

**DEPARTMENT OF TRANSPORTATION**

DIVISION OF ENGINEERING SERVICES

OFFICE ENGINEER

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April 8, 2011

07-LA-47, 103-3.5/4.6, 0.0/1.1

07-138204

Project ID 0700000142

NH-BR-P047(010)N

Addendum No.4

Dear Contractor:

This addendum is being issued to the contract for CONSTRUCTION ON STATE HIGHWAY IN LOS ANGELES COUNTY IN LONG BEACH AND LOS ANGELES ON ROUTE 47 FROM OCEAN BOULEVARD TO ROUTE 103 JUNCTION AND ON ROUTE 103 FROM ROUTE 47 JUNCTION TO ANAHEIM STREET OVERHEAD.

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

Bids for this work will be opened on Thursday, April 21, 2011.

This addendum is being issued to revise the Project Plans, the Notice to Bidders and Special Provisions, the Bid book, and the Information Handout.

Project Plan Sheets 8, 9, 10, 11, 12, 13, 18, 21, 22, 25, 26, 30, 39, 40, 46, 47, 48, 49, 50, 51, 53, 55, 56, 57, 58, 59, 61, 62, 63, 64, 65, 66, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 133, 150, 151, 152, 153, 154, 288, 290, 291, 292, 293, 294, 295, 296, 302, 316, 325, 327, 371, 372, 373 and 504 are revised. Copies of the revised sheets are attached for substitution for the like-numbered sheets.

Project Plan Sheets 46A, 46B, 64A, 64B, 64C, 64D, 64E, 80A, 80B, 80C, 80D, 89A, 89B, and 374A are added. Copies of the added sheets are attached for addition to the project plans.

In the Special Provisions, Section 4, "BEGINNING OF WORK, TIME OF COMPLETION, AND LIQUIDATED DAMAGES," the sixth and seventh paragraphs are revised as follows:

"Complete the work, except plant establishment work, within 885 working days  
Complete the work, including plant establishment work, within 1135 working days."

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In the Special Provisions, Section 5-1.12, "SUPPLEMENTAL PROJECT INFORMATION," is revised as attached.

In the Special Provisions, Section 5-1.13, "NOISE CONTROL," subsection "GENERAL," the second, third and fourth paragraphs are deleted and the first paragraph is revised as follows:

"Pile driving must be performed between one hour after sunrise and one hour before sunset."

In the Special Provisions, Section 5-1.22, "TUNNEL SAFETY ORDERS," is added as attached.

In the Special Provisions, Section 10-1.01, "ORDER OF WORK," the second paragraph is revised as follows:

"Work impacting Pier A Plaza is not allowed between the Monday before Thanksgiving and the end of the first week in January of the following year."

In the Special Provisions, Section 10-1.01, "ORDER OF WORK," the following paragraph is added after the second paragraph.

"Attention is directed to "Maintaining Existing Pump System" of these special provisions in regards to providing maintenance to the existing pumping plant, generator, drainage system and Continuous Deflective Separation (CDS) unit located adjacent to the south bank of Cerritos Channel during construction. The Contractor shall submit his proposed method for maintaining existing pump system to the Engineer for approval at least 10 days prior to the 1st working day."

In the Special Provisions, Section 10-1.02, "CONTRACTOR-FURNISHED RESIDENT ENGINEER'S OFFICE (RE OFFICE)," subsection "STRUCTURE," is revised as follows.

"The RE office must have a minimum ceiling height of 8 feet and a minimum 5000 square feet of floor space, 3 connected trailers with screened weatherproof windows with window treatment, and lockable doors. Distribute 4 sets of door keys to the Engineer. Windows must be equipped with interior shades, curtains, or blinds, and must have a minimum area of 8 square feet and able to open and close.

The RE office shall have at least 10 rooms, including 5 separate 12-foot by 12-foot office rooms, one 18-foot by 24-foot conference room, kitchen, dining room, and one unisex, one men's and one women's rest room. Raised entrances, at least 3 feet wide, and exits, except for the ramp exit, must have stairs. A landing of minimum 3 feet by 3 feet must be provided at each doorway with integral railings with steps or ramp. The RE office must be tied down. The tie-down must be securely supported by adequate blocking to provide a foundation. A photocell and motion-sensor activated exterior light must be provided at entrances. Provide perimeter lighting on the building exterior walls. Exterior lighting must be wall pack type, 100 W each and operated on single photoelectric cell equipped with override switch. Install and maintain an electronic security system that will respond to breaches of exterior doors and windows with an on-site alarm."

In the Special Provisions, Section 10-1.02, "CONTRACTOR-FURNISHED RESIDENT ENGINEER'S OFFICE (RE OFFICE)," subsection "TEMPORARY SANITARY FACILITIES," the third paragraph is revised as follows:

"The rest rooms must contain on-site sanitary facilities meeting all Federal, State, and local health department requirements, must be maintained clean and sanitary, and in good working condition, and must be stocked with lavatory and sanitary supplies. The rest rooms must have a toilet, lavatory with hot and cold water, toilet paper holder, paper towel dispenser and paper toweling, mirror, soap dispenser, sharps container, lighting, and mechanical ventilation. Provide one urinal in the men's restroom. Provide a sanitary supply disposal receptacle for the unisex and women's restroom. At completion of the work, sanitary facilities must be disinfected."

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In the Special Provisions, Section 10-1.02, "CONTRACTOR-FURNISHED RESIDENT ENGINEER'S OFFICE (RE OFFICE)," subsection "EQUIPMENT AND FURNISHINGS," the first paragraph is revised as follows:

"Provide equipment and furnishings for the office as follows:

- A. Twenty four desks with minimum working surface 42 x 30 inches each and 25 non-folding chairs with upholstered seats and backs and on rollers.
- B. Twenty four computer desks with height adjustment of 23 to 30 inches.
- C. Twenty four phones. One phone at minimum will have a speakerphone and answering machine.
- D. Two conference tables, 4 by 7 feet minimum size, with 8 non-folding chairs with upholstered seats and backs and on rollers.
- E. One plan rack capable of holding full-size drawings.
- F. Twenty four bookcases 4 feet in width, 6 feet in height, and 1 foot in depth, anchored to walls.
- G. One 12 cubic foot, minimum, refrigerator with a freezer unit.
- H. One microwave oven (700 watt minimum).
- I. Four 10.5 gallon waste baskets and 24 waste baskets large enough for daily pick-up service.
- J. Seven white boards, erasable felt marker type, 30 by 48 inches, minimum.
- K. Five metal filing cabinets, 5 drawer legal size, minimum 27 inches deep, with enamel finish.
- L. At least 4 fire extinguishers with a minimum underwriter's laboratory rating of 4A60BC."

In the Special Provisions, Section 10-1.035, "MARINE PILE DRIVING ENERGY ATTENUATOR," is added as attached.

In the Special Provisions, Section 10-1.04, "ESTABLISH MARINE ACCESS," is revised as attached.

In the Special Provisions, Section 10-1.205, "TEMPORARY FENCE," is added as attached.

In the Special Provisions, Section 10-1.265, "COOPERATION," is added as attached.

In the Special Provisions, Section 10-1.32, "MAINTAINING TRAFFIC," the twenty-ninth paragraph is replaced with the following two paragraphs as follows:

"Bridge construction, embankments, falsework, or other temporary work within the limits of the usable channel of Cerritos Channel must be provided with one opening for the passage of boats. The opening must have a horizontal clearance of not less than 75 feet measured normal to the direction of flow and a vertical clearance of not less than 43 feet measured from the normal water elevation. The opening and the approach channels must be marked in conformance with the requirements of the California Administrative Code, Title 14, Division 4, Department of Navigation and Ocean Development, Waterway Marking System, Sacramento, California.

Attention is directed to the U.S. Coast Guard permit. You must notify the Engineer at least 60 days in advance of events that may affect navigation in Cerritos Channel. Notification must include at a minimum 8 1/2" x 11" plans for demolishing the existing bridge, substructure construction, falsework installation, and superstructure construction to the Engineer for U.S. Coast Guard review and approval."

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In the Special Provisions, Section 10-1.48, "EXISTING HIGHWAY FACILITIES," subsection "BRIDGE REMOVAL," the second paragraph is revised as follows:

"Bridge removal (portion) and fender removal includes removing existing structures at the following locations as shown on the plans. Full compensation for removing existing portions of buried foundations that conflict with new cast-in-drilled-hole piling shall be included in the lump sum price paid for bridge removal (portion) at the locations involved and no separate payment will allowed therefor. The existing paint system on the structures contains red lead and chromium."

In the Special Provisions, Section 10-1.48, "EXISTING HIGHWAY FACILITIES," subsection "MAINTAINING EXISITNG PUMP SYSTEM," is added as attached.

In the Special Provisions, Section 10-1.50, "EARTHWORK," the following paragraphs are added after the first paragraph.

"At location specified on the plans, where imported borrow is to be placed on original grade with a slope 10:1 (H:V) or flatter, prepare the basement material by scarifying the basement material to a minimum depth of 8 inches, watered, graded and rolled in advance of placing new material thereon as specified in Section 19-6 "Embankment Construction," of the Standard Specifications.

Full compensation for preparing basement as shown on the plans, and as specified in the special provisions, and as directed by the Engineer, shall be considered as included in the contract price paid per cubic yard for excavating the material or the contract price paid for furnishing and placing the imported borrow, as the case may be, and no additional compensation will be allowed therefor."

In the Special Provisions, Section 10-1.67, "JOINTED PLAIN CONCRETE PAVEMENT," is revised as attached.

In the Special Provisions, Section 10-1.68, "CONCRETE PAVEMENT RAPID STRENGTH CONCRETE," is revised as attached.

In the Special Provisions, Section 10-1.73, "PILING," subsection "PERMANENT STEEL CASING," the following paragraph is added after the first paragraph.

"Permanent steel casings shall be installed with impact hammers."

In the Special Provisions, Section 10-1.735, "CEMENT DEEP SOIL MIXING," is added as attached.

In the Special Provisions, Section 10-2.01, "GENERAL," subsection "COST-BREAK DOWN," the tables after the seventh paragraph are revised as attached.

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In the Special Provisions, Section 10-4.04, "SANITARY SEWER AND SEWER MANHOLE SYSTEM," subsection "COST-BREAK DOWN," the table after the seventh paragraph is revised as attached.

In the Special Provisions, Section 10-5.04, "WATER SYSTEM," subsection "MATERIALS," the following subsection "PVC PIPE" is added after the subsection "STEEL PIPE".

**"PVC Pipe**

PVC pipe for sizes 4 inches through 12 inches must be at least DR 18, Pressure Class 235 psi pipe complying with ANSI/AWWA C900, with bell and spigot ends. Fittings must be ductile iron push-on joints complying with ANSI/AWWA C110/A21.10, with rubber gaskets complying with ANSI/AWWA C111/A21.11.

Pipe joint and fitting angle points must be restrained. Restrained joints must be a boltless restrained push-on joint design, must contain a positive axial locking restrained system, and be capable of deflection after assembly.

Pipe hydrostatic testing must comply with ANSI/AWWA C151.

The pipe joint lubricant must be a product of or a brand recommended by the pipe manufacturer, nontoxic, water soluble, and must not impart objectionable taste to water. The lubricant must be non-corrosive to iron and must not deteriorate the gasket."

In the Special Provisions, Section 10-5.04, "WATER SYSTEM," subsection "COST-BREAK DOWN," the table after the seventh paragraph is revised as attached

In the Special Provisions, Section 13-1.01, "GENERAL," is revised as attached.

In the Bid book, in the "Bid Item List," Items 2, 38, 48, 49, 54, 61, 71, 88, 95, 96, 145, 176, 177, 178, 179, 180, 181, 182, 184, 185, 189 and 200 are revised and Items 254, 255, 256, 257, 258 and 259 are added and Items 50 and 253 are deleted as attached.

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To Bid book holders:

Replace pages 3, 4, 5, 6, 7, 10, 11, 12, and 15 of the "Bid Item List" in the Bid book with the attached revised pages 3, 4, 5, 6, 7, 10, 11, 12, and 15 of the Bid Item List. The revised Bid Item List is to be used in the bid.

Attached are revisions to the Information Handout.

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

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

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

Inform subcontractors and suppliers as necessary.

This addendum and attachments are available for the Contractors' download on the Web site:

**[http://www.dot.ca.gov/hq/esc/oe/project\\_ads\\_addenda/07/07-138204](http://www.dot.ca.gov/hq/esc/oe/project_ads_addenda/07/07-138204)**

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

Sincerely,

  
for REBECCA D. HARNAGEL

Chief, Office of Plans, Specifications & Estimates  
Office Engineer  
Division of Engineering Services

Attachments

**5-1.12 SUPPLEMENTAL PROJECT INFORMATION**

The Department makes the following supplemental project information available:

**Supplemental Project Information**

Means	Description
Included in the Information Handout	<ol style="list-style-type: none"> <li>1. Final Foundation Report for Schuyler Heim Bridge (Replace), Bridge No. 53-3032 dated May 10, 2010</li> <li>2. Final Foundation Report, New Dock Street Off-Ramp, Bridge No. 53-3031 dated May 7, 2010.</li> <li>3. Final Foundation Report, New Dock On-Ramp, Bridge No. 53-3033 dated May 7, 2010.</li> <li>4. Final Foundation Report, SR 103 Off-Ramp, Bridge No. 53-3034K dated May 7, 2010.</li> <li>5. Final Foundation Report, SR 103 On-Ramp, Bridge No. 53-3035S dated May 7, 2010.</li> <li>6. Final Foundation Report, Retaining Wall A1, Bridge No. 53E0147, dated May 10, 2010.</li> <li>7. Final Foundation Report, Retaining Wall E1, Bridge No. 53E0149 and Retaining Wall E2, Bridge No. 53E0150, dated May 17, 2010.</li> <li>8. Foundation Report, Retaining Wall G1, Bridge No. 53E0151 and Retaining Wall G2, dated May 10, 2010.</li> <li>9. Foundation Report, Retaining Wall C1, Bridge No. 53E0148, dated May 10, 2010.</li> <li>10. Foundation Report, Retaining Wall H1 dated May 10, 2010.</li> <li>11. Battery backup system connection diagrams and foundation details</li> <li>12. California Coastal Commission Coastal Development Permit dated June 1, 2010</li> <li>13. U.S. Department of the Army Certificate of Compliance Permit No. SPL-2010-00186-PHT dated July 30, 2010</li> <li>14. California Regional Water Quality Control Board Water Quality Certification dated July 21, 2010</li> <li>15. Port of Long Beach Harbor Development Permit No. HDP-10-014 dated July 19, 2010</li> <li>16. United States Coast Guard Permit No. 3-10-10 dated August 24, 2010</li> <li>17. National Marine Fisheries Service Agreement dated February 12, 2010</li> <li>18. United States Fish and Wildlife Service Agreement dated June 9, 2009</li> <li>19. California Regional Water Quality Control Board Certification No. 10-005 dated July 21, 2010</li> <li>20. Conditional Approval of Site Investigation Work Plan for the Commodore Schuyler F. Heim Bridge Replacement Project, Long Beach, California dated July 2, 2010</li> <li>21. Pre-Demolition Asbestos and Lead Paint Survey Report, Commodore Schuyler Heim Bridge, Long Beach, California, dated April 23, 2010</li> <li>22. Final Baseline Hydroacoustic Survey Plan for Commodore Schuyler F. Heim Bridge, Demolition and Replacement Project, Long Beach, California dated July 15, 2010.</li> <li>23. California Public Utilities Commission Memo G.10-07-021, Terminal Island Fwy/New Dock St off ramp.</li> <li>24. California Public Utilities Commission Memo G.10-07-022, New Dock Street.</li> <li>25. California Public Utilities Commission Memo G.10-07-023, Terminal Island Freeway Overhead.</li> <li>26. Harbor Development Permit (Railroad Guidelines Section)</li> <li>27. Port of Long Beach/Port of Los Angeles Insurance Requirements for Joint Revocable Permit/Joint Temporary Entry &amp; Use License</li> <li>28. Release of Liability, Claims and Hold Harmless Agreement</li> <li>29. Contractor Site Visit Map and Pre-bid Site Visit Limits Maps</li> <li>30. Addendum to Final Materials Report (April 2, 2010) Schuyler Heim Bridge Replacement Project Los Angeles County, California (07-LA-47, PM 3.74, EA 238501) (Dated June 7, 2010)</li> </ol>

