

DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES

OFFICE ENGINEER

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August 21, 2013

07-LA-405-4.3
07-278304
Project ID 0700000539

ACNHPI-405-3(034)E

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 AT TEMPLE AVENUE 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 Thursday, September 5, 2013.

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

Project plan sheets 2, 3, 4, 13, 17, 22, 24, 27, 30, 40, 45, 47, 48, 49, 50, 51, 63, 68, 72, 77, 80, and 83 are replaced and attached for substitution for the like-numbered sheets.

Project plan sheet 2A is added and attached for addition to the project plans.

In the *Notice to Bidders and Special Provisions*, in the "STANDARD PLANS LIST," the following Standard Plan is added as follows:

"B7-11 Utility Details "

In the *Notice to Bidders and Special Provisions*, in the "STANDARD PLANS LIST," the following Standard Plans are deleted as follows:

"RSP ES-8A Electrical Systems (Pull Box)
ES-9A Electrical Systems (Structure Pull Box Installations)
ES-9B Electrical Systems (Conduit Riser and Expansion Fitting, Structure Installations)
ES-9C Electrical Systems (Structure Pull Box) "

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In the Special Provisions, Section 14-11.03, is replaced as attached.

In the Special Provisions, Section 15-2.03A(2)(a), is replaced as attached.

In the Special Provisions, Section 15-2.03A(2)(b), the second paragraph is replaced as follows:

"For metal bridge railing, impact sprinkler, and chain link railing posts the Department salvage storage location is:
At Special Crews Region Office, Building D, 7300 E. Bandini Blvd, Commerce, California 90040."

In the Special Provisions, Section 15-2.03A(4), "Payment," is added as attached.

In the Special Provisions, Section 20-3.03L(6): is deleted.

In the Special Provisions, Section 20-3.03N is replaced as follows:

"Replace the 5th paragraph of section 20-3.03N with:

Pipe supply lines on the discharge side of the valve must be tested in conformance with Method B only. Testing by Method A is not allowed."

In the Special Provisions, Section 26-1.03C, is deleted.

In the Special Provisions, DIVISION VI STRUCTURES is added.

In the Special Provisions, Section 51-4.03B, is replaced as follows:

Replace item 3 in the list in the 4th paragraph of section 51-4.03B with:

3. A minimum of 1.5 inch of deck slab concrete is maintained between deck slab reinforcement and the top of PC bulb-Tee girders. "

In the Special Provisions, Section 83, is deleted.

In the Special Provisions, Section 86-2.05A, the second paragraph is deleted.

In the Special Provisions, Section 86-2.05C, the first paragraph is deleted.

In the Special Provisions, Section 86-2.19, is replaced as attached.

In the Special Provisions, Section 86-2.20, is replaced as attached.

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In the *Bid* book, in the "Bid Item List," Items 8, 31, 34, 40, 46, 47, 63, 64, 66, and 89 are replaced, and Items 111, 112, and 113 are added, and item 110 is deleted as attached.

To *Bid* book holders:

In the *Bid* book, the entire "Bid Item List" is replaced as attached. The attached Bid Item List is to be used in the bid.

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

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

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

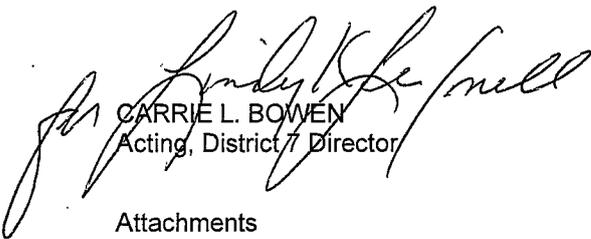
Inform subcontractors and suppliers as necessary.

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

http://www.dot.ca.gov/hq/esc/oe/project_ads_addenda/07/07-278304

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,



CARRIE L. BOWEN
Acting, District 7 Director

Attachments

Replace section 14-11.03 with:

14-11.03 MATERIAL CONTAINING HAZARDOUS WASTE CONCENTRATIONS OF AERIALY DEPOSITED LEAD

14-11.03A General

14-11.03A(1) Summary

Section 14-11.03 includes specifications for hazardous waste management while excavating, stockpiling, transporting, placing, and disposing of material containing hazardous waste concentrations of aerially deposited lead (ADL).

ADL is present within the project limits.

14-11.03A(2) Definitions

Type Z-2: Material that contains ADL in average concentrations (using the 95 percent Upper Confidence Limit) greater than or equal to 1,000 mg/kg total lead, greater than or equal to 5.0 mg/L soluble lead (as tested using the California Waste Extraction Test), and the material is surplus; or material that contains ADL in average concentrations greater than 150 mg/L extractable lead (based on a modified waste extraction test using deionized water as the extractant) or greater than 3,397 mg/kg total lead. This material is a Department-generated California hazardous waste and must be transported to and disposed of at a California Class I disposal site.

14-11.03A(3) Site Conditions

ADL concentration data and sample locations maps are included in the *Information Handout*.

Type Z-2 material exists as shown.

14-11.03A(4) Submittals

14-11.03A(4)(a) Lead Compliance Plan

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

14-11.03A(4)(b) Excavation and Transportation Plan

Within 15 days after approval of the Contract, submit 3 copies of an excavation and transportation plan. Allow 10 days for review. If revisions are required, as determined by the Engineer, submit the revised plan within 7 days of receipt of the Engineer's comments. For the revision, allow 7 days for the review. Minor changes to or clarifications of the initial submittal may be made and attached as amendments to the excavation and transportation plan. In order to allow construction to proceed, the Engineer may conditionally approve the plan while minor revisions or amendments are being completed.

Prepare the written, project specific excavation and transportation plan establishing the procedures you will use to comply with requirements for excavating, stockpiling, transporting, and placing or disposing of material containing ADL. The plan must comply with the regulations of the DTSC and Cal/OSHA and the requirements of the variance. The sampling and analysis portions of the excavation and transportation plan must meet the requirements for the design and development of the sampling plan, statistical analysis, and reporting of test results contained in US EPA, SW 846, "Test Methods for Evaluating Solid Waste," Volume II: Field Manual Physical/Chemical, Chapter Nine, Section 9.1. The plan must include the following elements:

1. Excavation schedule by location and date
2. Temporary locations of stockpiled material
3. Dust control measures
9. Transportation equipment and routes
10. Method for preventing spills and tracking material onto public roads
11. Truck waiting and staging areas
12. Site for disposal of hazardous waste
14. Spill Contingency Plan for material containing ADL

14-11.03A(4)(c) Burial Location Report

Not Used

14-11.03A(5) Quality Control and Assurance

Excavation, reuse, and disposal of material with ADL must comply with rules and regulations of the following agencies:

