

COUNTY OF TRINITY
DEPARTMENT OF TRANSPORTATION
WEAVERVILLE, CALIFORNIA

**NOTICE TO BIDDERS, SPECIAL PROVISIONS
AND BID BOOK**

FOR

LANCE GULCH ROAD PHASE 2 PROJECT

**IN
WEAVERVILLE, CALIFORNIA**

CONTRACT NO. 14-ROAD-02

October 2014

BIDS OPEN: 4:00 P.M., Thursday
November 6, 2014

Bid Book dated October 2014

Standard Specifications dated 2010

Project plans approved October 14, 2014

Standard Plans dated 2010

BID BOOK NO. Volume 1

SPECIAL NOTICES

- For federal-aid projects, the Department is modifying its DBE program.

CONTRACT NO. 14-ROAD-02

The special provisions contained herein have been prepared by or under the direction of the following Registered Persons.

HIGHWAY

Kelly Gallagher

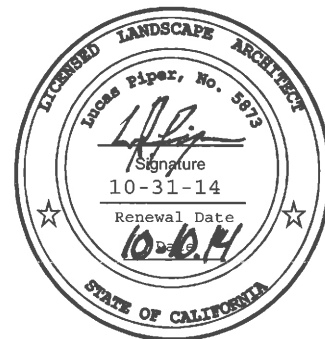
REGISTERED CIVIL ENGINEER



LANDSCAPE

Lucas Piper

LICENSED LANDSCAPE ARCHITECT



CONTRACT NO. 14-ROAD-02

The special provisions contained herein have been prepared by or under the direction of the following Registered Persons.

ELECTRICAL



REGISTERED CIVIL ENGINEER



COUNTY OF TRINITY, STATE OF CALIFORNIA
LANCE GULCH ROAD PHASE 2 PROJECT
ON LANCE ROAD
ALONG AND BETWEEN STATE ROUTE 3 AND STATE ROUTE 299
CONTRACT NO. 14-ROAD-02

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STANDARD PLANS LIST

The standard plan sheets applicable to this Contract include those listed below. The applicable revised standard plans (RSPs) listed below are included in the Information Handout.

ABBREVIATIONS, LINES, SYMBOLS AND LEGEND

A10A	Abbreviations (Sheet 1 of 2)
RSP A10B	Abbreviations (Sheet 2 of 2)
A10C	Lines and Symbols (Sheet 1 of 3)
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PAVEMENT MARKERS, TRAFFIC LINES, AND PAVEMENT MARKINGS

A20A	Pavement Markers and Traffic Lines, Typical Details
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RSP A20C	Pavement Markers and Traffic Lines, Typical Details
A20D	Pavement Markers and Traffic Lines, Typical Details
RSP A24A	Pavement Markings - Arrows
RSP A24C	Pavement Markings - Symbols and Numerals
A24D	Pavement Markings - Words
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A62A	Excavation and Backfill - Miscellaneous Details
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RSP A62DA	Excavation and Backfill - Concrete Pipe Culverts - Indirect Design Method
A62E	Excavation and Backfill - Cast-In-Place Reinforced Concrete Box and Arch Culverts
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OBJECT MARKERS, DELINEATORS, CHANNELIZERS AND BARRICADES

A73A	Object Markers
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A73C	Delineators, Channelizers and Barricades

FENCES

RSP A85	Chain Link Fence
RSP A85B	Chain Link Fence Details

CURBS, DRIVEWAYS, DIKES, CURB RAMPS AND ACCESSIBLE PARKING

RSP A87A	Curbs and Driveways
RSP A88A	Curb Ramp Details
RSP A88B	Curb Ramp and Island Passageway Details

DRAINAGE INLETS, PIPE INLETS AND GRATES

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GUTTER AND INLET DEPRESSIONS	
D78A	Gutter Depressions
D78B	Inlet Depressions - Concrete Shoulders
D78C	Inlet Depressions - Hot Mix Asphalt Shoulders
CONCRETE PIPE - DIRECT DESIGN METHOD	
D79	Precast Reinforced Concrete Pipe - Direct Design Method
D79A	Precast Reinforced Concrete Pipe - Direct Design Method
BOX CULVERTS	
D80	Cast-In-Place Reinforced Concrete - Single Box Culvert
RSP D82	Cast-In-Place Reinforced Concrete Box Culvert - Miscellaneous Details
D84	Box Culvert Wingwalls - Types A, B and C
D88	Construction Loads on Culverts
FLARED END SECTIONS	
D94A	Metal and Plastic Flared End Sections
D94B	Concrete Flared End Sections
PIPE COUPLING AND JOINT DETAILS	
D97H	Reinforced Concrete Pipe or Non-Reinforced Concrete Pipe - Standard and Positive Joints
D97I	Corrugated Polyvinyl Chloride Pipe with Smooth Interior - Standard and Positive Joints
H51	Erosion Control Details - Fiber Roll and Compost Sock
H52	Rolled Erosion Control Product
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T1A	Temporary Crash Cushion, Sand Filled (Unidirectional)
T1B	Temporary Crash Cushion, Sand Filled (Bidirectional)
T2	Temporary Crash Cushion, Sand Filled (Shoulder Installations)
T3A	Temporary Railing (Type K)
T3B	Temporary Railing (Type K)
TEMPORARY TRAFFIC CONTROL SYSTEMS	
RSP T13	Traffic Control System for Lane Closure on Two Lane Conventional Highways
TEMPORARY WATER POLLUTION CONTROL	
T51	Temporary Water Pollution Control Details (Temporary Silt Fence)
T53	Temporary Water Pollution Control Details (Temporary Cover)
T56	Temporary Water Pollution Control Details (Temporary Fiber Roll)
T57	Temporary Water Pollution Control Details (Temporary Check Dam)
T58	Temporary Water Pollution Control Details (Temporary Construction Entrance)
T59	Temporary Water Pollution Control Details (Temporary Concrete Washout Facility)
T61	Temporary Water Pollution Control Details (Temporary Drainage Inlet Protection)
T62	Temporary Water Pollution Control Details (Temporary Drainage Inlet Protection)
T63	Temporary Water Pollution Control Details (Temporary Drainage Inlet Protection)
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BRIDGE DETAILS	
B0-3	Bridge Details

	RETAINING WALLS
RSP B3-5	Retaining Wall Details No. 1
	UTILITY OPENING
B7-11	Utility Details
	CHAIN LINK RAILING, CABLE RAILING AND TUBULAR HAND RAILING
RSP B11-47	Cable Railing
	ROADSIDE SIGNS
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RS2	Roadside Signs - Wood Post, Typical Installation Details No. 2
RS4	Roadside Signs, Typical Installation Details No. 4
	ELECTRICAL SYSTEMS - LEGEND AND ABBREVIATIONS
RSP ES-1A	Electrical Systems (Legend and Abbreviations)
RSP ES-1B	Electrical Systems (Legend and Abbreviations)
RSP ES-1C	Electrical Systems (Legend and Abbreviations)
	ELECTRICAL SYSTEMS - SERVICE EQUIPMENT AND WIRING DIAGRAMS
ES-2A	Electrical Systems (Service Equipment)
ES-2C	Electrical Systems (Service Equipment Notes, Type III Series)
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	ELECTRICAL SYSTEMS - CONTROLLER CABINETS
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	ELECTRICAL SYSTEMS - TELEPHONE DEMARCATION CABINETS
ES-3E	Electrical Systems (Telephone Demarcation Cabinet, Type B)
	ELECTRICAL SYSTEMS - SIGNAL HEADS, SIGNAL FACES AND MOUNTINGS
RSP ES-4A	Electrical Systems (Vehicular Signal Heads and Mountings)
RSP ES-4B	Electrical Systems (Pedestrian Signal and Ramp Metering Sign)
RSP ES-4C	Electrical Systems (Vehicular Signal Heads and Mountings)
ES-4D	Electrical Systems (Signal Mounting)
RSP ES-4E	Electrical Systems (Vehicular Signal Heads and Optical Detector Mounting)
	ELECTRICAL SYSTEMS - DETECTORS
ES-5A	Electrical Systems (Detectors)
RSP ES-5B	Electrical Systems (Detectors)
RSP ES-5C	Electrical Systems (Accessible Pedestrian Signal, Push Button Assemblies and Magnetic Vehicle Detector)
RSP ES-5D	Electrical Systems (Curb Termination and Handhole)
	ELECTRICAL SYSTEMS - SIGNAL AND LIGHTING STANDARDS
ES-7B	Electrical Systems (Signal and Lighting Standard - Type 1 and Equipment Numbering)
RSP ES-7C	Electrical Systems (Signal and Lighting Standard, Case 1 Signal Mast Arm Loading, Wind Velocity = 100 mph and Signal Mast Arm Lengths 15' to 30')
RSP ES-7F	Electrical Systems (Signal and Lighting Standard, Case 4 Signal Mast Arm Loading, Wind Velocity = 100 mph and Signal Mast Arm Lengths 25' to 45')
RSP ES-7G	Electrical Systems (Signal And Lighting Standard, Case 5 Signal Mast Arm Loading, Wind Velocity = 100 mph and Signal Mast Arm Lengths 50' to 55')
	ELECTRICAL SYSTEMS - SIGNAL AND LIGHTING STANDARD DETAILS
ES-7M	Electrical Systems (Signal and Lighting Standard - Detail No. 1)
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	ELECTRICAL SYSTEMS - INTERNALLY ILLUMINATION STREET NAME SIGN
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	ELECTRICAL SYSTEMS - PEDESTRIAN BARRICADES
ES-7Q	Electrical Systems (Pedestrian Barricades)

	ELECTRICAL SYSTEMS - PULL BOX
RSP ES-8A	Electrical Systems (Non-Traffic Pull Box)
	ELECTRICAL SYSTEMS - ISOFOOTCANDLE DIAGRAMS AND FOUNDATION DETAILS
RSP ES-10A	Electrical Systems (Isofootcandle Diagrams)
RSP ES-11	Electrical Systems (Foundation Installations)
	ELECTRICAL SYSTEMS - SPLICING, FUSE RATING, KINKING AND BANDING DETAILS
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COUNTY OF TRINITY
DEPARTMENT OF TRANSPORTATION
NOTICE TO BIDDERS

Bids open Thursday, November 6, 2014

General work description: Construct approximately 0.9 mile of new roadway with sidewalk. Project also includes the construction of drainage facilities, including a box culvert, and the addition of turn pockets and signal and lighting at intersection with State Highway 299. Project also requires environmental mitigation work by a qualified subcontractor. You must perform, place, construct, or install other items and details not mentioned that are required of the plans under the Standard Specifications and special provisions.

The County will receive sealed bids for **LANCE GULCH ROAD PHASE 2 PROJECT**

Contract Number: **14-ROAD-02**

Bid Specifications may be downloaded from the following location:

<http://www.trinitycounty.org/index.aspx?page=84>

You may request plans, specifications and bid proposal documents in digital format from the Office of Trinity County, Department of Transportation, 31301 State Highway 3, Weaverville, California, mailing address P.O. Box 2490, Weaverville, California 96093-2490. Request may also be sent by email to:

tcdot@trinitycounty.org

You are responsible for printing and binding the bid documents from the digital format before submitting the bid.

Bid forms for this work are included in a separate book entitled:

COUNTY OF TRINITY
DEPARTMENT OF TRANSPORTATION
NOTICE TO BIDDERS, SPECIAL PROVISIONS
AND BID BOOK - VOLUME 2

FOR

LANCE GULCH ROAD PHASE 2 PROJECT
IN
TRINITY COUNTY
CONTRACT NO. 14-ROAD-02

The Contractor must have either a Class A license or a combination of class C licenses that make up a majority of the work.

The DBE Contract goal is 5.9 percent, based on the Base Bid only.

Federal-aid project No.: RPSTPL-5905(102)

For the federal training program, the number of trainees or apprentices is 4, based on the Base Bid only.

Lance Gulch Road Phase 2 Project
Bid No. 14-ROAD-02

NTB-1

Bids must be on a unit price basis. Trinity County has a fixed amount of funding available for contract, and it is the County's goal to accomplish as much work as funding will allow. If this contract is awarded, it will be made to the lowest responsible bidder whose total bid amount does not exceed Trinity County's available funding in accordance with the following sequence:

1. Base Bid plus Additive Bid #1 plus Additive Bid #2 plus Additive Bid #3 plus additive Bid #4 plus Additive Bid #5
2. Base Bid plus Additive Bid #1 plus Additive Bid #2 plus Additive Bid #3 plus additive Bid #4
3. Base Bid plus Additive Bid #1 plus Additive Bid #2 plus Additive Bid #3
4. Base Bid plus Additive Bid #1 plus Additive Bid #2
5. Base Bid plus Additive Bid #1
6. Base Bid

Complete the work for the entire project regardless of the additive bid segments awarded, excluding plant establishment and extended plant establishment work, within 160 working days.

Complete plant establishment work within 3 years, starting at the end of the working days. Extended plant establishment begins once the plant establishment period ends.

Complete the plant establishment work and the extended plant establishment work and monitoring and reporting, within 5 years, starting at the end of the working days.

A pre-bid meeting is scheduled for 2:00 p.m. on Thursday, October 30, 2014, at the County Department of Transportation Office. The pre-bid meeting is NOT mandatory.

The County will receive sealed bids until 4:00 p.m. on the bid open date at the Office of the Trinity County Department of Transportation at 31301 State Highway 3, Weaverville, California. Bids received after this time will not be accepted.

Bid proposals shall be sealed in an envelope plainly marked "BID PROPOSAL FOR LANCE GULCH ROAD PHASE 2, CONTRACT NO. 14-ROAD-02", on the outside. Bids will only be accepted from registered plan holders. Bids not properly marked will be considered nonresponsive.

The County will immediately open and publicly read the bids in the Conference Room at the mentioned location after the specified closing time.

Present bidders' inquiries to the Trinity County Department of Transportation, 31301 State Highway 3, P.O. Box 2490, Weaverville, California 96093-2490, (530) 623-1365. Bid inquiries must be received by 4:00 PM on Monday, November 3, 2014.

Inquiries or questions about alleged patent ambiguity of the plans, specifications, or estimate must be submitted as a bidder inquiry before bid opening. After this time, the County will not consider these questions as bid protests.

Submit your bid with bidder's security equal to at least ten percent (10%) of the bid.

If you are awarded a contract, you will be required to furnish the County with a payment bond equal to 100% of the total bid and a performance bond equal to 50% of the total bid.

You must take necessary and reasonable steps to ensure that DBEs have opportunity to participate in the Contract (49 CFR 26).

Prevailing wages are required on this Contract. The Director of the California Department of Industrial Relations determines the general prevailing wage rates. Obtain the wage rates at the DIR Web site, <http://www.dir.ca.gov/DLSR/PWD>, or from the County's Department of Transportation.

The federal minimum wage rates for this Contract as determined by the United States Secretary of Labor are included in the Bid Book and are available at <http://www.wdol.gov/dba.aspx>.

If the minimum wage rates as determined by the United States Secretary of Labor differs from the general prevailing wage rates determined by the Director of the California Department of Industrial Relations for similar classifications of labor, you and your subcontractors must not pay less than the higher wage rate. The County does not accept lower State wage rates not specifically included in the federal wage determinations. This includes helper, or other classifications based on hours of experience, or any other classification not appearing in the federal wage determinations. Where Federal wage determinations do not contain the State wage rate determination otherwise available for use by you and your subcontractors, you and your subcontractors must pay not less than the Federal minimum wage rate that most closely approximates the duties of the employees in question.

The U.S. Department of Transportation (DOT) provides a toll-free hotline to report bid rigging activities. Use the hotline to report bid rigging, bidder collusion, and other fraudulent activities. The hotline number is (800) 424-9071. The service is available 24 hours 7 days a week and is confidential and anonymous. The hotline is part of the DOT's effort to identify and investigate highway construction contract fraud and abuse and is operated under the direction of the DOT Inspector General.

California Department of Transportation has made available Notices of Suspension and Proposed Debarment from the Federal Highway Administration. For a copy of the notices, go to http://www.dot.ca.gov/hq/esd/oe/contractor_info. Additional information is provided in the Excluded Parties List System at <http://www.epls.gov>.

