Request for Proposal

K. RWQCB: Regional Water Quality Control Board

L. SMARTS: Stormwater Multi-Application & Reporting System

M. SWPPP: Storm Water Pollution Prevention Plan.

N. SWRCB: State Water Resources Control Board

O. WPC: Water Pollution Control

1.07 RELATED MATERIALS

A. State of California, Department of Transportation (Caltrans), Standard Specifications Section 20, "Erosion Control and Highway Planting."

B. The Caltrans "Storm Water Pollution Prevention Plan and Water Pollution Control Program Preparation Manual" and the "Construction Site Best Management Practices Manual," and addenda thereto issued up to, and including, the date of the RFP, hereafter referred to respectively as the "Preparation Manual" and the "Construction Site BMP Manual" and collectively as the "Manuals." Copies of the Manuals may be obtained from the Department of Transportation, Material Operations Branch, Publication Distribution Unit, 1900 Royal Oaks Drive, Sacramento, California 95815, Telephone: (916) 445-3520.
1. Copies of the Manuals may also be obtained from Caltrans' Internet Web Site portal at:
   

C. The California Storm water Quality Association (CASQA) "Storm water Best Management Practice Handbook Portal: Construction," including Appendix B, the "Storm Water Pollution Prevention Plan Outline" and Appendix D, "Field Monitoring and Analysis Guidance" and addenda thereto issued up to, and including, the date of advertisement of the Project, hereafter referred to respectively as the "Manuals." Copies of the Manuals and the National Pollutant Discharge Elimination System (NPDES) permits may be obtained by accessing CASQA's Internet Web Site portal at:

   http://www.cabmphandbooks.com/


1.08 GENERAL REQUIREMENTS

A. Implementation of Storm Water Pollution Prevention Plan (SWPPP) measures shall be the first order of business upon site mobilization. Make documentation available prior to commencement of Project.

B. Metro will not be liable to the Contractor for failure to accept all or any portion of an originally submitted or revised SWPPP program, nor for any delays to the Work due to the Contractor's failure to submit an acceptable SWPPP.

C. A copy of the SWPPP, inspection records, prepared REAP reports, and sampling records, together with updates, revisions and amendments shall be kept at the construction site. At the request of Metro or its designee, the Contractor shall furnish multiple copies of the SWPPP for distribution.

D. Contractor shall designate qualified QSD/QSP staff prior to commencement of Project and no later than submission of all required SWPPP materials to Metro to prepare and implement the SWPPP, defined by the CGP as follows:

   1. Qualified SWPPP Developer (QSD): The Contractor's QSD shall have registrations/certifications listed in Section VII of the CGP by commencement of A QSD must prepare and sign the SWPPP, the SWPPP must be in place prior to any construction activities. The contractor cannot be allowed to obtain a QSD within 1 year from commencement of project activity.

   2. Qualified SWPPP Practitioner (QSP): The Contractor's QSP shall have registrations/certifications listed in Section VII of the CGP and successfully complete the SWRCB sponsored or approved QSP training course and QSP exam prior to any Construction activity. Or the QSP cannot be allowed as a QSD within 1 year from commencement of Project activity.
3. If either the QSP or the QSD is no longer employed by the Contractor or is no longer associated with the Work, the Contractor shall notify Metro or its designee within 24 hours, and designate a replacement within 72 hours, and **so Metro can** update the SWRCB’s Storm Water Multi-Application & Reporting System (SMARTS) within 72 hours.
   a. The replacement QSD or QSP shall have the registrations/certifications within specified time frame.

4. Contractor shall designate individual(s) as QSP and QSD Data Submitter(s), to be approved and certified by Metro or its designee, acting as the legally responsible party, to **Metro will** upload data electronically into Storm Water Multi-Application & Reporting System (SMARTS). The SWPPP, quarterly inspection reports, Annual Reports, and all sampling results for non-visible pollutants shall be uploaded onto SMARTS by the certified Data Submitter(s), at Metro’s or its designee’s request.

E. Contractor shall provide updates to submittal items monthly or as directed by Metro or its designee per the requirements of this Specification, and shall provide **documents for Metro to** upload to SMARTS as directed by Metro or its designee.

F. Contractor shall design and incorporate BMPs into the Project design in a manner that ensures that Project facilities comply with the requirements of the respective permits.

G. Contractor shall implement the permitted design and shall conduct all necessary monitoring and testing and any modifications deemed necessary for compliance prior to final completion and hand over of the Project Work to Metro, providing requisite reports to Metro or its designee upon request.

H. The Contractor shall be responsible for complying with Sections 5650 and 12015 of the Fish and Game Code, and other applicable statutes relating to prevention or abatement of water pollution.

I. All areas of exposed earth created by the Contractor beyond what is shown on the Drawings and referred to in the Construction Specifications shall also be subject to these provisions except that the Contractor shall be fully responsible for all costs and liabilities associated with slope protection Work and erosion control in these areas.

1.09 CONSTRUCTION WATER POLLUTION CONTROL

A. General: The Contractor's program to control water pollution shall be included in the SWPPP to prevent any net increase in pollution of storm water runoff from entering waterways. The Contractor shall exercise every reasonable precaution to protect the creeks within the Project area from pollution including fuels, oils, and other harmful materials and shall conduct the operations and schedule the operations so as to avoid muddying and silting of the creek in accordance with the CGP. The Contractor shall provide effective temporary water pollution control measures for all creeks or their tributaries. Such measures shall include but not be limited to providing dikes, basins, ditches, and applying straw and seed. Contractor shall coordinate water pollution control work with all other Work done on the Contract.
B. Training: Contractor shall provide Water Pollution Control training as required by the CGP. Documentation of training shall be provided to Metro or its designee within one week of the training. Training shall be performed by qualified staff and documentation of training shall be kept on site with the SWPPP documents as defined by the SWRCB.

C. Water Pollution Control Maintenance: Contractor shall furnish sufficient personnel, materials and adequate equipment to perform the water pollution control maintenance work immediately and to work continuously until its completion. Water pollution control maintenance work shall consist of maintaining and replacing temporary water pollution control measures throughout the duration of the Contract until permanent measures are accepted by Metro. Maintenance work and SWPPP implementation shall be considered as integral functional practices to implement water pollution control. Failure to fully comply with the requirements of the Construction General Permit shall subject the Contractor to all fines, damages and job delays incurred due to failure to implement and properly update the SWPPP.

D. Water Pollution Control Effectiveness: If the measures being taken by the Contractor are inadequate to control water pollution effectively, Metro or its designee may direct the Contractor to revise its operations and its SWPPP program. Such directions will be in writing and will specify the items of Work for which the Contractor’s water pollution control measures are inadequate. No further Work shall be performed on said items until the water pollution control measures are adequate and, if also required, a revised SWPPP program has been accepted.

E. SWPPP Implementation: The Contractor shall be responsible upon approval of the SWPPP and throughout the duration of the Project for installing, constructing, inspecting, maintaining, removing and disposing of the water pollution control measures included in the SWPPP. Unless otherwise directed by Metro or its designee, the Contractor's responsibility for SWPPP implementation shall continue throughout any temporary suspension of Work ordered in conformance with the Contract Provisions. Requirements for installation, construction, inspection, maintenance, removal, and disposal of water pollution control measures are specified in the Manuals and specified herein.

1. Contractor’s program for implementing, inspecting, and maintaining water pollution control practices for wind erosion control, tracking control, non-storm water control, and waste management and materials pollution control shall be year round.

2. The National Weather Service weather forecast shall be monitored for the project's zip codes and used by the Contractor on a daily basis. If there is any chance of rain forecast within 48 hours, the forecast shall be printed out and kept with the SWPPP. If the chance of precipitation is greater than 50%, the necessary water pollution control practices shall be deployed prior to the onset of the precipitation, and monitoring shall increase, as required by law and outlined in the Construction General Permit. For Risk Level II and III locations within the project, a Rainfall Event Action Plan (REAP) shall be prepared as required by the SWPPP. The REAP shall be provided to Metro or its designee within 72 hours of completion. The National Weather Service weather forecast is found at:

   http://www.wrh.noaa.gov/

3. The Contractor shall maintain a rain gage at the site at all times during construction.
Rain gage readings shall be recorded daily and provided to Metro within 72 hours whenever the daily rainfall total is greater than 0.25 inches per day or whenever the rainfall is a part of a qualifying storm event as defined by the CGP.

4. For all project Risk Levels, the QSP, or a Metro approved substitute designated and trained by the QSP (QSP-substitute) shall inspect the site before a forecast storm (within 48 hours prior to a forecast storm), during the storm (at 24-hour intervals during extended rains), and after a storm (not later than 48 hours after rain event). Inspections shall be documented as specified in the Manual. Inspection forms shall be provided to Metro or its designee within 72 hours of the inspection.

5. Stormwater inspections shall be performed by the QSP or individual trained by the QSP-substitute year round a minimum of once a week at all active areas and all areas with installed BMPs as required by permit and the SWPPP. More frequent monitoring is required for rain events. Contractor shall provide a rain gauge on site as specified above and record the measurements in rain event inspection reports.

6. Non-Stormwater inspections shall be performed quarterly by the QSP, QSP-substitute, Metro or its designee (quarterly inspection time periods are January-March, April-June, July-September, and October-December).

7. Contractor shall conduct sampling and analyses of storm water as required by the Construction General Permit. Sampling shall be performed by the QSP or Metro approved QSP-substitute.

8. If the Contractor or Metro identifies a deficiency in any aspect of the implementation of the approved SWPPP or amendments, the deficiency shall be corrected immediately (within 72 hours of identification). The deficiency may be corrected at a later date and time if requested by the Contractor and approved by Metro in writing, but not later than the onset of any precipitation event. If the Contractor fails to correct the identified deficiency by the date agreed or prior to the onset of precipitation, the Project shall be in noncompliance. Attention is directed to the Contract Documents for possible noncompliance penalties.

9. If the Contractor fails to conform to the approved SWPPP and Construction General Permit, Metro may order the suspension of construction operations which create or have the potential to create water pollution.

10. Implementation of water pollution control practices may vary by season. The Construction Site BMP Manual and this Section shall be followed for control practice BMP selection of year round, water pollution control practices.

11. Disturbed soil areas shall be considered active whenever the soil disturbing activities have occurred, continue to occur or will occur during the ensuing 14 days. Non-active areas shall be protected as required within 14 days of cessation of soil disturbing activities or prior to the onset of any precipitation event, whichever occurs first.

12. The Contractor shall provide barriers adequate to prevent flow of muddy water, vegetation debris, soil and other materials into any creek or drainage channel. During construction of such barriers, muddying of the creek/drainage channel shall not be allowed. Oily or greasy substances originating from the Contractor's operations shall not be allowed to enter or be placed where they may potentially enter any creek or drainage channel.
1.10 POST-CONSTRUCTION PERMANENT WATER POLLUTION CONTROL

A. Contractor’s program to control water pollution for permanent facilities shall be in
accordance with regulatory requirements, the Los Angeles County MS4 Permit
Municipal Regional Permit (for City and County owned facilities and right of way), and
the Construction General Permit (for all other facilities) as outlined in Article 1.05,
Submittals, of this Section.

B. Contractor shall provide pre-construction surveys as outlined in Section 01 71 24 –
Preconstruction Surveys, and shall include all necessary hydraulic and hydrologic
studies and runoff drainage calculations to comply with NPDES requirements as well as
sustainability goals, and those included in the Metro Environmental Policy and Water
Use and Conservation Policy (www.metro.net/sustainability). Contractor shall participate
with Metro or its designee upon request in regulatory agency meetings regarding
NPDES compliance.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 01 35 35
SECTION 01 35 43

ENVIRONMENTAL PROCEDURES FOR HAZARDOUS MATERIALS

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Performing excavation and demolition Operations, where contaminated materials exist.

B. Contractor shall be responsible for the removal, transportation and disposal of Hazardous Waste Materials as indicated in the Contract Documents. Contractor shall have, under Subcontract at the time of Award, sub-contractor qualified to remove and dispose of Hazardous Materials in accordance with applicable laws and other requirements, including but not limited to the provisions of Section 01 57 19 – Temporary Environmental Control. Contractor shall notify Metro Construction Manger (CM) verbally immediately, each time suspected Hazardous Material is found and proceed with removal and disposal as described above. Contractor shall then notify Metro CM in writing, confirming the verbal notification.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures

B. Section 01 35 29: Health, Safety, and Emergency Response Procedures for Contaminated Sites

C. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)

D. Section 01 57 19: Temporary Environmental Control

1.03 REFERENCES

A. South Coast Air Quality Management District (SCAQMD):
   1. Rule 1166 – Volatile Organic Compound Emissions from Decontamination of Soil

B. California Code of Regulations (CCR):
   1. Title 8: Section 51 93 - Bloodborne Pathogens
   2. Title 22: Division 4.5, Chapter 11, Article 3 § 66261.24 – Characteristic of Toxicity

C. California Health and Safety Code

D. Code of Federal Regulations (CFR):
   1. 49 CFR: Title 49 - Transportation
1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).

B. Comply with the requirements of the Site Specific Safety and Health Plan prepared by the contractor and approved by Metro or its designee Metro will provide certain monitoring and testing for Hazardous Substances in the air, soil and groundwater, pursuant to Section 01 35 29 – Health, Safety, and Emergency Response Procedures for Contaminated Sites.

C. Obtain SCAQMD Rule 1166 Permit prior to soils excavation work.

1.05 SUBMITTALS

A. Product Data: Manufacturer’s description and specifications for personal Protective Equipment (PPE) and monitoring equipment.

B. Provide Notice of all anticipated Hazardous Substances or issues such as Underground Storage Tanks (USTs), Gas Casings, Asbestos and contaminated soil or groundwater. The Design-Builder may use the Environmental Site Assessments, Geotechnical Evaluation Report, the Contract Documents indicating the Contract Items for Hazardous Waste Removal, and any other available information in preparation of this Notice.

C. Material Safety Data Sheets (MSDS): Manufacturer’s Material Safety Data Sheets for each type of material used in Work.

1.06 DEFINITIONS

A. Asbestos: Material containing greater than 0.1% of asbestiform variety of serpentine (chrysotile), riebeckit (crocidolite), cummingtonite-grunerite (amosite), anthophyllite, actinolite, or tremolite.

B. Asbestos-Related Work: As defined in Section 25914.1 of the California Health and Safety Code (as amended, modified and replaced from time to time)

C. Metro-Directed Facility: Facility, located within thirty miles of the Worksite that Metro chooses to accept Contaminated Soils for subsequent recycling, storage, disposal, incineration or other disposition.

D. Contaminated Soils: Soils which are excavated that exhibit one or more of the following Characteristics:
   1. Greater than (> 100 ppm Total Recoverable Petroleum Hydrocarbon per EPM Method 418:1
   2. 5 ppm Total Petroleum Hydrocarbons as gasoline per EPA Method 8015
   3. 50 ppm direct reading from hand held Photo Ionization Detector calibrated by 100 ppm Hexane
   4. 0.1 ppm Benzene, or > 10 ppm Toluene, or > 62 ppm Ethyl Benzene, or > 62 ppm Xylenes per EPA Method 8020
5. Characteristic of Toxicity per CCR, Title 24, § 66261.24

E. Gas Casings: Oil and gas wells and casings.

F. Hazardous Substances: Substance, material or waste, exposure to which results, or may result, in adverse affects on health and safety, including without limitation: Substance defined as hazardous substance under Section 101(14) of the Federal Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (as further amended, modified, or replaced from time to time), or under Sections 25316 and 25317 of the California Health and Safety Code (as amended, modified or replaced from time to time); substance or waste defined as a hazardous substance or hazardous waste under 8 CFR 5192 et seq., or 29 CFR 1910 et seq., and 29 CFR 1926 et seq. (as amended, modified or replaced from time to time); any substance, material or waste listed by the U.S. Department of Transportation and regulated as hazardous materials under 40 CFR 172.101 and appendices (as amended, modified or replaced from time to time); any substance, material or waste requiring Hazardous Substance Removal (as defined below); Asbestos, Petroleum, petroleum byproducts, waste oil, crude oil and natural gas; other gases including hydrogen sulfide and methane, and designated wastes per California Code of Regulations, Chapter 15, Title 23, Article 2.

G. Hazardous Substances Removal: As defined in Section 25914.1(c) of the California Health and Safety Code (as amended, modified or replaced from time to time) including the removal of all hazardous substances as defined herein.

H. Hazardous Waste: Waste or combination of wastes as defined in 40 CFR 261.3 et seq., or regulated as hazardous waste in California pursuant to California Health and Safety Code, Chapter 5, Division 20, or as defined as hazardous waste in 40 CFR 171.8, or listed by the U.S. Department of Transportation and regulated as hazardous under 49 CFR 172.101 and appendices (as each of the foregoing statutes and regulations are amended, modified or replaced from time to time) and deemed a waste.

I. Hazardous Waste Operations: Operations that require the disturbance of hazardous substances including, but not limited to, excavation, demolition, segregating, stockpiling, loading, hauling and disposal. Operations that are conducted in accordance with all requirements of CCR, Title 8, Section 5192 (Cal/OSHA).

J. Hazardous Waste Operations Safety and Health Program: as defined in CCR, Title 8, Section 5192 and as required in Section 01 35 29 – Health, Safety, and Emergency Response Procedures for Contaminated Sites.

K. Included Environmental Operations: The following Work is defined as “Included Environmental Operations,” and is included as part of the Scope of the Design-Builders Work:

1. Removal, abatement, transport and disposal of asbestos-containing material (ACM).
2. Offsite transportation and disposal of soils classified as RCRA Hazardous or Non-RCRA hazardous waste.
3. Waste as determined by the Contractor and confirmed by Metro. Removal and Disposal of known RCRA or Non-RCRA hazardous waste material will be listed as a Contract Item or Items in the Project Definition Documents and will be compensated
4. Closure, drainage, sealing, removal, transport, or disposal of oil or gas wells or casings (gas casings) or Underground Storage Tanks (USTs), sumps or vaults subject to laws and regulations regarding closure, drainage, sealing, excavation, removal, transport, or disposal, for protection of health, safety and the environment.

5. Sampling and analytical Work, required to classify or characterize excavated soils or groundwater for the purposes of proper handling and disposal.

6. Treatment of contaminated groundwater in accordance with Section 01 57 19 – Temporary Environmental Control, unless the source can be shown to be outside the limits of the Project.


M. Non-RCRA Hazardous Waste: Industrial wastes that exhibit a level of contamination not considered hazardous, but are required by the State of California to be managed for disposal to a permitted Class II landfill. Class II landfills are specially designed to reduce the risks of groundwater contamination from industrial wastes. Also known as California-Regulated Waste.

N. Solid Waste: All solid, semi-solid, and liquid wastes, but does not include Hazardous Wastes as defined in Section 25227 of the California Health and Safety Code, Division 20, Chapter 6.5 (as amended, modified or replaced from time to time).

O. USTs: Underground Storage Tanks, sumps and vaults subject to any laws or Regulations regarding closure, drainage, sealing, excavation, removal, transport or disposal, or other laws for the protection of health, safety and the environment.

P. Asbestos Cement Pipe (ACP): Variety of pipes or piping components containing asbestos.

1.07 WORK SITE CONDITIONS

A. The Geotechnical Evaluation Report with various Supplements contains information about soil and groundwater at the Worksite. Metro will provide the Phase I and Phase II Environmental Assessments by addendum, if available. Section 1101.30.05 enumerates properties and anticipated conditions at each parcel. The Project Definition Documents indicate quantities of Hazardous Waste, which have been identified to the extent possible. Hazardous Waste Information, where available, may be described within Geotechnical Reports included with the Contract Documents. The Design-Builder shall familiarize itself with the information provided.
2.01 PERSONAL PROTECTIVE EQUIPMENT AND MONITORING EQUIPMENT

A. Conform to the requirements of Cal/OSHA, Federal OSHA, and Section 01 35 29 – Health, Safety, and Emergency Response Procedures for Contaminated Sites.

PART 3 – EXECUTION

3.01 DISCOVERY OF HAZARDOUS SUBSTANCES

A. Upon encountering suspected hazardous substances, USTs, gas casings, lead containing materials, Asbestos Cement Pipe, or other asbestos containing Material during performance of excavation or demolition, immediately notify Metro CM by telephone, and then within 24 hours in writing. Describe in such notifications the location and condition of the area and implement the Environmental Safety and Health Program controls, if required, as specified in Section 01 35 29 – Health, Safety, and Emergency Response Procedures for Contaminated Sites. Continue the excavation or demolition without delay, of non-impacted areas, except to the extent prevented by performing the required hazardous substance removal.

B. Contractor, or Hazardous Waste Subcontractor, shall segregate, load, haul, and dispose of the Hazardous Substance. If Contractor stockpiles soils, prior to their removal and disposal, the Contractor shall spray the stockpile with water or SCAQMD approved vapor suppressant and cover the Stockpile with heavy-duty continuous, clear plastic sheeting to prevent any exposure of the soil to the atmosphere until the stockpile is moved. All stockpile management shall be in accordance with SCAQMD Rules 1166 and 403 and the SWPPP.

C. Contractor shall load, transport and dispose of the Hazardous Substance in accordance with all applicable laws and regulations.

3.02 EXCAVATION OF CONTAMINATED SOILS

A. Contaminated Soils shall be handled as specified in this Section. Contractor shall notify Metro when Contaminated Soils are found which meet the definition in 1.06 EF above.

END OF SECTION 01 35 43
SECTION 01 35 53

WORKSITE SECURITY REQUIREMENTS

(This specification is designed for any Metro Construction Project. There are several portions of this specification where one of three parallel paragraphs will be chosen based on the Project Scope of Work. In addition, most all contracts will require the Construction Safety and Security Manual (Version 4). Any editing of this baseline to conform to a particular Project Scope must be completed and approved by the Director, Construction Safety.)

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Minimum requirements for Contractor’s Construction Security Program. Requirements in this section are NOT stand alone and shall be taken in conjunction with the requirements of the Metro Construction Safety and Health Manual, Revision 4. Requirements include but are not limited submittals, personnel, equipment, behaviors and work site conditions.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures
B. Section 01 35 23: Worksite Safety Requirements
C. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)
D. Section 01 50 00: Temporary Facilities and Controls
E. Section 01 52 13: Construction Facilities
F. Section 01 53 05: Temporary Decking Systems
G. Section 01 53 16: Temporary Precast Concrete Deck
H. Section 01 53 16: Temporary Access Roads and Parking Areas
I. Section 01 56 23: Temporary Barriers
J. Section 01 56 26: Construction Fencing (Wood)
K. Section 01 56 28: Construction Fencing (Chain Link)
L. Section 01 66 00: Product Storage and Handling Requirements
M. Construction Safety and Security Manual (CSSM) Revision 4
1.03 REFERENCES

A. American National Standards Institute/International Safety Equipment Association (ANSI/ISEA):
   1. ANSI/ISEA 107 - High-Visibility Safety Apparel and Hardwear

B. City of Los Angeles:

C. County of Los Angeles Department of Health Services:
   1. Emergency Medical Services Agency, EMT Information

D. State of California, Division of Occupational Safety and Health (Cal/OSHA):
   1. California Code of Regulations (CCR) Title 8 – Industrial Relations et seq.

E. California Code of Regulations (CCR); Title 24:
   1. Part 3 - California Electrical Code (CEC)
   2. Part 9 - California Fire Code (CFC)

F. National Fire Protection Association (NFPA):
   1. NFPA 70 - National Electrical Code (NEC)

G. U.S. Department of Labor, Occupational Safety and Health Administration (OSHA):
   1. Code of Federal Regulations (CFR) Title 29, Part 1910 (Occupational Safety and Health Standards) et seq.,

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).

B. Contractor shall comply with the requirements of this section, as directed by Metro Director of Construction Safety.

C. Comply with State of California Division of Safety and Health (Cal/ OSHA) Title 8, and other Federal and local laws or regulation.

D. Non compliance with the Security requirements and local and Federal regulation will not be the basis of a change in scope of this Work.

E. Metro or its designee reserves a right to conduct either announced or un-announced review of security plan enforcement according to the requirements of this Section.

F. Issues found to be non-compliant shall be addressed by the Contractor at a weekly construction progress meeting in which safety and security items are discussed.
1.05 SUBMITTALS

A. Refer to Sections 01 33 00 – Submittals Procedures, for submittal requirements and procedures.

B. Submittals and re-submittals, when required, shall be considered within the original scope of this Contract and shall be submitted in accordance with Metro accepted submittal schedule so as to not delay the performance of Work by the Contractor.

C. The refusal of Metro or its designee to issue permission to perform Work upon the Worksite, either prior to Work beginning or during the Contractor’s performance of the Work, due to the Contractor’s failure to submit listed safety submittals, or due to Metro rejection of unacceptable submittals, shall not constitute a basis for any claim of delay, interference, disruption or other similar types of claims.

D. Approved submittals shall be revised and resubmitted as changes in conditions warrant or upon request of Metro.

E. Upon receiving notice of award of this Contract, the Contractor shall prepare and submit for review the submittal listed below. No work shall be performed at the Worksite, until Metro has returned the submittals as "Approved".

1. Submit a written site specific Security and Loss Prevention Program that outlines the method of property and asset protection to be used by the Contractor.

2. Metro will review and approve written plans of the Contractor identifying measures for securing project related Worksites.

F. The Program shall address both active and passive security measures to be implemented by the Contractor and shall include, but is not limited to the following.

1. Security Guard Service: The Contractor shall provide on-site Security guard service 24 hours a day and seven days a week.

2. Lighting / Illumination: The Contractor shall provide and maintain adequate lighting throughout each Worksite including but not limited to staging, lay-down areas and employee parking lots.

3. Office Security: Contractor office facilities directly supporting the Work shall be secured to prevent entry and shall be provided with alarm systems.

4. Physicals Barriers: Contractor shall provide and install perimeter fencing. Access areas shall be closed and locked at the end of shift or when Work is completed in the area.

G. Project Warning Signage: Contractor shall provide signs such as ‘Keep Out - No Trespassing, Authorized Personnel Only or similar.”

H. Upon approval by the Metro or its designee, the Contractor shall implement the approved Program.
1. Metro or its designee will monitor the performance of the Contractors Program to ensure that adequate security is provided during the construction of the project.

I. Should either the Contractor or Metro determine that conditions have changed the Contractor will be required to resubmit an updated site specific Security and Loss Prevention Program that reflects the changes in conditions.

1. Make re-submittals in accordance with Metro approved submittal schedule so as to not delay the performance of Work by the Contractor.

1.06 DEFINITIONS

A. Terms defined in this section are defined at the time of first use.

1. Refer also to the list of definitions in the Construction Safety and Security Manual which is part of this Contract.

1.07 ADMINISTRATIVE REQUIREMENT

A. Provide, operate and maintaining security at the Worksite during construction. Security refers to the protection of both Metro property and the property of the Contractor from theft, vandalism, pilfering or other destructive activities.

1. It is the Contractor’s sole responsibility to provide protection for property (including equipment and supplies) under the Contractor’s care, custody and control.

B. Establishing, implementing and maintaining an effective, site-specific, Security and Loss Prevention Program (the Program).

1. The Contractor is solely responsible for record keeping and insuring that subcontractors are informed of and comply with the Program.

C. Compliance with California Code of Regulations (CCR), Title 8, as well as all other federal, state and local regulations, statutes and codes applicable to security operations.

1. Strict compliance with applicable regulations as determined by Metro or its designee shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by the Contractor nor shall it be relied upon to form the basis of a claim for delay.

2. Compliance with determinations by Metro or its designee shall not relieve the Contractor from other obligations imposed by law or regulation nor serve as the basis of request for change to increase the cost of the Work.

D. The Program shall comply with CFR 1926.800 (b) (3), which states: “The employer shall control access to all openings to prevent unauthorized entry underground.

1. Unused chutes, manways, or other openings shall be tightly covered, bulkheaded, or fenced off and shall be posted with warning signs indicating “Keep Out” or similar language.”

E. The Program shall include methods of protecting physical structures, above, below or at
grade, Construction Facilities, Product Storage and Handling area, from trespassers and malicious mischief.

F. On Projects involving multiple Prime Contractors, each Prime Contractor shall coordinate with all other Prime Contractors to insure that all Project areas are adequately patrolled. This requirement for coordination of Security activities and plans also applies to any Prime Contractors working on Metro properties in the same or adjacent areas to other Prime Contractors even if the Work for each Prime Contractor is part of separate Projects.

G. The Prime Contractor and sub-contracted Security Firm(s) shall coordinate with the Local Law Enforcement and the Metro Security Department for patrol enhancement via the Metro’s Third Party Coordinator.


1.08 WORKSITE CONDITIONS

A. Operating Rail Systems: Portions of the Work are in the vicinity of Metro’s existing operating rail transit system. Contractor shall insure that Subcontracted Security Firm’s employees receive required rail safety training and conform to the Operating Right of Way Rules.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Refer to Section 01 66 00 – Product Storage and Handling Requirements for general requirements for product delivery, storage and handling procedures.

PART 2 - PRODUCTS

2.02 SECURITY EQUIPMENT AND TOOLS

A. Select, provide and retain a reputable uniformed armed security guard service. Security guards assigned by the Subcontracted Security Firm shall only be assigned to Project Worksites for patrol and other security related activities.

B. Provide security guards with motor vehicles to enhance patrolling the entire project during construction work activities including holidays and weekends. Personnel assigned by the Subcontracted Security Firm shall perform only duties directly related to the security function.

C. Security guards shall be equipped with cell phones to enhance their ability to report incidences in a timely manner and allow direct contact with emergency communications dispatchers.

D. Security guards shall be provided with Personnel Protective Equipment (PPE), to insure compliance with Technical Specification Section 01 35 23 – Worksite Safety
PART 3 – EXECUTION

3.02 SECURITY PERSONNEL

[Note to Specifier: The following paragraph shall be modified to reflect the scope of Work of the specific contract.]

A. Per paragraph 1.05.F.1, Security Personnel are required to be employed or subcontracted for this Work. The following shall apply to Security Personnel on the Project: OR Security Personnel are not required to be employed or subcontracted for this Work. However, in the event the Contractor chooses to employ security personnel or a security sub-contractor, the following shall apply:

1. Contractor shall ensure security guards service is on time and on duty providing security protection during construction activities, including holidays and weekends.

2. Contractor shall ensure security guard service employs personnel who are professional, well-groomed and wear clean, pressed uniforms.

3. Contractor shall ensure that Subcontracted Security provides personnel who are bonded and certified as security officers.
   A. Security personnel shall be properly licensed and certified to bear and use service weapons.
   B. Contractor shall audit and review the Subcontracted Security Firm’s recruitment policies and procedures to ensure appropriate background checks and training is completed.

4. Contractor shall ensure that security personnel receive orientation training regarding construction sites and known or potential hazards and methods for recognizing and avoiding known or potential hazards.

END OF SECTION 01 35 53
1.01 SECTION INCLUDES

A. Sustainability requirements as identified in this Section shall be integrated by Contractor into design and construction of the Project. In general, sustainability shall address sustainable practices in the following categories:
   1. Planning and design
   2. Energy efficiency
   3. Water efficiency and conservation
   4. Material conservation and resource efficiency
   5. Environmental quality

B. The Work shall support the respective sustainability policies of Metro, and shall be consistent with Metro Facility Design Criteria for Sustainability.

C. The Project design and construction shall comply with the mandatory sustainability measures as well as voluntary sustainability requirements required by the California Green Building Standards Code (Part 11) California Code of Regulations, Title 24.

D. Enumerate and include in the bid documents, voluntary measures that will be implemented by the Contractor in his design.

E. As a part of the design process, the Contractor shall provide the first draft of the project specific Sustainability Plan to for review within 45 days of Notice to proceed (NTP) and the final project specific Sustainability Plan 90 days after NTP. Where the Design Criteria are in conflict with sustainability requirements, the Contractor shall document the conflict in the Sustainability Plan, and the Design Criteria shall take precedence.

F. The Contractor shall provide a qualified Sustainability Coordinator to manage the development of a Sustainability Plan and coordinate implementation of the Plan. This individual shall be a California licensed Architect or Engineer, LEED AP of appropriate specialty with full understanding of the sustainability design, construction processes and programs.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures

B. Section 01 35 35: Water Pollution Control
C. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)

D. Section 01 57 13: Temporary Erosion and Sedimentation Controls

E. Section 01 66 00: Product Storage and Handling Requirements

F. Section 01 74 19: Waste Management and Disposal

G. Section 01 78 23: Operations and Maintenance Data

1.03 REFERENCES

A. The following references are provided for Contractor's convenience in developing of the project specific Sustainability Plan. Contractor's attention is directed to the fact that some of the references provide Project requirements, while others are guidance documents. These references are not considered all inclusive. It is the expectation of Metro that the Contractor will supplement this information based on their working knowledge of the sustainability and current changing industry practices, throughout the life of the Contract.

1. Metro Sustainability Policy
2. California Code of Regulations, Title 24
   a. Part 1 - California Building Standards Administrative Code
   b. Part 2 - California Building Code
   c. Part 6 - California Energy Code
   d. Part 11 - California Green Building Standards Code (CAL Green Code)
   e. Part 12 - California Reference Standards Code
3. ASHRAE Standard 52.2 - "Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size"
7. Local Government Green Procurement Guide, California Sustainability Alliance, September 2010

1.04 QUALITY ASSURANCE
A. Comply with Project Quality Program Requirements (see 1.02 above).

1.05 SUBMITTALS

A. Refer to Section 01 33 00 – Submittal Procedures, for submittal requirements and procedures.

B. Contractor shall submit project-specific Sustainability Plan within 90 days after NTP.

C. Contractor shall submit progress updates to Metro monthly in the format specified herein and agreed upon with Metro or its designee, shall provide additional supporting information upon Metro request, and shall provide an updated sustainability report annually which adopts current approaches in the industry and reflects current Project status.

1.06 DEFINITIONS

A. Green Building: Holistic approach to demolition, design, construction, operation, maintenance, and deconstruction that minimizes the building's impact on the environment, occupants and the community. This practice expands and complements the classical building design concerns of economy, utility, durability, and comfort. Green building is also known as sustainable or high performance building.

B. Sustainability: actions melding the interests of environment, society, and economics, and supporting sustainable development which is in turn defined by the UN Brundtland Commission as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. For the public transportation industry, this means:

1. Employing practices in design and capital construction, such as using sustainable building materials, recycled materials, and solar and other renewable energy sources to make facilities as 'green' as possible.

2. Employing practices in operations and maintenance such as reducing hazardous waste, increasing fuel efficiency, creating more efficient lighting and using energy-efficient propulsion systems.

3. Employing community-based strategies to encourage land use and transit-oriented development designed to increase public transit ridership.

C. GHG: Greenhouse gases, gases which trap heat in the Earth's atmosphere and contribute to climate change, primarily carbon dioxide, methane, nitrous oxide, hydrofluorocarbons (HFCs) and perfluorocarbons (PFC), and sulfur hexafluoride (SF6).

D. LEED: US Green Building Council Leadership in Energy and Environmental Design LEED, a nationally recognized building certification program with formal, tiered levels of accomplishment based on documentation of accumulated points.

E. USGBC: US Green Building Council, a non-profit organization dedicated to sustainable building design and construction; also the developer of the LEED rating system.
F. Carbon Footprint: Total set of greenhouse gas emissions caused by an organization, event or product, expressed in carbon dioxide equivalent units.

G. Project Sustainability Plan: Project-specific plan that defines sustainability goals and details how these goals will be attained for the project.

H. Sustainability Measures: Designated measures to be incorporated to the Project Sustainability Plan, based on the Sustainability Measures Checklist.

1.07 APPROVALS

A. The Contractor shall submit Sustainability Plan, Design and Construction documents to Metro. Metro will seek recommendations from local municipalities with jurisdiction over portions of the Project and will require Contractor implementation of local municipality review comments that are approved by Metro.

B. Metro or its designee will perform appropriate inspections to verify and document the implementation of Metro-approved Sustainability Plan during design and construction.

PART 2 – PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. The Contractor shall furnish all design, materials, equipment, devices, appurtenances, facilities, and services required for preparing and modifying the project-specific Sustainability Plan, progress reporting, and for implementing the Plan and performing the specified Work.

PART 3 – EXECUTION

3.01 SUSTAINABILITY PLAN GOALS

A. The Sustainability goals for the Project, as a minimum, are to efficiently implement the mandatory sustainability measures as listed in the Sustainability Measures Checklist from the Current Edition of California Code of Regulations (CCR), CALGreen, Part 11 of Title 24, and record benefits associated with each measure. If the facility is greater than 10,000 square feet, Contractor shall follow the LEED guidelines to achieve a minimum of LEED Silver certification in accordance with Metro’s Energy and Sustainability Policy.

B. The Sustainability Measures and the Project's environmental requirements pertaining to sustainability shall be incorporated to the Sustainability Plan and their implementation status updated in all subsequent progress reports.

3.02 SUSTAINABILITY PLAN CONTENTS AND FORMAT

A. The Contractor shall prepare and implement Metro-Project specific Sustainability Plan which shall be organized as follows:
1. Introduction and Basis
2. Goals
3. Sustainability Commitments — list all sustainability elements (mandatory, voluntary or optional)
4. Implementation Process and Responsibilities
5. Monitoring Implementation, Measurement, Reporting and Verification
6. References

B. The Contractor's Sustainability Plan shall include mandatory and voluntary elements for sustainability on the Project and include a process for identifying and submitting to Metro for additional cost-effective sustainability opportunities as the Project progresses.

C. Capture of existing regulatory standards, local government policies and programs, and project requirements that reflect sustainability elements.

D. The Contractor's progress reporting on each criteria element shall be provided to Metro on a monthly basis in a tabulated format, listing the following for each criteria element:
   2. Detailed description of the Sustainability Criteria Element/commitment
   4. Environmental Benefits - Short and Long Term
   5. Implementation Method/Status/verification including reasons for non implementation

END OF SECTION 01 35 63
SECTION 01 35 66

GREEN CONSTRUCTION POLICY SPECIFICATIONS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Contractor’s responsibilities and obligations relative to the Los Angeles County Metropolitan Transportation Authority (Metro) Green Construction Policy. The Green Construction Policy establishes requirements for identifying and mitigating air emission impacts on human health and the environment; for reducing on-road and off-road mobile sources, as well as ancillary diesel-fueled equipment used during construction activities administered by Metro; for implementing feasible and appropriate Best Management Practices (BMPs); and for monitoring to ensure compliance with this policy.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures

B. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)

1.03 REFERENCES

A. California Code of Regulations (CCR):

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).

B. The Contractor will designate a qualified person on the Contractor’s staff to be responsible for compliance with this Section and providing the submittals.

C. The Metro Technical Representative or its designee will monitor Contractor’s performance of tasks specified, and will inspect necessary records, reports and procedures to ensure compliance with this Section.

1.05 SUBMITTALS

A. Refer to Section 01 33 00 - Submittal Procedures, for submittal requirements and procedures.
B. The Contractor shall submit the following documents prior to the issuance of a Notice to Proceed (NTP) to commence work on a construction project:

1. A certified statement signed and printed on the Contractor’s letterhead by the Contractor’s qualified person confirming that all construction equipment, on-road equipment and generators comply with the requirements in the Section. The certified statement will also include the Contractor’s qualified person’s name, title, business address, e-mail address, phone number and fax number. The Contractor’s qualified person will be responsible for compliance with this section and providing all the submittals listed in the Section. Use the attached Certification of Compliance sample form attached to this Section.

2. A list of all the construction equipment, on-road vehicles and generators, required under this section, with the following information:
   a. Construction Equipment including generators: Name of contractor or subcontractor responsible for equipment, equipment name and description, manufacturer, equipment serial number, engine model year, EPA Tier rating, horsepower rating, fuel type, type of emission control technology installed, manufacturer, device serial #, CARB-VDECS level and CARB Equipment ID number.
   b. On-Road Equipment: Name of contractor or subcontractor responsible for equipment, equipment name and description, make, model, year, vehicle identification number, engine model year, EPA Tier rating, horsepower rating, fuel type, type of emission control technology installed, manufacturer, device serial #, CARB-VDECS level and CARB Equipment ID number.

3. A copy of the certified EPA rating, CARB registration, or SCAQMD / AVAQMD permit for each applicable piece of equipment to be used onsite.

4. A monthly fuel usage log for all construction equipment, on-road equipment and generators. The monthly log shall be submitted in electronic format (in MS Word or Excel) and hard copy by the 7th day of each month during the project. Use the attached Monthly Fuel Usage forms attached to this Section.

5. Provide and attach copies of fuel delivery receipts identifying source of supply, quantity of fuel, and quality of fuel to the Construction Equipment Monthly Fuel Usage form.

6. If an unanticipated need for the use of construction equipment, on-road equipment or generators arises after construction has commenced or after the Contractor has submitted the information required by the above subsections, the Contractor shall provide such information for the unanticipated equipment within 14 days after an identified emergency or when the need arises and prior to the use of the equipment or vehicle.

1.06 DEFINITIONS

A. AVAQMD: Antelope Valley Air Quality Management District.

B. Best Available Control Technology (BACT): technology, verified by CARB, for an off-road vehicle that achieves reductions in PM emissions at the highest applicable classification level for diesel emission control strategies. A summary of CARB-verified
C. Best Management Practices (BMP): methods determined to be the most effective, practical means of preventing or reducing pollution.

D. CARB: California Air Resources Board.

E. CARB Classification Levels: levels of diesel emission control retrofit technologies, with Level 3 being the highest classification level, and the only level acceptable for a retrofit under this Section, except as provided for in this Section.

1. Level 3 is defined as retrofit technology that reduces diesel PM emissions by eighty-five percent (85%) or greater or reduces engine emissions to less than or equal to 0.01 grams diesel PM per brake horsepower-hour;

2. Level 2 is defined as retrofit technology that reduces diesel PM emissions by between fifty and eighty-four percent (50-84%);

3. Level 1 is defined as retrofit technology that reduces diesel PM emissions by between twenty-five and forty-nine percent (25-49%).

F. Construction Equipment: A vehicle or equipment that is powered by a non-road engine, fifty horsepower (50 HP) and greater, and that is not a motor vehicle or a vehicle used solely for competition, which shall include, but not be limited to, excavators, backhoes, cranes, compressors, generators, bulldozers and similar equipment.

G. Construction Project: A project that is performed on Metro properties or rights-of-way and involves the construction, alteration or repair of buildings, structures, or other real property. For the purposes of this definition, the terms “buildings, structures, or other real property” include, but are not necessarily limited to, improvements of all types to bridges, highways, parkways, streets, subways, tunnels, rail lines, sewers, and utilities. If the project is performed in collaboration with another agency or agencies or parties, including where the other agency or agencies or parties have the lead responsibility for construction, the Metro shall discuss with those agencies or parties the incorporation of the provisions of this Section into all agreements, including Memoranda of Understanding, between the Metro and the other agency or agencies or parties. Until such time, provisions of this Section shall only be used as a guideline in performing construction projects that receive/program Metro funds in whole or in part.

H. DECS: Diesel Emission Control Strategy.

I. EPA: U.S. Environmental Protection Agency.

J. Generator: An internal combustion engine used for power generation.

L. On-Road Equipment: typically vehicles intended by their manufacturer for use on public highways. On-road vehicles must be certified by their manufacturer with the U.S. Department of Transportation (DOT), National Highway Traffic Administration (NHTSA), as compliant with on-highway safety standards as well as certified to all applicable ARB and U.S. EPA on-road emission standards. Compliance with these standards is indicated by separate safety and emissions labels on the vehicle (e.g., worker commute vehicles, light-duty trucks, heavy-heavy duty trucks, delivery trucks, water trucks, vacuum trucks).

M. PM: Particulate Matter.

N. SCAQMD: South Coast Air Quality Management District.

O. Sensitive Receptor Site: a site that is within the definition provided in the CARB Air Quality and Land Use Planning Guidelines (2005) (http://www.arb.ca.gov/ch/landuse.htm) such as schools, daycares, playgrounds, and hospitals.


1.07 COSTS

A. Contractor shall be responsible for the costs associated with the use of construction equipment associated with the project. The Contractor shall be responsible for the costs associated with the use of construction equipment by any and all sub-contractors associated with the project, unless stated otherwise in a contractual document between Contractor and sub-contractor(s). Costs include, but are not limited to, the cost of compliant equipment, retrofit technologies, pollution control technologies, leased construction equipment and applicable permits/certifications for certain equipment.

B. Metro is not responsible for the costs associated with the use of construction equipment associated with the project.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 CONSTRUCTION EQUIPMENT AIR EMISSION CONTROL REQUIREMENTS

A. Construction Equipment:
   1. The Contractor will incorporate, where feasible, construction equipment with approved emission-reducing technology such as hybrid drives and specific fuel economy standards.
   2. Construction Equipment idling in excess of five (5) consecutive minutes will be prohibited, or except as allowed under Title 13 of the California Code of Regulations §2485 (CARB’s Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling).
3. The contractor will establish truck-staging zones for vehicles waiting to load or unload material at the construction site. Such zones will be located where diesel emissions have the least impact on abutters and the general public.

4. All construction equipment shall comply with the following EPA engine specification requirements (http://www.epa.gov/otaq/standards/allstandards.htm):
   a. Prior to December 31, 2011: All off-road diesel-powered construction equipment greater than 50 horsepower (hp) shall meet Tier-2 off-road emission standards at a minimum. In addition, all construction equipment greater than 50 hp shall be retrofitted with a CARB-verified Level 3 Diesel Emissions Control Device system (DECS).
   b. From January 1, 2012, to December 31, 2014: All off-road diesel powered construction equipment greater than 50 hp shall meet Tier-3 off road emission standards at a minimum. In addition, all construction equipment greater than 50 hp shall be retrofitted with a CARB-verified Level 3 DECS. Any emissions control device used by the Contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations.
   c. From January 1, 2015 and onwards: All off-road diesel-powered construction equipment greater than 50 hp shall meet Tier-4 off-road emission standards at a minimum. In addition, if not already supplied with a factory-equipped diesel particulate filter, all construction equipment shall be outfitted with Best Available Control Technology (BACT) devices certified by CARB. Any emissions control device used by the Contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations.

B. On-Road Equipment:
   1. Trucks or equipment hauling material such as debris or any fill material shall be fully covered while operating at, to and from the Metro construction project.
   2. Individual truck idling in excess of five (5) consecutive minutes will be prohibited, or except as allowed under Title 13 of the California Code of Regulations §2485 (CARB’s Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling).
   3. All on-road equipment will comply with the following engine specification requirements:
      a. Prior to December 31, 2013: All on-road heavy-duty diesel trucks or equipment with a gross vehicle weight rating (GVWR) of 19,500 pounds or greater shall meet or exceed the EPA 2007 on-road emission standards for PM (0.01 g/bhp-hr); or shall be equipped with a CARB verified Level 3 diesel particulate filter.
      b. From January 1, 2014 and beyond: All on-road heavy-duty diesel trucks or equipment with a GVWR of 19,500 pounds or greater shall comply with EPA 2007 on-road emission standards for PM and NO (0.01 g/bhp-hr and at least 1.2 g/bhp-hr, respectively).

C. Generators:
1. Every effort shall be made by the Contractor to utilize grid-based electric power at any construction site, where feasible.

2. Where access to the power grid is not available, on-site generators must:
   a. Meet a 0.01 gram per brake-horsepower-hour standard for PM; or
   b. Be equipped with BACT for PM emissions reductions.

D. Best Management Practices:
   1. In addition to the equipment requirements, the Best Management Practices (BMPs) listed below are imposed on all construction projects and shall include, at a minimum:
      a. Use of diesel particulate traps or best available control technology, as feasible;
      b. Maintain equipment according to manufacturers’ specifications;
      c. Individual truck idling in excess of five consecutive minutes will be prohibited, or what is allowed under Title 13 of the California Code of Regulations §2485 (CARB’s Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling);
      d. Maintain a buffer zone that is a minimum of 1,000 feet between truck traffic and sensitive receptors, where feasible;
      e. Where applicable and feasible, work with local jurisdictions to improve traffic flow by signal synchronization;
      f. If feasible and as allowed by local jurisdictions, configure construction parking to minimize traffic interference;
      g. Enforce truck parking restrictions, where applicable;
      h. Prepare haul routes that conform to local requirements to minimize traversing through congested streets or near sensitive receptor areas;
      i. Provide dedicated turn lanes for movement of construction trucks and equipment on- and off-site, as feasible;
      j. Schedule construction activities that affect traffic flow on the arterial system to off-peak hours to the extent practicable;
      k. Use electric power in lieu of diesel power where available; and
      l. Traffic speeds on all unpaved roads to be 15 mph or less.
      m. Suspend the use of all construction equipment during first-stage smog alerts.
      n. Suspend all excavating and grading operations when wind speeds (as instantaneous gusts) exceed 25 miles per hour.

E. Sensitive Receptors:
   1. The Contractor shall ensure that diesel emissions do not cause harmful effects to adjacent sensitive receptors.
      a. Contractors performing construction activities that are located within 1,000 feet of sensitive receptors shall notify each of these sites in writing at least thirty (30) days before construction activities begin. Notification shall include the name of
the project, a description of the location, the acreage of the construction site, the type and quantity of equipment and vehicles that will be operating at or near the site, the start date and reasonably anticipated duration of the construction, and contact information for a Metro community liaison who can answer any questions. The Contractor will include the Metro on the notification distribution list and will provide the Metro with a copy of all responses to the letter within ten (10) days of receipt of responses.

F. Enforcement:

1. Any violations of the requirements set forth in this Section shall be deemed to be a material breach of the Contractor agreement, and the Metro will use all available remedies including warnings, fines, requirement to remove equipment, institution of special assessments, and termination of contract.

2. Metro will conduct inspections of construction sites and affected construction equipment, on-road equipment and generators for compliance with this Section. The inspections will be conducted as part of existing Metro staff functions and without advance notice to the Contractor. The results of the inspections will be verified consistent with project contract requirements and in accordance with the enforcement provisions above.

G. Exceptions:

1. All construction equipment requirements within this Section shall apply unless any of the following circumstances exist and the contractor provides a written finding consistent with project contract requirements that:

   a. The Contractor intends to meet the requirements of this policy as to a particular vehicle or piece of equipment by leasing or short-term rental, and the Contractor has attempted in good faith and due diligence to lease the vehicle or equipment that would comply with this policy, but that vehicle or equipment is not available for lease or short-term rental within 200 miles of the project site, and the Contractor has submitted documentation to the Metro showing that the requirements of this Exception provision apply.

   b. The Contractor has been awarded funding by SCAQMD or another agency that would provide some or all of the cost to retrofit, repower, or purchase a piece of equipment or vehicle, but the funding has not yet been provided due to circumstances beyond the Contractor’s control, and the Contractor has attempted in good faith and due diligence to lease or short-term rent the equipment or vehicle that would comply with this policy, but that equipment or vehicle is not available for lease or short-term rental within 200 miles of the project site, and the Contractor has submitted documentation to the Metro showing that the requirements of this Exception provision apply.

   c. Contractor has ordered a piece of equipment or vehicle to be used on the construction project in compliance with this policy at least 60 days before that equipment or vehicle is needed at the project site, but that equipment or vehicle has not yet arrived due to circumstances beyond the Contractor’s control, and the Contractor has attempted in good faith and due diligence to lease or short-term rent a piece of equipment or vehicle to meet the requirements of this policy, but that equipment or vehicle is not available for lease or short-term rental.
within 200 miles of the project, and the Contractor has submitted documentation to the Metro showing that the requirements of this Exception provision apply.

d. Construction-related diesel equipment or vehicle will be used on a Metro construction project site for fewer than ten (10) calendar days per calendar year. The Contractor shall not consecutively use different equipment or vehicles that perform the same or a substantially similar function in an attempt to use this Exception to circumvent the intent of this Section. In any of the situations described above, the Contractor shall provide the next cleanest piece of equipment or vehicle as provided by the step down schedules in Table A for Construction Equipment and Table B for On-Road Equipment.

| Table A. Construction Equipment Compliance Step Down Schedule* |
|-----------------|-----------------|-----------------|
| Compliance Alternative | EPA Engine Standard | CARB-verified DECS (VDECS) |
| 1               | Tier 4           | N/A**            |
| 2               | Tier 3           | Level 3          |
| 3               | Tier 2           | Level 3          |
| 4               | Tier 2           | Level 3          |
| 5               | Tier 2           | Level 2          |
| 6               | Tier 2           | Level 1          |
| 7               | Tier 2           | Uncontrolled     |
| 8               | Tier 1           | Level 2          |

*Table A and Table B Use Instructions:

For example, if Compliance Alternative #3 is required by this Section, but a Contractor cannot obtain an off-road vehicle that meets the Tier 2 engine standard that is equipped with a Level 3 DECS (Compliance Alternative #3 in Table A) and meets one of the above exceptions, then the Contractor shall use a vehicle that meets the next compliance alternative (Compliance Alternative #4) which is a Tier 1 engine standard equipped with Level 3 DECS. Should the Contractor not be able to supply a vehicle with a Tier 1 engine equipped with a Level 3 DECS in accordance with Compliance Alternative #4 and has satisfied the requirements of one of the above exceptions as to the Contractor’s ability to obtain a vehicle meeting Compliance Alternative #4, the Contractor shall then
supply a vehicle meeting the next compliance alternative (Compliance Alternative #5), and so on. If the Contractor is proposing an exemption for on-road equipment, the step down schedule in Table B should be used. A Contractor must demonstrate that it has satisfied one of the exceptions listed in the selected Compliance Alternative # before it can use a subsequent Compliance Alternative. The goal is to ensure that the Contractor has exercised due diligence in supplying the cleanest fleet available.

**Tier 4 or 2007 Model Year equipment not already supplied with a factory-equipped diesel particulate filter shall be outfitted with Level 3 VDECS.

END OF SECTION 01 35 66
CERTIFICATION OF COMPLIANCE
WITH
GREEN CONSTRUCTION POLICY SPECIFICATION
SPECIFICATION SECTION 01 35 66

I hereby certify:

1. That the equipment(s) identified in the attached Contractor Construction Equipment List and Contractor On-Road Equipment List includes all equipment that will be utilized at the site and complies with all of the requirements within the TITLE Section 01 35 66.

