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Serious Drought.
Help save water!

July 17, 2015

08-SBd-15-42.5/46.0
08-3555V4
Project ID 0814000086
ACNHPI-015-1(237)146E
STPLN-6208(029)

Addendum No. 1

Dear Contractor:

This addendum is being issued to the contract for CONSTRUCTION ON STATE HIGHWAY IN SAN BERNARDINO COUNTY IN VICTORVILLE FROM 0.5 MILE NORTH OF MOJAVE DRIVE TO 1.5 MILE NORTH OF STODDARD WELLS ROAD OVERCROSSING.

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 Wednesday, August 5, 2015.

This addendum is being issued to revise the project plans, the *Notice to Bidders and Special Provisions* and the *Bid* book.

Project plan sheets 209, 414, 419, 643, 644, 651, 655, 658, 697, 727, 754, 767, 784, 785 and 787 are replaced and attached for substitution for the like-numbered sheets.

Project plan sheets 579A, 593A, 593B and 593C are added and attached for addition to the project plans.

In the Special Provisions, Section 14-11.08A is replaced as attached.

In the Special Provisions, Section 14, page 57, the title "ENVIRONMENTAL STEWARDSHIP" should be moved to page 48, and added to the beginning of the Section 14.

In the Special Provisions, Section 15-6.02 is added as attached.

In the Special Provisions, Section 15-6.10 is added as attached.

In the Special Provisions, Section 15-6.11 is added as attached.

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In the *Bid* book, in the "Bid Item List," Items 87, 176 and 195 are replaced.

In the *Bid* book, in the "Bid Item List," Items 310 and 311 are added.

In the *Bid* book, in the "Bid Item List," Item 309 is deleted.

To *Bid* book holders:

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

Submit the *Bid* book as described in the *Electronic Bidding Guide* at the Bidders' Exchange website.

http://www.dot.ca.gov/hq/esc/oe/electronic_bidding/electronic_bidding.html

Inform subcontractors and suppliers as necessary.

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

http://www.dot.ca.gov/hq/esc/oe/project_ads_addenda/08/08-3555V4

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 Mohsen Sultan

MOHSEN SULTAN
Chief, Office of Contracting Systems
Office Engineer
Division of Engineering Services

Attachments

Replace "Reserved" in section 14-11.08 with:

14-11.08A General

Section 14-11.08 includes specifications relating to the disturbance of existing paint systems.

The existing paint system on bridge number 54-0484 contains lead. Any work that disturbs the existing paint system exposes workers to health hazards and produces:

1. Debris containing heavy metal in amounts that exceed the thresholds established in 8 CA Code of Regs and 22 CA Code of Regs. This debris is a Department-generated hazardous waste.
2. Toxic fumes when heated.

Grime and detritus already on the bridge before the start of work may also contain lead. Consider this grime and detritus part of the existing paint system. The Department is the hazardous waste generator if the Engineer accepts waste-characterization test results demonstrating that the debris is a hazardous waste.

Contain all debris produced when the existing paint system is disturbed. If containment measures are inadequate to contain and collect debris produced when the existing paint system is disturbed, stop the work and do not perform additional work until:

1. Revised debris containment and collection plan has been authorized
2. Released material has been collected and contained

Handle, store, transport, and dispose of debris produced when the existing paint system is disturbed under applicable federal, state, and local hazardous waste laws.

14-11.08B Submittals

14-11.08B(1) General

Not Used

14-11.08B(2) Debris Containment and Collection Plan

Submit a debris containment and collection plan. The plan must:

1. Identify materials, equipment, and methods to be used when the existing paint system is disturbed
2. Include shop drawings of:
   2.1. Containment systems complying with section 59-2.03B(3)
   2.2. Components that provide ventilation, air movement, and visibility for worker safety
3. Include the name and location of the analytical laboratory that will perform the analyses
4. Identify the hazardous waste transporter that will haul the debris and provide documentation of
   4.1 Current DTSC registration
   4.2 Compliance with the CA Highway Patrol Biennial Inspection of Terminals Program
5. Include the name and location of the disposal facility that will accept the hazardous waste

Allow 20 days for review.

If required, submit a revised debris containment and collection plan.

14-11.08B(3) Lead Compliance Plan

Submit a lead compliance plan under section 7-1.02K(6)(j)(ii).

14-11.08B(4) Air Monitoring Reports

Not Used

14-11.08B(5) Soil Sampling Results for Debris Containment Verification

Submit test results of soil analysis verifying debris containment, including results for soil samples taken after corrective action:

1. Verbally within 48 hours after sampling
2. Within 5 days after sampling

Soil sampling results must include:

1. Date and location of sample collection, sample number, contract number, bridge number, full name of the structure and District-County-Route-Post mile
2. Concentrations of heavy metals expressed in mg/kg and mg/L
3. Name and address of the certified laboratory that performed the analyses
4. Chain of custody documentation

14-11.08B(6) Waste-Characterization Test Results

Submit waste-characterization test results for the debris and chain of custody documentation before:

1. Requesting the Engineer's signature on the disposal facility's waste profile document
2. Requesting a generator's EPA Identification Number
3. Removing the debris from the site

14-11.08B(7) Request for U.S. Environmental Protection Agency Identification Number

Submit a request for the generator's EPA Identification Number when the Engineer accepts waste-characterization test results documenting that the debris is a hazardous waste.

14-11.08B(8) Disposal Documentation

Submit documentation from the receiving landfill or recycling facility confirming proper disposal within 5 business days of transporting debris from the project.

14-11.08C Safety and Health Provisions

14-11.08C(1) General

Comply with 8 CA Code of Regs, including § 1532.1.

14-11.08C(2) Protective Work Clothing and Washing Facilities

Supply clean protective work clothing for 5 Department personnel:

1. Whenever there is possible exposure to heavy metals or silica dust
2. During application of paint undercoats

Replace protective work clothing as needed.

Protective work clothing and washing facilities must be inspected and authorized for use by Department personnel before starting any activity with the potential for lead exposure.