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	<p>31. Addendum to "Final Foundation Report, Schuyler Heim Bridge (Replace), Dated May 10, 2010", Bridge No. 53-3032, Los Angeles County, California, 7-LA-47, PM 3.58, EA 138201</p> <p>32. Revised Addendum No. 2 to "Final Foundation Report, Schuyler Heim Bridge (Replace), Dated May 10, 2010", Bridge No. 53-3032, Los Angeles County, California, 7-LA-47, PM 3.58, EA 138201</p> <p>33. Addendum to "Final Foundation Report, NB SR 103 Off-Ramp, Dated May 7, 2010", Bridge No. 53-3034K, Los Angeles County, California, 7-LA-47, PM 0.01, EA 138201 (Dated July 1, 2010)</p> <p>34. Addendum 2 to "Final Foundation Report, NB SR 103 Off-Ramp, Dated May 7, 2010", Bridge No. 53-3034K, Los Angeles County, California, 7-LA-47, PM 0.01, EA 238501 (Dated December 21, 2010)</p> <p>35. Addendum to "Final Foundation Report, New Dock Street Off-Ramp, Dated May 7, 2010", Bridge No. 53-3031, Los Angeles County, California, 7-LA-47, PM 3.74, EA 138201 (Dated July 1, 2010)</p> <p>36. Addendum to "Final Foundation Report, New Dock Street On-Ramp, Dated May 7, 2010", Bridge No. 53-3033, Los Angeles County, California, 7-LA-47, PM 3.74, EA 138201 (Dated July 1, 2010)</p> <p>37. Addendum to "Final Foundation Report, SB SR 103 On-Ramp, Dated May 7, 2010", Bridge No. 53-3035S, Los Angeles County, California, 7-LA-47, PM 0.01, EA 138201 (Dated July 1, 2010)</p> <p>38. Addendum 2 to "Final Foundation Report, SB SR 103 On-Ramp, Dated May 7, 2010", Bridge No. 53-3035S, Los Angeles County, California, 7-LA-47, PM 0.01, EA 238501 (Dated December 21, 2010)</p> <p>39. Addendum to "Final Foundation Report, Retaining Wall A1 (Bridge No. 53E0147), Dated May 10, 2010", Los Angeles County, California, 7-LA-47, PM 3.55, EA 138201 (Dated July 2, 2010)</p> <p>40. Addendum to "Final Foundation Report, Retaining Wall C1 (Bridge No. 53E0148), Dated May 10, 2010", Los Angeles County, California, 7-LA-47, PM 3.72, EA 138201 (Dated July 2, 2010)</p> <p>41. Addendum to "Final Foundation Report, Retaining Wall E1 (Bridge No. 53E0149) and Retaining Wall E2 (Bridge No. 53E0150), Dated May 17, 2010", Los Angeles County, California, 7-LA-47, PM 0.10, EA 138201 (Dated July 2, 2010)</p> <p>42. Addendum to "Final Foundation Report, Retaining Wall G1 (Bridge No. 53E0151) and Retaining Wall G2 (Bridge No. 53-RWG2), Dated May 10, 2010", Los Angeles County, California, 7-LA-47, PM 0.17, EA 138201 (Dated July 2, 2010)</p> <p>43. Letter from Department of Transportation to United States Coast Guard, Bridge Administration with Subject "Schuyler Heim Bridge Replacement Project, Los Angeles County, CA - Response to Questions on Bridge Permit Application" (Dated March 17, 2010)</p> <p>44. Letter from State of California Department of Industrial Relations Division of Occupational Safety and Health Administration Mining and Tunneling Unit to California Department of Transportation with Subject "Underground Classification Numbers: C050-037-11T to C054-037-11T EA 07-138204 - Schuyler Heim Bridge Replacement Project (Dated January 4, 2011)</p> <p>45. "As-Built" for Caltrans Seismic Retrofit Project 07-265004</p> <p>46. "As-Built" for Port of Long Beach MSE Wall at Pier S Terminal</p> <p>47. Final Environmental Impact Statement/Environmental Impact Report and Section 4(f) Evaluation, Volumes I and II.</p> <p>48. Hazardous Waste Re-Assessment for Proposed Changes to Scope of Work, SR-47 Schuyler Heim Bridge Replacement Project, Long Beach, California, Los Angeles County.</p>
Available as specified in the Standard Specifications	Bridge as-built drawings
Available at: <a href="http://www.dot.ca.gov/hq/es/c/oe/weekly_ads/index.php">http://www.dot.ca.gov/hq/es/c/oe/weekly_ads/index.php</a>	Cross sections

### **5-1.22 TUNNEL SAFETY ORDERS**

The work to be performed has been classified "Potentially Gassy" by the State Division of Occupational Safety and Health under Section 8422 of the Tunnel Safety Orders of the California Code of Regulations.

The Contractor's attention is directed to Section 7-1.06, "Safety and Health Provisions," of the Standard Specifications. A change to the work as a direct result of the Contractor's planned operations that would cause work activities to fall under the requirements of the Tunnel Safety Orders, and that has not been shown on the plans or specified in these special provisions shall be reason for suspension of the work. The Contractor shall notify the Engineer not less than 20 days prior to worker exposure to a facility meeting the definition of a tunnel or shaft as described in Sections 8403 or 8405 of the Tunnel Safety Orders. The Department will obtain additional location classifications as may be necessary to allow the work to proceed.

The Contractor shall prominently post a notice of the classification and any special orders, rules, special conditions, or regulations at the tunnel work site, and all personnel shall be informed of the classification.

At least 7 days prior to beginning work covered by these provisions, the Contractor shall submit the name of the person designated as the on-site Safety Representative to the Engineer along with proof of certification by the Division of Occupational Safety and Health as having met the requirements of Section 8406 of the Tunnel Safety Orders of the California Code of Regulations.

## 10-1.035 MARINE PILE DRIVING ENERGY ATTENUATOR

### GENERAL

#### Summary

This work consists of designing, furnishing, installing, operating, monitoring, maintaining, and removing a marine pile driving energy attenuator system to attenuate underwater energy generated by pile installation including but not limited to coffer dams, casings, trestles, falsework, and column fender construction. The marine pile driving energy attenuator system for pile installations that are 8 feet or greater in diameter must consist of an air bubble curtain system.

An air bubble curtain system is generally consists an air compressors, supply lines to deliver air, distribution manifolds or headers, perforated aeration pipes, and a frame. The frame facilitates transport and placement of the system, keeps the aeration pipes stable, and provides ballast to counteract the buoyancy of the aeration pipes in operation.

For this specification, pile installation refers to activities involved in driving a single pile; pile driving refers to the time when the hammer is physically driving the pile.

Attention is directed to "Supplemental Project Information" of these special provisions. Marine pile driving energy attenuator must be established in compliance with applicable permits, licenses, agreements, and certifications (PLACs) as specified in Section 7-1.04 "Permits, Licenses, Agreements, and Certifications," of the Standard Specifications.

#### Submittals

Submit a Marine Pile Driving Energy Attenuator Plan with working drawings including the air bubble curtain system. The Marine Pile Driving Energy Attenuator Plan must include performance criteria for sound attenuation to achieve the maximum practicable reductions in underwater sound levels during construction in accordance with applicable PLACs and this special provision. The report must include a Hydroacoustic Monitoring Plan.

The Hydroacoustic Monitoring Plan must detail seasonal and diurnal operational usage constraints, the means of sampling (i.e., locations, frequency, and methods to be implemented during pile driving), monitoring and analysis of real time data and as characterized within PLACs. The plan must specify marine mammal minimization measures to prevent incidental harassment if an occasional transitory animal appears and define the limits of "marine mammal safety zones" based on the hydroacoustic threshold values established by NMFS and ambient baseline data proposed in the "Final Baseline Hydroacoustic Survey Plan", dated July 15, 2010, prepared by Tetra Tech, and included in the Information Handout. Specifications for pile driving, biological monitoring, and stop work authority must be characterized in the Hydroacoustic Monitoring Plan

You must submit working drawings with supplement for the attenuator systems to the Engineer for approval in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings" of the Standard Specifications, except as otherwise noted.

Working drawings with supplements must be signed by a Mechanical Engineer who is registered in the State of California. Working drawings must include the following:

- A. Details of the systems including mechanical and structural details.
- B. Details of anchorage components, air compressors, supply lines, distribution manifolds, aeration pipes and frame.
- C. Details of proposed means of isolating noise-producing systems on the pile-driving barge.
- D. Details of meters, gauges, and recording devices.
- E. Description of measures taken to avoid shining light into the water during pile driving operations.
- F. Details of the manufacturer's recommendations for installation of the flow meters in conditions of laminar flow and non-laminar flow.

The supplement to the working drawing must include the following:

- A. Independently checked design calculations.
- B. Materials list including the name of the manufacturer and the source, model number, description, and standard of manufacture.
- C. Manufacturer's descriptive data and catalog cuts for products proposed for the system, including air compressors.
- D. Calculations showing pressure loss in the piping system and estimated flows from the most removed orifice of the aeration piping.

Within 40 days after approval of the contract, you must submit working drawings, with supplements, to the Engineer. You must allow the Engineer 20 days to review the working drawings. If the Engineer determines required, you must revise and resubmit the working drawings within 15 days of receipt of the Engineer's comments. Allow the Engineer 10 days to review the revised working drawings.

Submit inspection reports within 48 hours following inspection.

### Quality Control and Assurance

The approved attenuator system must be operating prior to beginning pile driving at any pile location. If the Engineer determines the attenuator fails, pile driving must be stopped immediately. Pile driving must not resume until the Engineer determines the attenuator system at that location is operating in conformance with the requirements of this section.

Failure of the air bubble curtain system includes, but is not be limited to, the following failures as determined by the Engineer:

- A. The pressure or flow rate in a meter falls below 90% of its determined operating value during the pile driving operation. Operating values based on calculated data will be determined during the performance test.
- B. During inspection of the perforated pipe, the Engineer determines that erosion of the holes or debris has clogged the holes that will degrade the performance of the system.

You must make provisions for the Engineer to inspect the attenuator system for proper operation before each deployment and as necessary during deployment. Proper operation of the air bubble curtain system during deployment will be determined by observation of the digital meters (air flow) and analog gauges (pressure) in the monitoring station and by other methods developed by the Engineer.

Sound levels in excess of 180 dB<sub>RMS</sub> with an impact hammer and 120 dB<sub>RMS</sub> from vibratory hammer must not occur at distances greater than 30 ft from the pile being driven.

The sound attenuation system must meet or exceed the performance criteria for sound attenuation and water quality.

### CONSTRUCTION

You must provide adequate means to prevent light from pile driving operations from shining directly into the water. At least 15 minutes prior to and during pile driving operations, do not shine light directly into the water in areas adjacent to piles being driven.

When a vibratory hammer is used, use "soft start" technique to install each pile. Each pile will be vibrated at low energy for 15 seconds followed by a 1 minute waiting period during which no vibration occurs. This procedure must be repeated twice prior to vibrating piles into place.

Do not install or proof test with impact hammer more than 2 piles per day with a minimum 12-hour interval between daily driving.

Piles must be installed between one hour after sunrise and one hour before sunset.

Stop pile installation when directed by the Engineer. If a transitory animal appears within the defined limits of the marine mammal safety zone; stop pile installation until the animal leaves.

Proof test one pile each day using an impact hammer from all piles installed that day.

Use a sound attenuation system during proof testing.

Air bubble curtain system must conform to the following:

- A. Air bubble system consists of multiple and concentric layers of perforated aeration pipes stacked vertically in accordance with the following:

Water Depth (ft)	No. of Layers
0 to less than 15	2
15 to less than 30	4
30 to less than 50	7
50 to less than 65	10
65 to less than 80	13

- B. Pipes in any layer must be arranged in a geometric pattern that allows pile driving operation to be completely enclosed by bubbles for the full depth of the water column and for a radial dimension of no more than 2 feet as measured from the outside surface of the pile.
- C. The lowest layer of perforated aeration pipes must be designed to contact the mudline without sinking into the bay mud.
- D. The system must provide a bubble flux of 22 cubic feet per minute per linear foot of pipe in each layer. Air holes must be 0.6 inches in diameter and must be spaced 0.8 inches apart. Air holes must be placed in 4 adjacent rows along the pipe to provide uniform bubble flux.
- E. Meters must be provided in accordance with the following:
  - 1. Pressure meters must be installed at inlets to aeration pipelines (manifolds) and at points of lowest pressure in each branch of the aeration pipeline pipelines (manifolds).
  - 2. The Flow meters must be installed in the main line at each compressor and at each branch of the aeration pipelines (manifold). In applications where the feedline from the compressor is continuous from the compressor to the aeration pipe inlet, the flow meter at the compressor can be eliminated.
  - 3. Flow meters must be installed according to the manufacturer's recommendation based on laminar flow or non-laminar flow, which ever applies.

Gauges must be installed above the water line and shall be accessible to the Engineer. You must keep a continuous electronic log of meters and gauges when the system is operating. Readings must be logged every 1 minute and at other times, as determined by the Engineer, when variation in the readings exceed 10%. Maintain a graphical plot showing the variation of the meter readings with time.

Air pressure and air flow meters and gauges must be calibrated by an independent testing laboratory approved by the Engineer prior to use in the attenuator system. Meters shall be accurate to within 2 percent.

Conduct a performance test of the bubble curtain prior to pile driving operations to confirm the calculated pressures and flow rates at each manifold ring.

Submit an inspection/performance report in conformance with "Working Drawings," of these special provisions within 72 hours following the performance test.

Monitor the condition of the attenuator system and prepare inspection reports daily during pile installation operations and no less than every other day during periods of no activity.

Your design, installation, maintenance, monitoring, operation and removal of the attenuator system must take into account the site conditions and the requirements of pile installation. Factors to be taken into account include anchoring, moving, and dismantling the system; configuration of channel bottom; water velocity; water-surface conditions; air and water temperatures; and positioning of pile and pile-driving equipment relative to the bubble curtain system.

The design of the system must ensure that the system extends from channel bottom to the water surface during maximum water-current conditions and accommodates tidal changes.

If a pile-driving barge is used, the pile-driving barge must be isolated from the noise-producing operations. This isolation must not transmit noise from the pile driving operation through the barge to the water column. The barge deploying or containing the pile-driving equipment is not required to be contained within the system.

Remove the attenuator system at the completion of the project and the system will remain your property.

## MEASUREMENT AND PAYMENT

The contract lump sum price paid for marine pile driving energy attenuator includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing marine pile driving energy attenuators, complete in place, including Marine Pile Driving Energy Attenuator Plan, Hydroacoustic Monitoring Plan, designing, installing, inspecting, operating, maintaining, monitoring, recording, isolating pile-driving barge from pile installation noise and removing the attenuator systems, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

## **10-1.04 ESTABLISH MARINE ACCESS**

### **GENERAL**

#### **Summary**

This work consists of furnishing, erecting, maintaining and removing barges, trestles and other facilities to establish marine access to the job site. This work is separate from and in addition to work specified in Section 11, "Mobilization," of the Standard Specifications.

Marine access must be established within the limits shown on the plans, in compliance with applicable permits, licenses, agreements, and certifications as specified in Section 7-1.04 "Permits, Licenses, Agreements, and Certifications," of the Standard Specifications.

#### **Submittals**

Within 4 weeks after contract approval in accordance with Section 5-1.02 "Plans and Working Drawings," of the Standard Specifications, submit calculations and working drawings of access trestles and cofferdams for approval by the Engineer. The submittal must include locations of existing piles and demonstrate that piling or foundations for access trestles or cofferdams will not conflict with the existing piles.

You must allow the Engineer 50 days to review and approve the working drawings and supplemental calculations. If revisions are required, as determined by the Engineer, revise and resubmit the working drawings and calculations within 10 days of receipt of the Engineer's comments and allow 15 days for the Engineer to review the revisions.

### **CONSTRUCTION**

Attention is directed to the existence of piles in the vicinity of bridge piers. You must locate existing piling prior to driving piles.

You must use a vibratory hammer to install piles for Establish Marine Access. Vibratory hammers must be use a "soft start" technique to install each pile. Vibrate piles at low energy for 15 seconds followed by a 1 minute waiting period during which no vibration occurs. This procedure must be repeated twice prior to vibrating piles into place.

Attention is directed to "Marine Pile Driving Energy Attenuator" of these special provisions. Use a sound attenuation system during proof testing with an impact hammer.

### **REMOVAL**

When no longer required, marine access facilities must be completely removed. Removed materials become your property and must be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

### **COST BREAK-DOWN**

Furnish the Engineer a cost break-down for the contract lump sum item of establish marine access. The cost break-down table must be submitted to the Engineer for approval within 15 working days after the contract has been approved. Cost break-down tables will be approved, in writing, by the Engineer before any partial payment will be made for the applicable items of establish marine access involved.

Attention is directed to "Time-Related Overhead" of these special provisions regarding compensation for time-related overhead.