DATE: _____

BOARD OF SUPERVISORS
COUNTY OF TRINITY
STATE OF CALIFORNIA

Wendy G. Tyler
Clerk of the Board of Supervisors
of the County of Trinity, State of California

ORGANIZATION

Any paragraph added or deleted by a revision clause does not change the paragraph numbering of the *Standard Specifications* for any other reference to a paragraph of the *Standard Specifications*.

State: The County of Trinity, including its authorized officers, employees, agents, consultants and volunteers

Caltrans

This project is in a freeze-thaw area.

Make checks and bonds payable to the County of Trinity.

AA

Means	Description
Included in the <i>Information Handout</i>	Geotechnical Study for Weaverville East Connector Roadway, Cross Sections, Revised Standard Plans applicable to the project

SP-2

Replace section 2-1.33A with:

Complete forms in the *Bid* book. Submit the completed *Bid* Book with your bid.

Except for each subcontracted bid item number and corresponding percentage, do not fax submittals.

All blank spaces in the Bid form must be filled in, in ink, in both words and figures, where required. No changes will be made in the phraseology of the forms. Written amounts will govern in cases of discrepancy between the amounts stated in writing and the amounts stated in figures. In case of discrepancy between unit prices and totals, unit prices will prevail. Indicate receipt of all addenda.

Any Bid will be deemed nonresponsive if it contains any of the following:

1. omissions, erasures, alterations, or additions of any kind
2. prices uncalled for
3. prices that are obviously unbalanced
4. fails to conform to the conditions of the published Advertisement for Bid in any manner.

Sign your bid in ink in the space provided.

If you are:

1. corporation, the legal name of the corporation must be stated, together with the signature of the officer or officers authorized to sign contracts on behalf of the corporation
2. co-partnership, the true name of the firm must be stated, together with the signature of the partner or partners authorized to sign contracts on behalf of the co-partnership

If the signature is by an agent, or other than an officer of a corporation or a member of a partnership, a Power of Attorney must be on file with the County prior to opening of Bids or submitted with the Bid, otherwise the Bid will be considered nonresponsive.

State and local sales and use taxes required by State statutes and laws will be paid by you. Prices quoted in the Bid must include sales tax.

Replace section 2-1.33B with:

Submit a bid based on the bid item quantities the Department shows in all the Bid Item Lists.

Trinity County has a fixed amount of funding available for expenditure on this contract (\$5,244,000), and it is the County's goal to accomplish as much work as funding will allow. If this contract is awarded, it will be made to the lowest responsible bidder whose total bid amount does not exceed Trinity County's available funding in accordance with the following sequence:

1. Base Bid plus Additive Bid #1 plus Additive Bid #2 plus Additive Bid #3 plus Additive Bid #4 plus Additive Bid #5
2. Base Bid plus Additive Bid #1 plus Additive Bid #2 plus Additive Bid #3 plus Additive Bid #4
3. Base Bid plus Additive Bid #1 plus Additive Bid #2 plus Additive Bid #3
4. Base Bid plus Additive Bid #1 plus Additive Bid #2
5. Base Bid plus Additive Bid #1
6. Base Bid

Failure to complete all items in the Base Bid and all items in the additive bids may result in rejection of bids.

Add to section 2-1.33C:

On the Subcontractor List form, list each subcontractor to perform work in an amount in excess of 1/2 of 1 percent of the total bid or \$10,000, whichever is greater (Pub Cont Code § 4100 et seq.).

The Subcontractor List form must show the name, address, license number and work portions to be performed by each subcontractor listed.

On the *Subcontractor List*, you must either submit each subcontracted bid item number and corresponding percentage with your bid or fax these numbers and percentages to (530) 623-5312 or email them to tcidot@trinitycounty.org within 24 hours after bid opening. Failure to do so results in a nonresponsive bid.

Replace section 2-1.37 with:

Submit your bid as directed in the *Notice to Bidders*. Bids not properly marked may be considered nonresponsive. Note several of the documents in the *Bid Book* must be notarized before being submitted as part of the bid.

Complete all forms in the *Bid Book* except the contract form and submit the entire bound *Bid Book* to the County as your bid.

The Bid Schedule in the *Bid Book* sets the item prices and totals, and must be signed by you. Fill in all blanks in the proposal form, bid schedule and other documents as required in the *Bid Book*.

Add to section 2-1.46:

Bids may be considered nonresponsive for any of the following reasons:

1. Bids not presented on supplied forms
2. Bids do not include the entire bound *Bid Book* with all pages intact and without interlineations, alterations or erasures
3. Bids contain alternative proposals
4. Bids are a facsimile of your complete and executed proposal forms
5. Bids are a copy except as provided in the instructions in the *Bid Book*

Replace section 2-1.47 with:

The County may grant bid relief under Pub Cont Code § 5100 et seq. Submit any request for bid relief to the County within 3 business days after bid opening. Submit all requests on the Relief of Bid Request found at:

http://www.dot.ca.gov/hq/esc/oe/contractor_info/relief.pdf

AA

3 CONTRACT AWARD AND EXECUTION

Replace section 3-1.04 with:

Submit Bid Protest to the Trinity County Department of Transportation, 31301 State Highway 3, P.O. Box 2490, Weaverville, California 96093-2490.

The County will either award the Contract or reject all bids within 60 days from bid opening. This period may be subject to extension for such further period as agreed upon in writing between the Department and you.

The award of the contract, if it be awarded, will be to the lowest responsible bidder whose bid complies with all the requirements.

The Contract must be executed by the successful bidder and returned, together with the contract bonds, to the County so that it is received within 10 business days, after the bidder has received the contract for execution. Failure to do so will be just cause for forfeiture of the proposal guaranty. The executed contract documents must be delivered to the following address:

Lance Gulch Road Phase 2 Project
Bid No. 14-ROAD-02

Trinity County Department of Transportation
31301 State Highway 3
PO Box 2490
Weaverville, CA 96093

Replace section 3-1.08 with:

Caltrans has established an overall 25 percent small business participation goal. Caltrans is tracking small business participation on all contracts to determine whether the goal is achieved.

Delete section 3-1.11:

Replace “Caltrans” in the heading in the 2nd paragraph in section 3-1.12 with:

Local Agency

Replace section 3-1.18 with:

The successful bidder must sign the *Contract* form.

The County will submit the contract signature document to the successful bidder for execution prior to award. The successful bidder must sign the Contract Form, and all copies and return it to the County within 10 business days with:

Deliver to the County:

1. Signed Contract form, including the attached form FHWA-1273
2. Contract bonds
3. Documents identified in section 3-1.07

The Trinity County Board of Supervisors meets on the second and fourth Tuesday of each month. Once County staff receives the last of the above listed documents, County staff will review contract documents and, if in order, will submit the documents to the Board of Supervisors for contract approval. County staff will notify the successful bidder of the anticipated date for the award. If contract license copies required by section 2-1.33E and section 3-1.06 are not submitted prior to the award date, the project will not be awarded to the successful bidder. Contract documents will be submitted for approval at the regularly scheduled Board meeting that is at least one week following the date that the County receives all documents listed above. County staff will notify you of Board approval within 5 business days of contract award.

The bidder's security may be forfeited for failure to execute the contract within the time specified (Pub Cont Code §§ 10181, 10182, and 10183).

[illegible]

5 CONTROL OF WORK

Add to section 5-1.02:

Your subcontract and any lower tier subcontract must include the *"Required Contract Provisions Federal-Aid Construction Contracts"* under Section 7-1.11 of the Standard Specifications. Noncompliance must be corrected. Payment for subcontracted work involved will be withheld from progress payments due, or that become due, until correction is made. Failure to comply may result in termination of the contract.

Add to the end of the 2nd sentence in paragraph 3 of section 5-1.13A:

at http://www.dir.ca.gov/dir/Labor_law/DSLE/Debar.html.

Replace the 9th paragraph 3 of section 5-1.13A with:

Submit copies of all subcontractor licenses.

Add to section 5-1.20A:

Property owner at Sta "EC" 64+87 Lt (APN 024-500-71) may have his own Contractor on site finishing the construction of his driveway off the "C2" line. Coordinate your activities with his, if there is a conflict notify the Engineer.

During the progress of the work under this Contract, work under the following contracts may be in progress at or near the job site of this Contract:

Contract no.	County–Route–Post Mile	Location	Type of work
02-3E7704	Tri-299-36.9/53.5	In and near Junction City and Weaverville from North Fork Trinity River Bridge to 0.1 mile east of Industrial Parkway	Hot mix asphalt overlay, guardrail, drainage, roadway signs and curb ramps.
14-ROAD-01	Tri-CR 266	In Weaverville Phase 1 – new alignment for Lance Gulch Road	Construct new roadway from State Route 3 to 600-feet North of Pioneer Lane

Phase 1 (Contract No. 14-ROAD-01) is expected to be complete in September 2015. Portions of the project overlap with this contract. A phase 1 schedule will be made available to you and you must coordinate with phase 1 Contractor to avoid schedule and Order of work conflicts. Do not enter the Phase 1 work area without coordinating with the Phase 1 Contractor. Report any unresolved conflicts to the Engineer. No modifications are allowed to your bid based on changes to the Phase 1 schedule provided in the Information Handout .

State Route 299 over Buckhorn Summit will be under one-way traffic control for the duration of this project and must be considered when scheduling delivery of materials to the work site. If an alternative route is required this will be at your expense.

Add to Section 5-1.20B(1):

You are responsible for all fines, damages and job delays incurred due to failure to implement the requirements of the Permits, including but not limited to the US Army Corp of Engineers Permit, the US fish and Wildlife Permit and the NOAA Section 7 (See Exhibits A thru C).

STATE OF CALIFORNIA ENCROACHMENT PERMIT

Portions of this project are located within the jurisdiction of the State of California. Before start of work within the State of California's right-of-way or work affecting the State of California facilities, you will be required to obtain an Encroachment Permit at State of California Transportation office:

CALTRANS, DISTRICT 2
PERMIT ENGINEER
1657 Riverside Drive

Lance Gulch Road Phase 2 Project
Bid No. 14-ROAD-02

SP-6

Redding, CA 96001
(530) 225-3400
(530) 225-3097 FAX

Caltrans fee exemption may apply. Check with the Caltrans District permits office.

Replace section 5-1.27C with:

Make your records available for inspection, copying, and auditing by Caltrans representatives for the same time frame specified under section 5-1.27B. The records of subcontractors and suppliers must be made available for inspection, copying, and auditing by Caltrans representatives for the same period. Before Contract acceptance, the Caltrans representative notifies the Contractor, subcontractor, or supplier 5 business days before inspection, copying, or auditing.

If an audit is to start more than 30 days after Contract acceptance, the Caltrans representative notifies the Contractor, subcontractor, or supplier when the audit is to start.

Replace section 5-1.27E with:

Maintain separate records for change order work costs.

Submit change order bills to the Engineer.

Add to section 5-1.36D:

Utility Contact Information

Utility	Contact	Address	Phone
Phone/Communication - Verizon	Dennis Harman – dennis.harman@verizon.com	PO Box 1218 115 Bremer Street Weaverville, CA 96093-1218	530-623-5546
Sewer - Weaverville Sanitary District	Jim Cloud– weavervillesd@yahoo.com	PO Box 1269 Weaverville, CA 96093	530-598-5965
Trinity PUD – Power Company	Andy Lethbridge - alethbridge@trinitypud.com	PO Box 1216 Weaverville, CA 96093	530-623-5536
Water – Trinity County CSD	Wes Scribner - wscribner@trinitycounty.org	PO Box 1510 Weaverville, CA 96093	530-623-5051
Cable – Velocity	Travis Finch, CEO tf@velotech.net	241 Unit D Washington Street; P.O. box 246, Weaverville, CA 96093	(877) 623-3550, ext. 3005

The utility owner will relocate a utility shown in the following table before the corresponding date shown:

Utility Relocation and Date of the Relocation

Utility	Location	Date
Overhead Electric, phone, cable	SR 299 and Lance Gulch Road	April 1, 2015
Overhead Electric, phone, cable	Pioneer Road	April 1, 2015

New water points of connection for irrigation including hot tap, meter, valve and pressure reducing valve will be installed by Weaverville Community Services District (WCSD) within 7 days following request by you and payment of fees by the County.

Coordinate with TPUD and Verizon regarding the connections for the signals. The County will pay connection fees.

You must install conduits for new utilities as shown.

Fiber optic lines owned by AT&T are high risk utilities. When excavating near the fiber optic lines shown, you and your subcontractors must call USA DIG, telephone number 811, 48 hours prior to initial start of work, and an additional 48 hours notification for subsequent starts when the work schedule is interrupted. The excavation contract bidder should be aware there is a hand dig zone that extends from within 2 feet of the AT&T Fiber Optic Cable. (4' wide strip).

Add after the 1st paragraph in section 5-1.42:

The RFI must

1. be submitted as soon as possible after you have discovered the need for additional information or clarification
2. state your question or concern clearly
3. reference the specification or plan sheet in question
4. state the date of the RFI and the date by which you must have an answer in order not to delay your activities

The Prime Contractor will submit all RFI's.

[illegible]

6 CONTROL OF MATERIALS

Add to section 6-2.03:

If additive #5 is included in the project, the Department furnishes you with:

- Model 2070 controller assembly, including controller unit, completely wired controller cabinet, and detector sensor units
- Components of battery backup system as follows:
 - Inverter/charger unit
 - Power transfer relay
 - Manually-operated bypass switch
 - Battery harness
 - Utility interconnect wires
 - Battery temperature probe
 - Relay contact wires

The Department furnishes you with completely wired controller cabinets with auxiliary equipment but without controller unit at 5065 Mountain Lakes Blvd, Redding, CA 96003-1458. At least 48 hours before you pick up the materials, inform the Engineer of what you will pick up and when you will pick it up.

[illegible]

7 LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

Replace the 2nd paragraph of section 7-1.02K(2) with:

The general prevailing wage rates determined by the Director of Industrial Relations, for the county or counties in which the work is to be done, are available at the County of Trinity address. These wage rates are not included in the Contract Documents. Changes in general prevailing wage determinations apply to

the Contract when the Director of Industrial Relations has issued them at least 10 days before advertisement.(Labor Code § 1773.6 and 8 CA Code of Regs 16204).

Replace the 4th paragraph of section 7-1.02K(3):

Submit certified payroll to the Engineer.

Delete the 5th, 6th, 7th, 8th and 9th paragraphs of section 7-1.02K(3).

Replace section 7-1.02M(2) with:

7-1.02M(2) Fire Prevention

Cooperate with local fire prevention authorities in eliminating hazardous fire conditions and implement the fire prevention plan in this special provision.

Obtain the phone numbers of the nearest fire suppression agency, California Department of Forestry and Fire Protection (Cal Fire) unit headquarters, United States Forest Service (USFS) ranger district office, and U.S. Department of Interior (USDI) BLM field office. Submit these phone numbers to the Engineer before the start of job site activities.

Immediately report to the nearest fire suppression agency fires occurring within the project limits.

Prevent project personnel from setting open fires that are not part of the work.

Prevent the escape of and extinguish fires caused directly or indirectly by job site activities

Except for motor trucks, truck tractors, buses, and passenger vehicles, equip all hydrocarbon-fueled engines, both stationary and mobile including motorcycles, with spark arresters that meet USFS standards as specified in the *Forest Service Spark Arrester Guide*. Maintain the spark arresters in good operating condition. Spark arresters are not required by Cal Fire, the BLM, or the USFS on equipment powered by properly maintained exhaust-driven turbo-charged engines or equipped with scrubbers with properly maintained water levels. The *Forest Service Spark Arrester Guide* is available at the Caltrans district offices.

Each toilet must have a metal ashtray at least 6 inches in diameter by 8 inches deep half-filled with sand and within easy reach of anyone using the facility.

Locate flammable materials at least 50 feet away from equipment service, parking, and gas and oil storage areas. Each small mobile or stationary engine site must be cleared of flammable material for a radius of at least 15 feet from the engine.