Protective work clothing remains your property upon completion of the Contract.

14-11.08D Work Area Monitoring

14-11.08D(1) General

Monitor the ambient air and soil in and around the work area to verify the effectiveness of the containment system. Work area monitoring includes:

1. Collecting, analyzing, and reporting air and soil test results
2. Recommending corrective action when specified air or soil concentrations are exceeded

Collect air and soil samples at locations designated by the Engineer.

14-11.08D(2) Air Monitoring

Not Used

14-11.08D(3) Soil Sampling for Debris Containment

Collect 14 soil samples before starting work and collect 14 soil samples within 36 hours after cleaning existing steel. A soil sample consists of 5 plugs, each 3/4 inch in diameter and 1/2 inch deep, taken at each corner and center of a 1 sq yd area. Analyze soil samples for:

1. Total lead by US EPA Method 6010B or US EPA Method 7000 Series
2. Soluble lead by California Waste Extraction Test (CA WET)

The laboratory that analyzes the samples must be certified by the State Water Resources Control Board (SWRCB) Environmental Laboratory Accreditation Program (ELAP) for all analyses to be performed.

Concentrations of heavy metals in the work area soil must not increase when the existing paint system is disturbed. If soil sampling shows an increase in the concentrations of heavy metals after completing the work:

1. Clean the affected area
2. Resample until soil sampling and testing shows concentrations of heavy metals less than or equal to the concentrations collected before the start of work

In areas without exposed soil, the concentrations of heavy metals in the work area must not increase when the existing paint system is disturbed. Any visible increase in the concentrations of heavy metals must be removed.

14-11.08E Debris Management

14-11.08E(1) Debris Storage

Debris produced when the existing paint system is disturbed must not be temporarily stored on the ground. Before the end of each work shift, remove accumulated debris from the containment system. Store the debris as a hazardous waste.

14-11.08E(2) Debris Waste Characterization

Perform waste characterization testing on the debris as required by the disposal facility including:

1. Total lead by US EPA Method 6010B
2. Soluble lead by California Waste Extraction Test (CA WET)
3. Soluble lead by Toxicity Characteristic Leaching Procedure (TCLP)

From the first 220 gal of hazardous waste or portion thereof, if less than 220 gal of hazardous waste are produced, a minimum of 4 randomly selected samples must be taken and analyzed individually. Samples must not be composited. From each additional 880 gal of hazardous waste or portion thereof, if less than 880 gal are produced, a minimum of 1 additional random sample must be taken and analyzed.

Use chain of custody procedures consistent with chapter 9 of US EPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846) while transporting samples from the job site to the analytical laboratory. The laboratory must be certified by the State Water Resources Control Board (SWRCB) Environmental Laboratory Accreditation Program (ELAP) for all analyses to be performed.

Before performing the analyses, the laboratory must homogenize each sample. The homogenization process must not include grinding of the samples. A sample aliquot must be:

1. Obtained in an amount large enough for all analyses to be performed
2. Homogenized a 2nd time
3. Used for the total and soluble analyses after the 2nd homogenization

14-11.08E(3) Debris Transport and Disposal

14-11.08E(3)(a) General

For bidding purposes, assume the debris is a hazardous waste.

14-11.08E(3)(b) Hazardous Waste Debris

After the Engineer accepts the waste-characterization test results, dispose of the debris:

1. Within 30 days after accumulating 220 lb of debris
2. At an appropriately permitted Class I facility located in California

Make all arrangements with the operator of the disposal facility.

If less than 220 lb of hazardous waste is generated in total, dispose of it within 30 days after the start of accumulation of the debris.

Use a hazardous waste manifest and a transporter using vehicles with current DTSC registration certificate when transporting hazardous waste. The Engineer provides the generator's EPA Identification Number and signs all manifests as the hazardous waste generator within 2 business days of accepting the waste-characterization test results and receiving your request for the generator's EPA Identification Number.

14-11.08E(3)(c) Nonhazardous Waste Debris

If waste characterization test results demonstrate that the debris is a nonhazardous waste and the Engineer accepts the results, dispose of the debris at an appropriately permitted CA Class II or CA Class III facility or recycle it. Make all arrangements with the operator of the disposal facility and comply with the facility's requirements.

You may dispose of nonhazardous debris at a facility equipped to recycle the debris if you make all arrangements with the recycling facility's operator and perform any facility-required testing of the debris.

The Department does not adjust payment for disposal of nonhazardous debris at a recycling facility.

Replace section 15-6.02 with:

15-6.02 FILL CULVERT VOIDS

15-6.02A General

Section 15-6.02 includes specifications for filling voids below and around a culvert that have been found during cleaning and inspection.

Wherever pipeliners are shown, fill voids before installing pipeliners.

Wherever there are voids in the materials below the invert of the culvert and these voids are greater than 3 inches deep, fill the voids with slurry cement backfill.

Wherever there are voids in the materials below the invert of the culvert and these voids are greater than 6 inches deep, fill the voids with slurry cement backfill.

Wherever there are voids in the materials around the culvert and these voids are greater than 6 inches deep, fill the voids with grout.

If grout is used to fill voids:

1. Submit a grouting plan under section 15-6.01A(3)(d)
2. Schedule and conduct a grouting meeting under section 15-6.01A(4)(c)

15-6.02B Materials

Slurry cement backfill must comply with section 15-6.01B(1).

Grout for filling voids must comply with section 15-6.01B(2).

15-6.02C Construction

After receipt of the inspection and evaluation report, the Engineer may order additional void-detection work including probing and hammer sounding. Additional void-detection work is change order work.

Prevent the flow of cementitious material and water from construction activities into waterways and drainage facilities.

If voids are found, install grout ports as ordered. Install valves, or removable plugs at grout ports. Probe at each grout port location. The probe must be at least 4 feet long, fit through the grout ports, and be rigid enough to sense probe refusal. Grout ports must be watertight. If authorized, you may screw grout ports in place or attach them by other methods. Do not weld grout ports to galvanized surfaces.