1. US DOT
2. US EPA
3. California Environmental Protection Agency
4. CDPH
5. DTSC
6. Cal/OSHA
7. California Department of Resources Recycling and Recovery
8. RWQCB, Region 4, Los Angeles
9. California Air Resources Board
10. South Coast Air Quality Management District

Transport and dispose of material containing hazardous levels of lead under federal and state laws and regulations and county and municipal ordinances and regulations. Laws and regulations that govern this work include:

1. Health & Safety Code, Division 20, Chp 6.5 (California Hazardous Waste Control Act)
2. 22 CA Code of Regs, Div. 4.5 (Environmental Health Standards for the Management of Hazardous Waste)
3. 8 CA Code of Regs

14-11.03B Materials

Not Used

14-11.03C Construction

14-11.03C(1) General

Not Used

14-11.03C(2) Material Management

Transport excavated Type Z-2 material using:

1. Hazardous waste manifest
2. Hazardous waste transporter with a current DTSC registration certificate and CA Highway Patrol (CHP) Biennial Inspection of Terminals (BIT) Program compliance documentation.

14-11.03C(3) Dust Control

Excavation, transportation, placement, and handling of material containing ADL must result in no visible dust migration. A water truck or tank must be on the job site at all times while clearing and grubbing or performing earthwork operations in work areas containing ADL. Apply water to prevent visible dust.

14-11.03C(4) Surveying Type Y-1 or Y-2 Material Burial Locations

Not Used

14-11.03C(5) Material Transportation

Before traveling on public roads, remove loose and extraneous material from surfaces outside the cargo areas of the transporting vehicles and cover the cargo with tarpaulins or other cover, as outlined in the approved excavation and transportation plan. You are responsible for costs due to spillage of material containing lead during transport.

14-11.03C(6) Disposal

Analyze surplus material for which the lead content is not known for lead before removing the material from within the project limits. Submit a sampling and analysis plan and the name of the analytical laboratory at least 15 days before beginning sampling and analysis. Use a CDPH ELAP certified laboratory. Sample at a minimum rate of 1 sample for each 200 cu yd of surplus material and test for lead using US EPA Method 6010B or 7000 series.

14-11.03D Payment

Payment for a lead compliance plan is not included in the payment for environmental stewardship work.

The Department does not pay for stockpiling of material containing ADL, unless the stockpiling is ordered. The Department does not pay for sampling and analysis unless it is ordered. The Department does not pay for additional sampling and analysis required by the receiving landfill.

Sampling, analyses, and reporting of results for surplus material not previously sampled is change order work.

Add to the table in section 15-2.03A(2)(a)

Metal Bridge Railing	Rail	25/bundle
Chain Link Railing	Posts	10/bundle

15-2.03A(4) Payment

Payment for salvaging chain link railing posts is included in the payment for salvaging metal bridge railing.

Add to section 86-2:

86-2.19 COMMUNICATION SYSTEM (MODIFY)

86-2.19A General

86-2.19A(1) Summary

This work includes modifying communication systems.

Modify communication system includes installing:

- 1 Conduits, innerducts, conductors and cables of various sizes, types and installation methods
- 2 Splice vaults
- 3 Fiber optic and twisted pair splice enclosures inside splice vaults
- 4 Other required incidental equipment
- 5 Twisted pair cables (75P22) and fiber optic cables (12SMFO and 72SMFO)

86-2.19A(2) Definitions

Breakout: Cable "breakout" is produced by removing jackets just beyond the last tie-wrap point, exposing 3 to 6 feet of cable buffers, Aramid strength yarn and central fiberglass strength members and cutting Aramid yarn, central strength members and buffer tubes.

Connector: Mechanical device providing the means for attaching to and decoupling from a transmitter, receiver or another fiber.

Connectorized: Fiber with a connector affixed to it.

Connector Module Housing (CMH): Patch panel used in the FDF to terminate singlemode fibers with most common connector types.

Couplers: Devices normally located within FDF's mounted in panels, that mate 2 fiber optic connectors. Couplers may also be referred to as adapters, feed-throughs and barrels.

Fiber Distribution Unit (FDU): Enclosure containing a Connector Module Housing (CMH) and a Splice Module Housing enclosure.

Jumper: Short fiber optic cable with connectors installed on both ends.

Light Source: Portable piece of fiber optic test equipment that in conjunction with power meter is used to perform end-to-end attenuation testing. It contains a stabilized light source operating at the designed wavelength of the system under test. It also couples light from the source into the fiber to be received at the far end by the receiver.

Link: Passive section of the system, the ends of which are to be connected to active components. A link may include splices and couplers.

Optical Time Domain Reflectometer (OTDR): Fiber optic test equipment used to measure total amount of power loss between 2 points and the corresponding distance. It provides a visual and printed display of the relative location of system components and as losses attributable to each component or defect in fiber, splices and connections.

Pigtail: Short length of fiber optic cable with a connector installed on one end.

Power Meter: Portable fiber optic test equipment used to perform end-to-end attenuation testing in conjunction with a light source, containing a detector that is sensitive to light at the designed wavelength of the system under test. The display indicates the amount of power injected by the light source that arrives at the receiving end of the link.

Segment: Section of F/O cable not connected to an active device which may or may not have splices

Splice Enclosure: Environmentally sealed container used to organize and protect splice trays that allows splitting or routing of fiber cables from and to multiple locations.

Splice Module Housing (SMH): Housing for storage of splice trays, pigtails and short cable lengths.

Splice Tray: Container used to organize and protect spliced fibers.

Splice Vault: Underground container used to house excess cables and splice enclosures.

86-2.19A(3) Quality Control and Assurance

You must arrange at your expense, to have a technician qualified to work on communication system routing materials and equipment present at the time these materials and equipment are installed, modified, connected, or reconnected.

86-2.19B Materials

New equipment must be current standard production units and must have been in production for a minimum of 6 months.

86-2.19B(1) Communication Conduit

86-2.19B(1)(a) General

HDPE conduit must be joined by heat fusion. Heat fusion, including electrofusion, must be by methods recommended by the conduit manufacturer, and with equipment approved for the purpose. Equipment must not expose conduit to direct flame. Heat fusion must be performed by conduit manufacturer certified or authorized personnel. A minimum of 2 test fusions, by each fusion operator, must be demonstrated to the Engineer prior to performing fusion operations on any HDPE conduit to be installed.

Where edge drains are in the path of conduit routing, you must locate edge drains, then install conduit maintaining a minimum depth of 24 inches. If an edge drain is damaged by your work, repairs will be at your expense.

Conduit adjacent to overcrossings or bridge foundations must be trenched and installed in shoulders as close as possible to the edge of traveled way.