2. If an unanticipated need for the use of construction equipment, on-road equipment or generators arises after construction has commenced or after we have submitted the information required by Construction Equipment Air Emission Control Specification Section 01 35 66, we shall provide such information using either the Contractor Construction Equipment List or the Contractor On-Road Equipment List, as appropriate within 14 days after an identified emergency or when the need arises and prior to the use of the equipment or vehicle.

3. That any discrepancy to the above will be reported to Metro point of contact within 10 business days.

4. That all of the above conditions will be followed. Any deviation will be considered a breach in the agreement.

5. I understand that my equipment(s) are subject to random and scheduled inspections to verify that the device(s) are installed and operating properly.

CERTIFICATION
I certify to the best of my knowledge that I will comply with the items listed in TITLE Specification Section 013XX and that I am the authorized signatory or designee for the Contractor.

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<th>Signature</th>
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<td>(Print Name)</td>
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| Company Address | Email Address |
# CONTRACTOR CONSTRUCTION EQUIPMENT LIST

## SPECIFICATION SECTION 01 35 66

**Project Name:**

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<tr>
<th>Contractor/Subcontractor Responsible For Equipment</th>
<th>Equipment Name and Description</th>
<th>Manufacturer</th>
<th>Equipment Serial #</th>
<th>Engine Model Year</th>
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* I hereby certify that the above information is a true and accurate account of all construction equipment that is currently scheduled to be utilized at the site.

_____________________________  ________________
Signature                                      Title

_____________________________  ________________
(Print Name)                                 Date

_____________________________
Company Name

_____________________________
Phone Number

_____________________________
Company Address

_____________________________
Email Address

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Green Construction
Policy Specification  01 35 66 - 11
Baseline: 05/01/12
## CONSTRUCTION EQUIPMENT MONTHLY FUEL USAGE REPORT

**SPECIFICATION SECTION 01 35 66**

**Project Name:**

**Contractor/Subcontractor Name:**

**Month/Year:**

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Green Construction Policy Specification 01 35 66 - 12 Baseline: 05/01/12
ON-ROAD EQUIPMENT MONTHLY FUEL USAGE REPORT

SPECIFICATION SECTION 01 35 66

Project Name: ________________________________  Page__of____

Contractor/Subcontractor Name: ________________________________

Month/Year: ________________________________

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SECTION 01 35 69

LEAD-RELATED CONSTRUCTION WORK

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Performing contract activities where lead containing materials (LCM) pose potential exposure over Permissible Exposure Limit for lead. Typical leaded materials include lead-based painted surfaces, lead in pipe welds, and lead in soils. It is the responsibility of Contractor to ensure that its employees are not occupationally exposed to lead during the construction activities, including demolition, excavation, and grading.

B. Metro will provide to Contractor results of lead surveys. Refer to Section 02 41 00 - Demolition, for reference to survey information. Survey report will contain information on locations, approximate quantities, and amount of lead found in buildings or structures. Based on site background data, Metro may test soil in areas where lead may be present. For other construction Work, it is the responsibility of the Contractor to identify and control lead hazards.

C. Scope of this Work extends beyond leaded-paint and lead abatement activities and includes construction Work, demolition, and renovation, including painting, salvaging, and maintenance.

D. If lead containing surfaces, such as coating or paint are present, stabilization of surfaces or removal of LCM from substrate is considered within Scope of this Work. Provide Lead Related Construction Work Safety and Health Plan that addresses, as a minimum, requirements of CCR, Title 8, Section 1532(c) "Compliance Program" which includes following lead-related issues:
   1. Exposure Assessment - Air Monitoring.
   2. Employee Information and Training.
   3. Medical Surveillance and Medical Removal Protection.
   4. Respiratory Protection
   5. Personal Protective Clothing
   6. Hygiene/Handwashing Facilities
   7. Signs
   8. Engineering Controls
   9. Housekeeping
   10. Record keeping
   11. Disposal of LCM
1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures

B. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)

1.03 REFERENCES

A. The following regulations apply to construction work-related to lead exposures (Construction Lead Standard):
   2. California Code of Regulations (CCR), Title 8, Section 1532.1
   3. Mine Safety and Health Administration (MSHA)
   4. Nationals Institute of Occupational Safety and Health (NIOSH)
   5. South Coast Air Quality Management District (SCAQMD):
      a. Rule 1420 - Emissions Standards for Lead
   6. Other applicable local, state, and federal regulations.

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above), and the following.

B. Employ specialist certified by California Department of Public Health, as Lead-in Construction Supervisor, to prepare lead related construction work safety and health plan and to supervise Work.

1.05 SUBMITTALS

A. Refer to Section 01 33 00 – Submittal Procedures, for submittal requirements and procedures.

B. Lead-Related Construction Work Safety and Health Plan showing Contractor’s conformance with this Section before starting Work specified under this Section.

C. Medical clearance and training records of employees who may be occupationally exposed to lead before starting Work specified under this Section.

D. Medical monitoring results taken within 20 days following completion of lead related work.
E. Name and credentials of specialist supervising lead-related Work and is preparing Lead-Related Work Safety and Health Plan.

F. Proof of Notice to SCAQMD pursuant to Rule 1420 - Emission Standards for Lead, within 10 days of Work which is sufficient for lead related construction work (no fee required).

1.06 DEFINITIONS (Not Used)

PART 2 – PRODUCTS

2.01 MATERIALS

A. Provide personal protective equipment and clothing (PPE) conforming to requirements set forth by Cal/OSHA and Federal OSHA appropriately certified by NIOSH and MSHA.

B. Provide vacuums and negative air machines complying with SCAQMD requirements and having necessary permits.

PART 3 – EXECUTION

3.01 PREPARATION

A. Prepare and submit Lead Related Construction Work Safety and Health Plan 10 Working days prior to disturbing any leaded material identified in lead survey. Refer to Article 1.05 - Submittal of this Section.

B. Submit documentation required by Section 01 33 00 – Submittal Procedures.

3.02 EXECUTION

A. Notify Metro if LCM is removed or disturbed from on or any substrate. Metro may test LCM and determine its disposition.

END OF SECTION 01 35 69
SECTION 01 35 70

ASBESTOS-RELATED CONSTRUCTION WORK

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Performing contract activities where asbestos containing materials (ACM) pose potential exposure over Permissible Exposure Limits for asbestos. It is the responsibility of the Contractor to ensure that its employees are not occupationally exposed to asbestos during the construction activities, including demolition, excavation and grading.

B. Metro will provide to the Contractor results of asbestos surveys. Refer to Section 02 41 00 Demolition, for reference to survey information. Survey report will contain information on locations, approximate quantities, and amount of asbestos found in buildings or structures. Based on site background data, Metro may test soil in areas where asbestos may be present For other construction Work, it is the responsibility of the Contractor to identify and control asbestos hazards.

C. Scope of this Work extends beyond asbestos abatement activities and includes construction Work, demolition, and renovation, including painting, salvaging and maintenance.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures

B. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)

1.03 REFERENCES

A. Except to the extent that more explicit or more stringent requirements are written directly into the CONTRACT DOCUMENTS, applicable codes, regulations, and standards have the same force and effect (and are made part of the CONTRACT DOCUMENTS) as if copied directly into the CONTRACT DOCUMENTS, or as if published copies are bound herewith.

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above), and the following.

B. Employ specialist certified by California Department of Public Health, as Asbestos-in Construction Supervisor, to prepare asbestos related construction work safety and health plan and to supervise Work.
1.05 SUBMITTALS

A. Refer to Section 01 33 00 – Submittal Procedures, for submittal requirements and procedures.


C. Copy of Contractor’s Certification of Contractor’s Performing Asbestos and Hazardous Waste Related Work.

D. Copy of Employee Asbestos training certificates.

E. Copy of South Coast Air Quality Management District (AQMD) Rule 1403 Notification.

F. Uniform Hazardous Waste Manifests (for friable ACM)

G. Non-Hazardous Waste Manifests (for non-friable ACM).

1.06 DEFINITIONS (Not Used)

PART 2 – PRODUCTS (Not Used)

2.01 MATERIALS

A. Provide personal protective equipment and clothing (PPE) conforming to requirements set forth by Cal/OSHA and Federal OSHA appropriately certified by NIOSH and MSHA.

B. Provide vacuums and negative air machines complying with SCAQMD requirements and having necessary permits.

PART 3 – EXECUTION

3.01 PREPARATION

A. Prepare and submit Asbestos Related Construction Work Safety and Health Plan 10 Working days prior to disturbing any asbestos containing material identified in asbestos survey. Refer to Article 1.05 -.Submittal of this Section.

B. Submit documentation required by Section 01 33 00 – Submittal Procedures.

3.02 EXECUTION

A. Abatement
1. Do not commence abatement activities until the Health and Safety Plan for ACM Abatement Work is approved by Metro, and a Rule 1403 Notification has been properly submitted to AQMD.

2. Provide personal air monitoring of workers and conduct quality control and regulated area monitoring throughout the duration of the Work, and have the most recent data on site.

3. See Section 1.01 for additional information.

B. Disposal

1. Use licensed Hazardous Waste Hauler to dispose of the ACM.

2. Obtain Metro approval of the ACM disposal facility. Do NOT haul ACM to a non-Metro approved facility.

3. Only Metro shall sign the Hazardous Waste Manifests and Non-Hazardous Waste Manifests associated with the disposal of the ACM.

C. Clearance Testing

1. Contractor shall provide a Certificate of Inspection to Metro after ACM abatement activities are completed.

2. Indicate, in the Certificate of Inspection, that final air sampling was performed, and the results of the air sampling meet regulatory limits.

D. Closure Report

1. Prepare a Draft Closure Report within 10 days of the completion of ACM abatement. MTA will review and comment on the Draft Closure Report.

2. Describe or include the following in the Closure Report(s) (one bound submittal of each report).
   a. A copy of the Daily Logs
   b. A copy of permits for the equipment used (e.g., Negative Air Machines).
   c. Copies of all personal air monitoring logs.
   d. Copies of all tare tickets, manifests, and bills of lading for ACM waste disposed.

3. Prepare a Final Closure Report within 15 days of receiving MTA’s comments on the Draft Closure Report.

END OF SECTION 01 35 70
SECTION 01 35 91

HISTORIC TREATMENT PROCEDURES

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Coordinating excavation operations with Project Archaeologist (PA), temporary suspension of excavation operations at specific isolated locations for archaeological and paleontological excavations, and relocating excavation operations temporarily to bypass archaeological discovery sites.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures

1.03 REFERENCES

A. California Public Resources Code:
   1. Chapter 1.7 - Archaeological, Paleontological, and Historical Sites, Section 5097.5(a)
   2. Chapter 1.75 - Native American Historical, Cultural, and Sacred Sites, Section 5097.98.

B. Native American Heritage Commission (NAHC)

1.04 QUALITY ASSURANCE (Not Used)

1.05 SUBMITTALS

A. Refer to Section 01 33 00 – Submittal Procedures, for submittal requirements and procedures.

B. Discovery Plan prepared by one or more of following responsible parties:
   1. Environmental Compliance and Services Department (ECSD) Staff
   2. Project Engineer
   3. Archaeologist/Paleontologist

1.06 DEFINITIONS (Not Used)

1.07 WORKSITE CONDITIONS
A. Pre-Construction Meeting: Before commencement of excavation at Worksite, hold pre-excavation meeting to discuss excavation methods to be used in field, and establish lines of communication between Design-Builder, Metro, and PA regarding archaeological or paleontological discoveries and their removal.

1. Metro will familiarize Design-Builder, by means of a 1 hour training class, with specific types of archaeological or paleontological materials that may be encountered, extent of cooperation with PA, and methods of dealing with discovery of resources.

2. Metro will familiarize PA with construction procedures.
   a. Design/Build Contractor will video tape the class.
   b. D/B Contractor will show it to every new construction employee that may be involved with earth-disturbing work.
   c. D/B Contractor's employee will sign a note of having seen the video, and will be compliant with the requirements of this Spec.

B. Metro will remain single authority on Worksite.

1. Coordination between PA and Design-Builder shall flow through Metro

2. Metro will provide project Archeologist.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 COORDINATION

A. Coordinate excavation operations with PA.

1. PA will be responsible for monitoring removal of earth from tunnel or station sites, cut-and-cover locations, and surface excavations for archaeological or paleontological resources.

2. If such resources are encountered, PA will determine significance and, if required, will recover resources and associated data.

3. If archeological or paleontological resources are encountered on Caltrans Right of Way Caltrans, PA will notify Metro.

3.02 MONITORING

A. PA will provide monitoring of excavation to ensure discrete deposits and individual archaeological or paleontological features are not inadvertently lost.

B. PA will assign trained monitor to observe earth moving activities.
1. It may be necessary to temporarily suspend earth moving activities if archaeological or paleontological resources are found.

2. PA will determine type, period and significance of resource and appropriate excavation and removal procedure to be followed.

C. Monitoring activities will continue until excavation has passed zone where archaeological or paleontological finds are considered likely.

3.03 TREATMENT OF DISCOVERY

A. Although unlikely, discovery of human remains is a possibility.

1. If archaeological or paleontological deposits are encountered during excavation, temporarily halt Work in immediate area so that PA can conduct evaluation to determine whether discovery is significant.

2. In event of accidental discovery or recognition of human remains during construction, based on State of California Health and Safety Code Section 7050.5, implement following course of action immediately by PA, Metro, Construction Manager, or authorized site representative:
   a. Work around paleontological discovery, evaluation and data recovery to minimize work stoppage.
   b. No further excavation or disturbance of Worksite is to occur within 100 feet.
   c. Have construction personnel promptly vacate 100 foot buffer zone.

3. Immediately notify County Coroner of find (by PA or Metro).

4. There is to be no further activity at Worksite until Coroner has made determination of origin and disposition, pursuant to California Public Resources Code Chapter 1.7 – Archaeological, Paleontological, and Historical Sites, and Chapter 1.75 – Native American Historical, Cultural, and Sacred Sites Section 5097.98.

5. If human remains are determined to be prehistoric, Coroner will notify Native American Heritage Commission (NAHC), and NAHC will determine and notify Most Likely Descendent (MLD).
   a. MLD is to complete inspection of Worksite within 48 hours of notification.
   b. MLD then has opportunity to recommend to Metro or person responsible for excavation work, means for treating, with appropriate dignity, human remains and associated grave goods.

3.04 RECOVERY

A. When PA determines archaeological or paleontological discovery is significant, provide labor, materials and equipment to excavate, load, transport and unload discovery within Project limits as requested by PA and accepted by Metro.

END OF SECTION 01 35 91
PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Requirements for the Contractor to meet the intent of Metro’s Construction Project public outreach, stakeholder communications, and construction impact mitigation procedures (Construction Relations).

B. Support all public outreach and notifications program related to environmental compliances and Construction Relations’ Standard Operating Procedures.

C. Provide resources, technical information, schedule dissemination of information, public outreach and notifications, construction signage, logistical and other assistance as specified to support the Metro’s Construction Relations Team in providing the public with accurate, timely project information.

1. Metro’s Construction Management Team will retain responsibility for overall project communications, outreach, and public relations.

2. The Contractor and related Public Information Coordinator (PIC), under general direction of the Metro Construction Relations Manager (MCRM), shall produce activity specific notifications and provide construction specific responses to constituents directly impacted by Project and construction activities.

1.02 RELATED SECTIONS (Not Used)

1.03 REFERENCES (Not Used)

1.04 QUALITY ASSURANCE (Not Used)

1.05 SUBMITTALS (Not Used)

1.06 DEFINITIONS (Not Used)

1.07 GENERAL REQUIREMENTS

A. The Contractor and designated Public Information Coordinator (PIC) will have the primary responsibility for ensuring that all construction activities, related schedules and potential impacts and mitigations are communicated in a timely manner to MCRM and will serve as additional support to the Construction Relations Team (CRT).

1. To facilitate this effort provide the following:
a. Construction Relations Liaison: Provide at minimum, one dedicated full time position Public Information Coordinator (PIC) who is accessible 24/7 to both the Contractor’s team and Metro Construction Relations.

1) This person shall attend all Project update meetings, possess and maintain broad base current knowledge of all Project activities, schedules and impacts to integrate on a regular basis with personnel who are knowledgeable about the Project to serve as the key liaison to Metro Construction Relations.

2) PIC will help in coordinating construction related issues, such as noise and vibration monitoring; and will assist with implementation of mitigation measures.

3) PIC may be co-located with CRT at the Integrated Project Management Office and shall be available to meet with MCRM at least once per week and more frequently as needed.

b. Public Information Coordinator’s Responsibility: The PIC will support CRT as needed, by preparing, translating and disseminating construction notices. CRL will be responsible for preparing graphic renderings and creating detour maps.

2. Notices: A construction notice template will be provided by PIC which will include: activity description, dates of the activity to be performed, hours when Work is to be conducted, what to expect/detours and anticipated impacts.

a. Notices will be created for every activity taking place in the public right-of-way, for those activities on private property that will take place over an extended period of time and for those activities which may have a public impact.

b. Construction notices may be translated as required for reaching the demographics of the community prior to their dissemination.

c. Be responsible for distributing anywhere from a few hundred to several thousand copies door-to-door in every direction from the point of activity and will be responsible for providing an electronic high resolution copy to Construction Relations; both of which must happen at least 72-hours before the activity begins.

d. In addition to door-to-door distribution, the Contractor may also be asked to distribute to major institutions within the alignment.

3. Renderings: Be responsible for creating high resolution topographically correct electronic renderings of different facets of the Project.

a. The elements of the electronic renderings will also depict final striping and landscaping per final design.

b. These graphic renderings will serve to educate the public on major construction activities such as decking, tunneling, building protection (grouting) and like items.

4. Maps: The maps will be used to illustrate to the public what the approved detours are for construction activities requiring street or lane closures.

a. The Contractor will be provided approved design guidelines to be followed for these.
b. The PIC may be in a position to contract for some of the services locally, preferably along the project alignment for preparation of Maps, Renderings, or Notices.

5. Complaints: The PIC will be responsible for facilitating complaint oriented field reports submitted by CRT from initiation and research investigation through resolution.
   a. Copies of all communications must be submitted to the MCRM.
   b. The Liaison will also provide a status report on all outstanding cases monthly.

6. Meetings: Invite CRT to all field and internal meetings where construction activities and schedules are discussed (i.e., construction progress meetings, readiness review meetings, field meetings, or partnering sessions.)

7. Schedule: Provide Construction Relations an updated, accurate schedule of construction activities on a weekly basis.
   a. Changes to that schedule need to be communicated immediately. The schedule shall be accompanied by detailed descriptions of activities that will produce noise with the proposed efforts to mitigate the impacts.

8. Play-of-the-Day: Provide Construction Relations a Play-of-the-Day which represents all traffic related detours and activities for any given day.
   a. These will be provided daily to Construction Relations by a specified time.

9. Be available to attend community meetings, briefings, elected officials briefings or presentations as requested.
   a. Construction Relations will coordinate scheduling and provide background and as much advance notice on requests to present as possible.

10. Request through Construction Relations meetings with elected officials when seeking changes to current work plan (e.g., expedited schedule, night time work, and like items.)
   a. The Contractor will be responsible for presenting plans.
   b. Construction Relations will facilitate requests for presentations to elected officials and will also accompany the Contractor.

11. Request MCRM or its designee to accompany the PIC or its representative (superintendents and field staff included) to all project briefings with the public.

12. Coordinate with Construction Relations to resolve community complaints related to traffic detours and other third party impacts that may arise to ensure mitigating measures are noted and successfully communicated.

13. Maintain current roster and inform Construction Relations of Superintendents’ names and cell numbers for all night time activities.

14. Establish an emergency call out procedure in coordination with Construction Relations.

15. In accordance with the Design-Build requirements, coordinate with the Construction Relations Manager the public participation review process for issues related to final design (e.g., landscaping, materials selection, and like items.)
B. Access Information, Staff and Noticing Assistance:

1. Coordinate with Metro Construction Relations initial notifications and circulation of regular Work Schedules and planned activities;

2. Provide Metro Construction Relations at least 10 Days notice, to ensure directly impacted parties are given advanced notice for commencement of major construction activities on private property.

3. Make the construction site available on an as-needed basis for Metro Construction Relations staff to conduct on-site community relations/government relations Project tours as needed.
   a. A Metro Construction Relations staff member will coordinate with Public Information Coordinator and Contractor regarding visitor safety issues and to minimize interruptions to construction activity;

4. Work out a protocol for access to Worksite with the Metro Construction Relations prior to the start of construction.

5. Designated Metro Construction Relations staff shall receive advance notification of, and be included in all scheduled and unscheduled weekly Progress Meeting and Readiness Review Meetings, Site Meetings.
   a. Provide appropriate technical and community relations representation for Metro meetings as needed.

C. 24-Hour Access:

1. Ensure that the Public Information Coordinator is available 24/7 to facilitate after hour complaints with field staff and in partnership with Metro Construction Relations.

2. Contact the assigned Metro Construction Relations representative(s) through the designated device and number to make immediate contact and report all urgent information both during regular business hours and after hours.

3. All Projects inquiries from media and the general public made directly to the Contractor shall be forwarded to Metro Construction Relations for a response.

4. Direct interactions and responses to Contractor notifications shall be forwarded to Metro Construction Relations for facilitation.

D. Emergency Notification Procedures:

1. Include the Metro Construction Relations Manager, Director and/or assigned Metro Construction Relations staff representatives in the Contractor’s emergency notification procedures for the Project; and

2. Include the Metro Construction Relations Manager and/or Metro Construction Relations assigned staff representatives as points of contact for emergency notification.

E. Equipment:

1. Provide staff with safety equipment and materials (hard hats, vests and other appropriate items) and appropriate safety briefings necessary for Work site tours.

F. Worksite Maintenance:
1. Provide clean up as necessary for tours and visits by dignitaries, and for special events.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 PUBLIC AND BUSINESS IMPACTS MITIGATION PLAN

A. While Metro Construction Relations has the primary responsibility for all public interface on this Project; the Contractor shall provide details of public and business impacts mitigation plan on key issues.

1. Include a narrative explaining what actions will be taken to mitigate potential impacts as a result of Project and construction activities.

2. Outline in detail how each of the following issues will be addressed during construction and specifically how Contractor will proactively address complaints related to:
   a. Noise
   b. Vibration
   c. Dust and Truck Tire Track Out
   d. Traffic Control, Truck Haul Routes and Contractor Staff Parking
   e. Access to homes, businesses and institutions
   f. Night time construction
   g. Pedestrian Access and Safety

3.02 MONTHLY STATUS REPORT

A. Metro Construction Relations will submit complaint oriented field reports on behalf of the public for alleged damages.

1. Under the Contractor Carried Insurance Program, the Contractor has the responsibility of evaluating and resolving all complaints directly with the complainants.

2. Provide Metro Construction Relations copies of all communications with complainants and a written monthly status report on all complaints, including when the cases are closed.

B. Coordinate with Construction Relations on established field report protocols related to alleged damage complaints.

3.03 CONTACT WITH NEWS MEDIA/MEDIA PROTOCOL

A. Metro Construction Relations manages and coordinates all external communications on
the Project.

1. In the event there is a media-related request from Construction Relations, the Contractor shall be prepared to assist with logistics coordination for press/media/milestone events

3.04 SPECIFIC INFORMATION

A. Should an event or incident, or other Project circumstance develop which is likely to generate community or media interest, inform Metro Construction Relations immediately, and cooperate with Metro direction with regard to content and distribution of information.

1. Ensure that all field supervisor and other management personnel have been informed of Metro’s emergency notification procedures in the event of an emergency.

3.05 VISUAL COMMUNICATIONS

A. The Contractor will be responsible for the creation of maps that identify approved detours.

1. A map style guide will be provided to the Contractor for this purpose.
2. The maps will be used for construction notices and for electronic media.
3. As such, they shall be created as high resolution electronic files.
   a. Samples of previous maps can be provided upon request.

B. Be prepared to provide at minimum 10 high resolution, topography accurate electronic renderings with the approved striping, landscaping and final conditions when appropriate of various project elements.

1. These would be limited to electronic renderings of cut and cover, decking, tunneling, station box construction, and like items.
   a. Samples of previous renderings can be provided upon request.

C. The Design-Builder may be required to assist Metro with the provision of business exposure or temporary directional signage for those properties directly impacted due to construction and shall undertake to perform this work as directed by Metro.

END OF SECTION 01 35 95
PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Project Quality Program requirements to ensure compliance with contract documents, applicable regulatory requirements and industry standards.

B. Project Quality Program, supported by specific and detailed procedures, defines project organization, processes, and responsibilities that will ensure construction, procured equipment and materials, installation and testing will comply with specified contract documents.

1.02 RELATED SECTIONS

A. Section 01 31 03: Design Management Requirements

B. Section 01 33 00: Submittal Procedures

C. Section 01 78 39: As-Built Drawings and Current Status Documents

1.03 REFERENCES

A. California Code of Regulation (CCR), Title 24:
   1. Part 2 - California Building Code (CBC)

B. Los Angeles County Metropolitan Transportation Authority (Metro):
   1. Metro CADD Standards

1.04 QUALITY ASSURANCE (Not Used)

1.05 SUBMITTALS

A. All Submittals shall meet requirements of Section 01 33 00 - Submittal Procedures.

B. Project Quality Program Manual shall meet requirements of this Section.

C. Design Quality Program and Procedures shall meet requirements of this Section.

D. Design Quality Control Manager resume

E. Design Manager resume
F. Design Unit Plan meeting requirements of this Section.

G. Third Party Coordination Plan meeting requirements of this Section.

H. Project Instructions, Procedures, and Drawings meeting requirements of this Section.

I. Source Inspection List: Includes identification of suppliers and manufacturers of materials and components to be incorporated in Work.

J. Inspection and test Instructions that define inspection requirements for source, receiving, in-process and final inspection and test.

K. Current qualifications and certifications of independent test laboratories that will be used for job control testing in accordance with this Section.

L. Current qualifications and certifications of test and inspection personnel employed by laboratories identified in this Section.

M. Construction Work Plans meeting requirements of this Section.

N. Personnel Qualifications meeting requirements of this Section.

O. Material Safety Data Sheets (MSDS): Manufacturer’s Material Safety Data Sheets for each type of material used in Work.

1.06 DEFINITIONS (Not Used)

1.07 SPECIAL INSPECTION

A. Metro Responsibility:
   1. Obtaining and paying for services of registered deputy inspectors to perform “Special Inspections” required by building permit and California Building Code (CBC).

B. Contractor Responsibility:
   1. Obtaining and paying for services of an Independent Testing Laboratory as defined herein.
   2. Do not use results of Special Inspections or results of inspections conducted by Metro or its designee or other agency in fulfillment of requirements of this specification.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 PROJECT QUALITY PROGRAM
A. Project Quality Program Manual (PQPM):

1. Prepare Project Quality Program Manual describing project organization’s processes and responsibilities that will ensure design, construction, procurement of equipment and materials, installation and testing. The Project Quality Program Manual will comply with specified requirements of the contract documents.
   a. Obtain Metro Quality Management approval of Project Quality Program Manual before Work is authorized to start.
   b. After approval by Metro Quality Management, do not revise Project Quality Program Manual without prior written approval of Metro Quality Management.

B. Address following in PQPM as a minimum:

1. Project Quality Organization:
   a. Project Quality Organization (PQO) (“Project Quality”) and individuals responsible for executing quality responsibilities will report to executive level of management which is independent from line organizations responsible for performing Work.
   b. Provide organizational charts illustrating Project Quality Organization’s internal and external reporting relationships as well as relationship to sub-tier contractors or consultants and Independent Testing Laboratory. Include these charts in PQPM for approval by Metro Quality Management before start of Work.
   c. Assign a Project Quality Assurance Manager (PQAM) to Project, who will be responsible for Project Quality Program functions and meet the following requirements:
      1) Individual available at Worksite location or offsite locations, as required, to perform or support all Quality related activities.
      2) PQAM reports directly to contractor executive management personnel with responsible in charge of project execution and contract compliance.
      3) PQAM does not have responsibility for project construction, cost, schedule, or design.
      4) PQAM shall not be an employee of the Contractor’s Independent Testing Laboratory or sub-tier contractor.
      5) PQAM has authority to stop affected Work, control further processing, or prevent shipment of items that do not meet contract quality requirements.
         a) Stop Work Order written by PQAM can only be removed by PQAM.
         b) PQAM notifies Metro when Stop Work Order is issued and when it is removed.
   d. Design/Build (D/B) Management Responsibilities:
      1) Ensure that Project Quality Organization has adequate resources to fulfill requirements of this section and other Contract requirements.

2. Quality Management Personnel Qualifications:
   a. Project Quality Assurance Manager (PQAM):
1) Bachelors degree from accredited four-year educational institution in quality, an engineering discipline, engineering technology, management, business administration or related field and minimum of fifteen years Quality experience, at least five years of which is in Quality management position and is a professional engineer licensed in the state of California.

2) Educational requirements may be waived by Metro Quality Management based on additional courses, certificates or specified training in welding, non-destructive testing, construction engineering, electrical systems design or testing, knowledge of heavy civil construction related to rail and rail systems design, structures, tunnel construction, including construction or manufacture or testing of trackwork components; Rail Systems elements such as Traction Power, OCS, Communication and Train Control systems.

b. Design Quality Assurance Manager (DQAM):
   1) Bachelors degree from accredited four-year educational institution in quality, architecture, or engineering, or related field and minimum of ten years experience, at least three years in Quality management position and is a professional engineer licensed in the state of California.

   2) Specific design quality experience as identified in this Section above may be substituted for education, subject to approval by Metro Quality Management.

c. Design Manager (DM):
   1) Degree from accredited four-year educational institution in architecture or engineering, or related field and minimum of fifteen years experience, including participation in another project of similar size and complexity in leadership position and is a professional engineer licensed in the state of California.

d. Quality Engineers, when Utilized by Contractor:
   1) Bachelors degree from accredited four-year institution in engineering, engineering technology, management, business administration or related field and minimum of three years project quality experience.

   2) Specific quality experience may be substituted for education, subject to approval by Metro Quality Management.

e. Lead Inspectors, when Utilized by Contractor:
   1) Ten years related construction inspection experience plus at least two years as lead inspector, as minimum.

   2) Lead Inspectors report directly to Project Quality Assurance Manager.

f. Inspection and Test Personnel:
   1) Experience and training commensurate with Work to be performed.

   2) Minimum of two years experience for type of Work to be inspected.

   3) Identify activities such as special process requiring qualified/certified production, inspection and test personnel and establish minimum competence level and describe in Contractor’s Quality Procedures.

   4) Inspectors report directly to Lead Inspectors.
g. Submit personnel qualifications/certifications of Project Quality personnel to Metro for review and approval before assignment to Project.

3.02 DESIGN CONTROL

A. General:

1. Design/Builder’s (D/B) Design Organization:
   a. Produce complete final design of Project as defined in Project Definition Documents.
   b. Design Organization may be a consultant or in-house Metro design team qualified and experienced in design of similar Work.
   c. Prepare design documents including, but not limited to, design and construction drawings, project specifications, and other design and engineering reports, calculations and documents to complete design in conformance with Contract requirements.
   d. Implement requirements of this Section and impose them on sub-tier design organizations.
   e. If D/B subcontracts design work to outside design firm, organization shall have its own parallel Design Quality Program and staff interfacing with D/B’s Quality organization.
   f. Subject to Metro approval, design portion of Work may be described in separate Project Design Quality Manual (PDQM) that is subordinate to D/B’s Project Quality Program Manual (PQPM).
      1) Include in PDQM design control procedures to define processes and responsibilities to control and verify that contractual engineering design requirements are met.
      2) Describe interfaces among design organizations and sub-consultants.
      3) Address in PDQM applicable elements of this portion of this document and submit to Metro for review and acceptance within 14 days of Notice to Proceed (NTP).
   g. Designate Design Manager (DM) to manage Work performed by D/B’s design organization.
      1) Designate DM with sufficient experience and background necessary to lead design effort for this Project.
      2) Submit DM’s credentials to Metro for approval within 5 days of NTP.
   h. Designate Design Organization Design Quality Control Manager (DQC M) to manage implementation of Design Quality Program.
      1) Submit credentials for QDCM-DQM for approval by Metro within 5 days of NTP.
      2) Depict design organization structure on organizational chart in PDQM.
      3) Design organization may implement unified design quality program applicable to every design sub-consultants in lieu of individual quality programs for each
4) Include in **PDQM** description of interface with D/B’s organization.

i. If design organization is subconsultant to D/B, include design coordinator in D/B organization to serve as point of contact with design organization.

j. Train every person engaged in design process on provisions of Design Quality Program.

**B. Design Units:**

1. Within 30 days from NTP, develop and submit for approval, plan and schedule for packaging design documents for Work into series of groupings or Design Units.

   a. Design Units: Consist of Units of Work that provide logical and efficient method for completing Project within approved project schedule and in conformance with Contract Documents.

   b. Divide Project into two broad categories, Facilities and Systems, and then divided into Design Units.

2. Include in facilities portion of Contract, but not limited to, those structures that comprise static physical portions of Project such as trackway and stations, bridges, utilities, streets, drainage facilities, fencing, access roads, retaining walls, landscaping, irrigation equipment, signage, yards and shops, stations and appurtenances forming permanent structures.

3. Systems portions of Contract are those items and components that comprise station communications, traffic signals with train control interface, train control system, traction power system and, electrical and electronic portions associated with train operations of permanent project.

**C. Design Stages:**

1. As specified in Contract or based on approval from Metro, make design review submittals to Metro and Third Parties at identified stages, or milestones in design progress, such as 60%, 85%, 100% and issued for construction.

   a. Identify these milestones in Metro approved project schedule.

   b. Identify design documents submitted for milestone review on each drawing and document with date and milestone review (ex: 85%, mm/dd/yr).

2. D/B is responsible for scheduling adequate time periods to allow completion of design quality activities including intra- and inter-discipline reviews, Metro and Third Party reviews and comment disposition.

**D. Third Party Coordination Plan:**

1. Provide Third Party Coordination Plan by D/B that includes names of Governmental and Utility entities and probable contact persons at each agency or entity.

2. Describe interfaces in Plan, including types of permits, approvals, coordination, and inspections anticipated for Project.

3. Submit Third Party Coordination Plan to Metro for approval within thirty days of NTP.
E. Design Document Preparation:

1. During design process, develop project-specific specifications in Construction Specifications (CSI) format.
   a. Prepare project specific drawings based on specific materials, products, equipment, procedures and methods D/B intends to use to comply with Contractual requirements.
   b. Metro supplied specifications may be used if they are appropriate.

2. Provide Drawings conforming to Metro CADD Standards unless otherwise directed by Metro.
   a. Provide Drawings suitable for reproduction in 11x17 inch size; each character and line shall be clearly distinguishable.

3. Use of Building Information Modeling (BIM) (provisions to be developed)


5. Provide final design documents to be used for construction signed and sealed by appropriate registered architect or engineer currently licensed in State of California.

F. Design Process:

1. Design control and review is required of design documents, including but not limited to drawings, sketches, specifications, technical provisions, calculations, reports, studies, and like items.

2. Translate design inputs, applicable City, County, State, Federal and Caltrans Codes and Standards, contract documents, and other applicable quality and technical requirements into design documents.
   a. Field verify as-built information being used prior to incorporation into design.

3. Formally check calculations using independent and qualified reviewer.
   a. Make documentation of checking process available to Metro for review.

4. Validate computer programs used for design calculations to demonstrate that program produces valid solutions.
   a. Maintain evidence of validation and make available to Metro upon request.
   b. Control changes to computer programs to ensure that changes are verified and approved by authorized individuals.

5. Interim or Pre-final (60 – 85%) Design for each Design Unit:
   a. Includes but is not limited to, general configuration of facilities and equipment, horizontal and vertical alignments, cross-sections, typical sections, plan and elevation views, equipment layouts, structure layouts, design reports and similar level of design for features included in Design Unit.
   b. Submit initial documentation required to request deviations from Metro or Third Party design criteria or standards with review package.

6. Unless otherwise directed by Metro, conduct constructability review of 85% submittal and transmit report of results along with submittal package.
7. Final Design Unit Submittal:
   a. Includes but is not limited to, detailed, 100 percent complete and checked Design Drawings, Project Specifications, reports, supporting calculations and design documentation necessary for final Metro and Third Party approval and for construction of Design Unit Work.
   
   b. Provide documentation, including but not limited to, written approval of design deviations from Metro or Third Party design standards and criteria, to Metro prior to Final Design Submittal.

G. Design-Builder Internal Design Reviews:
   1. Conduct internal design organization design reviews prior to each milestone design stage submittal.
   
   2. Conduct design reviews to evaluate and determine that appropriate design, design interface, quality, safety and reliability standards have been specified; that parts, materials, equipment and processes are appropriate to application.
   
   3. Verify through design review that design complies with contract requirements, including following:
      a. Accuracy;
      b. Adequacy;
      c. Conformance to standards of practice;
      d. Compliance with codes and standards;
      e. Cost effectiveness;
      f. Quality;
      g. Fitness for purpose or function as specified in Contract.
   
   4. Perform design review activities using individuals other than those who originated design with qualifications at least equal to those of design originator.
   
   5. Conduct each design review process as separate and independent review activity.
      a. Conduct Intra- and Inter-discipline reviews serially.
      b. It is responsibility of Design Builder to allow adequate time in project schedule for design reviews.
   
   6. Document design reviews and retain records until design package is issued for construction.
      a. Prepare and implement design review procedures and design review checklists for each design review process identified below:
         1) Perform Intradiscipline design review of design documents within originating engineering discipline to ensure design is consistent with applicable design criteria, standards, codes and other governing requirement documents;
         2) Use Intradiscipline design review to verify that resolutions of previous review comments have been incorporated into design documents.
         3) Perform Interdiscipline design review of design documents after
intradiscipline reviews have been completed to verify design compatibility among interfacing engineering disciplines, and to identify and resolve design conflicts;

4) Identify and subject to design review design interface review between (a) this contract area of responsibilities and existing Metro contracts and (b) among Contractor’s subcontracts.

5) During design development process, Metro may meet with design organization and review in-process design work.
   a) DM is responsible for documenting comments made in meeting and for providing written resolution within 15 days.
   b. Resolve comments resulting from each review process and incorporate into design documents before subsequent review is started.

H. Metro and Third Party Design Reviews:

1. Do not commence Metro and Third Party Design Reviews until required D/B Internal design reviews have been completed.

2. Provide Metro three copies of each submittal that has been submitted to local jurisdiction or other Third Party for approval within seven calendar days.

3. Include in each Design Review Submittal package Design Drawings, Project Specifications and supporting data, reports and such information as needed to advance to next stage of design or start of construction whichever is applicable.

4. Submit Design Unit review document packages to reviewers in accordance with his approved schedule using Metro’s Document Collaboration System.
   a. Submit hard copies of design documents, in quantities required, to those Third Parties that do not have capability to utilize Metro’s Document Collaboration System.
   b. D/B shall be responsible for submitting necessary design documents to applicable third party agencies including City of Los Angeles and applicable departments within city, County of Los Angeles Department of Public Works, Caltrans and others.
   c. If Third Party review is not concurrent with Metro review, submit copies of submittals made to Third Parties.

5. Metro comments will be provided to D/B using Document Collaboration System.
   a. Third Party comments will be provided to D/B in written form by Third Party in their format.
   b. D/B may receive separate comment packages from each sub-unit and group within organization that reviews design submittal.
   c. Regardless of form of comments, D/B is responsible for providing written responses and resolutions prior to re-submittal to Metro and Third Parties for design review comments received.

6. Track Metro and Third Party design review comments until comments are resolved.
   a. Submit design comments and resolutions to Metro with next review cycle.
I. Design Review and Comment Resolution Meetings:
   1. Joint comment resolution meeting may be scheduled by D/B to discuss responses to Metro and Third Party review comments and to determine review comments to be incorporated into design documents.
   2. More than one joint comment resolution meeting per design submittal may be necessary in order to discuss design review comments.
   3. Prepare meeting notes of comment resolution meetings and submit them to Metro within five days for review and concurrence.

J. Certification of Design:
   1. When design units are finalized for submittal to D/B for construction, conduct assessment and evaluation of design by DM and certify that design satisfies Contract requirements, including following:
      a. Design has been checked in accordance with D/B's Metro-approved Project Quality Program Manual or Design Quality Manual.
      b. D/B has obtained required Third Party approvals and permits.
      c. Design documents meet Contract requirements.
      d. Work shown on Design Documents is ready for construction to completion.
   2. When design units are finalized for submittal to D/B for construction, obtain certification from DQM that design development process has been conducted in accordance with D/B's Metro-approved Project Quality Program Manual or Design Quality Manual and procedures.

K. Design Review of Major Temporary Works:
   1. Conduct design review of Major Temporary Works that represent complex structures and that potentially may affect safety, quality and durability of Permanent Works.
      a. Review includes effect of Major Temporary Works on Permanent Works, with Metro and Third Parties participating in review.
      b. If design of Major Temporary Works is being produced by design organization, include design in Final Design Unit review package and will undergo formal review as part of Design Unit documents.
   2. If D/B or construction sub-contractor produces Major Temporary Works design documents after Design Unit documents have been approved and distributed, then Major Temporary Works design documents must undergo separate formal review with Metro.
      a. Check, review and certify Major Temporary Works Documents in accordance with this Section prior to their being issued for construction.
   3. Secure necessary permits, clearances, and closures from government agencies prior to construction.

L. Design Changes:
   1. Design changes, including field changes, are subject to same design control and verification processes as original design.
a. Obtain approval of design changes to Final Design documents in writing by Engineer of Record of original design or by California licensed Professional Engineer of appropriate experience if original Responsible Engineer is no longer available.

b. Provide changes to designs, drawings, specifications, calculations, and reports signed and dated by California licensed Professional Engineer (signed and sealed for design changes to Final Design documents).

2. Obtain certification by D/B’s DM and DQM of design change in accordance with requirements of this Section.

a. Submit changes to Metro prior to such changes being implemented for construction.

3. Incorporate design changes, including field changes into original document and re-issued after four changes to document have been made.

M. Design Support During Construction:

1. D/B is responsible for ensuring technical integrity of design.

   a. Responsibility includes review and approval of construction submittals.

   b. Provide for responsible architect or engineer (Designer of Record) to review and approve construction submittals for technical adequacy prior to construction.

2. Provide verification by D/B’s DM during construction that conditions actually encountered are consistent with approved Design Drawings, Construction Drawings and Project Specifications.

N. Final As-Built Design Documents:

1. Maintain construction “as-built” design documents for Work performed continuously as Work progresses.

2. Maintain set of current status documents at applicable Worksite.

3. Prepare new revision of Project Record design documents and submit to Metro at project completion.

4. Incorporate in documents changes made during construction of Project as well as other information required by specifications.

5. Submit project record drawings and specifications as a unified design package which integrates all Design Units

6. Refer to Section 01 78 39 – As-Built Drawings and Current Status Documents.

3.03 INSTRUCTIONS, PROCEDURES, AND DRAWINGS

A. Prescribe and perform project and project support organizations activities and processes that affect quality and services in accordance with documented instructions, procedures or drawings that include or reference appropriate quantitative or qualitative approval criteria for determining that prescribed results have been satisfactorily attained.

1. Describe activity to level of detail that will assure consistent and acceptable results.
B. Submit controlling project instructions and procedures to Metro Quality Management for review and approval thirty calendar days after Notice To Proceed is issued.
   1. For subsequent Work, submit instructions, procedures, or drawings to Metro for review and approval within thirty calendar days before Work is scheduled to start.
   2. Related Work may not proceed until instructions and procedures are accepted by Metro.

C. Controlling instructions, procedures, drawings, and changes thereto shall be subject to configuration control.

D. Make available current issues of instructions, procedures and drawings at locations where applicable Work is performed and promptly remove obsolete documents from use and from Work area.

3.04 DOCUMENT CONTROL

A. Control preparation, issue and change of documents that specify quality requirements or prescribe activities affecting quality such as instructions, procedures, or drawings to ensure that correct and current documents are being used.
   1. Review such documents, including changes thereto, for adequacy and approval for release by authorized personnel.
   2. Perform review and approval to changes to documents by same organizations that performed original review and approval.
   3. Provide reviewing organizations access to pertinent background data or information upon which to base their approval.

3.05 PROCUREMENT CONTROL

A. Purchase products, materials and services from subcontractors and suppliers that have demonstrated effective product quality history.
   1. Evaluate and approve subcontractors and suppliers based on their ability to meet defined quality, safety and reliability performance standards.
   2. Project Quality shall participate in evaluation process.

B. Pass Metro specified quality and design requirements down to subcontractors and suppliers.
   1. Where equipment procurement is involved, define methods and means for handling, storage, and packaging in procurement documents.
   2. Provide for monitoring and evaluation of subcontractors and suppliers performance by Project Quality to ensure compliance to contract documents.

C. Maintain records of supplier and subcontractor qualifications and performance monitoring and make available to Metro upon request.
D. Evaluate materials and equipment to be used in Work and prepare Source Inspection List to identify materials that will be inspected at supplier location.
   1. Submit Source Inspection List within 30 days of NTP for Metro review and approval.
   2. Conduct inspections based on approved Source Inspection List.

E. Provide for review of procurement documents by Project Quality to ensure appropriate Project Quality requirements are specified in procurement documents.

3.06 PROCESS CONTROL

A. Provide for planning, documentation, and approval of processes (construction, manufacturing, installation, testing, and like items, by authorized individuals.
   1. Stipulate quality workmanship standards in written standards.
   2. Provide trained and qualified individuals performing Work in specific processes and quality workmanship standards.

B. Include adequate in-process inspection and test points to ensure conformance to contract requirements.
   1. Metro may impose inspection and test points to verify compliance.
   2. Inspection by Metro does not relieve Contractor from performing required inspections and tests.

C. Document in-process and completed Work.
   1. Maintain records of completed Work operations and make available to Metro.

3.07 CONTROL OF SPECIAL PROCESSES AND JOB CONTROL TESTING

A. Special processes and job control testing associated with hardware fabrication or construction shall conform to applicable Government Laws and Standards, Industry Standards and Metro contract requirements. Examples of special processes and job control tests may include, but are not limited to:

   Special Processes:                     Job Control Testing:
   Metal Welding                         Concrete
   Non-destructive Examination           Corrosion Control
   Coatings                             Soils
   Plating

3.08 INDEPENDENT TESTING LABORATORY

A. Employ services of Independent Testing Laboratory to perform material qualification and job control testing utilizing personnel who are not affiliated with Contractor and who are not affiliated with subcontractor performing Work on Project; pay for Laboratory services.
B. Employ inspection and test laboratories performing special processes or job control testing that have appropriate current certification issued by recognized regulatory agency.

C. Obtain approval of Contractor’s Laboratory by Metro Quality Management before related Work is allowed to start.
   1. Do not change Metro-approved Laboratory without written approval of Metro Quality Management.

D. Accomplish special process inspections and tests using qualified technicians, certified inspectors or other qualified or certified individuals as specified in governing Codes or Standards, Industry Standards, Metro Specification, or other applicable controlling document.
   1. Review credentials of technicians or inspectors performing special process inspections or tests and job control tests for compliance with applicable codes, standards, and special training/tests, and accepted by Design/Builder before inspections and tests are performed.
   2. Maintain records of credentials at Worksite and make available to Metro upon request.

3.09 INSPECTION AND TESTS

A. Subject Work performed under this contract to Quality Control Inspection to ensure compliance to contract documents.

B. Work activities subject to inspection include, but are not limited to, material and equipment receiving, in-process and final construction activities, in-process tests, qualification tests, equipment installation and tests, and system integration testing and acceptance.

C. Subject material and equipment procurements to Source Inspection as determined by Metro Project Quality.

D. Subject Work to continuous inspection during Work shifts and off-site Work activities.
   1. Assignment of inspection personnel shall be consistent with level of activity and complexity of Work to be performed.
   2. Such inspections shall be by individuals other than those responsible for performing Work.

E. Conduct inspections in accordance with Quality Control Inspection Instructions and Field Inspection Checklists.
   1. Prepare detailed Inspection Instructions and include workmanship standards for in-process and final construction and installation activities.
   2. Comply with Inspection Instructions as approved by individuals with appropriate knowledge and expertise and as reviewed and accepted by Project Quality and
Metro before related Work starts.

3. Work may not proceed without inspection instructions and checklists in place for specific work activity.

F. Prepare inspection planning in support of construction schedule.

1. Include identification of prerequisite requirements such as approved submittals, material certifications, verification of personnel certifications for special processes, equipment calibration/verification, applicable inspection instructions and checklists that are available, and number of inspectors required.

G. Implement sufficient inspection points to verify Work is in accordance with contract documents

H. Each inspector is responsible for documenting results of daily inspections and surveillances on Daily Inspection Reports that include applicable Quality Inspection Checklists.

1. Validate results of inspections and tests by printed name, signature and date on test document by test technician, reviewing test engineer or appropriate responsible individual and inspector who witnessed test.

I. Maintain inspection and test documents on Worksite as quality records and make available to Metro upon request.

J. Provide inspection and test personnel trained and qualified in their areas of responsibility.

1. Verify appropriate certifications as required by Contract Documents, Government Codes and Standards, and Industry Standards.

2. Maintain certification records and make available to Metro upon request.

K. Prepare Test Procedures for test operations and specify as minimum test prerequisites, test set-up, test parameters and acceptance criteria.

1. Provide test procedures prepared and approved by individuals with appropriate knowledge and expertise as reviewed and accepted by Metro before related test is performed.

Provide inspection personnel with sufficient organizational freedom to identify and report nonconforming conditions and have sufficient training, knowledge and experience to perform specific inspections.

L. Materials and each part or detail of Work may also be subject to inspection and testing by Metro.

1. In addition, when Local Agency or Utility Owner is to accept or pay for portion of cost of Work, its respective representatives have right to inspect Work.
a. Such inspection does not make such person party to Contract nor will it change rights of parties hereto.

b. Contractor hereby consents to such inspection and testing.

c. Upon request from Metro, furnish information to such persons as are designated in such request and permit such persons access to applicable parts of Work.

M. Metro may impose inspection hold points to verify compliance to contract documents during phases of Work.

1. Contractor may not proceed with Work until each hold point has been released by Metro.

2. Inspections by Metro do not relieve Contractor from performing contractually required inspections.

N. Reviews, tests, inspections or approvals performed by others does not relieve Contractor of obligations to perform Work in accordance with contract documents.

1. Reviews, inspections, tests and approvals conducted by Metro, Government agencies, and others do not constitute acceptance of materials or Work reviewed, tested or inspected, and Metro may reject or accept Work or materials, request changes or identify additional Work which must be done prior to final approval date.

O. Remove or uncover such portions of finished construction as directed by Metro before Final Acceptance.

1. After examination by Metro or designee, restore Work to standard required by contract documents.

2. If Work exposed or examined is not in conformance with requirements of contract documents, costs of uncovering, removing and restoring Work and recovery of delay to critical path occasioned thereby will be borne by Contractor.

3. Work done or material used without adequate notice to and opportunity for prior inspection by Metro may be ordered uncovered, removed or restored at Contractor’s cost and with no entitlement for time extension even if Work proves acceptable after uncovering.

If Work exposed or examined under this Section is in conformance with requirements of contract documents and adequate notice and opportunity for prior inspection was given to Metro, then delay to Critical Path from uncovering, removing and restoring Work shall be considered Metro Excusable Delay, and Contractor entitled to Contract Modification for cost of such efforts and recovery of delay to Critical Path occasioned thereby.

3.10 INSPECTION AND TEST STATUS

A. Identify status of inspections and tests through use of markings, stamps, tags, labels, routing cards, test reports, and like items, indicating conformance or nonconformance.
B. Maintain status of inspections and tests throughout construction and installation activities.

3.11 CONTROL OF MEASURING AND TEST EQUIPMENT

A. Status and control measuring and test equipment, including software when applicable, by individual item to ensure that accuracy and reliability of equipment is maintained on ongoing basis; control elements include following:

1. Calibration standards traceable to National Institute of Standards and Technology (NIST).
2. Uniquely identify measuring and test equipment by equipment type, identification number, and location.
3. Clearly indicate next calibration due date on individual measuring and test equipment items.
4. Identify calibration intervals, document, and periodically review for effectiveness.
5. Handle, preserve, and store measuring and test equipment to ensure that accuracy and fitness for use is maintained.
6. Maintain measuring and test equipment calibration records and make available for review by Metro.
7. Verification and documentation of developed software.

B. Document measuring and test equipment found to be out of tolerance, damaged, or lost during use shall on nonconformance report.

1. Work inspected or tested with out-of-tolerance or damaged equipment is not acceptable until nonconformance is resolved and characteristics previously inspected have been corrected and verified.

3.12 CONTROL OF NONCONFORMING ITEMS

A. Document items whether material, equipment, or hardware, including construction and testing that do not conform to Contract Documents, Reference Codes or Reference Standards on Nonconformance Report, segregated and controlled until nonconforming condition is analyzed, dispositioned, corrected and corrective action verified.

1. Only then may items be returned to use.
2. Organization responsible for creating nonconforming condition shall be responsible for investigating cause of nonconformance, and initiating corrective action including implementing steps to prevent recurrence.
3. Document cause of problem, disposition, and corrective action and make available to Metro upon request.

B. Perform review of nonconforming hardware and materials using qualified and authorized individuals to determine appropriate disposition and corrective action; disposition of
nonconforming items and materials include:
1. Rework to meet original design.
2. Repair to achieve fitness for use.
3. Accept condition as-is.
4. Reject condition and return hardware and material to supplier.

C. Obtain approval of Repair and Accept-as-is dispositions shall be approved by Metro before affected Work proceeds begins.

D. Maintain status of nonconforming hardware and materials and status reports distributed to responsible organizations.
1. This includes distribution to Contractor's senior management and Metro Quality Management at least monthly or as designated by Metro.
2. Maintain records associated with nonconforming hardware and materials make and available to Metro upon request.

3.13 HANDLING, SHIPPING, STORAGE, AND PRESERVATION

A. Provide methods and means for handling hardware and materials to prevent damage or deterioration.
1. Store hardware and materials in designated controlled areas such as stock rooms, designated hold areas, or segregated areas, to facilitate accountability and to prevent damage, deterioration and theft.
2. Define methods for authorizing receipt and dispatching hardware and materials.