Pump grout into voids until it appears that all water and air has been ejected. Plug grout ports or close port valves as soon as you stop pumping the grout.

The maximum injection pressure at the nozzle must not exceed 5 psi for fluid, unsanded grout mix.

Monitor the culvert for deformation and cracks. If cracking occurs in a concrete culvert or lining, reduce the grout injection pressure. If deformation of the existing structure exceeds 1/2 inch at any location, reduce the injection pressure.

Repair any permanent deformations or cracks resulting from your grouting work. The Department does not pay for these repairs.

15-6.02D Payment

Filling voids below the invert of the culvert with slurry cement backfill is paid for as change order work.

Filling voids around the culvert with grout is paid for as change order work.

Record the quantity of slurry cement backfill that is installed and submit this quantity. The Department does not pay for slurry cement backfill that leaks through to the inside of the culvert. The Department does not pay for slurry cement backfill that is wasted, disposed of, or remaining on hand after completion of the work.

Record the quantity of grout that is installed and submit this quantity. The Department does not pay for grout that leaks through to the inside of the culvert. The Department does not pay for grout material that is wasted, disposed of, or remaining on hand after completion of the work.

Replace "Reserved" in section 15-6.10 with:

15-6.10A General

15-6.10A(1) Summary

Section 15-6.10 includes specifications for installing plastic pipeliners in an existing culvert.

Grout the annular space between the pipeliner and the culvert.

15-6.10A(2) Submittals

Submit a certificate of compliance for the plastic pipeliner, joint system, and couplers.

If you pressurize the plastic pipeliner, the annular space grouting plan must include:

1. Manufacturer's recommendation for the maximum internal pressure
2. Maximum differential pipeliner pressures

15-6.10B Materials

15-6.10B(1) General

The nominal diameter and thickness of the pipeliner must comply with the dimensions shown. As an alternative you may use any one of the following:

1. PVC closed-profile wall pipe that complies with ASTM F1803
2. HDPE solid wall pipe that complies with AASHTO M 326 and ASTM F714
3. Polyethylene large-diameter-profile wall sewer and drain pipe that complies with ASTM F894

15-6.10B(2) Plastic Pipeliner Joints

Plastic pipeliner joints or couplers must comply with manufacturer's instructions and be compatible with the installation method for the corresponding plastic pipeliner.

Joint systems must comply with ASTM F949, ASTM F1803, and ASTM F894. Joint systems must be field connected with molded or fabricated couplings that do not increase the outside diameter or reduce the inside diameter when assembled.

Procedures for making heat fusion joints for plastic solid wall pipe must comply with:

1. For HDPE solid wall pipe:
   1.1. AASHTO M 326
   1.2. ASTM F714
   1.3. ASTM F2620, practice for heat fusion joining of polyethylene pipe and fittings
2. For PVC solid wall pipe:
   2.1. Pipe suppliers procedures at all times during fusing operations
   2.2. Technicians performing the work must hold current qualification credentials for the pipe size being fused, as documented by the supplier.

Joint systems or couplers must comply with specifications for standard shear strength in section 61-1.01D(1)(b).

15-6.10C Construction

15-6.10D Payment

Not Used

Replace section 15-6.11 with:

15-6.11 CURED-IN-PLACE PIPELINERS

15-6.11A General

15-6.11A(1) Summary

Section 15-6.11 includes specifications for lining an existing culvert by either pulling or inverting a resin-impregnated fabric tube and curing the tube in place.

For all types of resin and installation methods, capture and dispose of any process water and wastewater resulting from the installation and flushing of the cured-in-place pipeliner (CIPP). Comply with section13-4.03D(5).

15-6.11A(2) Definitions

segment: Continuous run of CIPP installed from one end of a culvert to the other end.

15-6.11A(3) Submittals

Submit a work plan for installing the CIPP. The work plan must include:

1. Resin sample. Submit a minimum of 4 oz of unreacted liquid resin to METS, attention Chemical Laboratory. You must include any necessary co-reactants, proposed cure method, and infrared scans of both the reacted and unreacted resin with the sample.
2. Summary sheet for each culvert. Identify the summary sheet by the structure number shown for the corresponding culvert. Summary sheets must include:
   - 2.1. Calculated minimum thickness of liner
   - 2.2. Manufacturer's recommendations for:
     - 2.2.1. Minimum pressure to hold the tube tight against the culvert
     - 2.2.2. Maximum allowable pressures to ensure no damage to the tube nor to the culvert
     - 2.2.3. Postcure temperature
     - 2.2.4. Cure pressures including the minimum cold, maximum heated, and maximum cold pressures
     - 2.2.5. Cure time including accommodations for the effects of the anticipated heat sink conditions and variation over the length of the culvert. For UV light curing include a full protocol for time, rate of travel of the UV assembly, pressures, and amount of lamps in operation for the correct curing of the fabric tube.
     - 2.3. Resin trade name
   - 2.4. Expected maximum exothermic temperature
   - 2.5. Method of liner insertion such as air inversion, water inversion, or pulled-in-place
   - 2.6. Proposed cure method such as water, UV light or hot steam
   - 2.7. Proposed length, access and termination points for each segment
3. Manufacturer's information for:
   - 3.1. Resin, resin enhancer, and bond enhancer identification and typical properties including:
     - 3.1.1. Identification of supplier
     - 3.1.2. Resin test results including infrared scans of both the reacted and unreacted resin
     - 3.1.3. Pipeliner and resin manufacturer's certification that the resin and catalyst system meets requirements of each site where CIPP will be placed and is compatible with the intended installation method, service conditions and existing culvert material including bituminous coatings
     - 3.1.4. Certificates of compliance for CIPP in compliance with ASTM F 2019, ASTM D 5813, ASTM F 1216, or ASTM F 1743
   - 3.2. Resin enhancer data including:
     - 3.2.1. Size range in microns
     - 3.2.2. Amount used in the formulated resin
     - 3.2.3. Bond-enhancing coating material
     - 3.2.4. Certification from the resin manufacturer or formulator that bond enhancer is compatible with the resin system
     - 3.2.5. Certification from the bond enhancer manufacturer that the material is suitable for use in aqueous environments