Cost break-downs must be completed and furnished in the format shown in the sample of the cost break-downs included in this section. You must designate additional line item descriptions of work and the quantity, value and amount for those line items must be completed in the same manner as for the unit descriptions shown in the samples. The line items and quantities given in the samples are to show the manner of preparing the cost break-down you furnish.

Determine the quantities required to complete the work shown on the plans. The quantities and their values must be included in the cost break-downs submitted to the Engineer for approval. You are responsible for the accuracy of the quantities and values used in the cost break-down submitted for approval. Cost break-downs must reflect the items, work, quantities and costs required to establish marine access to the job site, including as a minimum: initial mobilization of marine access facilities, monthly facility and equipment rental, monthly maintenance, and demobilization. You are responsible for the accuracy of the quantities and costs used in the schedule of values submitted for approval.

The sum of the amounts for the line items of work listed in the cost break-down table for establish marine access work must be equal to the contract lump sum price bid for establish marine access. Overhead and profit, except for time-related overhead, must be included in each individual line item of work listed in a cost break-down table.

No adjustment in compensation will be made in the contract lump sum price paid for establish marine access due to differences between the quantities shown in the cost break-down you furnish and the quantities required to complete the work as shown on the plans and as specified in these special provisions.

Individual line item values in the approved cost break-down tables will be used to determine partial payments during the progress of the work and as the basis for calculating an adjustment in compensation for the contract lump sum item of establish marine access due to changes in line items of work ordered by the Engineer. When the total of ordered changes to line items of work increases or decreases the lump sum price bid for establish marine access by more than 25 percent, the adjustment in compensation for the applicable lump sum item will be determined in the same manner specified for increases and decreases in the total pay quantity of an item of work in Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications.

**ESTABLISH MARINE ACCESS COST BREAK-DOWN**

**Contract No. 07-138204**

UNIT DESCRIPTION	UNIT	APPROXIMATE QUANTITY	VALUE	AMOUNT
Initial Mobilization	LS	Lump Sum		

**TOTAL** \_\_\_\_\_

**MEASUREMENT AND PAYMENT**

The contract lump sum price paid for establish marine access includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in establish marine access, complete in place, including designing, constructing, maintaining, and removing marine access, complete in place, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

#### 10-1.205 TEMPORARY FENCE

Temporary fence shall be furnished, constructed, maintained, and later removed as shown on the plans, as specified in these special provisions and as directed by the Engineer.

Except as otherwise specified in this section, temporary fence shall conform to the plan details and the specifications for permanent fence of similar character as provided in Section 80, "Fences," of the Standard Specifications.

Used materials may be installed provided the used materials are good, sound and are suitable for the purpose intended, as determined by the Engineer.

Materials may be commercial quality provided the dimensions and sizes of the materials are equal to, or greater than, the dimensions and sizes shown on the plans or specified herein.

Posts shall be either metal or wood at the Contractor's option.

Galvanizing and painting of steel items will not be required.

Treating wood with a wood preservative will not be required.

Concrete footings for metal posts will not be required.

Temporary fence that is damaged during the progress of the work shall be repaired or replaced by the Contractor at the Contractor's expense.

When no longer required for the work, as determined by the Engineer, temporary fence shall be removed. Removed facilities shall become the property of the Contractor and shall be removed from the site of the work, except as otherwise provided in this section.

Removed temporary fence materials that are not damaged may be constructed in the permanent work provided the materials conform to the requirements specified for the permanent work and such materials are new when used for the temporary fence.

Holes caused by the removal of temporary fence shall be backfilled in conformance with the provisions in the second paragraph of Section 15-1.02, "Preservation of Property," of the Standard Specifications.

The various types and kinds of temporary fence will be measured and paid for in the same manner specified for permanent fence of similar character as provided in Section 80, "Fences," of the Standard Specifications.

Full compensation for maintaining, removing, and disposing of temporary fence shall be considered as included in the contract prices paid per linear foot for the various types of temporary fence and no additional compensation will be allowed therefor.

**10-1.265 COOPERATION**

It is anticipated that work by another contractor may be in progress adjacent to or within the limits of this project during progress of the work on this contract. The following table lists contracts anticipated to be in progress during this contract.

Contract No.	Co-Rte-PM	Location	Type of Work
Port of Long Beach Project. Contract number not yet assigned	LA-47-PM 3.8/4.1	Cerritos Channel	Channel Dredging
Caltrans Project. Contract number not yet assigned	LA-103-PM 0.1	Area between NB Route 103 mainline and NB Route 103 Henry Ford Off-Ramp	Pump Station Replacement (Caltrans Pump 53-2626W)
07-275704	LA-103-PM 0.0/1.0	Terminal Island UPRROH	Bridge Painting

Comply with Section 7-1.14, "Cooperation," of the Standard Specifications.

## MAINTAINING EXISTING PUMP SYSTEM

You must maintain the existing pumping plant, generator, drainage system and Continuous Deflective Separation (CDS) unit located adjacent to the south bank of Cerritos Channel during construction.

Pumping plant, generator, drainage system and CDS unit maintenance must be staged so the drainage capacity is maintained throughout the life of the contract. You are responsible for maintaining drainage pumping capacity of the drainage area, and maintenance of the pumping plant, generator, drainage system and CDS unit throughout the life of the contract. Section 7-1.15, Relief From Maintenance and Responsibility, of the Standard Specifications does not apply to the pumping plant, generator, drainage system and CDS unit.

The total drainage capacity maintained shall not be less than 18,000 gallons per minute at 26 feet of total dynamic head. Maintaining Existing Pump System includes, but not be limited to, providing necessary adjustments and repairs, and cleaning of the CDS unit, entrance bay, and the various sumps, for the proper operation of the Drainage Pumping Plant Equipment and Pumping Plant Electrical Equipment, including the generator, automatic transfer switch, electrical controls, ultrasonic depth and other measurement devices, discharge pipeline, outfall and other components required for full and complete operation of the present pumping plant. You must repair damages resulting from vandalism, theft, or other criminal activities.

Pumping capacity must be maintained by a method approved by the Engineer.

The contract lump sum price paid for maintaining existing pump system shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in maintaining existing pump system elements as shown on the plans, specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Repairing damages resulting from vandalism, theft, or other criminal activities will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

## 10-1.67 JOINTED PLAIN CONCRETE PAVEMENT

### GENERAL

#### Summary

This work includes constructing jointed plain concrete pavement.  
Comply with Section 40, "Concrete Pavement," of the Standard Specifications.

#### Submittals

Submit AASHTO T 336 coefficient of thermal expansion test results to the Engineer.  
For rejected test strips, submit a plan for changed materials, methods, or equipment before constructing additional test strips.

#### Quality Control and Assurance

##### General

Perform coefficient of thermal expansion testing under AASHTO T 336 at a frequency of 1 test for each day of paving.

##### Prepaving Conference

Meet with the Engineer at a prepaving conference at a mutually agreed time and place. Discuss methods of performing the production and paving work.

Prepaving conference attendees must sign an attendance sheet provided by the Engineer. The prepaving conference must be attended by your:

1. Project superintendent
2. Quality control manager
3. Paving construction foreman
4. Subcontractor's workers including:
  - 4.1. Foremen
  - 4.2. Concrete plant manager
  - 4.3. Concrete plant operator
  - 4.4. Personnel performing saw cutting and joint sealing

Do not start paving activities including test strips until the listed personnel have attended a prepaving conference.

##### Test Strips

The first paving activity must be to construct a test strip:

1. 700 to 1,000 feet long
2. Same width as the planned paving
3. With the same equipment used for the planned paving

The Engineer evaluates the test strip for compliance with the specifications for Engineer's acceptance.

The Engineer selects from 6 to 12 core locations for dowel bars and up to 6 locations for tie bars per test strip.

If you use mechanical dowel bar inserters, the test strip must demonstrate they do not leave voids, segregations, or surface irregularities such as depressions, dips, or high areas.

Allow the Engineer 3 days to evaluate the test strip for:

1. Smoothness
2. Dowel bar and tie bar alignment
3. Thickness
4. Final finishing except coefficient of friction

During the 3-day evaluation, the Engineer rejects a test strip if:

1. Surface varies more than 0.02 foot from a 12-foot straightedge's lower edge
2. Wheel path's individual high points are greater than 0.025 foot in 25 feet
3. Dowel bars do not comply with specified placement tolerances
4. Concrete pavement thickness deficiency is greater than 0.05 foot
5. Final finishing does not comply with the specifications except coefficient of friction

Remove the test strip if the Engineer rejects it for noncompliance with the specifications for dowel bar alignment or thickness. Dispose of rejected test strip material under Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

If the Engineer rejects the test strip for noncompliance with the smoothness or final finishing specifications except coefficient of friction, you may grind the test strip into compliance if you intend to leave it as part of the paving.

If the Engineer does not reject the test strip during the 3-day evaluation, you may begin production paving while the Engineer continues to evaluate the test strip for compliance with the other specifications. If the Engineer rejects the test strip for noncompliance with the other specifications, stop production paving until you construct a test strip the Engineer accepts.

Construct additional test strips until the Engineer accepts one.

Construct additional test strips if:

1. You propose different paving equipment including:
  - 1.1. Batch plant
  - 1.2. Paver
  - 1.3. Dowel bar inserter
  - 1.4. Tie bar inserter
  - 1.5. Tining
  - 1.6. Curing equipment
2. You change concrete mix proportions

The Engineer may allow paving to start without a test strip if you use a batch plant mixer, paving equipment, and personnel that completed a Department project within the preceding 12 months. Submit supporting documents and previous project information.

## **MATERIALS**

### **Bar Reinforcement**

Bar reinforcement must be one of the following:

1. Epoxy coated steel reinforcing bar:
  - 1.1. Bar must comply with ASTM A 615/A 615M, Grade 40 or 60; ASTM A 996/A 996M; or ASTM A 706/A 706M.
  - 1.2. Epoxy-coating must comply with ASTM A 934/A 934M. Epoxy-coating must be purple or gray and handled at the manufacturing plant and job site under ASTM D 3963/D 3963M and Section 52-1.02B, "Epoxy-coated Reinforcement," of the Standard Specifications.
2. Stainless steel bar:
  - 2.1. Stainless steel bar must be descaled, pickled, and polished solid stainless steel bars, UNS Designation S31603 or S31803, Grade 60 under ASTM A 276/A 276M, and ASTM A 955/A 955M.
  - 2.2. If placed under the basket placing method, stainless steel baskets must comply with ASTM A 493/A 493M, UNS S31600 or S31603.

### **Dowel Bar and Dowel Bar Baskets**

Dowel bar and dowel bar baskets must be the following:

1. Stainless steel bar:
  - 1.1. Stainless steel bar must be descaled, pickled, and polished solid stainless steel bars, UNS Designation S31603 or S31803, Grade 60 under ASTM A 276/A 276M, and ASTM A 955/A 955M.
  - 1.2. If placed under the basket placing method, stainless steel baskets must comply with ASTM A 493/A 493M, UNS S31600 or S31603.

### **Tie Bar and Tie Bar Baskets**

Tie bar and tie bar baskets must be the following:

1. Stainless steel bar:
  - 1.1. Stainless steel bar must be descaled, pickled, and polished solid stainless steel bars UNS Designation S31603 or S31803, Grade 60 under ASTM A 955/A 955M. If placed under the basket placing method, baskets must be stainless steel under ASTM A 493/A 493M, UNS S31600 or S31603.

### **Joint Seal**

Use compression seal for longitudinal, isolation, and transverse joints.

### **Tack Coat**

Tack coat must comply with Section 39, "Hot Mix Asphalt," of the Standard Specifications.

## **CONSTRUCTION**

### **Tie Bar Spacing On Curves**

If the curvature of a concrete pavement slab prevents equal spacing of tie bars to maintain the minimum clearance from transverse joints, space them from 15 to 18 inches.

### **Transverse Contraction Joints**

Transverse contraction joints must be Type A1. If widening existing concrete pavement, do not construct transverse contraction joints to match the existing pavement's joint spacing or skew unless specified. Transverse joints in concrete pavement on a curve must be on a single straight line through the curve's radius point.

### **Longitudinal Contraction Joints**

Longitudinal contraction joints must be Type A1.

### **Transition Joints With Hot Mix Asphalt**

If a joint between concrete pavement and hot mix asphalt is specified, apply tack coat between the concrete pavement and hot mix asphalt.

### **Concrete Pavement Removal**

When removing and replacing concrete, remove it to full depth and width.

### **Crack Treatment**

If cracks form that do not extend to the full depth of a slab, treat the cracks with a high molecular weight methacrylate resin under "Concrete Pavement Crack Treatment."

### **Removal and Replacement of Slabs Without Bar Reinforcement**

For full depth and partial length slab removal, saw cut the full depth and width.

Saw cut full slabs at the longitudinal and transverse joints. Saw cut partial slabs at joints and where the Engineer orders. You may make additional saw cuts within the removal area to facilitate slab removal or to prevent binding of the saw cut at the removal area's edge. Saw cut perpendicular to the slab surface.

Use slab lifting equipment with lifting devices that attach to the slab. After lifting the slab, paint the cut ends of dowels and tie bars.

Construct transverse and longitudinal construction joints between the new slab and existing concrete using dowel bars. For longitudinal joints, offset dowel bar holes from original tie bars by 3 inches. For transverse joints, offset dowel bars holes from the original dowel bars by 3 inches.

Drill holes and use chemical adhesive to bond the dowel bars to the existing concrete. Use an automated dowel bar drilling machine. Holes must be at least 1/8-inch greater than the dowel bar diameter. Clean the holes in compliance with the chemical adhesive manufacturer's instructions. Holes must be dry when you place chemical adhesive.

Immediately after inserting dowel bars into the chemical adhesive-filled holes, support the dowel bars and leave them undisturbed for the minimum cure time recommended by the chemical adhesive manufacturer.

Clean the faces of joints and underlying base from loose material and contaminants. Coat the faces with a double application of pigmented curing compound under Section 28-1.07, "Curing," of the Standard Specifications. For partial slab replacements, place preformed sponge rubber expansion joint filler at new transverse joints in compliance with ASTM D 1752.

### **MEASUREMENT AND PAYMENT**

If the Engineer accepts a test strip and it remains as part of the paving surface, the test strip is measured and paid for as jointed plain concrete pavement, seal pavement joint, and seal isolation joint as the case may be.

Full compensation for providing a facility for and attending the prepaving conference is included in the contract price paid per cubic yard for jointed plain concrete pavement and no additional compensation is allowed therefor.

Full compensation for applying tack coat at transverse transition joints and end anchors is included in the contract price paid per cubic yard for jointed plain concrete pavement and no separate payment is made therefor.

If the curvature of a slab affects tie bar spacing and additional tie bars are required, they are included in the contract price paid per cubic yard for jointed plain concrete pavement and no additional compensation is allowed therefor.

## **10-1.68 CONCRETE PAVEMENT (RAPID STRENGTH CONCRETE)**

### **GENERAL**

#### **Summary**

This work includes removing existing pavement and underlying base and constructing rapid strength concrete (RSC) pavement.

Comply with Section 40, "Concrete Pavement," of the Standard Specifications.

#### **Definitions**

**early age:** Time less than 10 times the concrete's final set time.

**final set time:** Time a specific penetration resistance of 4,000 psi is achieved, determined under ASTM C 403.

**opening age:** Time the concrete achieves the specified strength for opening to traffic.

#### **Submittals**

##### **Quality Control Plan**

At least 20 days before placing trial slabs, submit a written Quality Control Plan (QCP). The QCP must detail the methods used to ensure the quality of the work. You or the Engineer may request a meeting with you, the Quality Control Managers (QCMs), and the Engineer to discuss the QCP. Allow the Engineer 15 days to accept the QCP.

##### **Mix Design**

At least 10 days before use in a trial slab, submit a mix design for RSC that includes:

1. Opening age
2. Proposed aggregate gradation
3. Proportions of hydraulic cement and aggregate
4. Types and amounts of chemical admixtures
5. Maximum time allowed between batching and placing
6. Range of ambient temperatures over which the mix design is effective
7. Final set time
8. Any special instructions or conditions such as water temperature requirements

Submit more than 1 mix design to plan for ambient temperature variations anticipated during RSC placement. Each mix design must have a maximum ambient temperature range of 18 °F.

Submit modulus of rupture development data for each mix design. You may use modulus of rupture development data from laboratory-prepared samples. The testing ages for modulus of rupture development data must include 1 hour before opening age, opening age, one hour after opening age, 24 hours, 7 days, and 28 days.

##### **Trial Slab**

Submit split aggregate samples taken during trial slab construction.