3.14 QUALITY RECORDS

A. Quality Records are documents that specify design, document results of inspections and tests, and include other related documents.
1. Identify, collect, index, and store Quality Records in manner that precludes damage, loss or deterioration.
2. Designate specific retention times and location and when records are accessible for use.
3. At minimum, identify Quality Records by title, contract number, revision, date, and are signed by authorized individual.
4. Quality Records are considered valid only if stamped (controlled) or signed by authorized individual.
5. Corrections or revisions to Quality Records are subject to same level of review and approval as original document.
6. Make Quality Records available for review by Metro upon request.

3.15 QUALITY AUDITS AND SURVEILLANCE

A. Schedule, plan, and conduct quality audits and surveillances, on on-going basis covering project quality related activities and project phases.
   1. Maintain audit/surveillance schedule current and available to Metro upon request.
   2. Metro Quality Management may participate as observer on audits/surveillances.
   3. Quality Audits consist of evaluation of effectiveness of specific process.
   4. Quality Surveillances consist of evaluation of effectiveness of specific activity.

B. Conduct audits and surveillances using qualified, trained and experienced quality personnel independent of those responsible for activity being audited.
   1. Maintain records of qualifications, training and experience and make available to Metro upon request.

C. Document results of Quality audits and surveillances and, at minimum, distributed to management of subject organization.

D. Responsibility for conducting investigative actions to determine and document problem cause and implementing corrective actions to correct problem and prevent recurrence Rests with management of subject organization
   1. Transmit reports of audits and surveillances to Metro within seven days of last audit or surveillance activity.

3.16 QUALITY TRAINING

A. Identify and document training needs to support Work in contract documents and provide for training of personnel performing activities affecting quality.

B. Qualify personnel performing specific assigned tasks on basis of appropriate education, training and experience.

C. Retain records of training activities as quality records and make available to Metro upon request.

3.17 ACCESS TO WORK AREAS

A. Provide full access to Metro wherever Work is performed under this contract to conduct audits, inspections and tests to verify compliance to contract document requirements.
   1. Access includes on-site and off-site work areas and work areas of subcontractors and suppliers.
2. Provide access to local authorities having jurisdiction to Work performed on their facilities.

B. Audits, inspections and tests conducted by Metro, or other authorized Third parties does not relieve contractor of responsibility to conduct required inspections and tests to ensure compliance to contract document requirements.

3.18 RESPOND TO METRO NON-CONFORMANCES

A. Respond to Metro issued Nonconformance Reports, Quality Action Requests and other documented reports of nonconforming or indeterminate conditions within time period specified in document.

B. Include in response, description of investigative actions, statement of root cause of problem, action to correct problem to prevent recurrence, to satisfaction of Metro.

3.19 AS-BUILT DOCUMENTS

A. Maintain construction “as-built” design documents for Work performed current as Work progresses.

B. Identify final as-built design documents as “Project Records” in accordance with Section 01 78 39 – As-Built Drawings and Current Status Documents, and delivered to Metro prior to requesting final Metro inspection of applicable Work.

3.20 READINESS REVIEW

A. Participate in readiness reviews scheduled by Metro.

B. Conduct readiness reviews prior to start of specific Work activities or Work elements to identify and finalize prerequisite planning activities, review required submittals, inspections and tests required for Work activity and to discuss and ensure full understanding by participants, including subcontractors, exists for specific Work methods to be accomplished.

C. Metro shall authorize Work to proceed based on results of readiness review.

1. Work may not proceed without Metro’s approval.

3.21 CONSTRUCTION WORK PLANS

A. Prepare Construction Work Plans (CWP) for individual Work elements or as specified by Metro.

B. Show CWP preparation activities and Readiness Review Meetings on the three week look ahead schedules.

C. Submit CWP prior to Readiness Review Meetings described in this Section.
D. All CWPs shall be approved by the Design Builder superintendent and the PQM. Subcontractor personnel, including the field supervisor, Project Quality Manager and CWP preparer, shall approve their CWPs.

E. Subject Work may not proceed until CWP has been approved by Metro.

F. Comments must be resolved and CWP and associated inspection checklists resubmitted for approval prior to commencement of Work described in CWP.

G. Address following in CWP as minimum:
   1. Description of Work and applicable Contract drawings and specification sections.
   2. Include actions that are defined as "special events" in Work that may constitute exposing general public to danger, inconvenience, or risk.
   3. List of current required submittals to complete Work activity.
   4. Individual(s) and position(s) responsible for supervision of Work, including contact information.
   5. Planned start date of Work, progress rate expected and extended Work hours required.
   6. Prerequisite activities required including Third Party permits.
   7. Include a Job Hazard Analysis (JHA) for scope of Work.
   8. Identification of Inspections and tests to be accomplished, including drawings and specifications to be used for acceptance.
   9. Inspection hold points for Contractor, Metro, and third party inspections identified on inspection checklists.

3.22 FAILURE TO PERFORM

A. Nonconforming Work: Work that Metro determines does not conform to requirements of contract documents.

B. Remove nonconforming Work and replace with Work acceptable to Metro, at Contractor's cost.

C. Promptly take action necessary to prevent similar deficiencies from occurring in future.
   1. Fact that Metro may not have discovered nonconforming Work does not constitute acceptance of such nonconforming Work.
   2. In event Contractor fails to correct nonconforming Work after receipt of notice from Metro requesting such correction and within time specified in notice, Metro may cause nonconforming Work to be remedied or removed and replaced and may deduct cost of doing so from moneys due or to become due Contractor or obtain reimbursement from Contractor for such cost.
   3. Remedy for Contractor's failure to perform will be in addition to other rights or remedies available to Metro under this contract.
END OF SECTION 01 43 10
PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Project Quality Program definitions and requirements to ensure compliance to contract documents, applicable regulatory requirements and industry standards.

B. The Project Quality Program, supported by specific and detailed procedures, defines the project organization; processes and responsibilities that will ensure that construction, equipment and materials procurement; installation and testing will comply will all specified requirements of contract documents.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures

B. Section 01 78 39: As-Built Drawings and Current Status Documents

1.03 REFERENCES

A. California Code of Regulation (CCR), Title 24:
   1. Part 2 - California Building Code (CBC)

B. B. Los Angeles County Metropolitan Transportation Authority (Metro):
   1. Metro CADD Standards

1.04 QUALITY ASSURANCE (Not Used)

1.05 SUBMITTALS

A. Refer to Section 01 33 00 - Submittal Procedures, for submittal requirements and procedures.

B. Project Quality Program Manual – shall meet the requirements of this section.

C. Construction Procedures.

D. Project Instruction, Procedures, and Drawings, meeting requirements of this Section.

E. Source Inspection List which includes the identification of all suppliers and manufacturers of materials and components to be incorporated in the work.
F. Inspection and test Instructions that define the inspection requirements for source, receiving, in-process and final inspection and test.

G. Current qualifications and certifications of independent test laboratories that will be used for job control testing in accordance with this Section.

H. Qualifications and Certifications of test and inspection personnel employed by the laboratories identified in this Section.

I. Construction Work Plans meeting the requirement of this Section.

J. Personnel Qualifications.

K. Material Safety Data Sheets (MSDS): Manufacturer’s Material Safety Data Sheet for each type of material used in Work.

1.06 DEFINITIONS

A. Metro: In general “Metro” means Metro or its designee, except where indicated.

1.07 SPECIAL INSPECTION

A. Metro Responsibility:

1. Obtaining and paying for services of registered deputy inspectors to perform “Special Inspections” required by building permit and California Building Code (CBC).

B. Contractor Responsibility:

1. Obtaining and paying for services of an Independent Testing Laboratory as defined herein.

2. Do not use results of Special Inspections or results of inspections conducted by Metro or its designee or other agency in fulfillment of requirements of this specification.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 PROJECT QUALITY PROGRAM

A. Project Quality Program Manual (PQPM):

1. Prepare Project Quality Program Manual describing project organization’s processes and responsibilities that will ensure design, construction, procurement of equipment and materials, installation and testing. The Project Quality Program Manual will comply with specified requirements of the contract documents.

   a. Obtain Metro Quality Management approval of Project Quality Program Manual before Work is authorized to start.
b. After approval by Metro Quality Management, do not revise Project Quality Program Manual without prior written approval of Metro Quality Management.

B. Address following in PQPM as a minimum:

1. Project Quality Organization:
   a. Project Quality Organization (PQO) (“Project Quality”) and individuals responsible for executing quality responsibilities will report to executive level of management which is independent from line organizations responsible for performing Work.
   b. Provide organizational charts illustrating Project Quality Organization’s internal and external reporting relationships as well as relationship to sub-tier contractors or consultants and Independent Testing Laboratory. Include these charts in PQPM for approval by Metro Quality Management before start of Work.
   c. Assign a Project Quality Manager (PQM) to Project, who will be responsible for Project Quality Program functions and meet the following requirements:
      1) Individual available at Worksite location or offsite locations, as required, to perform or support all Quality related activities.
      2) PQM reports directly to contractor executive management personnel with responsible in charge of project execution and contract compliance.
      3) PQM does not have responsibility for project construction, cost, schedule, or design.
      4) PQM shall not be an employee of the Contractor's Independent Test Laboratory or sub-tier contractor.
      5) PQM has authority to stop affected Work, control further processing, or prevent shipment of items that do not meet contract quality requirements.
         a. Stop Work Order written by PQM can only be removed by PQM.
         b. PQM notifies Metro when Stop Work Order is issued and when it is removed.
   d. The Design/Bid/Build (D/B/B) Management shall ensure that the Project Quality Organization has adequate resources to fulfill the requirements of this Section and other Contract requirements.

2. Quality Management Personnel Qualifications:
   a. Project Quality Manager (PQM):
      1) Bachelors degree from accredited four-year educational institution in quality an engineering discipline, engineering technology, management, business administration or related field and minimum of ten years Quality experience, at least five years of which is in Quality management position.
      2) Educational requirements may be waived by Metro Quality Management based on additional courses, certificates or specified training in welding, non-destructive testing, construction engineering, electrical systems design or testing, knowledge of heavy civil construction related to rail and rail systems design, structures, tunnel construction, including construction or manufacture or testing of trackwork components; Rail Systems elements such as Traction Power, OCS, Communication and Train Control systems.
b. Quality Engineers, when Utilized by Contractor:
   1) Bachelors degree from accredited four-year institution in engineering, 
      engineering technology, management, business administration or related field 
      and minimum of three years project quality experience.
   2) Specific quality experience may be substituted for education, subject to 
      approval by Metro Quality Management.

c. Lead Inspectors, when Utilized by Contractor:
   1) Ten years related construction inspection experience plus at least two years 
      as lead inspector, as minimum.
   2) Lead Inspectors report directly to Project Quality Manager.

d. Inspection and Test Personnel:
   1) Experience and training commensurate with Work to be performed.
   2) Minimum of two years experience for type of Work to be inspected.
   3) Identify activities such as special process requiring qualified/certified 
      production, inspection and test personnel and establish minimum 
      competence level and describe in Contractor’s Quality Procedures.
   4) Inspectors report directly to Lead Inspectors.

e. Submit personnel qualifications/certifications of Project Quality personnel to 
   Metro for review and approval before assignment to Project.

3.02 INSTRUCTIONS, PROCEDURES, AND DRAWINGS

A. Prescribe and perform project and project support organizations activities and processes 
   that affect quality and services in accordance with documented instructions, procedures 
   or drawings that include or reference appropriate quantitative or qualitative approval 
   criteria for determining that prescribed results have been satisfactorily attained.
   1. Describe activity to level of detail that will assure consistent and acceptable results.

B. Submit controlling project instructions and procedures to Metro Quality Management for 
   review and approval thirty calendar days after Notice To Proceed is issued.
   1. For subsequent Work, submit instructions, procedures, or drawings to Metro for 
      review and approval within thirty calendar days before Work is scheduled to start.
   2. Related Work may not proceed until instructions and procedures are accepted by 
      Metro.

C. Controlling instructions, procedures, drawings, and changes thereto shall be subject to 
   configuration control.

D. Make available current issues of instructions, procedures and drawings at locations 
   where applicable Work is performed and promptly remove obsolete documents from use 
   and from Work area.

3.03 DOCUMENT CONTROL
A. Control preparation, issue and change of documents that specify quality requirements or prescribe activities affecting quality such as instructions, procedures, or drawings to ensure that correct and current documents are being used.

1. Review such documents, including changes thereto, for adequacy and approval for release by authorized personnel.
2. Perform review and approval to changes to documents by same organizations that performed original review and approval.
3. Provide reviewing organizations access to pertinent background data or information upon which to base their approval.

3.04 PROCUREMENT CONTROL

A. Purchase products, materials and services from subcontractors and suppliers that have demonstrated effective product quality history.

1. Evaluate and approve subcontractors and suppliers based on their ability to meet defined quality, safety and reliability performance standards.
2. Project Quality shall participate in evaluation process.

B. Pass Metro specified quality and design requirements down to subcontractors and suppliers.

1. Where equipment procurement is involved, define methods and means for handling, storage, and packaging in procurement documents.
2. Provide for monitoring and evaluation of subcontractors and suppliers performance by Project Quality to ensure compliance to contract documents.

C. Maintain records of supplier and subcontractor qualifications and performance monitoring and make available to Metro upon request.

D. Evaluate materials and equipment to be used in Work and prepare Source Inspection List to identify materials that will be inspected at supplier location.

1. Submit Source Inspection List within 30 days of NTP for Metro review and approval.
2. Conduct inspections based on approved Source Inspection List.

E. Provide for review of procurement documents by Project Quality to ensure appropriate Project Quality requirements are specified in procurement documents.

3.05 PROCESS CONTROL

A. Provide for planning, documentation, and approval of processes (construction, manufacturing, installation, testing, and like items, by authorized individuals.

1. Stipulate quality workmanship standards in written standards.
2. Provide trained and qualified individuals performing Work in specific processes and quality workmanship standards.
B. Include adequate in-process inspection and test points to ensure conformance to contract requirements.
   1. Metro may impose inspection and test points to verify compliance.
   2. Inspection by Metro does not relieve Contractor from performing required inspections and tests.

C. Document in-process and completed Work.
   1. Maintain records of completed Work operations and make available to Metro.

3.06 CONTROL OF SPECIAL PROCESSES AND JOB CONTROL TESTING

A. Special processes and job control testing associated with hardware fabrication or construction shall conform to applicable Government Laws and Standards, Industry Standards and Metro contract requirements. Examples of special processes and job control tests may include, but are not limited to:

<table>
<thead>
<tr>
<th>Special Processes</th>
<th>Job Control Testing</th>
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<tbody>
<tr>
<td>Metal Welding</td>
<td>Concrete</td>
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<tr>
<td>Non-destructive Examination</td>
<td>Corrosion Control</td>
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<td>Coatings</td>
<td>Soils</td>
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<td>Plating</td>
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3.07 INDEPENDENT TESTING LABORATORY

A. Employ services of Independent Testing Laboratory to perform material qualification and job control testing utilizing personnel who are not affiliated with Contractor and who are not affiliated with subcontractor performing Work on Project; pay for Laboratory services.

B. Employ inspection and test laboratories performing special processes or job control testing that have appropriate current certification issued by recognized regulatory agency.

C. Obtain approval of Contractor’s Laboratory by Metro Quality Management before related Work is allowed to start.
   1. Do not change Metro-approved Laboratory without written approval of Metro Quality Management.

D. Accomplish special process inspections and tests using qualified technicians, certified inspectors or other qualified or certified individuals as specified in governing Codes or Standards, Industry Standards, Metro Specification, or other applicable controlling document.
   1. Review credentials of technicians or inspectors performing special process inspections or tests and job control tests for compliance with applicable codes, standards, and special training/tests, and accepted by Design/Builder before inspections and tests are performed.
   2. Maintain records of credentials at Worksite and make available to Metro upon request.
3.08 INSPECTION AND TESTS

A. Subject Work performed under this contract to Quality Control Inspection to ensure compliance to contract documents.

B. Work activities subject to inspection include, but are not limited to, material and equipment receiving, in-process and final construction activities, in-process tests, qualification tests, equipment installation and tests, and system integration testing and acceptance.

C. Subject material and equipment procurements to Source Inspection as determined by Metro Project Quality.

D. Subject Work to continuous inspection during Work shifts and off-site Work activities.
   1. Assignment of inspection personnel shall be consistent with level of activity and complexity of Work to be performed.
   2. Such inspections shall be by individuals other than those responsible for performing Work.

E. Conduct inspections in accordance with Quality Control Inspection Instructions and Field Inspection Checklists.
   1. Prepare detailed Inspection Instructions and include workmanship standards for in-process and final construction and installation activities.
   2. Comply with Inspection Instructions as approved by individuals with appropriate knowledge and expertise and as reviewed and accepted by Project Quality and Metro before related Work starts.
   3. Work may not proceed without inspection instructions and checklists in place for specific work activity.

F. Prepare inspection planning in support of construction schedule.
   1. Include identification of prerequisite requirements such as approved submittals, material certifications, verification of personnel certifications for special processes, equipment calibration/verification, applicable inspection instructions and checklists that are available, and number of inspectors required.

G. Implement sufficient inspection points to verify Work is in accordance with contract documents.

H. Each inspector is responsible for documenting results of daily inspections and surveillances on Daily Inspection Reports that include applicable Quality Inspection Checklists.
   1. Validate results of inspections and tests by printed name, signature and date on test document by test technician, reviewing test engineer or appropriate responsible individual and inspector who witnessed test.

I. Maintain inspection and test documents on Worksite as quality records and make available to Metro upon request.
J. Provide inspection and test personnel trained and qualified in their areas of responsibility.
   1. Verify appropriate certifications as required by Contract Documents, Government Codes and Standards, and Industry Standards.
   2. Maintain certification records and make available to Metro upon request.

K. Prepare Test Procedures for test operations and specify as minimum test prerequisites, test set-up, test parameters and acceptance criteria.
   1. Provide test procedures prepared and approved by individuals with appropriate knowledge and expertise as reviewed and accepted by Metro before related test is performed.
   2. Provide inspection personnel with sufficient organizational freedom to identify and report nonconforming conditions and have sufficient training, knowledge and experience to perform specific inspections.

L. Materials and each part or detail of Work may also be subject to inspection and testing by Metro.
   1. In addition, when Local Agency or Utility Owner is to accept or pay for portion of cost of Work, its respective representatives have right to inspect Work.
      a. Such inspection does not make such person party to Contract nor will it change rights of parties hereto.
      b. Contractor hereby consents to such inspection and testing.
      c. Upon request from Metro, furnish information to such persons as are designated in such request and permit such persons access to applicable parts of Work.

M. Metro may impose inspection hold points to verify compliance to contract documents during phases of Work.
   1. Contractor may not proceed with Work until each hold point has been released by Metro.
   2. Inspections by Metro do not relieve Contractor from performing contractually required inspections.

N. Reviews, tests, inspections or approvals performed by others does not relieve Contractor of obligations to perform Work in accordance with contract documents.
   1. Reviews, inspections, tests and approvals conducted by Metro, Government agencies, and others do not constitute acceptance of materials or Work reviewed, tested or inspected, and Metro may reject or accept Work or materials, request changes or identify additional Work which must be done prior to final approval date.

O. Remove or uncover such portions of finished construction as directed by Metro before Final Acceptance.
   1. After examination by Metro or designee, restore Work to standard required by contract documents.
2. If Work exposed or examined is not in conformance with requirements of contract documents, costs of uncovering, removing and restoring Work and recovery of delay to critical path occasioned thereby will be borne by Contractor.

3. Work done or material used without adequate notice to and opportunity for prior inspection by Metro may be ordered uncovered, removed or restored at Contractor's cost and with no entitlement for time extension even if Work proves acceptable after uncovering.

4. If Work exposed or examined under this Section is in conformance with requirements of contract documents and adequate notice and opportunity for prior inspection was given to Metro, then delay to Critical Path from uncovering, removing and restoring Work shall be considered Metro Excusable Delay, and Contractor entitled to Contract Modification for cost of such efforts and recovery of delay to Critical Path occasioned thereby.

3.09 INSPECTION AND TEST STATUS

A. Identify status of inspections and tests through use of markings, stamps, tags, labels, routing cards, test reports, and like items, indicating conformance or nonconformance.

B. Maintain status of inspections and tests throughout construction and installation activities.

3.10 CONTROL OF MEASURING AND TEST EQUIPMENT

A. Status and control measuring and test equipment, including software when applicable, by individual item to ensure that accuracy and reliability of equipment is maintained on ongoing basis; control elements include following:

1. Calibration standards traceable to National Institute of Standards and Technology (NIST).
2. Uniquely identify measuring and test equipment by equipment type, identification number, and location.
3. Clearly indicate next calibration due date on individual measuring and test equipment items.
4. Identify calibration intervals, document, and periodically review for effectiveness.
5. Handle, preserve, and store measuring and test equipment to ensure that accuracy and fitness for use is maintained.
6. Maintain measuring and test equipment calibration records and make available for review by Metro.
7. Verification and documentation of developed software.

B. Document measuring and test equipment found to be out of tolerance, damaged, or lost during use shall on nonconformance report.
1. Work inspected or tested with out-of-tolerance or damaged equipment is not acceptable until nonconformance is resolved and characteristics previously inspected have been corrected and verified.

3.11 CONTROL OF NONCONFORMING ITEMS

A. Document items whether material, equipment, or hardware, including construction and testing that do not conform to Contract Documents, Reference Codes or Reference Standards on Nonconformance Report, segregated and controlled until nonconforming condition is analyzed, dispositioned, corrected and corrective action verified.

1. Only then may items be returned to use.

2. Organization responsible for creating nonconforming condition shall be responsible for investigating cause of nonconformance, and initiating corrective action including implementing steps to prevent recurrence.

3. Document cause of problem, disposition, and corrective action and make available to Metro upon request.

B. Perform review of nonconforming hardware and materials using qualified and authorized individuals to determine appropriate disposition and corrective action; disposition of nonconforming items and materials include:

1. Rework to meet original design.
2. Repair to achieve fitness for use.
3. Accept condition as-is.
4. Reject condition and return hardware and material to supplier.

C. Obtain approval of Repair and Accept-as-is dispositions by Metro before affected Work proceeds.

D. Maintain status of nonconforming hardware and materials and status reports distributed to responsible organizations.

1. This includes distribution to Contractor's senior management and Metro Quality Management at least monthly or as designated by Metro.

2. Maintain records associated with nonconforming hardware and materials make and available to Metro upon request.

3.12 HANDLING, SHIPPING, STORAGE, AND PRESERVATION

A. Provide methods and means for handling hardware and materials to prevent damage or deterioration.

1. Store hardware and materials in designated controlled areas such as stock rooms, designated hold areas, or segregated areas, to facilitate accountability and to prevent damage, deterioration and theft.

2. Define methods for authorizing receipt and dispatching hardware and materials.

3.13 QUALITY RECORDS
A. Quality Records are documents that specify design, document results of inspections and tests, and include other related documents.
   1. Identify, collect, index, and store Quality Records in manner that precludes damage, loss or deterioration.
   2. Designate specific retention times and location and when records are accessible for use.
   3. At minimum, identify Quality Records by title, contract number, revision, date, and are signed by authorized individual.
   4. Quality Records are considered valid only if stamped (controlled) or signed by authorized individual.
   5. Corrections or revisions to Quality Records are subject to same level of review and approval as original document.
   6. Make Quality Records available for review by Metro upon request.

3.14 QUALITY AUDITS AND SURVEILLANCE

A. Schedule, plan, and conduct quality audits and surveillances, on on-going basis covering project quality related activities and project phases.
   1. Maintain audit/surveillance schedule current and available to Metro upon request.
   2. Metro Quality Management may participate as observer on audits/surveillances.
   3. Quality Audits consist of evaluation of effectiveness of specific process.
   4. Quality Surveillances consist of evaluation of effectiveness of specific activity.

B. Conduct audits and surveillances using qualified, trained and experienced quality personnel independent of those responsible for activity being audited.
   1. Maintain records of qualifications, training and experience and make available to Metro upon request.

C. Document results of Quality audits and surveillances and, at minimum, distributed to management of subject organization.

D. Responsibility for conducting investigative actions to determine and document problem cause and implementing corrective actions to correct problem and prevent recurrence rests with management of subject organization.
   1. Transmit reports of audits and surveillances to Metro within seven days of last audit or surveillance activity.

3.15 QUALITY TRAINING

A. Identify and document training needs to support Work in contract documents and provide for training of personnel performing activities affecting quality.

B. Qualify personnel performing specific assigned tasks on basis of appropriate education, training and experience.
C. Retain records of training activities as quality records and make available to Metro upon request.

3.16 ACCESS TO WORK AREAS

A. Provide full access to Metro wherever Work is performed under this contract to conduct audits, inspections and tests to verify compliance to contract document requirements.
   1. Access includes on-site and off-site work areas and work areas of subcontractors and suppliers.
   2. Provide access to local authorities having jurisdiction to Work performed on their facilities.

B. Audits, inspections and tests conducted by Metro, or other authorized Third parties does not relieve contractor of responsibility to conduct required inspections and tests to ensure compliance to contract document requirements.

3.17 RESPOND TO METRO NON-CONFORMANCES

A. Respond to Metro issued Nonconformance Reports, Quality Action Requests and other documented reports of nonconforming or indeterminate conditions within time period specified in document.

B. Include in response, description of investigative actions, statement of root cause of problem, action to correct problem to prevent recurrence, to satisfaction of Metro.

3.18 AS-BUILT DOCUMENTS

A. Maintain construction “as-built” design documents for Work performed current as Work progresses.

B. Identify final as-built design documents as “Project Records” in accordance with Section 01 78 39 – Project Record Documents, and delivered to Metro prior to requesting final Metro inspection of applicable Work.

3.19 READINESS REVIEW

A. Participate in readiness reviews scheduled by Metro.

B. Conduct readiness reviews prior to start of specific Work activities or Work elements to identify and finalize prerequisite planning activities, review required submittals, inspections and tests required for Work activity and to discuss and ensure full understanding by participants, including subcontractors, exists for specific Work methods to be accomplished.

C. Metro shall authorize Work to proceed based on results of readiness review.
   1. Work may not proceed without Metro’s approval.

3.20 CONSTRUCTION WORK PLANS
A. Prepare Construction Work Plans (CWP) for individual Work elements or as specified by Metro.

B. Submit CWP prior to Readiness Review Meetings described in this Section.

C. Subject Work may not proceed until CWP has been approved by Metro.

D. Comments must be resolved and CWP and associated inspection checklists resubmitted for approval prior to commencement of Work described in CWP.

E. Address following in CWP as minimum:
   1. Description of Work and applicable Contract drawings and specification sections.
   2. Include actions that are defined as “special events” in Work that may constitute exposing general public to danger, inconvenience, or risk.
   3. List of current required submittals to complete Work activity.
   4. Individual(s) and position(s) responsible for supervision of Work, including contact information.
   5. Planned start date of Work, progress rate expected and extended Work hours required.
   6. Prerequisite activities required including Third Party permits.
   7. Include a Job Hazard Analysis (JHA) for scope of Work.
   8. Identification of Inspections and tests to be accomplished,
   9. Inspection hold points for Contractor, Metro, and third party inspections identified on inspection checklists.

3.21 FAILURE TO PERFORM

A. Nonconforming Work: Work that Metro determines does not conform to requirements of contract documents.

B. Remove nonconforming Work and replace with Work acceptable to Metro, at Contractor's cost.

C. Promptly take action necessary to prevent similar deficiencies from occurring in future.
   1. Fact that Metro may not have discovered nonconforming Work does not constitute acceptance of such nonconforming Work.
   2. In event Contractor fails to correct nonconforming Work after receipt of notice from Metro requesting such correction and within time specified in notice, Metro may cause nonconforming Work to be remedied or removed and replaced and may deduct cost of doing so from moneys due or to become due Contractor or obtain reimbursement from Contractor for such cost.
   3. Remedy for Contractor's failure to perform will be in addition to other rights or remedies available to Metro under this contract.
SECTION 01 43 38

FIELD SAMPLES AND MOCK-UPS

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Field samples and mock-ups.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures

B. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)

C. Section 01 66 00: Product Storage and Handling Requirements

1.03 REFERENCES – (Not Used)

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).

B. Implement Quality Program in accordance with requirements of Sections indicated above.

1.05 SUBMITTALS

A. Refer to Sections 01 33 00 – Submittal Procedures, for submittal procedures and requirements.

B. Material Safety Data Sheets (MSDS): Manufacturer’s Material Safety Data Sheets for each type of material used in Work.

1.06 DEFINITIONS (Not Used)

1.07 DELIVERY, STORAGE, AND HANDLING

A. Refer to Section 01 66 00 – Product Storage and Handling Requirements, for general requirements for delivery, storage, and handling procedures.

1.08 FIELD SAMPLES AND MOCK-UPS
A. Field samples and mock-ups shall be prepared at Worksite by Contractor as specified in various Sections of these Specifications.
   1. Affected finish work shall not be started until Metro or its designee has approved field samples and jobsite mock-ups in writing.

B. Construct and prepare field samples and Worksite mock-ups at designated locations at Worksite or on structure as directed by Metro or its designee.
   1. Contractor shall have product manufacturers provide field samples and mock-ups that involve their materials, for proper application or installation of materials in accordance with their respective instructions and recommendations for conditions or circumstances involved in application or installation.

C. Construct or prepare as many additional samples and mock-ups as may be required, as determined by Metro or its designee, until desired features, textures, finishes, and colors are obtained. Approved samples and mock-ups shall serve as standards of quality for various affected units of Work.

D. Record relevant information on preparation of Sample or Mock-up, such as materials used, mix designs, process or procedure, operator name, and like items.

E. Preserve approved field samples and mock-ups for comparison purposes until affected work is completed and accepted by Metro or its designee. Match finished Work to approved field samples or mock-ups.

1.09 ACCEPTANCE OF WORK

A. Compare completed Work to relevant characteristics of sample or mock-up to determine acceptability. Metro reserves right to make final determination of acceptability of production Work.

B. Completed Work that is not accepted is non-conforming and must be addressed in accordance with the Project Quality Program Requirements.

C. If Contractor elects to start Work before Metro or its designee has approved related field samples or mock-ups, as specified or instructed, Contractor does so at risk of having Work rejected by Metro or its designee without compensation.

1.10 REMOVAL AFTER COMPLETION

A. Remove Field Samples and Mock-Ups from Worksite and structures after completion and acceptance of affected Work, or as otherwise directed by Metro or its designee.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)
END OF SECTION 01 43 38
SECTION 01 45 20

GENERAL MATERIALS TESTING PROGRAM REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Requirements for providing test support personnel and equipment to test all fabricated and manufactured materials and equipment as required in other Sections and to verify compliance with specified performance requirements.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures

B. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)

1.03 REFERENCES (Not Used)

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).

1.05 SUBMITTALS

A. Refer to Section 01 33 00 - Submittal Procedures, for submittal requirements and procedures.

1.06 DEFINITIONS (Not Used)

1.07 TEST RESPONSIBILITY

A. The Contractor shall perform all native (in-situ) field tests and that of fabricated and manufactured materials and equipment that are specified as the Contractor’s responsibility in other Specification Sections.

B. Tests conducted by Metro shall be supported by the Contractor as specified; however, the Contractor will not be responsible for any other aspect of Metro testing.

C. Tests performed by the Contractor, the equipment manufacturer, or an accredited testing laboratory in accordance with Project Quality Program Requirements, will require by Metro or its designee. Although Metro personnel will witness Contractor testing, the Contractor shall be responsible for planning, scheduling, and performing the tests.
D. All factory and field-testing shall be conducted under the direction of the Contractor's Quality Control (QC) group. Individual Subcontractor test directors shall report directly to the Contractor's QC group.

E. The Contractor / Subcontractor shall furnish all test instruments and any other equipment and materials necessary to perform the tests.

F. Acceptance of the structures, facilities, and equipment provided under the Contract is contingent upon successful compliance with inspection and test requirements. These tests shall demonstrate the performance of the fabricated and manufactured materials and equipment at various points in the design, manufacturing, and installation process.

G. The Contractor shall be fully responsible for the repair or replacement of any materials or equipment damaged as a result of tests, and shall bear all associated costs.

1.08 TEST DOCUMENTATION

A. Requirements for planning and performing tests, recording data, and reporting test results shall be as specified herein. Unless indicated otherwise, the general requirements stated herein shall apply to all testing. Specific requirements are contained in the applicable Specifications Sections. The Contractor shall allow 30 Days for the review of test documentation submittals by Metro or its designee.

B. The Contractor and its suppliers shall establish procedures required for inspecting, accepting and testing of manufactured and prefabricated materials either by source inspection/testing, Worksite inspection/testing, or Certificate of Compliance. These procedures shall be included in the Contractor's Quality Control Plans and Test Plans to be submitted to and approved by Metro or its designee prior to the fabrication of the materials.

C. Source Inspection/Testing is acceptance testing of manufactured and prefabricated materials at locations other than the Worksite and shall be performed by the approved testing laboratories. Sufficient notification shall be given to Metro or its designee to witness these tests.

D. Special processes required in fabrication, production or installation that cannot be verified by subsequent inspection shall be performed under controlled conditions. This process may include joining or special fabrication techniques for metals, welding, bonding, heat treatment, surface treatment, corrosion control techniques, painting and special coatings.

E. The Contractor and supplier shall address the following requirements in their Quality Plans and Test Plans:
   1. Special Process Production Procedures and instructions per applicable codes, standards, specification and drawings
   2. Work Plan for Special Process Production or Installations that provides for an appropriate Work Sequence, suitable working environment, and appropriate equipment.
   3. Appropriate Certifications for Special Processes and Production Procedures (i.e.}
welding, procedures specifications, welder qualifications procedures, welder, welding operators, and tack welder qualifications).

4. Appropriate qualifications for personnel performing or inspecting special processes (i.e. Certified Welding Inspection (CWI), Nondestructive Testing Personnel Qualifications and Certifications and Special Coating Inspector).

5. Equipment warranty requirements and current calibration records.

1.09 TEST PLAN AND SCHEDULE

A. The Contractor shall prepare and submit its proposed Test Plan to Metro or its designee for approval as specified in the Technical Specifications Section 01 33 00 - Submittal Procedures.

B. The Test Plan shall list each test procedure that will be submitted by the Contractor to demonstrate compliance with the requirements of this Contract. This Test Plan shall include required tests needed for completion of Design, Pre-Construction, Construction testing, manufacturing and suppliers testing. The Test Plan shall include:

1. Index describing each test with its procedure number and objectives.
2. Listing of applicable pre-requisites for each test.
3. Test program personnel organization and responsibilities of each organization level.
4. Test reporting methodology, including instructions for recording pertinent test conditions, identifying, evaluating, and correcting causes of problems or failures.
5. Sample general test sheets and instructions for their use.
6. Description of procedures for preparing and submitting test data sheets.
7. Identification, where applicable, of primary test agency if other than the Contractor.
8. General provisions for re-test as a result of either test failure or modification of equipment after test.
9. Description of method used to schedule each test.
10. Test Plan revision procedure and controls.

C. Testing Schedule. The Contractor shall prepare a Schedule of Materials Control "Frequency Tables" based on the sampling, test methods and frequencies specified in the Contract Technical Specifications Sections. The Test Schedule shall be submitted for Metro approval.

1.10 TEST PROCEDURES

A. The Contractor shall maintain a copy of all standard test methods / procedures as specified in the Contract Documents.

B. The test procedures and reports shall include:
1. Test Title and ID Number.
2. Statement, including diagrams where appropriate, identifying the materials, equipment or element of work.
3. Names of Independent Testing Laboratory Personnel performing the tests
4. Applicable industry standards.
5. List of equipment required to perform the test. Test instruments shall be listed including manufacturer, model, type, and serial number.
6. List of prerequisite tests.
7. Description of the required test set up, including, but not limited to, diagrams illustrating test equipment connections and identifying test points.
8. Step by step instructions for performing the test and identifying the points at which data will be recorded where applicable
9. Test constraints
11. Limits for acceptable data and an explanation of any special data reduction.
12. Specific provisions for re-test as a result of either test failure or modification of equipment after test.
13. Test Data Sheets. Test data sheets shall identify the test, and shall be designed to include spaces to record test data, test date, and signatures of individuals performing and witnessing the tests. Data sheets shall be arranged in tabular form where practical. For each test procedure, general and specific data sheets shall be provided.
   a. General Test Data Sheets: General or generic test data sheets shall provide a template, or general layout, for all tests in a particular test category. General test data sheets can be prepared to apply in more than one test category. General data sheets shall include test identification, date or revision number, and spaces for check-off, discrepancies, and verification of the test's completion. Where applicable, general test data sheets shall include drawing numbers, test equipment and their respective model numbers, references to the applicable procedure number, allowable limits for certain entries, and corrective actions required.
   b. Specific Test Data Sheets: Specific test data sheets shall contain all the information for each test category and each test condition pre-filled out. Test data sheets incorporating site-specific information shall be filled out and submitted to Metro or its designee 10 Days prior to conducting test. Data entries shall be referenced to the applicable procedure, and allowable limits for each entry shall be indicated on the data sheets.

1.11 TEST SUPPORT DOCUMENTATION

A. All relevant Contractor-prepared drawings and submittals shall be available for reference during the conduct of each test unless otherwise specified in the individual Sections of the Technical Specifications.
1.12 TEST EQUIPMENT/INSTRUMENT CERTIFICATION

A. Test equipment/instruments shall be calibrated and accuracy certified within 180 Days prior to use. Calibration certification shall be submitted with the relevant test reports.

1.13 TEST NOTIFICATION

A. The Contractor shall notify Metro or its designee and all participating parties 14 Days before the scheduled start of tests.

1.14 TEST WITNESSING

A. Metro reserves the right to witness any and all tests, appoint an independent agency as a test witness representative, or perform an Independent Assurance Sampling and Testing (IAST) of the Work. The witness(es) will be present on a non-interfering and non-participatory basis.

B. All witnessing parties shall sign the test reports.

1.15 TEST REPORTS

A. Test Reports shall be prepared and submitted for review and approval by Metro or its designee no later than 10 Days after completion of the respective test. As a minimum, the Test Report shall contain test data sheets, test commentary and a conclusion statement.

B. Test Data Sheets: Test Reports shall include completed test data sheets prepared in accordance with Article 1.10, B, 13 herein. Completed test data sheets shall contain all site-specific information, test results, and appropriate signatures.

C. Test Commentary: The Contractor shall prepare a brief commentary on the test. The commentary shall compare the test results and pass/fail criteria, where applicable. In case of test failure, the commentary shall provide an analysis of the test, probable reasons for the failure and remedial measures the Contractor intends to undertake. If failure is corrected during the test, the commentary shall include the corrective action taken.

D. Conclusion: The Contractor shall provide a concluding statement assessing the results of the tests (i.e. success or failure).

1.16 REJECTION AND RETESTING

A. All test equipment shall be examined and inspected thoroughly immediately after the test has been completed.

B. Failure of test equipment to meet the performance requirements, or damage sustained during the test, shall be sufficient grounds for rejection of equipment. Equipment failing to pass the test shall have deficiencies corrected by modifications, if necessary, and be retested without impacting the Project Schedule unless otherwise approved in writing by
Metro or its designee.

C. The cost of any rework of a unit of Work, or the fabrication or manufacture of a new unit of Work including retesting and witnessing by Metro or its designee, shall be borne by the Contractor.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 45 20
SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Furnishing, installing, operating, maintaining and removing temporary facilities, including electrical power, lighting, telephone, water, fire protection, sanitary service and storm drainage for use during construction and for testing equipment installed under this Contract.

B. Electrical Service:
   1. Provide and pay costs for installing and maintaining lighting and power for field offices, storage and other construction facilities, and areas, including sufficient power for testing equipment installed under this Contract.
   2. Provide power electrically operated and controlled construction facilities, including tools; equipment; and testing equipment.
   3. Provide night security lighting, when applicable, at secured areas within construction limits at offices, storage facilities and excavated areas.
   4. Bear costs of temporary electric service permits, fees and deposits required by governing authorities; and connection charges and temporary easements, including installation, maintenance and removal of equipment.

C. Communication Services:
   1. In Metro's Contractor furnished field office, Contractor shall furnish ten communication lines category 6e. Eight of them shall be used for voice communication and two for data communication. The data communication shall be T-1 computer service lines with measuring hardware. All computers will be connected to a network hardware which will allow them to use the data communication at the same time.

D. Water Service:
   1. Furnish, install and maintain temporary water system to serve areas within limits of Contract Worksite and construction staging area throughout construction period. Provide water for drinking, construction, sanitation, first aid, fire protection and cleaning. Ensure water service for temporary fire protection is sufficient to supply requirements in Paragraph E-Fire Protection.

   Obtain permits and approvals from regulating authorities. Pay fees, deposits and connection costs including installation, maintenance and removal associated with temporary water systems.
E. Fire Protection:
   1. Provide and maintain continuously supplied fire protection system as required by the local, and NFPA fire regulations.

F. Sanitary Service:
   1. Furnish, install and maintain temporary sanitary facilities and services throughout construction period.
   2. Ensure separate or single user toilets are provided to assure privacy between genders.
   3. Furnish and maintain number of enclosed toilet facilities as follows:
      a. A minimum of one separate toilet facility shall be provided for each 20 employees or fraction thereof of each gender. Such facilities may include both toilets and urinals provided that the number of toilets shall not be less than one half of the minimum required number of facilities for use by men.
      b. Where the provision of water closets is not feasible due to the absence of a sanitary sewer or the lack of an adequate water supply, nonwater carriage disposal facilities shall be provided.
      c. Washing facilities shall be provided as follows: A minimum of one washing station shall be provided for each twenty employees or fraction thereof.
   4. Obtain municipal permits and pay fees for temporary sanitary sewer connections.

G. Storm Drainage:
   1. Furnish, install and maintain temporary storm drainage facilities throughout construction period. Do not impede drainage of adjacent private property or cause surface flow in streets and sidewalks to back up on to adjacent properties.
   2. Provide facilities as required to drain areas outside appendage construction.
   3. Provide connections to temporary storm drains.
   4. Obtain permits and pay fees for temporary and permanent storm drainage connections.

H. Temporary Sump Pumps:
   1. Furnish, install and maintain temporary sump pumps during construction and post construction tunnel drainage.
   2. Provide duplex sump pumps in each sump structure. There are four sump structures in this contract.
   3. Each pump shall have 200 GPM Capacity. Total dynamic head (TDH) of the pumps varies within the sump structure, ranging between 70 to 130 feet.
   4. Discharge duplex pumps to their respective sanitary sewer/storm drain surge chamber (cross connection) as soon as the chambers are constructed.
5. Connect duplex pumps to their respective chamber through the sump pump permanent discharge (SPD) piping system.

6. Following substantial completion, sump pump system with the temporary pumps and means to lift, replace and serve shall be turned over to Metro for post construction drainage of the tunnel. The system shall be functional and operational. The control panels and auxiliary equipment, such as water level sensors, shall be the industry standard and installed in a manner for easy access and maintenance.

7. Shop drawings shall be submitted clearly indicating the location of the control panels, the source of the power supply and auxiliary equipment.

8. The pump manufacturers shall provide on-site instruction, up to eight hours, to Metro’s maintenance personnel on recommended vendor maintenance and operating procedures before the sump pumps are turned over to Metro.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures
B. Section 01 35 23: Worksite Safety Requirements
C. Section 01 35 53: Worksite Security Requirements
D. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)

1.03 REFERENCES

A. National Fire Protection Association (NFPA):
   1. NFPA 70 - National Electrical Code (NEC)
B. Underwriters’ Laboratories, Inc. (UL)
C. The Association of Electrical Equipment and Media/Imaging Manufacturers (NEMA)
D. California Code of Regulations (CCR), Title 8:
   1. Division 1 - Department of Industrial Relations (Cal/OSHA)
E. California Code of Regulations (CCR), Title 24:
   1. Part 2 - California Building Code (CBC)
   2. Part 3 - California Electrical Code (CEC)
   3. Part 9 - California Fire Code (CFC)
F. Comply with following where applicable:
1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).

B. Conform to Cal/OSHA and local codes.
   1. Provide UL listed products complying with NEMA requirements.

1.05 SUBMITTALS

A. Refer to Sections 01 33 00 – Submittal Procedures, for submittal requirements and procedures.

B. Working Drawings and manufacturer's literature. Show and describe temporary facilities, equipment and materials, including layout of temporary installations. Include water supplies and temporary fire protection plan.

C. Detailed street lighting plan showing temporary lighting facilities, electrical service location and circuit diagram.

D. Material Safety Data Sheets (MSDS): Manufacturer’s Material Safety Data Sheets for each type of material used in Work.

1.06 DEFINITIONS (Not Used)

PART 2 – PRODUCTS

2.01 ELECTRICAL SERVICE

A. Temporary Power and Lighting Equipment: Include fixtures, transformers, panelboards, switches, lamps, grounding, poles, conduits and wiring sized and capable of continuous service and capacity adequate to ensure complete operating system including sufficient power for testing equipment installed under this Contract. Comply with NFPA 70 (NEC) and (CEC).

B. Temporary lighting system shall provide a general coverage of not less than 3 foot candles, with a minimum of 5 foot candles in active work area.

C. Provide temporary extension cords not longer than 200 feet to supply tools. To ensure adequate voltage for the safe and proper operation of tools, extension cords or cord sets between 75 and 133 feet long shall be one amperage rating above the rating of the source socket. Extension cords or cord sets greater than 133 feet but less than 200 feet shall be two amperage ratings greater than the source socket.
D. Extension cord and extension cord sets shall be of the same amperage rating as the breaker protecting the circuit.

2.02 WATER SERVICE

A. Provide materials and equipment, sanitary and adequate for purposes intended, and satisfying requirements of codes and regulations pertaining to temporary water systems. Bottled products may be used if those products comply with codes. Clearly label portable containers having a dispensing tap and use only for drinking water. Provide single service disposable cups and sanitary container for dispensing cups.

2.03 FIRE PROTECTION

A. Provide fire protection equipment, as required by federal, state, and local authorities.

2.04 SANITARY SERVICE

A. Provide materials and equipment adequate for intended purposes; create no unsanitary conditions or violate applicable codes for temporary sanitary facilities. Provide weather-proof, sightproof, ventilated and sturdy enclosures for toilet and washing facilities.

B. Provide portable type toilet facilities complying with Cal/OSHA.

2.05 STORM DRAINAGE

A. Provide materials adequate to drain intended areas.

B. Ensure sanitary and storm drainage facilities remain separate.

2.06 SUMP PUMPS, DUPLEX

A. Provide nonclogging, automatic, electric-motor driven, submersible, centrifugal, pumps in duplex configuration as indicated.

B. Design each pump with pumping capacity not less than 200 gallons per minute against total dynamic head indicated, when suction head is one foot with pumping water at 65°F with specific gravity of 1.0, and containing less than one percent solids up to two inches in diameter.

C. Design pumps to run dry without damage to motor or pump at motor speed not more than 1750 rpm, for a minimum of eight hours, and capable of pumping wastewater continuously 24 hours per day.

D. Provide factory applied protective coal-tar epoxy coating for corrosion control.

E. Provide bronze non-clog design impeller in natural hydraulic balance, capable of passing solids, fibrous material and heavy sludge. Provide impeller with long-throughway without acute turns.
F. Fasten and lock impeller to shaft to prevent material movement such that reverse rotation cannot cause loosening.

G. Design pump to transfer axial and radial loads to motor bearings.

H. Provide sealed, antifriction, pre-lubricated bearings. Design and select bearings for minimum of 25,000 hours B-10 life of continuous operation under specified conditions.

I. Provide pump with tandem double mechanical seals. Run seal faces in oil reservoir.

J. Equip tandem double seals with lower seal consisting of one stationary and one rotating tungsten-carbide ring, and upper seal consisting of one stationary tungsten-carbide ring and one rotating carbon ring. Each pair in contact by separate spring.

K. Provide replaceable type seals.

L. Provide motors that are UL listed for hazardous locations, Class 1, Groups C and D, Division 1. Voltage and other electrical ratings - As indicated. The requirements for the motor to be listed for hazardous locations does not constitute a classification for the room or sump.

M. Enclose motor in watertight casing. Provide Class F, moisture-resistant insulated windings.

N. Provide motor cooling characteristics to permit continuous operation in totally submerged, partially submerged, and non-submerged conditions.

O. Provide moisture detector in motor housing to detect seal failures.

P. Provide waterproof motor lead, liquid level detector, moisture detector and other control cables alarm cables as required.

Q. Provide electrical alternator system for the duplex pump that will control the operation of a two pump system with float sensors which allows alternate operation of the two pumps, operate both pumps in a high water condition and activate the alarm if there is high water condition that when both pumps are running can control. Control panel shall have NEMA 3R enclosure. Both panel and sensor floats shall be UL Listed. Alarm system shall have an audible horn and visual light installed in the construction trailer.

R. Provide coal-tar epoxy coating for piping and pump columns in sump.

S. Provide seismic restraints as required.

T. Provide means to lift, replace and service pumps. Clean sumps and flush discharge lines as required on a regular basis. Pump assemblies in accordance with manufacturer’s installation instructor connect to discharge piping.

U. Install control panels, make electrical connections, and make adjustments required to place system in proper operating condition in accordance with manufacturer’s instruction.
V. Maintain pump assemblies in good working condition.

2.07 LIFTS AND STAIRS

A. Provide stairs in accordance with Safety and Health Regulation for Construction, 29 CFR, Part 1926.

PART 3 – EXECUTION

3.01 ELECTRICAL SERVICE INSTALLATION

A. Locate products to not interfere with materials handling equipment, storage spaces, traffic, and execution of Work. Install products to present a neat and orderly appearance, structurally sound. Maintain products to ensure continuous electrical service and safe Working conditions.

B. Install temporary power facilities framework and mount in space served.

C. Provide power centers on average of one for each 10,000 square feet of building area or station floor; locate power centers where electricity may be secured with an extension cord not longer than 100 feet.

3.02 TELEPHONE SERVICE

A. Install temporary telephone service in neat and orderly manner, make installation structurally and electrically sound, and ensure continuous service. Modify, relocate and extend service as Work progress requires. Place conduit and cable to not interfere with traffic, Work areas, materials handling equipment, storage areas, and Work of other contractors. Service lines may be aerial. Post telephone numbers and locations of emergency facilities including emergency hospitals, physicians, ambulance service, and police and fire departments in conspicuous locations at Worksite and at telephone locations.

3.03 WATER SERVICE

A. Install systems in neat and orderly manner. Make systems structurally and mechanically sound. Maintain continuous service. Modify, relocate and extend systems as Work progresses.

B. Do not incorporate any part of temporary water distribution system into permanent water distribution system.

3.04 FIRE SERVICE

A. Install products in conformance with Cal/OSHA requirements.

1. Provide fire extinguishers and fire water supply accessible, functional, and clearly
identified during construction period, maintain in-place until permanent fire protection systems are functional.

2. Furnish not less than one 10 pound, all-purpose (ABC) dry chemical fire extinguisher within 10 feet of cutting and welding operations.

3. Provide portable 20 pound (ABC), dry chemical type fire extinguishers, excepting those kept within 10 feet of cutting and welding operations.

B. Instruct construction personnel as to location and use of temporary fire protection equipment.

C. Conform to requirements of Los Angeles City Fire Department, (LAFD) Fire Code, and where applicable, California Fire Code (CFC), during critical interruptions of temporary fire protection service.

3.05 SANITARY SERVICE

A. Install temporary sanitary and washing facilities in neat and orderly manner within limits of Work and convenient to workstations. Make facilities structurally and mechanically sound. Anchor facilities to prevent dislocation; conceal from public view. Modify, relocate and extend facilities as required by progress of Work.

B. Service toilets at time intervals to minimize accumulation of wastes and prevent creation of unsanitary conditions, but not less than once a week.

3.06 STORM DRAINAGE

A. Locate and install temporary storm drainage facilities where necessary to drain construction maintenance, or storage areas.

B. Maintain facilities in good working order.

END OF SECTION 01 50 00
SECTION 01 51 23

TEMPORARY AND POST CONSTRUCTION VENTILATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Minimum requirements for the installation, maintenance and performance of an underground ventilation system to ensure compliant air quality and prevent respiratory hazards during each phase of the Project. These phases may include, but are not limited to: initial cut and cover excavation, tunnel driving, hole through(s), station construction and finishes installation.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures
B. Section 01 35 23: Worksite Safety Requirements
C. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)
D. Section 01 57 19: Temporary Environmental Control

1.03 REFERENCES

A. California Code of Regulations (CCR) Title 8, Chapter 4, Subchapter 20; “Tunnel Safety Orders"
B. California Code of Regulations (CCR) Title 8, Chapter 4, Subchapter 4; “Construction Safety Orders"
C. California Occupational Safety and Health Administration
D. U.S. Department of Labor, Occupational Safety and Health Administration (OSHA):
   1. Code of Federal Regulations (CFR) Title 29, Part 1910 (Occupational Safety and Health Standards) et seq.,

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).
B. Contractor shall comply with the requirements of this Section, as interpreted by Metro.

1. Strict compliance with the requirements of this section as well as the applicable regulations, as determined by Metro Director, Construction Safety, shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by the Contractor nor shall it be relied upon to form the basis of any claim.

2. Compliance with determinations by Metro shall not relieve the Contractor from other obligations imposed by law or regulation nor serve as the basis of request for change to increase the cost of the Work.

C. Compliance with the requirements of this section is subject to both announced and un-announced review.

1. Issues found to be non-compliant shall be addressed by the Contractor on a schedule agreed to by Metro and the Contractor.

1.05 SUBMITTALS

A. Refer to Section 01 33 00 - Submittal Procedures, for submittal requirements and procedures.

B. Submit a Project Ventilation Plan at least sixty (60) calendar days prior to placing workers or equipment in covered excavations, shafts, tunnels or other spaces with similar features. This Plan shall be reviewed and signed by an Engineer qualified to practice in the State of California, a Mining Engineer, a Certified Industrial Hygienist or other person with significant experience in Tunnel Ventilation requirements and planning. The plan must include, but is not limited to:

1. General ventilation planning and coordination, including air flow directions in each tunnel bore and or station.

2. Working Drawings with layout and details of the ventilation system(s), including (but not limited to) main and booster fan locations and specifications, bag line locations, bulkheads, reversing switches, smoke and gas sensors and other features deemed critical by the Engineer or designer.