Deflections of communication conduit must not exceed one inch/foot when avoiding obstructions. Conduit from typical trench sections must not deflect by more than one inch/foot from the alignment preceding or following splice vaults.

86-2.19B(1)(b) Materials

Communication conduit must be orange Schedule 40 high density polyethylene (HDPE) conduit and comply with NEMA TC-7.

Communication conduit in structures must be Type 1 unless otherwise specified.

Use colored slurry cement backfill to backfill trenches for the installation of communication conduits that will contain fiber optic cables. Colored slurry cement backfill must comply with section 19-3.

86-2.19B(1)(c) Construction

Conduit must enter splice vaults through knockouts. Conduit ends must not extend beyond interior wall of splice vaults. Space around conduits through end walls of splice vaults must be filled with minor concrete cement mortar. Do not use conduit bodies in lieu of specified bends to change the direction of communication conduit runs. Conduit bodies must not be used instead of specified bends to change the direction of communication conduit runs.

Bends must not be placed in sections of conduit in excess of those indicated. The total degrees of bending in a section of conduit between splice vaults must not exceed a total of 180 degrees.

Changes in indicated conduit bends must comply with the standard specifications.

Minimum bending radius for 2 inches, 3 inches and 4 inches communication conduits must be 24 inches, 36 inches and 48 inches. Bends greater than 22 degrees must be factory bends and bends greater than 45 degrees must be galvanized rigid steel with necessary adapters.

86-2.19B(2) One inch Innerduct

86-2.19B(2)(a) General

Separate innerducts must be installed for each fiber optic cable along communication mainlines.

Yellow must be used for the 72SMFO, fiber optic cables used for video/data and contrasting colors for the 12SMFO for video distribution. Exteriors of innerducts must be marked with sequential measurement markings every 3 feet.

86-2.19B(2)(b) Materials

Innerducts must be one inch, smooth or ribbed high density polyethylene (HDPE) duct.

86-2.19B(2)(c) Construction

Innerduct must be installed using manufacturer's recommended practices using cable pulling lubricants recommended by the innerduct manufacturer and pull ropes. If innerduct is installed with adjacent cables in the same conduit, innerducts and cables must be installed together in one operation. Innerducts must be installed in continuous runs between splice vaults without splices or joints.

Ends must be smooth to prevent scraping of cables. Dynamometers must be used to record installation tensions and tension limiting devices must be used to prevent exceeding maximum pulling tensions during installation. Breakaway devices must be used to limit pulling tensions. One device must be placed in series with every element rated for less than maximum pulling tensions of that element. Innerducts must not be stressed beyond the minimum-bending radius allowed by the innerduct or fiber optic cable manufacturer.

Tension must be set to the manufacturer's maximum limit. Maximum pulling tension must be recorded for each innerduct run.

Immediately before installing cables, innerducts must be blown out with compressed air until foreign material is removed. After cables have been installed, seal ends of innerducts with an approved type of sealing compound.

86-2.19B(3) Splice Vault

86-2.19B(3)(a) General

Splice vaults must have tamper proof bolts to secure the cover/metal lid to the box. Tamper proof bolts must be approved before ordering and installing.

Splice vaults must be installed as detailed and where shown on the plans. Splice vaults and covers must have an AASHTO HS 20-44 rating, except in areas protected from vehicular traffic, may be rated for AASHTO H5 loads (25 percent of HS 20-44).

Splice vaults in shoulders are shown for general location.

86-2.19B(3)(b) Materials

Splice vaults must be 60 inches (L) x 30 inches (W) x 30 inches (D) nominal inside dimensions. Covers must be in one or 2 sections with inset lifting pull shots in each portion. Enclosures, covers and extensions must be concrete gray.

Metallic or nonmetallic cable racks must be installed on the interior of both sides of splice vaults. Racks must be capable of supporting a load of 100 pounds, minimum, per rack arm. Racks must be supplied in lengths appropriate to boxes in which they will be placed. Rack arms must not be less than 6 inches in length. Metallic cable racks must be fabricated from ASTM Designation: A36 steel plate and must be hot-dip galvanized after fabrication. Metallic cable racks must be bonded and grounded.

86-2.19B(3)(c) Construction

Splice vaults must be installed one inch above grade in unpaved areas.

86-2.19B(4) Twisted Pair Cable

86-2.19B(4)(a) General

Twisted pair cable must be supplied and installed in the configurations shown.

86-2.19B(4)(b) Materials

Twisted pair cables must meet the requirements of Rural Utility Service (RUS) Bulletin 1753F-205 (PE-39):

86-2.19B(4)(c) Construction

Replace cable damaged during installation at your expense.

Install cables in conduits. Conduit ends must have rough edges smoothed to prevent scraping cables. Apply manufacturer's recommended lubricant to cables to reduce friction between cables and conduits. Protect exposed cable ends from moisture ingress.

Do not stress the cable beyond the manufacturer's minimum bending radius. Dynamometers must be used to measure installation tension and tension-limiting devices must be used to prevent exceeding the manufacturer's maximum pulling tension specification.

Provide a loop of cable with a minimum length of 10 feet in splice vaults.

Seal conduit entrances in splice vaults with conduit sealing compound following installation of cables in conduits. Maintain the pair count and RUS color code during splicing. Identify cables and pair counts with cable markers. Field splices must be made in twisted pair splice closures located in splice vaults. Secure cables in place within splice vaults.

86-2.19B(5) Twisted Pair Splice Enclosure

86-2.19B(5)(a) General

Splice closures must be installed inside splice vaults for drops from twisted-pair trunk cables to equipment locations and at mid-span splices as shown.

86-2.19B(5)(b) Materials

Twisted pair splice enclosures must be furnished in 1-foot and 2-foot sizes.

Twisted-pair splice enclosures consist of neoprene sleeves secured with hose clamps.

Splice kits must contain hardware items, including enclosures, vinyl tape, bonding clamps, splice connectors, No. 22 AWG, insulated wire, spacer tapes and terminal lugs.

86-2.19B(5)(c) Construction

Enclosures must be mounted securely inside communications pull boxes or splice vaults and must be properly grounded and cable sheaths bonded using bonding clamps. Trunk cables must be identified as "IN" or "OUT" depending upon their location relative to splices (toward communications nodes or away from communications nodes). Tape collars must be placed around the 2 trunk cables and drop cables at locations required by splice enclosures. Splice enclosures must be fitted to splices and hose clamps tightened over cables.

Pairs of drop cables must be spliced to designated pairs in trunk cables as indicated in twisted-pair splice tables. Splice conductors must be crimped onto wires using manufacturer approved installation tools.