##### **Calibration Testing Certificates of Compliance**

Submit a Certificate of Compliance under Section 6-1.07, "Certificates of Compliance," of the Standard Specifications with each delivery of aggregate, cement, and admixtures to be used for calibration tests. Submit certified copies of the weight of each delivery. The Certificate of Compliance must state the source of materials used for the calibration tests is from the same source to be used in the work. The Certificate of Compliance must be signed by your authorized representative.

### **Cement and Admixtures**

At least 45 days before intended use, submit a sample of cement from each proposed lot and samples of proposed admixtures in the quantities ordered by the Engineer.

During RSC pavement operations, submit uniformity reports for hydraulic cement at least once every 30 days to the Transportation Laboratory, Attention: Cement Laboratory. Uniformity reports must comply with ASTM C 917, except testing age and water content may be modified to suit the particular material.

### **Chemical Adhesive (Drill and Bond)**

At least 7 days before the start of dowel bar (drill and bond) work, submit a copy of the chemical adhesive manufacturer's recommended installation procedure.

### **Quality Control and Assurance**

#### **Pre-operation Conference**

Meet with the Engineer at a pre-operation conference at a mutually agreed time and place. Make the arrangements for the conference facility. Discuss methods of performing the work.

Pre-operation conference attendees must sign an attendance sheet provided by the Engineer. The pre-operation conference must be attended by your:

1. Project superintendent
2. Project manager
3. Quality control manager
4. Paving foreman
5. Concrete plant manager
6. Concrete plant operator
7. Personnel performing saw cutting and joint sealing
8. Plant inspector
9. Paving machine operators
10. Inspectors
11. Samplers
12. Testers
13. Subcontractor's workers

Do not start paving activities including test strips until the listed personnel have attended a pre-operation conference.

The purpose of the pre-operation conference is to familiarize personnel with the project's requirements. Items to be discussed include the processes for:

1. Production
2. Transportation
3. Placement
4. Replacing pavement
5. Contingency plan
6. Sampling
7. Testing

#### **Quality Control Program**

##### **General**

Establish a quality control program. The quality control program assures the Engineer that methods and procedures are in place to produce and place RSC in compliance with the specifications.

If the quality control program is not implemented and followed, the Engineer orders RSC work stopped.

### **Quality Control Managers**

For the project, designate a lead QCM and assistant QCMs.

The lead QCM administers the quality control plan (QCP). The lead QCM must hold current American Concrete Institute (ACI) certification as "Concrete Field Testing Technician-Grade I" and "Concrete Laboratory Testing Technician-Grade II." Assistant QCMs must hold current ACI certification as "Concrete Field Testing Technician-Grade I" and either "Concrete Laboratory Testing Technician-Grade I" or "Concrete Laboratory Testing Technician-Grade II."

The QCM responsible for the production period involved must review and sign the sampling, inspection, and test reports before submittal to the Engineer. At least 1 QCM must be present for:

1. Each stage of mix design
2. Trial slab construction
3. Production and construction of RSC
4. Meetings with the Engineer relating to production, placement, or testing.

A QCM must not be a member of this project's production or paving crews, an inspector, or a tester. A QCM must have no duties during the production and placement of RSC except those specified.

### **Quality Control Plan**

The QCP describes the procedures you will use to control the production process including:

1. Determining if changes to the production process are needed
2. Procedures for proposing changes
3. Procedures for implementing changes

Do not start RSC work until the QCP has been accepted by the Engineer. The Engineer accepts the QCP based the inclusion and adequacy of:

1. The names and qualifications of the lead Quality Control Manager (QCM) and assistant QCMs.
2. An outline procedure for the placement and testing of trial slabs
3. An outline procedure for the production, transportation, and placement of RSC
4. An outline procedure for sampling and testing to be performed during and after RSC construction
5. A contingency plan for correcting problems in production, transportation, or placement. Include the quantity and location of standby material in your contingency plan.
6. Provisions for determining if RSC placement must be suspended and temporary roadway structural section constructed
7. Forms to report inspection, sampling, and testing
8. The location of your quality control testing laboratory and testing equipment during and after paving operations
9. A list of the testing equipment to be used including date of last calibration
10. The names and certifications of quality control personnel including those performing sampling and testing

At the time of QCP submission, the Department qualifies the quality control samplers and testers through the Independent Assurance Program (IAP) for the sampling and testing they perform.

### **Quality Control Inspection, Sampling, and Testing**

Perform quality control sampling, testing, and inspection throughout RSC production and placement. Before any sampling and testing, give the Engineer at least 2 business days notice. Give the Engineer unrestricted access to your quality control inspectors, samplers, testers, and laboratories. Submit testing results within 15 minutes of testing completion. Record inspection, sampling, and testing on the forms accepted with the QCP and submit them within 48 hours of completion of each paving shift and within 24 hours of 7-day modulus of rupture tests.

Provide a testing laboratory to perform quality control tests. Maintain sampling and testing equipment in proper working condition. Perform sampling under California Test 125.

Testing laboratories and testing equipment must comply with the Department's Independent Assurance Program.

## **Trial Slabs**

Before starting work on RSC pavement, complete one trial slab for each rapid strength concrete mix design. Trial slabs demonstrate that you are capable of producing RSC pavement in compliance with the specifications within the specified time periods including delivery, placement, finishing, and curing times, and under similar atmospheric and temperature conditions expected during replacement operations.

During trial slab construction, sample and split the aggregate for gradings, cleanness value, and sand equivalent testing. Trial slabs must comply with the QCP for RSC production and placement. The QCP must detail your intended:

1. Locations and times
2. Production procedures
3. Placement and finishing methods
4. Sampling methods, sample curing, and sample transportation
5. Testing and test result reporting

The trial slab must be at least 10' x 20'. The trial slab thickness must be at least 10 inches. Place trial slabs near the job site at a mutually-agreed location that is neither on the roadway nor within the project limits.

Within 20 minutes after rapid strength concrete delivery for trial slabs, fabricate test beams under California Test 524. Use beams to determine early age and 7-day modulus of rupture values.

Cure beams fabricated for early age testing so that the monitored temperatures in the beams and the trial slab are always within 5 °F. Monitor and record the internal temperatures of trial slabs and early age beams at intervals of at least 5 minutes. Install thermocouples or thermistors connected to strip-chart recorders or digital data loggers to monitor the temperatures. Temperature recording devices must be accurate to within  $\pm 2$  °F. Measure internal temperatures at 1 inch from the top, 1 inch from the bottom, and no closer than 3 inches from any edge until early age testing is completed.

Cure beams fabricated for 7-day testing under California Test 524 except place them into sand at a time that is from 5 to 10 times the final set time, or 24 hours, whichever is earlier.

Trial slabs must have an early age modulus of rupture of not less than 400 psi and a 7-day modulus of rupture of not less than 600 psi.

You may request to use ASTM C 805 or ASTM C 900 to estimate the modulus of rupture of the pavement. If the Engineer accepts these test methods, but either you or the Engineer later withdraw the request or acceptance, you must use the selected test method until 7 days after you notify the Engineer of withdrawal of the request or 7 days after the Engineer notifies you of withdrawal of acceptance. During trial slab curing, perform correlation testing to determine the relationship between the modulus of rupture and ASTM C 805 or ASTM C 900 test results that were performed. Establish the correlation by testing at 4 or more time intervals. At a minimum, perform tests 1 hour before and 1 hour after the opening age and 2 others within 15 minutes of the opening age. Calculate modulus of rupture estimates with either a linear, exponential, or logarithmic least squares best-fit equation, whichever provides the best correlation coefficient.

Dispose of trial slabs and test specimens for trial slabs under Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

## **Production Process Control and Quality Control Testing**

Contingency plan equipment and personnel must be present at the job site.

Provide continuous process control and quality control sampling and testing throughout RSC production and placement.

During production of RSC, sample and test aggregates at least once for every 650 cubic yards of RSC produced, but not less than once per placement shift. Test aggregates for compliance with gradations, cleanness value, and sand equivalent specifications.

At least once for every 650 cubic yards of RSC produced, but not less than twice per placement shift, sample and test for:

1. Yield
2. Penetration
3. Air content
4. Unit weight

During placement of RSC, fabricate beams and test for modulus of rupture within the first 30 cubic yards, at least once every 130 cubic yards, and within the final truckload.

If the Engineer requests, submit split samples and fabricate test beams for the Engineer's testing.

For determining early age modulus of rupture, cure beams under the same conditions as the pavement until 1 hour before testing. Cure beams fabricated for the 7-day test under California Test 524. The Engineer uses modulus of rupture test results for accepting or rejecting the replacement pavement and pay factor adjustment for low modulus of rupture.

Dispose of materials resulting from the construction of the test beams, temporary roadway structural section, and rejected replacement pavement under Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

**Weighmaster Certificates**

Weighmaster certificates for RSC, regardless of the proportioning method used, must include the information necessary to trace the manufacturer and the manufacturer's lot number for the cement being used. If proportioned into fabric containers, the weighmaster certificates for the cement must contain date of proportioning, location of proportioning, and actual net draft cement weight. If proportioned at the pour site from a storage silo, the weighmaster certificates must contain date of proportioning, location of proportioning, and the net draft cement weight used in the load.

**Engineer's Acceptance for Modulus of Rupture**

RSC pavement must develop a minimum modulus of rupture of 400 psi before opening to traffic. RSC pavement must develop a minimum modulus of rupture of 600 psi 7 days after placement. The Engineer may accept RSC pavement that does not attain the specified moduli of rupture as specified in "Pay Factor Adjustment for Low Modulus of Rupture." The Engineer determines the modulus of rupture by testing 3 beam specimens under California Test 524 and averaging the results. You may fabricate beam specimens using an internal vibrator under ASTM C 31. No single test represents more than that day's production or 130 cubic yards, whichever is less.

Beam specimens for early age must be cured so the temperature in the specimens is within 5 °F of the temperature in the pavement. You must determine the modulus of rupture at other ages using beams cured and tested under California Test 524 except place them in sand from 5 to 10 times the final set time or 24 hours, whichever is earlier. You must perform the testing to determine modulus of rupture values of the RSC pavement in the presence of the Engineer.

**Pay Factor Adjustment for Low Modulus of Rupture**

The Engineer adjusts payment for RSC for modulus of rupture as follows:

1. Payment for RSC with a modulus of rupture of 400 psi or greater before opening to traffic and 7-day modulus of rupture of 600 psi or greater is not adjusted.
2. Payment for RSC with a 7-day modulus of rupture less than 500 psi is not adjusted and no payment is made. Remove this RSC and replace it at your expense with RSC that complies with the specifications.
3. Payment for RSC with a modulus of rupture less than 350 psi before opening to traffic is not adjusted and no payment is made. Remove this RSC and replace it at your expense with RSC that complies with the specifications.
4. Payment for RSC with a modulus of rupture of 350 psi or greater before opening to traffic and a 7-day modulus of rupture greater than or equal to 500 psi is reduced by the percentage in the pay table for the quantity represented by the tests.

**Percentage Pay Table**

Modulus of Rupture (psi) at opening to traffic	7-Day Modulus of Rupture (psi)		
	Greater than or equal to 600	Less than 600 and greater than or equal to 550	Less than 550 and greater than or equal to 500
Greater than or equal to 400	100%	95%	90%
Less than 400 and greater than or equal to 350	95%	95%	90%
Less than 350	0%	0%	0%

The Engineer rejects any RSC area that develops 1 or more transverse full depth random cracks within 64 days after placement. Remove this RSC at your expense and replace it with RSC that complies with the specifications. A transverse crack is a crack running from one longitudinal edge of the panel to the other.

Partial depth cracks must be treated with a high molecular weight methacrylate resin under "Concrete Pavement Crack Treatment."

## MATERIALS

### Temporary Roadway Structural Section

#### Aggregate Base

Aggregate base for temporary roadway structural section must be produced from any combination of broken stone, crushed gravel, natural rough-surfaced gravel, reclaimed concrete and sand. Grading of aggregate base must comply with the 3/4-inch maximum grading specified in Section 26-1.02A, "Class 2 Aggregate Base," of the Standard Specifications.

#### Hot Mix Asphalt

For hot mix asphalt:

1. Choose the 3/8-inch or 1/2-inch HMA Type A or Type B aggregate gradation under Section 39-1.02E, "Aggregate," of the Standard Specifications.
2. Minimum asphalt binder content must be 6.8 percent for 3/8-inch aggregate gradation and 6.0 percent for 1/2-inch aggregate gradation.
3. Choose asphalt binder Grade PG 64-10, PG 64-16, or PG 70-10 under Section 92, "Asphalts," of the Standard Specifications.
4. The mix design must meet an approved Job Mix Formula.

#### RSC

RSC that fails to meet opening strength but has a modulus of rupture of at least 200 psi may serve as temporary roadway and must be replaced during the next paving shift.

#### Bond Breaker

Bond breaker must be one of the following:

1. White curing paper under ASTM C 171
2. White opaque polyethylene film under ASTM C 171, except that the minimum thickness must be 6 mils
3. Paving asphalt, Grade PG 64-10, under Section 92, "Asphalts," of the Standard Specifications
4. Curing compound (5) under Section 90-7.01b, "Curing Compound Method," of the Standard Specifications

#### Rapid Strength Concrete

Section 40-3.03, "Proportioning," and Section 90-1.01, "Description," of the Standard Specifications do not apply to RSC.

Choose the combined aggregate grading for RSC from either the 1-1/2 inch maximum or the 1-inch maximum combined grading under Section 90-3.04, "Combined Aggregate Gradings," of the Standard Specifications.

Produce RSC with hydraulic cement. Hydraulic cement must comply with ASTM C 219 and:

#### Hydraulic Cement

Test Description	Test Method	Requirement
Contraction in air	California Test 527, W/C Ratio = 0.39 ±0.010	0.053 %, max.
Mortar expansion in water	ASTM C 1038	0.04 %, max.
Soluble chloride <sup>a</sup>	California Test 422	0.05 %, max.
Soluble sulfates <sup>a</sup>	California Test 417	0.30 %, max.
Thermal stability	California Test 553	90 %, min.
Compressive strength @ 3 days	ASTM C 109	2,500 psi

Note:

<sup>a</sup> Perform test on a cube specimen fabricated under ASTM C 109. Cure the specimen at least 14 days and then pulverized to 100 percent passing the No. 50 sieve.

You may use Type C accelerating and Type E accelerating and water reducing chemical admixtures as specified in Section 90-4, "Admixtures," of the Standard Specifications. In addition to the admixtures listed on the Department's current list of approved admixtures, you may request citric acid or borax. If used, include chemical admixtures in any specified testing.

### **Joint Sealant for Isolation Joints**

Use preformed compression joint seal for isolation joints.  
Use bituminous joint sealant for isolation joint next to bituminous pavement.

### **Joint Sealant for Contraction Joints**

Use preformed compression joint seal for transverse and longitudinal contraction joints.

### **Joint Filler for Isolation Joints**

Joint filler for isolation joints must be bituminous expansion joint filler under section 40-2.08, "Joint Filler Material," of the Standard Specifications.

## **CONSTRUCTION**

### **Transverse Contraction Joints**

Transverse contraction joints must be Type A1.

### **Longitudinal Contraction Joints**

Longitudinal contraction joints must be Type A2.

### **Removing Existing Pavement and Base Materials**

The Engineer determines the exact limits of RSC pavement.

When removing existing pavement or pavement and underlying base material, replace them with base material and concrete pavement within the same work period. If you are unable to construct, finish, and cure concrete pavement before the specified traffic opening time, construct a temporary roadway structural section.

Saw cut the outline of concrete pavement to be removed with a power-driven saw. Do not saw cut within concrete pavement slabs more than 2 days before concrete pavement slab removal. If you saw cut in work shifts that are before the actual removal work shift, do not make saw cuts parallel or diagonal to the traveled way. Saw cut so that traffic will not dislodge any pieces or segments.

Saw through tie bars and dowel bars before concrete pavement slab removal.

Remove concrete pavement by non-impacting methods. Remove each pavement panel in one or more pieces without disturbing or damaging the underlying base.

Pavement and base removal must be performed without damage to pavement and base to remain in place. Damage to pavement and base to remain in place must be repaired or removed and replaced at your expense.

Dispose of removed materials under Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

After removing pavement and base to the required depth, grade to a uniform plane. Water and compact the material remaining in place to a firm and stable base. The finished surface of the remaining material must not extend above the grade established by the Engineer. At your expense, fill areas that were over-excavated during base removal with replacement material in the same operation as the base replacement.