3. Calculated Constant and Emergency air speeds and volumes.

4. Hold points or other Project Milestones which require the modification of the Ventilation System(s) and or plan.

C. Resubmit the Ventilation Plan when changed by the qualified person or as directed by Metro.

1.06 DEFINITIONS

A. Temporary Ventilation: Ventilation provided in underground or other areas of the Project to ensure compliant oxygen levels, the removal of noxious or hazardous dusts or other particulates and the dilution and removal of explosive or toxic gases prior to the commissioning and certification of the Permanent Ventilation System(s).
B. Post Construction Ventilation: Ventilation provided in underground or other areas of the Project to ensure compliant oxygen levels, the removal of noxious or hazardous dusts or other particulates and the dilution and removal of explosive or toxic gases after the completion of Tunnel Construction but prior to the commissioning and certification of the Permanent Ventilation System(s). This includes the ventilation of ancillary rooms and other sections of underground stations or other structures not directly connected to the tunnel or trackway.

C. Permanent Ventilation System(s): Ventilation provided by a system or systems designed, commissioned and certified to provide compliant oxygen levels, the removal of noxious or hazardous dusts or other particulates and the dilution and removal of explosive or toxic gases to transportation workers and the general public upon the commencement of Revenue Operations.

1.07 ADMINISTRATIVE OR GENERAL REQUIREMENTS

A. Submit documentation that the Contractor will provide, operate, maintain and remove temporary ventilation system(s); furnish and install in-place post construction ventilation systems in stations, crossovers, tunnels, and cross passages, as required; monitoring enclosed areas for presence of gas; ventilating areas as necessary to meet applicable Cal/OSHA, California Code of Regulations (CCR), Title 8 requirements; as specified and indicated.

B. Modify temporary ventilation systems as Work progresses; ensure safe Working environment in accordance with Cal/OSHA rules and regulations, and allow beneficial occupancy of Contract, or portions thereof, until completion of Work or as specified.

C. Prevent accumulations of dust, fumes, mists, vapors and gases in spaces or open areas occupied during both construction and post construction periods by ventilation. Provide ventilation for curing of installed materials and for temporary sanitary facilities.
   1. Prevent ventilation system from dispersing hazardous substances into occupied areas and to the environment.
   2. Terminate exhaust systems at surface in manner which will not be objectionable to nearby residents, business, or environment. Comply with requirements of Section 01 57 19 Temporary Environmental Control.
   3. Ventilate:
      a. Personnel occupied space and other areas where hazardous accumulation of harmful gases may occur.
      b. Areas where installed products are curing and drying.
      c. Storage spaces containing hazardous and volatile materials.

PART 2 - PRODUCTS

2.01 MATERIALS
A. Provide materials, new or used, adequate for purposes intended and satisfying requirements of codes and regulations pertaining to temporary and post construction ventilation and as specified. Materials may be patented specialty products if those products comply with codes applicable to temporary and post construction ventilation systems.

2.02 FACILITIES

A. Provide facilities, including wiring, controls and ducting, satisfying requirements of codes and regulations pertaining to temporary and post construction ventilation and as specified.

2.03 VENTILATING EQUIPMENT

A. Provide ventilating equipment as per the approved Ventilation Plan and in compliance with the requirements of CCR Title 8.

PART 3 - EXECUTION

3.01 TEMPORARY VENTILATION SYSTEMS

A. General: Install ventilation systems in neat and orderly manner; make structurally, mechanically and electrically sound; ensure safe, continuous service at required times; and modify and extend as Work progresses during tunnel construction phase, ensuring air movement in compliance with approved Ventilation Plan. Install system in manner which will minimize interference with, and creation of hazard to Work, movement of personnel, traffic, materials handling, storage areas, finishes, or Work of other Metro contractors.

B. Tunnel: Install and operate a ventilation system capable of continuous delivery of minimum 100,000 cfm of fresh air at each tunnel face during excavation period.

1. Metro does not warrant that 100,000 cfm will in all cases be sufficient to provide airflows required to satisfy CCR, Title 8 requirements for continuous operation. Contractor shall regularly evaluate ventilation needs in order to comply with Tunnel Safety Order requirements and install additional capacity, if deemed necessary, at no additional cost to Metro. Installation of additional capacity will trigger the revision and re-submittal of the Ventilation Plan.

2. Provide a system capable of operating 24 hours per day, seven days per week in each tunnel bore. Operate system on a schedule approved by Metro or its designee and as required to satisfy Cal/OSHA requirements.

3. During subsequent construction operations in holed through tunnel (i.e., crosspassage excavation, cast-in-place lining placement, and placement of invert and walkway concrete, etc.) and in underground chambers, ventilate with sufficient fresh air to satisfy Cal/OSHA requirements. System shall be capable of operating 24 hours per day, seven days per week. Operate system on a schedule approved by Metro or its designee and as required to satisfy Cal/OSHA.
C. During cut-and-cover construction under temporary cover, commencing with excavation operations, install and operate ventilation system which will have sufficient capacity to dilute gas and fumes in the Work area to satisfy Cal/OSHA requirements, and, Capable of maintaining a minimum ventilation rate of 30 linear feet per minute throughout Work area and operating 24 hours per day, 7 days per week. Operate system on a schedule approved by Metro or its designee and as required to satisfy Cal/OSHA.

D. Ventilation system: Provide emergency power source available to operate system in event of failure.

3.02 POST CONSTRUCTION VENTILATION SYSTEMS FOR TUNNELS

A. The following paragraphs apply only to those projects where the Scope of Work of the Contractor includes ONLY the excavation and building of the Tunnel structure(s) and or station box(es) but excludes installation of track, traction power, systems and finishes. If the Project scope requires the contractor to complete all work required for Revenue Operations then the contractor shall provide, operate, maintain and remove a ventilation system which meets the requirements of the approved Ventilation Plan for the Post Tunnel Construction period and activities.

B. At completion of Contract, leave in-place a ventilation system which will maintain a minimum of 200 fpm velocity in each tunnel or tunnel segment as indicated. Turn over operative system to Metro’s designee for future use, maintenance and removal. Have post construction ventilation systems designed and certified by a Mechanical Engineer registered in State of California and confirm compliance with requirements of applicable Sections of CCR, Title 8.

C. Coordinate post construction ventilation system design with intervening contracts. If feasible, select ventilation equipment which can be used in system ventilation after use in construction phase.

D. Design system to allow passage within tunnel and station of equipment that does not encroach into any portion of the dynamic envelope of the trains.

3.03 POST CONSTRUCTION VENTILATION SYSTEMS FOR STATIONS

A. The following paragraphs apply only to those projects where the Scope of Work of the Contractor includes ONLY the excavation and building of the Tunnel structure(s) and or station box(s) but excludes installation of track, traction power, systems and finishes. If the Project Scope requires the contractor to complete all work required for Revenue Operations then the contractor shall provide, operate, maintain and remove a ventilation system which meets the requirements of the approved Ventilation Plan for the Post Tunnel Construction period and activities.

B. At completion of Contract, leave in-place a ventilation system which will maintain 3 air changes per hour in the stations and crossover (if applicable). Turn over operative system to Metro’s designee for future use maintenance and removal. Have post construction ventilation systems designed and certified by a Mechanical Engineer registered in State of California and confirm compliance with requirements of applicable Sections of CCR, Title 8.
C. Coordinate post construction ventilation system design with intervening contracts. If feasible, select ventilation equipment which can be used in post construction ventilation system after use in construction phase.

3.04 PERMANENT VENTILATION SYSTEMS

A. Do not use permanent ventilation systems for temporary or post-construction ventilation, unless otherwise permitted in writing by Metro or its designee.

3.05 GAS MONITORING

A. As specified in Section 01 35 23 - Worksite Safety Requirements.

B. At minimum, comply with the requirements of CCR, Title 8, Tunnel Safety Orders.

3.06 EQUIPMENT LOCATION

A. Equipment located in tunnel or trainway shall allow passage of equipment fitting within the clearance diagram.

END OF SECTION 01 51 23
SECTION 01 52 13

CONSTRUCTION FACILITIES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Furnishing, installing, maintaining, and removing Construction Facilities (Field Offices) for the Worksite, for Metro or its designee.

B. The Contractor shall provide and maintain well-lit, heated, air-conditioned, and ventilated field offices at or near the site of each of the work segments for the exclusive use of Metro's personnel (including Metro authorized consultants and Third Party staff).

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures

B. Section 01 35 23: Worksite Safety Requirements

C. Section 01 35 53: Worksite Security Requirements

D. Section 01 50 00: Temporary Facilities and Controls

1.03 REFERENCES

A. California Code of Regulations (CCR), Title 8:

   1. Division 1, Department of Industrial Relations (Cal/OSHA)

1.04 QUALITY ASSURANCE (Not Used)

1.05 SUBMITTALS

A. Refer to Section 01 33 00 - Submittal Requirements, for submittal requirements and procedures.

B. The Contractor shall submit within 10 days of NTP a section of their mobilization plan for providing Metro or its designee’s field offices including drawings showing site locations for proposed offices, physical addresses, facilities, and list of furnishings and equipment indicating manufacturers and model numbers.

C. The Contractor shall submit within 60 days of demobilization a supplement to the mobilization plan describing demobilization of Metro’s field offices.

1.06 DEFINITIONS

A. Metro Field Offices: Separate office space, either in trailers or an office building, for the exclusive use by Metro personnel.
PART 2 - PRODUCTS

2.01 METRO FIELD OFFICES

A. It is likely that the Contractor will have more than one field office location due to the size of the project and the number of construction segments. The Contractor shall provide similar facilities for Metro’s Field Offices at each location. Upon award Contractor shall meet with Metro to determine office locations.

B. The office shall be new or in a like-new condition.

C. In the event the Contractor elects to maintain a field office in an office building rather than a trailer, provide a Metro field office within the same building. The design for the office shall be submitted and approved prior to furnishing the office. If the Contractor relocates its field office to another location during construction, Metro's field office shall also be relocated to the new location. Relocation of the field office shall be scheduled so as not to interrupt Metro's normal work activity.

D. The Metro offices shall be designed with a reception area at the entrance and shall have screened windows with window treatment. Raised entrances and exits shall have stairs. The floors shall be able to withstand 125 pounds per square foot (PSF) live loads and be covered with resilient flooring. The offices, if trailers, shall be tied down to prevent damage or overturning and be provided with a motion-sensing exterior light at each entrance.

1. The first office shall have a minimum of 1,200 square feet of working floor space and lockable doors with 6 sets of keys. The office area shall be configured as follows:
   a. 2 individual offices with floor to ceiling interior walls and a lockable door.
   b. 2 cubicle offices with partitions a minimum of 6 feet in height.
   c. 2 file/inspection areas with partitions.
   d. A rest room. Rest room shall have a toilet, lavatory with hot and cold water, toilet paper holder, paper towel dispenser, mirror, soap dispenser, lighting, and mechanical ventilation.

2. The second office shall have a minimum of 1,800 square feet of working floor space and lockable doors with 14 sets of keys. The office area shall be configured as follows:
   a. 8 individual offices with floor to ceiling interior walls and a lockable door.
   b. 4 cubicle offices with partitions a minimum of 6 feet in height.
   c. 2 file/inspection areas with partitions.
d. 1 small conference room enclosed with floor to ceiling interior partitions and closable doors.

e. 2 rest rooms. Each rest room shall have a toilet, lavatory with hot and cold water, toilet paper holder, paper towel dispenser, mirror, soap dispenser, lighting, and mechanical ventilation.

3. The third office shall have a minimum of 1,800 square feet of working floor space and lockable doors with 14 sets of keys. The office area shall be configured as follows:

a. 8 individual offices with floor to ceiling interior walls and a lockable door.

b. 4 cubicle offices with partitions a minimum of 6 feet in height.

c. 2 file/inspection areas with partitions.

d. 1 small conference room enclosed with floor to ceiling interior partitions and closable doors.

e. 2 rest rooms. Each rest room shall have a toilet, lavatory with hot and cold water, toilet paper holder, paper towel dispenser, mirror, soap dispenser, lighting, and mechanical ventilation.

E. Provide lighting to uniformly deliver not less than 100 foot-candles at desk height in all areas except restrooms. Adequately light and ventilate restrooms, complying with code requirements.

F. Locate exterior lighting over entrance doors. Provide grounded duplex electrical receptacles at approximately 10 foot spacing for interior walls, with at least one on each wall except in restrooms.

G. Provide automatic heating and air conditioning equipment capable of maintaining ambient office temperature between 68°F and 78°F.

H. Provide drinking water chilled by electrically operated drinking fountain.

I. Provide restrooms with lavatory, flush-type water closet, mirror, grounded duplex electrical receptacle, soap holder, toilet paper holder, paper towel dispenser and wastebasket.

J. Provide hot water heater of not less than 20 gallons storage capacity.

K. Provide security equipment, controls, and personnel in compliance with Contractor's approved Project Security Plan.

1. Submit Security Plan as per Section 01 35 53.
L. Provide and maintain electricity, water, sewer, data service, and telephone for the duration of the project. The Contractor shall pay for connection of temporary utilities and pay monthly utility charges, including cost for telephone usage within State of California. Costs of telephone calls outside of California shall be billed on a monthly basis and reimbursed by Metro.

M. If the field office is in a trailer, the Contractor shall construct a gravel base road from the nearest paved road to the field office and construct a gravel parking area in front of the field office for twice the number of occupants of the office’s vehicles.

N. Furnishings: New and of type and quantity listed below:

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desks</td>
<td>14</td>
<td>Double pedestal, 30 by 48 inches, minimum, with lockable drawers and keys</td>
</tr>
<tr>
<td>Computer desks</td>
<td>14</td>
<td>A computer desk a minimum of 30° in depth</td>
</tr>
<tr>
<td>Cubicle desks</td>
<td>16</td>
<td>A desk partition attached for the length of the cubicle a minimum of 30” in depth</td>
</tr>
<tr>
<td>Cubicle computer desks</td>
<td>16</td>
<td>A computer desk partition attached for the cubicle a minimum of 30” in depth</td>
</tr>
<tr>
<td>Conference table</td>
<td>3</td>
<td>4 by 6 feet minimum size</td>
</tr>
<tr>
<td>Chairs</td>
<td>8</td>
<td>Non stackable chairs with rollers for the conference rooms</td>
</tr>
<tr>
<td>Chairs</td>
<td>20</td>
<td>Stackable metal chairs suitable for conferences</td>
</tr>
<tr>
<td>Reference table</td>
<td>4</td>
<td>Height of 36 inches, depth of 44 inches, and length of 60 inches; with 2x4 open framework and a durable pressed-board top surface or equivalent</td>
</tr>
<tr>
<td>Drawing table</td>
<td>4</td>
<td>A minimum of 36 by 60 inches with drawers</td>
</tr>
<tr>
<td>Drafting stool</td>
<td>4</td>
<td>Roller mounted, swivel, cushioned, adjustable, and suitable for the height of the drawing table furnished</td>
</tr>
<tr>
<td>Chairs</td>
<td>30</td>
<td>Roller mounted, swivel, and cushioned</td>
</tr>
<tr>
<td>Plan rack w/holders</td>
<td>4</td>
<td>Capable of holding 24 sticks of full-size (24 by 36 inches) drawings</td>
</tr>
<tr>
<td>Shelves</td>
<td>4</td>
<td>Ceiling high, installed. Each unit shall be 30 inches deep by 5 feet wide, divided vertically into 4 equal compartment heights, compartmentalized horizontally with vertical intermediate supports not over 3 feet apart, and ends and backs closed with plywood sheets. All shelf units shall be anchored to a wall in order to prevent overturning</td>
</tr>
<tr>
<td>Refrigerator</td>
<td>4</td>
<td>18 cu. Ft. minimum</td>
</tr>
<tr>
<td>Microwave Oven</td>
<td>4</td>
<td>700 watt minimum</td>
</tr>
<tr>
<td>Waste basket</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Recycle bin</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Whiteboard</td>
<td>30</td>
<td>Erasable felt marker type, 30 by 48 inches, minimum size</td>
</tr>
<tr>
<td>Coat Racks</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Filing cabinet</td>
<td>8</td>
<td>Fire proof metal, lockable, with 2 sets of keys, 5- drawer legal size, 27 inches deep, with baked on enamel finish</td>
</tr>
<tr>
<td>Bookshelves</td>
<td>10</td>
<td>3 feet long by 6 feet tall, minimum size</td>
</tr>
</tbody>
</table>
O. Provide handicap access in accordance with applicable codes and regulations.

P. Fire Extinguisher: Provide ABC fire extinguishers. The number, extinguisher rating, and location shall be in accordance with NFPA No. 10. However, the minimum extinguisher rating shall be 2A:10BC, and in no case shall the area covered per extinguisher be greater than 3000 square feet nor shall the travel distance to the nearest extinguisher exceed 50 feet.

Q. Communication Equipment and Office Machines for Contracting Officer's Field Office.

   1. Provide and maintain the following machines and communication equipment in the Contracting Officer's field office for the duration of the work.

   2. The office machines and communications equipment shall be new or in a like-new condition.

   3. Unless otherwise noted, upon the acceptance of the project, the machines and communications equipment will be returned to the Contractor.

   4. All electrical equipment listed in this section shall be furnished with surge protection.

   5. Provide telephone service as specified in this Section.

   Table 2. Communication and Office Equipment

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Printer/Copier – Machine with Photocopying, scanning, facsimile, and printing capabilities – Provide Quantity 3 ea</td>
<td>Provide consolidated unit equivalent to Canon C5051 or better with color capability</td>
</tr>
<tr>
<td>Telephones – Provide Quantity 30 ea</td>
<td>With conference call feature, two lines, and answering system</td>
</tr>
</tbody>
</table>

R. The Contractor shall furnish the following computer hardware and the latest editions of the following software unless otherwise specified:

   Table 3. Computer/Electronic Equipment

<table>
<thead>
<tr>
<th>Desktop Computer</th>
<th>Quantity: 24</th>
</tr>
</thead>
<tbody>
<tr>
<td>OptiPlex 990 MT</td>
<td>OptiPlex 990 Minitower for Standard Power Supply</td>
</tr>
<tr>
<td>Operating System(s)</td>
<td>Genuine Windows® 7 Professional, SP1, No Media, 32-Bit, English</td>
</tr>
<tr>
<td>Processors</td>
<td>Intel® CoreTM i5 2400 Processor (3.1GHz, 6M)</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>4GB DDR3, Non-ECC, 1333MHz Dual Channel SDRAM, 2x2GB</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------------------------------------------------</td>
</tr>
<tr>
<td><strong>Keyboard</strong></td>
<td>Dell Multimedia Pro Keyboard, English</td>
</tr>
<tr>
<td><strong>Video Cards</strong></td>
<td>512MB AMD RADEON HD 6350 (2 DVI), Full Height</td>
</tr>
<tr>
<td><strong>Boot Hard Drives</strong></td>
<td>250GB 2.5 SATA with 16MB DataBurst CacheTM</td>
</tr>
<tr>
<td><strong>1394 FireWire Adapter</strong></td>
<td>USB 3.0 Ports adapter, Full Height</td>
</tr>
<tr>
<td><strong>Mouse</strong></td>
<td>Dell MS111 USB Optical Mouse</td>
</tr>
<tr>
<td><strong>Systems Management Mode</strong></td>
<td>Intel® vPro Technology Enabled</td>
</tr>
<tr>
<td><strong>Removable Media Storage Device</strong></td>
<td>16X DVD +/- RW, Roxio Creator, CyberlinkPowerDVD, No Media</td>
</tr>
<tr>
<td><strong>Thermals</strong></td>
<td>Heat Sink, Performance, Minitower</td>
</tr>
<tr>
<td><strong>Speakers</strong></td>
<td>Internal Dell Business Audio Speaker</td>
</tr>
<tr>
<td><strong>Power Supplies</strong></td>
<td>OptiPlex 990 Minitower Standard Power Supply</td>
</tr>
<tr>
<td><strong>Documentation</strong></td>
<td>Opti 990 Documentation English and French</td>
</tr>
<tr>
<td><strong>Hard Drive Mode</strong></td>
<td>No RAID</td>
</tr>
<tr>
<td><strong>Energy Efficiency Options</strong></td>
<td>No Dell Energy Smart Power Management Settings</td>
</tr>
<tr>
<td><strong>Resource DVD</strong></td>
<td>No Resource DVD</td>
</tr>
<tr>
<td><strong>Hardware Support Services</strong></td>
<td>3 Year ProSupport with 3 Year NBD Limited Onsite Service After Remote Diagnosis</td>
</tr>
<tr>
<td><strong>Security Hardware</strong></td>
<td>Chassis Intrusion Switch Option</td>
</tr>
<tr>
<td><strong>Processor Branding</strong></td>
<td>Core i5 vPro Sticker</td>
</tr>
<tr>
<td><strong>Desktop Monitor</strong></td>
<td>ViewSonic VX2250wm-LED 22 inch LCD</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Laptop</strong></th>
<th><strong>Quantity</strong>: 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latitude E6520</td>
<td>Latitude E6520</td>
</tr>
<tr>
<td>Operating System</td>
<td>Genuine Windows® 7 Professional, SP1, No Media, 32-bit, English</td>
</tr>
<tr>
<td>Processor</td>
<td>Intel® Core™ i5-2540M (2.60GHz, 3M cache) with Turbo Boost Technology 2.0</td>
</tr>
<tr>
<td>Memory</td>
<td>4.0GB, DDR3-1333MHz SDRAM, 1 DIMM</td>
</tr>
<tr>
<td>Internal Keyboard</td>
<td>Internal English Dual Pointing Keyboard, Numpad</td>
</tr>
<tr>
<td>Graphics</td>
<td>nVidia® NVSTM 4200M 512MB DDR3 Discrete Graphics for Dual Core</td>
</tr>
<tr>
<td>Primary Storage</td>
<td>250GB 7200rpm Hard Drive</td>
</tr>
<tr>
<td>LCDs</td>
<td>15.6” HD (1366x768) Anti-Glare LED-backlit</td>
</tr>
<tr>
<td>AC Adapter</td>
<td>90W A/C Adapter (3-pin)</td>
</tr>
<tr>
<td>Primary Optical Device</td>
<td>8X DVD +/- RW w/Roxio and Cyberlink Power DVDTM, no media</td>
</tr>
<tr>
<td>Camera/Microphone</td>
<td>Light Sensitive Webcam and Noise Cancelling Digital Array Mic</td>
</tr>
<tr>
<td>Wireless LAN</td>
<td>Intel® Centrino® Advanced-N 6205 802.11a/b/g/n (802.11) half mini card</td>
</tr>
<tr>
<td>Systems Management</td>
<td>Intel vProTM Technology’s Advanced Management</td>
</tr>
<tr>
<td>Primary Battery</td>
<td>6-cell (60WH) Primary Lithium Ion Battery</td>
</tr>
<tr>
<td>Carrying Cases</td>
<td>Nylon Carrying Case – Fits Laptops with Screen – Up to 15.6”</td>
</tr>
</tbody>
</table>
### Hardware Support Services

- **3 Year ProSupport with 3 Year NBD Limited Onsite Service After Remote Diagnosis**

### Extended Battery Service

- **2 Years Extended Battery Service for Years 2 and 3 of System Life**

### Energy Star/E-PEAT Gold

- **Energy Star 5.0 Enabled / EPEAT Gold**

### Asset Protection Software

- **Absolute Computrace Complete 5 Year License Installed**

### Processor Branding

- **Intel Core i5 vPro Label**

### Docking Station

- **Suitable for provided laptop**

### Desktop Monitor

- **ViewSonic VX2250wm-LED 22 inch LCD**

### Laptop Accessories

- **2-button mouse, 101-keyboard and soft carrying case**

### Electronic Equipment

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>40” LCD or plasma color TV/ Monitor/DVD player, with mobile roller stand to house TV</td>
</tr>
</tbody>
</table>

1. Computer System for Field Office of the Contracting Officer's: Computer hardware and software shall be compatible with Metro existing inventory. Metro will provide the network server, and network installation. All electrical equipment listed in this section shall be furnished with surge protection.

2. Furnish supplies, paper, and toner for the machines and communication equipment for the duration of the project.

3. Computer equipment and software shall be new and unused. Software shall include all documentation, license, and registration information. Annual maintenance fees for the software shall be paid by the Contractor for the duration of the project.

4. Furnish and install all necessary attachments including cables and hook-up accessories, operating features, connections, and controls required for the computer equipment to perform the functions and properly operate the system. Anti-theft and seismic devices shall be furnished and installed on the equipment.

5. The computer system shall be for the exclusive use of Metro employees. The system shall be successfully tested by the Contractor prior to acceptance by Metro or its designee. The acceptance test will be considered met when it has been demonstrated that the equipment works properly through at least 3 cycles of operation (cold boot and access each software package).

   a. After the computers and other equipment are accepted, it shall become the property of Metro. The ownership shall include all items of equipment, hardware, software accessories, and appurtenances.
b. The warranties, guarantees, entitlement, or other rights associated with ownership and use of the equipment shall be assigned to Metro. At the time of acceptance of the system, the Contractor shall deliver the instruction manuals and warranty registration forms of the manufacturer and supplier of the equipment and software to Metro or its designee.

c. At the time of acceptance, the keys or other unlocking instruments for the anti-theft devices.

6. The Contractor will not be responsible for system maintenance after acceptance by the Contracting officer.

7. Provide and install a hardwired system to allow the computers, printers, and Internet system to communicate with each other.

PART 3 - EXECUTION

3.01 FIELD OFFICES

A. Complete and in place within 60 days after Notice to Proceed date.

B. Contractor has option of providing mobile office space, or rented office space.

3.02 INSTALLATION

A. Install field office on structurally suitable foundations.

B. Jack mobile unit off wheels and support. Enclose area under trailer with weatherproof skirting.

C. Provide covered steps and landings at exterior doors.

D. Provide an exterior hose bib with hose and a boot wash station.

E. Install tie-downs in compliance with Los Angeles City Code or other governing agency.

F. Provide access from public streets to field office and easily accessible parking space in accordance with the size of the offices for full-size passenger automobiles or light trucks. Grade field office site, access roadway and parking area for drainage, and surface with asphalt paving or crushed stone.

3.03 MAINTENANCE AND SERVICE

A. Provide continuous maintenance of field office - inside and outside, specified supplies, furniture, fixtures, roads and parking area during construction period.

B. Repair or refinish damage as required.

C. Provide regular rodent and pest control.
D. Provide janitorial service each workday at a time to not disrupt regular work schedules. Furnish soap, paper towels and toilet tissue. Sweep, mop, dust and dispose of trash. Provide for pickup and processing of recyclables.

3.04 COMPLETION OF CONSTRUCTION OPERATIONS

A. Upon completion of construction operations, or as otherwise required by Metro or its designee, remove field office and furnishings and restore the site as described in the demobilization plan.

B. Disposition of Office Facilities: At the completion of all work, the Metro's field office, and furnishings shall remain the property of the Contractor, and Contractor shall remove same, including utility connections, from the premises.

C. After demobilization the field offices sites shall be restored in accordance with the demobilization plan. Utility services shall be disconnected and capped. The area shall be clean and free of any evidence of scarred landscape or damage to the surrounding vegetation. The site shall be finish graded to smooth and properly draining contours.

D. The Contractor shall notify Metro 60 days in advance of their intent to demobilize the Metro field offices.

END OF SECTION 01 52 13
SECTION 01 53 05

TEMPORARY DECKING SYSTEMS

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Designing, furnishing, installing, maintaining, removing and disposing of temporary decking in public right-of-way, unless indicated to facilitate passage of pedestrian, vehicular traffic and construction equipment over excavations as necessary for stations, crossovers, access shafts, emergency exits, and appendages.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures
B. Section 01 35 23: Worksite Safety Requirements
C. Section 01 35 53: Worksite Security Requirements
D. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)

1.03 REFERENCES

A. American Association of State Highway and Transportation Officials (AASHTO):
   1. AASHTO HB-17 - Standard Specification for Highway Bridges (with California Amendments)
B. ASTM International (ASTM):
   1. ASTM A36 - Carbon Structural Steel
   2. ASTM D2047 - Test Method for Static Coefficient of Friction of Polish Coated Flooring Surfaces as Measured by the James Machine
   3. ASTM F609 - Test Method for Using a Horizontal Pull Slipmeter (HPS)
C. American Welding Society (AWS):
   1. AWS D1.1 - Structural Welding Code – Steel
D. California Code of Regulations (CCR), Title 24:
   1. Part 2 - California Building Code (CBC)
   2. Part 3 - California Electrical Code (CEC)
E. California Department of Transportation (Caltrans):
1. Caltrans Bridge Design Specifications (BDS)
2. California Manual on Uniform Traffic Control Devices (California MUTCD)
   a. Work Area traffic Control Handbook (WATCH Manual)

F. National Fire Protection Associations (NFPA):
   1. NFPA 70 - National Electrical Code (NEC)

G. Institute of Electrical and Electronics Engineers (IEEE):
   1. IEEE C2 - National Electrical Safety Code (NESC)

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).

B. Decking: Designed by registered professional Civil or Structural Engineer licensed in State of California.

C. Conform to following:
   1. Design temporary decking and supporting steel system for minimum following loads.
      a. Street Traffic: HL-93 loading according to Caltrans Bridge Design Specifications (BDS)
      b. Superimposed street loads such as barricades, railing, wheel guards etc.
      c. Loads hanging beneath traffic decking system.
      d. Weight of decking system.
   2. Construction Safety and Security Procedures: Comply with Sections 01 35 23 – Worksite Safety Requirements and 01 35 53 – Worksite Security Requirements
   3. Include wheel guards, railings, barricades and other safety requirements in decking design.
   4. Design members supporting decking to allow clearance for existing utilities to be supported in place.
   5. Maintain and keep valves, manholes, fire hydrants, vaults and other utility facilities to be temporarily supported beneath traffic decking accessible while portions of utility system remain active.
   6. Wheel Guards: Not less than 12 inches high.
   7. Provide for and maintain proper drainage.
   8. Maintain access to driveways.
   9. Accommodate necessary site lines.
   10. Accommodate signals and street light clearances.

D. Welding Operations: Comply with AWS D1.1, for Dynamically Loaded Structures; and Section 05 05 33 - Basic Welding Requirements.
1.05 SUBMITTALS

A. Refer to Section 01 33 00 – Submittal Procedures, for submittal requirements and procedures.

B. Calculations and Working Drawings: Prepared, sealed and signed by registered Civil or Structural Engineer licensed in State of California.

C. Working Drawings: Include location, sequence of installation, construction of decking and supporting members, details for girders, beams, welding, bolting, bearing piles (other than those forming a part of excavation support system), accessories, wearing surface, slip-resistant materials, openings, ramps, guardrails, curbs, signs and access hatches; and maintenance, time duration, and removal of decking system.

   1. Do not make changes to accepted details without prior written concurrence by Metro or its designee.

D. Welding Procedures: Conform to AWS D1.1. For welded member subject to traffic loads, conform to Section 9, Dynamically Loaded Structures.

E. Submit certificates of compliance from material manufacturer for decking materials specified in Article 2.01.

1.06 DEFINITIONS (Not Used)

1.07 WORKSITE CONDITIONS

A. Maintain vehicular and pedestrian access in accordance with Controlling Traffic requirement as approved by City of Los Angeles, Department of Transportation, or local jurisdiction.

PART 2 – PRODUCTS

2.01 DECKING MATERIALS

A. Decking material shall be new and free from damage and defects. Salvaged or used material with penetration welds shall not be used. Materials used for temporary decking remain property of Contractor. Decking materials are listed below.

B. Concrete: As specified in Section 03 05 15 - Portland Cement Concrete.

C. Structural Steel: Conform to ASTM A36, Section 05 12 23, Structural Steel, and Section 05 50 00 - Metal Fabrications.

D. Precast Concrete: As specified in Section 01 53 16 - Temporary Precast Concrete Deck, Section 03 40 00 - Precast Concrete, and Section 03 41 13 - Precast Prestressed Planks.
E. Surfacing Material: Wearing course coefficient of friction not less than 0.30 for skid resistance as determined by California Test 342 and static coefficient of friction not less than 0.5 as determined by ASTM D2047, F609, or other procedure approved by City of Los Angeles Bureau of Engineering.

F. Asphalt Concrete Pavement: As specified in Section 32 12 16 - Asphalt Concrete Pavement. Provide ramps to raise decking as required or as indicated.

PART 3 – EXECUTION

3.01 INSPECTION

A. Before installation, Metro or its designee may inspect materials used for decking.
   1. Remove rejected materials from Worksite.

3.02 DECKING INSTALLATION

A. Install decking in accordance with accepted construction sequence, accepted Codes, approved Working Drawings, and requirements of jurisdictional authorities.
   1. Securely fasten surface members to prevent movement under traffic conditions.
   2. Embed transition members, plates and ramps in existing pavement with asphalt patching material to prevent movement and mitigate noise under traffic conditions.

3.03 DECKING STRUCTURE

A. Provide access ramps at pedestrian and vehicular crossing when required by difference in elevation.
   1. Taper surfaces located in pedestrian areas with material at sides to eliminate tripping hazards.
   2. Determine position of utilities required to be supported in-place before beginning design and installation of decking.
   3. Do not encroach beyond limits of construction easements when constructing driveway ramps.
   4. Obtain additional easements and permission to enter private property.

B. Provide decking with lifting holes that is readily removable without endangering adjacent construction, and fasten to eliminate movement.

C. Make temporary openings in decking where access is necessary for advancement of Work. Protect and barricade openings to ensure safety of public, Workmen and Work. Paint top and traffic sides of barricades with two coats of white traffic paint.

D. Install barricades along sides of pedestrian walkways in accordance with Article 10 of Work Area Traffic Control Handbook (WATCH Manual) or the California Manual on Uniform Traffic Control Devices, whichever is more stringent.
E. Install fences along both sides of pedestrian walkways on decked areas where walkways are adjacent to open areas, storage areas and areas used by Contractor.

F. Erect and maintain load limit and other signs to restrict loading on decking so maximum design loading is not exceeded.

G. When no longer required, remove decking and transport from Worksite.

H. Cut off interior and exterior support members eight feet below surface.

I. Provide solid covers for lifting holes in decking at pedestrian crossings that are flush with decking surface.

J. Do not splice deck beams unless design and location of splice is reviewed and accepted by Metro or its designee.

K. All splices shall be full penetration welds.

L. Provide surface access through decking structure for valves, manholes, vaults and other facilities which require continuous access and will be temporarily supported beneath decking structure.
   1. Install access features not later than two weeks after completion of decking system.

M. Design and install deck structure to properly support and protect existing utilities.

N. Secure wheel guard or curb by bolting at a minimum of three places per segment of wheel guard or curb.

O. Provide continuous neoprene support under decking panels

3.04 SLIP-RESISTANT MATERIAL

A. Apply to decking surface at pedestrian and vehicular traffic areas as indicated.

3.05 CONSTRUCTION OF COVERED PEDESTRIAN WALKWAYS

A. Erect a structurally adequate, drained, covered pedestrian walkway where public roadway/walkway adjoins Worksite in areas which involve possibility of overhead construction operations endangering safe passage of person along roadway/walkway.
   1. Provide waterproofed heavy wood plank overhead decking, protective plywood enclosure, walk handrails, barricades, warning signs and lights.
      a. Paint with two coats of white reflectionized traffic paint.
   2. Comply with requirements of governing authorities.

B. Pedestrian walkway shall have a surface with a static coefficient of friction of not less than 0.5. Submit test data for acceptance.

C. Construct covered walkway structure in accordance with following:
1. Section 01 35 23 – Worksite Safety Requirements.
2. NFPA 70 (NEC)
4. California Building Code (CBC)
5. California Electrical Code (CEC)
6. Other pertinent parts of Contract.

D. Construct covered walkway structure to provide pedestrian thoroughfare access where existing sidewalks cross trackway.
   1. Clear width for pedestrian travel way minimum of 72 inches.
   2. Deflection criteria for main or secondary supporting member of covered walkway span is L/360.
   3. Walkway: Rigid structure enclosed on sides.

E. Provide covered structure with openings for gravity ventilation.
   1. Provide lighting within enclosure; festoon lighting is not allowed.
   2. Provide permanent fixture lighting type with rigid conduit and wire.
   3. Conceal conduit and wire
   4. Recess fluorescent fixtures.
   5. Provide fixtures with wire guard to mitigate vandalism and tampering.
   6. Provide lighting fixtures with minimum light level of 10 foot candles.

F. Lighting shall be installed with multiple circuits to reduce likelihood of total loss of light.

G. Provide emergency egress lighting as required CEC or NFPA 101 – Life Safety Code, whichever is more stringent.

3.06 FIELD QUALITY CONTROL

A. Allowable Tolerances
   1. Do not exceed 1/2 inch difference in surface elevations of abutting decking panels.
   2. Do not exceed 1/2 inch for horizontal gaps in decking panels.
   3. Do not raise elevation of temporary decking above existing sidewalk elevation, except where indicated without prior acceptance of Metro or its designee.

B. Provide and maintain access facilities for inspection of decking structure and supported utilities, lagging and bracing.

3.07 MAINTENANCE
A. Maintain decking components to standard, with respect to public safety and convenience, acceptable to Metro or its designee.

B. Immediately repair broken and chipped pieces, bent and loose plates of deck members, and protruding deck fasteners.

C. Patch paving adjacent to traffic decking as potholes develop. Immediately resecure loose transition members and plates.

D. Keep decking, transition members and ramps free from water, mud and debris.

E. Maintain paint striping for traffic delineation on decking surface as indicated on accepted traffic control plan or as directed by Metro or its designee.

F. Maintain and replace surfacing material as needed to keep coefficient of friction within limits specified.

G. Maintain barricades and fences in good condition.

3.08 USE OF TIMBER DECK MATS DURING BACKFILLING

A. Timber deck mats may be used in backfilling stage following removal of structural support system provided following conditions are met:

1. Mats Placed at Grade: Place mats on four inch sand/cement bed. Mix sand and cement bed into road base and re-compact upon removal of deck mats on grade.

2. Tolerances for Gaps and Abutting Panels: As specified above.

3. Place single timber fillers only at curb side.
   a. Avoid use of single timbers in vehicular lanes.

4. Provide spike or plate at filler timbers to mat panels.

5. Provide transitions ramps from existing deck system to finished street and sidewalk levels when required.
   a. Do not exceed five percent for ramps vertical slope.


3.09 WELD INSPECTION

A. A visual Inspection: 100 percent of welds to AWS D1.1, Section 9.

B. Magnetic Particle Inspection: 100 percent of cover plate fillet welds to AWS D1.1, Section 9. 10 percent of all other fillet welds to AWS D1.2, Section 8.

C. Ultrasonic Inspection: 100 percent of full penetration welds to AWS D1.1, and 100 percent of splices both field and shop.
END OF SECTION 01 53 05
PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Furnishing, **designing**, installing and maintaining temporary precast concrete deck of the thickness and minimum strength necessary to carry load of construction equipment and traffic over excavation as needed for the Contractors Work.
   1. Remove deck when temporary decking system is no longer required.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures

B. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)

C. Section 01 53 05: Temporary Decking Systems

D. Section 01 66 00: Product Storage and Handling Requirements

E. Section 03 05 15: Portland Cement Concrete

F. Section 03 60 00: Grout

G. Section 05 05 33: Basic Welding Requirements

1.03 REFERENCE STANDARDS

A. American Welding Society (AWS):
   1. AWS D1.1 Structural Welding Code Steel

B. Prestressed Concrete Institute (PCI):
   1. PCI MNL 116 Manual for Quality Control for Plants and Production of Precast Prestressed Concrete Products

C. California Department of Transportation (Caltrans):
   1. Caltrans Bridge Design Specifications (BDS)

1.04 QUALITY ASSURANCE
A. Comply with Project Quality Program Requirements (see 1.02 above).

B. Manufacturer Qualifications: Use precast concrete manufacturing facilities that are certified in accordance with PCI MNL 116, by the Precast Concrete Institute Plant Certification Program, before the start of production.

C. Installer Qualifications: Regularly engaged in installation of precast concrete decks and employing qualified Workers to handle and install precast members.

1.05 SUBMITTALS

A. Refer to Section 01 33 00 – Submittal Procedures, for submittal requirements and procedures.

B. Working Drawings and product data for precast concrete deck indicating dimensions, design loads, anchors, connections and accessories, signed by registered civil or structural engineer licensed in State of California.

C. Calculations: Prepared, sealed and signed by registered civil or structural engineer licensed in State of California. Use exact methods using tire contact area.

D. Manufacturer’s installation instructions.

E. Layout Drawings: Show access points for suspended utilities.

F. Welder qualifications and welding procedures in accordance with AWS D1.1 and Section 05 05 33 – Basic Welding Requirements.

G. Certified test reports as required for material specified in Part 2 - Products.

H. Material Safety Data Sheets (MSDS): Manufacturer’s Material Safety Data Sheets for each type of material used in Work.

1.06 DEFINITIONS (Not Used)

1.07 DELIVERY, STORAGE AND HANDLING

A. Refer to Section 01 66 00 – Product Storage and Handling Requirements, for general requirements for product delivery, storage and handling procedures.

B. Lift and support deck units only at support points indicated on reviewed and accepted Working Drawings.

C. Protect edges of members from chipping, spalling, cracking or other damage.

PART 2 – PRODUCTS
2.01 PROVIDE DECK
   A. Provide Deck as reviewed and accepted by Metro or its designee.
   B. Nominal Thickness: As required to carry imposed loads, but not less than ten inches.
   C. Plank Width: Manufacturer's standard width.

2.02 CONNECTING AND SUPPORTING DEVICES
   A. Do not paint surfaces of items in contact with concrete or requiring field welding.
   B. Provided embedded plates required to support electrical cable trays, light fixtures and unit heaters.

2.03 GROUT
   A. As specified in Section 03 60 00 – Grout.

2.04 WELDING
   A. As specified in Section 05 05 33 – Basic Welding Requirements.
      1. Use shielded metal arc welding (SMAW) process.

2.05 CONCRETE
   A. As specified in Section 03 05 15 – Portland Cement Concrete.

2.06 PERFORMANCE
   A. Performance Criteria:
      2. Wheel Loading: HL-93
      3. Driving surface: Caltrans Bridge Design Specifications

PART 3 – EXECUTION

3.01 INSTALLATION
   A. Install deck in accordance with manufacturer's installation instructions and reviewed and accepted Layout Drawings.
   B. Provide temporary bracing during installation.
      1. Maintain bracing in place until final support is provided.
C. Install members without damage to units.

D. Maintain uniform horizontal and vertical joints as installation progresses.

E. Allow planks to fully deflect under own weight and adjust placement differences between planks before final connections are made, as specified in Section 01 53 05 – Temporary Decking Systems.

F. Perform welding in accordance with AWS D1.1 and Section 05 05 53 – Basic Welding Requirements.

G. Provide a level top surface:
   1. Place grout to compensate for elevation differences between adjacent planks.

H. Replace failed planks as directed by Metro or its designee.

I. Remove deck when temporary decking system is no longer required.

END OF SECTION 01 53 16
SECTION 01 55 13
TEMPORARY ACCESS ROADS AND PARKING AREAS

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Designing, locating, laying out, constructing, maintaining, and removing temporary access roads and parking areas.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures
B. Section 01 35 23 Worksite Safety Requirements
C. Section 01 35 53 Worksite Security Requirements
D. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)
E. Section 01 56 23: Temporary Barriers
F. Section 01 56 26: Construction Fencing (Wood)
G. Section 01 56 28: Construction Fencing (Chain Link)

1.03 REFERENCES

A. State of California Department of Transportation (Caltrans) Standard Specifications; California Department of Transportation Manual on Uniform Traffic Control Devices (California MUTCD), as published on the dated of Notice to Proceed.
B. Standard Specifications for Public Works Construction (SSPWC).
C. City of Los Angeles Department of Public Works, Bureau of Engineering
   2. Standard Plan S-601-3
D. California Code of Regulations (CCR), Title 24:
1. Part 2 – California Building Code (CBC)

E. U.S. Department of Transportation (USDOT):
   1. Federal Transit Administration (FTA) – American with Disability Act (ADA) Standards for Transportation Facilities.

1.04 QUALITY ASSURANCE
   A. Comply with Project Quality Program Requirements (see 1.02 above).

1.05 SUBMITTALS
   A. Refer to Section 01 33 00 – Submittal Procedures, for submittal requirements and procedures.
   B. Layout and details for construction of temporary access roads and parking areas.

1.06 DEFINITIONS (Not Used)

PART 2 – PRODUCTS

2.01 MATERIALS AND EQUIPMENT
   A. Provide materials and construction and maintenance methods to satisfy emergency response requirements of local jurisdictions, and adequate for loading, density of traffic, and weather conditions expected at temporary access roads and parking areas during construction period.
   B. Comply with the provisions Section 01 35 23 Worksite Security Requirements and the Contractor’s approved security plan. Resubmit the security plan as needed for each new parking area or yard.

PART 3 – EXECUTION

3.01 INSTALLATION
   A. Locate temporary access roads and parking areas to serve construction Work adequately and result in minimum interference with performance of Work.
   B. Relocate, modify and extend facilities, as required, during course of Work.
   C. On-street parking by Contractor employees will not be permitted within vicinity of Worksite.

3.02 TEMPORARY TRAFFIC CONTROLS
A. Provide temporary traffic controls and permits if required at junctures of temporary roads with public roads, including warning signs for public traffic and stop signs for construction road entrances onto public roads.

B. Comply with requirements and recommendations of local traffic authorities.

3.03 MAINTENANCE

A. Maintain temporary access roads and parking areas in a safe, secure, and useable condition acceptable to Metro or its designee during construction period.

B. Comply with the provisions of Section 01 35 23, Worksite Security Requirements and the Contractor’s approved security plan.

3.04 REMOVAL

A. After completion of construction, remove materials used for building of temporary roads and parking areas.

3.05 RESTORATION

A. Restore to original condition, impacted areas and items within city or county right-of-ways due to construction of temporary access roads and parking areas.
   1. Restore soils compacted by traffic to density of surrounding soils.
   2. Obtain approvals from city, county, or local authority having jurisdiction.

END OF SECTION 01 55 13
CONTROLLING TRAFFIC (METRO - FURNISHED TCP)

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Developing contract drawings that includes detour plans, Traffic Control Requirements (TCR) and Traffic Circulation Plans (TCP) accepted by Metro or its designee and local jurisdiction for this Contract. Should the Contractor choose to modify the accepted detour plans or implement alternative detour plans, such modification or alternative plan shall be implemented only with the prior written acceptance of Metro or its designee or the appropriate agency having jurisdiction. Furnish, install, maintain and remove temporary and permanent traffic signal hardware per standards and requirements relevant to the appropriate agency having jurisdiction. Provide temporary pavement marking; furnish flaggers; protect vehicular and pedestrian traffic on the streets and sidewalks adjacent to Worksite affected by construction per standards and requirements relevant to the appropriate agency having jurisdiction; restrict construction vehicular traffic to acceptable haul routes, staging areas, and travel times; ensure unimpeded access to buildings adjacent to Worksite; and ensure compliance with the (TCR and TCP) as accepted by the Metro and its designee, and the local jurisdiction.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures
B. Section 01 35 23 Worksite Safety Requirements
C. Section 01 35 53 Worksite Security Requirements
D. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)
E. Section 01 56 23 Temporary Barriers
F. Section 01 56 26: Construction Fencing (Wood)
G. Section 01 56 28: Construction Fencing (Chain Link)
H. Section 34 41 13: Traffic Signals
I. Section 34 41 16 Automated Traffic Surveillance Control (ATSC) system

1.03 REFERENCES

A. State of California Department of Transportation (Caltrans) Standard Specifications;
California Department of Transportation Manual on Uniform Traffic Control Devices (California MUTCD)

B. Standard Specifications for Public Works Construction (SSPWC).

C. City of Los Angeles Department of Public Works, Bureau of Engineering
2. Standard Plan S-601-3

D. California Code of Regulations (CCR), Title 24:
1. Part 2 – California Building Code (CBC)

E. U.S. Department of Transportation (USDOT):
1. Federal Transit Administration (FTA) – American with Disability Act (ADA) Standards for Transportation Facilities.

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).

B. Refer to Section 34 41 13 – Traffic Signals, for traffic signal materials and installation.

C. Refer to Section 33 82 13 – Underground Telephone, Telegraph, and City Communications.

D. Refer to Section 34 41 16 – Automated Traffic Surveillance Control (ATSC) system.

E. Designate a qualified person, acceptable to the Metro or its designee, to inspect, maintain, and test traffic control devices daily and to ascertain devices are continuously operational, serviceable, in-place and clean. Provide daily inspection reports to Metro and the local jurisdiction upon request.

F. Assign qualified persons who have successfully completed "Traffic Control for Safe Work Zones in Urban Areas" (TS-10B) course administered through Institute of Transportation Studies, University of California, Berkeley, California, or equivalent course to be responsible for maintenance, implementation and inspection of traffic control.

G. Employ a professional contractor who specializes in traffic control, acceptable to the Metro or its designee, to be responsible for installation, maintenance, and removal of traffic control and detour devices, as indicated in traffic circulation plans.

H. Notify local jurisdiction authority ten working days prior to implementing the detour plans for coordination and inspection services.
1.05 SUBMITTALS

A. Refer to Section 01 33 00 – Submittal Procedures, for submittal requirements and procedures.

B. Additional detour plans or modifications to the accepted TCR, TCP, or new detour plans not shown in accepted TCR or TCP - Prepare and submit to the Metro or its designee and local jurisdiction for acceptance, not less than twenty-one (21) days prior to implementation.

Prepare under direction of a registered Traffic Engineer/Civil Engineer licensed in State of California and experienced in preparation of detour plans. Obtain written acceptance of Metro or its designee prior to implementation. Preparation of a detour plan is required when, but not limited to:

1. Traffic is to be diverted to the left of centerline delineation (double yellow, dashed or median channelization) for two or more consecutive day or night work periods.
2. An existing permanent or detour traffic lane on any street is continuously obstructed.
3. Work area is adjacent or in an intersection.
4. In other unusual situations where traffic and physical conditions, such as speed or restricted visibility, require special treatment.
5. Metro or its designee, and the local jurisdiction will determine need for, and extent of, changes to traffic control devices including traffic signals, traffic signs, loops, cameras, parking meters, channelization and striping removal and restriping.
6. Local jurisdiction does not agree that detours can take place via WATCH manual.

C. Accompany additional or modified detour plans by submittal describing proposed locations and time durations; include following:

1. Pedestrian and public vehicular traffic routing
2. Traffic blockage and lane restrictions and reductions expected to be caused by construction operations
3. Allowable on-street parking within immediate vicinity of Worksite
4. Access to buildings immediately adjacent to operations
5. Driveways which will be blocked by construction operations
6. Temporary traffic control devices, temporary pavement striping and marking of streets and sidewalks affected by construction
7. Temporary commercial and industrial loading and unloading zones
8. Modifications to street lighting locations and operation as shown on Street Lighting Plans
9. Modifications to traffic signal locations and operation in accordance with local jurisdiction accepted temporary signal plan
10. Construction vehicle routes, travel times, staging, locations, and number and size of vehicles involved
D. Individual street closure plans for acceptance before starting Work. Prepare plans stamped by a licensed civil or traffic engineer. Show and describe proposed location of closure, dates and hours of street closure, proposed detour routes, detour sign locations, alternative access available to individual parcels of land affected by street closing, and details of barricades.

1. Pending acceptance by local jurisdiction, limit full-street closures to:
   a. Nightly Monday through Friday, from 8:30 pm until 5:30 am next morning (9 hours).
   b. 8:30 pm Friday until 5:30 am following Monday (57 hours).

2. Acceptance of a TCR showing temporary street closures does not constitute permission to close street. Acceptable closure is effective only upon obtaining required permit from local jurisdiction or other governing agency.

3. The governing agency has right to revoke a permit if such action is warranted by circumstances.

E. Lane and sidewalk closure plans before starting Work. Obtain written acceptance of plans from Metro or its designee and local jurisdiction before implementation. Show and describe proposed location, dates, hours, and duration of closure, vehicular and pedestrian traffic routing and management, traffic control devices for implementing pedestrian and vehicular movement around closures, and details of barricades.

F. Haul route plan and disposal site location, number of trucks, grading, excavation and erosion permit through Metro or its designee for approval by Rail Transit Impact Traffic Management Committee (RCTM). Obtain haul route permits from the local jurisdiction authorities.

G. Notify, in writing, fourteen days in advance, while coordinating with Metro Community Relations Representative, individual owners, owner's agents, and tenants of buildings adjacent to Worksite before impairing access to those buildings and use of adjacent public ways or prohibiting stopping and parking of vehicles. Before restricting pedestrian and vehicular access to properties affected by this Contract, obtain written acceptance of pedestrian circulation and driveway access plan from Metro and approval from local authorities.

H. Manufacturer's product data.

I. Material Safety Data Sheets (MSDS): Manufacturer’s Material Safety Data Sheets for each type of material used in Work.

1.06 DEFINITIONS

A. “Detour”: Street that may be temporarily closed at night and as specified in detour plans which has prior approval by local authorities having jurisdiction.

B. “Sidewalk”: Walkway that is entirely within street curb and property line section of the public right-of-way.
1.07  STREETS MAY BE TEMPORARILY CLOSED

A. Streets may be temporarily closed at night as specified in detour plans accepted by local jurisdiction.

PART 2 – PRODUCTS

2.01  TRAFFIC CONTROL DEVICES

A. Traffic Control Devices shown on TCR, TCP, and other detour plans include signs, traffic signals, delineators, striping, barriers, barricades, K-rails, guard rails, crash cushions, and high-level warning devices, conforming to Manual on Uniform Traffic Control Devices (California MUTCD) as modified for use in California and published by the California Department of Transportation. Provide material and products in accordance with Standard Specifications for Public Works Construction (SSPWC) as adopted and as modified by local jurisdiction and California Department of Transportation (Caltrans) Standard Specifications and Standard Plans. Conflicts between above documents will be resolved by Metro or its designee and the local authorities having jurisdiction.

B. Other warning, directional or informational signs of professional quality on 1/2 inch minimum thickness exterior plywood. Do not make signs with crayons, marking pens and spray cans. Provide lettering of uniform height. Fabricate reflectionized signs using high grade material for providing visibility during night-time closures. Signs not found in the California MUTCD shall be designed and constructed to meet the general criteria of traffic control devices as described in the California MUTCD.