86-2.19B(6) Outdoor Fiber Optic Cables

86-2.19B(6)(a) General

86-2.19B(6)(a)(i) Summary

Outdoor fiber optic cables must meet the requirements of TIA-492CAA for singlemode Class IVa fibers and the requirements of ICEA S-87-640 with deviations stated herein.

Cables must be installed and tested in accordance with the requirements NECA/FOA-301 and TIA-568.

86-2.19B(6)(a)(ii) Submittals

Documentation for testing conducted at the manufacturer's premises must be submitted when the equipment is delivered to the site.

Documentation of field testing results must be provided within 2 working days after testing.

A minimum of 15 working days before arrival of cable at the site, you must provide detailed test procedures for field testing for review and approval. Procedures must include tests involved and how tests are to be conducted. Test procedures must include the model, manufacturer, configuration, calibration, and alignment procedures for proposed test equipment.

Submit the manufacturer's recommended procedures for pulling fiber optic cable at least 20 working days before installing cable.

86-2.19B(6)(a)(iii) Quality Control and Assurance

86-2.19B(6)(a)(iii)(1) Factory Testing

Documentation of compliance with fiber specifications as listed in the Fiber Characteristics Table must be supplied from the original equipment manufacturer. Before shipment, but while on shipping reels, 100 percent of fibers must be tested for attenuation. Copies of the results must be maintained on file by the manufacturer with a file identification number for a minimum of 7 years, attached to cable reels in waterproof pouches, and submitted to you and to the Engineer.

86-2.19B(6)(a)(iii)(2) Arrival On Site

Cables and reels must be physically inspected on delivery and 100 percent of fibers must be attenuation tested to confirm that cable meets requirements. Failure of a fiber in the cable will be cause for rejection of the entire reel. Test results must be recorded, dated, compared and filed with copies accompanying shipping reels in weatherproof envelopes. Attenuation deviations from shipping records of greater than 5 percent must be brought to the attention of the Engineer. Do not install cables until completion of testing and written approval. Copies of traces and test results must be submitted. If test results are unsatisfactory, the reel of F/O cable must be considered unacceptable and records corresponding to that reel of cable must be marked accordingly. Unsatisfactory reels of cable must be replaced with new reels of cable at your expense. New reels of cable must be tested to demonstrate acceptability. Copies of test results must be submitted.

86-2.19B(6)(a)(iii)(3) After Cable Installation

Index matching gel will not be allowed in connectors during testing. After fiber optic cable has been pulled, but before breakout and termination, test 100 percent of fibers with an OTDR for attenuation. Record and date test results, compare, and file with previous copies of these tests. Submit copies of traces and test results. If OTDR test results are unsatisfactory, reject that segment of the F/O cable. Replace unsatisfactory segments of cable with new segments, without additional splices, at your expense. Test new cable segments to demonstrate acceptability. Submit copies of test results.

86-2.19B(6)(a)(iii)(4) System Cable Verification at Completion

86-2.19B(6)(a)(iii)(4)(a) Power Meter and Light Source

At the conclusion of OTDR testing, 100 percent of fiber links must be tested end-to-end with a power meter and light source, under EIA Optical Test Procedure 171 and in the same wavelengths specified for OTDR tests. Tests must be conducted in one direction, as shown in Appendix A, the Insertion Loss (1C) must be calculated. Test results must be recorded, compared, and filed with the other recordings of the same links. Test results must be submitted to the Engineer. These values must be recorded in the Cable Verification Worksheet in Appendix A.

86-2.19B(6)(a)(iii)(4)(b) OTDR Testing

After passive cabling systems have been installed and are ready for activation, 100 percent of fibers must be tested with OTDR for attenuation at wavelengths of 1310 nm and 1550 nm. OTDR testing must be performed in both directions (bi-directional) on fibers. Test results must be generated from software of test equipment, recorded, dated, compared and filed with previous copies. A hard copy printout and an electronic copy on a CD of traces and test results must be submitted. The average of the 2 losses must be calculated and recorded in the Cable Verification Worksheet in Appendix A. The OTDR must be capable of recording and displaying anomalies of at least 0.02 dB. Connector losses must be displayed on OTDR traces.

86-2.19B(6)(a)(iii)(4)(c) Cable Verification Worksheet

The Cable Verification Worksheet shown in Appendix A must be completed for links in fiber optic systems using data gathered during cable verification. Completed worksheets must be included as part of system documentation.

86-2.19B(6)(a)(iii)(5) Test Failures

If link loss, measured from the power meter and light source, exceeds the calculated link loss or the actual location of fiber ends does not agree with the expected location of fiber ends, fiber optic links will not be accepted. Unsatisfactory segments of cable or splices must be replaced with new segments of cables or splices at your expense. OTDR testing, power meter and light source testing, and Cable Verification Worksheet must be completed for repaired links to determine acceptability. Copies of test results must be submitted. Removal and replacement of segments of cable must be considered as removal and replacement of a single contiguous length of cable connecting 2 splices and 2 connectors. Removal of a section containing a failure will not be allowed.

86-2.19B(6)(a)(iii)(6) Passive Component Package Testing and Documentation

Pigtails or jumpers must be tested for insertion attenuation loss using optical power meters and light sources. Singlemode terminations must be tested for return reflection loss. Values must meet loss requirements specified and must be recorded on tags attached to pigtails or jumpers.

After an assembly is complete, you must visually verify that tagging of loss values is complete. You must provide copies of the manufacturer test documents for the conducted "end-to-end" optical power meter/light source test from pigtail ends to end of terminating points assuring continuity and overall attenuation loss values are within the acceptable range.

Attach one copy of the test document in a plastic envelope to the assembled FDU. Copies must be provided separately to the Engineer, and must be maintained on file by the manufacturer or supplier for a minimum of 7 years.

Assembled and completed FDU units must be protectively packaged for shipment.

86-2.19B(6)(a)(iii)(7) Fiber Optic System Performance Margin Design Criteria

Installed system performance margin must be at least 6 dB for links. If the design system performance margin is less than 6 dB, notify the Engineer of your plan to meet this requirement.

86-2.19B(6)(a)(iii)(8) Active Component Testing

Transmitters and receivers must be tested with power meters and light sources to record transmitter average output power (dBm) and receiver sensitivity (dBm). Values must be recorded in the Fiber System Performance Margin Calculations Worksheet.