### **Temporary Roadway Structural Section**

Place hot mix asphalt and aggregate base where existing pavement is replaced for construction of a temporary roadway structural section. The quantity must be equal to the quantity of pavement removed during the work shift. If you place temporary roadway structural section, it must be maintained and later removed as the first order of work when replace concrete pavement activities resume. The temporary roadway structural section must consist of 3-1/2 inch thick hot mix asphalt over aggregate base. RSC not conforming to the specifications may be used for temporary roadway structural section with the Engineer's approval.

Spread and compact aggregate base and hot mix asphalt by methods that produce a well-compacted, uniform base, with a surface of uniform smoothness, texture and density. Surfaces must be free from pockets of coarse or fine material. You may spread aggregate base and hot mix asphalt each in one layer. The finished surface of hot mix asphalt must not vary more than 0.05 foot from the lower edge of a 12-foot long straightedge placed parallel with the centerline and must match the elevation of existing concrete pavement along the joints between the existing pavement and temporary surfacing.

After removing temporary roadway structural section, you may stockpile removed aggregate base at the project site and reuse it for temporary roadway structural sections. When no longer required, dispose of standby material or stockpiled material for temporary roadway structural sections under Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

## Rapid Strength Concrete

### General

Concrete pavement penetration specified in Section 90-6.06, "Amount of Water and Penetration," of the Standard Specifications does not apply to RSC.

RSC must develop the specified opening age and 7-day modulus of rupture strengths.

### Proportioning

Weighing, measuring, and metering devices used for proportioning materials must comply with Section 9-1.01, "Measurement of Quantities," of the Standard Specifications.

For batches with a volume of 1 cubic yard or more, proportioning must comply with one of the following methods:

1. Batch the ingredients at a central batch plant and charge them into a mixer truck for transportation to the pour site. Proportion ingredients under Section 90-5, "Proportioning," of the Standard Specifications.
2. Batch the ingredients except the cement at a central batch plant and charge them into a mixer truck for transportation to a cement silo and weigh system, which must proportion cement for charging into the mixer truck.
3. Batch ingredients except the cement at a central batch plant and charge them into a mixer truck for transportation to a location where pre-weighed containerized cement is added to the mixer truck. The cement pre-weighing operation must utilize a platform scale. The platform scale must have a maximum capacity of 2.75 tons with a maximum graduation size of 1 pound. Pre-weigh cement into a fabric container. The minimum amount of cement to be proportioned into any single container must be 1/2 of the total amount required for the load of RSC being produced.
4. Cement, water, and aggregate are proportioned volumetrically.

For central batch plants, indicators for weighing and measuring systems such as over and under dials must be grouped so that each indicator's smallest increment can be accurately read from the control point of the proportioning operation. In addition, indicators for weighing and measuring cement batched from a remote weighing system must be placed so that each indicator can be accurately read from the control point of the proportioning operation.

Weighing equipment must be insulated from other equipment's vibration or movement. When the plant is operating, each draft's material weight must not vary from the designated weight by more than the specified tolerances. Each scale graduation must be 0.001 of the usable scale capacity.

Aggregate must be weighed cumulatively. Equipment for weighing aggregate must have a zero tolerance of  $\pm 0.5$  percent of the aggregate's designated total batch weight. Equipment for the separate weighing of the cement must have a zero tolerance of  $\pm 0.5$  percent of the cement's designated individual batch draft. Equipment for measuring water must have a zero tolerance of  $\pm 0.5$  percent of the water's designated weight or volume.

The weight indicated for any individual batch of material must not vary from the preselected scale setting by more than:

**Batch Weight Tolerances**

Material	Tolerance
Aggregate	$\pm 1.0$ percent of designated batch weight
Cement	$\pm 0.5$ percent of designated batch weight
Water	$\pm 1.5$ percent of designated batch weight or volume

Proportioning consists of dividing the aggregate into the specified sizes and storing them in separate bins, and then combining the aggregate with cement and water. Proportion dry ingredients by weight. Proportion liquid ingredients by weight or volume.

Handle and store aggregates under Section 90-5.01, "Storage of Aggregates," of the Standard Specifications. Proportion liquid admixtures under Section 90-4.10, "Proportioning and Dispensing Liquid Admixtures," of the Standard Specifications.

Control aggregate discharged from several bins with gates or mechanical conveyors. The means of discharge from the bins and from the weigh hopper must be interlocked so that no more than 1 bin can discharge at a time, and the weigh hopper cannot be discharged until the required quantity from each of the bins has been deposited in the weigh hopper.

At the time of batching, dry and drain aggregates to a stable moisture content. Do not proportion aggregates with visible separation of water from the aggregate during proportioning. At the time of batching, the free moisture content of fine aggregate must not exceed 8 percent of its saturated, surface-dry weight.

If the proportioning plant has separate supplies of the same size group of aggregate with different moisture content, specific gravity, or surface characteristics affecting workability, exhaust 1 supply before using another supply.

Keep cement separated from the aggregate until discharged into the mixer. When discharged into the mixer, cement must be free of lumps and clods. Before reuse, clean fabric containers used for transportation or proportioning of cement.

Weigh systems for proportioning aggregate and cement must be individual and distinct from other weigh systems. Each weigh system must have a hopper, a lever system, and an indicator.

When ordered by the Engineer, determine the gross weight and tare weight of truck mixers on scales designated by the Engineer.

Install and maintain in operating condition an electrically actuated moisture meter. The meter must indicate on a readily visible scale the changes in the fine aggregate moisture content as it is batched. The meter must have a sensitivity of 0.5 percent by weight of the fine aggregate.

Obtain the Engineer's acceptance before mixing water into the concrete during hauling or after arrival at the delivery point. If the Engineer accepts additional water be incorporated into the concrete, the drum must revolve not less than 30 revolutions at mixing speed after the water is added and before starting discharge. Measure water added to the truck mixer at the job site through a meter in compliance with Section 9-1.01, "Measurement of Quantities," of the Standard Specifications.

### **Volumetric Proportioning**

You may choose to proportion RSC by volume.

Handle and store aggregates under Section 90-5.01, "Storage of Aggregates," of the Standard Specifications. Proportion liquid admixtures under Section 90-4.10, "Proportioning and Dispensing Liquid Admixtures," of the Standard Specifications.

Batch-mixer trucks must proportion cement, water, aggregate, and additives by volume. Aggregate feeders must be connected directly to the drive on the cement vane feeder. The cement feed rate must be tied directly to the feed rate for the aggregate and other ingredients. Only change the ratio of cement to aggregate by changing the gate opening for the aggregate feed. The drive shaft of the aggregate feeder must have a revolution counter reading to the nearest full or partial revolution of the aggregate delivery belt.

Proportion aggregate with a belt feeder operated with an adjustable cutoff gate delineated to the nearest quarter increment. The gate opening height must be readily determinable. Proportion cement by any method that complies with the accuracy tolerance specifications. Proportion water with a meter under Section 9-1.01, "Measurement and Payment," of the Standard Specifications.

Calibrate the cutoff gate for each batch-mixer truck used and for each aggregate source. Calibrate batch-mixer trucks at 3 different aggregate gate settings that are commensurate with production needs. Perform at least 2 calibration runs for each aggregate gate.

Individual aggregate delivery rate check-runs must not deviate more than 1.0 percent from the mathematical average of all runs for the same gate and aggregate type. Each test run must be at least 1,000 pounds.

At the time of batching, dry and drain aggregates to a stable moisture content. Do not proportion aggregates with visible separation of water from the aggregate during proportioning. At the time of batching, the free moisture content of fine aggregate must not exceed 8 percent of its saturated, surface-dry weight.

If the proportioning plant has separate supplies of the same size group of aggregate with different moisture content, specific gravity, or surface characteristics affecting workability, exhaust 1 supply before using another supply.

Cover rotating and reciprocating equipment on batch-mixer trucks with metal guards.

Individual cement delivery rate check-runs must not deviate more than 1.0 percent of the mathematical average of 3 runs of at least 1,000 pounds each.

When the water meter operates from 50 to 100 percent of production capacity, the indicated weight of water delivered must not differ from the actual weight delivered by more than 1.5 percent for each of 2 runs of 300 gallons. Calibrate the water meter under California Test 109. The water meter must be equipped with a resettable totalizer and display the operating rate.

Conduct calibration tests for aggregate, cement, and water proportioning devices with a platform scale located at the calibration site. Platform scales for weighing test-run calibration material must have a maximum capacity of 2.75 tons with maximum graduations of 1 pound. Error test the platform scale within 8 hours of calibrating the batch-mixer truck proportioning devices. Perform error-testing with test weights under California Test 109. Furnish a witness scale that is within 2 graduations of the test weight load. The witness scale must be available for use at the production site throughout the production period. Equipment needed for the calibration of proportioning systems must remain available at the production site throughout the production period.

The batch-mixer truck must be equipped so that accuracy checks can be made. Recalibrate proportioning devices every 30 days after production starts or when you change the source or type of any ingredient.

A spot calibration is calibration of the cement proportioning system only. Perform a 2-run spot calibration each time 55 tons of cement passes through the batch-mixer truck. If the spot calibration shows the cement proportioning system does not comply with the specifications, complete a full calibration of the cement proportioning system before you resume production.

Proportion liquid admixtures with a meter.

Locate cement storage immediately before the cement feeder. Equip the system with a device that automatically shuts down power to the cement feeder and aggregate belt feeder when the cement storage level is less than 20 percent of the total volume.

Submit aggregate moisture determinations, made under California Test 223, at least every 2 hours during proportioning and mixing operations. Record moisture determinations and submit them at the end of each production shift.

Equip each aggregate bin with a device that automatically shuts down the power to the cement feeder and the aggregate belt feeder when the aggregate discharge rate is less than 95 percent of the scheduled discharge rate.

Proportioning device indicators must be in working order before starting proportioning and mixing operations and must be visible when standing near the batch-mixer truck.

Identifying numbers of batch-mixer trucks must be at least 3 inches in height, and be located on the front and rear of the vehicles.

Mix volumetric proportioned RSC in a mechanically operated mixer. You may use auger-type mixers. Operate mixers uniformly at the mixing speed recommended by the manufacturer. Do not use mixers that have an accumulation of hard concrete or mortar.

Do not mix more material than will permit complete mixing. Reduce the volume of material in the mixer if complete mixing is not achieved. Continue mixing until a homogeneous mixture is produced at discharge. Do not add water to the RSC after discharge.

Do not use equipment with components made of aluminum or magnesium alloys that may have contact with plastic concrete during mixing or transporting of RSC.

The Engineer determines uniformity of concrete mixtures by differences in penetration measurements made under California Test 533. Differences in penetration are determined by comparing penetration tests on 2 samples of mixed concrete from the same batch or truck mixer load. The differences must not exceed 5/8 inch. Submit samples of freshly mixed concrete. Sampling facilities must be safe, accessible, clean, and produce a sample that is representative of production. Sampling devices and sampling methods must comply with California Test 125.

Do not use ice to cool RSC directly. If ice is used to cool water used in the mix, it must be melted before entering the mixer.

When proportioning and charging cement into the mixer, prevent variance of the required quantity by conditions such as wind or accumulation on equipment.

Each mixer must have metal plates that provide the following information:

1. Designed usage
2. Manufacturer's guaranteed mixed concrete volumetric capacity
3. Rotation speed

The device controlling the proportioning of cement, aggregate, and water must produce production data. The production data must be captured at 15-minute intervals throughout daily production. Each capture of production data represents production activity at that time and is not a summation of data. The amount of material represented by each production capture is the amount produced in the period from 7.5 minutes before to 7.5 minutes after the capture time. The daily production data must be submitted in electronic or printed media at the end of each production shift. The reported data must be in the order including data titles as follows:

1. Weight of cement per revolution count
2. Weight of each aggregate size per revolution count
3. Gate openings for each used aggregate size
4. Weight of water added to the concrete per revolution count
5. Moisture content of each used aggregate size
6. Individual volume of other admixtures per revolution count
7. Time of day
8. Day of week
9. Production start and stop times

10. Batch-mixer truck identification
11. Name of supplier
12. Specific type of concrete being produced
13. Source of the individual aggregate sizes
14. Source, brand, and type of cement
15. Source, brand and type of individual admixtures
16. Name and signature of operator

You may input production data by hand into a pre-printed form or it may be captured and printed by the proportioning device. Present electronic media containing recorded production data in a tab delimited format on a CD or DVD. Each capture of production data must be followed by a line-feed carriage-return with sufficient fields for the specified data.

#### **Base Replacement Layer**

Replace removed base materials with Lean Concrete Base Rapid Setting (LCBRS) in a separate and distinct operation from replacing concrete pavement.

Finish the replacement base layer to the grade of the original base layer. Do not texture the surface. Finish to a smooth surface, free of projections such as mortar ridges, voids, and porous areas.

#### **Bond Breaker**

Place bond breaker between replacement pavement and existing lean concrete base, cement treated base, or new base replacement layer.

If you use curing paper or polyethylene film, place it in a wrinkle free manner. Overlap adjacent sheets a minimum of 6 inches in the same direction as the concrete pour.

If you use curing compound or paving asphalt, before application remove foreign and loose materials remaining from slab removal.

If you use paving asphalt, do not add water before applying asphalt to the base surface. Apply the paving asphalt in one even application at a rate from 0.02 to 0.10 gallon per square yard over the entire base surface area. Do not place concrete pavement until the paving asphalt has cured.

If you use curing compound, apply it in 2 separate applications. Apply each application evenly at a rate from 0.07 to 0.11 gallon per square yard over the entire base surface area.

#### **Spreading, Compacting, and Shaping**

The specifications for pavement thickness in Section 40, "Concrete Pavement," of the Standard Specifications do not apply.

You may use metal or wood side forms. Wood side forms must not be less than 1-1/2 inches thick. Side forms must be of sufficient rigidity, both in the form and in the connection with adjoining forms, that movement will not occur under forces from subgrading and paving equipment or from the pressure of concrete.

Side forms must remain in place until the pavement edge no longer requires the protection of forms. Clean and oil side forms before each use.

After you deposit the RSC on the subgrade, consolidate RSC with high-frequency internal vibrators. Consolidate adjacent to forms and across the full paving width. Place RSC as nearly as possible to its final position. Do not use vibrators for extensive shifting of RSC.

Spread and shape RSC with powered finishing machines supplemented by hand finishing.

After you mix and place RSC, do not add water to the surface to facilitate finishing. Use surface finishing additives as recommended by the manufacturer of the cement after their use is approved by the Engineer.

#### **Joints**

Before placing RSC against existing concrete, place 1/4-inch thick commercial quality polyethylene flexible foam expansion joint filler across the original transverse and longitudinal joint faces and extend the excavation's full depth. Place the top of the joint filler flush with the top of the pavement. Secure joint filler to the joint face of the existing pavement to prevent the joint filler from moving during the placement of RSC.

Construct transverse contraction joints in pavement widenings to match the spacing and skew of the contraction joints in the adjacent existing pavement. Where the existing transverse contraction joint spacing in an adjacent lane exceeds 15 feet, construct an additional transverse contraction joint midway between the existing joints. Complete sawing of contraction joints within 2 hours of completion of final finishing. Cut contraction joints a minimum 2-3/4 inches deep.

### **Dowel Bars and Tie Bars**

Drill concrete and bond dowel bars and tie bars with chemical adhesive at construction joints. Use any of the other placement methods for dowel bars and tie bars at contraction joints.

When drilling and bonding dowel bars and tie bars, clean drilled holes in compliance with the chemical adhesive manufacturer's instructions. Holes must be dry at the time of placing the chemical adhesive and bars. Immediately after inserting bars into the chemical adhesive, support bars to prevent movement during curing. Leave the supported bars undisturbed until chemical adhesive has cured a minimum time instructed by the manufacturer. If the Engineer rejects bars, drill new holes adjacent to the rejected holes, place new bars, and securely bond to the concrete.

Install dowel bars at all transverse joints.

Install tie bars at longitudinal joints. Do not install tie bars within 15 inches of any transverse joint when transverse joints do not align.

### **Final Finishing**

If the Engineer determines by visual inspection the final texturing may not comply with the specifications for coefficient of friction, the Engineer tests to determine coefficient of friction. Open the pavement to traffic and allow 5 days after concrete placement for the Department to test for coefficient of friction. If pavement does not comply with the specifications for coefficient of friction, grind the pavement under Section 42-2, "Grinding," of the Standard Specifications. Perform grinding before sealing joints.

You must stamp your company name, the date placed and the contract number on the first and last successive concrete slabs of each working day. Stamp all individual slabs. Level the location of the stamp with a steel trowel below the pavement texture before affixing the stamp.

The engineer accepts replace concrete pavement (rapid strength concrete) for smoothness based on straight edge measurement Profile Index specified in Section 40-1.03J, "Profilograph Test Procedure," of the Standard Specifications are not required.