C. Maintain signs graffiti-free and replace if damaged or vandalized.

2.02  TRAFFIC SIGNAL EQUIPMENT

A. Traffic Signal equipment removed during demolition and site clearing Work: Store as specified on traffic signal plans. Refer to Section 34 14 13 – Traffic Signals, for traffic signal plans.

PART 3 – EXECUTION

3.01  WORK AREA TRAFFIC CONTROL PRACTICES

A. Conform to the California MUTCD as modified for use in California and published by the California Department of Transportation, and detour plans for the Contract as accepted by Metro or its designee.

3.02  TEMPORARY TRAFFIC CONTROL DEVICES

A. Place temporary control devices in those locations which will enable traffic to traverse area without hazard or abrupt changes in direction. Place delineators in accordance with accepted detour plans. Operate warning lights between sunset and sunrise; place
control devices to alert approaching traffic to hazards and variances to normal traffic patterns. Place flashing arrow signs where motorists' visibility of existing warning devices, traffic signals and pedestrian crosswalks would be limited or obscured. Place barricades, delineators and similar protective devices where personnel and equipment will be working within five feet of edge of a lane bearing traffic. Clean and repair damaged devices or replace with new devices as required. Remove devices when no longer required.

3.03 TEMPORARY TRAFFIC STRIPING AND PAVEMENT MARKINGS

A. Stripe and mark pavement before diverting traffic in accordance with accepted detour plans. Repaint detour and non-detour striping in traffic control zone within 15 days, upon receiving a written request from Metro or its designee, or as necessary, when determined, as hazardous traffic conditions. Maintain stripes and marks until permanent traffic marking and striping have been provided, or temporary condition is no longer required. Remove temporary stripes and marks when no longer required.

3.04 FLAGGERS

A. Furnish and use flaggers as specified in accepted detour plans, or the California MUTCD. Furnish flaggers where construction equipment may intermittently encroach on traffic lanes, unprotected sidewalks and crosswalks, and where construction operations would affect public safety and convenience. Personnel who perform flagging shall be trained and qualified in compliance with the California MUTCD and California Code of Regulations, Title 8.

3.05 CONSTRUCTION VEHICULAR TRAFFIC

A. Restrict construction vehicles to accepted haul routes, accepted staging areas, and accepted travel times.

3.06 MAINTAINING VEHICULAR AND PEDESTRIAN FLOW ADJACENT TO WORKSITE

A. Ensure construction operations will not impede normal traffic.

3.07 SIGNS

A. Furnish and install parking regulatory signs, such as NO STOPPING ANY TIME, NO PARKING ANY TIME, at Worksite. Contact Metro or its designee and local jurisdiction, a minimum of five Working days in advance of construction for installation, relocation or removal of regulatory parking signs. In addition:
   1. Furnish and install necessary advance detour or guidance signing not specified in TCR.
   2. Install regulatory parking controls and vehicle turn restrictions.
   3. Implement traffic control modifications outside of traffic control zone which are necessary to manage diverted traffic.
3.08 HAUL ROUTE PLAN

A. Post a copy of haul route plan permit approved by local jurisdiction, or other governing agency, at Worksite and in each Contract vehicle having a gross weight exceeding 10,000 pounds. Provide copy to hauling subcontractors.

3.09 TRAFFIC CONTROL OFFICERS

A. If determined necessary by Metro or local authority having jurisdiction, a Traffic Control Officer will be provided, by local authority having jurisdiction.

3.10 STORAGE OF CONSTRUCTION MATERIAL AND EQUIPMENT

A. Do not store construction material or equipment outside designated Work area as indicated in TCR.

B. Do not store construction material or equipment, within designated Work area, more than five days. Special exemptions for material or equipment may be granted by Metro or its designee upon receiving a written request specifying use and specific time period.

C. Do not store construction material or equipment, within designated Work area, higher than four feet or as allowed by local jurisdiction. Special exemptions for equipment may be granted by Metro, its designee, or upon receiving a written request specifying the equipment use and specific time period required.

D. Do not store construction material and equipment in manner that would create visibility obstructions to motoring public.

3.11 CONSTRUCTION DURATION

A. Restrict construction activities to time durations specified on the Traffic Control Requirements. Submit written request through Metro to local authority having jurisdiction specifying need to extend Work beyond accepted time duration. Obtain written acceptance from local authority having jurisdiction for time duration extensions.

3.12 PLATING

A. Allow the use of steel plates for specified time durations based on the following conditions: (use Standard Plan S-610-27 and SSPWC, 7-10.1 for guidance)

1. Any plate intended for use by public vehicles to pass over the excavation during non-work hours shall installed by grinding the supporting pavement such that the top of the plate and the existing grade are level.

2. Install plate overlap on to existing pavement per the design of excavation support system.

3. Weld adjacent plates together to prevent rocking and movement.
4. Use only plates with a welded or other permanent friction coating or treatment. Use of spray on or other coatings which can wear off and then must be re-applied is prohibited.

5. Cover lift holes on steel plates located in pedestrian areas.

6. Warn vehicle traffic of the existence of steel plates using advance warning signage in compliance with the California MUTCD including the use of sign type W8-24.

7. Fill any gaps between steel plates and existing pavement with cold mix asphalt and compact.

END OF SECTION 01 55 26
CONTROLLING TRAFFIC (CONTRACTOR-FURNISHED TLR)

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Preparation of the drawings that will include Worksite Traffic Controls Plans (WTCP), Traffic Circulation Plans (TCP) and Temporary Traffic Signal Plans for approval by the local Authorities Having Jurisdiction (AHJ). The plans will also include Traffic Lane Requirements (TLR) for acceptance by Metro, and local jurisdiction. Furnish flaggers; protect vehicular and pedestrian traffic on streets and sidewalks adjacent to Worksite affected by construction; restrict construction vehicle traffic to accepted haul routes and travel times; ensure unimpeded access to buildings adjacent to Worksite; and ensure compliance with TLR accepted by Metro, its designee, or the local authorities having jurisdiction.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures

B. Section 01 35 23: Worksite Safety Requirements

C. Section 01 35 53: Worksite Security Requirements

D. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)

E. Section 01 56 23: Temporary Barriers

F. Section 01 56 26: Construction Fencing (Wood)

G. Section 01 56 28: Construction Fencing (Chain Link)

H. Section 34 41 13: Traffic Signals

I. Section 34 41 16: Automated Traffic Surveillance Control (ATSC) system

1.03 REFERENCES

A. State of California Department of Transportation (Caltrans) Standard Specifications; California Department of Transportation Manual on Uniform Traffic Control Devices (California MUTCD)


B. Standard Specifications for Public Works Construction (SSPWC).

C. City of Los Angeles Department of Public Works, Bureau of Engineering
   2. Standard Plan S-601-3

D. California Code of Regulations (CCR), Title 24:
   1. Part 2 – California Building Code (CBC)

E. U.S. Department of Transportation (USDOT):
   1. Federal Transit Administration (FTA) – American with Disability Act (ADA) Standards for Transportation Facilities.

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).

B. Refer to Section 34 41 13 – Traffic Signals, for traffic signal materials and installation.

C. Refer to Section 33 82 13 – Underground Telephone, Telegraph and City Communications.

D. Refer to Section 34 41 16 – Automatic Traffic Surveillance Control (ATSC) System.

E. Use materials and install traffic signals, except as otherwise stated or provided herein, to conform to Standard Specifications for Public Works Construction (SSPWC) as modified by the local jurisdiction.

F. Designate a qualified person to inspect and test traffic control devices daily and ascertain devices are continuously operational, serviceable, in-place and clean.

G. Train persons who will be responsible for design, implementation and inspection of traffic control.

1.05 SUBMITTALS

A. Refer to Section 01 33 00 – Submittal Procedures, for submittal requirements and procedures.

B. Show and describe proposed locations and time durations in plans to include following:
   1. Pedestrian and public vehicular traffic routing.
   2. Traffic blockage and lane restrictions and reductions anticipated to be caused by construction operations.
   3. Allowable on-street parking within the immediate vicinity of Worksite.
4. Access to buildings immediately adjacent to Worksite.

5. Driveways which will be blocked by construction operations.

6. Temporary traffic control devices, temporary pavement striping and marking of streets and sidewalks affected by construction.

7. Temporary commercial and industrial loading and unloading zones.

8. Modifications to traffic signal locations and operation in accordance with local jurisdiction accepted temporary signal plan.

9. Construction vehicle routes, travel times, staging, locations, and number and size of vehicles involved.

C. Lane and sidewalk closure plans before starting Work. Obtain written acceptance of plans local jurisdiction before implementation. Show and describe proposed location, dates, hours and duration of closure, vehicular and pedestrian traffic routing and management, traffic control devices for implementing pedestrian and vehicular movement around closures, and details of barricades.

D. Haul route plan and a disposal, grading, excavation and erosion permit for acceptance before starting Work.

E. Notify in writing, fourteen days in advance, individual owners, owners' agents, and tenants of buildings adjacent to Worksite, in writing, before impairing access to those buildings and use of adjacent public ways or prohibiting stopping and parking of vehicles. Before restricting pedestrian or vehicular access to properties affected by this Contract, obtain written acceptance of pedestrian circulation and driveway access plan from local jurisdiction.

F. Traffic detour plans in compliance with TLR accepted by local jurisdiction and specified standards. Obtain written acceptance of traffic detour plans from local jurisdiction before implementation. Prepare a detour plan when:
   1. Traffic is to be diverted to left of centerline delineation (double yellow, dashed, or median channelization) for two or more consecutive days.
   2. An existing permanent or detour traffic lane on any street is to be recurrently obstructed for more than one week.
   3. Work area is adjacent to an intersection and results in a transition within intersection.
   4. In other unusual situations where traffic and physical conditions, such as speed or restricted visibility, require special treatment.
   5. The local jurisdiction will determine need for, and extent of, striping removal and restriping.

G. Material Safety Data Sheets (MSDS): Manufacturer’s Material Safety Data Sheets for each type of material used in Work.

1.06 DEFINITIONS
A. “Detour Plans”: Plans that include Worksite Traffic Control Plans (WTCP), Traffic Circulation Plans (TCP), Work Area Traffic Control Handbook (WATCH), standards plans of local authority having jurisdiction, and modification pre-approved site specific plans.

B. “Sidewalk”: Walkway that is entirely within street curb and property line section of the public right-of-way.

PART 2 – PRODUCTS

2.01 TRAFFIC CONTROL DEVICES

A. Include signs, traffic signals, delineators, striping, barriers, barricades and high-level warning devices. Conform to California Department of Transportation (Caltrans), California Manual on Uniform Traffic Control Devices (California MUTCD).

1. Materials and Products: In accordance with SSPWC and as modified by corresponding local jurisdiction.

2.02 TRAFFIC SIGNAL EQUIPMENT

A. Refer to Section 34 41 13 – Traffic Signals.

2.03 TEMPORARY WALKWAY

A. Provide temporary pedestrian walkways using asphalt concrete pavement (rolled hot mix) of width and location shown on approved plans. Provide covered pedestrian walkways when overhead construction is adjacent to public walkways or areas.

PART 3 – EXECUTION

3.01 WORK AREA TRAFFIC CONTROL PRACTICES

A. Conform to MUTCD Part 6 – Temporary Traffic Control and Work Area Traffic Control Handbook (WATCH Manual), SSPWC as maybe modified by the corresponding local jurisdiction.

3.02 TEMPORARY TRAFFIC CONTROL DEVICES

A. Place temporary control devices in locations which will enable traffic to traverse area without hazard or abrupt changes in direction. Place delineators not more than 25 feet on centers. Operate warning lights between sunset and sunrise; place control devices to alert approaching traffic to hazards and variances to normal traffic patterns. Place flashing arrow signs where motorists' visibility of existing warning devices, traffic signals and pedestrian crosswalks would be limited or obscured. Place barricades, delineators and similar protective devices where personnel and equipment will be Working within
five feet of the edge of a lane bearing traffic. Clean and repair damaged devices or replace with new devices as required.

3.03 TEMPORARY TRAFFIC STRIPING AND PAVEMENT MARKINGS

A. Stripe and mark the pavement before diverting traffic in accordance with detour plans approved by the local jurisdiction. Maintain stripes and marks until permanent traffic marking and striping have been provided, or temporary condition is no longer required. Where construction activities warrant design and implementation of detour plans, adhere to following standards:

1. Traffic Lanes: Minimum striped width of 10 feet. Provide additional clearance width of two feet between striped lane and curb, barricade, barrier or other vertical obstruction.

2. Install double yellow centerline striping, channelization barrier striping (eight inch wide solid white strip), left or right edge line striping (four inch wide solid yellow or white stripe), as appropriate, to delineate edge of traveled way adjacent to barricading.

3. Use interconnected segments of Type K rail barrier to separate edge of traveled way from an open excavation or vertical obstruction other than curb, placed at least two feet from centerline, channelization line or edgeline striping. Provide end segments with vertically tapered ends facing traffic and placed at angle of approximately 15 degrees away from approaching traffic.

4. Remove permanent and temporary conflicting striping by sandblasting or other permanent means. Paint cover is not considered permanent removal.

5. Terminate barricading a minimum of 20 feet in advance of, and resume a minimum of 20 feet beyond, driveways in operation.

6. Notify local jurisdiction, or other governing agency through Metro or its designee, not less than five Working days before starting or implementing a change in detour phasing. Obtain inspection and acceptance by the local jurisdiction of striping markout and proposed removal before installing striping.

7. Immediately upon completion of construction phases of Contract, completely sandblast detour striping and reinstall non-detour permanent striping. Notify the local jurisdiction 10 Working days in advance, to arrange for reinstallation of non-detour permanent striping. Some local agencies may have contractor install or re-install non-detour striping.

3.04 FLAGGERS

A. Furnish and use flaggers as specified in accepted TLR, Caltrans MUTCD, and WATCH Manual. Furnish flaggers where construction equipment may intermittently encroach on traffic lanes, unprotected sidewalks and crosswalks, and where construction operations would affect public safety and convenience.

3.05 CONSTRUCTION VEHICULAR TRAFFIC
A. Restrict construction vehicles to accepted haul routes and accepted travel times.

3.06 MAINTAINING VEHICULAR AND PEDESTRIAN FLOW ADJACENT TO WORKSITE

A. Ensure construction operations will not impede normal traffic.

3.07 SIGNS

A. Install, maintain and remove construction related signing. Contact local jurisdiction a minimum of five Working days in advance of construction for installation, relocation or removal of regulatory parking signs.

3.08 HAUL ROUTE PLAN

A. Post copy of haul route plan permit approved by TBD at Worksite and in each Contract vehicle having a gross weight more than 10,000 pounds; provide copy to hauling subcontractors.

3.09 TRAFFIC CONTROL OFFICERS

A. If Traffic Control Officers are determined necessary by Los Angeles Department of Transportation (LADOT), will be provided by the local jurisdiction upon two (2) working days notice, unless an emergency situation occurs. The Contractor shall pay the costs of Traffic Control Officers time. Traffic Control Officers will be required during work involving shut down of traffic signals and may be necessary of other stages of the work, or during other detour operations. Notify LADOT ten working days before performing work within an signalized intersection.

3.10 TRAFFIC SIGNAL FACILITIES

A. Notify Traffic Signal Inspector of LADOT or other governing agency three-ten Working days in advance of beginning Work at each traffic signal controlled intersection.

B. In event of damage to existing traffic signal equipment, immediately notify (Traffic Signal Superintendent for LADOT or other governing agency. Replace damaged equipment and have replacement inspected by Traffic Signal Inspector before signal circuits are energized.

C. If necessitated by improvement, temporary removal and reinstallation of traffic signal equipment and entire cost – may be considered as included in other Work for which bid items are entered.

3.11 STORAGE OF CONSTRUCTION MATERIAL AND EQUIPMENT

1. Do not store construction material or equipment outside designated Work areas as indicated in WTCP.

2. Do not store construction material or equipment, within designated Work areas, more than five days. Special exemptions for material or equipment may be granted.
by LADOT upon receiving a written request justifying use and for the specific time period required.

3. Do not store construction material or equipment, within designated Work areas, higher than four feet. Special exemptions for equipment may be granted by Metro upon receiving a written request justifying specifying the equipment use and for the specific time period required.

4. Do not store construction material and equipment in a manner that would create visibility obstructions to motorist, or visibility of pedestrians in the walkway from the roadway. The storage of material and equipment, etc. in the public right-of-way is not permitted without prior approval by the local jurisdiction.

3.12 CONSTRUCTION DURATION

A. Restrict traffic lane requirements to time durations as specified on the WTCP. Submit written request through Metro to LADOT specifying need to extend Work beyond accepted hours and/or time duration. Obtain LADOT’s written approval from Metro, for time duration extensions.

3.13 PLATING

B. Allow the use of steel plates for specified time durations based on the following conditions: (use Standard Plan S-610-27 and SSPWC, 7-10.1 for guidance)

1. Any plate intended for use by public vehicles to pass over the excavation during non-work hours shall installed by grinding the supporting pavement such that the top of the plate and the existing grade are level.

2. Install plate overlap on to existing pavement per the design of excavation support system.

3. Weld adjacent plates together to prevent rocking and movement.

4. Use only plates with a welded or other permanent friction coating or treatment. Use of spray on or other coatings which can wear off and then must be re-applied is prohibited.

5. Cover lift holes on steel plates located in pedestrian areas.

6. Warn vehicle traffic of the existence of steel plates using advance warning signage in compliance with the California MUTCD including the use of sign type W8-24.

7. Fill any gaps between steel plates and existing pavement with cold mix asphalt and compact.

END OF SECTION 01 55 27
PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Furnishing, erecting, and maintaining temporary barricades, signs, flaggers, lights, road surfaces, pavement markings for detours, miscellaneous parking lot striping, and other safeguards necessary to protect life, health and safety of public during performance of Project Work for duration of Contract.

B. Job Coordination:
   1. Coordinate construction to offer the least possible obstruction and inconvenience to the public. Do not have under construction a greater length or amount of Work than can be properly performed with due regard to conveniences of public and public safety. Finish Work as Project progresses insofar as practicable.
   2. Permit public traffic to pass through Work areas with as little inconvenience and delay as possible. Except as specified below, keep existing roads and streets adjacent to or within limits of Project open and maintain in a good and safe condition for traffic. Remove deposits and debris from roadway and repair damage resulting from construction operations.
   3. Maintain existing traffic controls, traffic signal loops, cameras, and street lighting systems at crossings in operation for benefit of public during progress of Work.
   4. Conduct construction operations in manner to cause as little inconvenience as possible to adjacent property owners. Maintain convenient access to driveways, houses, businesses, and buildings along line of Work.
   5. Protect open trench excavations in accordance with applicable sections of Caltrans Standard Specifications or other applicable standard at end of each day's operations.
   6. Submit written proposal to Metro its designee regarding the temporary removal or relocation of bus stops or shelters in conflict with Work and obtain prior acceptance of Metro or its designee and the respective local agencies before proceeding with such removal or relocation.
   7. Traffic Signals:
      a. Provide temporary traffic signals and other temporary signal systems to convey traffic through Project. Design temporary traffic signals to minimize inconvenience to general public.
      b. Submit proposed temporary traffic signal Shop Drawings to Metro or its designee, and agency (third party having jurisdiction) for review and acceptance by local jurisdiction. Standard review period is 30 days.
   8. Maintain access for fire, ambulance, and law enforcement emergency vehicles at all times. Access requirements may require Contractor to temporarily suspend its operations until emergency is over.
9. Perform operations in manner to cause minimum disruption in access to adjacent properties. Should denial or disruption of access to adjacent property be necessary to accomplish Work, notify Metro or its designee in advance of denial or disruption and post a notice of denial in a conspicuous place on right-of-way line or temporary construction easement line on property. After acceptance by Metro or its designee, notify affected party in writing at least 14 days in advance of actual denial or disruption.

   a. Posted Sign: Minimum 18 inches by 36 inches with minimum 2 1/2 inches high lettering describing the closure dates.

   b. If construction is delayed, requiring dates of access disruption to be changed, revise dates on sign accordingly and notify Metro or its designee.

10. Coordinate activities with local events.

1.02 RELATED SECTIONS

   A. Section 01 33 00: Submittal Procedures
   B. Section 01 35 23 Worksite Safety Requirements
   C. Section 01 35 53 Worksite Security Requirements
   D. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)
   E. Section 01 55 26 Controlling Traffic (Metro-Furnished TCP)
   F. Section 01 55 27 Controlling Traffic (Contractor-Furnished TCP)
   G. Section 01 56 23: Temporary Barriers
   H. Section 01 56 26 Construction Fencing (Wood)
   I. Section 01 56 28 Construction Fencing (Chain Link)

1.03 REFERENCES

   A. State of California Department of Transportation (Caltrans) Standard Specifications; California Department of Transportation Manual on Uniform Traffic Control Devices (California MUTCD), as published on the dated of Notice to Proceed.

   B. Standard Specifications for Public Works Construction (SSPWC).

   C. City of Los Angeles Department of Public Works, Bureau of Engineering
2. Standard Plan S-601-3

D. California Code of Regulations (CCR), Title 24:
   1. Part 2 – California Building Code (CBC)

E. U.S. Department of Transportation (USDOT):
   1. Federal Transit Administration (FTA) – American with Disability Act (ADA) Standards for Transportation Facilities.

F. Applicable portions of the California Vehicle Code (CVC)

G. Each City directly affected by the Contractor’s activities.

1.04 QUALITY ASSURANCE
A. Comply with Project Quality Program Requirements (see 1.02 above).

1.05 SUBMITTALS
A. Refer to Section 01 33 00 – Submittal Procedures, for submittal requirements and procedures.

B. Traffic Control Plan (TCP) for approval by affected local jurisdictions before starting Work. Submit an updated TCP when necessary to modify traffic operation or undertake a construction activity which creates a different traffic pattern.

C. Copies of approved traffic control plans from affected local jurisdictions in accordance with Section 01 33 00 – Submittal Procedures.

D. Haul route plan and approved disposal, grading, excavation and erosion permit to Metro or its designee and applicable third party, before starting Work.

E. Notify individual owners of adjacent property in writing fourteen days in advance, impairing access to public ways adjacent thereto or prohibiting stopping/parking of vehicles.

F. Traffic Management Plan.

G. Material Safety Data Sheets (MSDS): Manufacturer’s Material Safety Data Sheets for each type of material used in Work.

PART 2 – PRODUCTS

2.01 TRAFFIC CONTROL DEVICES
A. Conform to the Manual of Uniform Traffic Control (MUTCD) as modified for use in California and published by the California Department of Transportation. Conform to
Section 12 of Caltrans Standard Specifications, applicable third party standards, these Specifications, and local jurisdiction specifications.

2.02 CONSTRUCTION AREA SIGNS

A. Term "Construction Area Signs" includes temporary signs required for direction of public traffic through or around Work during construction. Such signs are shown in the California MUTCD. Unless otherwise directed by Metro or appropriate local jurisdiction, use the MUTCD edition in effect on the date of NTP. Deliver new signs or signs in like-new condition to Project. Sign panels: Product of commercial sign manufacturer. Do not use double-faced signs.

2.03 CHANNELIZING DEVICES

A. Use portable delineators as described and specified in the California MUTCD.

2.04 BARRICADES

A. Use barricades as described and specified in the California MUTCD and Section 01 56 23 - Temporary Barriers.

2.05 TEMPORARY AND INTERIM TRAFFIC SIGNALS

A. Conform to the specifications in the California MUTCD or local jurisdictions and Sections 01 56 26 Controlling Traffic (Metro Furnished) and 01 56 27 Controlling Traffic (Contractor Furnished).

2.06 TEMPORARY STRIPING

A. Temporary striping and markings used during construction - existing, or when required, four-inch white or yellow tape accepted by Metro or its designee. The acceptable length of time for use of temporary striping and markings shall be in accordance with Caltrans specifications and those of the local jurisdiction.

2.07 BARRIERS

A. Comply with provisions of Section 01 56 23 – Temporary Barriers.

B. Use Type K rail barriers to separate edge of traveled way from open excavations, as a vertical obstruction other than curb; to isolate construction Work areas as indicated on Contract Drawings and as requested by Metro or its designee, and applicable third party.

2.08 STREET PLATES

A. Limit the length of open trench excavations for underground construction to 50 feet or less at each construction location. Protect open trench excavations in accordance with
applicable portions of the Caltrans Standard Specifications, California MUTCD or City of Los Angeles requirements, whichever is most stringent.

PART 3 – EXECUTION

3.01 GENERAL FOR ALL CITIES

A. Traffic Safety:

1. Provide flaggers, signs, temporary pavement markings, and other devices, and erect and maintain barricades, lights, guards, standard construction signs, warning signs and detour signs, as necessary to warn and protect public from injury and damage as a result of Contractor's operations which may occur on streets affected by such operations.

2. Patrol traffic control area and reset disturbed signs and traffic control devices immediately. Remove or cover non-applicable signs during periods not needed.

3. Upon failure of Contractor to provide immediately such flaggers, or to provide, erect, maintain, or remove such barricades and lights, and erect, maintain or remove signs when ordered to do so by Metro or its designee, Metro or its designee shall be at liberty, without further notice to Contractor or its Surety, to provide necessary flaggers, to provide, erect, maintain, or remove barricades and lights, and to erect, maintain and remove signs, at Contractor's expense.

4. In event a traffic signal or beacon is made inoperative, due to Contractor's operations, provide uniformed flaggers or suitable traffic control devices for control and movement of traffic during time signal or beacon is inoperative at no additional cost to Metro. Types of traffic control devices used are subject to review and acceptance of Metro or its designee and respective local agencies.

B. Temporary Traffic Controls:

1. Provide temporary traffic controls at juncture of temporary access roads with public roads, including, but not limited to, warning signs for public traffic, and "STOP" signs for construction road entrance onto public roads. Comply with requirements of local traffic authorities.

2. Maintenance: Maintain temporary access roads, and parking areas in a safe and useful condition during construction period.

3. Removal and restoration: Remove materials utilized for building of temporary roads and parking areas. Restore temporary access opening to original condition, such as curb and gutter, and driveway aprons.

C. Street Closures:

1. Coordinate street closures and apply for with 60 days advance notification; obtain permission from local jurisdiction prior to such street closure.

2. Maintain pedestrian access to adjacent buildings.

END OF SECTION 01 55 28
CONSTRUCTION NOISE AND VIBRATION CONTROL

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Eliminating or minimizing noise and vibration generated by construction activities, and of complying with applicable noise regulations, specification requirements, and noise and vibration limits specified within this Section.

B. Use equipment with effective noise-suppression devices and employ other noise control measures such as enclosures and barriers necessary to protect the public. Schedule and conduct operations in a manner that will minimize, to the greatest extent feasible, the disturbance to the public in areas adjacent to the construction activities and to occupants of buildings in the vicinity of the construction activities.

C. Submit a Noise Control Plan and a Noise Monitoring Plan, as specified in this Section. Both plans shall be prepared by an Acoustical Engineer meeting the qualifications specified in this Section. Do not operate noise generating construction equipment at the construction site prior to acceptance of the Noise Control and Monitoring Plans. Update Noise Control Plan every three months.

D. Compliance with the requirements of this Section may require the use of equipment with special exhaust silencers or noise attenuating enclosures, and construction of temporary enclosures or noise barriers around activities. Use haul routes and staging areas, as approved by Metro and the City of Los Angeles according to the local jurisdiction authorities, to minimize noise at residential and other sensitive receptor sites. Do not operate trucks used for removal of excavated material and delivery of construction materials on local residential streets or on streets that pass by schools during school hours, unless specifically accepted by Metro or its designee.

E. Metro or its designee will monitor Contractor's performance of tasks specified, and will inspect necessary records, reports and procedures.

F. Designate staff member as Noise and Vibration Control Representative to be trained by and work with the Acoustical Engineer specified in this Section.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures

B. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)

C. Section 01 35 23 Worksite Safety Requirements
D. Section 01 35 53 Worksite Security Requirements

1.03 REFERENCES

A. California Code of Regulations (CCR), Title 24
B. California Health and Safety Code (CHSC)
C. City of Los Angeles Building Code, Chapter XI, Los Angeles Noise Ordinance
D. American National Standards Institute (ANSI):
   1. ANSI S1.4 - Specification for Sound Level Meters
   2. ANSI S2.4 - Method for Specifying the Characteristics of Auxiliary Analog Equipment for Shock and Vibration Measurements
E. ASTM International (ASTM):
   1. ASTM C423 - Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
   2. ASTM E90 - Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
   3. ASTM E413 - Classification for Rating Sound Insulation
F. International Electrotechnical Commission (IEC):
   1. IEC 61672 - Electroacoustics Sound Level Meters
G. Occupational Safety and Health Act (OSHA) regulations (CCR Title 8)
H. Society of Automotive Engineers (SAE):
   1. SAE J88 - Sound Measurement Off-Road Work Machines - Exterior
   2. SAE J366 - Exterior Sound Level for Heavy Trucks and Buses
   3. SAE J994 - Alarm- Backup- Electric Laboratory Performance Testing
I. International Organization for Standardization (ISO):
J. U.S. Department of Transportation, Federal Highway Administration (FHWA):
L. U.S. Environmental Protection Agency (EPA):
1. EPA Report NTID 300.1 – Notice from Construction Equipment and Operations, Building Equipment, and home Appliances. (1972)

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).

1.05 SUBMITTALS

A. Refer to Section 01 33 00 – Submittal Procedures, for submittal requirements and procedures.

B. Qualifications and work experience of the acoustical engineer as specified in this Section. This submittal is required prior to the submittal of the Noise Control and Noise Monitoring Plans.

C. Contractor's Noise Control Plan as specified in this Section.

D. Contractor's Noise Monitoring Plan and the weekly Noise Measurement Reports as specified in this Section.

E. Noise measurement equipment makes and models, and calibration conformance certificates as specified in this Section.

F. Equipment noise certification reports as specified in this Section.

G. Shop and Working Drawings, computations, material data and other criteria, for noise abatement measures, identified in the Noise Control Plan and for moveable noise barriers, noise barrier fences and noise control curtains as specified in this Section. Have drawings and computations stamped by a License Professional Engineer registered in the State of California.

H. Contractors Weekly Vibration Measurement Reports as specified in this Section.

I. Material Safety Data Sheets (MSDS): Manufacturer’s Material Safety Data Sheets for each type of material used in Work.

1.06 DEFINITIONS

A. Construction Site: For purpose of noise and vibration control requirements, the Contract limits of construction. This includes Right-of-Way lines, property lines, construction Easement Boundary or property lines and Contractor staging areas outside the defined boundary lines, used expressly for construction.

B. Noise Level Measurements: Unless otherwise indicated, the use of A-weighted and "slow" response settings of instrument complying with Type 2 requirements of latest revision of ANSI S1.4 and IEC 61672.

C. A-Weighted Noise Levels: Decibels (referenced to 20 micro-Pascal) as measured with A-weighting network of standard sound level meter, abbreviated dBA.
D. C-Weighted Noise Level: Decibels (referenced to 20 micro-Pascal) as measured using the C-weighting network on a sound level meter complying with the criteria for a Type 1 (Precision) or Type 2 (General Purpose Sound Level Meter), as defined in the current revision of ANSI S1.4. Use the FAST setting on the sound level meter to measure the C-weighted sound level.

E. Vibration Measurements: The use of a vibration transducer, amplifier, peak detector, and frequency band filters complying with ANSI S2.4.

F. Vibration: Velocity in microinches per second. Vibration levels are expressed as velocity levels in Decibels referenced to one microinch per second, abbreviated VdB.

G. Daytime: The period from 7:00 AM to 9:00 PM Monday through Friday local time, and Saturdays, and Sundays, 8:00 AM to 6:00 PM.

H. Nighttime: Periods other than daytime.

I. Noise Sensitive Locations: Residential areas, institutions, hospitals, parks, and other locations so named herein.

J. \( L_{\text{max}} \): The maximum measured sound level.

K. One-hour \( L_{\text{eq}} \) A weighted Equivalent Sound Level: The continuous sound level that represents the same sound energy as the varying sound levels over one hour.

L. Sound Transmission Class (STC): A single number rating calculated in accordance with ASTM E413, using values of sound transmission loss. It provides an estimate of the performance of a partition in certain common sound insulation problems.

M. Stationary/Continuous Noise: Daytime noise from stationary sources, and parked mobile sources that produce repetitive or long-term noise lasting more than two hours.

N. Mobile/Intermittent Noise: Daytime noise from non-stationary mobile equipment operated by a driver, or from source of intermittent, non-recurring on long-term basis, non-scheduled, non-repetitive, short-term noises (not lasting more than two hours).

### 1.07 RESPONSIBILITIES OF CONTRACTOR

**A.** Perform Work within the permissible noise levels, work schedule limitations, and procedures provided for in this Section and applicable Federal, state, county and municipal codes, regulations, and standards.

**B.** Other than those provided herein, be responsible for obtaining, at Contractor's own expense, permits, variances, equipment certifications, and other documents required by this Section and by applicable Federal, state, county and municipal codes, regulations and standards.

**C.** With regard to noise monitoring, include the following:

1. Furnish instrumentation for noise monitoring that complies with the standards specified in this Section and that is capable of measuring the sound levels defined in this Section.

2. Collect and report noise monitoring data, report whether the noise monitoring data indicates compliance under specialized in this Section, and submit a Noise Measurement Report to Metro or its designee on a weekly basis.
3. Provide access to Metro or its designee to review measured data and coordinate the Contractor's schedule for noise monitoring.

4. Implement noise abatement measures as required by this Section, based on the Contractor's noise monitoring data and nuisance conditions reported by Metro or its designee.

PART 2 – PRODUCTS

2.01 NOISE CONTROL MATERIALS

A. Noise control materials may be new or used. Used materials shall be sound and free of damage and defects and shall be of a quality and condition to perform their designed function.

2.02 NOISE BARRIER FENCES

A. Use material that will last for the duration of construction of this Contract. Construct using two layers of 3/4 inch Medium Density Overlay (MDO) plywood sheeting or acceptable equal. Line the construction site side with glass fiber or mineral wool type noise-absorbing material at least two inches thick. Protect this material using wire mesh or perforated sheets that are corrosion resistant and that have at least 30 percent open area and provision for water drainage. Or Provide a wall assembly with a STC-25 or greater, based on certified sound transmission loss data taken according to ASTM E90 and a Noise Reduction Coefficient (NRC) rating of NRC-0.70 or greater, based on certified sound absorption coefficient data taken according to ASTM C423.

B. Line the construction site side with glass fiber or mineral wool type noise-absorbing material at least two inches thick. Protect this material using wire mesh or perforated sheets that are corrosion resistant and that have at least 30 percent open area and provision for water drainage.

C. Provide a wall assembly with a STC-25 or greater, based on certified sound transmission loss data taken according to ASTM E90 and a Noise Reduction Coefficient (NRC) rating of NRC-0.70 or greater, based on certified sound absorption coefficient data taken according to ASTM C423.

D. Construct gates and doors in the fence either hinged or rolling of the same or equally effective material as the noise barrier fence. Construct gates and doors in the fence to ensure that the edges overlap the fence to eliminate gaps. During nighttime hours maintain gates and doors in a closed position except for brief periods of time to allow access to the Construction Site.

E. Attach lagging to support posts designed so that the fence will withstand 80 mph wind loads plus a 30 percent gust factor.

F. Provide flush mating surfaces of wall sides when walls are joined together or at corners. Close gaps between wall sections and between bottom edge of walls and grade.
with material that will completely close the gaps and be dense enough to attenuate noise.

**G.** Be responsible for the design, detailing and adequacy of the framework and supports, posts, attachment methods and other appurtenances required for the proper erection of the noise control walls.

**F.** Prepare the design details for the noise control wall footing, steel posts, supports and framework, signed and sealed by a Professional Engineer licensed in the State of California. Submit the design and detailed engineering to Metro or its designee.

**H.** Height of barriers: As required to meet noise control plans

### 2.03 MOVEABLE NOISE BARRIERS

**A.** Construct moveable barriers of one inch thick Medium Density Overlay (MDO) plywood sheeting, or other acceptable material with a STC25 rating or greater.

**B.** Line barriers on construction site side with glass fiber or mineral wool type sound absorbing material at least two inches thick. Protect this material by wire mesh or perforated sheets that are corrosion resistant and that have at least 30 percent open area, with provision for water drainage.

**C.** Provide materials and details of construction sufficiently weather resistant to last through the duration of construction of this Contract.

**D.** Construction Details:

1. Attach barrier panels to support frames constructed in sections to provide a moveable barrier utilizing the standard temporary precast concrete median barrier or other supports.

2. When barrier units are joined together, overlap the mating surfaces of the barrier sides or make flush with each other. Close gaps between barrier units, and between the bottom edge of the barrier panels and the ground, with material that will completely close the gaps and be dense enough to attenuate noise.

3. Height of barriers: As required to meet noise control plans.

### 2.04 NOISE CONTROL CURTAINS

**A.** Noise Control Curtains: Durable, flexible composite material featuring a noise barrier layer bonded to a sound-absorptive material on one side.

1. STC rating of STC-25 or greater based on certified sound transmission loss data taken according to ASTM E90.

2. NRC rating of NRC 0.70 or greater based on certified sound absorption coefficient data taken according to ASTM C423.

**B.** Noise Barrier Layer: A rugged, impervious material with a surface weight of at least one pound per square foot. Height of barriers: As required to meet noise control plans.
C. Sound Absorptive Material: Include a protective facing, and securely attached to one side of the noise barrier layer over its entire surface.
   1. Mildew resistant, vermin proof and non-hygroscopic.

D. The noise control curtain materials: Abuse resistant, exhibiting superior hanging and tear strength during construction. The curtain barrier material shall have a minimum breaking strength of 120 lb/in. and a minimum tear strength of 30 lb/in. Based on the same test procedures, the curtain absorptive material facing shall have a minimum breaking strength of 100 lb/in. and a minimum tear strength of seven 7 lb/in.
   1. Corrosion resistant to most acids, mild alkalis, road salts, oils and grease.
   2. Fire retardant, and approved by the City of Los Angeles Fire Department prior to procurement.

E. Construct gates and doors of a material with a STC 25 or greater rating.

F. Construction Details:
   1. Install the noise control curtains in vertical segments extending the full curtain height, and have seams and joints with a minimum overlap of two inches and be sealed using hook fasteners or double grommets. Use construction details according to the manufacturer’s recommendations.
   2. Secure the curtain at ground level and/or at intermediate points by framework and supports.
   3. Be responsible for the design, detailing and adequacy of framework, supports, ties, attachment methods and other appurtenances required for the proper installation of the curtain.
   4. Prepare and seal the design and details necessary for the noise control curtain framework and supports using a Professional Engineer licensed in the State of California. Submit the design and detailed engineering to Metro or its designee for review prior to procurement.

PART 3 – EXECUTION

3.01 NOISE LEVEL LIMITS

A. Stationary/Continuous Noise: Prevent noise intrusion from stationary sources, and parked mobile sources which produce repetitive or long-term noise lasting more than two hours from exceeding limits shown on Table 1.

B. Mobile/Intermittent Noise: Prevent noise from non-stationary mobile equipment operated by a driver, or from sources of intermittent, non-recurring on a long term basis, non-scheduled, non-repetitive, short term noises (not lasting more than two hours), from exceeding the limits shown on Table 2.

C. Nighttime operations noise limits are established by LAPD and by Metro Project Noise and Vibration Criteria as shown on Table 1 and 2. The LAPD limits are based on pre-
construction ambient $L_{eq}$ measurements plus five dBA. The LAPD limits apply for the hours of 9:00 PM to 7:00 AM Monday through Friday, 9:00 PM Friday to 8:00 AM Saturday, 6:00 PM Saturday to 8:00AM Sunday and 6:00PM Sunday to 7:00AM Monday. Enforcement will be based on a 15 minute average measurement.

D. At the surface of the construction site during night time hours use only equipment that, operating under full load, meets the noise limits specified in Table 3 when measured according to the test procedures used for equipment noise certification as specified in this Section.

E. Contractor is prohibited from operating equipment at night that does not meet nighttime noise emission limits in Table 3 below. If the Contractor's existing equipment on-site does not meet nighttime noise emission limits for surface construction activities specified in Table 3 or falls out of compliance, remove the non-compliant equipment promptly from nighttime service by immediately parking and turning off equipment when it is safe to do so.

F. Trucks operating off-site between the hours of 12:00 midnight and 5:00 AM have lower emission limits (80 dBA at 50 feet emission limit) than normally required by the California Vehicle Code. All trucks used for these nighttime hours must be certified in accordance with these specifications. Take necessary steps to comply with this limit, which may include fitting this equipment with high grade engine exhaust silencers and engine casing sound insulation.

3.02 NOISE CONTROL PLAN

A. Requirements:

1. Within 180 days of Notice To Proceed (NTP), prior to the start of construction submit to Metro or its designee the name, address, and qualifications of the Acoustical Engineer responsible for preparing and overseeing the implementation of the Noise Control Plan.

2. The minimum requirements for the Acoustical Engineer: Bachelor of Science Degree or higher degree, from a qualified program in engineering, physics, or architecture offered by an accredited university or college, and five years experience in noise control engineering and construction noise analysis, or current enrollment as a full Member or Board-certified Member in the Institute of Noise Control Engineering.

3. In addition to the basic requirements shown above, the Acoustical Engineer must demonstrate substantial and responsible experience in preparing and implementing construction noise control and monitoring plans on construction projects conducted in an urban setting, calculating construction noise levels, and designing and overseeing the implementation of construction noise abatement measures.

4. Within 45 days of NTP prior to construction, submit the Noise Control Plan to Metro or its designee.

5. Noise Control Plan: Include the following for nighttime construction activities that may occur at the surface of the construction site:

   a. Site Drawing: Prepare a scaled drawing of the construction site indicating the following:
1) Contract name and number  
2) Contractor's name  
3) Date  
4) Scale  
5) Direction of North  
6) Noise sensitive locations near the construction site  
7) Construction equipment locations used during nighttime hours, designated by the code letter used in Column (a) in Part A of the Noise Control Plan Form, Figure 4.  
8) Locations of the noise levels calculated for residential, commercial, and industrial areas as specified in this Section.  
9) Locations and types of noise abatement measures that may be required to meet codes and regulations as indicated by the calculations as specified in this Section.  

b. Equipment Inventory: Prepare an inventory of equipment used during nighttime hours by providing the following information in the indicated columns of Noise Control Plan Form, Figure 4.  
1) Column (a): Code letter in sketch to indicate position of equipment on site and to identify Certificates of Noise Compliance  
2) Column (b): Appropriate equipment category from Table 3  
3) Column (c): Equipment manufacturer and model, if known at the time of the Plan's preparation  
4) Column (d): Unique identifier (ID), such as registration number, if known at the time of the Plans preparation.  
5) Column (e): Equipment horsepower  
6) Column (f): Noise emission limit from Table 3.  
7) Column (g): Estimated noise level at 50 feet; if greater than the value in Column (f), source noise control device (e.g. mufflers) must be used to comply with limit.  
8) Column (h): Estimated date of first use on site  
9) Column (i): Estimated date of last use on site.  

c. Noise Calculations: Prepare calculations of nighttime \( L_{\text{max}} \) and one-hour \( L_{\text{eq}} \) noise levels expected at the nearest residential, commercial and industrial property line based on the equipment noise levels given in Part A of the Noise Control Plan Form. Determine the nearest property lines from the currently identified noise sensitive locations indicated in Table 4. Calculate preliminary one-hour \( L_{\text{eq}} \) construction noise projections for those sensitive locations and insert with locations into Table 5. Make the calculations for locations where noise emitted by applicable equipment will cause the greatest noise level for each type of land use, for nighttime periods, if necessary. Provide the results on Part B of the Noise Control Plan Form with calculations included below the results, and
with the locations for the calculations indicated on the site sketch. The noise calculation procedure shall be as follows:

1) Calculate $L_{\text{max}}$ according to the method outlined below:

$$L_{\text{max}}(\text{equipment}) = EL - 20 \log_{10} \left( \frac{D}{50} \right)$$

where:

$EL =$ Estimated equipment noise level at 50 feet, in dBA.

$D =$ Distance from the equipment to property-line location, in feet.

Then, combine the individual contributions of each piece of equipment to obtain the overall maximum construction noise level at each location as follows:

$$L_{\text{max}}(\text{overall}) = 10 \log_{10} \left( \sum 10 \left[ L_{\text{max}}(\text{equipment})/10 \right] \right)$$

2) Calculate one-hour $L_{\text{eq}}$ according to the methodology recommended by the US Department of Transportation, Federal Highway Administration Special Report Highway Construction Noise: Measurement, Prediction and Mitigation, as follows:

First, calculate the construction one-hour $L_{\text{eq}}$ at each property-line location for each item of equipment using the following equation:

$$\text{One-hour } L_{\text{eq}}(\text{equipment}) = EL - 20 \log_{10}(D/50) + 10 \log_{10}(UF/100)$$

where:

$EL =$ Estimated equipment noise level at 50 feet, in dBA.

$D =$ Distance from the equipment to the property-line location, in feet.

$UF =$ "Usage factor," expressed as the percent of time that the equipment is operated at full power while on site. This factor shall be estimated by the Contractor or the qualified acoustical engineer. Guidelines for the selection of usage factors are provided by the US Environmental Protection Agency (EPA) Report NTID 300.1, Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances.

Then, combine the individual contributions of each piece of equipment to obtain the overall construction one-hour $L_{\text{eq}}$ at each location as follows:

$$\text{One-hour } L_{\text{eq}}(\text{overall}) = 10 \log_{10} \left( \sum 10 \left[ \text{one-hour } L_{\text{eq}}(\text{equipment})/10 \right] \right)$$

3) Compare the calculated $L_{\text{max}}$ and one-hour $L_{\text{eq}}$ values with the Contract limits specified in this Section.

4. **Description of Required Noise Abatement Measures** as specified in Paragraph 3.2 C. of this Section.

5. Update the Noise Control Plan at three month intervals (based on Metro or its designee’s initial acceptance date) and re-submit the Plan within 10 days of the start of each quarterly period. Update and re-submit the Noise Control Plan upon any major change in work schedule, construction methods, or equipment operations not included in the most recent Plan.
B. Noise Abatement Measures: If the results of the noise calculations prepared in accordance with this Section indicate that noise level limits listed in this Section will be exceeded, identify proposed noise abatement measures, their anticipated effects (dBA reductions), and a schedule for their implementation. Re-calculate the noise levels at the nearest sensitive receptor location property lines which include the anticipated noise reduction effects and submit the results on Part B of the Noise Control Plan Form. Include, as backup documentation to Part B of the Noise Control Plan, drawings, sketches, and suitable calculations which demonstrate anticipated noise reduction benefits and that proposed structures or facilities comply with applicable building code requirements.

C. Noise Reduction Methods: To the extent required to meet the noise limits specified by this Section, include noise reduction measures listed below, or others of the Contractor's devising to minimize construction noise emission levels. Noise reduction measures include, but are not limited to the following:

1. Scheduling truck loading, unloading, and hauling operations so as to minimize noise impact near noise sensitive locations and surrounding communities.
2. Locating stationary equipment so as to minimize noise impact on the community.
3. Do not leave equipment pieces idling when not in use.
4. Limiting the use of enunciators or public address systems, except for emergency notifications.
5. Maintaining equipment such that parts of vehicles and loads are secure against rattling and banging.
6. Limit the time that steel decking or plates for street decking or covering excavated areas are in use.
7. Grading of surfaced irregularities on construction sites to prevent the generation of impact noise and ground vibrations by passing vehicles.
8. Schedule Work to avoid simultaneous activities that both generate high noise levels.

3.03 NOISE MONITORING PLAN

A. Requirements:

1. Have the Noise Monitoring Plan prepared and administered by the Contractor's Acoustical Engineer.
2. Within 45 days of NTP, submit the Noise Monitoring Plan to Metro or its designee, specifying the nighttime and daytime construction activities, monitoring locations, equipment, procedures, schedule of measurements and reporting methods to be used.
3. Furnish noise monitoring data to Metro or its designee on a weekly basis. Include measurements taken during the previous week.
4. In the event that the measured noise levels exceed allowable limits, immediately notify Metro or its designee and immediately implement additional Noise Abatement Measures as specified in the Noise Control Plan. See also and in this Section.
5. If the measured nighttime levels exceed the noise limits specified in this Section,
reduce the noise levels by appropriate abatement measures in order to comply with the nighttime Noise Variance requirements or terminate the nighttime construction activity responsible for the noise limits exceedance until the daytime hours when higher noise levels are permitted.

B. Measurement Locations:
   1. Measure the noise-sensitive locations identified in this Section in the vicinity of the construction site for noise levels. These locations may change during the Contract and shall be updated as required by Metro.
   2. Prepare and submit a scaled plan indicating monitoring locations, including measurements to be taken at construction site boundaries and at nearby residential, commercial and industrial property lines.

C. Measurement Equipment:
   1. Perform noise measurements with an instrument that is in compliance with the criteria for a Type 1 (Precision) or Type 2 (General Purpose) Sound Level Meter as defined in the current revision of ANSI S1.4.
   2. Provide sound level meters capable of measuring the $L_{\text{max}}$ and one-hour $L_{\text{eq}}$ on both the A-Weighted and C-Weighted scales required by regulatory criteria and Noise Level Limits.
   3. Calibrate sound level meters, microphones, and calibrators for certified laboratory conformance at least once a year. Submit a current certificate of conformance to Metro or its designee prior to using the sound level meter and submit updated certificates following subsequent calibrations on a yearly basis for the duration of this Contract or upon the completion of repairs to the instrument.

D. Measurement Procedure:
   1. Field calibrate the sound level meter using an acoustic calibrator, according to the manufacturer’s specifications, prior to each measurement.
   2. Except as otherwise indicated, perform measurements using the A weighting network and the SLOW response of the sound level meter.
   3. Measure impulsive or impact noises using the C-Weighting network and the FAST response of the sound level meter.
   4. Fit the measurement microphone with an appropriate windscreen at the location of the sensitive receptor at least four to six feet away from the nearest reflective surface.
   5. Take noise measurements at noise sensitive locations within 150 feet of the construction site at least once each week and after a change in construction activity or construction location. Measurement Periods: Minimum of 20 15 minutes.
   6. Construction noise measurements shall coincide with daytime and nighttime periods of maximum noise generating construction activity, and be taken during the construction phase or activity that has the greatest potential to create annoyance or to exceed applicable noise regulations and restrictions.
   7. If, in the estimation of the person performing the measurements, outside noise
sources contribute significantly to the measured noise level, repeat the measurements (with the same outside source contributions when construction is inactive to determine the background noise level).

8. Submit noise data to Metro or its designee on a weekly basis using the Noise Measurements Report Form provided in Figure 2. Note the type of measurement (e.g. baseline, on-going construction) on the form.

9. Clearly identify monitoring locations and sketch on the back of the Noise Measurements Report Form, Figure 2, along with the locations of and distances from any noise sensitive location.

10. Identify construction equipment operating during the monitoring period and the locations sketched on the back of the Noise Measurements Report Form, along with the locations and distances to any noise sensitive location.

3.04 EQUIPMENT NOISE CERTIFICATION

A. Requirements for Construction Equipment:

1. Ensure that Contractor and Subcontractor equipment, of the categories listed in Table 3 to be used (during nighttime hours at the surface of the construction site) for a total duration greater than five days, shall be tested for compliance with the stated noise emission limits by the Acoustical Engineer during the first day of use on the construction site or at an alternative site acceptable to Metro or its designee.

2. Retest equipment as described above at six month intervals while in use on-site, and certify new equipment before being placed into service at the site.

3. For each piece of equipment tested, submit a noise report to Metro or its designee by completing the Application for Certificate of Equipment Noise Compliance provided in Figure 3. Ensure that the equipment identification number used for the Certificates is consistent with the identification number used in the Noise Control Plan.

4. Do not use equipment of the categories listed in Table 3, as described above on-site without valid certificates of noise compliance submitted as required.

B. Test Procedures for Construction Equipment:

1. Operate engine powered equipment by the Contractor or Contractor's representative at maximum governed rpm under full load conditions during the tests under the supervision of the Acoustical Engineer.

2. Test portable and mounted impact hammers, such as hoe rams and jackhammers to be used for concrete breaking, by the Acoustical Engineer during the first day of actual operation at the construction site under maximum load conditions as rated by the equipment manufacturer.

3. Noise certification measurements: As specified in Paragraph 3.3 F. of this Section. Use an acoustic calibrator of the type recommended by the sound level meter manufacturer prior to measurements.

4. If possible, make measurements at two locations:
   a. Two feet outside the right side of the equipment casing, at a distance of 50 feet.
and height of five feet above ground level, and;

b. Two feet outside the left side of the equipment casing, at a distance of 50 feet and a height of five feet above ground level, with the equipment operating as indicated in items 3.4.B.1, 2, or 3 above for a minimum period of one minute. Reduce measurements made at less than 50 feet, because of space limitations at the test site, by the values given in Table 6 to estimate the 50-foot sound level.

C. Compliance:

1. Submit a noise report to Metro or its designee for each item of equipment used on the surface of the construction site during nighttime hours of the categories listed in Table 3. Submit the report on the form shown in Figure 3 with certification by the Acoustical Engineer that equipment noise emissions do not exceed those prescribed in Table 3.

2. If the noise levels obtained during the tests exceed those specified in Table 3, remove such equipment from nighttime use until such equipment is modified and retested, or substitute other equipment to meet the noise level requirements.

3. Upon compliance Metro or its designee will mark the noise report indicating Metro or its designee’s concurrence, including the certification date and equipment identification number, for verification by Resident Engineer. Keep the noise reports readily available on file in the construction field office for inspection by Metro or its designee upon request.

4. The Certificate of Noise Compliance will remain valid for a period of six months only. Delays caused by the certification refusal or by time lost in improving the rejected equipment or finding alternate acceptable equipment will not be a basis for monetary or time delay claims, or for avoidance of liquidated damages or withholding of payment.

5. Equipment shall be subject to spot noise level testing by Metro or its designee’s discretion to determine that the equipment in use meets the requirements specified in Table 3. If such tests are requested by Metro or its designee, locate and operate the equipment as directed by Metro or its designee at the designated site so as to facilitate the measurements.

   a. Provide Metro or its designee with a copy of the results of the measurements. If such tests demonstrate that any equipment does not comply with this part, Metro or its designee will revoke the certificate of Noise Compliance and the Contractor will take the equipment out of use according to requirements of this Section until compliance is achieved. A new Certificate of Noise Compliance will be issued upon proof of compliance.