Each area to be cleared and grubbed must be cleared and kept clear of flammable material such as dry grass, weeds, brush, downed trees, oily rags and waste, paper, cartons, and plastic waste. Before clearing and grubbing, clear a fire break at the outer limits of the areas to be cleared and grubbed. Other fire breaks may be ordered and are change order work.

Furnish the following fire tools:

1. 1 shovel and 1 fully charged fire extinguisher UL rated at 4 B:C or more on each truck, personnel vehicle, tractor, grader, or other heavy equipment.
2. 1 shovel and 1 backpack 5-gallon water-filled tank with pump for each welder.
3. 1 shovel or 1 chemical pressurized fire extinguisher, fully charged, for each gasoline-powered tool, including chain saws, soil augers, and rock drills. The fire tools must always be within 25 feet from the point of operation of the power tool. Each fire extinguisher must be of the type and size required by the Pub Res Code § 4431 and 14 CA Code of Regs § 1234. Each shovel must be size O or larger and at least 46 inches long.

Furnish a pickup truck and driver for the sole purpose of fire control during working hours. The truck must be equipped with:

1. 10 shovels, 5 axes, 2 backpack 5-gallon water-filled tanks with pumps

Add to section 9-1.16C:

1. Bar Reinforcing Steel
2. Alternative Pipe Culvert
3. Reinforced Concrete Pipe
4. Alternative Flared End Section
5. Precast Concrete Pipe Inlet
6. Precast Concrete Pipe Manhole
7. Rock Slope Protection Fabric
8. Miscellaneous Iron and Steel
9. Frame and Cover
10. Chain Link Fence

Replace section 9-1.16F with:

You will have the right to substitute securities for the retention under Pub Cont Code § 22300. No substitution will be accepted until:

- If you have substituted securities for any of the retention, the County may request that such securities be revalued from time to time, but not more often than monthly. Such revaluation will be made by a person or entity designated by the County and approved by you. If such revaluation results in a determination that the securities have a market value less than the amount of retention for which they were substituted, then the amount of the retention required under the Contract will be increased by such difference in market value. Such increased retention will be withheld from the next progress payment(s) due to you under the Contract.

A Claim Review Board, appointed by the Director of Transportation, will review such claims and make a written recommendation. The Contractor may meet with the Claims Review Board to make a presentation in support of such claims with the Engineer's authorized representative present.

[illegible]

DIVISION II GENERAL CONSTRUCTION

10 GENERAL

Add to section 10-1.02:

Install ESA fences before start of work and as specified in Section 14-1.02A.

You must contact Caltrans Permit office before and after working on the loops and the traffic signals.

Rock crushing or concrete batching on site will require a temporary use permit from the County which will take 3 months to issue and cost you \$6,100 in fees.

Do not place the uppermost layer of new pavement until all underlying conduits and loop detectors are installed.

Before starting the traffic signal functional test at any location, all items of work related to signal control must be completed and all roadside signs, pavement delineation, and pavement markings must be in place at that location.

At the end of each working day if a difference in excess of 0.15 feet exists between the elevation of the existing pavement and the elevation of an excavation within 5 feet left and/or 8 feet right of the traveled way, place and compact material against the vertical cut adjacent to the traveled way. During the excavation operation, you may use native material for this purpose except once the placing of the structural section starts, structural material must be used. Place the material to the top of the existing pavement and taper at a slope of 4:1 (horizontal:vertical) or flatter to the bottom of the excavation. Do not use treated base for the taper.

Replace "Reserved" in section 10-1.03 of the RSS for section 10-1 with:

You may work within drainage channels only from June 15th to October 15th of any year. Channel realignment and grading must be constructed when channel is dry, when channel is ready, re-route water into the new channel then abandoned the old channel.

All tree and shrub cutting must occur between September 1st and February 28th unless the County's biologist has verified the absence of nesting birds.

All root removal, grading and other ground disturbing activities are restricted to the dry season, typically May 1 to November 15.

Removing and reconstructing fence and wall must be performed in a manner to prevent public access to private property. Maintain security at the CHP property at all times.

You may elect to construct and use a temporary access road and crossing over Lance Gulch for your construction equipment. Any temporary access road and crossing must comply with all permit requirements. Payment for the temporary access road and crossing is included in the payment for the contract bid items.

AA

12 TEMPORARY TRAFFIC CONTROL

Replace section 12-2 with:

12-2 CONSTRUCTION PROJECT FUNDING SIGNS

12-2.01 GENERAL

Section 12-2 includes specifications for installing construction project funding signs.

Temporary signs must be mounted on temporary movable stands approved by Engineer before use.

Details for construction project funding signs are shown.

Keep construction project funding signs clean and in good repair at all times.

12-2.02 MATERIALS

Construction project funding signs must be portable and as shown.

The background on construction project funding signs must be Type II retroreflective sheeting on the Authorized Material List for signing and delineation materials.

The legend must be retroreflective, except for nonreflective black letters and numerals. The colors blue and orange must comply with PR Color no. 3 and no. 6, respectively, as specified in the Federal Highway Administration's *Color Tolerance Chart*.

The legend for the type of project on construction project funding signs must read as follows:

CONSTRUCT ROADWAY

The legend for the types of funding on construction project funding signs must read as follows and in the following order:

FEDERAL HIGHWAY TRUST FUNDS

STATE HIGHWAY FUNDS

The legend for the year of completion on construction project funding signs must read as follows:

YEAR OF COMPLETION 2016

The size of the legend on construction project funding signs must be as described. Do not add any additional information unless authorized.

12-2.03 CONSTRUCTION

Install 2 Type 1 construction project funding signs at the locations designated by the Engineer before starting major work activities visible to highway users. After installation you may be required to move them up to 2 additional times to a location directed by the Engineer.

When authorized, remove and dispose of construction project funding signs upon completion of the project.

12-2.04 PAYMENT

Not Used

Add to section 12-3.12C:

Start displaying the message on the portable changeable message sign 30 minutes before closing the lane.

Place the portable changeable message sign in advance of the 1st warning sign for each:

1. Stationary lane closure on SR 299
2. Shoulder closure on SR 299
3. Speed reduction zone

For 5 days, starting on the day of signal activation, place 1 portable changeable message sign in each direction of travel and display the following message: "SIGNAL AHEAD -- PREPARE TO STOP."

Replace "Not Used" in section 12-3.12D with:

Payment for portable changeable message signs is included in the payment for traffic control system.

Add to section 12-4.02A:

At least 1 week before starting construction that will affect vehicle access to the CHP rear parking area, submit a traffic handling plan to provide paved access to Route 299 from the both CHP parking areas (front and rear) at all times during construction, including construction of the new driveway ("D" Line) and retaining wall in that area.

On SR 299 and Glen Road, the full width of the traveled way must be open to traffic when there are no active construction activities in the traveled way or within 6 feet of the traveled way and on:

1. Fridays after 3:00 p.m.
2. Saturdays
3. Sundays
4. Designated holidays

Designated holidays are shown in the following table:

Designated Holidays

Holiday	Date observed
New Year's Day	January 1st
Washington's Birthday	3rd Monday in February
Memorial Day	Last Monday in May
Independence Day	July 4th
Labor Day	1st Monday in September
Veterans Day	November 11th
Thanksgiving Day	4th Thursday in November
Christmas Day	December 25th

The maximum length of a single stationary one-way reversing traffic-control lane closure is 0.5 miles between flaggers.

Personal vehicles of your employees must not be parked on the traveled way or shoulders, including sections closed to traffic.

For work on Route 299, if work vehicles or equipment are parked within 6 feet of a traffic lane, close the shoulder area with fluorescent orange traffic cones or portable delineators. Place the cones or delineators on a taper in advance of the parked vehicles or equipment and along the edge of the traveled way at 25-foot intervals to a point not less than 25 feet past the last vehicle or piece of equipment. Use at least 9 cones or delineators for the taper. Use a W20-1, "Road Work Ahead," W21-5b, "Right/Left Shoulder Closed Ahead," or C24(CA), "Shoulder Work Ahead," sign mounted on a crashworthy, portable sign support with flags. The sign must be 48 by 48 inches and placed as ordered by the Engineer. If a cone or delineator is displaced or overturned, immediately restore the device to its original position or location.

A minimum of 1 paved traffic lane not less than 12 feet wide must be open for use by traffic. Traffic may be allowed on unpaved road during the construction of Glen Road.

The detour shown is to be used when the flagging is in place during the construction of Glen Road.

Once work starts on Glen Road, work diligently to minimize impacts to traffic.

Replace "Reserved" in section 12-4.04 with:

Lane Closure Restriction for Designated Holidays and Special Days										
Thu	Fri	Sat	Sun	Mon	Tues	Wed	Thu	Fri	Sat	Sun
x	H xx	xx	xx							
	SD xx									
x	xx	H xx	xx							
		SD xx								
	x	xx	H xx	xx						
			SD xx							
	x	xx	xx	H xx	xxx					
	x	xx	xx	SD xx	xxx					
				x	H xx					
				x	SD xx					
					x	H xx				
						SD xx				
						x	H xx	xx	xx	xx
							SD xx			
Legend:										
	Refer to lane requirement charts									
x	The full width of the traveled way must be open for use by traffic after 3 p.m.									
xx	The full width of the traveled way must be open for use by traffic.									
xxx	The full width of the traveled way must be open for use by traffic until 9 a.m.									
H	Designated holiday									
SD	Special day									

Replace section 12-5 with:

12-5 TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE

12-5.01 GENERAL

Section 12-5 includes specifications for closing traffic lanes with stationary lane closures on 2-lane, 2-way highways. The traffic control system for a lane closure must comply with the details shown.

Traffic control system includes signs and portable changeable message signs.

12-5.02 MATERIALS

Not Used

12-5.03 CONSTRUCTION

Whenever components of the traffic control system are displaced or cease to operate or function as specified from any cause, immediately repair the components to the original condition or replace the components and restore the components to the original location.

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For a stationary lane closure made only for the work period, remove the components of the traffic control system from the traveled way and shoulder, except for portable delineators placed along open trenches or excavation adjacent to the traveled way at the end of each work period. You may store the components at selected central locations designated by the Engineer within the limits of the highway.

For traffic under 1-way control on unpaved areas, the cones shown along the centerline need not be placed.

You may use a pilot car to control traffic. If a pilot car is used for traffic control, the cones shown along the centerline need not be placed. The pilot car must have radio contact with personnel in the work area. Operate the pilot car through the traffic control zone at a speed not greater than 25 miles per hour.

12-5.04 PAYMENT

Traffic control system for lane closure is paid for as traffic control system. Flagging costs are included in the payment for Traffic Control System.

Section 12-1.03 does not apply.

The requirements in section 4-1.05 for payment adjustment do not apply to traffic control system. Adjustments in compensation for traffic control system will be made for an increase or decrease in traffic control work if ordered and will be made on the basis of the cost of the necessary increased or decreased traffic control. The adjustment will be made on a force account basis for increased work and estimated on the same basis in the case of decreased work.

A traffic control system required by change order work is paid for as a part of the change order work.

Replace section 12-8 with:

12-8 TEMPORARY PAVEMENT DELINEATION

12-8.01 GENERAL

Section 12-8 includes specifications for placing, applying, maintaining, and removing temporary pavement delineation.

Painted traffic stripe used for temporary delineation must comply with section 84-3. Apply 1 or 2 coats.

Temporary signing for no-passing zones must comply with section 12-3.06.

12-8.02 MATERIALS

12-8.02A General

Not Used

12-8.02B Temporary Lane Line and Centerline Delineation

Temporary pavement markers must be the same color as the lane line or centerline markers being replaced. Temporary pavement markers must be one of the temporary pavement markers on the Authorized Material List for short-term day or night use, 14 days or less, or long-term day or night use, 180 days or less.

12-8.02C Temporary Edge Line Delineation

Temporary, removable, construction-grade striping and pavement marking tape must be one of the types on the Authorized Material List. Apply temporary, removable, construction-grade striping and pavement marking tape under the manufacturer's instructions.

12-8.03 CONSTRUCTION

12-8.03A General

Whenever work activities obliterate pavement delineation, place temporary or permanent pavement delineation before opening the traveled way to traffic. Place lane line and centerline pavement delineation for traveled ways open to traffic. On multilane roadways, freeways, and expressways, place edge line delineation for traveled ways open to traffic.

Establish the alignment for temporary pavement delineation, including required lines or markers. Surfaces to receive an application of paint or removable traffic tape must be dry and free of dirt and loose material.

Do not apply temporary pavement delineation over existing pavement delineation or other temporary pavement delineation. Maintain temporary pavement delineation until it is superseded or you replace it with a new striping detail of temporary pavement delineation or permanent pavement delineation.

Place temporary pavement delineation on or adjacent to lanes open to traffic for a maximum of 14 days. Before the end of the 14 days, place the permanent pavement delineation. If the permanent pavement delineation is not placed within the 14 days, replace the temporary pavement markers with additional temporary pavement delineation equivalent to the striping detail specified for the permanent pavement delineation for the area. The Department does not pay for the additional temporary pavement delineation.

When the Engineer determines the temporary pavement delineation is no longer required for the direction of traffic, remove the markers, underlying adhesive, and removable traffic tape from the final layer of surfacing and from the existing pavement to remain in place. Remove temporary pavement delineation that conflicts with any subsequent or new traffic pattern for the area.

12-8.03B Temporary Lane Line and Centerline Delineation

Whenever lane lines or centerlines are obliterated, the minimum lane line and centerline delineation must consist of temporary pavement markers placed longitudinally at intervals not exceeding 24 feet. The temporary pavement markers must be temporary pavement markers on the Authorized Material List for short-term day or night use, 14 days or less, or long-term day or night use, 180 days or less. Place temporary pavement markers under the manufacturer's instructions. Cement the markers to the surfacing with the adhesive recommended by the manufacturer, except do not use epoxy adhesive to place pavement markers in areas where removal of the markers will be required.

For temporary lane line or centerline delineation consisting entirely of temporary pavement markers, place the markers longitudinally at intervals not exceeding 24 feet.

Where no-passing centerline pavement delineation is obliterated, install the following temporary no-passing zone signs before opening lanes to traffic. Install a W20-1, "Road Work Ahead," sign from 1,000 feet to 2,000 feet in advance of a no-passing zone. Install a R4-1, "Do Not Pass," sign at the beginning of a no-passing zone and at 2,000-foot intervals within the no-passing zone. For continuous zones longer than 2 miles, install a W7-3a or W71(CA), "Next ____ Miles," sign beneath the W20-1 sign. Install a R4-2, "Pass With Care," sign at the end of the no-passing zone. The Engineer determines the exact location of temporary no-passing zone signs. Maintain the temporary no-passing zone signs in place until you place the permanent no-passing centerline pavement delineation. Remove the temporary no-passing zone signs when the Engineer determines they are no longer required for the direction of traffic.

12-8.03C Temporary Edge Line Delineation

Whenever edge lines are obliterated on multilane roadways, freeways, and expressways, place edge line delineation for that area adjacent to lanes open to traffic consisting of (1) solid, 4-inch wide traffic stripe tape of the same color as the stripe being replaced, (2) traffic cones, (3) portable delineators or channelizers placed longitudinally at intervals not exceeding 100 feet. You may apply temporary painted traffic stripe where removal of the 4-inch wide traffic stripe will not be required.

The Engineer determines the lateral offset for traffic cones, portable delineators, and channelizers used for temporary edge line delineation. If traffic cones or portable delineators are used for temporary pavement delineation for edge lines, maintain the cones or delineators during hours of the day when the cones or delineators are being used for temporary edge line delineation.

Channelizers used for temporary edge line delineation must be an orange surface-mounted type. Cement channelizer bases to the pavement as specified in section 85 for cementing pavement markers to pavement except do not use epoxy adhesive to place channelizers on the top layer of the pavement. Channelizers must be one of the 36-inch, surface-mounted types on the Authorized Material List.

Remove the temporary edge line delineation when the Engineer determines it is no longer required for the direction of traffic.

12-8.04 PAYMENT

Not Used

Dewatering must comply with the provisions of Order No. R1-2009-0045 adopted by North Coast RWQCB (General NPDES Permit No. CA 0024902, *Waste Discharge Requirements for Low Threat Discharges to Surface Waters in the North Coast Region*). This permit is available at the North Coast RWQCB's Web site.