Test pavement smoothness in the longitudinal direction only, except not within one foot of pavement not part of this contract. Correct pavement not in compliance with smoothness specifications within 48 hours by grinding.

### **Curing Method**

Use the curing method recommended by the manufacturer of the cement for replacement pavement.

### **Replace Existing Pavement Delineation**

Replace any existing pavement delineation removed, obliterated, or damaged by the work involved in replacing concrete pavement. Comply with the specifications for new delineation.

### **MEASUREMENT AND PAYMENT**

Concrete pavement (Rapid Strength Concrete) is measured and paid for in the same manner specified for concrete pavement in Sections 40-4.01, "Measurement," and 40-4.02, "Payment," of the Standard Specifications.

The Engineer adjusts payment for concrete pavement (Rapid Strength Concrete) in compliance with "Pay Factor Adjustment for Low Modulus of Rupture."

Full compensation for the pre-operation conference and the prepaving meeting is included in the contract price paid per cubic yard for concrete pavement (Rapid Strength Concrete) and no additional compensation will be allowed therefor.

Full compensation for removing and disposing of existing concrete pavement and underlying base, constructing trial slabs, furnishing and placing bond breaker, furnishing and disposing of standby materials for temporary roadway structural section, constructing, maintaining, removing, and disposing of temporary roadway structural section, work involved in determining the modulus of rupture of RSC pavement, and quality control program, are included in the contract price paid per cubic yard for concrete pavement (Rapid Strength Concrete) and no additional compensation will be allowed therefor.

Repair, or removal and replacement of the damaged pavement and base is at your expense and will not be measured or paid for.

The contract unit price paid for dowel bar and tie bar includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in placing stainless steel bars, including but not limited to drilling holes, placing stainless steel dowel bars, and bonding the dowel bars with chemical adhesive, and furnishing and placing threaded splice couplers and baskets, in concrete pavement complete in place, including properly verifying bar alignment as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

If calibration of volumetric batch-trucks is performed more than 100 miles from the project limits, payment for replace concrete pavement (Rapid Strength Concrete) is reduced by \$1,000 per calibration session.

If RSC does not conform to the mix design requirements or the specifications, the Engineer orders you to provide extra samples and testing. The Engineer determines the costs for sampling, fabricating, transporting, and testing extra samples under Section 4-1.03D, "Extra Work," of the Standard Specifications. If the extra samples do not comply with the specifications, these costs are at your expense. If the extra samples comply with the specifications, the Engineer pays you for these costs.

## 10-1.735 CEMENT DEEP SOIL MIXING

### GENERAL

#### Summary

Cement Deep Soil Mixing must conform with the details shown on the plans and as specified in these special provisions. Attention is directed to "Order of Work" and "Obstructions" of these special provisions. Attention is directed to Section 7-1.11 "Preservation of Property" of the Standard Specifications.

#### Definitions

**Pre-Production (PPC) Program:** Field test program you develop and conduct and approved by the Engineer at locations selected by the Engineer prior to initiation of production CDSM.

**Cement Grout:** Stable homogenous mixture of cement and water.

**Soil-Cement:** Mixture of cement grout and in-situ soils.

**Soil-Cement Element:** A soil-cement column formed by mixing soil in-situ with cement grout using an auger at controlled mixing rates during a single penetration and withdrawal of the auger.

**CDSM CIDH Pile Unit:** Two concentric rings of soil-cement elements surrounding a single CIDH pile.

**CDSM MSE Wall Unit:** 905 linear foot length of soil-cement elements measured parallel to the existing MSE Wall.

**Wet Grab Sample:** Soil-cement sample taken from soil-cement element after the tools are withdrawn. The soil-cement sample is poured into cylinders for later laboratory testing.

**Laboratory:** Independent Construction Materials Testing Firm you contract that is responsible for forming, curing, preserving and transporting samples; performing laboratory testing, and reporting laboratory test results.

**Area Replacement Ratio (ARR):** The ratio of each soil-cement element plan area to the plan tributary area of the soil cement element.

**Vertical Alignment Profile:** A graphical or tabular data representation of the actual sectional view of each soil-cement element.

#### Submittals

Submittals must conform to the requirements in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications and these special provisions, and must be stamped by a California Registered Professional Civil Engineer, except for survey data which must be stamped by either a California Registered Professional Civil Engineer or a California Registered Land Surveyor.

**Pre-Construction Submittal –** You must submit a CDSM installation plan to the Engineer for approval at least 4 weeks prior to mobilizing CDSM equipment for production mixing that includes complete descriptions, details and supporting calculations for the following:

- A. Names and qualifications of the CDSM personnel and surveyors, including project experience, resumes and other documentation that demonstrates the experience qualifications of the project engineers, field superintendents, rig operators, and batch plant operators.
- B. A list of contractors, responsible engineers, project descriptions and personnel responsibilities from CDSM projects completed by the CDSM Project Engineers and Field Superintendents during the past 10 years. Contractor's names, addresses and telephone numbers must be included for these projects representing the individuals comparable experience. The projects listed to demonstrate personnel qualifications must have employed equipment using similar auger configurations as the work proposed.
- C. Submit data on equipment to be used for the CDSM, proportioning, pumping, injecting and mixing soil-cement and other ancillary equipment, including equipment capable of remixing non-conforming soil-cement.
- D. Sequence and time schedule of operations, including plan location and sequence of CDSM. You must submit a soil-cement element Layout Plan based on the limits shown on the plans to achieve the required plan area configurations, coverage, and necessary overlaps and auger re-penetrations over the depths and limits shown on the plans.
- E. Cement grout mix design including: cement type, cement source, cement compound composition, water-cement ratio by weight and other pertinent details. Limit water- cement ratio to (1:1 maximum), unless otherwise demonstrated in the Pre-Production (PPC) Program specified in these special provisions.

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ADDED PER ADDENDUM NO. 4 DATED APRIL 8, 2011

- F. The results of the PPC Program including, but not limited to: estimated in-situ 7-day and 28-day compressive strength of the soil-cement, cement-grout injection pressure and rates, mixing rotational speeds, penetration and withdrawal rates of the mixing tools, and mixing times at bottom of the soil-cement element when there is no vertical movement of the mixing tools, and description of mixing operations.
- G. Description of Quality Control Plan for CDSM including, but not limited to, the following:
  - 1. A detailed description of the Quality Control Plan to be undertaken each day during CDSM to confirm that the installed soil-cement conforms to the required compressive strengths and unit weights specified, the plan area coverage over the required depths and limits, and required horizontal and vertical alignments.
  - 2. Details of procedures to obtain soil-cement samples, catalog cuts of the soil- cement sampling device and curing boxes.
  - 3. Daily measures during CDSM to continuously monitor, modify and control: water-cement ratios; cement-grout injection pressures and quantities; mixing rotational speeds; penetration and withdrawal rates of the mixing equipment; horizontal and vertical alignments of the soil- cement elements; and other related aspects of the CDSM process.
  - 4. Example formats of Daily Production Reports conforming to the requirements stated herein.
  - 5. Names, certifications and licenses of the Laboratory and companies responsible for performing quality control tests.
  - 6. Proposed details and formats of required tabular and graphical data presentations to be submitted to the Engineer during the course of the work.

Construction Submittals - You must submit the following construction reports to the Engineer for approval for the CDSM work.

- A. Daily Production Reports - Within one working day after the end of a work shift, submit Daily Production Reports for the work shift to the Engineer. Daily Production Reports must be filled out, checked for correctness, and signed by the CDSM Contractor's field superintendent and your field superintendent at the end of every work shift. The reports must contain, but not be limited, to the following information:
  - 1. Day, month, year, time of work, shift, beginning and end; names of each superintendent in charge of the Work for the CDSM firm and you; a list of workers' names associated with each CDSM machine; and a summary of equipment used during the shift.
  - 2. The location and "neat" limits as shown on the Working Drawings of each completed soil-cement element installed during the work shift and soil-cement elements completed to date, on a plan of suitable scale to clearly detail the locations of the elements.
  - 3. Time of day of beginning and completion of each soil-cement element installed during the work shift.
  - 4. Water-cement ratios, cement type, brand, and cement grout injection pressures and rates, mixing rotational speeds, penetration and withdrawal rates of the mixing equipment, batch plant production records, percentage of cement content, and installation sequence for every soil- cement element.
  - 5. Other pertinent observations including, but not limited to; spoil returns, cement grout escapes, ground settlement and/or heave, collapses of the soil-cement element, advancement rates of the mixing equipment, and unusual behavior of equipment during the CDSM process and other noteworthy events. In the event of a Contractor claim, the Daily Production Reports must be the primary documents to substantiate the reasons and basis for the claim.
  - 6. Date, time, plan location, sample designation and elevation, and other details of soil- cement sampling.
  - 7. Summary of downtime or unproductive time, including start and end time, duration, and reason.
- B. Soil-Cement Element Profiles - Within 2 working days after the completion of each soil-cement element, submit the following:
  - 1. Deviations of the center coordinates from the layout plan to the nearest 3 in. at the top of the element.
  - 2. Vertical alignment profiles must be submitted in accordance with the frequencies specified to the nearest 0.5 in. over the measurement length along axes parallel and perpendicular to the line of longitudinal or circumferential progression; the elevation to the nearest 2 in. of the top and bottom of the element.

C. Survey Data - Within 5 weeks after completion of the CDSM, you must submit survey data including:

1. A final Layout Plan of suitable scales showing the locations of each soil-cement element at the top of the element.
2. A tabular summary of layout center coordinates modified to reflect measured- deviations of each soil-cement element at the top of the element, the elevation of the top and bottom of each element.
3. A compilation of vertical alignment profiles.

#### **Quality Control and Assurance**

You must obtain soil-cement samples, including fluid and core samples, and provide them to the Laboratory for testing specified in these special provisions. The Laboratory must preserve, cure, transport, and test the samples and report test results to the Engineer. The test results must be signed and stamped by a California licensed Civil Engineer from the Laboratory. You must coordinate sampling activities and Soil-Cement Quality Control with the Engineer and the Laboratory. You must supply incidental items, access, inside storage space, curing boxes and electrical power to the curing boxes. You must supply molds for use in forming the samples.

**Wet Grab Soil-Cement Samples:** A daily in-situ sampling round must be performed for every 200 cubic yards of mixing performed at locations selected by the Engineer. You must obtain sampling rounds from a single soil cement element, consisting of non-cured soil-cement samples from 3 depths selected by the Engineer. You must obtain up to 25 additional wet grab sample test rounds as directed by the Engineer.

Sampling rounds must be conducted within 60 minutes of the completion of the soil-cement column. The device used to retrieve the wet grab soil-cement samples must be capable of obtaining a discrete fluid sample of soil-cement at a depth determined by the Engineer and must be capable of accepting particles not thoroughly mixed that are up to 6 in. in dimension. The sampler must be lowered empty, air only, to the required depth in the soil-cement element, then opened. Once filled with the soil-cement, the sampler must be closed to exclude entry or loss of soil-cement and must be expeditiously raised to ground surface.

Retrieved soil-cement samples must be of sufficient volume to produce a minimum of 6 full cylinders, 3 in. diameter by 6 in. high. You must separate and retain soil-cement retrieved from each depth. You must then cut retrieved particles of soil larger than 1 in. into smaller pieces that will pass a 1 in. sieve, and then immediately form the 6 cylinders with material passing through a 1 in. sieve, including particles of soil that were cut up.

Soil-cement samples must be formed, cured and preserved in accordance with AASHTO T 23 and protected from freezing and extreme weather conditions which could have deleterious effect.

If you cannot obtain a complete round of sampling in the designated soil-cement element, you must obtain a full round of wet grab samples from the next soil-cement element installed by that rig. You must continue taking wet grab samples in subsequent soil-cement elements until a full round is obtained.

From each sampling round, one cylinder from each sampling depth must be used to determine the cement factor based on the cement content determined in accordance with ASTM D 806. Unless otherwise directed by the Engineer, for each of the 3 depths sampled for each soil cement element, the Laboratory must test one cylinder at 7 days, one cylinder at 14 days, and two cylinders at 28 days for unconfined compressive strength in accordance with ASTM Designation: D 2166. The Laboratory must submit the laboratory test results to the Engineer. Submit 2 cylinders from each of the 3 depths sampled for each soil cement element to the Engineer.

### Wet Grab Soil Cement Sampling and Testing Schedule

Description	Interval	Quantity	Notes
Number of sampling rounds (soil-cement elements)	Per 200 cubic yards of CDSM installed	1	At soil-cement elements determined by the Engineer
Number of wet grab soil-cement samples	Per soil-cement element	3	At depths determined by the Engineer
Number of cylinders	Per wet grab sample	6	3 in. diameter x 6 in. tall cylinder
Total cylinders	Per soil-cement element	18 (6 x 3)	
Number of cylinders for test of cement factor and cement content	Per soil-cement element	3	At each of the 3 sampling depths
Number of cylinders for unconfined compressive strength test	Per soil-cement element	12	Test one at 7 days, one at 14 days and 2 at 28 days at each of the 3 sampling depths
Number of cylinders to be submitted to the Engineer	Per soil-cement element	6	2 at each of the 3 sampling depths

Core Samples: You must take core samples for obtaining and testing in-situ samples to evaluate compressive strength, unit weight, vertical alignment, and composition of the soil-cement. Coring of soil-cement must be performed in accordance with AASTHO T 225 and the requirements stated herein.

Continuous core samples of soil-cement elements must be obtained at up to 200 separate locations selected by the Engineer and over the entire depth of the soil-cement element. The samples must be obtained using a PQ-size triple tube core barrel with a side discharge.

Immediately after retrieving the soil-cement core samples from each boring, you must wrap preserve and submit 7 core samples per boring selected by the Engineer for unconfined compressive strength test by the Laboratory in accordance with ASTM Designation: D 2166. You must grout and completely fill boreholes after coring with a cement mixture, minimum unconfined compressive strength of 200 psi, you design and the Engineer approves.

You must box, store, preserve and deliver the remaining core samples. Core samples must be protected from freezing and extreme weather conditions.

If recovered core samples from a boring provide less than 90% recovery, or less than 50% RQD, or fewer than 2 intact cores of length more than 8 in. in each core run, the Engineer may direct you to drill up to 2 additional cores and recover additional core samples for testing. If the samples from either of these additional corings do not provide required recovery, this process must be repeated until coring provides required samples. Additional corings and core sampling are at your expense.

In a core run, the sum length of unmixed or poorly mixed soil regions or lumps that extend entirely across the diameter of the core (full diameter lump) must not exceed 10% of the recovered core length.

Pressuremeter Testing: At each soil-cement element where cores are recovered, conduct pressure meter testing at up to 5 depths as selected by the Engineer. You must submit documentation that the pressuremeter Consultant has successfully completed at least 5 pressuremeter testing projects within the last 3 years of a scope and complexity similar to that described herein.

The Pressuremeter testing must be performed in accordance with ASTM Designation: D4719. Load re-load cycles must be performed consistent with Section 9.8 of ASTM D4719. Equipment necessary for the pressuremeter testing such as probe, cables, control unit, etc., must conform to the requirement of ASTM D4719.

Within 48 hours of completion of pressuremeter testing, you must provide the results of the pressuremeter testing to the Engineer in a format conforming to the reporting requirements listed in Section 11 of ASTM D4719. You must provide a digital copy of the pressuremeter test data to the Engineer along with the report.

Vertical Alignment Profiles: You must obtain vertical alignment profiles for one soil cement element per day and advise the Engineer within one hour after measuring the vertical alignment profile, of non-compliance with tolerance requirements. You must, at the direction of the Engineer, obtain and submit up to 3 additional vertical alignment profiles per day.

## **MATERIALS**

### **Cement**

Cement used for CDSM work must conform to Section 90-2.01 "Cement" of the Standard Specifications. Cement type used must be identified in the submitted cement grout mix design approved by the Engineer.

Bulk cement must be measured, handled, transport and stored in accordance with the manufacturer's recommendations. Cement packaged in cloth or paper bags must be sealed within plastic or rubber vapor barriers.

Cement must be stored in a manner to prevent damage by moisture. Material that has become caked due to moisture absorption must not be used. Cement bags must be stacked no more than 10 bags high. Cement containing lumps or foreign matter of a nature and in amounts that may be deleterious to the grouting operations must not be used.

### **Cement Grout**

Cement grout must be a stable, homogeneous mixture of cement and water. The ratios of the components must be included in the pre-construction submittal. Cement grout composition must not change throughout CDSM installation unless requested in writing by you and approved in writing by the Engineer.

Water used in soil-cement and cement grout mixing and other applications must be potable, clean, of neutral pH and free from sewage, oil, acid, alkali, salts, organic materials and other contamination.