3.05 VIBRATION LEVEL LIMITS

A. Measures applied to limit noise levels may in some cases limit vibration levels also. Measures specified above for noise levels are applicable.

B. All Areas: Conduct Construction activities so that vibration levels at a distance of 50 feet from construction limits or at nearest affected building (whichever is closer) do not exceed root-mean-square (rms) unweighted vibration velocity levels in vertical direction over a frequency range of 1 to 100 Hz as listed in Table 76.
C. Vibration levels at buildings affected by construction operations refer to vertical direction vibration on ground surface or building floor, or 50 feet from Construction Limits, whichever is closer.

D. Conduct weekly measurements of vibration during peak vibration generating construction activities. If the construction set up changes more often than weekly, conduct vibration measurements as often as the set up changes. Furnish vibration monitoring data to Metro or its designee on a weekly basis. Include measurements taken during the previous week.

3.06 CONSTRUCTION SITE NOISE CONTROL

A. Perimeter Noise Barrier Fence:
   1. Maintain existing perimeter noise barrier fences along streets as indicated. The noise barrier fences may not provide sufficient noise reduction to meet the daytime or nighttime noise limits specified in this Section. It is the Contractor's responsibility to meet these limits by other methods such as installing additional fixed barrier fences or movable barriers, raising the height of the noise barrier fences, and providing additional noise control measures specified in this Section.
   2. Construct gates and/or doors in the fence either hinged or rolling of the same or equally effective material as the noise barrier fence. Construct gates and doors in the fence to ensure that the edges overlap the fence to eliminate gaps. During nighttime hours maintain gates and doors in a closed position except for brief periods of time to allow access to the Construction Site.

B. During nighttime construction activities shield noise generating equipment to the extent that the line-of-sight is broken between the equipment's engine exhaust stack and/or engine casing and any residential building or structure where sleep activity occurs within 500 feet of that activity.

C. In no case expose public to construction noise levels exceeding 90 dBA (slow) within a 15 minute time limit, or to impulsive noise levels with a peak sound pressure level exceeding 115 dBC maximum transient level as measured on general purpose sound level meter on C-weighting and fast meter response.

3.07 CONSTRUCTION METHODS – EQUIPMENT

A. Minimize the use of impact devices, such as jackhammers, pavement breakers, and hoe rams. Where possible, use concrete crushers or pavement saws rather than hoe rams for tasks such as concrete deck removal and retaining wall demolition.

B. Pneumatic impact tools and equipment used at the construction site shall have intake and exhaust mufflers recommended by the manufacturers thereof, to meet relevant noise ordinance limitations and Metro project criteria shown in this Section.

C. Equip noise producing equipment i.e. jackhammers and pavement breakers with acoustically attenuating shields or shrouds recommended by the manufacturers thereof, to meet relevant noise ordinance limitations.
D. Line or cover hoppers, conveyor transfer points, storage bins, and chutes with sound-deadening material.

E. Provide mufflers or shield paneling for other equipment, including internal combustion engines, recommended by manufacturers thereof.

F. As required to meet the noise limits specified in this Section, use alternative procedures of construction, and select proper combination of techniques that generate least overall noise and vibration. Such alternative procedures include the following:
   1. Use electric welders powered from utility main lines instead of riveting or electric generators/welders. Use of welders powered by on-site electric generators.
   2. Mix concrete off-site instead of on-site.
   3. Employ prefabricated structures instead of assembling on-site.

G. Use construction equipment manufactured or modified to dampen noise and vibration emissions, such as:
   1. Use electric instead of diesel powered equipment.
   2. Use hydraulic tools instead of pneumatic impact tools.
   3. Use electric instead of air or gasoline driven saws.

3.08 CONSTRUCTION METHODS – OPERATIONS

A. Operate equipment so as to minimize banging, clattering, buzzing, and other annoying types of noises, especially near residential areas during the nighttime hours.

B. To the extent feasible, configure the construction site in a manner that keeps noisier equipment and activities as far as possible from noise sensitive locations and nearby buildings.

C. Install equipment with back-up alarms operated by Contractor, vendors, suppliers, and subcontractors on the construction site, with either audible self-adjusting back-up alarms or manual adjustable alarms. The self-adjusting alarms shall automatically adjust to a minimum of five dBA and a maximum of 10 dBA over the surrounding background noise levels and have an operating range between 77-97 dBA. Set the manual adjustable alarms at the low setting, 87 dBA. Installation and use of alarms shall comply with CCR Title 8, Section 1592, Warning Methods.

D. In no case shall the above restrictions limit the Contractor's responsibility for compliance with applicable Federal, state and local safety ordinances and regulations and other Sections of these construction specifications.

E. Maximize physical separation, as far as practicable, between noise generators and noise receptors. Separation includes following measures:
   1. Provide enclosures for stationary items of equipment and barriers around particularly noisy areas on site.
   2. Locate stationary equipment to minimize noise and vibration impact on community,
subject to acceptance of Metro or its designee.

F. Minimize noise-intrusive impacts during most noise sensitive hours.
   1. Plan noisier operations during times of highest ambient noise levels.
   2. Keep noise levels relatively uniform; avoid excessive and impulse noises.
   3. Turn off idling equipment.
   4. Phase in start-up and shut-down of site equipment.

G. Select truck routes for muck disposal so that noise from heavy-duty trucks will have minimal impact on sensitive land uses (e.g., residential).
   1. Conduct truck loading, unloading and hauling operations so noise and vibration are kept to a minimum.
   2. Route construction equipment and vehicles carrying soil, concrete or other materials over streets and routes that will cause least disturbance to residents in vicinity of Work.
   3. Submit haul routes and staging areas to the City of Los Angeles, Bureau of Engineering and LADOT, 30 days before required date.

3.09 CONSTRUCTION METHODS – MOVEABLE NOISE BARRIERS

A. Install moveable noise barriers in accordance with requirements of this Section for Moveable Noise Barriers, as required to comply with the Noise Control Plan and to meet the noise limits specified in this Section, to shield the public from construction noise during the course of the Contract.

B. Provide readily removable noise barriers so that they may be repositioned, as necessary, to provide noise abatement for non-stationary and stationary processes.

C. Installation, Maintenance, and Removal:
   1. Install the barriers such that the sound-absorptive surfaces face the noise source.
   2. Maintain the moveable noise barriers and repair damage that occurs, including, but not limited to, keeping barriers clean and free from graffiti, and maintaining structural integrity. Promptly repair or replace gaps, holes, and weaknesses in the barriers, and openings between, or under the units with new material.

D. The use of moveable noise barriers is a minimum noise control requirement that may not provide sufficient noise reduction to meet the daytime or nighttime noise limits specified in this Section. It is the Contractor’s responsibility to meet these limits by other methods such as installing additional moveable noise barriers, installing noise barrier fences, and providing additional noise control measures specified in this Section as indicated.

3.10 CONSTRUCTION METHODS – NOISE CONTROL CURTAIN

A. Install noise control curtains in accordance with requirements of this Section for Noise Control Curtains, as required to meet the noise limits specified in this Section, to shield
public from construction noise during the course of the Contract.

B. The noise control curtains shall be readily moveable so that they may be repositioned, as necessary, to provide noise abatement for non-stationary and stationary processes.

C. Installation, Maintenance and Removal:
   1. The noise control curtains shall be installed without any gaps such that the sound-absorptive side faces the construction activity to be shielded.
   2. Maintain the noise control curtains and promptly repair any damage that may occur. Gaps, holes or weaknesses in the curtain, or openings between the curtain and the ground shall be promptly repaired by the Contractor.
**TABLE 1 – ALLOWABLE SOUND LEVELS OF TOTAL CONSTRUCTION SITE NOISE**

<table>
<thead>
<tr>
<th>AFFECTED STRUCTURE OR LAND USE</th>
<th>MAXIMUM ALLOWABLE CONTINUOUS NOISE LEVEL, dBA (Lmax)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>DAYTIME</strong></td>
</tr>
<tr>
<td></td>
<td>7:00 AM to 8:00 PM</td>
</tr>
<tr>
<td>Residential</td>
<td></td>
</tr>
<tr>
<td>Single family residence not along major arterials</td>
<td>60</td>
</tr>
<tr>
<td>Land uses along an arterial or in multifamily residential areas, including hospitals</td>
<td>65</td>
</tr>
<tr>
<td>In commercial areas, including hotels</td>
<td>70</td>
</tr>
<tr>
<td>Commercial</td>
<td></td>
</tr>
<tr>
<td>In noise sensitive, semi-residential/ commercial areas, including schools, libraries, and churches</td>
<td>70</td>
</tr>
<tr>
<td>In non-noise sensitive commercial areas with no nighttime residency</td>
<td>75</td>
</tr>
<tr>
<td>Industrial</td>
<td></td>
</tr>
<tr>
<td>All locations</td>
<td>80</td>
</tr>
</tbody>
</table>

**TABLE 2 – ALLOWABLE SOUND LEVELS OF SHORT TERM* CONSTRUCTION EQUIPMENT**

<table>
<thead>
<tr>
<th>STRUCTURE OR LAND USE</th>
<th>MAXIMUM ALLOWABLE INTERMITTENT NOISE LEVEL, dBA (Lmax)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>DAYTIME</strong></td>
</tr>
<tr>
<td></td>
<td>7:00 AM to 8:00 PM</td>
</tr>
<tr>
<td>Residential</td>
<td></td>
</tr>
<tr>
<td>Single family residence not along major arterials</td>
<td>75</td>
</tr>
<tr>
<td>Land uses along an arterial or in multifamily residential areas, including hospitals</td>
<td>80</td>
</tr>
<tr>
<td>In commercial areas, including hotels</td>
<td>80</td>
</tr>
<tr>
<td>Commercial</td>
<td></td>
</tr>
<tr>
<td>In noise sensitive, semi-residential/ commercial areas, including schools, libraries, and churches</td>
<td>85</td>
</tr>
<tr>
<td>In non-noise sensitive commercial areas with no nighttime residency</td>
<td>85</td>
</tr>
<tr>
<td>Industrial</td>
<td></td>
</tr>
<tr>
<td>All locations</td>
<td>90</td>
</tr>
</tbody>
</table>

*SHORT-TERM is defined in this Section.
TABLE 3 – NOISE EMISSION LIMITS FOR CONSTRUCTION EQUIPMENT USED DURING NIGHTTIME HOURS; MEASURED AT 50 FEET FROM CONSTRUCTION EQUIPMENT*

<table>
<thead>
<tr>
<th>Equipment Category</th>
<th>( L_{\text{max}} ) Level (dBA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backhoe</td>
<td>75</td>
</tr>
<tr>
<td>Bar Bender</td>
<td>75</td>
</tr>
<tr>
<td>Chain Saw</td>
<td>81</td>
</tr>
<tr>
<td>Compactor</td>
<td>75</td>
</tr>
<tr>
<td>Compressor**</td>
<td>65</td>
</tr>
<tr>
<td>Compressor (other)**</td>
<td>75**</td>
</tr>
<tr>
<td>Concrete Mixer</td>
<td>71</td>
</tr>
<tr>
<td>Concrete Pump</td>
<td>77</td>
</tr>
<tr>
<td>Crane</td>
<td>81</td>
</tr>
<tr>
<td>Dozer</td>
<td>81</td>
</tr>
<tr>
<td>Front End Loader</td>
<td>75</td>
</tr>
<tr>
<td>Generator***</td>
<td>69</td>
</tr>
<tr>
<td>Gradall</td>
<td>81</td>
</tr>
<tr>
<td>Grader</td>
<td>81</td>
</tr>
<tr>
<td>Paver</td>
<td>81</td>
</tr>
<tr>
<td>Pneumatic Tools</td>
<td>81</td>
</tr>
<tr>
<td>Scrapper</td>
<td>81</td>
</tr>
<tr>
<td>Tractor</td>
<td>79</td>
</tr>
</tbody>
</table>

*  Noise emission limits apply to equipment used at surface of the construction site during nighttime hours of 9 pm to 7 am.

**  Portable Air Compressor that is rated at 75 cfm or greater and that operates at greater than 50 psi

***  Use Quiet Generators from MQ Power, or equivalent to meet the noise limits.

TABLE 4 – NOISE SENSITIVE LOCATIONS – TBD

<table>
<thead>
<tr>
<th>Location No</th>
<th>Address</th>
<th>Land Use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## TABLE 5 – PRELIMINARY NOISE PROJECTIONS – TBD
(Refer to drawing prepared according to requirements of this Section.)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Construction One-Hour $L_{eq}$ at Each Receiver (dBA)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Receiver #1</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## TABLE 6 – ADJUSTMENTS FOR CLOSE-IN EQUIPMENT NOISE MEASUREMENTS

<table>
<thead>
<tr>
<th>Measurement Values to be Subtracted from Measured Sound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance (Feet)</td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>19-21</td>
</tr>
<tr>
<td>22-23</td>
</tr>
<tr>
<td>24-26</td>
</tr>
<tr>
<td>27-29</td>
</tr>
<tr>
<td>30-33</td>
</tr>
<tr>
<td>34-37</td>
</tr>
<tr>
<td>38-42</td>
</tr>
<tr>
<td>43-47</td>
</tr>
<tr>
<td>48-50</td>
</tr>
</tbody>
</table>

## TABLE 7 – CONSTRUCTION VIBRATION LIMITS

<table>
<thead>
<tr>
<th>VIBRATION TYPE AND PERMISSIBLE AGGREGATE DURATION:</th>
<th>LIMIT:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustained (&gt;1 hr/day)</td>
<td>0.01 in/sec (80 VdB re $10^{-6}$ in/sec)</td>
</tr>
<tr>
<td>Transient (&gt;= 10 min to &lt;1 hr/day)</td>
<td>0.03 in/sec (90 VdB re $10^{-6}$ in/sec)</td>
</tr>
<tr>
<td>Transient (&lt;10 min/day)</td>
<td>0.10 in/sec (100 VdB re $10^{-6}$ in/sec)</td>
</tr>
</tbody>
</table>
FIGURE 1
QUARTERLY NOISE CONTROL PLAN FORM - PART B

QUARTERLY NOISE CONTROL PLAN (DUPLICATE AS NEEDED)

Contract No.: ____________________________  Contract Name: ____________________________
Contractor: ______________________________  Site: ______________________________
Date: ______________________________  Land Use: ______________________________

Resubmit every 3 months.

PART B: RESIDENTIAL, COMMERCIAL AND INDUSTRIAL PROPERTY NOISE LEVELS

<table>
<thead>
<tr>
<th></th>
<th>Calculated one hour(L_{eq}) (dBA)</th>
<th>Calculated (L_{max}) (dBA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nighttime</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOISE ABATEMENT MEASURES**

**ANTICIPATED EFFECTS**

**CALCULATIONS:** Attach additional sheet(s) as needed.

Contract No(s): ____________________________
FIGURE 2. NOISE MEASUREMENTS REPORT FORM

Date: ______________________
Time: ______________________

NOISE MEASUREMENTS REPORT FORM

Measured By: ____________________________ Of: ____________________________ (Company)

Monitoring Address: ____________________________________________________________ (Provide Sketch on Back)

Location No: ____________ Wind Speed: ________________ Km/Hr Direction: ____________ (MPH x 1.6)
Location of Sound Level Meter: (No closer than 15 meters from equipment and 3 meters from building)
Monitoring was Conducted: ________________ Meters from Equipment ( ________________ )

Land Use:   ☐ Residential/Institutional     ☐ Business/Recreational     ☐ Industrial

Sound Level Meter: Make and Model: ________________ ☐ A - Weighted Sound Level (Slow)
☐ C - Weighted Sound Level (Fast)

Duration of Measurement: ___________________________ (20-15 minutes to 1 hour)

<table>
<thead>
<tr>
<th>Calibration</th>
<th>Field Notes (example: 2200-2205 H, Airplane 90 dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>one-hour $L_{eq}$</td>
<td></td>
</tr>
<tr>
<td>$L_{50}$</td>
<td></td>
</tr>
<tr>
<td>$L_{10}$</td>
<td></td>
</tr>
<tr>
<td>$L_{1.0}$</td>
<td></td>
</tr>
<tr>
<td>MAXL</td>
<td></td>
</tr>
<tr>
<td>Allowable Noise Limit</td>
<td></td>
</tr>
</tbody>
</table>

Check one of the following:
☐ Ongoing Construction   ☐ Post-Construction: _____________________ (Contract)
☐ Baseline Conditions (Complete all that apply below)

Active Contract(s): ____________________________________________________________ (List all contracts that contribute to measured noise)

Complaint Response: ____________________________________________________________ (Describe: Include Log-In Number)

Abatement Follow-up: ____________________________________________________________ (Describe)
FIGURE 3
EQUIPMENT SOUND LEVEL DATA REPORTING FORM
APPLICATION FOR CERTIFICATE OF EQUIPMENT NOISE COMPLIANCE

Contractor Name: ________________________________
Contract Name & Number: __________________________

Equipment Type: _________________________________
Manufacturer & Model Number: _______________________
Identification Number: _____________________________
Rated Power & Capacity: _____________________________
Operating Condition During Test: ____________________

Measured Sound Levels at 20 to 50 feet:

Measured Values and Distance:
   Right Side: ______________ dBA (SLOW), at __________ feet
   Left Side: ______________ dBA (SLOW), at __________ feet

Estimated Values at 50-Foot Distance:
   Right Side: ______________ dBA (SLOW).
   Left Side: ______________ dBA (SLOW).

Maximum Values Allowed for this Equipment: ________________ dBA (SLOW) at 50 feet.

If equipment sound level exceeds maximum value allowed, indicate action taken to achieve compliance:

_________________________________________________

_________________________________________________

Name, Address & Phone No. of Acoustical Engineer
__________________________________________________

Authorized Signature: ___________________________ Date: __________
CONTRACTOR'S APPROVAL:
Authorized Signature: ___________________________ Date: __________
ENGINEER'S CONCURRENCE:
Authorized Signature: ___________________________ Date: __________
FIGURE 4
QUARTERLY NOISE CONTROL PLAN FORM - PART A

QUARTERLY NOISE CONTROL PLAN - NIGHTTIME CONSTRUCTION ACTIVITIES
AT THE SURFACE OF THE CONSTRUCTION SITE (DUPLICATE AS NEEDED)

Contract No.: ___________________ Contract Name: ___________________ Contractor: ________________

Site: __________________________ Date: ____________________________ Resubmit every three months

(ATTACH SITE SKETCH)

PART A: EQUIPMENT INVENTORY

<table>
<thead>
<tr>
<th>Code letter (a)</th>
<th>Equipment</th>
<th>Noise Limit (f)*</th>
<th>Estimated Noise at 50'' (g)</th>
<th>Date Begin (h)</th>
<th>Date End (i)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category (b)</td>
<td>Model (c)</td>
<td>ID# (d)</td>
<td>HP (e)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

END OF SECTION 01 56 19
PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Furnishing, installing, maintaining, replacing as necessary, and removing (except as indicated) temporary barriers and traffic control devices.

1. Temporary barriers include fencing, gates, and barricades, including K-rails, guard rails, and crash cushions at indicated locations, complete with signs, general lighting, warning lights, and similar devices.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures
B. Section 01 35 23 Worksite Safety Requirements
C. Section 01 35 53 Worksite Security Requirements
D. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)
E. Section 01 55 13: Temporary Access Road and Parking Ares
F. Section 01 55 26: Controlling Traffic (Metro-Furnished TCP)
G. Section 01 55 27: Controlling Traffic (Contractor Furnished TLR)
H. Section 01 55 28: Controlling Traffic
I. Section 01 56 26: Construction Fencing (Wood)
J. Section 01 56 28: Construction Fencing (Chain Link)

1.03 REFERENCES

A. State of California Department of Transportation (Caltrans) Standard Specifications; California Department of Transportation Manual on Uniform Traffic Control Devices (California MUTCD)
B. Standard Specifications for Public Works Construction (SSPWC).

C. City of Los Angeles Department of Public Works, Bureau of Engineering
   2. Standard Plan S-601-3

D. California Code of Regulations (CCR), Title 24:
   1. Part 2 – California Building Code (CBC)

E. U.S. Department of Transportation (USDOT):
   1. Federal Transit Administration (FTA) – American with Disability Act (ADA) Standards for Transportation Facilities.

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).

1.05 SUBMITTALS

A. Refer to Sections 01 33 00 – Submittal Procedures, for submittal requirements and procedures.

B. Product Data

C. Crash Test Data: Conforming to requirements of local authorities having jurisdiction.
   1. Crash test data are required to ascertain that temporary barriers provided will meet applicable standards of local authorities having jurisdiction.

1.06 DEFINITIONS

A. Temporary barriers are defined K-rails, guard rails, and crash cushions.

B. Traffic Circulation Plan (TCP): Defined under Section 01 55 26 – Controlling Traffic (Metro-Furnished TCP)

C. Worksite Traffic Control Plan (WTCP): Defined under Section 01 55 27 – Controlling Traffic (Contractor Furnished TLR).

1.07 WORKSITE CONDITIONS

A. Repair and maintain damaged fences, which are to remain in-place at completion of Work.

B. Remove and dispose of obstructions that interfere with construction of fences. Finish grade to minimize or eliminate undulation in profile of fence.
PART 2 – PRODUCTS

2.01 BARRIERS

A. Conform temporary barriers controlling traffic to the Traffic Control Requirements (TCR) of applicable local agency Worksite Traffic Control Plan (WTCP) and Traffic Circulation Plans (TCP); the State of California Department of Transportation Traffic Manual (WATCH Manual); Caltrans Standard Specifications and Standard Plans; standard specifications for Public Works Construction (SSPWC), and other applicable standards of local authorities having jurisdiction on Traffic Control Requirements.

B. Materials: Provide and maintain barricades, including K-rails, guard rails, and crash cushions, at indicated locations, complete with signs, general lighting, warning lights, striping, tabs, and similar devices where appropriate and free of graffiti.

2.02 ACCESSIBILITY

A. Provide walkway accessibility in compliance with California Code of Regulations (CCR), Title 24 requirements and FTA ADA Standards, with minimum width of four feet for wheelchairs.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Position temporary barriers equipped with appropriate signs, to protect and inform traveling public, and serve construction Work.

1. Relocate, modify, and extend traffic barriers as required during course of Work in accordance with approved Worksite Traffic Control Plans (WTCP), and other applicable standards by local City and/or county that have jurisdiction on approving Traffic Control Plans.

B. Provide K-rails installed adjacent to traffic lanes or used to separate traffic from Work area devices in compliance with the CA DOT Standard Specifications. When the position of the K-rail does not allow of a minimum of 24 inches of horizontal support on the side away from traffic, each rail shall be pinned or otherwise fastened to the surface in compliance with the CA DOT Standard Specifications.

C. Screening shall be installed in compliance with approved WTCP and TCP as well as the Construction Safety and Security Manual.

3.02 PAINTING BARRIERS

A. Paint barricades as indicated on WTCP and TCP Paint Barricades.

B. Paint striping for pavement markings and crosswalks; apply two coats.

1. Except as may be modified by requirements of local authorities having jurisdiction.
3.03 TEMPORARY BARRIERS

A. Maintain temporary barriers, including K-Rails, guardrails, and crash cushions, fences and gates in safe condition and appearance acceptable to Metro and applicable standards of local authorities having jurisdiction.

B. Remove posters and paint over graffiti within 48 hours of discovery or written or verbal notification by Metro or its designee.

C. Realign units if they become displaced as soon as misalignment is noted.

D. Interconnect K-rails with adjacent units using steel pins in compliance with the CA DOT Standard Specifications.

E. Remove temporary barriers from Worksite when no longer required, upon approval by Metro or its designee.
   1. Restore areas in accordance with standards of Metro, or local authorities having jurisdiction.

END OF SECTION 01 56 23
SECTION 01 56 26

CONSTRUCTION FENCING (WOOD)

PART 1 – GENERAL

1.01 SECTION INCLUDES

1.02 Furnishing, installing, maintaining and removing wooden construction fences and gates for enclosing Worksite and the Contractor's staging and storage areas, and in areas selected by Metro or its designee to be fenced to meet noise level requirements specified in Section 01 56 19 – Construction Noise and Vibration Control.

1.03 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures
B. Section 01 35 23: Worksite Safety Requirements
C. Section 0135 53: Worksite Security Requirements
D. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)
E. Section 01 56 19: Construction Noise and Vibration Control
F. Section 01 56 23: Temporary Barriers
G. Section 01 56 28: Construction Fencing (Chain Link)
H. Section 09 91 00: Painting

1.04 REFERENCES

A. California MUTCD
B. Standard Specification of Public Works Construction (SSPWC)
C. South Coast Air Quality Management District (SCAQMD):
   1. Rule 1113 - Architectural Coatings

1.05 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).
B. Provide and maintain fencing acceptable to Metro or its designee and conforming to applicable codes.

1.05 SUBMITTALS

A. Refer to Sections 01 33 00 – Submittal Procedures for submittal requirements and procedures.

B. Working Drawings showing complete layout including locations of gates and construction details for footings and wood-to-wood connections.

1.06 DEFINITIONS

A. VOC Volatile Organic Compound, as defined in SACQMD Rule 102 – Definition of Terms:
   1. Any volatile compound of carbon, excluding methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonate, and exempt compounds.

C. SCAQMD: South Coast Air Quality Management District.

D. Term "paint" as used in this Section means coating systems materials, including primers, emulsions, enamels, stain, sealers and fillers, and other applied materials used as primers, intermediate, and finish coats.

1.07 WORKSITE CONDITIONS

A. Repair and replace damaged fences, which are to remain in-place at the completion of the Work.

B. Remove and dispose of obstructions except as indicated which interfere with construction of fences.
   1. Finish grade to minimize or eliminate undulation in profile of fence.

C. Comply with 01 35 23 Worksite safety requirements.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Worksite, packaged, bearing manufacturer's labels and plywood grade firmly affixed to material.

B. Remove unlabeled items and items delivered in damaged condition from Worksite.

PART 2 – PRODUCTS

2.01 FENCE PANELS
A. New or refurbished, four feet by eight feet, 3/4 inch exterior grade A-C plywood, acceptable to Metro or its designee.

2.02 NAILS
A. Galvanized.

2.03 FENCE FRAMING
A. As indicated on Working Drawings and approved by Metro or its designee.

2.04 GATES
A. Provide Chain Link Gates with locks and open into Work area as specified in Section 01 56 28 – Construction Fencing (Chain Link).
1. Provide sliding type gates if gates are larger than 10 feet.
2. Wood gates will not be used.
3. Install acrylic plastic panels in wooden fences if they are adjacent to driveways.

2.05 CONCRETE
A. Conform to requirements of current SSPWC for Portland cement concrete, for Class 500-C-2500 concrete used for footings.

PART 3 – EXECUTION

3.01 PLYWOOD PANELS
A. Mount on posts embedded in ground, on frames braced from behind, or fastened to concrete or asphalt surfaces; show details on Working Drawings.

3.02 PAINT
A. As shown on Metro approved Working Drawings and as specified in Section 09 91 00 – Painting.
1. Conform to South Coast Air Quality Management District (SCAQMD) Rules and Regulations.

3.03 FENCES AND GATES
A. Maintain in good condition.
1. Repaint as necessary to hide wear, weathering and graffiti.
2. Remove posters and paint over graffiti within 48 hours of discovery or verbal or written notification by Metro or its designee.
3. Relocate fences as necessary to accommodate construction activities.

4. Do not install fences where they would obscure visibility of adjacent business or pedestrians on sidewalks.

5. Provide wood fencing installed on each side of driveways with clear, 8 foot by 8 foot, acrylic plastic window on each side.

6. Position windows to maintain visibility between pedestrians and exiting construction vehicles.

B. Remove and dispose of when requirement for fences is complete.
   1. Remove only those portions of fencing as directed by Metro or its designee.

### 3.04 LINE POSTS

A. Space on not more than 10 foot centers.
   1. In determining the post spacing, make measurement parallel to slope of natural ground, with posts placed in vertical position.
   2. Provide total length of posts to be set in ground equal to length of portion embedded in concrete footing plus length required above ground.

### 3.05 FOOTINGS

A. Provide footings as indicated on Working Drawings approved by Metro or its designee.

B. Set posts in concreted minimum of six inches around each post.

C. Crown footings to height of approximately two inches above grade. Provide crown as integral part of footing.

D. Install line posts true and plumb, spaced equally on centers not to exceed 10 feet.

E. Install corner post when there is change of 30 degrees or more either in direction or in grade.

F. Attach plywood with galvanized nails, 16d at minimum nine inch centers.

G. Maintain maximum clearance of one inch between fence and ground line.

H. Install fence posts so as to avoid conflict with right-of-way monuments set by Metro. Before setting fence posts, confer with Metro or its designee regarding locations of right-of-way monuments.

### 3.06 WARNING SIGNS

A. Install warning signs on fence as indicated. Do not place manufacturer's signs or other signs on the fence.
END OF SECTION 01 56 26
SECTION 01 56 28

CONSTRUCTION FENCING (CHAIN LINK)

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Furnishing, installing, maintaining and removing construction chain link fences, eight feet high unless otherwise indicated, and gates for enclosing Worksite and the Contractor's staging and storage areas as necessary to meet project security requirements. Refer to Section 01 35 53, Worksite Security Requirements.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures
B. Section 01 35 23: Worksite Safety Requirements
C. Section 01 35 53: Worksite Security Requirements
D. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)
E. Section 01 56 19 Construction Noise and Vibration Control
F. Section 01 56 23 Temporary Barriers
G. Section 01 56 26: Construction Fencing (Wood)

1.03 REFERENCES

A. Standard Specification of Public Works Construction (SSPWC)
B. California Manual on Uniform Traffic Control Devices (CA MUTCD)

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).
B. Provide and maintain fencing acceptable to Metro or its designee and conforming to applicable codes.

1.05 SUBMITTALS
A. Refer to Section 01 33 00 – Submittal Procedures, for submittal procedures and requirements.

B. Working Drawings showing complete layout, including locations of gates and construction details.

C. Manufacturer's product data.

1.06 DEFINITIONS

A. “As indicated”: Plan, elevation, sections, details and general notes shown on approved contract drawings, shop drawings, and working drawings issued for construction by Metro or its designee and as specified

1.07 WORKSITE CONDITIONS

A. Comply with requirements of Sections 01 35 23 – Worksite Safety Requirements, and 01 35 53 – Worksite Security Requirements.

B. Repair and replace damaged fences, which are to remain in-place at completion of Work.

C. Remove and dispose of obstructions that interfere with construction of fences.
   1. Finish grade to minimize or eliminate undulation in profile of fence.

1.08 AREAS REQUIRING CONSTRUCTION FENCING

A. Provide construction fencing in areas where other agencies require construction areas to be fenced, and as required by Section 01 35 53 Worksite Security Requirements.

B. Furnish and install 8 foot high fence for construction areas while under construction, as listed below:
   1. Parcels requiring demolition, as indicated.
   2. Parcels requiring construction staging or construction staging restoration.

PART 2 – PRODUCTS

2.01 PRODUCTS

A. As specified in SSPWC Section 206-6, and standards of local authorities having jurisdiction, except used chain link fence material, in condition acceptable to Metro or its designee, may be used.

PART 3 – EXECUTION
3.01 INSTALLATION

A. As specified in SSPWC Section 304-3 – Chain Link Fence, as modified by approved submittal Drawings, except, posts with drive anchors may be placed directly in ground.

3.02 FENCES AND GATES

A. Maintain in good condition until requirement for fences is complete.

B. Remove posters or bills attached to the fence and paint over graffiti (on fence structure or green screening materials) within 48 hours of discovery or verbal or written notification by Metro or its designee.

C. Relocate fences and gates as necessary to accommodate construction activities and as accepted by Metro or its designee.

D. Remove and dispose of when requirement for fences is complete.

E. Do not install fences in such a manner that they would obscure the visibility of adjacent businesses or pedestrians on sidewalks from either passing traffic or vehicles entering/leaving the Project site. Do no apply fabric screening in such a manner as to obstruct the visibility of drivers entering/leaving the Project site.

END OF SECTION 01 56 28
PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Protecting shrubs and trees adjacent to Worksite and within Limits of Construction, Permanent Needs Line, and Temporary Construction Easement Lines.

B. Noting and protecting of all existing trees and shrubs, except those trees and shrubs that are in conflict with planned Work.

C. Working with Metro and local city or county agencies, or other authorities having jurisdiction in accordance with Project Environmental Impact Statement (EIS) and Environmental Impact Report (EIR).

D. Planned Work may include but is not limited to street widening, street restoration, locations where trackway departs from or re-enters street, street medians where trackway will run, and in Stations where landscape and hardscape improvements will be constructed.

E. Removal of shrubs and trees damaged beyond repair, as determined by Metro or its designee, and furnishing and installing replacement trees and shrubs acceptable to local City or County agencies or other authorities having jurisdiction and Metro.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures

B. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)

C. Section 01 56 28: Construction Fencing (Chain Link)

D. Section 01 66 00: Product Storage and Handling Requirements

E. Section 01 78 39: As-Built Drawings and Current Status Documents

1.03 REFERENCES

A. International Society of Arboriculture (ISA):
   1. Guide for Establishing Values of Trees and Other Plants

B. Standard Specifications Public Works Construction (SSPWC).
C. Bureau of Street Maintenance Standards.

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).

1.05 SUBMITTALS

A. Refer to Section 01 33 00 - Submittal Procedures, for submittal requirements and procedures.

B. Prepare Location Drawing showing plants to be protected in place, and proposed method of protection.
   1. Include estimated height, diameter and specie (or common name) of each plant to be protected.
   2. Describe structure and appearance of each plant.
   3. Identify which plants must be removed to allow construction of Work.

C. Test reports for topsoil to verify requirements of Article 2.04.

D. Provide photographic documentation of existing site condition prior to commencing of any construction.

1.06 DEFINITIONS (Not Used)

PART 2 – PRODUCTS

2.01 WATER

A. Potable.

2.02 FENCING MATERIALS

A. As specified in Section 01 56 28 – Construction Fencing (Chain Link), or accepted by Metro or its designee.

2.03 STRAW, HAY AND SOD

A. Clean material, free from debris, noxious weeds, and ingredients, insects and pests detrimental to plant growth.

2.04 TOPSOIL
A. Fertile, friable, natural loam with pH level of 5.5 to 6.5 and free from alkali, weed seed, mold, fungus, excessive clay content, large rocks, nematodes, insects and other pests detrimental to plant growth.

2.04 FERTILIZER
A. Commercial grade 10-10-5.

2.05 AGRICULTURAL TILE
A. Six inch diameter perforated acrylonitrile-butadiene-styrene (ABS) drainage tile, length as required.

2.06 ROOT WRAP
A. Burlap

2.07 AGGREGATE
A. Clean stone, gravel, or broken stone (1 inch to 3 inches), passing three-inch sieve and retained on one-inch sieve.

B. Stone: Clean, 3/4 inch broken stone or gravel passing one inch sieve and retained on 3/4 inch sieve.

C. Coarse Aggregate
D. Coarse Sand

2.09 TREE SPECIALIST
A. Provide tree protection and maintenance, including watering, pruning, fertilizing, and pest control, by or under supervision of qualified tree specialist accepted by Metro or its designee.

PART 3 – EXECUTION

3.01 PREPARATION
A. Prohibit traffic and storage of materials within drip lines of trees and shrubs indicated to be salvaged or to remain.

3.02 INSTALLATION
A. Erect fences or other acceptable protection around trees and shrubs those are indicated to remain.
1. Maintain minimum clearance of six inches outside drip line of such trees and shrubs, except for trees and shrubs within sidewalks of public right-of-way. In that case, erect fences six inches around circumference of tree.

B. Fence areas within drip line of trees on adjacent property that overhang Worksite.

3.03 TREE AND SHRUB ROOT PROTECTION

A. Wrap roots in burlap as directed using root wrap.

B. Tree and Shrub Root Protection:

1. Protect roots from flooding, erosion and excessive wetting resulting from dewatering operations, run-off and spillage, or drainage of solutions containing materials deleterious to tree roots.
   a. Area of Tree Root Protection: Within drip line.

2. Tree and shrub roots with greatest cross-section larger than one inch and which will remain exposed during excavation operations - cut roots and wrap with wet root wrap.

3. Utilities Indicated to be within Drip Line of Trees:
   a. Do not cut tap roots and main lateral roots.
   b. Cut smaller roots which interfere with Work with sharp pruning instruments and wrap root stub with wet burlap.

4. Excavations Indicated to be within Drip Lines of Trees:
   a. Excavate by hand and provide sheeting.
   b. Expose roots with narrow-tine spading forks and combing of soil.
   c. If large, main lateral roots are encountered, expose roots beyond excavation limits and bend and relocate roots without breaking.
   d. If large, main lateral roots are encountered immediately adjacent to new construction, and relocation of roots is not possible, cut roots approximately three inches back from new construction.
   e. Do not allow exposed roots to dry out before permanent backfill is placed; cover roots with earth or pack with peat moss and wrap with burlap.
   f. Water, keep moist, and temporarily support and protect roots from damage until permanently relocated and covered with backfill.

5. If existing grade around trees and shrubs is more than 12 inches below finish grade, construct retaining wall around tree and drainage system as indicated.

6. Existing trees may be removed and replanted or replaced with trees of similar size, shape, genus, and species if approved by Metro and local city and county agencies.
   a. Trees Indicated to Remain: Maintain, care for and protect as specified.

7. Lowering Grades: If existing grade within drip line of tree is above indicated finish grade, slope ground toward drip line, without abrupt change, to meet finish grade.
8. Raising Grades Less than Eight Inches: Within drip line, remove organic matter from surface, loosen surface soil, and evenly distribute 10-10-5 formula commercial fertilizer at rate of three pounds for each inch of tree trunk diameter.
   a. Place 18 inch wide ring of 3/4 inch broken stone or washed gravel around trunk to within three inches of finish grade.
   b. Cover stone or gravel with one-inch layer of straw, hay or inverted sod.
   c. Bring remainder of treated area to finish grade with topsoil.

9. Raising Grades Eight to 30 Inches: Within drip line, remove organic matter from surface, loosen surface soil and evenly distribute fertilizer at rate of three pounds for each inch of tree trunk diameter.
   a. Place 18 inch wide ring of 1-1/2 or two inch broken stone or washed gravel around trunk to within six inches of finish grade.
   b. Place agricultural tile upright approximately eight feet apart over area, beginning eight feet from trunk; set on broken stone (1 inch to 3 inches) and extend to surface flush with finish grade.
   c. Fill vertical tile with coarse aggregate and top with coarse sand.
   d. Fill remainder of treated area with coarse aggregate to within six inches of finish grade.
   e. Cover with one inch layer of straw, hay or inverted sod, and bring to finish grade with topsoil.

C. Water: Apply within drip line of shrubs and trees as required.

D. Repair limbs and trunks damaged by construction operations. Engage an experienced tree surgeon and conform to good arborist practice.

E. Trees and shrubs damaged beyond repair will be appraised by Metro.
   1. Remove damaged trees and shrubs and replace with same genus, species, variety and size, except that if tree having diameter greater than six inches has been damaged beyond repair, furnish and install new trees with diameter of six inches.
   2. If smaller trees replace larger trees, difference between value of tree destroyed and replacement will be computed in conformance with Guide for Establishing Values of Trees and Other Plants as published by International Society of Arboriculture, except that no allowance will be granted for cost of removal and replacement.
   3. Damages will be assessed in the amount equal to such difference. The smaller trees will be subject to acceptance by Metro or its designee.
   4. Plant replacement trees and shrubs as required by local authority having jurisdiction.

F. Street Trees:
2. Local authority having jurisdiction will inspect replacement street trees at nursery where purchased and when planted. Notify local authority having jurisdiction one week in advance of their inspection.

3. Local authority having jurisdiction will provide written approval of trees, following final inspection by local authority having jurisdiction on Street Tree Protection and correction of deficiencies.
   a. Replace trees that fail to survive or show signs of succumbing.

4. Provide maintenance of trees and shrubs for period of 24 months consisting of watering, replacement of stakes, and other activities necessary for trees to become established.

5. Replacement trees and shrubs will be adequately supported as directed by local authority having jurisdiction on Shrub and Tree Protection

3.04 MAINTENANCE PERIOD

   A. Maintain trees and shrubs until construction is complete and trees or shrubs have fully recovered from construction activities.

   B. In event that tree or shrub dies, replace tree or shrub with similar type and size as accepted by Metro and by local city or county agencies or authority having jurisdiction for such activity.

END OF SECTION 01 56 39
SECTION 01 57 13

TEMPORARY EROSION AND SEDIMENTATION CONTROLS

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Contractor using Best Management Practices (BMPs) in preparing, furnishing, installing, maintaining and removing temporary erosion and sedimentation controls.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures
B. Section 01 35 35: Water Pollution Control.
C. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)
D. Section 01 57 19: Temporary Environmental Control
E. Section 03 05 15: Portland Cement Concrete
F. Section 04 22 00: Concrete Unit Masonry
G. Section 06 10 00: Rough Carpentry

1.03 REFERENCES (Not Used)

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).

1.05 SUBMITTALS

A. Refer to Section 01 33 00 – Submittal Procedures, for submittal requirements and procedures.

B. Description and Working Drawings of BMPs for temporary erosion and sedimentation controls. Describe sequences and methods of installing controls. Indicate controls which will ensure storm water drainage from areas to be stripped or modified will not reach velocities that result in erosion of the soil and that storm water discharges are free of silt, trash and other contaminants. Discharges shall comply with requirements of Section 01 57 19 – Temporary Environmental Control and Section 01 35 35 Water Pollution
Control. Show final grading plan. Have proposed controls accepted by Metro or its
designee before starting earthwork operations. Secure grading permits before grading.

C. Manufacturer's product data.

D. Material Safety Data Sheets (MSDS): Manufacturer’s Material Safety Data Sheets for
each type of material used in work.

1.06 DEFINITIONS

A. BMPs for temporary erosion controls: Consist of temporary grading, grassing, mulching,
hydromulching, applying netting, watering and reseeding sloped surfaces, providing
berms at top of slopes, and providing interceptor ditches at ends of berms and at
locations which will eliminate or minimize erosion during construction, as indicated.

B. BMPs temporary sedimentation controls: Consist of contour grading, silt dams, traps,
barriers, sedimentation basins and other appurtenances.

PART 2 – PRODUCTS

2.01 EROSION CONTROL

A. Seed: Comply with California Food and Agricultural Code, and provide seed not less
than 98 percent pure and free from noxious weed seeds. Provide tested seed
acceptable to Metro or its designee before being sown. Seed, at time of sowing - From
previous or current year's harvest. Seed which has become wet, moldy, or otherwise
damaged will not be acceptable.

B. Provide Hulled Common Bermuda (cynodon dactylon) having germination rate not less
than 85 percent.

C. Mulch for Seeded Areas: Clean, seed-free hay or threshed straw.

D. Matting: Mesh matting, fabricated of unbleached, undyed and loose-twist jute yarn.

E. Matting Stakes: Fir, Southern Pine or Hemlock, not smaller than 1/2 inch square.

F. Hydromulch: Mulch and tackifier.

2.02 SEDIMENTATION CONTROL

A. Bales: Clean, seed-free cereal hay or grainstraw.

B. Matting: Mesh matting, fabricated of unbleached, undyed and loose-twist jute yarn.

C. Matting Stakes: Fir, Southern Pine or Hemlock, not smaller than 1/2 inch square.
D. Filter Stone: Crushed gravel stone graded such that 100 percent of material will pass one inch sieve and not more than five percent will pass 1/4 inch sieve.

E. Concrete Block: Hollow, loadbearing type, as specified in Section 04 22 00 – Concrete Unit Masonry.

F. Concrete: Class 2500, as specified in Section 03 05 15 – Portland Cement Concrete.

G. Plywood: One inch thick, exterior type, as specified in Section 06 10 00 – Rough Carpentry.

H. Silt Barriers: Floating or staked.

PART 3 – EXECUTION

3.01 EROSION CONTROL

A. Sow seed with mechanical seed drills or rotary hand seeders within 24 hours after ground has been scarified. If seeds have been sown with rotary hand seeders, lightly rake seeded areas. Roll and sprinkle seeded areas before spreading mulch. Sow seed at rate of 100 pounds per acre.

B. On slopes flatter than 3:1 spread mulch to loose thickness of 3/4 inch to 1 1/2 inches. Immediately after spreading, press mulch into soil with a disc harrow set straight.

C. Spread matting over mulched areas on slopes steeper than 3:1 horizontal to vertical.

D. Roll seeded areas parallel to contours, and water in a manner which will encourage sprouting. Rework areas exhibiting unsatisfactory growth. Reseed in conformance with seeding requirements specified above. Fill, compact and reseed eroded areas.

3.02 SEDIMENTATION CONTROL

A. Maintain silt dams, traps and barriers until no longer needed, subject to acceptance of Metro or its designee, and then remove controls. Remove hay bales which have deteriorated and filter stone which has become dislodged. Place new hay bales and new filter stone. Maintain retention ponds in condition to retain unfiltered water. Dispose of silt removed from ponds within Worksite where practical.

3.03 REMOVAL

A. Remove controls upon completion of portion of Contract for which controls were furnished.

END OF SECTION 01 57 13
SECTION 01 57 19

TEMPORARY ENVIRONMENTAL CONTROL

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Eliminating or minimizing air, soil and water pollution generated by construction activities.

B. Complying with legal requirements applicable to Construction Generated Hazardous Wastes, including preparation and implementation of Contractor generated Waste Management Plan and Storm Water Pollution Prevention Plan (SWPPP).

C. Designing and installing Water Treatment System.

D. Contractor shall operate and maintain the Water Treatment System in accordance with:
   1. The NPDES Permit
   2. LARWQCB Permit
   3. City of Los Angeles Bureau of Sanitation Industrial Wastewater Permit.
   4. Storm Water Pollution Prevention Plans (SWPPP)

E. Designating a qualified staff member as Pollution Control Representative.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures

B. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)

C. Section 01 50 00: Temporary Facilities and Controls

1.03 REFERENCES

A. Standard Specifications for Public Works Construction (SSPWC):
   1. Provide products for required Work in accordance with Standard Specifications for Public Works Construction (SSPWC) adopted by Board of Public Works of City of Los Angeles, and supplements that are adopted by the Board of Public Works of City of Los Angeles.

B. Metro has prepared an Environmental Impact Report/Environmental Impact Statement (EIR/EIS) in compliance with the California Environmental Quality Act (CEQA). Mitigation
measures from these documents are incorporated into these specifications where applicable.

C. Metro will have, by NTP, a NPDES Permit from the California Regional Water Quality Control Board (LARWQCB). The Permit application is provided in Section 3, BID/PROPOSAL Documents, Instructions to Bidders “INFORMATION AVAILABLE TO BIDDERS”.

D. South Coast Air Quality Management District (SCAQMD) rules and regulations.

E. Antelope Valley Air Quality Management District (AVAQMD), rules and regulations

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).

B. State of California Regional Water Quality Control Board Order No. 91-13-DWQ as amended by Order 92-12-DWQ.

1.05 SUBMITTALS

A. Refer to Section 01 33 00 – Submittal Procedures, for submittal requirements and procedures.

B. Contractor- Generated Hazardous Waste (CGHW) Management Plan: Required to be submitted within 30 days after the Notice to Proceed (NTP) with required documents.

C. Storm Water Pollution Prevention Plan (SWPPP): Required under the Clean Water Act and related federal and state laws and regulations required to be submitted within 30 days of the NTP. SWPPP shall be prepared in accordance with the NPDES permit.

D. Wastewater Management Plan: Required to be submitted within 30 days after the date of NTP. Submit monthly reports of daily monitoring wastewater discharges as specified in this section. A comprehensive Wastewater Management Plan submittal will include the following:

1. Projected discharges for approval by Metro or its designee.

2. Illustrate the location of contractor water treatment unit, and the location of Metro furnished water treatment system.

3. Depict layout of waste water transmission lines, associated pumps, valves, meters and utility supply and disposal systems.

4. Provide a list of equipment and its associated manufacturer’s specifications.

5. Provide Shop Drawings, in accordance with Section 01 33 00 – Submittal Procedures that detail the design, installation, operation, and maintenance of the Contractor water treatment unit in CADD drawings and the associated electronic files.

E. Sewer Connection and Location Drawings: Related to the Industrial Wastewater Permit to be submitted to the City of Los Angeles Bureau of Sanitation.
F. Storm Drain Connection and Location Drawings: Related to outfalls referenced in the NPDES permit application.

G. Fugitive Dust Emissions Control Plan: Required within 30 days after the NTP. Submit monthly reports of daily monitoring of fugitive dust emissions and control measures. Submittal of the Fugitive Dust Emissions Control Plan for Metro is independent of any SCAQMD requirement for a Fugitive Dust Emissions Control Plan under Rule 403 or other applicable Rule.

1.06 DEFINITIONS

A. Metro furnished Water Treatment System: Compilations of equipment that Metro will provide to treat Hydrocarbon contaminated groundwater.

B. Contractor Waste Water Treatment Unit: A compilation of equipment that the Contractor provides to treat wastewaters except hydrocarbon-contaminated groundwater.

C. Contractor-Generated Hazardous Waste: Hazardous Waste and Solid Waste generated, released or discharged by the Contractor or the Contractor’s agents or Subcontractors or their respective employees not related to hazardous waste and hazardous materials scope that is defined as part of the Project.

D. Contractor-Generated Hazardous Waste (CGHW) Management Plan: A written waste management plan properly governing CGHW prepared and implemented in accordance with Title 22, Division 4.5, California Code of Regulations, and other applicable laws and regulations.

E. Storm Water Pollution Prevention Plan (SWPPP): A written plan that details the requirements described herein related to management of storm water and storm water runoff during construction. The Plan will include mitigation measures related to storm water discharges as described in the NPDES Permit.

F. Additional Contaminated Groundwater treatment and Disposal: Contaminated groundwater to be treated and disposed of above capacity of Metro furnished Water Treatment System (s).

1.07 WORKSITE CONDITIONS

A. Treatment and disposal of contaminated groundwater flows beyond the capacity of the Metro furnished Treatment System will be compensated separately, for quantities over 600 gpm.

B. Contractor shall delegate environmental control, pollution monitoring and record keeping requirements to Contractor’s Safety Engineer, Contractor’s Environmental Manager, or most appropriate personnel.

PART 2 – PRODUCTS

2.01 PRODUCT FOR POLLUTION CONTROL
A. Provide products required for Work in accordance with Standard Specifications for Public Works Construction (SSPWC) and supplements adopted by board of Public Works of City of Los Angeles as modified by corresponding issue of Brown Book, and as indicated.

PART 3 – EXECUTION

3.01 AIR POLLUTION CONTROLS

A. Criteria for Fugitive Dust: Detailed descriptions and explanations of specific fugitive dust control measures are contained in South Coast Air Quality Management District (SCAQMD) Rules and Regulations (Rule 403, Limitation on Fugitive Dust Emissions; Rule 1186, PM10 Emissions from Paved and Unpaved Roads). Key features of Rule 403 are described below. The language of the most current version of Rule 403 and its Implementation Handbook governs unless indicated. Obtain permits or plans as required by the SCAQMD for air pollution controls. Prepare a Dust Control monitoring Plan that includes the following:

1. Designate a staff member as the Air Pollution Control representative, knowledgeable in environmental matters. The representative shall be responsible for ensuring compliance with the Fugitive Dust Emissions Control Plan, its preparation, submittal, implementation, monitoring, and record keeping.

2. Do not cause or allow emissions of fugitive dust from transport, handling, construction or storage activity to remain visible in atmosphere beyond property line of the emission source.

3. Take precautions to minimize fugitive dust emissions from operations involving demolition, excavation, grading, and clearing of land and disposal of solid waste. Utilize one or more of the applicable Best Available Control Measures (BACM) for each potential source of fugitive dust listed in Table 1 of Rule 403.

4. Do not cause or allow particulate matter to exceed 50 µg/m3 when determined as the difference between simultaneous upwind and downwind samples, collected on high volume particulate matter samplers or other EPA approved equivalent method, for PM-10 monitoring at the property line for a five hour period during the time of active operations. The decision to conduct sampling will be made and performed by the SCAQMD. Design-Builder is responsible for payment of the Ambient Air Analysis fees imposed by SCAQMD under Rule 304.1.

5. Prevent, or within one hour, remove the track-out of bulk material onto public paved roadways, as a result of Contractor’s operation, or utilize at least one of the control measures listed in Table 3 of Rule 403 and prevent the track-out of bulk material onto public paved roadways, and remove such material at any time track-out extends for more than 50 feet onto any paved public road, and remove all visible roadway dust tracked-out upon public paved roadways at the end of each Work day when active operations cease.

B. Use the following procedures and techniques at a minimum:
1. Trucks transporting soil, sand, other excavated, or backfill materials to or from the sites shall be covered with a tarpaulin from the point of origin to the point of unloading. Secure firm or remove loose tarpaulin material from such loads before leaving Worksite.

2. Remove visible roadway dust tracked-out upon public sidewalks at the conclusion of each shift. If necessary, water down and sweep streets around and near to the site that have heavy volumes of construction vehicles carrying debris and excavated materials, and adjacent sidewalks.

3. If conveyors are used, cover transfer points along conveyor system moving soil. Minimize drop height to the stockpile. Provide a sprinkler system and apply water to soils to retard dust development. This process does not include the slurry separation system (if used).

4. Install wheel/undercarriage-washing equipment, or a functional equivalent, at tunnel excavations as the first method by which to ensure that haul trucks have clean wheels and undercarriages before entering public roadways.

5. Incorporate adapted measures developed by SCAQMD on Best Available Control Measures (BACM) for Fugitive Dust and Rule 403 into the site operations for Fugitive Dust Control.

6. Water down construction sites according to SCAQMD Rule 403, as required to suppress dust, during grading, handling of excavation soil or debris, or during demolition.

7. Establish regular cycles and locations for cleaning trucks that haul soil from site.

C. Burning of wastes is prohibited. Remove scrap and waste material and dispose of in accordance with laws, codes, regulations, ordinances and permits.

D. Use construction equipment designed and equipped to prevent or control air pollution in conformance with most restrictive regulations of EPA, State and local authorities. Maintain evidence of such design and equipment and make available for inspection by Metro or its designee.

E. Establish and maintain records of a routine maintenance program for internal combustion engine powered vehicles and equipment used on Project. Keep records available for inspection by Metro or its designee.