3.3. Fabric tube description including:
   3.3.1. Identification of supplier
   3.3.2. Types of impermeable membranes and relative juxtaposition such as inner layer, outer layer, or both
   3.3.3. Maximum pulling force that will not damage fabric tube for pulled-in-place installations
3.4. Installation procedure for both insertion and resin curing
3.5. Sealing materials such as quick-set epoxy mortar, high viscosity epoxy, or hydrophilic vulcanized expansive rubber strip
3.6. Preliner description, preliner splicing recommendations, and identification of the supplier
3.7. Description of nontoxic lubricant for inversion installation. Lubricant must not (1) have any detrimental effects on the fabric tube, resin, or boiler and pump system, (2) support the growth of bacteria, and (3) adversely affect the fluid to be transported.

4. Record of annual calibration for pressure and temperature equipment performed by an independent testing agency including:
   4.1. Standards traceable to the National Institute of Standards and Technology
   4.2. Formal reporting procedure, including published test forms
   4.3. Sample of a temperature and pressure log to be used for monitoring the resin curing process. Logs must have temperatures for resin, water, or steam and pressure noted at 5-minute intervals. Logs must identify the date, fabric tube thickness, and drainage system number shown for the corresponding culvert.
5. Test results from an independent testing agency for 10,000-hour, 50-year flexural creep modulus test under ASTM D 2990. If authorized 10,000-hour tests are not available, for all formula calculations, use a minimum 75 percent reduction (25 percent retention) of the flexural modulus of elasticity for all formula calculations. Determine the flexural modulus of elasticity under ASTM D 790, Procedure A, and meet the requirements of ASTM D 5813, and Table 1 within ASTM F 2019, ASTM F 1216, or ASTM F 1743.
6. Certification on manufacturer's letterhead indicating you are approved by the fabric tube and resin manufacturer to perform CIPP installation work.
7. Material safety data sheets for all hazardous chemicals that will be used on the job site including resin, catalyst, cleaners, and repair agents. Identify the proposed use for each hazardous chemical and where it will be used in the work.
8. CIPP design calculations for each culvert location. Include the drainage system number shown for the corresponding culvert and the liner thickness. Design parameters include:
   8.1. CIPP classification. Unless otherwise shown, classification must be Type II (partially deteriorated) under ASTM D 5813 and ASTM F 1216, Appendix X1.1.1
   8.2. CIPP must be designed under ASTM F 1216, Appendix X1.2.1
   8.3. Ovality must be assumed at 5 percent
   8.4. If not described otherwise, assume the groundwater level is at 1/2 the culvert depth
   8.5. Assume no bonding to the culvert wall

Within 21 days of completing the resin curing at a given culvert location, submit the test results from an independent testing agency. Allow 3 business days for the Department's review. The report must be signed by an engineer who represents the independent testing agency and is registered as a civil engineer in the State. The report must include:

1. Infrared spectrographic chemical fingerprint. Run and compare the infrared spectrographic chemical fingerprint of the field sample with the accepted fingerprint from the pre-installation informational submittal. Verify that the field-sample resin system is the same as the authorized resin system.
2. Flexural strength and flexural modulus test results for field samples
3. Thickness measurements for the liner using prepared core samples
4. Description of the defects in the tested samples in terms of the affect on CIPP performance

15-6.11A(4) Quality Control and Assurance

Use an authorized laboratory. The laboratory must have facilities and staff capable of performing tests including (1) tests under ASTM D 790 and (2) the infrared spectrographic chemical fingerprint. Obtain the specified samples and transport them to the authorized laboratory or have the laboratory staff sample and transport the samples.

Mark each sample with the date, contract number, drainage system number of the corresponding culvert, and location where the sample was taken.

For each CIPP segment, test one 4-oz sample of catalyzed resin and submit the following additional 4-ounce catalyzed resin samples to METS, attention Chemical Laboratory:

1. Sample from the 1st segment
2. One sample randomly selected by the Engineer from the next 5 segments. If less than 5 segments remain, sample from one of the remaining segments.

Make cured samples from the identical materials (tube, resin and catalyst) to be used for the CIPP. Identify each sample by date, contract number, drainage system number of the corresponding culvert, thickness, name of resin, and name of catalyst.

The samples must be 6 by 16 inches in size: Comply with the following sampling procedures unless UV cured:

1. Place 3 aluminum-plate clamped molds, each containing a flat plate sample, inside the downtube when heated circulated water is used, and in the silencer when steam is used during the resin curing period
2. Seal each flat plate sample in heavy-duty plastic envelope inside the mold
3. Remove the 3 cured flat plate samples after draining all of the moisture from the cured CIPP

If UV cured, comply with field sampling procedures under ASTM F 2019, Section 7: Recommended Inspection Practices.

Test the samples for flexural properties under ASTM D 790, ASTM D 5813, ASTM F 1216, ASTM F 1743, or ASTM F 2019. Verify that physical properties of the field samples comply with the minimum initial test values under:

1. ASTM F 1216, Table 1, and as supplemented in Table 1 for heat cured polyester, vinylester, and epoxy resins. The flexural strength must be at least 4,500 psi. The flexural modulus must be at least 250,000 psi.
2. ASTM F 2019, Table 1, and as supplemented in Table 1 for UV cured CIPP. The flexural strength must be at least 6,500 psi. The flexural modulus must be at least 725,000 psi. Comply with sampling and testing procedures under ASTM F 2019, Section 7: Recommended Inspection Practices.