### **Soil-Cement**

Soil-cement must be a stable, uniform mixture of cement grout and the in-situ soils. The ratios of various soil-cement components must be approved in the PCC submittal subject to review by the Engineer. You must adjust the mix design throughout the course of work to achieve the required compressive strengths, cement content and total unit weights. You must submit changes in the mix design or cement factor and obtain the Engineer's approval prior to implementing changes.

The total unit weight of soil-cement samples must be measured and must be at least 115 pcf or as determined and approved by the Engineer based on the result of approved PPC submittal. For each test round the average total unit weight of soil-cement samples within the round will be calculated. If the average total weight from 2 consecutive test rounds is less than 120 pcf, or a value determined and approved by the Engineer based on the result of approved PPC submittal, you must adjust the mix as necessary to achieve the required unit weight.

Conformance with soil-cement uniformity criteria will be determined by the Engineer by evaluation of core samples. The soil-cement must contain soil fragments with a maximum dimension not exceeding 1/6 of the diameter of the auger or 8 in. whichever is smaller.

## **CONSTRUCTION**

You may provide an alternative plan meeting the minimum performance requirement specified herein. The alternative plan must be submitted as an attachment to the pre-construction submittal for approval by the Engineer.

### **Personnel**

You must provide on-site project engineers during deep mixing soil-cement operations experienced in work comparable to that described herein, with at least 5 full years experience as full time responsible Project Engineers in CDSM within the past 10 years. Experience as full time Project Engineer within the last 10 years must include at least 2 projects, each with installations of at least 10,000 cubic yards of soil-cement to depths exceeding 50 feet that required mixing in cohesive soils to create soil-cement structures similar to those described herein.

Field Superintendents must be present continuously on site, each shift of operation. The Field Superintendents must each have at least 3 years accumulated experience with soil-cement techniques similar to the techniques in the approved PPC submittal; including at least 2 projects, one of which within the past 5 years requiring deep mixing in cohesive soils similar to this project.

CDSM rig operators must have accumulated a minimum of one year experience with CDSM technique and a minimum 200 hours of operating time on the CDSM rig under the direct supervision of the Field Superintendent and equipment manufacturer representative.

Grout mixing plant operators must have a minimum 3 years experience in operating computer based cement grout mixing batch plants similar to the cement grout mixing batch plants in the approved PPC submittal.

## **Equipment**

Equipment must have devices to permit accurate and continuous monitoring and control of: water-cement ratios, cement-grout injection pressures and quantities, mixing rotational speeds, advancement and withdrawal rates of the mixing tools, and other operations required to install and mix the soil-cement.

The CDSM machines must be of sufficient size, capacity, torque, and capable of performing deep mixing to the required depths shown on the plans. The CDSM machine must be capable of advancing and withdrawing the mixing tools while simultaneously injecting cement-grout and mixing in-situ soils.

CDSM equipment must use single or multiple-shaft mixing equipment with multiple auger centers configured in one straight line. Shafts must uniformly inject cement grout at the bottom of the assembly. Mixing equipment must be capable of advancing through previously installed and hardened soil-cement. Continuous flight augers longer than 5 ft. are not allowed. If used to breakup and blend in-situ soil and cement grout, high-pressure jets must not be directed radially to extend beyond the perimeter of the auger flights. Air must not be injected into the in-situ soils.

## **Pre-Production (PPC) Program**

You must conduct a Pre-Production (PPC) Program within the limits of soil-cement areas prior to commencing CDSM to establish production parameters, procedures, and materials to be used during the production phase. The PPC Program will consist of CDSM of a 64 square foot area (8 feet x 8 feet) with an area replacement ratio of 75%.

The PPC Program must produce soil-cement mix design and procedures for production mixing based upon the information provided from the PPC Program including: estimated in-situ 7-day and 28-day compressive strength of the soil-cement, cement-grout injection pressure and rates, mixing rotational speeds, penetration and withdrawal rates of the mixing tools, and mixing times at bottom of the soil-cement element when there is no vertical movement of the mixing tools, and complete description of mixing operations.

You must submit to Engineer testing results and proposed variations in installation methods including mix design, rate of penetration, etc. and allow 30 days for review and approval prior to starting installation of production CDSM soil-cement elements.

## **Installation of Soil-Cement**

The ground improvement must extend to the elevations shown on the plans, or as approved by the Engineer.

CDSM must be installed in uniformly distributed regular patterns and arrangements to achieve the minimum area replacement ratio of 75% within the CDSM areas, and with soil-cement elements conforming to the alignment tolerances, required compressive strength, cement content and unit weights.

Soil-cement elements must penetrate through the dense crust and underlying weaker materials to the required elevations.

Difficult soil cement installation is anticipated due to the presence of embedment requirements into groundwater, sporadic gravels, interfingering layers of alluvial materials, subsurface concrete debris, underground utilities, overhead utilities, sound control, vibration monitoring, and traffic control. CDSM equipment must be capable of advancing through previously installed and cured soil-cement.

After final grouting of the soil-cement element, you must obtain samples of in-situ soil-cement samples in accordance with the locations and frequencies listed under "Quality Control and Assurance" of these special provisions.

Water, debris or spoil material must not be dumped or allowed to enter the soil-cement element.

Soil cement elements exhibiting partial or total instability must be backfilled with cement grout and remixed full depth, at your expense. Signs of instability that may be observed during construction could include excess flow of grout from the hole, settlement of ground, and squeezing in on the drill rods.

Soil-cement elements must not be installed within 3 ft. clear horizontal distance from existing utilities that are not abandoned.

New utilities to be located within 5 ft. of the existing ground surface that are within 3 ft. horizontal distance from soil-cement elements must not be constructed prior to installation of soil-cement elements.

During the first 60 days following successful completion of CDSM, no more than 5 ft. of fill or 600 psf of vertical pressure must be placed over the soil-cement elements within a clear distance of at least 25 ft. from soil-cement elements.

## **Horizontal and Vertical Alignment Tolerances**

The maximum horizontal deviation of the as-installed center of soil-cement elements at the ground surface or mud line installation level must not exceed 3 in. from the layout center coordinate, shown on your approved submittal.

The measured vertical alignment of soil-cement elements must not deviate in any direction more than 2 percent from vertical of the measured length, or be inclined more than 2 percent from vertical anywhere along the measured length.

At the direction of the Engineer, soil-cement elements that exceed the allowable horizontal or vertical alignment tolerances must be re-mixed or supplemented with one or more adjacent or overlapping elements, at your cost.

### **CDSM Acceptance**

CDSM must improve strength properties of foundation soils within the area shown on the plans. Soil-cement elements must be placed in a uniformly distributed regular pattern to achieve a 75% ARR.

Unconfined compressive strength testing must be performed in accordance with ASTM Designation: D-2166. The average 28-day unconfined compressive strength of soil-cement throughout the depth of each soil-cement element must be no less than 100 psi. The average 28-day unconfined compressive strength for a CDSM CIDH Pile Unit or CDSM MSE Wall Unit must have no more than 10% of the samples with unconfined compressive strength less than the minimum design value of 100 psi. You may use 7-day or 28-day strength tests as strength predictors, the strength acceptance criteria will be based only on test results from 28-day tests.

Cement content testing must be performed in accordance with ASTM Designation: D-806. The cement content within the soil-cement element must be no less than 15%, estimated as a percentage of dry soil weight. The average cement content for a CDSM CIDH Pile Unit or CDSM MSE Wall Unit must have no more than 10% of the samples with a cement content less than the minimum design value of 15%.

If the Engineer determines that CDSM work is unacceptable, you must submit to the Engineer for approval a mitigation plan for repair, supplementation, or replacement for each rejected portion of the CDSM work conforming to the provisions in Section 5-1.02, "Plans and Working Drawings" of the Standard Specifications. If the Engineer determines that it is not feasible to repair the rejected CDSM work, you must not include repair as a means of mitigation and must proceed with the submittal of a mitigation plan for replacement or supplementation of the rejected CDSM work.

Unacceptable CDSM work must be replaced at your expense.

### **Obstructions**

Abandoned utilities that are in conflict with the soil-cement elements must be removed prior to installation of soil-cement elements.

Where obstructions are encountered during CDSM, you must remove the obstruction or install additional soil-cement elements to encapsulate the obstruction, at the direction of the Engineer. If such conditions are encountered, you must notify the Engineer in writing, and provide pertinent information relating to the nature, depth, plan location coordinates, expected extent of the obstruction, and proposed procedures to overcome the obstruction. Construction to overcome an unknown obstruction must be performed with the written authorization of the Engineer, and will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

You may elect to install soil cement by an alternate CDSM pattern that avoids or encapsulates the subsurface obstructions but that achieves the required soil-cement area ratio, subject to the approval of the Engineer.

During and at completion of CDSM operations, the site must be maintained cleared of debris and water. Spoil return and other spoil material must be piped or channeled to holding ponds, tanks, or other retention structures or facilities. You must remove and dispose of waste materials in accordance with the provisions in Section 7 1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications, "Material Containing Hazardous Waste Concentrations of Aerially Deposited Lead", "Aerially Deposited Lead", "Contaminated Material, and "Project Information" of these special provisions.

Soil-cement collection, containment and disposal methods must be thoroughly explained and shown on Working Drawings in your submittals to the Engineer prior to the start of CDSM. You must incorporate and are responsible for sedimentation and turbidity control measures required by applicable federal, state and local regulations.

You must take necessary precautions and implement measures to prevent spoil return, other spoil material or stockpiled materials from entering storm drain structures, drainage courses and other utility lines or from leaving the site via surface runoff. You must prevent the migration of spoil return, spoil material or stockpiled materials into surface water bodies beyond the immediate limits of CDSM operations.

### **MEASUREMENT AND PAYMENT**

The contract lump sum price paid for Cement Deep Soil Mixing includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in cement deep soil mixing, complete-in-place including pre-production program, CDSM installation plan, daily production reports, soil-cement element profiles, survey data, obtaining and testing at a Laboratory soil cement fluid and core samples, performing wet grab soil cement and core sampling and testing, conducting pressure meter testing, obtaining vertical alignment profiles, unconfined compressive strength testing, cement content testing, removing conflicting abandoned utilities, containing, collecting and disposing of spoil return, complying with all applicable federal, state, and local regulations and permit requirements as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

CONTRACT NO. 07-138204

ADDED PER ADDENDUM NO. 4 DATED APRIL 8, 2011

**HIGHWAY PLANTING COST BREAK-DOWN**

**Contract No. 07-138204**

UNIT DESCRIPTION	UNIT	APPROXIMATE QUANTITY	VALUE	AMOUNT
ROADSIDE CLEARING	LS	LUMP SUM		
IRON SULFATE	LB	824		
SOIL AMENDMENT	CY	122		
MULCH	CY	745		
COMMERCIAL FERTILIZER (PACKET)	EA	6,589		
PLANT (GROUP A)	EA	6,589		

**TOTAL** \_\_\_\_\_

CONTRACT NO. 07-138204  
REVISED PER ADDENDUM NO. 4 DATED APRIL 8, 2011

**IRRIGATION SYSTEM COST BREAK-DOWN**

Contract No. 07-138204

UNIT DESCRIPTION	UNIT	APPROXIMATE QUANTITY	VALUE	AMOUNT
CONTROL AND NEUTRAL CONDUCTORS	LS	LUMP SUM		
1" ELECTRIC REMOTE CONTROL VALVE	EA	8		
1½" ELECTRIC REMOTE CONTROL VALVE	EA	4		
2" ELECTRIC REMOTE CONTROL VALVE	EA	1		
8-STATION SOLAR OPERATED IRRIGATION CONTROLLER (POLE MOUNTED, WITH ENCLOSURE CABINET)	EA	2		
2" PLASTIC PIPE (PR315) (SUPPLY LINE)	LF	380		
3" PLASTIC PIPE (PR315) (SUPPLY LINE)	LF	843		
BACKFLOW PREVENTER ASSEMBLY ENCLOSURE	EA	2		
1" BACKFLOW PREVENTER ASSEMBLY	EA	1		
1¼" BACKFLOW PREVENTER ASSEMBLY	EA	1		
SPRINKLER (TYPE A-11)	EA	10		
SPRINKLER (TYPE A-12)	EA	86		
SPRINKLER (TYPE B-2)	EA	48		
2" GATE VALVE	EA	1		
3" GATE VALVE	EA	1		
¾" PLASTIC PIPE (SCHEDULE 40 ) (SUPPLY LINE)	LF	1,8891		
1" PLASTIC PIPE (SCHEDULE 40 ) (SUPPLY LINE)	LF	978		
1¼" PLASTIC PIPE (SCHEDULE 40 ) (SUPPLY LINE)	LF	597		
1½" PLASTIC PIPE (SCHEDULE 40 ) (SUPPLY LINE)	LF	595		
2" PLASTIC PIPE (SCHEDULE 40 ) (SUPPLY LINE)		453		
REMOVE EXISTING IRRIGATION FACILITIES	LS	LUMP SUM		
CHECK AND TEST EXISTING IRRIGATION FACILITIES	LS	LUMP SUM		
1½" BALL VALVE	EA	1		
2" BALL VALVE	EA	3		

TOTAL \_\_\_\_\_

**SANITARY SEWER SYSTEM COST BREAK-DOWN**

**Contract No. 07-138204**

UNIT DESCRIPTION	UNIT	APPROXIMATE QUANTITY	VALUE	AMOUNT
12" EXTRA STRENGTH VCP SEWER PIPE WITH CASE 5 BEDDING	LF	546		
SEWER MANHOLE	EA	3		
8" PVC	LF	103		
MODIFY MANHOLE INLET/OUTLET	EA	1		
ADJUST MANHOLE TO GRADE	EA	1		
ABANDON SEWER LINE	LF	688		
ABANDON SEWER MANHOLE	EA	2		
REMOVE SEWER PIPE	LF	70		
CLEAN AND INSPECT SEWER	LF	649		
CAP SEWER PIPE	EA	8		
OPEN TRENCH	LF	649		
CASE 5 BEDDING	LF	649		
CONCRETE INVERTED U CHANNEL	LF	295		

**TOTAL** \_\_\_\_\_

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**MODIFY WATER SYSTEM COST BREAK-DOWN**

**Contract No. 07-138204**

UNIT DESCRIPTION	UNIT	APPROXIMATE QUANTITY	VALUE	AMOUNT
ABANDON EXISTING WATER LINE	LF	633		
12" PVC PIPE AND FITTINGS	LF	851		
6" PVC PIPE AND FITTINGS	LF	21		
20" STEEL CASING	LF	60		
FIRE HYDRANT ASSEMBLY	EA	4		
THRUST BLOCKS	CY	87		
12" GATE VALVE AND BOX	EA	3		
12" STEEL CASING	LF	20		
6" DUCTILE IRON PIPE AND FITTINGS	LF	46		
6" GATE VALVE	EA	1		
6" MECHANICAL JOING RETAINER GLAND (RESTRAINED JOINT WITH GASKETS)	EA	1		
6" MECHANICAL JOINT SLEEVE	EA	1		
6" BUTTSTRAP	EA	1		
6" INSULATING JOINT WITH GASKETS	EA	1		
CONCRETE SHOCK SLAB	CY	0.1		
SALVAGE FIRE HYDRANT	EA	1		
REMOVE FIRE HYDRANT GUARD POST	EA	2		
REMOVE 6" DUCTILE IRON PIPE	LF	5		
SALVAGE 6" GATE VALVE	EA	1		

**TOTAL** \_\_\_\_\_

**13-1.01 GENERAL**

There is work in the Railroad Right of Way for the project at or near the New Dock Street Off-Ramp located on Route 47/New Dock St Off Ramp at MP 18.57AT CPUC No. 120AT-18.57 DOT No. 811437X.

In accordance with the provisions in Section 7-1.12, "Indemnification and Insurance" of the Standard Specifications, you are responsible for damages to Railroad track and equipment operating on track resulting from your operations.

Conduct operations to prevent debris or other material from falling onto the tracks and right of way of the Railroad.

You must obtain and keep in force at all times a policy or policies of insurance that affords coverage for bodily injury or property damage arising out of construction or demolition operations within 50 feet of railroad property. Insurance coverage to be provided by a railroad protective insurance policy with such insurance to afford protection with a limit of not less than \$25 million (\$25,000,000) dollars per occurrence. The Port of Los Angeles, Port of Long Beach, Alameda Corridor Transportation Authority, Pacific Harbor Lines, Union Pacific Railroad, and Burlington, Northern, Santa Fe Railroad, must each be listed as a named insured under such insurance policy or policies.