F. Implement Fugitive Dust Measures listed in tables 1 and 2 of SCAQMD Rule 403 and perform record keeping in accordance with Sections (e)(1)(A)(iv) and (e)(1)(A)(v) of said rule. Make records available to Metro for inspection.

G. Apply Best Available Control Technology (BACT) method or use alternative forms of bentonite such as pellets, granules, or biodegradable gel. If bentonite is used in a powder form, implement measures to ensure that PM10 emissions do not exceed permissible levels. Additional measures may include:

1. Bulk Transport: transport bentonite by pneumatic means or enclosed trucks;
2. Enclosed Handling and Storage: unload bentonite pneumatically or by enclosed conveyors and chutes. Store bentonite in enclosed containers or silos with fabric filters.

3. Enclosed Slurry Batch Mixing: Use a mixer that is equipped with a pneumatic loader and a fabric filter or a mixer in an enclosed structure equipped with fabric filters at ventilation openings.

H. Criteria for VOC Contaminated Excavated Soils: Detailed descriptions and explanations of control measures are contained in SCAQMD Rule 1166. Contractor shall follow procedures outlined in Rule 1166, for Project specific permit application.

3.02 WATER POLLUTION CONTROLS

A. Metro has the sole right to determine, by its own discretion, whether the waste waters will be discharged to the sanitary sewer or the storm drain systems.

B. Connections and transport of waste waters shall be by closed conduit. If necessary, install and maintain pumps to deliver waste waters to their destination(s) described herein.

C. In accordance with Section 01 50 00 – Temporary Facilities and Controls, provide and maintain, for the duration of construction, temporary storm and sanitary sewer connection(s) in accordance with applicable requirements. Provide Metro with documentation that satisfies both the sanitary sewer and storm drain connection permits one month prior to connection installation.

D. Groundwater: Do not co-mingle groundwater that is produced from dewatering wells with other waste water stream. Test and treat as necessary any contaminated groundwater for all contaminant parameters in accordance with NPDES or LA City Industrial Wastewater Discharge permits. NPDES permit will require adherence to California Toxics Rule (CTR) discharge standards that will be the strictest among freshwater, saltwater, or human health for consumption (drinking water) limitations. NPDES treatment system will likely require equipment for treatment of dissolved metals, turbidity, chloride, sulfate and volatile organic compounds (VOCs) including MTDB. Transport groundwater, in the same manner as described elsewhere within this Section.

E. Metro Furnished Water Treatment System:

1. Metro will furnish two packaged waste water treatment plants suitable for removing hydrocarbon contaminates from groundwater, and technical support for a period not to exceed 120 hrs of time on site assisting with startup of Metro furnished water treatment systems. One treatment system is a skid-mounted unit with two Carbonaire Model PC-13 carbon vessels with a flow rate from 6-90 gallons per minute (gpm) for each vessel. The vessel capacity is 1500 pounds of carbon per vessel. The vessels will be transported to the site empty. The second treatment system includes two US Filter/Westate Model HP-20 carbon vessels, configured for series or parallel operation. Each vessel can contain 20,000 pounds of carbon. This system also has two bag filter housings for 10 micron bag filters configured in parallel. The filters are capable of 750 gpm each. In series the second treatment
system carbon vessels have a maximum capacity of 900 gpm. The filter and carbon vessels will be transported to the site empty.

2. Determine whether additional equipment is required for removal of contaminants other than hydrocarbons and any other treatment required for discharge into storm and sanitary sewers. Metro anticipates additional equipment for NPDES discharges will include a chemical addition and mixing tank, a chemical addition system for oxidizing agents and coagulations, a flocculation tank, a settling tank, a pH control system, an oil/water separator, and discharge flow meters to handle flow rates up to 1000 gallons per minute. Provide, operate, maintain and turnover such other equipment, treatment systems of methods as indicated in Section 01 50 00 – Temporary Facilities and Control.

3. Be solely responsible for installation, operation, and maintenance of Metro Furnished water treatment plant including personnel, power, water, replacement chemicals, carbon filter media, and other components consumed in operation and maintenance of the treatment plants.

F. Contractor Testing Requirements: At the frequency required by permit, sample and test effluent quality for those parameters of Contractor’s responsibility. Perform analyses on a one-day turn around (24-hour TAT). Record and log daily discharged quantities. Submit certified monthly reports no later than seven days after the end of each month detailing the daily flows and the testing results. Itemize discharges based on source such as groundwater extracted, construction process water, and storm water.

G. Contractor Noncompliance: Bear fines incurred as a direct result of Contractor’s failure to treat parameters that Contractor is responsible for.

H. Contractor has the option to haul and dispose of wastewaters at a disposal facility at Contractor’s expense.

I. Do not discharge pollutant wastes such as chemicals, fuels, lubricants, bitumens, raw sewage and other harmful wastes onto the land nor into or alongside rivers, streams and impoundments, nor into gutters, storm drains or channels leading thereto.

J. Control use of lubricating oils, hydraulic fluids, greases and other such products. Promptly clean up and properly dispose of materials contaminated by spillage or leakage of such products. Comply with storage and containment requirements of these materials in accordance with California Storm Water Permit Regulations.

3.03 STORMWATER POLLUTION PREVENTION PLAN

A. It is anticipated that Contractor will generate two water streams during construction: stormwater and construction wastewater (resulting from truck was-downs, construction activities, etc.) Contractor has the option of adopting a zero discharge option (meaning all water will be collected and hauled off-site), discharging only stormwater, or discharging both waste streams in accordance with applicable permits. Each choice has set of restrictions and requirements.

B. Zero Discharge Option: Contractor shall not discharge any wastewater on site. All wastewaters must be hauled offsite for disposal.
C. Stormwater Discharge Option: Contractor will not be allowed to discharge construction wastewater (other than stormwater) from the site if Contractor chooses to file a Notice of Intent (NOI) with the State Water Resources Control board to comply with the terms of the General Permit to Discharge Stormwater associated with construction activity. If Contractor chooses to file a NOI, Contractor must collect truck wash downs and general construction wastewater (other than stormwater and dispose of it off-site. The NOI requires the Contractor to prepare a Stormwater Pollution Prevention Plan and submit it to the State Water Resources Control Board, and submit a Notice of Termination when construction is complete.

D. All Wastewaters: If Contractor elects this option, Contractor shall notify Metro of its intent immediately. Contractor may discharge truck wash-down and other construction generated wastewater (in addition to stormwater) if Contractor complies with the remaining requirements of this Subsection.

1. Discharges to the sanitary sewer will require a Discharge Permit from the City of Los Angeles Bureau of Sanitation. The Contractor must obtain and comply with all terms and conditions of the permit, including discharge limitations. The sewer permit may contain a total discharge limitation between 100,000 and 150,000 gallons per day, and may contain hour restrictions for water discharges.

2. No discharges other than stormwater may be discharged into the storm drain, unless Contractor obtains an applicable NPDES permit from the Los Angeles Regional Water Quality Control Board. Contractor is responsible for obtaining NPDES permit if desired. If used, Contractor must comply with all terms and conditions of their NPDES permit. Discharges to the storm drain must be in compliance with the NPDES permit.

3. Submit a fully detailed waste-water management plan for Project discharges for approval by Metro.

4. Prepare and submit a Storm Water Pollution Prevention plan in accordance with paragraph 1.3.B.

5. All connections and transport of waste waters shall be by closed conduit. If necessary install and maintain pumps to deliver waste-waters to their destination(s) described herein. All connections may be made only on Metro or City of Los Angeles properties/rights -of-way.

6. Metro will determine water quality by sampling and analysis.

3.04 HAZARDOUS WASTE CONTROLS

A. This Section applies to Contractor -Generated Hazardous Waste (CGHW).

B. Contractor-Generated Hazardous Waste Management Plan: Prepare and implement a CGHW Plan in accordance with Title 22, Division 4.5, CCR, and applicable laws and regulations. Metro has the right to enforce Quality Assurance/Quality Control monitoring on Contractor's implementation of CGHW Plan.

C. Waste Generation: Be responsible for, and indemnify, defend and hold Metro harmless against any and all costs (including attorney’s fees and costs), demands, claims, damages, losses, delay costs (“Claims”) arising from or associated with the
management, abatement, removal, remediation, clean up, transport, reuse, recycling, storage and disposal of any and all Contractor-Generated Hazardous Waste; or any noncompliance with the Contractor-Generated waste Management Plan.

D. Waste Classification - In the event that Contractor or Metro reasonably suspects that Contractor has generated, released or discharged Contractor-Generated Hazardous Waste, bear costs of sampling and monitoring tests and other investigations to determine whether said waste is Solid Waste or Hazardous Waste in Accordance with federal, state and local requirements, including without limitation, RCRA and Title 22, CCR Chapter 30, Article II (as amended, modified or replaced from time to time). Metro reserves the right (but not the obligation) to perform its own physical and chemical analyses and tests on suspected CGHW. Furnish samples and test results, at Contractor's cost, as directed by Metro or its designee.

E. Disposal Regulations: Be responsible for the management, abatement, removal, remediation, clean up, loading, transport, unloading, reuse, recycling, storage and disposal of CGHW in accordance with laws, rules, regulations and orders, including without limitation, Title 22, Chapter 30 et seq California Code of Regulations, California Health and Safety Code Section 25100 et. seq, Titles 23 and 26, California Code of Regulations, and regulations of the waste disposal facility to be used.

F. Haul Routes: Haul routes for transporting solid or hazardous wastes are subject to the approval of City of Los Angeles, or other agency having jurisdiction over the transportation of such materials. Post copy of Haul route permit at Worksite. Sweep access points and surrounding areas as needed, no less than 3 times daily.

G. Street Sweeping: Have available, on site, at all times an operable standard size street sweeper capable of operating efficiently within the traffic conditions, and that complies with all applicable environmental standards. All public streets, including but not limited to private driveways and parking areas, impacted by construction vehicle traffic and construction activities, shall be kept clean of all track-out debris and dust build up at all times. Contractor shall monitor all areas, on a continuous basis, that are affected by the work or haul activities and take immediate action to correct any deficiencies. This shall include but not be limited to monitoring and cleaning, as required by Metro, City of Los Angeles, and any other agencies, in and around all staging sites, work areas, and haul routes.

END OF SECTION 01 57 19
PART 1 – GENERAL

1.01 SECTION INCLUDES

Design, design coordination, fabrication and installation of permanent and temporary signs and wayfinding elements for the Project. Metro’s Signage Standards are the result of continual analysis and evaluation by Metro Creative Services, within the Metro Communications Department, for the purpose of providing a safe, clear, uniform, and consistent aid for users of the Metro system. Customer wayfinding to Metro stations and facilities is further reinforced by a consistent system of architectural design and amenities.

Basic goals include:

A. To guide customers through the system in the most efficient, clear and least complicated manner.

B. To provide a safe trip for customers, warn of potential system hazards and direct to safe exiting in case of emergency.

C. To provide orientation and information required by customers to navigate the system at all key decision-making points.

D. To provide signage that is uniform and consistent to support Metro’s identity as a well-integrated transit system.

E. To avoid visual clutter, that is operationally inefficient, confusing to users, and the result of inconsistently applied and poorly planned signage and wayfinding.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures

B. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)

C. Section 06 10 00: Rough Carpentry

D. Section 09 91 00: Painting

1.03 REFERENCES

A. Metro Rail Design Criteria

B. Metro Signage Standards
1.04 QUALITY ASSURANCE
   A. Comply with Project Quality Program Requirements (see 1.02 above).

1.05 SUBMITTALS
   A. Refer to Sections 01 33 00 – Submittal Procedures, for submittal requirements and procedures.
   B. Product Data: Manufacturer’s product data on paint and related materials.
   C. Shop Drawings: Showing layout of required information for conformance with formats at end of this Section, for review and approval by Metro or its designee.
   D. Material Safety Data Sheets (MSDS): Manufacturer’s Material Safety Data Sheets for each type of material used in Work.
   E. The components of a typical signage package submittal to Metro shall include, but are not limited to:
      1. Outline/Illustration/Index of Sign Types
      2. Sign Location Plan
      3. Sign Message Schedule
      4. Sign Layout with specifications including
         a. Dimensions,
         b. Elevations
         c. Typeface(s),
         d. Color(s),
         e. Material(s),
         f. Attachment details, and
         g. Other special requirements.
      5. Signage narrative to convey design intent

1.06 DEFINITIONS (Not Used)

PART 2 – PRODUCTS (Not Used)
PART 3 – EXECUTION

3.01 METRO SIGNAGE STANDARDS

A. Signage and graphics shall fully conform, in design intent, materials, and finishes, to the most current version of the Metro Signage Standards manual as developed by Metro Creative Services in the Metro Communications Department.

B. Contractor shall refer to the Metro Rail Design Criteria and Metro Architectural Standard Drawings.

C. Signage, wayfinding and graphic elements shall be considered as “Elements of Continuity” as noted in Section 6.1 of the Metro Rail Design Criteria.

D. The Metro Signage Standards manual shall be used as the primary reference to convey signage design intent and a specific, comprehensive signage and wayfinding solution for the Project.

E. It is not the objective of the Metro Signage Standards to be utilized to determine a literal count of signs, sign types or sign locations.

F. Effective signage and wayfinding shall be integrated into the exterior and interior design of all stations, public and non-public facilities, parking lots/garages and other structures provided as part of the Metro Rail system.

G. Signage and wayfinding elements specific to the Project may include but are not limited to:

1. Pylons,
2. Monument signs,
3. Identification signs,
4. Wayfinding/directional signs,
5. Ornamental Metro-branding identity graphics and/or patterns,
6. Orientation maps,
7. Information kiosks,
8. Digital LED/LCD panels,
9. Pavement markings,
10. Regulatory and safety signs,
11. Emergency signs,
12. MUTCD signs, and
13. State/Fire/ADA code-required signs as described in the latest edition of the
   a. California Building Code,
   b. California Fire Code,
   c. Los Angeles City and County Fire Code,
   d. Federal ADA Standards,
   e. California State CalDAG, and

H. As approved by the ADA Officer, Metro Civil Rights Program.

3.02 CONTRACTOR ROLES AND RESPONSIBILITIES

A. Engage a professional environmental graphic design firm with proven expertise in
   transit signage and wayfinding to provide design services for all new corridor
   Projects, including new facilities or refurbishments to the existing transit system or
   facilities. These services shall comply with the design intent of the Metro Signage
   Standards.

B. Research and develop signage and wayfinding requirements at the initial stages of
   the Project to efficiently and fully address the operational and customer signage
   needs of the Project.

C. Provide designs, fabrication and installation attachment details as required for a
   Metro approved, user-oriented, signage system for the Project.

D. Allow for the variables of architectural and engineering configurations and site
   conditions associated with the individual stations or other facility types for the
   particular Project.

E. Inform Metro of any deviations, alterations or modifications to the Metro Rail Design
   Criteria that may have an impact on signage and wayfinding.

F. Provide signage design submittals, as noted in 1.05 Submittals in this Section, for
   Metro reviews and approvals, including fabrication shop drawings and material
   samples and resolve punch lists items.

G. Coordinate with Metro representatives and participate in meetings as required to plan
   the design, design coordination, fabrication and installation of all Project signage and
   wayfinding.

3.03 GENERAL REQUIREMENTS

A. Design and location of signs and graphics shall be uniform throughout the Project and
   shall be consistent with the design intent of the most recent Metro Signage Standards:
B. Locations, materials, and installations shall be in keeping with the design intent established by the Metro Signage Standards manual.

C. Messages, layouts, and graphics shall be simple, clear, and concise.

D. Signage shall occur at key decisions points and at intervals frequent enough to allow clarity of information and usage.

E. International signs and symbols shall be incorporated and utilized consistently throughout the Project.

F. Signage shall be of durable materials that are easily maintained, and protected by anti-graffiti coating, per Metro Signage Standards manual.

G. Critical signs, such as signs directing passengers to normal and emergency exits, shall have precedence over other signage. This priority may be indicated by differences in size, color, or location.

H. Some critical signs, such as regulatory and emergency information, shall provide messages in both English and Spanish and as directed by Metro Civil Rights Program.

I. Signage shall take precedence over public artwork and advertising with regard to location and prominence.

J. Artwork, landscape, traffic control devices, lighting, etc., and other operational and architectural elements shall be coordinated with signage and wayfinding to avoid sight line and constructability conflicts.

K. All tactile/Braille signs shall be fabricated by Visual Marking Systems, Inc. (VMS), or approved equal, as directed and approved by the Metro Civil Rights Program.

L. The design and provision of electrical power, where required, shall be the responsibility of the Contractor, unless specifically noted otherwise.

M. The Contractor, together with their professional environmental graphics signage contractor, shall meet with Metro Creative Services representative or designee, at the initial stage of Project design, and prior to any signage-related design submittal, to discuss the Project scope of work.

N. Metro Creative Services representative, or designee, shall review and approve all signage-related fabrication shop drawings, specifications, material and finish samples, or mock-ups prior to any signage fabrication.

O. Metro Creative Services representative, or designee, shall review the signage installation at the Project site once the Project reaches Substantial Completion, and throughout Final Completion and acceptance by Metro in coordination with the Metro Project Team.

P. The Contractor shall provide Metro Creative Services representative, or designee, with comprehensive digital files to record and archive the work, as a baseline for maintenance and for future repairs and replacement of the work.
END OF SECTION 01 58 13
PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Providing storage and protection of equipment, materials, products and supplies to be incorporated into construction; indicating such storage areas on Working Drawings, product packaging and handling; product transportation and delivery; and product Material Safety Data Sheets (MSDS).

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures

B. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)

C. Section 01 78 23: Operation and Maintenance Data

D. Section 01 78 43: Spare Parts and Replacement Materials

1.03 REFERENCES

A. California Air Resource Board (CARB) for determining permissible contents of volatile organic compounds (VOC) that can be stored at Worksite.

B. South Coast Air Quality Management District (SCAQMD):
   1. Rule 102 – Definition of Terms
   2. Rule 1113 – Architectural Coatings
   3. Rule 1168 – Adhesive and Sealant Applications

C. Environmental Protection Agency (EPA) – for applicable regulations.

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).

B. Materials, equipment, appliances, fixtures, and fabricated assemblies to be incorporated in the Work shall be new, except as may be indicated or specified otherwise in the Contract Documents.
C. Materials, equipment, assemblies, and systems shall be manufactured, fabricated, handled, and incorporated into the Work so as to ensure completed Work meeting the Contract requirements.

1.05 SUBMITTALS

A. Refer to Section 01 33 00 – Submittal Procedures, for submittal requirements and procedures.

B. Working Drawings: Show locations of storage areas not indicated on Contract Drawings. Do not locate storage areas in dedicated streets, within drip line of shrubs and trees indicated to remain, in pedestrian ways, or on private property without approval of property owner

C. Procedures to evaluate and implement storage and handling requirements and ensure that materials are stored accordingly.

D. Material Safety Data Sheets (MSDS): Manufacturer’s Material Safety Data Sheets for each material used in Work.

1.06 DEFINITIONS

A. VOC: Volatile Organic Compound, as defined in SCAQMD Rule 102 – Definition of Terms:
   1. Any volatile compound of carbon, excluding methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonate, and exempt compounds.

B. SCAQMD: South Coast Air Quality Management District

PART 2 - PRODUCTS

2.01 MATERIALS

A. Materials required for storage and protection of items specified: Durable, weatherproof, and painted to present appearance acceptable to Metro or its designee.

PART 3 – EXECUTION

3.01 PACKAGING AND HANDLING

A. Protect items during transport and handling.
   1. Include lifting or handling provisions to facilitate Worksite unloading and handling.

B. Protect projecting parts from damage and preclude personnel safety hazards.

C. Provide Packaging to protect against adverse environmental conditions.
D. Small parts shall be packaged in containers such as boxes, crates, or barrels to avoid dispersal and loss.
   1. Firmly secure an itemized list and description of contents to each such container.

3.02 TRANSPORTATION AND DELIVERY

A. Deliver materials in undamaged condition, in manufacturer’s original containers or packaging (where applicable), with identifying labels intact and legible.

B. Deliver cement, prepared dry mortar mixes, grouting material, plaster, and coloring material in original, unopened and sealed containers, bearing the brand and manufacturer’s name.

C. Refer also to the individual Specifications Sections for detailed requirements as applicable.

D. Perform receiving inspection of materials to ensure correct quantities, proper documentation and undamaged condition.

3.03 STORAGE

A. Confine operations, including storage of materials, to areas authorized or accepted by Metro or its designee.

B. Temporary buildings such as storage sheds, shops and offices, may be erected by Contractor only with acceptance of Metro or its designee; construct with labor and materials furnished by Contractor without additional expense to Metro.
   1. Temporary buildings and utilities will remain property of Contractor; and that must be removed upon completion of Work. With written consent of Metro, such buildings and utilities may be abandoned and need not be removed.

C. Palletize materials, products and supplies to be incorporated into construction; store off the ground, in areas indicated as storage areas on Contract Drawings and on accepted Working Drawings.

D. Store items in manner to prevent damage and facilitate inspection. Leave seals, tags and labels intact and legible. Maintain access to products to allow inspection. Protect products which would be affected by adverse environmental conditions.

E. Store items in manner to prevent damage to Metro's property.

F. Replace materials damaged or lost during storage with acceptable materials. Damaged materials may be repaired for use in this Contract only when specifically allowed by Metro or its designee.
   1. Document damage and resolution of issue on Noncomformance Report in accordance with requirements of Section 01 43 10 – Project Quality Program Requirements - Design/Build, or Section 01 43 20 – Project Quality Program Requirements - Design/Bid/Build.
G. Do not stack lumber higher than eight feet in unsecured areas. Conform to Cal/OSHA requirements. Periodically inspect stored products to ensure products are stored as specified and are free from damage and deterioration. Do not remove items from storage until they are to be incorporated into Work.

H. Do not stack materials for incorporation into Work or for methods and means of construction higher than five feet when using city streets, sidewalks or decking as temporary storage area.
   1. Keep access to fire alarms and hydrants clear. Do not temporarily store materials within 15 feet of fire alarm and hydrant facilities.

I. Store Owner Furnished Equipment in the same manner as Contractor supplied equipment.

J. Implement provisions for installed storage of equipment as required, such as rotating motors, humidity control in cabinets, and like items.

K. Follow manufacturer’s instructions for material storage to the extent it is practical.

L. Preserve tags, labels, shipping documents, and like items, that are necessary to maintain traceability of the materials.

M. Establish a controlled distribution process to release materials for construction and maintain an accurate inventory.

3.04 BOND OR HOLDING AREA

A. Provide secure bond or holding area for non-conforming material awaiting disposition, in accordance with Section 01 43 10 – Project Quality Program Requirements - Design/Build, or Section 01 43 20 – Project Quality Program Requirements - Design/Bid/Build.

3.05 MATERIAL SAFETY DATA SHEETS (MSDS)

A. Furnish MSDS for materials to be incorporated in Work.
   1. Provide one or more file drawers in Contractor’s field office (or other acceptable location) for filing of MSDS.
   2. File MSDS in accordance with Specification Section numbers, and make readily available to Metro or its designee; jurisdictional inspection authorities; and personnel engaged in Work.

B. Post MSDS for material that are flammable or otherwise hazardous on bulletin board provided for this specific purpose.
   1. Locate bulletin board at Worksite, sheltered from rain and wind and readily accessible to personnel engaged in Work.

**END OF SECTION 01 66 00**
SECTION 01 71 13

MOBILIZATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Preparatory Work and operations, including those necessary for payment of bonds, movement of personnel, equipment, supplies, and incidentals, to Contract Site; for establishment of offices, buildings and other facilities for Work on Contract; for other Work and operations which must be performed or costs incurred before beginning Work on various Contract items on Contract Site. Demobilization-Construction shall be a separate item to be paid upon completion of Work. The Work of Mobilization for Design shall be a separate item. Design Mobilization may occur at a location different than the Project Site and Metro or its designee shall have the right to approve the Scope of the Design Mobilization.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures

B. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)

C. Section 01 66 00: Product Storage and Handling Requirements

1.03 REFERENCES (Not Used)

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).

B. Metro or its designee has right to reject design/construction tools, equipment, materials and supplies which are, in its opinion, unsafe, improper or inadequate. Bring rejected design/construction tools, equipment, materials and supplies to an acceptable condition or remove them from Worksite.

1.05 SUBMITTALS

A. Refer to Section 01 33 00 - Submittal Procedures, for submittal requirements and procedures.

B. Layout of construction site including fences and gates, access roads, parking, buildings and storage areas at least seven days prior to the start of construction.
C. Certificates of Compliance for products specified in Part 2 - Products before delivery.

1.06 DEFINITIONS (Not Used)

1.07 DELIVERY, STORAGE, AND HANDLING

A. Refer to Section 01 66 00 - Product Storage and Handling Requirements, for general requirements for product delivery, storage, and handling procedures.

B. Deliver to Worksite construction tools, equipment, materials and supplies in conformance with local governing regulations.

PART 2 - PRODUCTS

2.01 DESIGN/CONSTRUCTION TOOLS

A. Provide Design/Construction Tools, equipment, materials and supplies of types and quantities, which will facilitate timely execution of Work and conform to California Code of Regulations and Los Angeles City/County Codes.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Provide personnel, products, design/construction materials, equipment, tools and supplies at Worksite and design location at time they are scheduled to be installed or utilized.

3.02 PLANT LOCATION

A. Locate plant, or plants, appropriately close to portion of Work for which it will be used.

3.03 DEMOBILIZATION

A. Upon completion of Work, remove construction tools, apparatus, equipment, unused materials and supplies, plant and personnel from Worksite. No compensation will be paid for design demobilization.

END OF SECTION 01 71 13
SECTION 01 71 24

PRECONSTRUCTION SURVEYS

PART 1— GENERAL

1.01 SECTION INCLUDES

A. Responsibility of Contractor for all damage that may be caused to existing facilities along the corridor, including access roads and truck routes to and from the Project construction site, due to Contractor activities.

B. Prepare preconstruction surveys required for documenting the existing conditions of the Worksite prior to commencement of the Work, including surveys of all structures, landscaping and other facilities within the Project's right-of-way and all those structures, landscaping and facilities adjacent to the Project's right-of-way which may be impacted by the construction operations required for this Contract.

C. Perform pre-construction surveys before beginning any Work on the Worksite that could alter the existing conditions. The Contractor shall determine which facilities and landscaping may be impacted during construction, and these facilities and landscaping shall then be surveyed and photographed. All cracks, damage, and evidence of settlement shall be documented, measured, and photographed. The results of the survey shall be documented in an organized, formal, bound, Preconstruction Survey Report, which shall also include mitigation proposals for all such potentially impacted structures and facilities required to be preserved or restored.

D. Perform post-construction surveys as specified.

1.02 RELATED SECTIONS

A. Section 01 32 33: Photographic Documentation
B. Section 01 35 35: Water Pollution Control
C. Section 01 50 00: Temporary Facilities and Controls
D. Section 01 71 13: Mobilization
E. Section 31 23 19: Dewatering
F. Section 31 50 00: Excavation Support Systems
G. Section 32 80 00: Irrigation System
H. Section 32 93 23: Landscape Planting

1.04 QUALITY ASSURANCE (Not Used)
1.07 REQUIREMENTS

A. Conduct preconstruction and post-construction pavement surveys. Perform surveys in accordance with all jurisdictional Agencies standards for pavement surveys using mobile deflection measuring instruments. Make video recordings of the areas to be surveyed and submit to Metro for approval. Refer to Sections 01 32 33 – Photographic Documentation, and 01 50 00 – Temporary Facilities and Controls, for additional requirements.

B. Conduct preconstruction landscape surveys and document the existing landscape conditions. Provide adequate information surveys on the existing conditions to enable preservation of existing trees, replacement of vegetation damaged or removed during construction activities, and repair or replacement of landscape sprinkler systems damaged during construction.

C. Before beginning construction, prepare a Storm Water Pollution Prevention Plan (SWPPP) in accordance with requirements of Section 01 35 35 – Water Pollution Control. Include the requirement in Plan to establish an erosion and sediment monitoring plan that will enable determination of the effects of construction on adjacent streets, utilities, structures, and wetlands. Include written and photographic records.

D. Perform preconstruction surveys of existing structures and facilities located above or adjacent to new construction that may be affected by the Work. Include photographs, maps, plans, written descriptions and surveyed foundation levels as necessary to document preconstruction conditions. Refer to Sections 31 23 19 – Dewatering, and 31 50 00 – Excavation Support Systems, for further requirements.

PART 2 — PRODUCTS (Not Used)

PART 3 — EXECUTION (Not Used)

END OF SECTION 01 71 24
SECTION 01 71 43

PERMITS, LICENSES, AND AGREEMENTS

1.01 SECTION INCLUDES

A. Procedures for obtaining permits and licenses, and information regarding Metro agreements in connection with the Work.
   1. Obtain permits and licenses not indicated in the Contract documents as being obtained by Metro, and pay fees, penalties, and fines associated with its Work under permits and licenses, including modifications to Metro obtained permits.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures
B. Section 01 31 31: Utility Coordination
C. Section 01 35 35: Water Pollution Control
D. Section 01 35 43: Environmental Procedures for Hazardous Materials
E. Section 01 50 00: Temporary Facilities and Controls

1.03 REFERENCES (Not Used)

1.04 QUALITY ASSURANCE (Not Used)

1.05 SUBMITTALS

A. Comply with Section 01 33 00 – Submittal Procedures, for submittal requirements and procedures.

1.06 DEFINITIONS (Not Used)

1.07 PERMITS, LICENSES, AND AGREEMENTS

A. Permit Modifications: Should modification to Metro obtained permit be requested by Contractor to accommodate the Contractor's design or construction methods, provide Metro with draft revisions of permit.
   1. Metro does not represent that such modifications will be accepted by permit-issuing authority nor shall Contractor have basis for claim due to failure of permit issuing authority to accept the Contractor's requested version.
   2. Allow at least 30 Days from time of submittal of proposed modification to receive approval or disapproval by Metro. Approval or disapproval by other agencies having
Permits, Licenses, and Agreements

1.08 METRO OBTAINED PERMITS AND APPROVALS

A. Metro has, or will obtain, permits listed in Table 1 below.

B. Permits not specifically listed below, and required for the Project but yet are not exempt per Special Permitting Process (“SPP”) as hereby attached, shall be obtained by the Contractor.

C. Contractor shall support Metro in obtaining all permits as noted below.

<table>
<thead>
<tr>
<th>Agency</th>
<th>Project Element</th>
<th>Type of Alignment</th>
<th>Responsibility</th>
<th>Specified Section</th>
<th>Remark</th>
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1.09 CONTRACTOR OBTAINED PERMITS AND FEES

A. Types of permits and fees that shall be obtained by the Contractor include, but are not limited to, the following:

1. City Encroachment Permits
2. Traffic Control Permit from appropriate City where Work occurs.
3. Tree Removals of heritage trees located on City Property, including permitting requirements: Conform to appropriate City where tree removal is to occur. Heritage trees are uniquely defined by each City.
5. Permits from local/regional/state water districts/agencies and from municipalities for drilling, well installation or removal, modifications to drainage facilities, potholing,
lane closures, street closures, SUSMP, SWPPP, temporary and permanent discharges to storm drains/sanitary systems, bypasses, and any other Work within jurisdiction of those entities.

6. Temporary Wastewater Discharge Permit from local Water Pollution Control Plant for discharges due to dewatering operations, or other construction activities in accordance with Section 01 35 43 – Environmental Procedures for Hazardous Materials. Contractor is responsible for fees associated with the Temporary Wastewater Discharge Permit.

7. State Department of Industrial Safety, Safety Permit(s) for escalators and elevators.

B. California Department of Transportation (Caltrans) will require site specific encroachment permits and encroachment permit riders for Contractor’s entry and Work on State property.

1.10 UTILITY IMPACTS

A. Metro may enter into utility relocation agreements with certain Utility Owners whose facilities are affected by Work. Relocation of such utilities, as identified on the plans and within the contract documents, will be performed by Utility Owners prior to Contractor’s scheduled commencement of construction in the vicinity of utilities. Refer to Section 01 31 31 – Utility Coordination, for requirements for coordinating with Utility Owners.

B. Design Drawings and Specifications indicate relocation Work to be performed by others, abandoned utilities to be removed by Contractor, utilities to be relocated by Contractor, utilities to be supported and/or protected in place, and Work to be coordinated by Contractor with Utility Owners.

1. Be responsible for protection of existing utilities, per an acceptable method by that Utility, during Work in vicinity of known and unknown existing utilities.

1.11 RIGHT-OF-WAY

A. Metro will make available Temporary Construction Easements and Construction Staging Areas to Contractor as shown on Design Drawings or as shown elsewhere in Contract documents.

1. Additional right-of-way or construction easements desired by Contractor for its convenience shall be pursued by Contractor at its sole expense. If Metro obtains any such right-of-way or easement at Contractor’s request, Contractor shall reimburse Metro for the cost.

2. Contractor is alerted to potential need for additional environmental clearance for access to or use of properties not already identified for proposed use in Contract Documents.

3. Contractor will be solely responsible for delays or other impacts to Project Work related to requests for additional right-of-way or construction easements.

PART 2 – PRODUCTS (Not Used)
PART 3 – EXECUTION (Not Used)

END OF SECTION 01 71 43
PART 1 – GENERAL

1.01 SECTION INCLUDES

A. General requirements for provision of new utility services including the following:
   1. New power distribution services from the local service providers; e.g. Southern California Edison and Los Angeles Department of Water and Power.
   2. New public and private telephone services from Metro selected service provider such as AT&T, Verizon or others.
   3. New water services from local Water Company
   4. New gas services from local Gas Company
   5. New cable services from local Metro selected Cable Company
   6. New sewage services from local Municipal Services

B. Contractor is responsibilities for coordination with service provider for high-voltage power services needed for traction and facility power.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures
B. Section 33 71 00: Underground Electrical Distribution System and Structures

1.03 REFERENCES

A. Design, install, inspect, and test new utility services in accordance with applicable requirements as specified by the local electric and telephone service providers, and water and sewage agencies in their respective service requirements manuals.

1.04 QUALITY ASSURANCE

A. Comply with Project Quality program Requirements (see 1.02 above).

1.05 SUBMITTALS

A. Refer to Section 01 33 00 – Submittal Procedures, for submittal requirements and procedures.

B. Submit necessary design documentation to the local utility service providers for review and approval. Provide copy of documentation to Metro or its designee.
C. Formal utility approval of service connection plans at service locations is required before proceeding with equipment, structure fabrication, and installation activities.

1.06 DEFINITIONS (Not Used)

1.07 NEW POWER SERVICES – TRANSMISSION

A. General:
   1. Southern California Edison service provider will provide high-voltage, three phase, 60 Hz service to the high voltage substations. Metro will apply for high-voltage services either from Southern California Edison or Los Angeles Department of Water and Power, and have Metro assigned to be authorized representative for coordination with the Service Provider related to the high-voltage electrical services.
   2. Contractor is responsible for providing all interfacing facilities in conformance with service provider requirements and coordinating with Service Provider through Metro.
   3. Conform to the coordination needed by the Service Provider’s requirements and Contract Documents.
   4. Metro will pay service connection fees and power consumption costs for permanent services upon Revenue Operation. All temporary services shall be paid by Contractor.

B. Coordination:
   1. Coordinate through Metro Representative utility requirements with Service Provider, ensuring that design and construction requirements conform to Service Provider requirements relating to high voltage substations equipment and supporting structures provided under this Contract.
   2. Obtain technical data, such as fault levels, relaying protection, grounding requirements, and related requirements, from Service Provider through written requests to Metro representative, as needed.

C. Additional Contractor Responsibilities for the High-Voltage Power Service:
   1. Obtain necessary permits for Contractor's Work associated with new power services from Service Provider and local authorities having jurisdiction.
   2. Complete final design of power services between designated point of connections to the Service Provider transmission network and high voltage substations.
   3. Furnish and install interfacing equipment, underground ductbanks, grounding wires, supporting structures, equipment pads, and other requirements for the Service Provider supplied equipment at high voltage substations.
   4. Furnish and install exposed and underground conduit system, junction boxes, grounding wires, and safety disconnect switches associated with metering current transformers (CT) and potential transformers (PT).
      a. Low-voltage wirings and terminations between metering equipment and metering enclosures will be by utility company.
   5. Install utility's combined metering combined CT, PT, metering enclosures and
hardware in metering enclosure that are not supplied and installed by electric utility company.

6. Coordinate interfaces with service provider through Metro representative.
   a. Provide support personnel on-site during connection, at meetings and installation Work by the Service Provider.

7. Ensure furnished high voltage substations switching equipment and protective relaying meet the Service Provider’s requirements and those of this Contract. Notify Metro or its designee should there be a conflict.

8. Schedule inspections with Service Provider through Metro and local authorities having jurisdiction, where applicable.

9. Provide service providers allowable time within Contractor’s schedule to successfully install all necessary Work for Service needs.

1.08 NEW POWER SERVICES – DISTRIBUTION

A. General:
   1. Electric Utility Company will provide 480 V, 3 phase, 60 Hz distribution services to facilities constructed under this Contract. Typically Electric Utility Company will provide 12 kV/480 V or 21 kV/480 V transformers and related equipment on or near Metro Worksite receiving 480 V service.
   
   2. Contractor is responsible for providing interfacing facilities in conformance with Electric Utility Company requirements and coordinating with Electric Utility Company to provide new distribution power services to facilities constructed under this Contract.
      a. Facilities include passenger stations and wayside facilities consisting of, but not limited to, pump stations, trackway lighting, and sites containing systems facilities such as train control houses, traction power substations, gap breaker stations, and high voltage substations.
   
   3. Coordinate utility requirements with Electric Utility Company to ensure that design and construction requirements for equipment furnished by the Service Provider are complied with.
   
   4. Obtain technical data, such as fault levels, grounding requirements, and other required utility information from service provider, as needed.

B. Applications for Service:
   1. Request new distribution power services for passenger stations and for wayside facilities along alignment.
      a. Requests for distribution services consist of Applications for Service and all other documents required by the Service Provider.
   
   2. When executing new services agreement with the Service Provider, select 50% discount option for payment of connection costs.
   
   3. Be responsible for costs associated with Applications and energizing of Service.
   
   4. Upon Substantial Completion of the Work or earlier date as directed by Metro,
transfer permanent new power services to Metro.
   a. Metro may direct that transfer be made to another agency or entity in which case arrange for transfer accordingly.

5. Be responsible for applying for and paying costs associated with temporary construction power services.

C. Service Connection Fees:
   1. Pay Electric Utility Company service connection fees associated with providing permanent new distribution services.
      a. Metro will reimburse Contractor for those service connection fees to extent such fees are in accordance with applicable CPUC tariff rules.
      b. Provide for Metro review, service connection agreements received from service provider prior to execution by Contractor.
      c. Metro reimbursement shall be for Contractor's actual costs for service provider service connection fees plus markup not to exceed two percent for processing. Reimbursement excludes other markup or profit.

   2. Remain responsible for performing all Work and paying costs associated with design and construction of Metro's facilities for Electric Utility Company services as required by the Service Provider including but not limited to trenches, ductbanks, vaults, subsurface structures, equipment pads, fencing, walls, and grounding.
      a. In the event that Electric Utility Company service connection fees include costs associated with such work, then the costs will be deducted from Metro reimbursement of Electric Utility Company service connection fees.

   3. The Contractor is responsible for all costs associated with temporary power services. In the event that the Electric Utility Company service connection fees include any costs associated with temporary services, then the costs will be deducted from Metro reimbursement of the Electric Utility Company service connection fees.

D. Utility Power Consumption Costs:
   1. Be solely responsible for payment of energy and demand costs inclusive of taxes and miscellaneous fees charged by the Electric Utility Company for new distribution services prior to Revenue Service Date (RSD).

   2. Provide Metro with copies of documentation of Contractor's payment to Electric Utility Company. If after transfer of services to Metro following Substantial Completion Metro receives Electric Utility Company billings for periods prior to Substantial Completion, Metro will pay Electric Utility Company and deduct costs from payments due Contractor.

E. Additional Contractor Responsibilities for Distribution Power Services:
   1. Obtain necessary permits for Work associated with new and temporary power services from Electric Utility Company and local authorities having jurisdiction.

   2. Complete final design of underground ductbanks, grounding system, structures, and primary fused load interrupter switchgear and transformer pads associated with new incoming power services between designated point of connection to the Electric
Utility Company distribution network and wayside and passenger station facilities.

3. Furnish and install underground ductbanks, grounding system, structures and equipment pads for the Electric Utility Company supplied equipment.

4. Furnish, install, test, and commission cables between the Electric Utility Company distribution equipment and line side of transformer at trackside traction power facilities.

5. Furnish, install, test, and commission low voltage cables between the Electric Utility Company transformer secondary side and 480V auxiliary power distribution equipment at passenger stations and wayside facilities.

6. Furnish and install 480V revenue metering enclosures and associated metering equipment, hardware, and support equipment in metering enclosure as part of Contractor provided 480V switchboards at passenger station facilities and as part of the auxiliary power distribution system at wayside facilities.

7. Coordinate 480V switchboard pull section and revenue meter section, ductbank/utility pole interface with Electric Utility Company.

8. Ensure the furnished equipment is mechanically and electrically compatible with the Electric Utility Company requirements; and that 480V meter sections complies with all requirements of the Electric Utility Company.

9. Schedule inspections with the Electric Utility Company and local authorities having jurisdiction (where applicable).

10. Provide service providers allowable time within Contractor’s schedule to successfully install all necessary Work for Service needs.

11. After power service improvements have been installed and tested, submit certification to Metro that improvements have been constructed and tested according to approved plans and specifications, and in accordance with the Service Provider’s requirements.

12. Submit certified set of as-built record drawings for each new power service to Metro prior to issuance of certificate of completion for service improvements.

   a. Submit as-built record documents to Metro with requirements in Section 01 78 39 – As-Built Drawings and Current Status Documents.

1.09  PUBLIC AND PRIVATE TELEPHONE SERVICES

A. General:

1. Coordinate through telephone service provider’s representative telephone service requirements, ensuring that design and construction requirements of the telephone service provider are complied with.

   a. Telephone service provider to train control houses/rooms and traction power facilities will be as indicated.

2. Obtain technical data, such as circuit protection, grounding requirements, and cable and connector types from telephone service provider, as needed.

3. Conform to telephone service provider’s service requirements and the Contract Documents.
B. Telephone Provider Interface:

1. Stations: Provide telephone interface at stations in Telecommunication Room (Telco Room). Provide 2 each 2-inch conduits between Telco Room and telephone service provider's pullbox, as indicated.

2. Train Control Houses (TCH): Provide telephone interface at TCH at telephone service provider's service cabinet located at property line or other location. Coordinated with private telephone company and approved by Metro.

C. Additional Contractor Responsibilities for the Public and Private Telephone Services:

1. Obtain necessary permits for Work associated with data line services from telephone service provider and local authorities having jurisdiction.

2. Complete final design of following private and public telephone services between designated points of connection and TCH or Telco rooms.

3. Request and arrange for following telephone services:
   
   a. Telephone Company leased back-up line data services to TCH and stations, as indicated.
   
   b. Dial telephone service for public pay telephones at stations. Metro will make arrangements for public telephone installation.

   c. Telephone Company leased dedicated line at each station for irrigation controller modems, as indicated.

   d. Sufficient cable pairs for future private telephone company leased dedicated lines for station concession booths or kiosks.

   e. Telephone Company leased line data services for service provider metering at high voltage substations; Confirm requirement with Metro or its designee.

4. Furnish and install interfacing equipment, underground ductbanks, grounding wires, and termination panel for telephone service provider's supplied equipment.

5. Furnish and install exposed and underground conduit system, junction boxes, and grounding wires.

6. Coordinate interfaces with telephone service provider.

7. Schedule inspections with telephone service provider and local authorities having jurisdiction (where applicable).

D. Telephone Service Costs:

1. Be solely responsible for payment of telephone usage costs inclusive of taxes and miscellaneous fees charged by private and public telephone providers for new telephone services prior to Substantial Completion of this Contract.

2. Provide Metro with copies of documentation of Contractor's payment to private and public telephone providers.

   a. If after transfer of services to Metro following Substantial Completion Metro receives telephone billings for periods prior to Substantial Completion, Metro will pay telephone providers and deduct costs from payments due to the Contractor.
1.10 NEW WATER SERVICES

A. General:
   1. Water service pipe, laterals, valves and fittings, shall conform to requirements of Utility Owner (Service Provider) and Agency having jurisdiction.
   2. Submit to Metro, list of materials and approved manufacturers for various products specified by the Service Provider.
   3. Conform to local authorities having jurisdiction and the Service Provider's service requirements and the Contract Documents.

B. Applications for Service:
   1. Request new water services and fire prevention services for passenger stations and for wayside facilities along alignment.
      a. Requests for services consist of Applications for Service and all other documents required by service provider and local authorities having jurisdiction.
   2. Be responsible for costs associated with Applications for Service.
   3. Upon Substantial Completion of this Contract or an earlier date as directed by Metro, transfer permanent water services to Metro.
      a. Metro may direct that transfer be made to another agency or entity in which case arrange for transfer accordingly.
   4. Be responsible for applying for and paying costs associated with temporary construction services.

C. Service Connection Fees:
   1. Pay service provider service connection fees associated with providing the permanent new water services and fire prevention services.
      a. Metro will reimburse Contractor for those service connection fees.
      b. Provide for Metro review, service connection agreements received from service provider prior to execution by Contractor.
      c. Metro reimbursement will be for Contractor's actual costs for water service connection fees and 2 percent markup for processing.
      d. Reimbursement excludes other markup or profit.
   2. Remain responsible for performing Work and paying costs associated with design and construction of Metro's facilities for water services as required by local authorities having jurisdiction and service provider, including but not limited to, valves meters, check valves, fire department connections and fire hydrants.
      a. In event that service provider connection fees include costs associated with such Work, then costs will be deducted from Metro reimbursement of service connection fees.
   3. Be responsible for costs associated with temporary water services.
      a. In event that service provider's connection fees include costs associated with temporary services, then costs will be deducted from Metro reimbursement of
service connection fees.

D. Service Provider Interface:
   1. Stations and Track Way Facilities: Locate water service interface at stations and
      other track way facilities, just outside of station/track way facility as indicated.
      a. Provide water service from stations and irrigation point of contacts to meters.

E. Additional Contractor Responsibilities for Public and Private Water Services:
   1. Obtain necessary permits for Work associated with water services and fire
      prevention services from water service provider and local authorities having
      jurisdiction.
   2. Verify size of service and requirements with service provider and local authorities
      having jurisdiction.
   3. Verify Service Provider's requirements for fire suppression.
   4. Complete final design of water services between designated point of connection and
      service point.
   5. Furnish and install interfacing materials, equipment and associated appurtenances
      as indicated, but not limited to, detector checks, valves, water meter connections and
      water service line compliant with local authorities having jurisdiction and Service
      Provider.
   6. Furnish and install exposed and underground pipe system, valves and fittings.
   7. Coordinate interfaces with the Water Service Provider.
   8. Schedule inspections with the Water Service Provider and local authorities having
      jurisdiction (where applicable).
   9. After water service improvements have been installed and tested, submit certification
      to Metro that improvements have been constructed and tested according to
      approved plans and specifications, and in accordance with the Service Provider's
      requirements.
   10. Submit certified set of as-built record drawings for each new water service location to
      Metro prior to issuance of certificate of completion for water service improvements.
   11. Submit as-built record documents to Metro with requirements in Section 01 78 39 –
       As-Built Drawings and Current Status Documents.

F. Water Service Costs:
   1. Be solely responsible for payment of water usage costs inclusive of taxes and
      miscellaneous fees charged by the Water Service Providers for the new water and
      fire prevention services prior to Substantial Completion of this Contract.
   2. Provide Metro with copies of documentation of Contractor's payment to water service
      providers.
      a. If after transfer of services to Metro following Substantial Completion Metro
         receives billings for periods prior to Substantial Completion, Metro will pay to the
         Water Service Providers and deduct costs from payments due to Contractor.
1.11 NEW SEWAGE SERVICES

A. General:
   1. Provide sewage service pipe, laterals, Manholes, and fittings, conforming to requirements of Utility Owner (Service Provider) or Agency having jurisdiction.
   2. Submit to Metro and local jurisdiction, list of materials and approved manufacturers for various products specified.
   3. Conform to local authorities having jurisdiction and Service Provider's service requirements, standards, codes and Contract Documents.

B. Applications for Service:
   1. Request new sewage services for passenger stations and for wayside facilities along alignment that require such facilities.
      a. Provide requests for services consisting of Applications, plans, designs for Service and all other documents as required by Service Provider and local authorities having jurisdiction.
   2. Be responsible for costs associated with Applications and all other documentation necessary for Service.
   3. Upon Substantial Completion of the Work or an earlier date as directed by Metro, transfer permanent sewage services to Metro.
      a. Metro may direct that transfer be made to another agency or entity in which case arrange for transfer accordingly.
   4. Be responsible for applying for and paying all costs associated with temporary construction services.

C. Service Connection Fees:
   1. Pay service provider service connection fees associated with providing permanent new sewage services.
      a. Metro will reimburse Contractor for those service connection fees to extent such fees are in accordance with applicable state and local authorities having jurisdiction.
      b. Provide for Metro review, service connection agreements received from the Service Provider prior to execution by Contractor.
      c. Metro reimbursement will be for Contractor's actual costs for water service connection fees and 2 percent markup for processing.
      d. Reimbursement excludes other markup or profit.
   2. Remain responsible for performing Work and paying costs associated with design and construction of Metro's facilities for sewage services as required by local authorities having jurisdiction and service provider, including but not limited to, piping, manholes and cleanouts. Should Contract Documents include sewer work within local jurisdiction Right-of-Way, Contractor shall be responsible for all aspects, including but not limited to, design, construction of that identified work.
      a. In event that Service Provider connection fees include costs associated with such
Work, then costs will be deducted from Metro reimbursement of service connection fees.

3. Be responsible for all costs associated with temporary sewage services including but not limited to, bypasses, siphons, pumps. In the event that the Service Provider’s connection fees include any costs associated with temporary services, then the costs will be deducted from Metro reimbursement of the service connection fees.

D. Service Provider Interface:

1. Stations, Trackway Facilities and Project areas: Locate sewage service interface at stations, trackway facilities and all other Project areas.
   a. Provide sewage service from station, trackway facility and all Project areas to sewer main as indicated.

E. Additional Contractor Responsibilities for Public and Private Sewage Service:

1. Obtain necessary permits for all Work associated with sewage services from sewage services provider and local authorities having jurisdiction.
2. Verify size of service and requirements with Service Provider and local authorities having jurisdiction.
3. Complete final design of sewage services between point of connection (sewer main) and service point.
4. Furnish and install interfacing materials, equipment and associated appurtenances as indicated, but not limited to, manholes, collars, pipe, structures and sewer service line compliant with local authorities having jurisdiction and service provider.
5. Coordinate interfaces with sewage service provider.
6. Schedule inspections with sewage service provider and local authorities having jurisdiction.
7. After sewage service improvements have been installed and tested, submit certification to Metro that improvements have been constructed and tested according to approved plans and specifications, and in accordance with service provider’s requirements.
8. Submit certified set of as-built record drawings for each new sewage service location to Metro prior to issuance of certificate of completion for sewage service improvements.
   a. Submit as-built record documents to Metro complying with requirements in Section 01 78 39 – As-Built Drawings and Current Status Documents.

F. Sewage Service Costs:

1. Be solely responsible for payment of sewage usage costs inclusive of taxes and miscellaneous fees charged by sewage service provider for new sewage services prior to Substantial Completion of this Contract.
2. Provide Metro with copies of documentation of Contractor’s payment to sewage service providers. If after transfer of services to Metro following Substantial Completion, Metro receives billings for periods prior to Substantial Completion, Metro will pay Sewage Service Provider and deduct costs from payments due to
Contractor.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 01 71 45
PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Maintaining clean, orderly Worksite and adjacent public ways, free of recognizable hazards, and performing final cleaning.

1.02 RELATED SECTIONS

A. Section 01 35 23: Worksite Safety Requirements
   B. Section 01 35 53: Worksite Security Requirements
   C. Section 01 35 66: Green Construction Policy
   D. Section 01 57 19: Temporary Environmental Control
   E. Section 01 74 19: Waste Management and Disposal

1.03 REFERENCES (Not Used)

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).

1.05 SUBMITTAL (Not Used)

1.06 DEFINITIONS (Not Used)

1.07 WORKSITE CONDITIONS

A. Safety Requirements:
   1. Maintain Worksite and adjacent public ways in neat, clean, and orderly manner, free of recognizable hazards.
   2. Keep catwalks, underground structures, Worksite walks, public sidewalks, roadways and streets, along with public and private walkways adjacent to Worksite, free from scrap, trash, debris and hazards.
   3. Dispose of materials in accordance with Section 01 74 19 – Waste Management and Disposal.

B. Hazards Control:
1. Store, control and dispose of hazardous and toxic products, wastes and containers in accordance with local requirements and Section 01 57 19 – Temporary Environmental Control.

2. Store volatile wastes in covered metal containers, and remove wastes from Worksite daily.

3. Do not accumulate wastes which create hazardous conditions.

4. If volatile and noxious cleaning substances are being used in spaces not adequately ventilated.

5. Comply with Section 01 35 23 Worksite Safety Requirements.

PART 2 – PRODUCTS

2.01 CLEANING MATERIALS

A. Comply with the requirements of Section 01 35 66, Green Construction Policy.

A. B. Use type of cleaning materials recommended by manufacturer of products for surfaces and for types and floorings are to be cleaned.

PART 3 – EXECUTION

3.01 INTERIM CLEANING

A. Clean Worksite and adjacent areas once each Workday or more often if directed by Metro or its designee during the span construction of activities.

1. Maintain structures, grounds and other areas of Worksite, including public and private properties immediately adjacent to Worksite, free from accumulations of waste materials including trash and litter not generated by Contractor.

2. Place waste materials in separate metal containers for recyclable products and waste materials.

3. Maintain construction area in broom-clean condition. Remove soil accumulations and mud resulting from construction activities from adjacent street surfaces and sidewalks.

B. Remove or secure loose material on open decks and on other exposed surfaces at end of each Workday, or more often, in manner which will maintain Worksite hazard-free.