Take core samples in the presence of the Engineer. Comply with the following core sample requirements:

1. Take 2 samples. Take the samples at least 10 feet from each end of the culvert or termination point and at a location near the top of the culvert. Samples must be at least 2 inches in diameter. Take the samples from the top of the culvert unless a minimum wall thickness is specified in section 15-6.11B(1). If a minimum wall thickness is specified in section 15-6.11B(1), take the samples as near as possible to the bottom of the culvert.
2. If human entry is used, samples may be cored internally. Repair cored holes under section 15-6.11C(5). Patch cored holes in the culvert with cement mortar under section 65-1.02F.
3. As an alternative, you may core samples from the top section of a CIPP that has been inverted using the same type of preliner through a pipe temporarily connected to the culvert. Take the cores 12 inches from the temporary joint. The pipe temporarily jointed to the culvert must be:
   3.1. Same diameter as the culvert
   3.2. Made of the same material as the culvert
   3.3. At least 10 feet long
   3.4. Placed at the end of the culvert and held in place by a suitable heat sink, such as sandbags or earth, that is at least 6 inches thick.
4. If culvert material is corrugated metal, obtain samples at the corrugation crests.

Prepare the core samples by separating the CIPP material from the culvert material. If heat cured, remove the film from the inner lining or preliner.

If UV cured, remove the film from the inner and outer foil.

Measure the thickness of the liner at 3 spots on each sample. If the culvert material is corrugated metal, measure the thickness at 3 spots that are along a line corresponding to the corrugation crests. Calculate the thickness as an average of at least 6 measurements.

If UV cured, comply with core sample requirements under 15-6.11A(4) and sampling and testing procedures under ASTM F 2019, Section 7: Recommended Inspection Practices. If the culvert material is corrugated metal, measure the thickness at 3 spots that are along a line corresponding to the corrugation crests. Calculate the thickness as an average of at least 6 measurements.

CIPP will be rejected if:

1. Actual temperature and curing time and schedule do not comply with those shown in the authorized work plan
2. Pressure deviates more than 1 psi from the required pressure
3. At any time during installation you violate the manufacturer's required minimum cool-down time or cool-down rate
4. There are defects including:
   - 4.1. Concentrated ridges, including folds and wrinkles exceeding 8 percent of the CIPP diameter
   - 4.2. Dry spots
   - 4.3. Lifts
   - 4.4. Holes
   - 4.5. Tears
   - 4.6. Soft spots
   - 4.7. Blisters or bubbles
   - 4.8. Delaminations
   - 4.9. Gaps in the length of the CIPP
   - 4.10. Gaps or a loose fit between the exterior of the CIPP and the culvert
5. Test results indicate one of the following:
   - 5.1. If heat cured, 2 of the 3 flat plate samples do not have the specified modulus of elasticity
   - 5.2. If heat cured, 2 of the 3 flat plate samples do not have the specified flexural strength
   - 5.3. If heat cured, 2 of the 3 flat plate samples do not have either the specified modulus of elasticity or the specified flexural strength
   - 5.4. If UV cured, 2 of the 3 cured samples do not have the specified modulus of elasticity
   - 5.5. If UV cured, 2 of the 3 cured samples do not have the specified flexural strength
   - 5.6. If UV cured, 2 of the 3 cured samples do not have either the specified modulus of elasticity or the specified flexural strength
6. The liner thickness is less than the greater of either one of the following:
   - 6.1. Specified thickness
   - 6.2. Calculated minimum thickness shown in your authorized work plan
7. Materials and installation methods are not those shown in your authorized installation plan
8. Defects are excessive or unrepairable
9. CIPP is not continuous or does not fit tightly for the full length of the culvert

15-6.11B Materials

15-6.11B(1) General

At all locations , the minimum wall thickness for the CIPP is 0.3 or the minimum thickness shown in the authorized installation plan, whichever is greater.

CIPP must comply with ASTM D 5813 or ASTM F 2019.

The fabric tube must consist of 1 or more layers of flexible, needled, polyester-fiber felt, an equivalent nonwoven material, or a combination of nonwoven and woven materials including reinforcing fibers and fabrics capable of carrying the resin, or at least 2 separate tubes made of corrosion resistant (E-CR or equivalent) glass fibers that comply with ASTM D 578. The fabric tube must:

1. Withstand installation pressures and curing temperatures
2. Be compatible with the resin system used and be capable of stretching to fit irregular pipe sections and negotiate bends
3. Have staggered longitudinal and circumferential joints between multiple layers of fabric so as not to overlap
4. Be fabricated to a size so that when installed it fits tightly in the internal circumference and length of the culvert
5. Have an impermeable, plastic, inner liner or outer liner film, or both for resin control. The liner must remain a permanent part of the system and an integral part of the fabric tube by bonding or fusing to the fabric tube.
6. Have a plastic coating with opacity that does not interfere with visual inspection
7. Have outer plastic coating that is impermeable to all wave lengths of light relevant to curing if CIPP is to be UV cured.

15-6.11B(2) Inversion Fabric Tube and Preliner Tube

Upon delivery, the outside layer of the fabric tube must be plastic coated with a material that is compatible with the resin system. Make allowance for circumferential stretching during inversion. Use a preliner tube sized to fit the culvert. The preliner tube must be composed of 3-ply laminate sheet combining two layers of polyethylene film and high-strength-nylon cord grid formed into a tube. The tube must be (1) sized to fit the culvert and (2) continuous for the entire length of the culvert.

15-6.11B(3) Pulled-In-Place Fabric Tube

The outside layer of fabric tube must have an impermeable plastic coating to contain the resin during and after fabric tube impregnation. Make allowance for circumferential and longitudinal stretching during installation. The minimum tensile strength of the fabric tube or reinforced fiber material in the longitudinal and transverse directions must be 750 psi when tested under ASTM D 5034 and ASTM D 5035.

15-6.11B(4) Resin System

Resin must be compatible with the installation process. Resin must be capable of curing in the presence and absence of water. The initiation temperature for curing must be less than 180 degrees F for heat cured systems. Resin must be one of the following:

1. Chemically resistant isophthalic-based polyester resin
2. Vinyl ester resin and catalyst system
3. Epoxy resin and hardener

Thixotropic agents that do not interfere with visual inspection may be added for viscosity control. Resins may contain pigments, dyes, or colors that do not interfere with visual inspection of the resin-impregnated liner or its required properties. Resin must not contain fillers except those required for viscosity control, fire retardance, air release, and extension of pot life. For UV-light cured systems a photo-initiator system must be added to the resin prior to the impregnation. The photo-initiator system must be tuned to the UV-curing equipment used or vice-versa.