APPENDIX A

Cable Verification Worksheet

*End-to-End Attenuation (Power Meter and Light Source) Testing
and OTDR Testing*

Contract No. _____ Contractor: _____

Operator: _____ Date: _____

Link Number: _____ Fiber Number: _____

Test Wavelength (Circle one): 1310 nm 1550 nm

Expected Location of fiber ends: End 1: _____ End 2: _____

Power Meter and Light Source Test Results:

Power In:	_____ dBm	1A
Output Power:	_____ dBm	1B
Insertion Loss [1A - 1B]:	_____ dB	1C

OTDR Test Results:

Forward Loss:	_____ dB	2A
Reverse Loss:	_____ dB	2B
Average Loss [(2A + 2B)/2]:	_____ dB	2C

To Be Completed by Caltrans:

Resident Engineer's Signature: _____

Cable Link Accepted: _____

APPENDIX B

Fiber System Performance Margin Calculations Worksheet

A. Calculate the Passive Cable Attenuation

1. Calculate Fiber Loss at Operating Wavelength: _____ nm	Cable Distance (times) Individual Fiber Loss (equal) @ 1310 nm (0.6 dB/mi) @ 1550 nm (0.5 dB/mi)	_____ mi x ____ dB/mi =
Total Fiber Loss:		_____ dB

B. Calculate the Total Connector/Splice Loss

2. Calculate Connectors/couplers Loss: (exclude Tx and Rx connectors)	Individual Connector Loss (times) Number of Connector Pairs (equal) Total Connector Loss:	0.4 dB x ____ = _____ dB
3. Calculate Splice Loss:	Individual Splice Loss (times) Number of Splices (equal) Total Splice Loss:	0.1 dB x ____ = _____ dB
4. Calculate Other Components Loss:	Total Components:	_____ dB
5. Calculate Total Losses:	Total Connector Loss (plus) Total Splice Loss (plus) Total Components (equal)	+ dB + dB + dB =
Total Connector/Splice Loss:		_____ dB

C. Calculate Active Component Link Loss Budget

System Wavelength:		_____ nm
Fiber Type:		singlemode
Average Transmitter Output (Launch Power):		_____ dBm
Receiver MAX Sensitivity (10 ⁹ BER) (minus)		_____ dBm
Receiver MIN Sensitivity (equal)		- _____ dBm =
Receiver Dynamic Range:		_____ dB
6. Calculate Active Component Link Loss Budget:	Average Transmitter Output (Launch Power) (minus)	_____ dBm
	Receiver MAX Sensitivity (equal)	- _____ dBm =
Active Component Link Loss Budget:		_____ dB

D. Verify Performance

7. Calculate System Performance Margin to Verify Adequate Power:	Active Component Link Loss Budget [C]	_____ dB
	(minus) Passive Cable Attenuation [A]	- _____ dB
	(minus) Total Connector/Splice Lost [B]	- _____ dB =
	(equal)	
System Performance Margin:		_____ dB

86-2.19B(6)(b) Materials

86-2.19B(6)(b)(i) Fiber Characteristics

Dimensional characteristics: core diameter, core non-circularity, cladding diameter, core/cladding concentricity error, coating diameter, coating/cladding concentricity error.

Mechanical characteristics: tensile strength, coating strip force.

Optical characteristics: Attenuation coefficient, mode field diameter (single mode fibers only), point discontinuity.

Detail specifications for Class IVa dispersion unshifted singlemode optical fibers as described by TIA-492CAAAXBBQB.

Property	FOTP(s)	Test conditions	Requirement
Cladding diameter μm	45 or 48 or 176	--	125 \pm 1.0
Cladding non-circularity	45 or 48 or 176	--	< 1.0 %
Core/cladding concentricity error μm	45 or 176	--	< 1.0
Coating diameter μm	55 or 163 or 173	--	250 \pm 15
Coating/cladding concentricity error μm	55 or 163 or 173	--	< 20
Tensile strength proof test	31	--	0.69 GPa
Coating strip force N	178	30 mm length	1.0 min, 9.0 max
Attenuation coefficient dB/km	78 or 61 or 120	@ 1310 nm	0.5
	78 or 61 or 120	@ 1500 nm	0.4
Mode field diameter	164 or 165 or 167	@ 1310 nm	9.1 \pm 0.5
Point discontinuity dB/pt	59	--	<0.10

86-2.19B(6)(b)(ii) Cable Layup

Fiber optic cables include these components:

1. Central strength member
2. Color coded buffer tubes containing color coded coated fibers with water blocking swellable polymer yarn or tape filling material
3. Flooding material is water blocking swellable polymer yarn or tape
4. Core wrap

86-2.19B(6)(b)(iii) Cable Properties

Cables must be tested in accordance with Parts 7 and 8 of ICEA S-87-640.

1. Part 7 "Cable testing, tests and requirements." Fibers of completed cables are tested at 1310 and 1550 nm for single mode fibers.
 - 1.1 Jacket print test
 - 1.2 Jacket thickness measurement
 - 1.3 Jacket material density measurement
 - 1.4 Jacket tensile strength, yield strength and ultimate elongation
 - 1.5 Jacket material absorption coefficient
 - 1.6 Environmental stress crack resistance
 - 1.7 Jacket shrinkage
 - 1.8 Length and marking accuracy
 - 1.9 Cable and component dimensions (including ribbon measurements)
 - 1.10 Ripcord function
 - 1.11 Material compatibility and cable aging
 - 1.12 Cable high and low temperature bend
 - 1.13 Cable external freezing
 - 1.14 Compound flow (drip) for filled cables
 - 1.15 Cable temperature cycling

- 1.16 Cable sheath adherence
 - 1.17 Water penetration
 - 1.18 Cable impact
 - 1.19 Cable tensile loading and fiber strain
 - 1.20 Cable compressive loading
 - 1.21 Cable twist
 - 1.22 Lightning damage susceptibility (where applicable)
- 2. Part 8 "finished cable optical performance requirements":
 - 2.1 Attenuation coefficient
 - 2.2 Point discontinuity
 - 2.3 Singlemode cable cutoff wavelength
- 3. Identify and mark cables in accordance with Part 6 of ICEA S-87-640.

86-2.19B(6)(b)(iv) Labeling

86-2.19(6)(b)(iv)(a) General

Label fiber optic cables permanently and in a consistent manner. Tags must be material designed for long term permanent labeling of fiber optic cables. Metal tags must be stainless steel with embossed lettering. Nonmetal label materials must be marked with permanent ink. Labels must be affixed to cables per the manufacturer's recommendations and must not be affixed in a manner, which will cause damage to the cable or the fibers. Handwritten labels will not be allowed.