1. Secure material in manner which will prevent dislodgement by wind and other forces.

C. Sprinkle waste materials with water or approved chemical palliative to prevent blowing of dust. Use water in accordance with the requirements of the site SWPPP and associated BMP's.

D. Promptly empty waste containers when full, and legally dispose of contents at dumping areas off Metro's property.
E. Control handling of waste materials. Do not permit materials to be dropped or thrown from structures. **Use good housekeeping practices in accordance with the requirements of the site SWPPP and associated BMP’s.**

F. Remove spillage of construction-related material from haul routes in accordance with Section 01 57 19 – Temporary Environmental Control.

G. Remove posters or bills attached to structures and paint over graffiti within 48 hours of discovery or verbal or written notification by Metro or its designee. This cleaning and removal of posters, bills, graffiti and similar markings shall be considered within the original scope of this Contract and shall not delay the schedule for performance of Work by the Contractor nor shall it be relied upon to form the basis of any claim.

3.02 **FINAL CLEANING**

A. Inspect interior and exterior surfaces, including concealed spaces, in preparation for substantial completion and occupancy.

1. Remove dirt, dust, litter, corrosion, solvents, discursive paint, stains, and extraneous markings.

2. Wash and polish glass, metal, ceramic and plastic surfaces.
   a. Protect Work that has been cleaned, and do not allow cleaning operations to damage or soil previously cleaned Work.


4. Remove tools and equipment used in construction, but not property of Metro or its designee.

5. Remove detachable labels and tags.
   a. File with manufacturer's specifications for specific material for Metro's records.

6. Repairs damaged materials to specified finish, or remove and replace them.

7. Remove calcification and repair damage from calcification and other chemicals.

B. Upon completion of construction, leave Worksite in clean, neat condition, satisfactory to Metro or its designee.

**END OF SECTION 01 74 00**
PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Development and implementation of a Project-specific Waste Management Plan, to

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures
B. Section 01 35 23: Worksite Safety Requirements
C. Section 01 35 29: Health, Safety, and Emergency Response Procedures for Contaminated Sites
D. Section 01 35 43: Environmental Procedures for Hazardous Materials
E. Section 01 35 53: Worksite Security Requirements
F. Section 01 35 63: Sustainability Plan
G. Section 01 43 10: Project Quality Program Requirements - Design/Build or
   Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build
   (as applicable)
H. Section 01 57 19: Temporary Environmental Control
I. Section 02 41 00: Demolition
J. Section 02 41 19: Selective Structure Demolition
K. Section 31 20 00: Earthwork

1.03 REFERENCES

A. Management of solid waste is regulated by the California Department of Resources, Recycling and Recovery (CalRecycle), Los Angeles County Recycling and Waste Reduction Commission, and the various local municipalities in which the Work is performed.

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).
B. Comply with the requirements of the pertinent County or other authority having jurisdiction, and obtain input and guidance to the Waste Management Plan by the jurisdictional authority before mobilizing on site. Should approval be required by ordinance, obtain approval of the Waste Management Plan from the County or other authority having jurisdiction.

C. Use of recycling service companies is limited to any of the following, unless otherwise approved by Metro or its designee in writing:

1. Firms included in the State of California Construction and Demolition (C&D) Debris Recycling Database.
2. Firms listed in the Los Angeles County Directory of Construction and Demolition Material Reuse and Recycling Firms.
3. Firms included in the Los Angeles County Builders Reuse and Recycling Guide.
4. Recycling services that will certify in writing that accepted waste will be diverted from landfill, not disposed of or dumped illegally, and not disposed of or dumped at sea or into waters of the U.S, providing written confirmation of disposition of the specific waste load(s).

1.05 SUBMITTALS

A. Refer to Section 01 33 00 - Submittal Procedures, for submittal requirements and procedures.

B. Submit specified Waste Management Plan using written and graphic representation to indicate how waste will be segregated, stored, and diverted from landfills at least 30 days prior to start of the Work.

C. If recyclers not listed in directories under Article 1.04 - Quality Assurance of this Section are proposed, submit additional certification from those recycling services to Metro and local authority having jurisdiction prior to waste generation.

D. Submit reports in accordance with approved Plan and CalRecycle requirements, including, but not limited to, timely documentation necessary to demonstrate compliance with waste minimization and landfill diversion requirements. At a minimum, reporting for waste management shall be contained in the Sustainability Reports as specified in Technical Specifications Section 01 35 63 - Sustainability Plan. In addition, Contractor shall submit field reports on a monthly basis documenting the Waste Management Plan implementation status throughout the duration of construction. The monthly waste management status reports shall include quantities demolished, quantities hauled to landfills, and quantities recycled/reused along with copies of tags from applicable facilities receiving the materials.

1.06 DEFINITIONS

A. Conversion Rate: The rate set forth in the standardized Conversion Rate Table approved by Metro or its designee for use in estimating the weight of materials identified in the Waste Management Plan.
B. Divert: To use material for any purpose other than disposal in a landfill or transfer facility.

C. Recycling Service: An off-site service that provides processing of material and diversion from landfill.

D. Hauler: The entity that transports construction and demolition debris to either a landfill or a recycling service.

E. Salvage/Reusable Building Materials: Typical materials include: Architectural Details (columns, fireplace mantels, molding), Brick, Cabinets, Doors, Lighting Fixtures, Lumber, Plumbing Fixtures, Sinks, Toilets, Tubs, Windows, Wood Flooring, and Fencing.

F. Mixed Construction/Demolition Debris: Typical materials include: Asphalt, Cardboard, Concrete, Metal, and Untreated Wood.

G. Contaminated or Hazardous Waste: Waste defined under Federal and state law to be hazardous or contaminated, requiring specialized handling and disposal. Refer to requirements of Section 01 57 19 - Temporary Environmental Control.

H. Reuse: Using a material or product that is recovered from construction, renovation, or demolition activities.

I. Recycling: The process of collecting and preparing recyclable materials in their original form or in manufacturing processes that do not cause the destruction/contamination of recyclable materials in a manner that precludes further use.

J. Recovery: Any process that reclaims materials, substances, energy, or other products contained within or derived from waste on-site. Recovery includes waste-to-energy, composting, and other processes.

K. Waste Segregation: The physical separation of waste by category for proper onsite handling, storage, and disposition, as required by Federal, state, and local regulations and as presented herein for maximum minimization of waste.

1.07 WASTE MANAGEMENT REQUIREMENTS

A. Contractor is solely responsible for compliance with all legal and regulatory requirements for handling, storage, and disposal of all wastes generated onsite.

B. Performance Requirements: The requirements for diversion of construction and demolition debris from landfill shall in no case be less than that required by state and local regulations. The minimum percentages for diversion of construction and demolition waste shall be as follows, unless modified and approved otherwise in writing by Metro or its designee on the basis of legislative revisions to waste minimization or results of waste characterization studies for the Work:

1. Divert a minimum of 75 percent of total construction waste from landfill, in order of preference: 1) weight, & 2) volume.

2. Divert a minimum of 100 percent of steel and concrete demolition waste from landfill and an overall minimum of 50 percent of remaining demolition waste from landfill.
C. Specific Requirements: Recycle magnetic ballasts and older fluorescent lamps containing polychlorinated biphenyls (PCBs) and other toxic chemicals in accordance with the law and in such a manner that potentially dangerous chemicals are safely reprocessed.

D. Contractor shall provide documents, including a Waste Management Plan, to show evidence of recycling, and reuse of recovered materials.

E. Contractor shall be held fully responsible for impacts of construction waste management requirements to schedule.

F. Contractor shall provide for optimum management of solid wastes via a materials management hierarchy while preventing environmental pollution and damage. The materials management hierarchy shall be: reduce, reuse, and recycle.

G. For instances or situations where compliance with the requirements of this Section do not apply or do not appear to be possible, Contractor shall so indicate and may request approval of an alternative from Metro; however, Metro or its designee reserves the discretionary right to decline such approval at no risk to Metro.

1.08 WASTE MANAGEMENT PLAN

A. Plan Development: Develop a Plan for diverting the specified percentage of construction debris from landfill. Include in Plan either or both written and graphic information to indicate construction debris will be diverted from landfills.

B. The Waste Management Plan shall include the following:

1. Indicate how the Contractor proposes to recover at least 75 per cent of total construction wastes for reuse and/or recycling and provide means for integration of waste minimization activity with the Project Schedule.

2. Propose means and methods for collecting and separating each type of debris deemed reusable or recyclable.

3. Include Quality Assurance provisions in the Plan.

4. Include a list of reuse facilities, recycling facilities and processing facilities that will be receiving the recovered materials (including take back by Metro, Vendors, Manufacturers, or other organizations, if applicable.)

5. Identify materials that are not recyclable or not recovered which will be disposed of in a landfill (or other means acceptable by the State of California and local ordinance and regulations) and explain why the materials are not recovered.

6. Identify the off-site recycling service and hauler of each designated debris item, who have agreed to accept and divert that item from landfill, in the proposed quantities anticipated. Schedule each item and list off-site recycling service and hauler company name, telephone number, address, and person contacted.

7. Include a "good faith" estimate of each type of construction waste that would be generated if no diversion methods were implemented. Submit with calculations based upon weight of each material. The following items are subject to the "good faith" estimate and diversion requirement:
a. Asphalt concrete  
b. Portland cement concrete  
c. Brick, clay products and ceramic tile  
d. Aggregate  
e. Clean earth fill  
f. Metals  
g. Wood products, including pallets  
h. Plant and tree trimmings may be included in wood products if so accepted by recycling service.  
i. Gypsum board  
j. Latex paint (not applicable to demolition work)  
k. Plastic piping  
l. Glass, excluding that used for containers  
m. Insulations  
n. Acoustical ceiling tiles, panels and boards  
o. Resilient floorings  
p. Carpets, and polyurethane foam pads (other types of pads may be included if accepted by recycling service)  
q. Cardboard and paper products  
r. Other, depending on anticipated waste.  

8. Calculate quantities, and convert volume measurements to weights in accordance with the defined Conversion Rate.  

9. List the permitted landfill, or other permitted disposal facilities, which will be accepting the disposed waste materials.  

10. Provide estimate of time requirements for demolition and for the removal of valuable reusable items and materials.  

11. For demolition, include a building engineering survey and worker safety plan, assessment of existing building condition and all potential hazards.  

12. Provide final accounting of disposition of recovered materials upon completion of activities as specified in Article 1.05 herein, Delivery receipts shall include, at a minimum:  
   a. Name of firm accepting the recovered materials or waste materials  
   b. Specify type of facility (e.g. retail facility, recycler, processor, Class III landfill, MRF)  
   c. Location of the facility  
   d. Type of materials
C. Plan Implementation:

1. Designate an on-site individual or individuals responsible for instructing workers and implementing the Waste Management Plan.

2. The Contractor shall be responsible for ensuring that the appropriate governmental entities are notified of the Work.

3. Protect the environment and local community. Remove and relocate reusable materials to be reinstalled or retained in a manner to prevent damage or contamination.

4. Maintain log of each load, of each category item diverted from landfill. Log in separately construction debris sent to a Class III landfill and materials sent to recycling facilities.
   a. Include in log, type of load, load weight, name of hauling service; recycling service or landfill, and date accepted by recycling service or by landfill.
   b. Metro or its designee reserves the right to audit the log at any time, retain and make available, all weight tickets, copies of receipts and invoices.
   c. Units of measure: Use same units as stated in the approved plan "good faith" estimate of construction debris that would be generated if no remedial methods were implemented.

5. Material Handling:
   a. Collection, Segregation, and Storage:
      1) Designate a specific onsite area or areas to facilitate separation of materials for potential reuse, salvage, recycling, and return.
      2) Keep waste bins and pile areas neat and clean. Clearly mark bins for each category of waste. Do not commingle non-recyclable waste with materials designated for reuse or recycling.
      3) Signs and instructions shall be clear, and easy to understand. All recycling containers shall be clearly labeled and lists of acceptable and unacceptable materials shall be posted throughout the site. Whenever possible, the lists shall be in multiple-languages, especially in Spanish, and in graphic symbols.
      4) Remove materials for recycling and recovery from the Work locations to approved containers or storage area as required. Failure to remove waste or recovered materials will be considered cause for withholding payment and termination of Contract.
      5) Position containers for recyclable and recoverable waste materials at a designated, accessible location on the Project Site. If materials are sorted on site, also provide a sorting area and all necessary sorting and storage containers.
      6) Deposit indicated recyclable, and recoverable materials in storage areas or
containers in a clean (no mud, adhesive, solvents, petroleum contamination), debris-free condition.

7) Ensure all recovered materials are made safe for handling and storage or are properly segregated for specialized handling by trained personnel.

8) Change-out loaded containers for empty containers, as demand requires.

9) If recovered materials are stored on-site for project duration, provide adequate security from pilferage.

b. Environmental Controls during Handling, Storage, and Transport: Do not allow designated materials to become contaminated or to contaminate site or surrounding areas.


6. Training and Coordination:

a. Furnish copies of the Waste Management Plan to all on-site supervisors, each Subcontractor, and Metro or its designee.

b. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all entities at the appropriate stages of the Work.

c. Meetings: Include construction waste management on the agenda of meetings. At a minimum, discuss waste management goals and issues at the following meetings:

   1) Preconstruction meeting.

   2) Worker orientations and regularly scheduled Jobsite meetings and safety training.

7. Waste Disposition: Arrange for adequate collection and transportation to deliver the properly segregated and stored wastes and recovered materials to the approved recycling center, processing facility, or disposal site. Maintain records as required by law and in accordance with this Section.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 74 19
PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Preparing and submitting operation and maintenance data for mechanical, electrical and other specified equipment.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures

1.03 REFERENCES (Not Used)

1.04 QUALITY ASSURANCE

A. Comply with Project Quality program Requirements (see 1.02 above).

1.05 SUBMITTALS

A. Refer to Section 01 33 00 - Submittal Procedures, for submittal requirements and procedures.

B. Proposed Operation and Maintenance Data format including a table of contents not less than 120 calendar days before final acceptance tests.

C. Three Completed Operation and Maintenance Data Manuals in final form (for review/comments) 90 calendar days before final acceptance tests.

D. One electronic copy and seven copies of Operation and Maintenance manual 30 calendar days before final acceptance tests to Metro’s Project Construction Manager.

Electronic copy as follows:

- Drawing files in Adobe PDF (searchable, non-scanned wherever possible) 11x17 page format.
- Other documents, pictures, graphs, and like items, in Adobe PDF (searchable, non-scanned wherever possible) format (tif or jpeg as an alternative).

E. Continuous Updating Program:

1. Furnish one copy of letter indicating suppliers have been notified to provide updated operation and maintenance data, service bulletins and other information pertinent to equipment, as it becomes available.
PART 2 - PRODUCTS

2.01 DOCUMENT SIZE
A. 8 1/2 inches by 11 inches, unless otherwise indicated herein.

2.02 PAPER
A. White bond, at least 20 pound weight.

2.03 TEXT
A. Printed, typewritten or word-processed.

2.04 PRINTED DATA
A. Manufacturer's catalog cuts, brochures, and operation and maintenance data. Clear reproductions will be acceptable.

2.05 DRAWINGS
A. 11 inches by 17 inches, preferably bound in with text. Larger drawings are acceptable, provided they are folded to fit into a pocket inside rear cover of manual. Reinforce edges of large drawings.

2.06 PRINTS OF DRAWINGS
A. Black on white, sharp in detail and suitable for making reproductions.

2.07 FLYSHEETS
A. Separate each portion of the manual with colored, neatly prepared flysheets briefly describing contents of the ensuing portion.

2.08 COVERS
A. 40 to 50 mil thick, clear plastic, front and back covers for each manual.

2.09 BINDINGS
A. Conceal binding mechanism inside manual; three-ring binders will be acceptable. Binding is subject to approval by Metro or its designee.
PART 3 - EXECUTION

3.01 GENERAL

A. Assemble operation and maintenance manual using manufacturer’s latest standard commercial data.

3.02 COVER AND COVER SHEET

A. Include following information on cover and on inside cover sheet:

OPERATION AND MAINTENANCE INSTRUCTIONS

(OPORTION AND MAINTENANCE DATA OF STRUCTURE OR FACILITY)

(TITLE AND NUMBER OF CONTRACT)

(ADDRESS)

(City, State)

(General subjects of this Manual)

________________________
Signed/Metro or its designee

____________________
Acceptance Date

3.03 CONTENTS OF MANUAL

A. Include following:

1. Index of volumes, in each volume of multiple volume systems.
2. Index, in and for each volume. List and combine the literature, for each system, in sequence of operation.
3. Names, addresses and telephone numbers of Contractor, suppliers and installers.
4. Names, addresses and telephone numbers of manufacturers’ nearest service representatives.
5. Names, addresses and telephone numbers of local parts vendor and service agency.
6. Anticipated date Metro assumes responsibility for maintenance.
7. Description of system and component parts.
8. Pre-operation check or inspection list.
9. Procedures for starting, operating and stopping equipment.
10. Post-operation check or shutdown list.
11. Inspection and adjustment procedures.
12. Emergency operating instructions.
13. Accepted test data.
14. Maintenance schedules and procedures.
15. One copy of each wiring diagram.
16. One copy of each piping diagram.
17. One copy of each duct diagram.
18. One copy of each accepted Shop Drawing.
19. Manufacturers’ parts lists with catalog names, numbers and illustrations.
20. Exploded view of each piece of equipment with part designations.
21. List of manufacturers’ recommended spare parts, prices and quantities for two years of operation.
22. List of special tools and test equipment required for the operation, maintenance, adjustment, testing and repair of the equipment, instruments and components. If certain special tools or equipment are known to be difficult to locate or acquire, include at least two suppliers for the product if possible.
23. Scale and corrosion control procedures.
24. Dismantling and reassembly instructions.
25. Troubleshooting and repair instructions.
27. Ordering information.
28. Transmittal memo and document Table of Contents clearly to identify if any warranties/guarantees and spare parts are included in the manual and the relevant page numbers on which they are noted.

END OF SECTION 01 78 23
SECTION 01 78 39

AS-BUILT DRAWINGS AND CURRENT STATUS DOCUMENTS

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Requirements and procedures for maintaining, annotating, and delivering Current Status, As-Built, and final As-Built Project Record Drawings, Specifications and indexes, (both in hardcopy and electronic formats), including pdf, tif, CAD, and Word files, as defined herein.

1. Work includes but is not limited to as-built documents for Work done in tunnels, at-grade, above grade, on bridges, highway crossings, stations, cut-and-cover structures, Yards and Shops, trackwork; inclusive of systems elements such as Traction Power, OCS, Train Control, and Communications, and city, county, state, and third party utilities and facilities.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures

B. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)

1.03 REFERENCES

A. Los Angeles County Metropolitan Transportation Authority (Metro):
   1. Metro Rail Design Criteria CADD Standards

B. American National Standards Institute (ANSI):
   1. ANSI Y14.4M - Pictorial Drawings

C. Standard Plans of local authorities having jurisdiction

D. Caltrans Standard Plans and Specifications

E. Standard Specifications for Public Works Construction (SSPWC)

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).

B. Print legibly and clearly relevant construction changes/data on current print of Current Status Documents to high standard of quality.
1. Employ person who is qualified and experienced in performing this type of work.

C. Prepare furnished drawings in accordance with standard of drafting specified in Metro Rail Design Criteria CADD Standards.

D. Perform on-site ongoing review of Current Status Documents and Logs on minimum of weekly basis to assure they are maintained and current.

E. Record additional construction information on As-Built or Current Status Documents as requested by Metro or its designee.

F. Shop and working drawings shall be signed and sealed by licensed engineer registered in State of California.

1.05 SUBMITTALS

A. Refer to Section 01 33 00 – Submittal Procedures, for submittal procedures and requirements.

B. Current Status Documents Log: Within 90 days from approval of Baseline Schedule, submit for acceptance Current Status Document Log. Submit Log every 90 days or whenever requested by Metro.

1. Schedule for submittal of Project Record documents should reflect Work scheduled on accepted Baseline Schedule.

C. Resident Engineer (RE) will review Current Status Document in conjunction with monthly payment request. Current Status Documents must be kept at Contractor's field office at all times (unless otherwise specified). In event these documents are not maintained, Metro will defer monthly payment for this pay item.

D. Milestone As-Built and final Project Record Drawings: Within 30 days of each milestone identified in Metro accepted Contract Schedule, submit one hard copy and electronic files in both CAD format and Adobe Acrobat format, of all related As-Built Drawings and Specifications referenced to applicable Shop, Installation or Working Drawings which have been revised to indicate As-Built Condition of Work and latest revision of Current Status Document Log. Deliver certification with submittal attesting that documents are true and complete record of Contract along with approval stamp and signature on drawings concerning third party.

E. Upon completion of all Contract Work and on mutually agreed schedule with Metro, submit CAD updated electronic files, Adobe Acrobat PDF files, Word files, and hard copies of all Project Record Documents, Final As-Built Mark-ups, and updated Current Status Document Log.

F. As-Built Construction Plans:

1. Once As-Built work done by Contractor is approved by City or local authorities having jurisdiction, Contractor shall arrange for transfer of As-Built information on contract plans electronic files in electronic format.

   a. Hard copies of updated plan sheets for every month shall be submitted to the
City, or local authorities having jurisdiction, including, but not limited to, LABOE, LABSL, LABSS, and ITA as identified herein, and Metro.

b. Upon completion of Rearrangement Work, Party that performed Work shall furnish other Party with reproducible “As-Built” drawings showing all Replacement Facilities installed by performing Party, within sixty working days after completion of Work for each set of plans.

c. All “As-Built” plans (whether provided by Metro, Consultant, or Contractor) shall be in format, which conforms to electronic formats of following:

1) Los Angeles City – Bureau of Engineering (LABOE):
   a) Street Improvement Plans: AutoCAD conforming to Metro CADD Standards and hard copies to be scanned with tif with 300 DPI min. after all signatures.
   b) Storm Drain Plans: AutoCAD conforming to Metro CADD Standards and hard copies to be scanned with tif with 300 DPI min. after all signatures.
   c) Structure Plans: AutoCAD conforming to Metro CADD Standards and hard copies to be scanned with tif with 300 DPI min. after all signatures.
   d) Sewer Plans: Micro Station conforming to Metro CADD Standards and hard copies to be scanned with tif with 300 DPI min. after all signatures.

2) City of Los Angeles – Bureau of Street Lighting (LABSL):
   a) All Plans: AutoCAD conforming to Metro CADD Standards and hard copies to be scanned with tif with 300 DPI min. after all signatures.

3) City of Los Angeles – Bureau of Street Services (LABSS):
   a) All Plans: Micro Station conforming to Metro CADD Standards and hard copies after all signatures.

4) City of Los Angeles – Information Technology Agency (ITA):
   a) All Plans: AutoCAD conforming to Metro CADD Standards and hard copy

1.06 DEFINITIONS

A. As-Built Documents Log: Updated Current Status Document Log submitted at interim milestone or at Contract completion.

B. Current Status Documents: Set of Construction Design Drawings and Shop/Working Drawings, and copy of Specifications marked and maintained by Contractor to show current As-Built status of construction in progress. When submitted, these shall be referred to as Milestone or Final As-built Documents as appropriate.


D. Project Record Drawings: Contractor Construction, Design, Shop, and Working Drawings that are revised and approved, which depict final as-built field configuration of Work items. Third Party coordination and approval shall be completed and incorporated into Project Record Set.
E. As-Built Specifications: Project Specifications reflecting changes during construction.

F. Current Status Document Log:
   1. Log of Contract Drawings and Specifications, including following information:
   2. Drawings:
      a. Revision Number
      b. Revision Issue Date
      c. Description of field changes which are marked on drawing, if applicable.
      d. Reference to Shop or Installation drawings, if applicable.
      e. Schedule for submittal of As-Built document.
   3. Specifications:
      a. Revision Number
      b. Revision issue date

1.07 MAINTENANCE OF AS-BUILT DOCUMENTS

A. Maintain at Worksite one copy of following documents for record purposes:
   1. Conformed Contract Documents. One set of full size 22 by 34 inch prints of drawings and one set of specifications shall be maintained for recording “as-built” revisions and special features.
   2. Change Orders/Modifications.
   3. Approved Submittals.
   4. Requests for Information.
   5. Inspection Reports.
   7. Field Test Reports and Records.
   9. Pre Construction Survey Reports
   10. Project Photographs

B. Maintain for record purposes at location approved by Metro or its designee, electronic files for those documents which are required to be submitted electronically. Ensure that backups of electronic files are made on regular basis and stored at remote location.

C. Store documents used for record purposes in Contractor's field office or other approved location, apart from documents used for construction. Documents shall be stored and maintained in such manner that they are readily retrievable in facilities that provide suitable environment to minimize deterioration or damage from moisture exposure or fire; and to prevent loss.
D. Provide files and racks for storage of documents.

E. Maintain documents in clean, dry, legible condition.

F. Make documents available at all times for inspection by Metro or its designee. Make copies of electronic documents available upon Metro’s or its designee’s request.

PART 2 – PRODUCTS

2.01 DOCUMENTS

A. Current Status Drawings

B. Current Status Specifications

C. Current Status Document Log

D. As-Built Drawings and Specifications

E. Project Record Documents

PART 3 – EXECUTION

3.01 SAFE KEEPING OF FIELD DOCUMENTS

A. During times when documents are not being updated, store drawings, indexes and specifications in fire resistant locked cabinet or provide off-site backup to prevent inadvertent destruction of documents.

3.02 MARKING CURRENT STATUS DOCUMENTS

A. Stamp each page of Drawings and Specifications of Current Status Documents "CURRENT STATUS." Lettering on stamp: 1/2 inch and 1/4 inch for Drawings and Specifications respectively.

B. Legibly record construction As-Built information on weekly basis. Include reference of Change, Change Notice, RFI responses, Non-Conformance Reports, shop drawings and other related information to extent that As-Built information requires markup on Contract drawings. Attach to current status Drawing markups or sketches as result of design modifications or RFIs. Pertinent information must be shown on Drawing. Do not cover up Work unless relevant information has been recorded.

C. Clearly identify Change Order revision by Change Order numbers. Where more than one change is made in an area of drawing, clearly identify changes graphically by marking copy of preceding changes. Insert these copies into set of Current Status Documents on top of preceding record in manner to preclude losing or damaging document.

D. Mark changes in clearly distinguishable manner and cloud changes.
E. When new revision of document is issued, stamp superseded document "SUPERSEDED" and keep in Current Status Document set for future reference of previous mark-ups and for use for production of As-Built Drawings. Contractor need not transfer data recorded on superseded drawings onto new revision but shall list all revisions on drawing index.

3.03 PREPARING FINAL AS-BUILT (PROJECT RECORD DOCUMENTS)

A. For drawings and specifications created by Contractor, prepare new revision for each drawing and specification. Include “Project Record” in revision block for drawings and in footer for specifications. Drawings not changed by As-Built conditions include word "UNCHANGED" in revision block. Incorporate all field as-built information as well as information required in Article 3.04. Seal documents and submit electronic files and hardcopies as directed by Metro. Submit updated Current Status Document Log as part of this package.

B. For drawings and specifications created by Metro or its consultant, mark and stamp “AS-BUILT” latest revisions of Contract Drawings and Specifications for As-Built condition. Lettering on stamp: 1/2 inch and 1/4 inch high for Drawings and Specifications respectively. Clearly define revisions in minimum of 1/8 inch letter on hard copy of Drawings and Specifications. Stamp Drawings not changed by As-Built conditions with word "UNCHANGED" above "AS-BUILT" label.

C. Use clouds to define extent of change.

D. Mark As-Built conditions to extent they deviate from contract requirements on copy of latest revision of Drawings or Specifications. Specific information required on each category of Drawings is specified in Article 3.04. If drawing does not facilitate such changes, furnish Shop Drawing showing details and cross-reference each drawing.

3.04 REQUIRED INFORMATION ON CURRENT STATUS AND PROJECT RECORD DRAWINGS

A. Following requirements are applicable to Contractor’s Work under each category as required. Provide as-built measurements with reference to datum used for dimensioning on appropriate drawings.

B. Civil and Utility Drawings:
   1. Street Paving Drawings: Measure distances and elevations indicated for As-Built condition and indicate in black or highlight adjacent to design elevation for sidewalks, curb and gutters, catch basins, top of manhole covers, valve boxes and other protrusions in paving any storm drain or sanitary sewer plan and profile.
   2. As applicable, obtain approval from Metro prior to submitting Project Record Drawings.

C. Right-of-Way Drawings: These drawings will be revised for archives by Metro or its designee. Contractor need not include these drawings in his submittal.

D. Architectural and Structural Drawings: Dimension of all items related to nearest 1/4 inch.
E. Mechanical Drawings:

1. Piping and Duct Drawings: Reference on index appropriate Construction Design and Shop Drawings indicating revisions to materials or routing of piping or ducts that are different from those indicated. Locate with tape measure locations and elevations of bends, valves, flanges, enlargements, anchors, cleanouts, etc. in relations to walls, finished floors or other convenient reference points. Show on Shop and/or Current Status Drawings as appropriate.

2. Equipment Drawings: Reference on index appropriate Construction Design and Shop Drawings for location of equipment and locations of major controls in relationship to walls and finished floor or other appropriate reference points. Show on Shop or Current Status Drawings as appropriate.

F. Electrical System Drawings:

1. Connection Diagrams: Cross-reference Shop Drawings with related diagrams to these drawings. Provide grounding connection records.

2. Conduit Runs: Provide dimension to indicate location and elevation of panels and junction boxes in relationship to walls and finished floor with reasonable accuracy. Show cross Sections and dimensions for all embedded conduits, cable trays and concealed conduits on Shop and Lift Drawings. Provide cross-references between Contract and Shop Drawings.

3. Labeling: Provide tagging and labeling of conduits and cables/wires and related schedules.

4. Locations of Equipment: As specified in Article 3.04 D – Mechanical Drawings.

5. Locations of Cables: Provide locations of cables, pull boxes/ handholes along with assigned circuit record.

3.05 CONTRACTOR FURNISHED DRAWINGS

A. Contractor Furnished Drawings - Drawings provided by Contractor and used for construction of permanent facilities. Prepare drawings to high standard of quality, as specified in Article 1.03 – References.

B. Produce drawings on D size (22 inches by 34 inches). Provide company logo on drawing and have drawing sealed by registered professional engineer licensed in State of California complete with sealer’s name, full signature and registration expiration date, where required by specifications.

C. Drawing numbers will be distinct to avoid duplication. Do subsequent revisions to these drawings. Include bubbles, triangles and description of revision in revision block and if initiated by Contractor.

D. Include these drawings in Current Status Documents. Update for changes as specified in other parts of these Specifications.

E. Revise originals of these drawings to show As-Built conditions as indicated.

F. Upon completion of construction or as directed by RE, submit updated Current Status
Document Log and revised drawings as noted above.

END OF SECTION 01 78 39
SECTION 01 78 43

SPARE PARTS, ILLUSTRATED PARTS CATALOG, AND REPLACEMENT MATERIALS

PART1 - GENERAL

1.01 SECTION INCLUDES

A. Furnishing, packaging, shipping, delivering and unloading spare parts, replacement materials, keys special tools, and test equipment.

B. Operation and Maintenance Data: Lists of spare parts.

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures

B. Section 01 43 10: Project Quality Program Requirements - Design/Build or Section 01 43 20: Project Quality Program Requirements - Design/Bid/Build (as applicable)

C. Section 01 66 00: Product Storage and Handling Requirements

D. Section 01 78 23: Operations and Maintenance Data

E. Section 08 71 00: Door Hardware

1.03 REFERENCES

A. South Coast Air Quality Management District (SCAQMD):
   1. Rule 1113 - Architectural Coatings

1.04 QUALITY ASSURANCE

A. Comply with Project Quality Program Requirements (see 1.02 above).

B. Implement Quality Control Program in accordance with requirements of Sections listed in Article 1.02 of this Specification.

1.05 SUBMITTALS

A. Refer to Section 01 33 00 - Submittal Procedures, for submittal requirements and procedures.

B. Spare Parts Lists & Illustrated Parts Catalog:
1. Prepare and submit a complete list of recommended spare parts for all equipment, appliances, and systems as specified in the various individual Sections of Technical Specifications, as applicable and in accordance with requirements of Article 2.01A.

2. The Spare Lists shall include all spare parts as required to provide for the maintenance and repairs of all Contractor-furnished equipment and appliances for a period of five years after the date of final acceptance.

3. The Spare Parts List shall be organized in accordance with the Technical Specifications, by Section number and title.

   a. The Spare Parts List shall include the parts name or description, its trade name, Contractor’s part number, manufacturer’s name, manufacturer’s part number, retail price, quantity, and correlation with the Contract and Construction Specifications, Technical Drawings, Construction Drawings, and Maintenance Manuals specified in Section 01 78 23 – Operation and Maintenance Data.

   b. Spare parts shall be grouped by equipment category. Replacement parts common to more than one category shall be cross-referenced and indexed. Such common parts shall have only one part number.

   c. Contractor will submit a recommended list of five years worth of consumption for spare parts and replacement material. The list shall follow a “Top Down Breakdown” starting with the top assembly and proceeding downward through its various sub-assemblies, components and detail parts to the lowest replaceable unit.

   The spare parts and consumable list will include the following but not limited to:

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare Parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traction Power</td>
<td>5 years of material to support operations.</td>
</tr>
<tr>
<td>Rail Communications</td>
<td>5 years of material to support operations.</td>
</tr>
<tr>
<td>UPS</td>
<td>5 years of material to support operations.</td>
</tr>
<tr>
<td>Track</td>
<td>5 years of material to support operations.</td>
</tr>
<tr>
<td>Overhead Contact System (OCS)</td>
<td>5 years of material to support operations.</td>
</tr>
<tr>
<td>Tiles, and other such flooring material</td>
<td>5 years of material to support operations.</td>
</tr>
<tr>
<td>Landscaping irrigation material</td>
<td>5 years of each type water head installed</td>
</tr>
<tr>
<td></td>
<td>5 years of each type of irrigation line installed</td>
</tr>
<tr>
<td></td>
<td>5 years of each type of controller used</td>
</tr>
<tr>
<td></td>
<td>5 years of each type of hose bibb used</td>
</tr>
<tr>
<td>Landscape Plants</td>
<td>None – Design builder required to meet the survival rate</td>
</tr>
<tr>
<td>Map Casing</td>
<td>5 years worth of material to support operations.</td>
</tr>
<tr>
<td>Trash Receptacle</td>
<td>5 years worth of material to support operations.</td>
</tr>
<tr>
<td>Seating (Seat &amp; support with supporting hardware</td>
<td>5 years worth of material to support operations of each type of unique seat used.</td>
</tr>
<tr>
<td>Station Canopy</td>
<td>None</td>
</tr>
<tr>
<td>Terrazo Material</td>
<td>None</td>
</tr>
<tr>
<td>Systems</td>
<td>5 years worth of material to support operations.</td>
</tr>
<tr>
<td>CCTV Equipment</td>
<td>5 years worth of material to support operations.</td>
</tr>
<tr>
<td>Description</td>
<td>Spare Parts</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>PTEL</td>
<td>5 years worth of material to support operations</td>
</tr>
<tr>
<td>MTEL</td>
<td>5 years worth of material to support operations</td>
</tr>
<tr>
<td>VMS</td>
<td>5 years worth of material to support operations</td>
</tr>
<tr>
<td>Control Console</td>
<td>5 years of material to support operations</td>
</tr>
<tr>
<td>Yard Equipment</td>
<td>Not Used</td>
</tr>
<tr>
<td>Signs</td>
<td>5 years worth of material to support operations</td>
</tr>
<tr>
<td>Light fixtures pedestrian and bike</td>
<td>5 years worth of material to support operations</td>
</tr>
<tr>
<td>Light fixtures (parking, stations, and all other fixtures)</td>
<td>5 years worth of material to support operations</td>
</tr>
<tr>
<td>Light bulbs (all types including signals)</td>
<td>5 years worth of material to support operations</td>
</tr>
<tr>
<td>Signal light fixtures</td>
<td>None</td>
</tr>
<tr>
<td>Fencing material</td>
<td>None</td>
</tr>
<tr>
<td>Sound wall</td>
<td>None</td>
</tr>
<tr>
<td>Paint &amp; Primer (for all painted surfaces)</td>
<td>5 years worth of material to support operations</td>
</tr>
<tr>
<td>Anti-Graffiti Coating</td>
<td>5 years worth of material to support operations</td>
</tr>
<tr>
<td>Security Kiosk</td>
<td>5 years worth of material to support operations</td>
</tr>
<tr>
<td><strong>Tunnel Ventilation Systems</strong></td>
<td>5 years worth of spare parts for tunnel ventilation systems including 1 fan motor and 1 damper actuator of each type</td>
</tr>
<tr>
<td><strong>Additional Items</strong></td>
<td>- 5 fuses of each type:</td>
</tr>
<tr>
<td></td>
<td>- one circuit breaker of each type. Including 120 volt, 480 volt, 750 volt, 16kV systems</td>
</tr>
<tr>
<td></td>
<td>- 5 complete light fixtures of each type</td>
</tr>
<tr>
<td></td>
<td>- one complete ready-to-run UPS of each (minus batteries)</td>
</tr>
<tr>
<td></td>
<td>- 5 track circuit modules of each type</td>
</tr>
<tr>
<td></td>
<td>- two complete sets of solid-state train control logic controllers, including vital, non-vital, TWC, event recorder and LCP systems, and all cards used</td>
</tr>
</tbody>
</table>

d. Using the unit cost in the submitted list of spare parts and replacement material, Metro Maintenance of Way (MOW) will adjust items and quantities as necessary up to the original NTE spare parts value in the contract, and give final approval to the contractor for each item listed.

1. **The special tools to be provided shall include all software programming tools that are not Commercial Off-The-Shelf (COTS) programs.**

d. 2. **Contractor is to supply the recommended special tools.**

e. Once MOW has given final approval of submitted list of spare parts and consumable material the lists shall be organized by the contractor in the accordance with the contract performance specifications, by section number and title. The spare parts/shipping list shall include the following. (Metro to provide Excel shipping template with each list separated by affected system)

1. Item by item listing
2. **Affected System (Track TPS, TC, Communications, OCS, Electrical,**
Mechanical, Corrosion Control, and like items.) or Station (station furniture, tiles, paints, and like items.)

3. Quantity provided

4. Product Name / Description (starting with the appropriate keyword, followed by keyword modifiers)

5. Manufacturer’s Name, Address and Telephone number

6. Manufacturer’s Part Number

7. Manufacturer’s Model Number

8. Unit of Measure (each, feet, and like items.)

9. Unit cost

10. Local Distributor (Name, Address, Federal ID, and Phone Number)

11. Distributor’s Part Number

12. Authorized OEM Rebuild Facility (Name, Address, and Phone Number)

13. Confirmation of whether part is hazardous or not. (Include MSDS sheet if hazardous)

14. Recommended stocking quantities

15. Alternate vendor sources

f. Spares referred to as “sets” (a single part number covering multiple replaceable units) are unacceptable. Items must be broken down to individual components.

g. Shipping List: Submit complete shipping list (hard copy and spreadsheet file) to Metro Material Management for review prior to requesting delivery appointment. Contractor will coordinate with Metro to check the shipping list against the contact requirements and list of approved spare parts prior to scheduling delivery. Submit MSDS for all hazardous materials (solvents, paints, and like items along with shipping list for Metro review/acceptance for storage. Delivery will not be schedule until discrepancies between the shipping lists and the contract and/or approved spare parts list are resolved. Following acceptance of the shipping list contractor may request a delivery date/time after information has been input in Metro’s Material Management system.

h. Illustrated Parts Catalog (IPC): The Illustrated Parts Catalog (IPC) describes and illustrates all the replaceable assemblies following a general “Top Down Breakdown” concept, starting with the top assembly and proceeding downward through its various sub-assemblies, components and detail parts to the lowest replaceable unit. This arrangement enables the user to start with the completely assembled (top) major groups and follow each down to the unit, or to reverse the procedure. Each part illustrated shall include a corresponding number on a related part listing in general disassembly sequence down to the lowest replaceable part. The listing will provide complete identifying information on each item. This format is designed to aid the user in readily identifying and ordering replacement parts to support proper maintenance of the equipment. The IPC submittal will be in PDF format.
C. Maintenance Materials List:
   1. Prepare and submit a complete list of maintenance materials as specified in
      accordance with requirements of Article 2.01A.
   2. The Maintenance Materials List shall be organized in accordance with the Technical
      and Construction Specifications by Section number and title. Include the quantities
      to be furnished.
   3. Where maintenance materials are specified as a percentage of the materials
      installed, such percentages shall be translated to actual quantities of materials in the
      Maintenance Materials List.

D. Keys, Special Tools, and Test Equipment List:
   1. Prepare and submit a complete list of keys, special tools, and test equipment as
      specified in accordance with requirements of Article 2.01A.
   2. The Keys, Special Tools, and Test Equipment List shall be organized in accordance
      with the Technical and Construction Specifications by Section number and title. Keys
      for finish hardware are specified in Section 03 71 00 - Door Hardware.
   3. Tools and test equipment will be submitted on separate lists and submitted as
      described in Article 1.05.

1.06 DEFINITIONS
   A. VOC: Volatile Organic Compounds
   B. SCAQMD: South Coast Air Quality Management District

1.07 DELIVERY, STORAGE, AND HANDLING
   A. Refer to Section 01 66 00 – Product Storage and Handling Requirements, for general
      requirements for delivery, storage, and handling procedures.

PART 2 - PRODUCTS

2.01 SPARE PARTS LIST
   A. Furnish spare parts and replacement materials as indicated in the table.

2.02 SPARE PARTS
   A. Requirements:
      1. Provide specific spare parts as specified in the individual Sections of Technical and
         Construction Specifications.
      2. Spare parts shall be identical to the parts installed in the Work.
   B. Quantities: Provide quantities based on reliability requirements, replacement lead time,
the Contractor's recommendations, and the following requirements:

1. Wear: Provide spare parts for components which may be expected to require regular replacement under normal maintenance schedules, such as mechanical parts subject to continuous operation.

2. Consume-ability: Provide spare parts for components with a life-expectancy of less than 5 years.

3. One-Time Limited Service: Provide spare parts that normally require replacement after performing their function one time, such as fuses.

4. Long Lead Time: Provide spare parts for components that are not readily available from distributors, such as for custom-fabricated components.

5. Exchange Assemblies: Provide assemblies which will be exchanged with malfunctioning units for installed equipment, and which must be inventoried as complete assemblies.

2.03 MAINTENANCE MATERIALS

A. Requirements:
   1. Provide maintenance materials as specified in the individual Sections of the Technical and Construction Specifications.
   2. Maintenance materials shall be identical to the materials installed in the Work.

B. Quantities: Provide quantities of materials as specified in the individual Sections of the Technical and Construction Specifications.

2.04 KEYS, SPECIAL TOOLS, AND TEST EQUIPMENT

A. Requirements: Provide sufficient keys, special tools and wrenches, and special test equipment and gages as required to access, start, maintain, and repair all the installed equipment, appliances, systems, and assemblies as specified in the individual Sections of the Technical and Construction Specifications.

B. Quantities: Provide quantities of keys, special tools, and test equipment as specified in the individual Sections of the Technical and Construction Specifications.

2.05 SPARE PARTS REQUIREMENT LIST

A. Provide recommended spare parts lists. Spare parts lists shall contain, as a minimum, the following information:
   1. Item by item listing
   2. Affected System (i.e.; VMS, Radio, etc.)
   3. Valid Manufacturer's Part Numbers
   4. Complete nomenclature (starting with the appropriate key word, followed by key word modifiers)
5. Correct quantities
6. Recommended stocking quantities
7. Vendor source
8. Vendor address and telephone number
9. Alternate vendor sources
10. Bills of material
11. Factory recommended Quantities, List of Item, and Prices

B. Each item shall have a valid manufacturer's part number on the part or attached to it, as well as on the packing slip.

PART 3 - EXECUTION

3.01 PACKAGING

A. Comply with applicable requirements of Section 01 66 00 – Product Storage and Handling Requirements. All spare parts, maintenance materials, keys, special tools, and test equipment shall be securely packaged in boxes, with the boxes clearly labeled as to the contents. Such labeling shall include: location and description of the equipment and the item, complete listing of all items in the box, and the quantity of each item included in the box.

B. Package and label spare parts and replacement materials in moisture proof containers suitable for shipment and storage. Attach copies of shipping list in package and to exterior of package. Submit procedures for packaging of spare parts for review and approval by Metro or its designee prior to any delivery of spare parts.

C. Packaging shall consider the reliability of the parts and the normal requirements for inspecting and inventorying (e.g., the packaging selected for highly reliable parts shall be such that the parts can be identified, inspected, stored for long periods, and endure multiple inventories).

D. On scheduled delivery date(s) representative(s) from Metro Maintenance will be contacted to witness inspection of the contents of each item and verify the manufacturer numbers on the delivered material, match the manufacturer part numbers on the submitted and approved spare parts list.

E. To allow adequate inspection time deliveries may be scheduled over a period of one or more days.

F. Spares shall be grouped together by like item, and not by station.

3.02 DELIVERY

A. Deliver spare parts, maintenance materials, keys, special tools, and test equipment to the warehouse location or locations specified in the Technical and Construction
Specifications. The warehouse location will be designated by Metro or its designee. Provide unloading service at the designated storage location for all delivered products.

B. Prepare formal receipts for all such delivered products, and have them signed by the authorized Metro or its designee at the location. A copy of all such receipts shall be submitted to Metro for information and record.

C. Spare parts shall be new and unused components. During the construction phase any factory repaired components will not be acceptable as being equal to newly manufactured unit and delivered to Metro for placement into inventory as a spare part.

3.03 PRESERVATIVE COATINGS

A. Apply to all materials subject to corrosion.

3.04 STORAGE AND HANDLING REQUIREMENTS

A. Spare parts, maintenance materials, keys, special tools, and test equipment may be stored temporarily at the site of the work in suitable storage facilities until time to deliver these products to the locations designated in the Technical and Construction Specifications. Any such storage shall comply with the requirements specified in Section 01 66 00 - Product Storage and Handling Requirements.

B. Unload spare parts and materials in a manner that will prevent damage to packages and contents. Metro or its designee will open packages and inspect spare parts and material for damage. Damaged parts and materials will be returned to contractor for replacement with undamaged parts and materials at no additional cost to Metro.

3.05 EXTRA PARTS

A. The Contractor shall provide 5 years worth of material to support operations (according to Section 1.05 Submittals, Section B) of final installed quantities all mounted stand alone equipment including but not limited to channel banks, switches, fiber loop converter, multiplexers, and power supplies. Fiber Optic (FO) receivers, FO transmitters, jumpers, station Public Address (PA) control panels, noise level gain adjust device (if not integral to amplifier), power amplifier, limiter (if not integral to amplifier), microphone, supervision and alarm system. Operation Control Center (OCC) panels, record/playback stations, audio control system, speaker, line detector, and color cameras. Spare parts shall be interchangeable with their corresponding part.

3.06 ALTERNATIVE VERSION

A. The Contractor shall submit a List of Spare Parts (according to Section 1.05 Submittals, Section B), including item prices, for review by Metro or its designee including Operations and Maintenance Staff. Metro or its designee will accept and return a revised list to the Contractor. The Final Spare Parts List shall be the basis for acceptance of spare parts delivered.
SECTION 01 78 55

SAFETY AND SECURITY CERTIFICATION

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Requirements for providing technical and administrative support to Metro’s Safety and Security Certification Program and compliance with Metro’s Safety and Security Certification Plan (SSCP).

1.02 RELATED SECTIONS

A. Section 01 33 00: Submittal Procedures

1.03 REFERENCES (Not Used)

1.04 QUALITY ASSURANCE (Not Used)

1.05 SUBMITTALS

A. Refer to Section 01 33 00 - Submittal Procedures, for submittal requirements and procedures.

B. Design (Criteria) and Construction (Specification) conformance checklists applicable to the scope of the project.

C. Safety and Security Certification Compliance Plan no later than two months following start of Preliminary Engineering: Final Design unless requested earlier by Metro Safety.

D. Verification Checklist for testing activities.

E. Safety Certification Verification Report (SCVR) summarizing the safety and security certification effort and compliance to CPUC General Order for such reports.

1.06 DEFINITIONS

A. Safety and Security Certification: The collective process of verifying that safety and security requirements are identified and incorporated into the project. Metro’s SSCP shall identify what actions the Contractor must take to comply.

B. Elements of Safety and Security Certification: The elements that need to be certified will be identified by Metro in its SSCP that is submitted and approved by the CPUC.

1.07 CONTRACTOR’S RESPONSIBILITIES
A. The Contractor shall prepare Design (Criteria) and Construction (Specification) conformance checklists applicable to the scope of the project. The checklists shall address the Certifiable elements identified in Metro’s SSCP.

B. Contractor shall conduct timely and responsive verification of checklists commensurate with the progress of design/construction/installation/testing work completion. Progress report shall be submitted to Metro Safety Department on an agreed upon schedule but shall be done on a quarterly basis as a minimum.

C. Contractor shall provide technical and administrative support to the Safety and Security Certification Review Team (SSCRT) that is chaired by Metro Safety. The SSCRT is responsible for oversight of the Safety and Security Certification program. The SSCRT will meet on an-as-needed basis but no less than a quarterly basis. The Contractor’s in-progress work will be reviewed for compliance to the program. Any shortcomings shall be identified by the SSCRT and resolved in a timely manner by the Contractor.

D. The Contractor shall prepare a Safety and Security Certification Compliance Plan showing how it will comply with Metro’s SSCP. This Compliance Plan shall be completed and submitted to Metro Safety no later than two months following start of Preliminary Engineering unless requested earlier by Metro Safety.

E. Contractor shall prepare a Verification Checklist for testing activities. This applies primarily to systems installation on Rail projects. The checklist shall include relevant and complete contractual safety requirements associated with the testing portion of the project. This checklist should address testing at the factory, field installation, and systems integration testing where applicable.

F. The Contractor shall prepare a Safety Certification Verification Report (SCVR) that summarizes the safety and security certification effort and comply with CPUC General Order for such reports. The SCVR shall be submitted to Metro Safety for review and comment with sufficient time to allow revisions to be made before the report is submitted to the CPUC for their review and approval. CPUC approval is a requirement identified in their General Order 164.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 78 55
PART 1 – GENERAL

1.01 SECTION INCLUDES
   A. Training sessions.
   B. Training manuals and training aids.

1.02 RELATED SECTIONS
   A. Section 01 78 23: Operation and Maintenance Data

1.03 REFERENCES (Not Used)

1.04 QUALITY ASSURANCE (Not Used)

1.05 SUBMITTALS (Not Used)

1.06 DEFINITIONS (Not Used)

1.07 TRAINING SESSIONS
   A. General:
      1. Prior to final inspection and acceptance, instruct and train Metro’s designated operating and maintenance (O&M) personnel in the operation, start-up and shut-down, adjustment, troubleshooting, servicing, and preventive maintenance of all equipment and systems.
      2. Explain to Metro’s O&M personnel, in full and to their complete understanding, all procedures necessary to operate and maintain all equipment and systems on a continuing basis.
      3. Provide training manuals and other instructional materials and teaching aids as required to properly perform the required instruction and training.
      4. Review the contents of all O&M Manuals specified in Section 01 78 23 - Operation and Maintenance Data, with Metro’s O&M personnel in full detail to explain all aspects of the Manuals and the operation and maintenance of all equipment and systems.
      5. Provide classroom and on-site instruction as most appropriate for the particular equipment or system or as specified more specifically in the individual specifications sections.
6. Provide the services of manufacturers’ representatives for instruction and training when special equipment and systems require the knowledge and expertise of the various manufacturers for the proper operation and servicing of such equipment and systems.

7. Operation and maintenance manuals are specified in Section 01 78 23 - Operation and Maintenance Data, and may be used for training manuals where appropriate.

8. Various specific and detailed requirements for instruction and training of Metro personnel are specified in the individual Sections of these Specifications, as applicable, and in the Contract Specifications.

9. Training shall be provided for all personnel that operate and maintain the equipment and Contractor shall certify that all personnel have been trained.

B. Classroom Sessions:

1. The Contractor shall provide instruction and training sessions in the operation and maintenance of all equipment and systems for Metro O&M personnel prior to acceptance by the Engineer of the affected work.

2. Training sessions shall be conducted by representatives of the various equipment and product manufacturers and the Subcontractors who are involved in the installation and acceptance testing of the affected equipment and systems. Training sessions shall enable a qualified service technician to troubleshoot and sustain the equipment and systems.

3. The Engineer will provide a classroom facility for such instruction and training sessions, located in a Metro facility in Los Angeles, California. Approximately fifteen Metro or its designee maintenance persons will attend each training session.

4. The Contractor shall schedule the training sessions through Metro at a time convenient to Metro. The Contractor shall notify Metro of the proposed training sessions at least 30 days before the dates the training will be held.

C. On-Site and Hands-on Sessions: Provide on-site, hands-on training sessions as required to demonstrate actual maintenance procedures on the equipment. Hands-on training shall provide Metro personnel with actual maintenance experience.

D. Videotaping Rights: Metro or its designee shall have the right to videotape any and all training sessions presented by the Contractor. Metro or its designee shall also have the right to use these videotapes for future Metro-conducted training courses.

1.04 TRAINING MANUALS AND TRAINING AIDS

A. The Contractor shall provide training manuals to supplement the O&M manuals specified in Section 01 78 23 - Operation and Maintenance Data, and submit them to Metro or its designee for review and approval at least 60 days before the scheduled start of training sessions. Training manuals shall be prepared specifically for use as training aids.

B. Provide each training-session participant with one copy of pertinent training manuals and pertinent O&M manuals before the start of training sessions. Provide Metro or its designee with electronic files and two additional training manuals for file and reference documents.
C. Upon completion of each training session or course of instruction, instructor's manuals, training manuals, training aids, special tools, and O&M manuals shall become the property of Metro or its designee. Provide Metro or its designee with all revisions to the training manuals throughout the Contract and Guaranty periods.

D. Metro or its designee reserves the right to copy all training manuals and training aids for use in Metro-conducted training courses.

E. The Contractor shall provide all special tools, equipment, training aids, and other materials required for the training of Metro personnel. The number of special tools and other training equipment shall be adequate for the number of participants attending the training sessions.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 01 79 00