The resin system must be manufactured by a company selected by the fabric tube manufacturer. Resin must be one the following types of corrosion-resistant resin systems:

1. Polyester resin that:
   1.1. Is created by condensation reactions between isophthalic/terathalic acid, maleic anhydride, and a glycol. Polymeric product is characterized by reactive unsaturation located along the molecular chain. This resin is compounded with a reactive styrene monomer and reacted together with initiators/promoters to produce cross-linked copolymer matrices.
   1.2. Contains only branched glycols, including propylene glycol and neopentyle glycol. PET/isophthalic polyester must not be used. Polyesters may be either virgin isophthalic acid or virgin teraphthalic acid but not a combination of both.
2. Vinyl ester resin. This resin is created from the products of reactions of epoxy resins with methacrylic acid and characterized by reactive unsaturation located in the terminal position of the molecular chain. It is compounded with a reactive styrene monomer and reacted together with initiators or promoters to produce cross-linked copolymer matrices.
3. Epoxy resin that:
   3.1. Is created by the reaction of epichlorohydrin and Bisphenol-A, Bispehnol-F, or Novalac to yield a diglycidyl ether or triglycidyl ether. It has terminal epoxy rings as the reactive sites.
   3.2. Must be composed of a diglycidyl ether of Bisphen-A (DGEBPA) or Bisphenol-F (DGEBPF) resin solution, or a mixture of both, and a curing agent compatible with the saturation and cure methods for cured-in-place pipeliner. The curing agent may be a catalytic type, an addition-curing agent type, or a mixture of both, as specified and proportioned under the manufacturer's formulation. The epoxy resin system must be free of volatile organic compounds and have low odor. It must comply with Title 8 of CA Code of Reg, subchapter 7, and have a flash point classification as a combustible liquid at 100 degrees F or higher. Sampling and testing must comply with section 95-1.

Resin enhancer may be used. The maximum amount of enhancer allowed is 30 lbs of enhancer per 100 lbs resin. Submit data to certify that the resin enhancer does not exceed the maximum amount. Enhancer material must be made in a batch method and attested to by the manufacturer.

If using aluminum trihydride or fiberglass-reinforced felt, use a suitable bond-enhancing compound, such as silane or an equivalent, to increase the bond between the resin and other material.

15-16.11C Construction

15-6.11C(1) General

For each culvert location and for each drainage system, notify the Engineer 2 business days before starting resin impregnation.

Obtain authorization before starting the installation of any pipeliner segment. The Engineer may require the submittal of all test results for 1 segment before allowing installation of another segment.

Before starting resin impregnation, inspect the entire fabric tube for defects. The fabric tube must be either (1) vacuum-impregnated with resin (wet-out) under controlled conditions or (2) impregnated with resin and run through a set of rollers separated by a space and calibrated under controlled conditions to ensure proper distribution of resin. The volume of resin must be enough to fully saturate the voids in the fabric tube material, including all resin-absorbing material of the calibration hose if applicable. Attach to the impregnated fabric tube certification of:

1. Date
2. Type of resin
3. Resin manufacturer, trade name and lot number
4. Resin calculation
5. Volume of resin used

The impregnated fabric tube must be stored in an area where the temperature is controlled to 70 degrees F or less for heat cured resins, or between 45 and 95 degrees F for UV cured resins.

Comply with the following:

1. Before installing the liner, place an impermeable plastic sheet 20 linear feet immediately upstream and downstream of the culvert. The impermeable plastic sheet must be either (1) at least 10 mil thick or (2) the same material as required for the preliner tube.
2. Capture any spillage of raw resin during installation.
3. If using pulled-in-place installation, install a semi-rigid, plastic slip sheet over the interior portions of the culvert that (1) could tear the outer film or (2) have a significant void.
4. Promptly repair all pinholes and tears in the plastic film or preliner. If these defective areas cannot be repaired, promptly replace the impermeable plastic film or preliner before proceeding with liner installation.
5. Remove and properly dispose of all waste materials.

15-6.11C(2) Inversion Installation

CIPP installation by inversion must comply with ASTM F 1216.

Install each preliner tube in the presence of the Engineer. The preliner tube must control resin loss and liner thickness and prevent blocked laterals. For long segments, several sections of preliner tube may be spliced together in compliance with the preliner manufacturer's instructions for forming a tube of adequate length.

If you fail to install the required preliner tube over the entire segment, you must remove the CIPP from the culvert.

Turn the fabric tube's end inside out and attach it to a platform ring or standpipe. Adjust the pressure of water or steam to cause the impregnated fabric tube to invert end to end and to hold tight against the culvert wall.

During inversion, maintain a pressure between the required minimum and maximum pressures. If at any time during the installation you violate the manufacturer's required minimum and maximum pressures, you must remove the tube from the culvert.

Use a lubricant during inversion to reduce friction. Lubricant must be poured into the inversion water in the down tube or applied directly to the tube. Lubricant must:

1. Be nontoxic
2. Not have any detrimental effect on tube, resin, and boiler and pump system
3. Not support the growth of bacteria
4. Not adversely affect the fluid to be transported

15-6.11C(3) Pulled-in-Place Installation

CIPP installation by pulling-in-place must comply with ASTM F 1743 or ASTM F 2019.

Winch the fabric tube into position using the manufacturer's instructions. Adjust the pressure of water, air, or steam to cause the calibration hose to invert the tube end to end and hold tight against the culvert wall.

15-6.11C(4) Resin Curing

15-6.11C(4)(a) General

Start resin curing by using either heat or pressure and complete the cure with a cool-down period for heat curing resin based CIPP. If UV cured, comply with curing procedures under ASTM F 2019.