86-2.19(6)(b)(iv)(b) Labeling of Cables

Labeling of backbones, distribution and drop fiber optic cables must conform to:

UNIQUE IDENTIFICATION CODE ELEMENTS For Backbone, Distribution or Drop Cables		
DESCRIPTION	CODE	NUMBER OF CHARACTERS
District	District number	2
Cable Type	Fiber: S: Singlemode	1
Cable fiber (or copper pairs) Count	Number of fibers or conductor pairs (Examples: 144 fibers; or 100 TWP)	3
Route Number	Hwy. Rte (Example: 005)	3
Begin Function	T: TMC; H: HUB; V: Video Node; D: Data Node; C: Cable Node; M: CCTV Camera; N: CMS; Z: Ramp Meter; U: Traffic Monitoring/Count Station/Vehicle Count Station (VDS, TOS); S: Splice Vault	1
Begin Function Number	Unique ID number corresponds to Begin Function (Example: H02 [Hub 02])	2
End Function	T: TMC; H: HUB; V: Video Node; D: Data Node; C: Cable Node; M: CCTV Camera; N: CMS; Z: Ramp Meter; U: Traffic Monitoring/Count Station; S: Splice Vault	1
End Function Number	Unique ID number corresponds to Begin Function (Example: H03 [Hub 03])	2
Unique Identifier	XX: If 2 or more cables of the same count are in the same run	2
TOTAL		17

Cables must display one unique identification, regardless of where the cable is viewed. The begin function and end function correspond to end points of cables. The order of the begin and end functions follow the hierarchy listed below, where the lowest number corresponding to the begin/end function is listed first.

List of Hierarchy										
1	2	3	4	5	6	7	8	9	10	11
TMC	HUB	Video Node (VN)	Data Node (DN)	Cable Node	CCTV Camera	CMS	Traffic Signal	Ramp Meter	Traffic Monitoring/ Count Station	Splice Vault

Cables must display one unique identification, regardless of where the cable is viewed. The begin function and end function correspond to end points of cables. The order of the begin and end functions follow the hierarchy listed below, where the lowest number corresponding to the begin/end function is listed first.

List of Hierarchy										
1	2	3	4	5	6	7	8	9	10	11
TMC	HUB	Video Node (VN)	Data Node (DN)	Cable Node	CCTV Camera	CMS	Traffic Signal	Ramp Meter	Traffic Monitoring/ Count Station	Splice Vault

If a cable is connected between HUBs, the lowest number will be listed as the start function.

86-2.19(6)(b)(iv)(c) Label Placement

Label placement must be as follows:

1. Cables must be labeled with the unique identification code element method at terminations, even if no connections or splices are made, and at splice vault entrances and exits.
2. Cable jackets entering splice enclosures must be labeled under the identification method.
3. Cable jackets must be labeled at entries to FDUs under the unique identification code element method. Fibers must be labeled with Fiber IDs and pigtailed must be labeled at connectors with Fiber IDs. FDUs must be labeled with Cable IDs on faces of FDUs. If multiple cables are connected to FDUs, each block of connectors relating to individual cables must be identified by a single label with Cable IDs. Individual connections must be marked on the face of FDUs in the designated area with Fiber IDs.
4. Fiber labels must be placed next to connectors of individual fibers.
5. Equipment to FDU jumpers must be labeled as to equipment type connected and must be labeled at both ends. FDU to FDU jumpers must be labeled at each end under the unique identification code element method.
6. Pigtailed must be labeled at the connector under the unique identification code element method.
7. Twisted-pair communications cables must be labeled under the unique identification code element method.

86-2.19B(6)(b)(v) Cable Installation

Cable installation must be in conformance with the procedures specified by the cable manufacturer. Mechanical aids may be used if a tension measuring device and break-away swivel are placed in tension to the end of cables. Tension in cables must not exceed 500 ft-lb or the manufacturer's recommended pulling tension, whichever is less. A calibrated break away feature must be employed to work in tandem with the tension measuring device and limit excessive tension by disengaging when a set tension is exceeded.

Bend radius must be a minimum of 20 times the outside diameter during installation and the final installed bend radius must be no less than ten times the outside diameter of the cable. Cable grips for installing fiber optic cables must have a ball bearing swivel The stress relief component must be installed at the entrance to the FDU as recommended by the manufacturer.

F/O cable must be installed using a cable pulling lubricant recommended by the F/O cable manufacturer and a pull rope must be lubricated at splice vaults during installation.

F/O cable must be installed without splices and must be limited to one cable splice every 4 miles. Midspan access splices or FDU terminations must involve fibers being spliced. Cable splices must be located in splice enclosures installed in splice vaults. A minimum of 65 feet of slack must be provided for F/O cables at splice vaults. Slack must be divided equally on each side of F/O splice enclosures.

86-2.19B(6)(b)(vi) Splicing

Field splices must be done in splice vaults or cabinets in splice trays housed in splice enclosures.

Fiber splices must be fusion type. Mean splice loss must not exceed 0.07 dB per splice and must be obtained by measuring loss through splices in both directions and averaging the resultant values.

Splices must be protected with a metal reinforced thermal shrink sleeve.

The mid-span access method must be used to access individual fibers in cables for splicing to other cables. Cable manufacturers recommended procedures and approved tools must be used for mid-span access. Only fibers to be spliced may be cut. Buffer tubes and individual fibers not being used in mid-span access must not be modified or damaged.

Individual fibers must be looped one full turn within splice trays to avoid micro bending. A 1.75 inch minimum bend radius must be maintained during installation and after final assembly in optical fiber splice trays. Bare fibers must be individually restrained in splice trays. Optical fibers in buffer tubes and placement of bare optical fibers in splice trays must not produce tensile force on optical fibers.

You will be allowed to splice a total of 30 percent of fibers to repair damage done during mid-span access splicing without penalty. The Engineer will assess a fine of \$300.00 for each additional and unplanned splice. A single fiber may not have more than 3 unplanned splices. If a fiber requires more than 3 unplanned splices, the entire length of F/O cable must be replaced at your expense.

86-2.19B(6)(b)(vii) Splice Enclosures

F/O field splices must be enclosed in splice enclosures, complete with splice organizer trays, brackets, clips, cable ties, seals and sealant. Splice enclosures must be suitable for direct burial or splice vault applications. Manufacturer's installation instructions must be supplied before installation of splice enclosures. Location of splice enclosures must be where a splice is required.

The fiber optic splice enclosure must consist of an outer enclosure, an inner enclosure and splice trays.

The fiber optic splice enclosure must be suitable for a temperature range of 32°F to 122°F.

The size of the enclosure must allow all the fibers of the largest fiber optic cable to be spliced to a second cable of the same size, plus 12 additional pigtails. The enclosure must be not more than 36 inches in length and not more than 8 inches in diameter. Two outer enclosures must fit into the fiber optic splice vault and must leave sufficient space for routing of the fiber optic communication cables, without exceeding the minimum bending radius of any cable. The enclosures must be designed for butt splicing.