Any settling basins must be sized appropriately to allow percolation of the effluent through the bottom and sides rather than overflow. The settling basin must be cleaned out each time it reaches 2/3 of capacity and be clean prior to recontouring the site.

You may place gravel-filled bags without Type K temporary railing under the following conditions:

- AA

An ESA exists on this project.

Before start of work, protect the ESA by installing Temporary Fence (Type ESA). The County biologist will mark the locations for installing the Temporary Fence (Type ESA). Do not install until the locations have been marked.

Limited access to the ESA is allowed for the mitigation Contractor with approval from the Restoration Ecologist. Any other access to an ESA is prohibited. You must take measures to ensure your forces do not disturb or enter these area, including giving written notice to your employees and subcontractors.

100-foot radius

The Department assigns an archaeological monitor to monitor job site activity within the AMA. Do not perform grading or excavation within the AMA unless the archaeological monitor is present or has determined his or her presence is not required.

AMA applies to the entire project site during excavation and/or grading.

14-6.02 SPECIES PROTECTION

Section 14-6.02 includes specifications for protecting regulated species or their habitat.

This project is within or near habitat for regulated species shown in the following table:

Species Name
Little Willow Flycatcher
Yellow-breasted Chat

The Department anticipates nesting or attempted nesting by migratory and nongame birds, and the Little Willow Flycatcher and Yellow-breasted Chat from May 1st to August 1st.

14-6.02B Material

Not Used

14-6.02C Construction

14-6.02C(1) General

Not Used

14-6.02C(2) Protective Radius

Upon discovery of a regulated species, stop construction activities within a 100-foot radius of the discovery or as defined in the table below. Immediately notify the Engineer. Do not resume activities until receiving notification from the Engineer.

Regulated species name	Protective radius
Raptors	500-foot
Little Willow Flycatcher	300-foot

14-6.02C(3) Protocols

Not Used

14-6.02C(4) Biological Resource Information

Not Used

14-6.02C(5) Protection Measures

Not Used

14-6.02C(6) Monitoring Schedule

Not Used

14-6.02D Payment

Not Used

Replace the 3rd paragraph of section 14-6.03A with:

The Department anticipates nesting or attempted nesting from March 1st to September 1st.

Add to section 14-6.03A:

If tree removal or construction prior to the breeding season is not practical, a County wildlife biologist will conduct a pre-construction survey for raptor and migratory bird nests. If an active nest is found within the construction zone, a 500-foot buffer zone will be maintained around the active nest until young have fledged. If a construction survey is performed and no migratory bird or raptor nests are found, and California Department of Fish and Wildlife concur, tree removal may proceed.

Replace section 14-6.03C with:

All tree and shrub removal must occur between September 1st and February 28th, unless the County's biologist has verified the absence of nesting birds. Stump removal, grading, blading, road building or other soil-disturbing activities must not occur until May 1 in upland areas or June 15 in riparian areas.

Where possible, trim trees and shrubs rather than removing them entirely when creating temporary access to the construction site. Where possible shrubs and trees should be cut at least four (4) feet above the ground level to leave the root systems intact.

Replace the 2nd paragraph of section 14-8.02A with:

Do not operate construction equipment or run the equipment engines from 6:00 p.m. to 7:00 a.m. on weekdays, from 5:00 p.m. to 8:00 a.m. on Saturday or on Sundays except you may operate equipment within the project limits during these hours to:

1. Service traffic control facilities
2. Service construction equipment
3. Emergency maintenance and repair of erosion control and pollution devices

Add to section 14-8.02A:

Locate stationary construction equipment, such as compressors and generators, within designated staging areas, as far away as possible from sensitive receptors. Impact tools and intake and exhaust ports on power construction equipment shall be muffled or shielded.

Replace the 3rd paragraph in section 14-9.03A with:

Apply water under section 14-9.03C and section 17.

Replace "Not Used" in section 14-9.03C with:

Enclose, cover or water all soil piles twice daily, or with sufficient frequency to maintain dampness. Water must be applied in a fine spray that does not result in runoff.

Replace "at least once a week" in the 2nd paragraph of section 14-10.01 with:

daily

Replace section 14-11.09 with:

14-11.09 TREATED WOOD WASTE

14-11.09A General

14-11.09A(1) Summary

Section 14-11.09 includes specifications for handling, storing, transporting, and disposing of treated wood waste (TWW).

Wood removed from roadside signs is TWW. Manage TWW under 22 CA Code of Regs, Div. 4.5, Chp. 34.

14-11.09A(2) Submittals

For disposal of TWW, submit as an informational submittal a copy of each completed shipping record and weight receipt within 5 business days.

14-11.09B Materials

Not Used

14-11.09C Construction

14-11.09C(1) General

Not Used

14-11.09C(2) Training

Provide training to personnel who handle TWW or may come in contact with TWW. Training must include:

1. Applicable requirements of 8 CA Code of Regs
2. Procedures for identifying and segregating TWW
3. Safe handling practices
4. Requirements of 22 CA Code of Regs, Div. 4.5, Chp. 34
5. Proper disposal methods

Maintain records of personnel training for 3 years.

14-11.09C(3) Storage

Store TWW before disposal using the following methods:

1. Elevate on blocks above a foreseeable run-on elevation and protect from precipitation for no more than 90 days.
2. Place on a containment surface or pad protected from run-on and precipitation for no more than 180 days.
3. Place in water-resistant containers designed for shipping or solid waste collection for no more than 1 year.
4. Place in a storage building as defined in 22 CA Code of Regs, Div. 4.5, Chp. 34, § 67386.6(a)(2)(C).

Prevent unauthorized access to TWW using a secured enclosure such as a locked chain-link-fenced area or a lockable shipping container located within the job site.

Resize and segregate TWW at a location where debris from the operation including sawdust and chips can be contained. Collect and manage the debris as TWW.

Provide water-resistant labels that comply with 22 CA Code of Regs, Div. 4.5, Chp. 34, §67386.5, to clearly mark and identify TWW and accumulation areas. Labels must include:

1. Caltrans District number, Caltrans and County's Construction Contract number
2. District and County's office address
3. Engineer's name, address, and telephone number
4. Contractor's contact name, address and telephone number
5. Date placed in storage

14-11.09C(4) Transporting and Disposal

Before transporting TWW, obtain an agreement from the receiving facility that the TWW will be accepted. Protect shipments of TWW from loss and exposure to precipitation. For projects with 10,000 lb or more of TWW, request a generator's EPA Identification Number at least 5 business days before the 1st shipment. Each shipment must be accompanied by a shipping record such as a bill of lading or invoice that includes:

1. Caltrans with district number
2. Construction Contract number
3. District and County's office address
4. Engineer's name, address, and telephone number
5. Contractor's contact name and telephone number
6. Receiving facility name and address
7. Waste description: Treated Wood Waste with preservative type if known or unknown/mixture
8. Project location
9. Estimated quantity of shipment by weight or volume
10. Date of transport
11. Date of receipt by the receiving TWW facility
12. Weight of shipment as measured by the receiving TWW facility
13. Generator's EPA Identification Number for projects with 10,000 lb or more of TWW

The shipping record must be at least a 4-part carbon or carbonless 8-1/2-by-11-inch form to allow retention of copies by the Engineer, transporter, and disposal facility.

Dispose of TWW at an approved TWW facility. A list of currently approved TWW facilities is available at:

<http://www.dtsc.ca.gov/HazardousWaste/upload/lanfillapr11pdated1.pdf>

Dispose of TWW within:

1. 90 days of generation if stored on blocks
2. 180 days of generation if stored on a containment surface or pad
3. 1 year of generation if stored in a water-resistant container or within 90 days after the container is full, whichever is shorter
4. 1 year of generation if storing in a storage building as defined in 22 CA Code of Regs, Div. 4.5, Chp. 34, § 67386.6(a)(2)(C)

14-11.09D Payment

Payment for removal and disposal of treated wood waste is included in the payment for Remove Roadside Sign.

Add section 14-12.02:

14-12.02 ENVIRONMENTAL REQUIREMENTS

This section takes precedence over any Standard Specifications that may conflict. Comply with the following permits: the US Army Corp of Engineers Permit, the US fish and Wildlife Permit and the NOAA Section 7 (See Exhibits A thru C).

Hydrology, Water Quality and Stormwater Runoff

Hydrology Mitigation-1.

- No contact of wet concrete with the live stream will be allowed. Groundwater that comes in contact with wet concrete during construction of the footing excavations will not be allowed to enter the creek but will be pumped to a truck or upland for disposal or treatment, or it may be discharged to a sediment-stilling basin and percolated back into the soil.
- If drilling muds are used to drill holes within the ordinary high-water zone, all drilling muds and fluid within all drilled holes will be pumped through a closed system, contained on-site in tanks, removed from the project area, and disposed of off-site at an appropriate facility.
- The TCDOT contractor will remove all spoils materials from the drilled pier holes and dispose of the material in a manner that will not result in discharge of runoff of sediment into Waters of the United States.
- Heavy equipment will not be operated in the active flow channel of East Weaver Creek.
- No diversion of surface flows of Weaver Creek will be allowed.
- Maintenance and refueling areas for equipment will be located a minimum of 150 ft. away from the active stream channel. If equipment must be washed, washing will occur where the water cannot flow into the creek channel.
- Spill containment booms will be maintained on-site at all times during construction operations and/or staging or fueling of equipment.

Floodplains

Floodplains Mitigation-1. All temporary fills, excavation spoils, materials stockpiles and construction equipment will be entirely removed from the 100-year floodplain, as mapped by the hydraulics engineer, on October 15. In no event will construction occur during winter storms.

Geology and Soils

Geology Mitigation-1. The following general erosion control measures will be implemented:

- Soil exposure will be minimized through the use of BMPs, ground cover, and stabilization practices. Exposed dust-producing surfaces will be sprinkled daily until wet while avoiding producing runoff.
- The TCDOT contractor will conduct daily inspections and maintenance of erosion and sediment control measures. Failures will be repaired each work day if they occur.
- All temporary erosion and sediment control measures will be removed after the working area is stabilized or as directed by the project engineer.
- Activities that increase the erosion potential shall be restricted to the fullest extent possible to the relatively dry summer and early fall period to minimize the potential for rainfall to mobilize and transport sediment to East Weaver Creek. If these activities must take place during the late fall, winter, or spring, then temporary erosion and sediment control structures must be in place and operational at the end of each construction day and maintained until disturbed ground surfaces have been successfully revegetated.

Hazardous Waste/Materials

Haz Mat Mitigation-1. If signs of contamination in soils or groundwater are encountered during excavation (odors, sheens or discolored soil), work in that excavation will stop immediately. The TCDOT and the Trinity County Division of Environmental Health will be notified. The soils and/or groundwater will be sampled and tested for suspected contaminants. A Workplan and Site Safety Plan will be prepared addressing safety procedures for completing the excavation, and disposal of the spoils and wastewater generated by the excavation. The workplan shall be approved by the Trinity County Division of Environmental Health and/or the NCRWQCB. Only workers with current Hazardous Waste Operations and Emergency Response (HAZWOPER) training shall be permitted to work in this area. Grading and construction on uncontaminated sections of the project may continue. Remediation of the contaminated soil and or groundwater in the surrounding area shall be the responsibility of the party responsible for the contamination.

INVASIVE SPECIES

- Construction supervisors and managers shall be educated on weed identification and the importance of controlling and preventing the spread of noxious weed infestations.
- Contractors shall clean construction equipment immediately prior to transporting into Trinity County.
- Seed all disturbed areas with certified weed-free native mixes. Mulch with certified weed-free mulch.

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15 EXISTING FACILITIES

Add to section 15-1.03A:

Reconstruction along the left and right side of SR 299 at Sta "299" 1203+39 to 1205+25 must be completed in a manner to preserve the existing landscape and irrigation. If damage occurs you are responsible for replacement of landscape and mulch and repair of the irrigation at your own cost.

Replace section 15-1.03B with:

15-1.03B Residue Containing Lead from Paint and Thermoplastic

Residue from grinding or cold planing contains lead from paint and thermoplastic. The average lead concentrations are less than 1,000 mg/kg total lead and 5 mg/L soluble lead. This residue:

1. Is a nonhazardous waste
2. Does not contain heavy metals in concentrations that exceed thresholds established by the Health and Safety Code and 22 CA Code of Regs
3. Is not regulated under the Federal Resource Conservation and Recovery Act (RCRA), 42 USC § 6901 et seq.

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

Payment for a lead compliance plan is not included in the payment for existing facilities work.

Payment for handling, removal, and disposal of grinding or cold planing residue that is a nonhazardous waste is included in the payment for the type of removal work involved.

Add to section 15-2.02A:

Do not remove any drainage facilities until their use is no longer required. The Contractor shall notify the Engineer in advance of any intended drainage facility removal.

Delete the 4th paragraph in section 15-2.02B(2)

Replace section 15-2.02B(3) with:

15-2.02B(3) Cold Planing Asphalt Concrete Pavement

15-2.02B(3)(a) General

Schedule cold planing activities so that not more than 7 days elapses between the time the pavement is cold planed and the HMA is placed.

15-2.02B(3)(b) Materials

Use the same quality of HMA for temporary tapers that is used for the HMA overlay or comply with the specifications for minor HMA in section 39.

15-2.02B(3)(c) Construction

15-2.02B(3)(c)(i) General

Do not use a heating device to soften the pavement.

The cold planing machine must be:

1. Equipped with a cutter head width that matches the planing width. If the cutter head width is wider than the cold plane area shown, submit to the Engineer a request for using a wider cutter head. Do not cold plane unless the Engineer approves your request.
2. Equipped with automatic controls for the longitudinal grade and transverse slope of the cutter head and:
 - 2.1. If a ski device is used, it must be at least 30 feet long, rigid, and a 1-piece unit. The entire length must be used in activating the sensor.
 - 2.2. If referencing from existing pavement, the cold planing machine must be controlled by a self-contained grade reference system. The system must be used at or near the centerline of the roadway. On the adjacent pass with the cold planing machine, a joint-matching shoe may be used.
3. Equipped to effectively control dust generated by the planing operation
4. Operated so that no fumes or smoke is produced.

Replace broken, missing, or worn machine teeth.

15-2.02B(3)(c)(ii) Grade Control and Surface Smoothness

Furnish, install, and maintain grade and transverse slope references.

The depth, length, width, and shape of the cut must be as shown or as ordered. The final cut must result in a neat and uniform surface. Do not damage the remaining surface.

16 CLEARING AND GRUBBING

Add to section 16-1.01:

Remove portions of the existing facilities in conflict with your work shown in the following table:

Existing facility	Location
Retaining wall and decorative railing	Associated with the CHP improvement
Fence	Associated with the CHP improvement

Retaining wall and decorative railing removal is limited to only that portion in conflict with construction. Remove portions of the wall as directed.

Do not sell or give away materials from improvements to the general public at the site. You may sell materials to duly licensed contractors and material vendors provided that you remove the materials from the site.

Add after “..and channels are to be excavated,” in the 2nd paragraph in section 16-1.01:

areas shown as wetland mitigation disturbance,

Add to section 16-1.03B:

Tree and shrub cutting must occur between September 1st and February 28th. Where possible, cut tree and shrubs at least four (4) feet above ground level leaving the root systems intact.

Add to section 16-1.03C:

Grubbing, consisting of stump and root removal and blading, must occur between May 1st and November 15th.

Add to section 16-1.03D:

Chips may be used as mulch and must comply with Section 20-7.02D(6). Logs must be decked in on site designated areas as directed. Local non-profits that may be interested in waste logs include:

1. Trinity River Restoration Program (desire stumps attached): contact D.J. Bandrowski 623-1800
2. California Conservation Camp (millable logs): contact Jan Smutz 286-2880
3. Golden Age Senior Center (firewood): contact Bill Koch 623-2324

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19 EARTHWORK

Add to the list in section 19-1.01A:

- #8. Biofiltration Check dam
#9 Constructing Bioswales
#10 Local borrow (topsoil)

Add to section 19-2.03G:

Roughen excavation slopes with a slope of 3:1 or flatter, and all fill slopes to receive erosion control materials by scarifying to a depth of 2 inches.