15-6.11C(4)(b) Heat Cure

After installing the CIPP, use a suitable heat source that is either hot water, steam, or steam with air. The delivery system must be capable of providing the required amount of heat uniformly throughout the section to completely cure the resin. Monitor the temperature throughout the curing process by:

1. Installing gages to measure the temperature of the incoming and outgoing heat source.
2. Placing remote sensing devices at both ends between the impregnated tube and the culvert invert to monitor the outside temperature of the CIPP.
3. Recording the temperature from each remote sensing device on a continuous tape from a strip-chart recorder. The tape readings must represent the temperature from start to completion of the resin-curing process and draining the CIPP.
4 Recording temperature every 5 minutes.

Submit the tape and log of recorded temperatures within 48 hours after completing the resin-curing process.

Initial curing is complete when the remote sensing devices achieve the manufacturer's required curing temperatures for either resin, catalyst, or both. The curing temperature and schedule must comply with the submitted data and cool-down period.

15-6.11C(4)(c) Pressure

Start the resin-curing process after you complete dimpling of the culvert openings. Maintain the required pressure until the resin-curing process is complete. Monitor the pressure throughout the curing process and record the pressure every 5 minutes.

Submit the recorded pressure within 48 hours after completing the resin-curing process.

15-6.11C(4)(d) UV Cure

UV curing must conform to ASTM F 2019, Section 6.7 Curing Methods-Ultraviolet Light Curing.

15-6.11C(4)(e) Cool Down for Heat Cured Resins

Before relieving pressure, cool the hardened CIPP to below 100 degrees F. Cool per the manufacturer's instructions. The cool-down rate must not exceed 15 to 20 degrees F/hour.

You may add cool water to the water column while maintaining circulation as the water is drained from a small hole at the opposite end of the CIPP. Maintain constant water-column height until cool-down is completed. Do not let a vacuum develop during the release of the water column.

15-6.11C(5) Repairs

As an alternative to replacing a rejected CIPP, you may request authorization to repair the CIPP. Submit a work plan for repairs and include adequate information to describe the repair work such as specified for an installation plan. If the repair plan is not authorized, replace the CIPP.

Authorization may be given for the defects and corresponding repair methods shown in the following table:

CIPP Repairs

Defect	Repair method
CIPP thickness is less than the specified thickness or the calculated minimum thickness	Remove and replace the CIPP. If groundwater conditions allow, you may install a second CIPP within the first CIPP that produces a similar dimension ratio to the first CIPP or use procedures in the authorized repair plan.
Concentrated ridges in the CIPP	If concentrated ridges fall outside the 120-degree invert arc and you demonstrate that grinding does not compromise the CIPP's structural integrity or reduce its thickness below the submitted, calculated minimum thickness, you may grind the concentrated ridges to the required tolerance. After grinding to the required tolerance, coat the ground area with the manufacturer's approved resin. At the end of each work day, dispose of any residue generated from grinding.
CIPP does not fit tightly against the culvert at the termination point	Fill the space between the CIPP and culvert with either of the following: 1. Quick-set epoxy mortar 2. High viscosity epoxy 3. Hydrophilic vulcanized expansive rubber strip
Wrinkles or ridges exceeding 5% and up to 8% of pipe diameter outside of the 120-degree invert arc	Grind to the required tolerance
Wrinkles or ridges exceeding 2% and up to 8% of pipe diameter inside of the 120-degree invert arc except corrugations in CMP	Grind to the required tolerance within the lower 120 degrees of pipe to remove wrinkles or ridges and point repair where needed to maintain the minimum thickness or use procedures in the authorized repair plan
Wrinkles or ridges exceed 8% of the pipe diameter	Remove and replace the CIPP
Holes, tears, soft spots, and lifts up to 6 inches in major dimension	Make point repairs under the manufacturer's instructions
Delaminated areas up to 12 inches in major dimension; blistering or bubbling of the coating present on over a maximum of 5% of the CIPP's surface area	Make point repairs under the manufacturer's instructions
Annular space at the lateral connection or at the end of the CIPP or infiltration at the lateral opening	Seal with quick-set epoxy mortar, high-viscosity epoxy or a hydrophilic vulcanized expansive rubber strip

15-6.11C(6) Restore Openings

Restore openings. Comply with

1. ASTM F 1216 Section 7.9
2. ASTM F 1743 Section 6.9
3. ASTM F 2019

15-6.11D Payment

Not Used

BID ITEM LIST
08-3555V4

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
81	170101	DEVELOP WATER SUPPLY	LS	LUMP SUM	LUMP SUM	
82	180106	DUST PALLIATIVE	LS	LUMP SUM	LUMP SUM	
83	190101	ROADWAY EXCAVATION	CY	669,000		
84	190185	SHOULDER BACKING	TON	22,700		
85 (F)	192003	STRUCTURE EXCAVATION (BRIDGE)	CY	988		
86 (F)	192020	STRUCTURE EXCAVATION (TYPE D)	CY	8,255		
87 (F)	192037	STRUCTURE EXCAVATION (RETAINING WALL)	CY	6,783		
88 (F)	192055	STRUCTURE EXCAVATION (SOIL NAIL WALL)	CY	1,101		
89 (F)	193001	STRUCTURE BACKFILL	CY	6,900		
90 (F)	193003	STRUCTURE BACKFILL (BRIDGE)	CY	1,543		
91 (F)	193013	STRUCTURE BACKFILL (RETAINING WALL)	CY	2,138		
92 (F)	193028	STRUCTURE BACKFILL (SOIL NAIL WALL)	CY	160		
93 (F)	193030	PERVIOUS BACKFILL MATERIAL	CY	59		
94 (F)	193031	PERVIOUS BACKFILL MATERIAL (RETAINING WALL)	CY	25		
95	198010	IMPORTED BORROW (CY)	CY	119,000		
96	200002	ROADSIDE CLEARING	LS	LUMP SUM	LUMP SUM	
97	200114	ROCK BLANKET	SQFT	107,000		
98	202006	SOIL AMENDMENT	CY	270		
99	204038	PLANT (GROUP U)	EA	2,090		
100	204096	MAINTAIN EXISTING PLANTED AREAS	LS	LUMP SUM	LUMP SUM	