## BID ITEM LIST

07-138204

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
1	070012	PROGRESS SCHEDULE (CRITICAL PATH METHOD)	LS	LUMP SUM	LUMP SUM	
2	070018	TIME-RELATED OVERHEAD	WDAY	885		
3	071325	TEMPORARY FENCE (TYPE ESA)	LF	190		
4	019838	ESTABLISH MARINE ACCESS	LS	LUMP SUM	LUMP SUM	
5	019839	CONTRACTOR FURNISHED RESIDENT ENGINEER'S OFFICE	LS	LUMP SUM	LUMP SUM	
6	074016	CONSTRUCTION SITE MANAGEMENT	LS	LUMP SUM	LUMP SUM	
7	074019	PREPARE STORM WATER POLLUTION PREVENTION PLAN	LS	LUMP SUM	LUMP SUM	
8	074028	TEMPORARY FIBER ROLL	LF	25,000		
9	074029	TEMPORARY SILT FENCE	LF	17,000		
10	074033	TEMPORARY CONSTRUCTION ENTRANCE	EA	8		
11	074034	TEMPORARY COVER	SQYD	600		
12	074035	TEMPORARY CHECK DAM	LF	120		
13	074037	MOVE-IN/MOVE-OUT (TEMPORARY EROSION CONTROL)	EA	30		
14	074038	TEMPORARY DRAINAGE INLET PROTECTION	EA	40		
15	074040	TEMPORARY HYDRAULIC MULCH (BONDED FIBER MATRIX)	SQYD	90,800		
16	074041	STREET SWEEPING	LS	LUMP SUM	LUMP SUM	
17	074042	TEMPORARY CONCRETE WASHOUT (PORTABLE)	LS	LUMP SUM	LUMP SUM	
18	074056	RAIN EVENT ACTION PLAN	EA	110		
19	074057	STORM WATER ANNUAL REPORT	EA	5		
20	074058	STORM WATER SAMPLING AND ANALYSIS DAY	EA	70		

## BID ITEM LIST

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Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
21	074015	TEMPORARY ACTIVE TREATMENT SYSTEM	LS	LUMP SUM	LUMP SUM	
22	120090	CONSTRUCTION AREA SIGNS	LS	LUMP SUM	LUMP SUM	
23	120100	TRAFFIC CONTROL SYSTEM	LS	LUMP SUM	LUMP SUM	
24	019840	TRIP REDUCTION PROGRAM	LS	LUMP SUM	LUMP SUM	
25	120120	TYPE III BARRICADE	EA	37		
26	120165	CHANNELIZER (SURFACE MOUNTED)	EA	380		
27	121161	TEMPORARY TERMINAL SECTION (TYPE K)	EA	6		
28	129000	TEMPORARY RAILING (TYPE K)	LF	31,200		
29	129100	TEMPORARY CRASH CUSHION MODULE	EA	340		
30	129510	TEMPORARY RETAINING WALL	SQFT	7,080		
31	019841	ASBESTOS HEALTH AND SAFETY PLAN	LS	LUMP SUM	LUMP SUM	
32	141101	REMOVE YELLOW PAINTED TRAFFIC STRIPE (HAZARDOUS WASTE)	LF	6,270		
33	146002	CONTRACTOR SUPPLIED BIOLOGIST (LS)	LS	LUMP SUM	LUMP SUM	
34	146003	NATURAL RESOURCE PROTECTION PLAN	LS	LUMP SUM	LUMP SUM	
35	019842	PEREGRINE FALCON NEST	EA	1		
36	148005	NOISE MONITORING	LS	LUMP SUM	LUMP SUM	
37	150221	ABANDON INLET	EA	13		
38	150227	ABANDON PIPELINE	LF	1,570		
39	150605	REMOVE FENCE	LF	2,800		
40	150620	REMOVE GATE	EA	4		

**BID ITEM LIST**  
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Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
41	150662	REMOVE METAL BEAM GUARD RAILING	LF	990		
42	150711	REMOVE PAINTED TRAFFIC STRIPE	LF	24,200		
43	150712	REMOVE PAINTED PAVEMENT MARKING	SQFT	270		
44	150722	REMOVE PAVEMENT MARKER	EA	1,280		
45	150742	REMOVE ROADSIDE SIGN	EA	3		
46	150760	REMOVE SIGN STRUCTURE	EA	2		
47	019843	REMOVE ROCK SLOPE PROTECTION	CY	4,360		
48	150806	REMOVE PIPE	LF	3,820		
49	150820	REMOVE INLET	EA	27		
50	BLANK					
51	150829	REMOVE RETAINING WALL	SQFT	5,250		
52	150846	REMOVE CONCRETE PAVEMENT	SQYD	5,170		
53	152430	ADJUST INLET	EA	1		
54	152440	ADJUST MANHOLE TO GRADE	EA	1		
55	153214	REMOVE CONCRETE CURB	LF	770		
56	153215	REMOVE CONCRETE (CURB AND GUTTER)	LF	3,280		
57	153218	REMOVE CONCRETE SIDEWALK	SQFT	780		
58	153221	REMOVE CONCRETE BARRIER	LF	3,970		
59	019844	REMOVE CONCRETE ISLAND	SQFT	1,130		
60	153246	REMOVE CONCRETE (MISCELLANEOUS)	SQFT	3,160		

**BID ITEM LIST**  
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Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
61	155002	PLUG PIPE	EA	1		
62	156585	REMOVE CRASH CUSHION	EA	3		
63	157561	BRIDGE REMOVAL (PORTION), LOCATION A	LS	LUMP SUM	LUMP SUM	
64	157562	BRIDGE REMOVAL (PORTION), LOCATION B	LS	LUMP SUM	LUMP SUM	
65	157563	BRIDGE REMOVAL (PORTION), LOCATION C	LS	LUMP SUM	LUMP SUM	
66	157564	BRIDGE REMOVAL (PORTION), LOCATION D	LS	LUMP SUM	LUMP SUM	
67	157565	BRIDGE REMOVAL (PORTION), LOCATION E	LS	LUMP SUM	LUMP SUM	
68	160101	CLEARING AND GRUBBING	LS	LUMP SUM	LUMP SUM	
69	170101	DEVELOP WATER SUPPLY	LS	LUMP SUM	LUMP SUM	
70	190101	ROADWAY EXCAVATION	CY	19,300		
71	190105	ROADWAY EXCAVATION (TYPE Z-2) (AERIALY DEPOSITED LEAD)	CY	2,980		
72	190110	LEAD COMPLIANCE PLAN	LS	LUMP SUM	LUMP SUM	
73	019845	ASBESTOS RELATED WORK	LS	LUMP SUM	LUMP SUM	
74	019846	COFFERDAM DEWATERING	LS	LUMP SUM	LUMP SUM	
75 (F)	192008	STRUCTURE EXCAVATION (TYPE A)	CY	7,175		
76 (F)	042910	STRUCTURE EXCAVATION (TYPE DC)	CY	1,838		
77 (F)	042911	STRUCTURE EXCAVATION (TYPE SC)	CY	850		
78	042912	STRUCTURE EXCAVATION (TYPE GC)	GAL	4,635,000		
79 (F)	192037	STRUCTURE EXCAVATION (RETAINING WALL)	CY	463		
80 (F)	192053	STRUCTURE EXCAVATION (TYPE Z-2) (AERIALY DEPOSITED LEAD)	CY	860		

**BID ITEM LIST**  
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Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
81 (F)	193003	STRUCTURE BACKFILL (BRIDGE)	CY	3,855		
82 (F)	193013	STRUCTURE BACKFILL (RETAINING WALL)	CY	904		
83 (F)	197021	EARTH RETAINING STRUCTURE, LOCATION A	SQFT	2,160		
84 (F)	197022	EARTH RETAINING STRUCTURE, LOCATION B	SQFT	1,176		
85 (F)	197023	EARTH RETAINING STRUCTURE, LOCATION C	SQFT	4,150		
86 (F)	197024	EARTH RETAINING STRUCTURE, LOCATION D	SQFT	4,090		
87 (F)	197025	EARTH RETAINING STRUCTURE, LOCATION E	SQFT	6,050		
88	198001	IMPORTED BORROW	CY	187,000		
89	200001	HIGHWAY PLANTING	LS	LUMP SUM	LUMP SUM	
90	200101	IMPORTED TOPSOIL	CY	200		
91	019847	LANDSCAPE BOULDER 4'X3'X3'	EA	12		
92	019848	LANDSCAPE BOULDER 3'X3'X2'	EA	12		
93	019849	LANDSCAPE BOULDER 2'X2'X1 1/2'	EA	5		
94	019850	ROCK BLANKET (TYPE 2)	SQFT	162,000		
95	019851	ROCK BLANKET (TYPE 1)	SQFT	41,100		
96	019852	BROKEN CONCRETE	CY	11,600		
97	204099	PLANT ESTABLISHMENT WORK	LS	LUMP SUM	LUMP SUM	
98	208000	IRRIGATION SYSTEM	LS	LUMP SUM	LUMP SUM	
99	019853	WATER METER (1" SIZE, LADWP)	EA	1		
100	019854	WATER METER (1-1/2" SIZE, PORT OF LONG BEACH)	EA	1		

## BID ITEM LIST

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Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
141 (F)	510053	STRUCTURAL CONCRETE, BRIDGE	CY	68,528		
142 (F)	510060	STRUCTURAL CONCRETE, RETAINING WALL	CY	597		
143 (F)	510072	STRUCTURAL CONCRETE, BARRIER SLAB	CY	615		
144 (F)	510086	STRUCTURAL CONCRETE, APPROACH SLAB (TYPE N)	CY	356		
145 (F)	510502	MINOR CONCRETE (MINOR STRUCTURE)	CY	605		
146	042923	FRACTURED RIB TEXTURE WITH WAVE PATTERN	SQFT	3,724		
147 (F)	042924	PRECAST CONCRETE ISOLATION CASING	CY	1,522		
148	042925	FURNISH PRECAST CONCRETE FENDER MODULE	EA	48		
149	042926	ERECT PRECAST CONCRETE FENDER MODULE	EA	48		
150	518051	PTFE SPHERICAL BEARING	EA	71		
151	042927	JOINT SEAL ASSEMBLY (MR=33")	LF	110		
152	042928	JOINT SEAL ASSEMBLY (MR=42")	LF	110		
153	042929	JOINT SEAL ASSEMBLY (MR=54")	LF	515		
154	042930	JOINT SEAL ASSEMBLY (MR=60")	LF	440		
155	042931	JOINT SEAL ASSEMBLY (MR=24")	LF	76		
156 (F)	520102	BAR REINFORCING STEEL (BRIDGE)	LB	26,188,000		
157 (F)	520103	BAR REINFORCING STEEL (RETAINING WALL)	LB	170,670		
158 (F)	520110	BAR REINFORCING STEEL (EPOXY COATED) (BRIDGE)	LB	690,000		
159 (F)	520120	HEADED BAR REINFORCEMENT	EA	15,495		
160 (F)	560218	FURNISH SIGN STRUCTURE (TRUSS)	LB	130,296		

## BID ITEM LIST

07-138204

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
161 (F)	560219	INSTALL SIGN STRUCTURE (TRUSS)	LB	130,296		
162	560244	FURNISH LAMINATED PANEL SIGN (1"-TYPE A)	SQFT	1,660		
163	560248	FURNISH SINGLE SHEET ALUMINUM SIGN (0.063"-UNFRAMED)	SQFT	520		
164	560249	FURNISH SINGLE SHEET ALUMINUM SIGN (0.080"-UNFRAMED)	SQFT	110		
165	560251	FURNISH SINGLE SHEET ALUMINUM SIGN (0.063"-FRAMED)	SQFT	1,740		
166	562002	METAL (BARRIER MOUNTED SIGN)	LB	1,390		
167	019862	HISTORIC BRIDGE PLAQUES	LS	LUMP SUM	LUMP SUM	
168	566011	ROADSIDE SIGN - ONE POST	EA	58		
169	566012	ROADSIDE SIGN - TWO POST	EA	3		
170	568001	INSTALL SIGN (STRAP AND SADDLE BRACKET METHOD)	EA	11		
171 (F)	570120	TREATED LUMBER AND TIMBER	MFBM	11		
172 (F)	042932	PLASTIC LUMBER	CY	127		
173 (F)	042933	UHMW SHEATHING	SQFT	12,300		
174	019863	REMOVE RAILROAD TRACK	LS	LUMP SUM	LUMP SUM	
175	601001	RAILROAD TRACK	LS	LUMP SUM	LUMP SUM	
176	620060	12" ALTERNATIVE PIPE CULVERT	LF	2,800		
177	650014	18" REINFORCED CONCRETE PIPE	LF	1,620		
178	650018	24" REINFORCED CONCRETE PIPE	LF	1,350		
179	650022	30" REINFORCED CONCRETE PIPE	LF	340		
180	650026	36" REINFORCED CONCRETE PIPE	LF	140		

**BID ITEM LIST**

**07-138204**

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
181	650034	48" REINFORCED CONCRETE PIPE	LF	250		
182	650036	51" REINFORCED CONCRETE PIPE	LF	900		
183	019864	15" SLOTTED CORRUGATED PIPE	LF	640		
184	019865	CLEAN OUT	EA	39		
185	700617	DRAINAGE INLET MARKER	EA	25		
186	019866	42" WELDED STEEL PIPE CASING	LF	250		
187	019867	30" ASPHALT COATED AND WRAPPED WELDED STEEL PIPE	LF	280		
188	705204	18" CONCRETE FLARED END SECTION	EA	1		
189	707051	DRAINAGE MANHOLE	EA	12		
190	019868	MODIFY SANITARY SEWER SYSTEM	LS	LUMP SUM	LUMP SUM	
191	720107	ROCK SLOPE PROTECTION(GRANULAR MATERIAL)	CY	27		
192	729010	ROCK SLOPE PROTECTION FABRIC	SQYD	86		
193	731501	MINOR CONCRETE (CURB)	CY	20		
194	731504	MINOR CONCRETE (CURB AND GUTTER)	CY	120		
195	731509	MINOR CONCRETE (CONCRETE MOW STRIP)	CY	36		
196	731511	MINOR CONCRETE (ISLAND PAVING)	CY	60		
197	019869	MINOR CONCRETE (CROSS GUTTER)	CY	26		
198	731521	MINOR CONCRETE (SIDEWALK)	CY	16		
199	731623	MINOR CONCRETE (CURB RAMP)	CY	2		
200 (F)	750001	MISCELLANEOUS IRON AND STEEL	LB	353,190		

**BID ITEM LIST**

**07-138204**

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
241	019874	COMMUNICATION SYSTEM	LS	LUMP SUM	LUMP SUM	
242	019875	CLOSED CIRCUIT TELEVISION CAMERA SYSTEM (LOCATION 1)	LS	LUMP SUM	LUMP SUM	
243	019876	CLOSED CIRCUIT TELEVISION CAMERA SYSTEM (LOCATION 2)	LS	LUMP SUM	LUMP SUM	
244	019877	CLOSED CIRCUIT TELEVISION CAMERA SYSTEM (LOCATION 3)	LS	LUMP SUM	LUMP SUM	
245	019878	CLOSED CIRCUIT TELEVISION CAMERA SYSTEM (CITY)	LS	LUMP SUM	LUMP SUM	
246	861101	RAMP METERING SYSTEM (LOCATION 1)	LS	LUMP SUM	LUMP SUM	
247	861102	RAMP METERING SYSTEM (LOCATION 2)	LS	LUMP SUM	LUMP SUM	
248	861200	WEIGH-IN-MOTION SYSTEM	LS	LUMP SUM	LUMP SUM	
249	861501	MODIFY SIGNAL AND LIGHTING	LS	LUMP SUM	LUMP SUM	
250	869072	SEISMIC MONITORING SYSTEM	LS	LUMP SUM	LUMP SUM	
251	869075	SYSTEM TESTING AND DOCUMENTATION	LS	LUMP SUM	LUMP SUM	
252	019879	MODIFY PORT OF LONG BEACH CONDUIT SYSTEM	LS	LUMP SUM	LUMP SUM	
253	BLANK					
254	071321	TEMPORARY FENCE (TYPE CL-6)	LF	920		
255	020703	MARINE PILE DRIVING ENERGY ATTENUATOR	LS	LUMP SUM	LUMP SUM	
256	020704	MAINTAINING EXISTING PUMP SYSTEM	LS	LUMP SUM	LUMP SUM	
257	020705	CEMENT DEEP SOIL MIXING	LS	LUMP SUM	LUMP SUM	
258	703575	24" WELDED STEEL PIPE (.250" THICK)	LF	1,630		
259	999990	MOBILIZATION	LS	LUMP SUM	LUMP SUM	

**TOTAL BID:**

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