Add to section 19-2.04:

Rough grading, embankments and excavation within the riparian area is paid for as roadway excavation.

Replace "Reserved" in section 19-3.03A with:

Where shown, remove material below the bottom of retaining wall footings. Replace with slurry cement backfill and place as specified in section 19-3.03F. Cut footing excavation into compacted fill and pour footing neat (without forming) against completed excavation.

Add to section 19-3.04:

Slurry cement backfill placed below footings is paid for as structure backfill.

Replace section 19-4 with:

19-4 JOINT TRENCH EXCAVATION

19-4.01 GENERAL

Section 19-4 includes specifications constructing joint trench excavation for utilities.

Comply with section 19-5.

19-4.02 MATERIALS

Class 2 aggregate base must comply with section 26.

Sand backfill must comply with section 19-3.03E(2).

Pull boxes must be concrete-type complying with section 86-2.06.

19-4.03 CONSTRUCTION

Install a #10 AWG solid (0.1019" Diameter), steel core soft drawn high strength tracer wire, 600# average tensile break load, 30 mil high molecular weight-high density polyethylene jacket complying with ASTM-D-1248, 30 volt rating. Color must be "RED". Trace wire must be installed inside one 2" lighting conduit pipe. The trace wire must be installed in a single continuous length without joints, and it must be accessible at all pull boxes.

19-4.04 PAYMENT

Joint trench excavation is measured along the length of trench. The joint trench will be measured along a single conduit length at locations where the various conduits cross the road.

Payment for trace wire, aggregate base, sand backfill, and conduits are included in the payment for joint trench excavation.

Pull boxes, including frames and covers, are paid for as each regardless of the size and type installed.

Add to section 19-6.04:

The Department does not pay for surplus material used to widen slopes.

The quantity of embankment is computed based on planned or authorized cross sections for embankment and the measured ground surface. The Department does not adjust the quantity of embankment if subsidence or consolidation occurs after placing embankment material has begun.

In addition to the locations described for excavation, local borrow (topsoil) must be obtained from the following locations:

- Local Borrow (Topsoil) must comply with sections 21-1.02D and 21-1.03D.

The portion of imported borrow placed within 4 feet of the finished grade must have a resistance (R-Value) of at least 18.

Provide the Engineer with the test results verify the clay meets the minimum requirements before constructing the bioswale check dams.

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Where the plants are to be planted more than 15 feet apart and are located outside of groundcover areas, control weeds by hand pulling within an area 6 feet in diameter centered at each plant location.

Where pavement, dikes, curbs, sidewalks, walls, and fences are located 12 feet or more beyond mulched areas, plant basins, and groundcover areas, limit mowing to 6 feet beyond these areas.

Replace 20-2.07B(2) (b) of the RSS with:

20-2.07B(2)(b) Battery Powered Irrigation Controllers

The irrigation Controller must be Hunter SVC Smart valve Controllers or approved equal.

Replace the 4th paragraph in section 20-2.09C(4) of the RSS with:

Install plastic pipe supply mains with solvent-cement type joints not less than 24 inches below grade measured to the top of the pipe.

Add section 20-2.11B of the RSS:

20-2.11B(12) Basket Strainer Assemblies

Basket strainer assemblies must be Rain Bird PRB-QKCHK-100 Basket filter or approved equal.

20-2.11B(13) Drain Valves

Drain valves must be Rain Bird 16A-FDV filtered drain valves or approved equal.

Add section 20-2.11C of the RSS:

20-2.11C(6) Basket Strainer Assemblies

A basket filter must be installed on the no pressure side of each control valve as shown.

20-2.11C(7) Drain Valves

Drain valves must be installed at all low points along all lateral lines where water is likely to pool during non-operation.

Drain valves must be connected to lateral lines using line-sized PVC SST with a female threaded ½ inch outlet.

Drain valves must be placed vertically, facing downward in an excavated pit 12 inches in diameter and 12 inches below bottom of lateral line trench depth. Pits shall be backfilled with ½" pea gravel around drain valve.

Add after the last paragraph of section 20-3.01B(9) of the RSS:

Foliage protection must be provided and installed as shown.

Add to section 20-3.03C(3)(d)(v) of the RSS for section 20:

Plant liner plants, potted plants, bulbs and cuttings between October 1 and April 30.

Replace paragraph 2 of section 20-7.01A with:

Plants and seeds required for this Contract must be grown specifically for this project. Order the seeds within 5 working days of receiving the Notice to Proceed.

Add to section 20-7.01B

20-7.01B(5)Soils Testing Report

Obtain agricultural suitability and fertility soils testing. Analysis must include recommendations for soil preparation and backfill mix as well as recommendations for post maintenance fertilization.

Soils testing laboratory and location/number of required sample locations must be approved by the County biologist.

A copy of the soils report must be provided to the County biologist before any work is completed. You must notify the County biologist of any soil problems that might affect plant growth before starting planting operations.

Replace section 20-7.02A with:**20-7.02A General**

Plants must be the variety and size shown and true to the type or name shown. Plants must be individually tagged or tagged in groups identifying the plants by species or variety. Furnish healthy, shapely and well-rooted plants with roots that show no evidence of being restricted or deformed. Plants must be well-grown, free from insect pests and disease, and grown in nurseries inspected by the Department of Food and Agriculture.

Root condition of plants furnished in containers are determined by removal of earth from the roots of not less than 2 plants nor more than 2 percent of the total number of plants of each species or variety.

If container-grown plants are provided from several sources, the roots of not less than 2 plants of each species or variety from each source must be inspected to determine the root condition.

If the sample plants inspected are found to be defective, including plants that are root bound or have an underdeveloped root ball, the entire lot or lots of plants represented by the defective samples may be rejected. Sample plants rendered unsuitable for planting because of this inspection are considered as samples at your expense.

Plants are subject to inspection by the Contractor's biologist (Project Restoration Ecologist) and the County biologist for size, variety, condition, root development defects, and injury upon delivery to the job site or at any time before and during progress of work.

All plants must be contract grown from stock obtained from within the Trinity River watershed. Non-native cultivars scheduled for planting at the intersections are exempt from this requirement.

All nursery stock shall conform to ANSI Z60.1 American standard for nursery stock.

Add to section 20-7.02C:**20-7.02C(2) Liner Plants for Plant Group M**

Liner plants for plant group M include plants in Treeband containers (2.5"x2.5"x5"deep).

Add to section 20-7.02C:**20-7.02C(6) Pot Plants for Plant Group A**

Pot plants for plant group I include all potted plants in one gallon containers (6"x6"x7"deep).

Potted (container) plants must be grown in individual containers.

Do not use containers made of biodegradable material.

Add to section 20-7.02C:**20-7.02C(7) Pot Plants for Plant Group I**

Pot plants for plant group I include all potted plants in TreePot 8 containers (8"x8"x18"deep).

Potted (container) plants must be grown in individual containers.

Do not use containers made of biodegradable material.

Add to section 20-7.02C:

20-7.02C(8) Bulb Plants for Plant Group E

Bulb plants for plant group E must be between 7 inches and 8 inches in size.

Bulbs shall be stored in a cool, dry, and dark place with adequate air circulation.

Add to section 20-7.02C:

20-7.02C(9) Willow Cuttings for Plant Group W

Collect pole cuttings no earlier than one week prior to installation.

Pole cuttings should be collected from mature wood of the parent tree, 75% shall be between 3 feet to 4 feet in length and shall have all branches and leaves removed; the remaining 25% shall be between 5 feet to 6 feet in length.

The bottom of each pole cutting shall be cut to a 45 degree angle directly below the bottom leaf bud.

Bundle pole cuttings and soak at least the lower 1/3 of the cuttings in water until the time of installation. Cuttings shall be soaked for a minimum of three (3) days prior to installation.

Add to section 20-7.02D(6)(a):

Where feasible use mulch from clearing and grubbing operations. Additional mulch may be imported as necessary.

Replace 20-7.03A with:

20-7.03A General

Planting includes delivery, storage, handling, and planting plants.

Planting must only occur after the inspection approval by the County biologist accepting final finish grades.

The contractor's biologist shall be responsible for overseeing all plant layout and flagging.

Exact locations of plant material must be reviewed by the County biologist in the field before installation.

Seeding must be completed between September 1 and October 15, and planting of container plants must follow.

Add new section 20-7.03B(4) Initial Invasive Plant Removal and Weed Control for the Enhanced Montane Riparian Areas

An initial plant removal and weed control event will occur during the fall of the last year of construction prior to the start of the plant establishment period. The removal event must occur between August 1st and September 15th.

The contractor will remove Himalayan blackberry and all other non-native plants deemed invasive by the California invasive plant council mechanically throughout the enhanced montane riparian areas with hand-held tools (mattock, Pulaski, pick hammer) and/or small equipment (mowers, masticators, rubber-tracked loaders, midi-excavators, etc...). Remove the basal root mass and all above ground portions of the targeted weeds. All removal protocol shall be per the Drawings.

All removed Himalayan blackberry will be disposed of legally at an approved off-site location.

Fill holes and small pockets in the soil with site soils and lightly compact before raking the surface smooth. Scarify the ground surface to prepare a seedbed.

There will be no use of herbicides, insecticides, rodenticides, or fungicides on the project site.

Dispose of invasive plants and weeds legally offsite at an approved disposal location.

Following initial clearing and removal event, the Contractor must seed all disturbed areas in accordance with the Drawings and Section 21-1.03E.

Replace 20-7.03C with:

20-7.03C Prepare Planting Area

Planting area preparation includes:

1. Staking the boundaries or individual locations of plantings and seeding zones.
2. Removal of vegetation within the immediate planting area.
3. Intersection bulb bed staking, cultivation, and topsoil amendment

The Contractor's biologist shall stake the boundaries of planting and seeding zones and identify individual plant locations .

The Contractor's biologist shall mark individual plant locations for container plants with color-coded and labeled pin-flags. Species, quantity, and layout will be as shown.

The Contractor's biologist will field mark patches to be planted with plug plants using color-coded pin flags. Species, quantity, and layout will be as shown.

The Contractor's biologist will field mark bulb planting area (bulb bed) using color-coded pin flags outlining the boundaries of each bulb planting bed. Location and size will be as shown.

Planting may begin after the County biologist has determined that the flagged layout and irrigation system installation is acceptable.

Following plant layout acceptance, the Contractor shall clear a 36 inch diameter circle around each individual planting location. The Contractor shall remove the top 2 inches of soil within the planting circle prior to planting hole excavation and planting.

Prior to planting of allium bulbs, plant group E, the Contractor's biologist will stake the limits of each bulb bed as shown on the Drawings. Following staking, the Contractor shall cultivate the identified area in accordance with Section 20-7.03F. The Contractor shall amend the soil with compost at the rates shown on the drawings prior to planting.

Replace 20-7.03D with:

20-7.03D Prepare Hole

For container plantings (plant groups I, A, and M), excavate plant holes to a minimum of two times the depth and two times the width of the container size. The sides of the holes must be scarified to eliminate smooth surfaces (allowing for root penetration) before plant installation.

Conduct work so the existing flow line in drainage ditches is maintained. Material displaced by your operations that interferes with drainage must be removed.

Replace paragraph 1 of section 20-7.03F with:

Cultivation must be by mechanical methods and performed until the soil is in a loose condition to a minimum depth of 12 inches. Soil clods must not be larger than 2 inches in maximum dimension after cultivation.

Replace section 20-9.01B with:

20-9.01B Definitions

Five year maintenance and monitoring establishment period: Monitoring and maintenance period begins after the acceptance of the completion of plant installation and extends for a period of five (5) years. Active maintenance (plant establishment work) will occur during years 1 through 3, monitoring will

occur during years 1 through 5 with extended plant establishment work (no active plant management or irrigation) during years 4 and 5.

Replace section 20-9.01C(1) with:

20-9.01C(1) General

If you encounter unanticipated and unwanted conditions that would potentially negatively affect the successful establishment of the native vegetative communities, you will prepare an adaptive management plan to address these conditions. You will submit the adaptive management plan with the estimated changes in cost (increases or decreases in cost) to the County biologist for review and approval prior to changing maintenance regimes.

All annual reports of maintenance activities will include an adaptive management section in which problems are described and adaptive management solutions and actions are presented.

A Contractor's maintenance log book specific to this job will be kept current for all maintenance activities done, with date, type of work, and person overseeing the operations. This book must be available at your office for inspection and evaluation if requested at any time by the County biologist or representative overseeing the maintenance contract performance. A summary of these logs must be included and supplied when requested, as part of annual monitoring report.

The Contractor's biologist must walk the entire job site before invasive vegetation management operations and must identify and clearly mark/stake herbaceous native vegetation patches and/or individual plants that are to be avoided during management operations. The County biologist must approve the avoidance areas before the start of invasive vegetation management operations.

Replace section 20-9.03D with:

20-9.03D(1) Roadside, Intersection, and Restored Montane and Wetland Riparian Weed Control

All competing vegetation shall be cut or hand-pulled within a 3-foot diameter circle around each container plant before competing vegetation reaches the seed stage of growth or exceeds 4 inches in height, whichever occurs first. Dispose of weeds the same day they are pulled.

Field maintenance crews shall perform this activity a minimum of two times between mid-March and the end of June and two times between August 1 and October 15 annually each year of the maintenance period.

There will be no use of herbicides, insecticides, rodenticides, or fungicides on the project site.

Weedy vegetation within a 20-foot diameter outside the 3-foot diameter planting circle shall be mowed and maintained at a height no greater than 6 inches or before they reach the seed stage of growth, whichever occurs first, during the irrigation season throughout the maintenance period. Mow invasive plants and weeds to a height of 3 inches. Remove trash and debris before mowing.

Perform weed control to maintain the roadway, intersections, and Riparian Complex A in a neat and presentable condition.

20-9.03D(2) Invasive Plant Removal and Weed Control for the Enhanced Montane Riparian Areas

Field maintenance crews will visit the job site in May and October of years 1-5. All re-sprouting Himalayan blackberry will be removed with hand tools and disposed of legally at an approved off-site location. All punch-list items listed by the Contractor's biologist during the April site inspection will be completed by the field crews by the end of May of the same year. All punch-list items from the September site inspection will be completed by the field maintenance crews by October 15th of the same year.

Removal and control Himalayan blackberry and other invasive or weed species must comply with section 20-7.03B(4), the removal and maintenance protocols on the Drawings, and with the recommendations included in the punch-lists prepared by the Contractor's biologist each April and September of each year of the establishment period.

The Contractor must provide and install herbaceous container plantings (tree bands) for replanting as directed by the Contractor's biologist during the October maintenance visit Year 1. The contractor shall supply and plant the exact quantities and species per the Drawings.

All work shall be performed as per the Drawings, Sheet CD-1, Enhanced Montane Riparian Weed Management Protocol.

Replace section 20-9.01G with:

20-9.03G Plant Staking

Replace the plant stakes that are inadequate to support plants with larger stakes.

Remove plant stakes when the County biologist determines they are no longer needed.

Replace section 20-9.03H with:

20-9.03H Replacement Plants

Replacement plants will be the same species and size as originally installed unless recommended substitute species are submitted by the Contractor's biologist and approved by the County biologist as an adaptive management decision.

Dead container plants in the Riparian Complex A mitigation area must be replaced to 100% of the original number installed in the Fall of years 1 and 2 of the maintenance period. No replacement plantings will be required in year 3.

Dead container plants for the roadside and intersection plantings areas must be replaced to 100% of the original number installed in the Fall of years 1, 2, and 3 of the maintenance period.

Herbaceous plug plantings do not require replacement unless patches larger than 50 square feet exhibit great than 50% mortality of the original number of plugs installed. Herbaceous plug replacement will be at the discretion of the County biologist.

Replace the 6th paragraph in section 20-9.03J with:

Winterize the irrigation system by turning all Water District installed gate valves at all points of connection immediately upstream of all installed backflow preventers to the off position followed by opening all control valves to de-pressurize the system. Winterization shall occur between November 1st and November 31st annually for years 1 – 3 of the maintenance period. All damage to the installed irrigation system caused by freezing shall be removed and new system components shall be installed.