REPLACED PER ADDENDUM NO. 1 DATED JULY 17, 2015

BID ITEM LIST
08-3555V4

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
161	498052	60" CAST-IN-DRILLED-HOLE CONCRETE PILE (SIGN FOUNDATION)	LF	270		
162 (F)	510051	STRUCTURAL CONCRETE, BRIDGE FOOTING	CY	2,010		
163 (F)	510053	STRUCTURAL CONCRETE, BRIDGE	CY	8,285		
164 (F)	510060	STRUCTURAL CONCRETE, RETAINING WALL	CY	2,646		
165 (F)	510061	STRUCTURAL CONCRETE, SOUND WALL	CY	12		
166	510081	AGGREGATE BASE (APPROACH SLAB)	CY	40		
167 (F)	510086	STRUCTURAL CONCRETE, APPROACH SLAB (TYPE N)	CY	391		
168	510087	STRUCTURAL CONCRETE, APPROACH SLAB (TYPE R)	CY	398		
169 (F)	510090	STRUCTURAL CONCRETE, BOX CULVERT	CY	3,053		
170	027728	10'X6'PRECAST REINFORCED CONCRETE BOX CULVERT	LF	390		
171 (F)	510092	STRUCTURAL CONCRETE, HEADWALL	CY	774		
172 (F)	510502	MINOR CONCRETE (MINOR STRUCTURE)	CY	276		
173	510805	DIAPHRAGM BOLSTER	EA	18		
174 (F)	511035	ARCHITECTURAL TREATMENT	SQFT	8,030		
175 (F)	044696	CONCRETE SURFACE TEXTURE (FLUTED RIB)	SQFT	50,943		
176	511106	DRILL AND BOND DOWEL	LF	6,645		
177	511110	DRILL AND BOND DOWEL (CHEMICAL ADHESIVE)	EA	12		
178	512202	FURNISH PRECAST PRESTRESSED CONCRETE GIRDER (30'-40')	EA	3		
179	512203	FURNISH PRECAST PRESTRESSED CONCRETE GIRDER (40'-50')	EA	15		
180	512204	FURNISH PRECAST PRESTRESSED CONCRETE GIRDER (50'-60')	EA	43		

REPLACED PER ADDENDUM NO. 1 DATED JULY 17, 2015

BID ITEM LIST
08-3555V4

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
181	512205	FURNISH PRECAST PRESTRESSED CONCRETE GIRDER (60'-70')	EA	17		
182	512279	FURNISH PRECAST PRESTRESSED CONCRETE BULB-TEE GIRDER (100'-110')	EA	14		
183	512283	FURNISH PRECAST PRESTRESSED CONCRETE BULB-TEE GIRDER (140'-150')	EA	15		
184	512289	FURNISH PRECAST PRESTRESSED CONCRETE BULB-TEE GIRDER (50'-60')	EA	10		
185 (F)	512500	ERECT PRECAST PRESTRESSED CONCRETE GIRDER	EA	117		
186	519088	JOINT SEAL (MR 1")	LF	1,331		
187	519092	JOINT SEAL ASSEMBLY (MR 2 1/2")	LF	87		
188	519100	JOINT SEAL (MR 2")	LF	420		
189 (F)	520101	BAR REINFORCING STEEL	LB	798,022		
190 (F)	520102	BAR REINFORCING STEEL (BRIDGE)	LB	3,205,242		
191 (F)	520103	BAR REINFORCING STEEL (RETAINING WALL)	LB	393,439		
192 (F)	520105	BAR REINFORCING STEEL (SOUND WALL)	LB	101,500		
193 (F)	520120	HEADED BAR REINFORCEMENT	EA	120		
194 (F)	530200	STRUCTURAL SHOTCRETE	CY	197		
195 (F)	550102	STRUCTURAL STEEL (BRIDGE)	LB	13,887		
196 (F)	560218	FURNISH SIGN STRUCTURE (TRUSS)	LB	216,830		
197 (F)	560219	INSTALL SIGN STRUCTURE (TRUSS)	LB	216,830		
198	560244	FURNISH LAMINATED PANEL SIGN (1"-TYPE A)	SQFT	1,910		
199	560245	FURNISH LAMINATED PANEL SIGN (1"-TYPE B)	SQFT	140		
200	560246	FURNISH LAMINATED PANEL SIGN (2 1/2"-TYPE B)	SQFT	200		

REPLACED PER ADDENDUM NO. 1 DATED JULY 17, 2015

BID ITEM LIST
08-3555V4

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
301	860934	TRAFFIC MONITORING STATION (LOCATION 4)	LS	LUMP SUM	LUMP SUM	
302	027746	MODIFY WIRELESS VEHICLE DETECTION SYSTEM (LOCATION 1)	LS	LUMP SUM	LUMP SUM	
303	027747	MODIFY WIRELESS VEHICLE DETECTION SYSTEM (LOCATION 2)	LS	LUMP SUM	LUMP SUM	
304	027748	WIRELESS VEHICLE DETECTION SYSTEM	LS	LUMP SUM	LUMP SUM	
305	861497	MODIFY SIGNAL AND LIGHTING (LOCATION 1)	LS	LUMP SUM	LUMP SUM	
306	861498	MODIFY SIGNAL AND LIGHTING (LOCATION 2)	LS	LUMP SUM	LUMP SUM	
307	995100	WATER METER CHARGES	LS	LUMP SUM	LUMP SUM	
308	995200	IRRIGATION WATER SERVICE CHARGES	LS	LUMP SUM	LUMP SUM	
309	BLANK					
310	833088	TUBULAR HANDRAILING	LF	610		
311	999990	MOBILIZATION	LS	LUMP SUM	LUMP SUM	

TOTAL BID: **$** _____