Splice enclosures must:

1. Have non-filled thermoplastic case
2. Be rodent proof, waterproof, re-enterable and moisture proof
3. Have cable entry ports that accommodate 0.4-inch to one-inch diameter cables
4. Have multiple grounding straps
5. Accommodate a minimum of 6 splice trays
6. Be suitable for "butt" or "through" cable entry configurations
7. Place no stress on finished splices within splice trays
8. Be expandable from 2 cables per end to 8 cables per end by using adapter plates

All materials in the enclosures must be nonreactive and must not support galvanic cell action. The outer enclosure must be compatible with the other enclosure components, the inner enclosure, splice trays, and cables.

The end plate must consist of 2 sections and must have capacity for 2 fiber optic trunk communication cables and 2 fiber optic pigtails communication.

The outer enclosure must protect the splices from mechanical damage, must provide strain relief for the cable, and must be resistant to salt corrosion.

The outer enclosure must be waterproof, re-enterable and must be sealed with a gasket. The outer enclosure must be flash-tested at 14.9 psi.

The inner enclosure must be of metallic construction. The inner enclosure must be compatible with the outer enclosure and the splice trays and must allow access to and removal of individual splice trays. The splice trays must be compatible with the inner enclosure and must be constructed of rigid plastic or metal.

Adequate splice trays must be provided to splice all fibers of the largest fiber optic cable, plus 12 pigtailed.

Each splice must be individually mounted and mechanically protected in the splice tray.

Splice enclosures must be bolted to side walls of splice vaults.

Verify the quality of splices before sealing splice enclosures. Splice enclosures must not be sealed until link testing is performed.

Optical fibers must be of appropriate lengths and must be appropriately identified. Splices must be fusion type and must be arranged within splice trays of fiber distribution units under the organizational design of splice trays. Appropriate protective coatings must be applied to fusion splices.

86-2.19C Construction

Not Used

86-2.19D Payment

Not Used

Add to Section 86-2

86-2.20 COMMUNICATION SYSTEM (TEMPORARY)

86-2.20A General

86-2.20A(1) Quality Control and Assurance

Communication system routing (temporary) must maintain operation of the Route 405 traffic management system elements, and Caltrans District 7 Traffic Management Center.

The temporary communication system must operate on a continuous 24 hour basis.

86-2.20B Materials

86-2.20B(1) Conduit

Conduit for temporary communication system must be Type 3. Concrete backfill, trace wire and warning tape will not be required in trenches. Conduit must be installed in trenches with a minimum depth of 18 inches or deeper.

86-2.20B(2) Fiber Optic Splice Vaults

Do not place grout in the bottom of splice vaults.

86-2.20B(3) Wood Poles

Pressure treatment or painting will not be required.

86-2.20C Construction

After cables have been installed, seal the ends of conduits terminating in splice vaults with an approved type of sealing compound.

86-2.20C(1) Removal

Remove temporary communication facilities outside the highway right of way when no longer required.

Conduits may be abandoned in place.

86-2.20D Payment

Not used

BID ITEM LIST
07-278304

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
1	070030	LEAD COMPLIANCE PLAN	LS	LUMP SUM	LUMP SUM	
2	080050	PROGRESS SCHEDULE (CRITICAL PATH METHOD)	LS	LUMP SUM	LUMP SUM	
3	120090	CONSTRUCTION AREA SIGNS	LS	LUMP SUM	LUMP SUM	
4	120100	TRAFFIC CONTROL SYSTEM	LS	LUMP SUM	LUMP SUM	
5	120116	TYPE II BARRICADE	EA	5		
6	120165	CHANNELIZER (SURFACE MOUNTED)	EA	160		
7	121161	TEMPORARY TERMINAL SECTION (TYPE K)	EA	2		
8	129000	TEMPORARY RAILING (TYPE K)	LF	2,280		
9	129100	TEMPORARY CRASH CUSHION MODULE	EA	50		
10	130100	JOB SITE MANAGEMENT	LS	LUMP SUM	LUMP SUM	
11	130200	PREPARE WATER POLLUTION CONTROL PROGRAM	LS	LUMP SUM	LUMP SUM	
12	130500	TEMPORARY EROSION CONTROL BLANKET	SQYD	2,460		
13	130620	TEMPORARY DRAINAGE INLET PROTECTION	EA	5		
14	130640	TEMPORARY FIBER ROLL	LF	1,800		
15	130680	TEMPORARY SILT FENCE	LF	700		
16	130730	STREET SWEEPING	LS	LUMP SUM	LUMP SUM	
17	130900	TEMPORARY CONCRETE WASHOUT	LS	LUMP SUM	LUMP SUM	
18	140003	ASBESTOS COMPLIANCE PLAN	LS	LUMP SUM	LUMP SUM	
19	141103	REMOVE YELLOW THERMOPLASTIC TRAFFIC STRIPE (HAZARDOUS WASTE)	LF	5,220		
20	150662	REMOVE METAL BEAM GUARD RAILING	LF	34		

BID ITEM LIST**07-278304**

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
21	150711	REMOVE PAINTED TRAFFIC STRIPE	LF	12,900		
22	150712	REMOVE PAINTED PAVEMENT MARKING	SQFT	57		
23	150714	REMOVE THERMOPLASTIC TRAFFIC STRIPE	LF	4,400		
24	150715	REMOVE THERMOPLASTIC PAVEMENT MARKING	SQFT	350		
25	150722	REMOVE PAVEMENT MARKER	EA	1,930		
26	025891	REMOVE STEEL POST (BOLLARD)	EA	4		
27	150771	REMOVE ASPHALT CONCRETE DIKE	LF	38		
28	150772	REMOVE CURB	LF	190		
29	150812	REMOVE PIPE (LF)	LF	390		
30	150820	REMOVE INLET	EA	2		
31	150853	REMOVE CONCRETE PAVEMENT (SQYD)	SQYD	440		
32	151270	SALVAGE METAL BRIDGE RAILING	LF	600		
33	151572	RECONSTRUCT METAL BEAM GUARD RAILING	LF	13		
34	153103	COLD PLANE ASPHALT CONCRETE PAVEMENT	SQYD	110		
35	153221	REMOVE CONCRETE BARRIER	LF	40		
36	153240	REMOVE CONCRETE (CURB, GUTTER AND SIDEWALK) (CY)	CY	30		
37	155003	CAP INLET	EA	1		
38	157560	BRIDGE REMOVAL (PORTION)	LS	LUMP SUM	LUMP SUM	
39	160102	CLEARING AND GRUBBING (LS)	LS	LUMP SUM	LUMP SUM	
40	190101	ROADWAY EXCAVATION	CY	760		