Add new section 20-9.05:

20-9.05 Extended Plant Establishment Work

Extended plant establishment work will include the removal of any re-sprouting Himalayan blackberry in the enhanced montane riparian habitat type as well as other maintenance items included on the punch-lists prepared by the Contractor's biologist during the April and September site inspections of years 4-5.

Add new section 20-9.06

20-9.06 Erosion Protection and Repair

Field maintenance crews will address remedial erosion control actions included on the punch-lists prepared by the Contractor's biologist at the April and September site inspections for all 5 years of the maintenance and monitoring period.

Add to section 20:

20-16 Five Year Monitoring and Reporting

20-16.01 General

Lance Gulch Road Phase 2 Project
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Not used.

20-16.01A Summary

Section 20-16 includes specifications for the monitoring and reporting during the five year maintenance and monitoring establishment period. Standardized monitoring methods and criteria will be used for the accurate measurement and assessment of percent cover in order to determine success in meeting criteria.

Monitoring will evaluate the extent to which the mitigation areas are incrementally developing high-quality habitat values. Qualitative vegetation measurements for herbaceous plantings, such as species composition, species percent cover, and species native status, will be used to assess the success of the restored and created riparian and wetland habitats and included as part of the annual reports and addressed in the adaptive management plan.

20-16.01C Submittals

20-16.01C(1) Annual Reports

You will conduct monitoring of vegetative and hydrologic performance throughout the project site and prepare and submit an annual report of monitoring results, maintenance activities, and adaptive management strategies and activities to the County and the County biologist no later than December 31st during each year of the five year maintenance and monitoring establishment period

Annual reports for years 1-3 will be prepared by the Contractor's biologist and include the following:

1. Summary of maintenance activities undertaken during the previous year.
2. Results of ocular estimates of cover collected using the California Native Plant Society's monitoring techniques.
3. Photographs from photograph documentation stations.
4. A comparison of results to annual performance criteria.

Annual reports for years 4 and 5 will be prepared by the Contractor's biologist and include the same items as those from years 1-3, except item 4. Instead of comparing to annual performance criteria, annual reports for years 4 and 5 will compare the results of the qualitative surveys to those from previous surveys.

20-16.01C(2) Photograph Documentation

You will establish photograph points at the start of the five year maintenance and monitoring establishment period. At least three photograph points will be required for each newly graded area. Additional photograph points will be established to document Himalayan blackberry removal "before and after" conditions.

Photograph points will have unique codes and be fixed with GPS equipment and included on as-built records and presented to County biologist. Photographs will be taken from each photograph point in April and September each year by the Contractor's biologist and included in the annual monitoring reports.

20-16.02 Monitoring

20-16.02A Irrigation Monitoring

You will monitor and adjust irrigation on a regular basis, and seasonal changes to irrigation timing will be made to ensure appropriate water application throughout the dry season.

20-16.02B Restored Montane Riparian and Riparian Wetland Monitoring

Installed trees and shrubs will be assessed by full census for percent survivorship by species in September of each year plant establishment for each of the habitat planting areas identified on the plans and as-built drawings.

Each sampled woody planting will be assessed annually for condition (health and vigor).

Percent survivorship will be determined by comparison to as-built conditions and results will be presented in tabular form by species.

Monitoring and reporting must be completed by the Contractor's biologist.

20-16.02C Enhanced Montane Riparian Monitoring

The Contractor's biologist will perform site inspections in mid-April and mid-September of years 1-5. Site inspections for year 1 will consist of:

1. Mapping locations of any resprouting Himalayan blackberry and marking those locations in the field with flagging tape or non-toxic marking paint.
2. Developing a punch-list of maintenance activities to be completed by field crews including recommendations for weed management actions for non-native invasive species besides Himalayan blackberry and remedial actions for erosion control.
3. Identifying and marking with pin flags patches to be planted with plug plants during the fall of year 1. Species, quantity, and layout will be as shown.
4. Walking the entire job site in meandering transects and record data based on ocular estimates on:
 - a. Native vegetation absolute cover.
 - b. Native vegetation absolute cover of plug planting patches greater than 50 square feet.
 - c. Non-native vegetation absolute cover.
 - d. Bare ground absolute cover including rocks and soil
 - e. Thatch absolute cover.
 - f. Invasive weed presence and locations.
5. Representative photos from fixed photo documentation stations must be taken by the Contractor's biologist at each site visit.

Site inspections for years 2 and 3 will consist of the same items as year 1, except item 3. If the job site does not meet performance standards during the September site inspection, the Contractor's biologist will identify locations for replacement plug plantings with pin flags or non-toxic paint. The quantity of new plug plantings required and approval of planting locations will be at the discretion of the County biologist.

Site inspections for years 4 and 5 will consist of:

1. Mapping locations of any resprouting Himalayan blackberry and marking those locations in the field with flagging tape or non-toxic marking paint.
2. Developing a punch list of maintenance activities to be completed by field crews including recommendations for weed management actions for non-native invasive species besides Himalayan blackberry and remedial actions for erosion control.
3. Walking the entire job site in meandering transects and record data based on ocular estimates on invasive species presence and locations.
4. Representative photos from fixed photo documentation stations must be taken by the Contractor's biologist at each site visit.

Monitoring and reporting must be completed by the Contractor's biologist.

20-16.03 Performance Standards

You must ensure that the project meets these performance standards through on-going maintenance, adaptive management activities, and replacement plantings.

Revegetation progress will be tracked using percent survival and percent cover performance criteria quantitative criteria.

20-16.03A Container Plants (Restored Montane Riparian and Riparian Wetland Habitats) Performance Standards

20-16.03A(1) Fall, Year 1: 100% of the number of woody container plants originally installed must be alive or replacement planting with approved species must be completed prior to the start of the irrigation season (April) in year 2.

20-16.03A(2) Fall, Year 2: 100% of the number of woody container plants originally installed must be alive or replacement planting with approved species must be completed prior to the start of the irrigation season (April) in year 3.

20-16.03A(3) Fall, Year 3: 80% of the number of woody container plants originally installed must be alive or the maintenance and monitoring establishment period will be extended for one year at no additional cost to the County.

20-16.03B Herbaceous Plant Plugs (Enhanced Montane Riparian Habitat) Performance Standards

Net type	Top – Leno Woven 100% biodegradable organic jute fiber Bottom – 100% biodegradable organic jute fiber	--
Number of nets	Double	--
Minimum roll width	6.67 feet	--
Matrix	100% coconut fiber 0.5 lbs/sqyd	--
Stiffness	0.11 oz-inch	ASTM D1388
Unvegetated shear stress	2.35 psf	
Minimum tensile strength – MD Minimum tensile strength - TD	141.6 psf 222 psf	ASTM D 6818
Functional longevity	24 months	--

Add to section 21-1.02O(5):

Turf reinforcement mat must be either Type A or Type B.

Add after the last paragraph of section 21-1.03B:

The entire seeding area must be reasonably smooth and conform to the desired finished grade. Before seeding, the entire seeding area must be scarified to create a loose friable topsoil medium to a minimum depth of two inches.

Add after the last paragraph in section 21-1.03E:

All hydroseed application areas must be hydroseeded with the native grass seed mix as shown during late summer (September 1 to October 15) utilizing the two-step hydroseed method described below:

1. Hydroseed Application Step 1 includes the following components:
 - a. Pounds of seed mix per acre per habitat zone (pounds per acre per zone shown)
 - b. Mycorrhizal inoculum in fine powder form (Mycorrhizal Applications or approved equal) at a rate of 10 pounds per acre
 - c. Green dyed cellulose fiber mulch at a rate of 500 pounds per acre
 - d. Water
2. Hydroseed Application Step 2 includes the following components:
 - a. Commercially available weed free straw at a rate of 4,000 pounds per acre
 - b. Green dyed cellulose fiber mulch at a rate of 500 pounds per acre
 - c. Tackifier at a rate of 150 pounds per acre
 - d. Water

All areas disturbed by the initial removal event during the construction period in the enhanced montane riparian must follow the above hydroseeding application rates and must be hydroseeded prior to October 25th following initial non-native invasive removal event.

All broadcast seeded areas must be hydromulched immediately following seeding. Hydromulch application must include the following components, quantities, and rates described below:

1. Hydromulch Application:
 - a. Commercially available weed free straw at a rate of 2,000 pounds per acre
 - b. Green dyed cellulose fiber mulch at a rate of 500 pounds per acre
 - c. Tackifier at a rate of 150 pounds per acre

d. Water

Replace section 21-1.03F with:

21-1.03F Broadcast Seeding

Apply appropriate seed mix at rates shown after site preparation. Mycorrhizal inoculum at a rate of 60 pounds per acre must be mixed with the seed prior to broadcast seeding. Broadcast seeding must be accomplished utilizing a knapsack hand-operated seeders capable of uniformly spreading dry seed at the specified rates. The seeding equipment and operators must be trained to apply the appropriate amount of seed prior to broadcast seeding.

Broadcast seeding area must be scarified to a minimum depth of one (1) inch using a flexible tine harrow or hand tools to create a loose and friable topsoil medium prior to broadcast seeding operations.

All seed material must be incorporated into the soil to a maximum depth of ¼ inch by dragging or raking.

All broadcast seeded areas must be hydromulched immediately following seeding. Hydromulching must comply with section 21-1.03E.

[illegible]

DIVISION V SURFACINGS AND PAVEMENTS

39 HOT MIX ASPHALT

Add to section 39-1.01A:

Produce and place HMA Type A under the Standard construction process.

Add to section 39-1.02C:

Asphalt binder used in HMA Type A must be PG 64-16.

Add to section 39-1.02E:

Aggregate used in HMA Type A must comply with the 3/4-inch HMA Types A and B gradation.

Add to section 39-1.11D of the RSS for section 39-1.11:

Pave shoulders and median borders adjacent to the lane before opening a lane to traffic.

Add to section 39-6:

The bid item for place hot mix asphalt (miscellaneous area) is limited to the areas shown and is in addition to the bid items for the materials involved.

Payment for tack coat for miscellaneous areas is included in payment for the hot mix asphalt used in miscellaneous areas.

[illegible]

DIVISION VII DRAINAGE

70 MISCELLANEOUS DRAINAGE FACILITIES

Add to section 70-1.02:

When tested under California Test 202, aggregate for the 3/4" crushed rock must comply with the grading requirements for the sieve sizes shown in the following table, unless otherwise approved:

Sieve size	Percentage passing
1"	100
3/4:"	75-100
1/2"	5-55
3/8"	0-15
No. 4	0-5
No. 8	0-2

Add to section 70-1.04:

Payment for 3/4" crushed rock is included in the payment for the various sizes of precast pipe manhole in the Bid Item List.

Add "access control rack" to the 2nd sentence in section 70-5.01A:

Add section 70-5.05D:

70-5.05D ACCESS CONTROL RACK70-5.05D(1) GENERAL

70-5.05D(1)A Summary

Section 70-5-.05D includes specifications for fabricating and installing access control racks.

70-5.05D(1)B Quality Control and Assurance

Miscellaneous metal materials are inspected at the fabrication site. Notify the Engineer:

1. When materials have been delivered to the fabrication site
2. At least 10 days before starting fabrication

70-5.05D(2) MATERIALS

Welding must comply with AWS D1.1.

Remove burrs, rough and sharp edges, and other flaws.

Straighten warped pieces after fabricating and galvanizing.

Steel fastener components must comply with section 55-1.02A(1); other miscellaneous iron and steel materials must comply with the corresponding specifications shown in the following table:

Material	Specification
Steel bars, plates, and shapes	ASTM A 36/A 36M, A 575, or A 576 (AISI or M Grades 1016–1030)
Stainless steel fasteners, alloys 304 & 316, for general applications:	
Bolts, screws, studs, threaded rods, and nonheaded anchor bolts	ASTM F 593 or F 738M
Nuts	ASTM F 594 or F836M
Washers	ASTM A 240/A 240M and ASME B18.22M

70-5-.05D(3) CONSTRUCTION

Attach the access control rack to the pipe as shown.

70-5-.05D(4) PAYMENT

Not Used

[illegible]

DIVISION VIII MISCELLANEOUS CONSTRUCTION

73 CONCRETE CURBS AND SIDEWALKS

Minor Concrete (miscellaneous construction) includes driveways and utility foundations shown.

Reinforcing mesh must comply with section 52-1.02D.

Dowels must comply with section 52-1.02B.

Construct curb cut in curb and gutter if Add Alt #2 is not awarded.

Payment for reinforcing mesh and dowels are included in the payment for minor concrete (curb and gutter).

Within 2 business days of performing the surveys, submit preconstruction and post construction surveys signed and sealed by one of the following:

1. Land surveyor registered in the State
2. Civil engineer registered in the State

Perform a preconstruction survey to verify that forms and site constraints will allow the design dimensioning and slope requirements to be achieved. Upon completing construction of these facilities, perform a post construction survey and verify that design dimensioning and slope requirements were achieved. The post construction survey must include a minimum of 3 measurements for each dimension and slope requirement shown. Individual measurements must be equally distributed across the specified slope or dimensional surface.

Before placing concrete, verify that forms and site constraints allow the required dimensioning and slopes shown. Immediately notify the Engineer if you encounter site conditions that will not accommodate the design details. Modifications ordered by the Engineer are change order work.

Dowels must comply with section 52-1.02B.

Payment for dowels is included in the payment for minor concrete (sidewalk).

AA

Add section 75-1.02D:

If Add Alt #2 is awarded, construct sidewalk drain as shown.

Minor concrete must comply with section 73-1.

Trough and grate must be Alhambra Foundry Narrow Slot A-2401 or approved equal.

Grates must be non-skid and comply with section 75-1.03F.

Not Used.

Sidewalk drains will be paid by the linear foot.

AA

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78-1 WATERLINE EXTENSION

Extend the water service as shown on the plans and under American Water Works Association (AWWA) standards.

Determine quantities required to complete work. Submit the quantities as part of the schedule of values.

Provide a schedule of values for each lump sum bid item.

All materials must comply with AWWA and ANSI standards.

Install locator wire of #10 insulated copper along all new PVC waterline. Attachment of the locator wire to the pipe must be made with plastic tie-wraps or other approved method. Interconnect wires by soldering at each piping intersection. Locator wire must be extended into all valve boxes for future attachment; allow at least 3 feet of slack in the locator wire at each box.

A 2" pipe finder tape labeled "Buried Water Line Below" must be installed on the top of the compacted bedding materials at 6" minimum above the top of the pipe.

All ductile and steel pipe fittings must be encased with a polyethylene filming under AWWA C105.

Conduct a satisfactory continuity test before acceptance.

Flush and disinfect all waterline systems under AWWA Standards.

Not Used

AA

Replace the 1st paragraph in section 80-3.02E with:

Slats must be plastic.

Add to the list in the 4th paragraph of section 80-3.02E:

3. Be brown

[illegible]

86 ELECTRICAL SYSTEMS

Add to the end of the 1st paragraph of the RSS for section 86-1.01:

This work is shown on plan sheets labeled E. The work involved in each bid item is shown on a sheet with a title matching the bid item description except for the following bid items:

1. Maintaining the existing traffic management system during construction

Traffic signal work must be performed at the following location:

1. Route 299 (Main Street)/Glen Road/Lance Gulch Road intersection (Alternative Bid)

Replace "15" in the 1st paragraph of the RSS for section 86-1.03 with:

"10"

Replace "Reserved" in section 86-1.06B with:

Traffic Management System (TMS) elements include, but are not limited to ramp metering (RM) system, communication system, traffic monitoring stations, video image vehicle detection system (VIVDS), microwave vehicle detection system (MVDS), loop detection system, changeable message sign (CMS) system, extinguishable message sign (EMS) system, highway advisory radio (HAR) system, closed circuit television (CCTV) camera system, roadway weather information system (RWIS), visibility sensor, and fiber optic system.

Existing TMS elements, including detection systems, shown and located within the project limits must remain in place and be protected from damage. If the construction activities require existing TMS elements to be nonoperational or off line, and if temporary or portable TMS elements are not shown, the Contractor must provide for temporary or portable TMS elements. The Contractor must receive authorization on the type of temporary or portable TMS elements and installation method.

Before work is performed, the Engineer, the Contractor, and the Department's Traffic Operations Electrical representatives must jointly conduct a pre-construction operational status check of all existing TMS elements and each element's communication status with the Traffic Management Center (TMC), including existing TMS elements not shown and elements that may not be impacted by the Contractor's activities. The Department's Traffic Operations Electrical representatives will certify the TMS elements' location and status, and provide a copy of the certified list of the existing TMS elements within the project limits to the Contractor. The status list will include the operational, defined as having full functionality, and the nonoperational components.

The Contractor must obtain authorization at least 72 hours before interrupting existing TMS elements' communication with the TMC that will result in the elements being nonoperational or off line. The Contractor must notify the Engineer at least 72 hours before starting excavation activities.

Traffic monitoring stations and their associated communication systems, which were verified to be operational during the pre-construction operational status check, must remain operational on freeway/highway mainline at all times, except:

1. For a duration of up to 15 days on any continuous segment of the freeway/highway longer than 3 miles
2. For a duration of up to 60 days on any continuous segment of the freeway/highway shorter than 3 miles

If the construction activities require existing detection systems to be nonoperational or off line for a longer time period or the spacing between traffic monitoring stations is more than the specified criteria above, and temporary or portable detection operations are not shown, the Contractor must provide provisions for temporary or portable detection operations. The Contractor must receive authorization on the type of detection and installation before installing the temporary or portable detection.

If existing TMS elements shown or identified during the pre-construction operational status check, except traffic monitoring stations, are damaged or fail due to the Contractor's activity, where the elements are not fully functional, the Engineer must be notified immediately. If the Contractor is notified by the Engineer that existing TMS elements have been damaged, have failed or are not fully functional due to the Contractor's activity, the damaged or failed TMS elements, excluding structure-related elements, must be repaired or replaced, at the Contractor's expense, within 24 hours. For a structure-related elements, the Contractor must install temporary or portable TMS elements within 24 hours. For nonstructure-related

TMS elements, the Engineer may authorize temporary or portable TMS elements for use during the construction activities.

The Contractor must demonstrate that repaired or replaced elements operate in a manner equal to or better than the replaced equipment. If the Contractor fails to perform required repairs or replacement work, the Department may perform the repair or replacement work and the cost will be deducted from monies due to the Contractor.

A TMS element must be considered nonoperational or off line for the duration of time that active communications with the TMC is disrupted, resulting in messages and commands not transmitted from or to the TMS element.

The Contractor must provide provisions for replacing existing TMS elements within the project limits, including detection systems, that were not identified on the plans or during the pre-construction operational status check that became damaged due to the Contractor's activities.

If the pre-construction operational status check identified existing TMS elements, then the Contractor, the Engineer, and the Department's Traffic Operations Electrical representatives must jointly conduct a post construction operational status check of all existing TMS elements and each element's communication status with the TMC. The Department's Traffic Operations Electrical representatives will certify the TMS elements' status and provide a copy of the certified list of the existing TMS elements within the project limits to the Contractor. The status list will include the operational, defined as having full functionality, and the nonoperational components. TMS elements that cease to be functional between pre and post construction status checks must be repaired at the Contractor's expense.

The Engineer will authorize the schedule for final replacement, the replacement methods and the replacement elements, including element types and installation methods before repair or replacement work is performed. The final TMS elements must be new and of equal or better quality than the existing TMS elements.

If no electrical work exists on the project and no TMS elements are identified within the project limits, the pre-construction operational status check is change order work.

Furnishing and installing temporary or portable TMS elements that are not shown, but are required when an existing TMS element becomes nonoperational or off line due to construction activities, is change order work.

Furnishing and installing temporary or portable TMS elements and replacing TMS elements that are not shown nor identified during the pre-construction operational status check and were damaged by construction activities is change order work.

If the Contractor is required to submit provisions for the replacement of TMS elements that were not identified, submitting the provisions is change order work.

Add to section 86-2.03B:

The bottom of the base plate must be flush with finished grade.

Add to section 86-2.04A:

The sign mounting hardware must be installed at the locations shown.

Install non-illuminated street name signs on signal mast arms using a minimum 3/4 by 0.020-inch round edge stainless steel strap and saddle bracket. Wrap the strap at least twice around the mast arm, tighten, and secure with a 3/4-inch stainless strap seal. Level the sign panel and tighten the hardware securely.

Add to section 86-2.05A:

Conduit installed underground must be Type 3.

Add to section 86-2.05B:

The conduit in a foundation and between a foundation and the nearest pull box must be Type 1.

Add to section 86-2.05C:

Within Caltrans right-of-way, if Type 3 conduit is placed in a trench, not in the pavement or under concrete sidewalk, after the bedding material is placed and the conduit is installed, backfill the trench to not less than 4 inches above the conduit with minor concrete under section 90-2, except the concrete must contain not less than 421 pounds of cementitious material per cubic yard. Backfill the remaining trench to finished grade with backfill material.

After conductors have been installed, the ends of the conduits must be sealed with an authorized type of sealing compound.

At those locations where conduit is required to be installed under pavement and underground facilities designated as high priority subsurface installation under Govt Code § 4216 et seq. exist, conduit must be placed by the trenching in pavement method under section 86-2.05C.

At other locations where conduit is required to be installed under pavement and if a delay to vehicles will not exceed 5 minutes, conduit may be installed by the trenching in pavement method.

Replace the 3rd paragraph in section 86-2.06A(2) of the RSS for section 86-2.06 with:

In a ground or sidewalk area, embed the bottom of a pull box in crushed rock.

Replace "Reserved" in section 86-2.06B of the RSS for section 86-2.06 with:

86-2.06B(1) General

86-2.06B(1)(a) Summary

Section 86-2.06B includes specifications for installing non-traffic-rated pull boxes.

86-2.06B(1)(b) Submittals

For pull boxes within the State Right-of-Way, before shipping pull boxes to the job site, submit a list of materials used to fabricate the pull boxes to METS. Include:

1. Contract number
2. Manufacturer's name
3. Manufacturer's installation instructions
4. Your contact information

For all other pull boxes submit materials lists, reports and warranties to the County Engineer.

Submit reports for pull boxes from an NRTL-accredited laboratory.

Before installing a pull box and cover, submit the manufacturer's replacement warranty for them.

86-2.06B(1)(c) Quality Control and Assurance

86-2.06B(1)(c)(i) Functional Testing

The pull box and cover must be tested under ANSI/SCTE 77, "Specification for Underground Enclosure Integrity."

86-2.06B(1)(c)(ii) Warranty

Provide a 2-year manufacturer's replacement warranty for the pull box and cover. The warranty period starts on the date of Contract acceptance.

For pull boxes within the State Right-of-Way deliver replacement parts within 5 business days after you receive notification of a failed pull box, cover, or both to the Caltrans Maintenance Electrical Shop at:

5065 Mountain Lakes Blvd
Redding, CA 96003-1458

For all other pull boxes, deliver parts to the County Engineer.

86-2.06B(2) Materials

The pull box and cover must comply with ANSI/SCTE 77, "Specification for Underground Enclosure Integrity," for tier 22 load rating and must be gray or brown.

Each pull box cover must have an electronic marker cast inside.

A pull box extension must be made of the same material as the pull box and attached to the box to maintain the minimum combined depths.

Include recesses for a hanger if a transformer or other device must be placed in a pull box.

The bolts, nuts, and washers must be a captive design.

The captive bolt must be capable of withstanding a torque from 55 to 60 ft-lb and a minimum pull-out strength of 750 lb. Perform the test with the cover in place and the bolts torqued. The pull box and cover must not be damaged while performing the test.

Hardware must be stainless steel with 18 percent chromium and 8 percent nickel content.

Galvanize ferrous metal parts under section 75-1.05.

The manufacturer's instructions must include:

1. Quantity and size of entries that can be made without degrading the strength of the pull box below the tier 22 load rating
2. Locations where side entries cannot be made
3. Acceptable method for creating the entry

The tier 22 load rating must be labeled or stenciled by the manufacturer on the inside and outside of the pull box and on the underside of the cover.

86-2.06B(3) Construction

Do not install a pull box in curb ramps or driveways.

A pull box for a post or a pole standard must be located within 5 feet of the standard. Place the pull box adjacent to the back of the curb or edge of the shoulder. If this is impractical, place the pull box in a suitable, protected, and accessible location.

Add to section 86-2.08A:

Wrap conductors around the projecting end of conduit in pull boxes. Secure conductors and cables to the projecting end of the conduit in pull boxes.

Add new section 86-2.08F with:

TELEPHONE CABLE

The telephone cable (TC) shall consist of 6 pairs of No.19 solid copper conductors. Conductors shall be twisted in pairs. Each conductor shall be insulated with a high molecular weight, heat stabilized, color coded polyethylene material. The insulation shall be 18 mils nominal.

Color code for TC cable shall be as follows:

1. White/Blue
2. White/Orange
3. White/Green

4. White/Brown
5. White/Gray
6. Red/Blue

The core shall be protected by a non-hygroscopic polyester film with a single longitudinally applied 5-mil thick corrugated copper shield (or 8-mil thick plastic coated aluminum shield). A moisture barrier of petrolatum-polyethylene compound shall be applied over the core tape and over and under the cable shield to fill all cable interstices.

The cable shall be provided with an outer jacket of extruded, black, high molecular weight, heat stabilized polyethylene material. The outer jacket shall have a thickness of 60-mils nominal. The outer diameter of the cable shall be 0.60-inch maximum.

All conductors shall be terminated inside the telephone demarcation cabinet and the controller cabinet as shown on the plans. All connections from the terminal block TB0 of the controller cabinet to the 8-position connecting block shall be via a cable consisting of 2 pairs of No.22 solid conductors and shall meet the same specifications as the TC cable.

Replace the 1st paragraph of section 86-2.09E with:

Splices must be insulated by "Method B."

Delete the 6th and 7th paragraphs of section 86-2.09E.

Add to section 86-2.11A:

Circuit breakers must be the cable-in/cable-out type mounted on non-energized clips. All circuit breakers must be mounted vertically with the up position of the handle being the "ON" position.

Each service must be provided with up to 2 main circuit breakers that will disconnect ungrounded service entrance conductors. Where the "Main" circuit breaker consists of 2 circuit breakers as described, each of the circuit breakers must have a minimum interrupting capacity of 10,000 A, rms.

Replace 7th and 8th paragraphs of section 86-2.11A with:

Service equipment enclosures must be the aluminum type.

Replace section 86-2.18 with:

86-2.18 NUMBERING ELECTRICAL EQUIPMENT

The placement of numbers on electrical equipment will be done by others.

Replace the 1st paragraph of section 86-3.02A(1) with:

This work includes installing a battery backup system. Comply with TEES.

Add to section 86-3.02A(2):

Submit the manufacturer's warranty documentation before installing the batteries.

Add to section 86-3.02A(3):

Batteries must have a 5-year manufacturer's warranty against defects in materials and workmanship. The warranty period starts on the date of Contract acceptance. Provide replacement batteries within 5

business days after notification of failed batteries. The Department pays to ship the failed batteries. Deliver replacement batteries to the District Maintenance Electrical Shop at:

5065 Mountain Lakes Blvd
Redding, CA 96003-1458

Add to section 86-3.02B:

The external cabinet must be capable of housing:

1. 4 batteries
2. Inverter/charger unit
3. Power transfer relay
4. Manually-operated bypass switch
5. Required control panels
6. Wiring and harnesses

Add to section 86-3.02C:

The Department assembles the BBS.

Replace section 86-4.01D(1)(c)(ii) with:

86-4.01D(1)(c)(ii) Warranty

The manufacturer must provide a written warranty against defects in materials and workmanship for LED signal modules for a minimum period of 48 months after installation of LED signal modules. Replacement LED signal modules must be provided within 15 days after receipt of failed LED modules at your expense. The Department pays for shipping the failed modules to you. All warranty documentation must be submitted to the Engineer before installation. Replacement LED signal modules must be delivered to State Maintenance Electrical Shop at 5065 Mountain Lakes Blvd, Redding, CA 96003-1458.

Add to section 86-4.01D(2)(a):

LED signal module must be manufactured for 12-inch circular and arrow.

Replace section 86-4.03H with:

86-4.03H LED Countdown Pedestrian Signal Face Modules

86-4.03H(1) General

86-4.03H(1)(a) Summary

Section 86-4.03H includes specifications for installing a LED countdown PSF module into a standard Type A pedestrian signal housing. Comply with TEES.

86-4.03H(1)(b) Definitions

Not Used

86-4.03H(1)(c) Submittals

Before shipping LED countdown PSF modules to the job site, submit all modules and the following items to METS:

1. Delivery form with Contract number and contact information
2. Installation manual and schematic wiring diagram
3. Product information, including manufacturer's name and month and year of manufacture
4. List of model, lot, and serial numbers

Submit documentation of the manufacturer's production QA, including test data showing the modules comply with the following requirements:

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1. Luminous intensity as shown in the table titled "Luminance Values."
2. Power factor after burn-in.
3. Test current flow measurements in amperes after burn-in. The measured values must comply with the design qualification figures. Record the measured ampere values with rated voltage on the product labels.

Submit the manufacturer's warranty before installing LED countdown PSF modules.

86-4.03H(1)(d) Quality Control and Assurance

86-4.03H(1)(d)(i) General

The Engineer rejects a module if a visual inspection reveals any of the following defects:

1. Exterior physical damage
2. Assembly anomalies
3. Scratches
4. Abrasions
5. Cracks
6. Chips
7. Discoloration
8. Other surface defects

The Department tests LED countdown PSF modules under ANSI/ASQ Z1.4 and California Test 606. The module submitted for testing must be representative of typical production units.

Comply with testing requirements for electrical material and equipment under section 86-2.14.

86-4.03H(1)(d)(ii) Warranty

Provide a 5-year manufacturer's replacement warranty against defects or failures. The warranty period starts on the date of Contract acceptance. Furnish replacement parts within 15 days after notification of a failed module. The Department does not pay for replacement modules. Deliver replacement modules to the Department's Maintenance Electrical Shop at:

5065 Mountain Lakes Blvd
Redding, CA 96003-1458

86-4.03H(2) Materials

A LED countdown PSF module must:

1. Use LED as the light source.
2. Be made of material complying with ASTM D 3935.
3. Be designed to mount behind or to replace face plates of a standard Type A housing as specified in the ITE publication *Equipment and Material Standards*, chapter 3, "Pedestrian Traffic Control Signal Indications," and the *California MUTCD*.
4. Have a minimum power consumption of 10 W for the "Upraised Hand."
5. Have internal components supported such that they withstand mechanical shock and vibration from high winds and other sources.
6. Use the required color and be the ultra-bright type rated for 100,000 hours of continuous operation for a temperature range from -40 to +74 degrees C.
7. Have replaceable signal lamp optical units.
8. Fit into the housing of a pedestrian signal section without modification.
9. Be a single, self-contained device that does not require on-site assembly for installation.
10. Have the following information permanently marked on the back of the module:
 - 10.1. Manufacturer's name
 - 10.2. Trademark
 - 10.3. Model number
 - 10.4. Serial number
 - 10.5. Lot number
 - 10.6. Month and year of manufacture
 - 10.7. Required operating characteristics, including:
 - 10.7.1. Rated voltage
 - 10.7.2. Power consumption

10.7.3. Volt-ampere

10.7.4. Power factor

11. Have prominent and permanent vertical markings for accurate indexing and orientation within the signal housing if a specific mounting orientation is required. Markings must be a minimum of 1 inch in height and include an up arrow and the word "up" or "top."

The circuit board and the power supply must be contained inside of the LED countdown PSF module. The circuit board must comply with TEES, chapter 1, section 6.

The enclosure containing the power supply or the electronic components of the module, except the lens, must be made of UL 94 V-0 flame-retardant material.