BID ITEM LIST

07-278304

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
41 (F)	192003	STRUCTURE EXCAVATION (BRIDGE)	CY	326		
42	192053	STRUCTURE EXCAVATION (TYPE Z-2) (AERIALY DEPOSITED LEAD)	CY	4		
43 (F)	193003	STRUCTURE BACKFILL (BRIDGE)	CY	885		
44	200120	CULTIVATE	SQYD	2,500		
45	202006	SOIL AMENDMENT	CY	33		
46	202036	SLOW RELEASE OR CONTROLLED RELEASE FERTILIZER	LB	130		
47	204008	PLANT (GROUP H)	EA	9,840		
48	204099	PLANT ESTABLISHMENT WORK	LS	LUMP SUM	LUMP SUM	
49	206400	CHECK AND TEST EXISTING IRRIGATION FACILITIES	LS	LUMP SUM	LUMP SUM	
50	206560	CONTROL AND NEUTRAL CONDUCTORS	LS	LUMP SUM	LUMP SUM	
51	206602	1" ELECTRIC REMOTE CONTROL VALVE	EA	1		
52	206604	1 1/2" ELECTRIC REMOTE CONTROL VALVE	EA	3		
53	206753	24 STATION IRRIGATION CONTROLLER (WALL MOUNTED)	EA	1		
54	208301	IRRIGATION CONTROLLER ENCLOSURE CABINET	EA	1		
55	208465	SPRINKLER (TYPE A-5)	EA	32		
56	208472	SPRINKLER (TYPE B-2)	EA	8		
57 (F)	208594	3/4" PLASTIC PIPE (SCHEDULE 40) (SUPPLY LINE)	LF	585		
58 (F)	208595	1" PLASTIC PIPE (SCHEDULE 40) (SUPPLY LINE)	LF	345		
59 (F)	208596	1 1/4" PLASTIC PIPE (SCHEDULE 40) (SUPPLY LINE)	LF	280		
60 (F)	208600	3" PLASTIC PIPE (SCHEDULE 40) (SUPPLY LINE)	LF	55		

BID ITEM LIST

07-278304

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
61 (F)	208601	4" PLASTIC PIPE (SCHEDULE 40) (SUPPLY LINE)	LF	40		
62	260303	CLASS 3 AGGREGATE BASE (CY)	CY	160		
63	280000	LEAN CONCRETE BASE	CY	81		
64	390132	HOT MIX ASPHALT (TYPE A)	TON	34		
65	394073	PLACE HOT MIX ASPHALT DIKE (TYPE A)	LF	38		
66	401050	JOINTED PLAIN CONCRETE PAVEMENT	CY	160		
67	404092	SEAL PAVEMENT JOINT	LF	980		
68	404093	SEAL ISOLATION JOINT	LF	520		
69	500020	PRESTRESSING PRECAST GIRDER	LS	LUMP SUM	LUMP SUM	
70 (F)	510051	STRUCTURAL CONCRETE, BRIDGE FOOTING	CY	173		
71 (F)	510053	STRUCTURAL CONCRETE, BRIDGE	CY	346		
72 (F)	510502	MINOR CONCRETE (MINOR STRUCTURE)	CY	7.2		
73	511106	DRILL AND BOND DOWEL	LF	354		
74	512277	FURNISH PRECAST PRESTRESSED CONCRETE BULB-TEE GIRDER (80'-90')	EA	3		
75	512278	FURNISH PRECAST PRESTRESSED CONCRETE BULB-TEE GIRDER (90'-100')	EA	3		
76 (F)	512500	ERECT PRECAST PRESTRESSED CONCRETE GIRDER	EA	6		
77	044342	REFINISH CONCRETE SURFACE	SQFT	1,219		
78	519091	JOINT SEAL (MR 1 1/2")	LF	44		
79 (F)	520101	BAR REINFORCING STEEL	LB	106		
80 (F)	520102	BAR REINFORCING STEEL (BRIDGE)	LB	110,500		

BID ITEM LIST

07-278304

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
81 (F)	044343	COMPOSITE COLUMN CASING	SQFT	3,360		
82 (F)	620800	CONCRETE BACKFILL (PIPE TRENCH)	CY	4.2		
83	641101	12" PLASTIC PIPE	LF	35		
84	650018	24" REINFORCED CONCRETE PIPE	LF	12		
85	650022	30" REINFORCED CONCRETE PIPE	LF	76		
86	680905	8" PERFORATED PLASTIC PIPE UNDERDRAIN	LF	260		
87 (F)	682022	CLASS 1 PERMEABLE MATERIAL (BLANKET)	CY	31.6		
88	730070	DETECTABLE WARNING SURFACE	SQFT	53		
89	731502	MINOR CONCRETE (MISCELLANEOUS CONSTRUCTION)	CY	13		
90 (F)	750001	MISCELLANEOUS IRON AND STEEL	LB	249		
91	750010	MANHOLE FRAME AND COVER	EA	1		
92	800360	CHAIN LINK FENCE (TYPE CL-6)	LF	8		
93	802560	10' CHAIN LINK GATE (TYPE CL-6)	EA	2		
94 (F)	833032	CHAIN LINK RAILING (TYPE 7)	LF	315		
95 (F)	833142	CONCRETE BARRIER (TYPE 26 MODIFIED)	LF	315		
96	025892	CONCRETE BARRIER (TYPE 50 MODIFIED)	LF	40		
97	839541	TRANSITION RAILING (TYPE WB)	EA	1		
98	839578	END CAP (TYPE TC)	EA	1		
99	840504	4" THERMOPLASTIC TRAFFIC STRIPE	LF	16,500		
100	840506	8" THERMOPLASTIC TRAFFIC STRIPE	LF	1,850		

BID ITEM LIST
07-278304

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
101	840515	THERMOPLASTIC PAVEMENT MARKING	SQFT	570		
102	840656	PAINT TRAFFIC STRIPE (2-COAT)	LF	21,100		
103	840666	PAINT PAVEMENT MARKING (2-COAT)	SQFT	72		
104	850101	PAVEMENT MARKER (NON-REFLECTIVE)	EA	1,130		
105	850111	PAVEMENT MARKER (RETROREFLECTIVE)	EA	820		
106	860090	MAINTAINING EXISTING TRAFFIC MANAGEMENT SYSTEM ELEMENTS DURING CONSTRUCTION	LS	LUMP SUM	LUMP SUM	
107	025893	COMMUNICATION SYSTEM (MODIFY)	LS	LUMP SUM	LUMP SUM	
108	025894	COMMUNICATION SYSTEM (TEMPORARY)	LS	LUMP SUM	LUMP SUM	
109	869075	SYSTEM TESTING AND DOCUMENTATION	LS	LUMP SUM	LUMP SUM	
110	BLANK					
111	200002	ROADSIDE CLEARING	LS	LUMP SUM	LUMP SUM	
112	260203	CLASS 2 AGGREGATE BASE (CY)	CY	48		
113	999990	MOBILIZATION	LS	LUMP SUM	LUMP SUM	

TOTAL BID:

\$