Each symbol must be at least 9 inches high and 5-1/4 inches wide. The lens' signal output for the "Walking Person" and "Upraised Hand" symbols and the countdown display must not exceed a ratio of 5 to 1 for the highest and lowest luminance values. The symbols must comply with ITE publication *Equipment and Material Standards*, chapter 3, "Pedestrian Traffic Control Signal Indications," and the *California MUTCD*. The 2-digit countdown timer, "Upraised Hand," and "Walking Person" indications must be electronically isolated from each other. The 3 indications must not share a power supply or interconnect circuitry.

The module must maintain an average luminance value for at least 5 years of continuous signal operation for a temperature range from -40 to +74 degrees C.

The module must operate over the specified ambient temperature and voltage range and be readable both day and night at distances up to the full width of the area to be crossed. Upon initial testing at 25 degrees C, the module must have at least the luminance values shown in the following table:

Luminance Values

PSF module symbol	Luminance
"Upraised Hand" and 2-digit countdown timer	1,094 fL
"Walking Person"	1,547 fL

The color output of the module must comply with chromaticity requirements in section 5.3 of ITE publication *Equipment and Material Standards* chapter 3, "Pedestrian Traffic Control Signal Indications."

When operating over a temperature range from -40 to +74 degrees C, the measured chromaticity coordinates of the module must comply with the following requirements for 5 years after Contract acceptance:

Chromaticity Standards (CIE Chart)

"Upraised Hand" and 2-digit countdown timer (portland orange)	$0.600 \leq X \leq 0.659$ Y: Not greater than 0.390 or less than 0.331 or less than $0.990 - X$
"Walking Person" (lunar white)	X: Not less than 0.280 or greater than 0.400 Y: Not less than $0.0483 + 0.7917 \cdot X$ or greater than $0.0983 + 0.7917 \cdot X$

The module must not exceed the power consumption requirements shown in the following table:

Maximum Power Consumption Requirements

PSF module display	At 24 °C	At 74 °C
"Upraised Hand"	10.0 W	12.0 W
"Walking Person"	9.0 W	12.0 W
2-digit countdown timer	6.0 W	8.0 W

The wiring and terminal block must comply with section 13.02 of ITE publication *Equipment and Material Standards*, chapter 2, "Vehicle Traffic Control Signal Heads." The PSF module must have spade lugs and 3 secured, jacketed copper wires that comply with NEC and are:

1. Color coded
2. 3 feet long
3. 600 V(ac)
4. 20 AWG minimum stranded
5. Rated for service at +105 degrees C

The module must operate:

1. At a frequency of 60 ± 3 Hz over a voltage range from 95 to 135 V(ac) without flicker perceptible to the unaided eye. Fluctuations of the line voltage must have no visible effect on the luminous intensity of the indications. The rated voltage for measurements must be 120 V(ac).
2. With currently-used Department controller assemblies, including solid-state load switches, flashers, and conflict monitors. Comply with TEES, chapters 3 and 6. If an alternating current of 20 mA or less is applied to the unit, the voltage read across the 2 leads must not exceed 15 V(ac).
3. With a smart control and regulation mode that exhibits countdown displays automatically adjusted to the traffic controller's programmed intervals.

The countdown PSF module must operate during the pedestrian change interval. The module must begin counting down when the flashing "Upraised Hand" interval turns on, counting down to 0 and turning off when the steady "Upraised Hand" interval turns on.

The module's on-board circuitry must:

1. Include voltage surge protection to withstand high-repetition noise transients. The voltage surge protection must comply with NEMA Standard TS, section 2.1.6.
2. Comply with Class A emission limits for electronic noise under 47 CFR 15, subpart B.

The module must provide a power factor of 0.90 or greater.

The total harmonic distortion from a current and voltage induced in an alternating-current power line by a PSF module must not exceed 20 percent at an operating temperature of 25 degrees C.

The module's circuitry must prevent light emission perceptible to the unaided eye when a voltage of 50 V(ac) or less is applied to the unit.

When power is applied to the module, light emission must occur within 90 ms.

86-4.03H(3) Construction

Use LED countdown PSF modules from the same manufacturer.

Install the module in a standard Type A pedestrian signal housing. Special tools must not be required for installing the modules.

The installation of the module into the pedestrian signal face must require only the removal of the lens, reflector, and existing LED module.

86-4.03H(4) Payment

Not Used

Add to section 86-4.03I(1)(b):

Submit warranty documentation as an informational submittal before installing LED PSF modules.

Replace section 86-4.03I(1)(c)(ii) with:

86-4.03I(1)(c)(ii) Warranty

Submit a 5-year manufacturer's warranty against defects in materials and workmanship for LED PSF modules. The 5-year warranty period starts on the date of Contract acceptance. Furnish replacement modules within 15 days after receiving the failed modules. The Department does not pay for replacement modules. Deliver replacement modules to the Department's Maintenance Electrical Shop at:

5065 Mountain Lakes Blvd
Redding, CA 96003-1458

Add to the 6th paragraph in section 86-4.03I(2):

Installation of the LED PSF module into the pedestrian signal face only requires the removal of lenses, reflectors, and existing LED modules.

Add to section 86-5.01A(1):

Loop wire must be Type 2.

Loop detector lead-in cable must be Type B.

Slots must be filled with hot-melt rubberized asphalt sealant.

You may use a Type E loop where a Type A loop is shown.

For Type E detector loops, sides of the slot must be vertical and the minimum radius of the slot entering and leaving the circular part of the loop must be 1-1/2 inches. Slot width must be a maximum of 5/8 inch. Loop wire for circular loops must be Type 2. Slots of circular loops must be filled with elastomeric sealant or hot-melt rubberized asphalt sealant.

The depth of the loop sealant above the top of the uppermost loop wire in the sawed slots must be 2 inches, minimum.

Fill slots in concrete with hot-melt rubberized asphalt sealant for loop detectors.

Replace "Reserved" in section 86-5.03 of the RSS with:

86-5.03A General

86-5.03A(1) Summary

Section 86-5.03 includes specifications for installing accessible pedestrian signals (APS). Comply with TEES.

86-5.03A(2) Definitions

accessible pedestrian signal: Accessible pedestrian signal as defined in the *California MUTCD*.

accessible walk indication: Activated audible and vibrotactile action during the walk interval.

ambient sound level: Background sound level in dB at a given location.

ambient sound sensing microphone: Microphone that measures the ambient sound level in dB and automatically adjusts the APS speaker's volume.

APS assembly: Assembly that includes a pushbutton to actuate the APS components.

audible speech walk message: Audible prerecorded message that communicates to pedestrians which street has the walk interval.

programming mechanism: Device to program the APS' operation.

pushbutton information message: Pushbutton information message as defined in the *California MUTCD*.

pushbutton locator tone: Pushbutton locator tone as defined in the *California MUTCD*.

vibrotactile pedestrian device: Vibrotactile pedestrian device as defined in the *California MUTCD*.

86-5.03A(3) Submittals

Before shipping the APS units to the job site, submit the units with the following to METS:

1. Delivery form including Contract number and your contact information
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2. Manufacturer's name
3. Model, lot, and serial numbers
4. Month and year of manufacture
5. Wiring diagram
6. Product data
7. Programming mechanism if not integral to the APS

Submit 5 APS user and operator manuals for each signalized location as informational submittals. Each manual must have a master item index that includes:

1. Descriptions of the APS and its associated equipment and cables
2. Illustrative block diagrams
3. Manufacturer's contact information
4. Technical data specifications
5. Parts list, descriptions, and settings
6. Fault diagnostic and repair procedures
7. Preventative maintenance procedures for maintaining APS performance parameters

Submit the manufacturer's warranty documentation as an informational submittal before installing the APS.

Submit a record of completed field tests, the APS' final configuration, audible sound level and threshold, and a list of all parameter settings.

86-5.03A(4) Quality Control and Assurance

86-5.03A(4)(a) General

The APS must be compatible with the Department-furnished Model 170E/2070L controller assembly.

The power to the APS must be connected to the pedestrian signal's terminal blocks.

86-5.03A(4)(b) Functional Testing

Perform 2 field tests on the APS: (1) when traffic is noisy during peak traffic hours and (2) when traffic is quiet during off-peak hours. Notify the Engineer 15 days before testing the APS.

86-5.03A(4)(c) Warranty

The APS must have a 2-year manufacturer's warranty against any defects or failures. The 2-year warranty period starts at Contract acceptance. Deliver a replacement within 10 days after you receive notification of a failed APS. The Department does not pay for the replacement. Deliver the replacement to the Department's Maintenance Electrical Shop at:

5065 Mountain Lakes Blvd
Redding, CA 96003-1458

86-5.03A(4)(d) Training

Provide a minimum of 8 hours of training by a certified manufacturer's representative for up to 10 Department employees selected by the Engineer. The training must include instruction in installing, programming, adjusting, calibrating, and maintaining the APS.

Furnish materials and equipment for the training.

86-5.03B Materials

The housing for the APS assembly must be made of corrosion-resistant material. Theftproof bolts used for mounting the APS housing to the standard must be stainless steel with a chromium content of 17 percent and a nickel content of 8 percent.

The color of metallic housing must match color no. 33538 of FED-STD-595.

The color of plastic housing must match color no. 17038, 27038, or 37038 of FED-STD-595.

The APS assembly must be rainproof and shockproof in any weather condition.

The APS assembly must include:

1. Pushbutton actuator with a minimum diameter of 2 inches. If a mechanical switch is used, it must have:
 - 1.1. Operating force of 3.5 lb
 - 1.2. Maximum pretravel of 5/64 inch
 - 1.3. Minimum overtravel of 1/32 inch
 - 1.4. Differential travel from 0.002 to 0.04 inch
2. Vibrotactile device on the pushbutton or on the arrow.
3. Enclosure with an ambient-sound-level-sensing microphone and weatherproof speaker. The enclosure must:
 - 3.1. Weigh less than 7 lb.
 - 3.2. Measure less than 16 by 6 by 5 inches.
 - 3.3. Fit the signal standard.
 - 3.4. Have a wiring hole with a diameter not exceeding 1-1/8 inches.
 - 3.5. Be attached to the pole with 2 screws with a diameter from 1/4 to 3/8 inch suitable for use in tapped holes. The clear space between any 2 holes in the post must be at least twice the diameter of the larger hole.
4. Pushbutton sign.

The APS speakers and electronic equipment must be installed inside the APS assembly's enclosure. The speaker grills must be located on the surface of the enclosure.

Speakers must not interfere with the housing or its mounting hardware.

The conductor cable between the APS assembly and the pedestrian signal head must be a no. 9, 20-conductor cable complying with MIL-W-16878D. The wiring must comply with section 13.02 of ITE publication *Equipment and Material Standards* chapter 2, "Vehicle Traffic Control Signal Heads," and be NEC rated for service at +105 degrees C.

The APS must:

1. Include a mechanism for enabling and disabling its operation.
2. Have electronic switches, a potentiometer, or a handheld device for controlling and programming the volume level and messaging. Deliver any handheld programming device to the Engineer.
2. Provide information using:
 - 2.1. Audible speech message that plays when the pushbutton is actuated. The message must include the name of the street to be crossed. The APS must have at least 5 audible message options. The Engineer selects the message. The message must have a percussive tone consisting of multiple frequencies with a dominant component of 880 Hz. If the tone is selected as the message, it must repeat 8 to 10 ticks per second.
 - 2.2. Pushbutton locator tone that clicks or beeps. The pushbutton must produce the locator tone at an interval of 1 tone per second. Each tone must have a maximum duration of 0.15 second. The tone volume must adjust in response to the ambient sound level and be audible up to 12 feet from the pushbutton or to the building line, whichever is less.
3. Have a pushbutton that remains functional during an APS failure.

For signalized intersections, the APS must:

1. Have a pushbutton that when actuated activates the pedestrian walk signal's timing during an APS failure.
2. Provide information using:
 - 2.1. Audible speech walk message. The message must be activated from the beginning of the walk interval and repeated for its duration. An example of the message is "Peachtree. Walk sign is on to cross Peachtree."
 - 2.2. Pushbutton information message that provides the name of the street to be crossed. The message must play when the pushbutton is actuated. An example of the message is "Wait to cross Howard at Grand. Wait."
3. Have a functional pushbutton that activates the pedestrian walk signal whenever actuated, even if the audible speech walk message, the pushbutton information message, the pushbutton locator tone, and the vibrating surface features are disabled.

86-5.03C Construction

Arrange to have a manufacturer's representative at the job site when the APS is installed, modified, connected, or reconnected. The APS must not interfere with the Department-furnished controller assembly, the signal installation on signal standards, the pedestrian signal heads, or the terminal compartment blocks. The APS electronic control equipment must reside inside the APS assembly and the standard pedestrian signal head.

You are responsible for the compatibility of the components and for making the necessary calibration adjustments to deliver the performance specified. Furnish the equipment and hardware, and then set up, calibrate, and verify the performance of the APS.

Point arrows on the pushbutton signs in the same direction as the corresponding crosswalk. Attach the sign to the APS assembly.

Do not install an APS on a standard smaller than Type 1.

86-5.03D Payment

Not Used

Replace section 86-6.02 with:

86-6.02 LED LUMINAIRES

86-6.02A General

86-6.02A(1) Summary

Section 86-6.02 includes specifications for installing LED luminaires.

86-6.02A(2) Definitions

CALiPER: Commercially Available LED Product Evaluation and Reporting. A U.S. DOE program that individually tests and provides unbiased information on the performance of commercially-available LED luminaires and lights.

correlated color temperature: Absolute temperature in kelvin of a blackbody whose chromaticity most nearly resembles that of the light source.

house side lumens: Lumens from a luminaire directed to light up areas between the fixture and the pole, such as sidewalks at intersection or areas off the shoulders on freeways.

International Electrotechnical Commission (IEC): Organization that prepares and publishes international standards for all electrical, electronic, and related technologies.

junction temperature: Temperature of the electronic junction of the LED device. The junction temperature is critical in determining photometric performance, estimating operational life, and preventing catastrophic failure of the LED.

L70: Extrapolated life in hours of the luminaire when the luminous output depreciates 30 percent from initial values.

LM-79: Test method from the Illumination Engineering Society of North America specifying test conditions, measurements, and report format for testing solid state lighting devices, including LED luminaires.

LM-80: Test method from the Illumination Engineering Society of North America specifying test conditions, measurements, and report format for testing and estimating the long-term performance of LEDs for general lighting purposes.

National Voluntary Laboratory Accreditation Program (NVLAP): U.S. DOE program that accredits independent testing laboratories.

power factor: Ratio of the real power component to the complex power component.

street side lumens: Lumens from a luminaire directed to light up areas between the fixture and the roadway, such as traveled ways and freeway lanes.

surge protection device (SPD): Subsystem or component that protects the unit against short-duration voltage and current surges.

total harmonic distortion: Ratio of the rms value of the sum of the squared individual harmonic amplitudes to the rms value of the fundamental frequency of a complex waveform.

86-6.02A(3) Submittals

Submit a sample luminaire to METS for testing after the manufacturer's testing is completed. Include the manufacturer's test data.

Product submittals must include:

1. LED luminaire checklist.
2. Product specification sheets, including:
 - 2.1. Maximum power in watts.
 - 2.2. Maximum designed junction temperature.
 - 2.3. Heat sink area in square inches.
 - 2.4. Designed junction to ambient thermal resistance calculation with thermal resistance components clearly defined.
 - 2.5. L70 in hours when extrapolated for the average nighttime operating temperature.
3. LM-79 and LM-80 compliant test reports from a CALiPER-qualified or NVLAP-approved testing laboratory for the specific model submitted.
4. Photometric file based on LM-79 test report.
5. Initial and depreciated isofootcandle diagrams showing the specified minimum illuminance for the particular application. The diagrams must be calibrated to feet and show a 40 by 40 foot grid. The diagrams must be calibrated to the mounting height specified for that particular application. The depreciated isofootcandle diagrams must be calculated at the minimum operational life.
6. Test report showing SPD performance as tested under ANSI/IEEE C62.41.2 and ANSI/IEEE C62.45.
7. Test report showing mechanical vibration test results as tested under California Test 611 or equal.
8. Data sheets from the LED manufacturer that include information on life expectancy based on junction temperature.
9. Data sheets from the power supply manufacturer that include life expectancy information.

Submit documentation of a production QA performed by the luminaire manufacturer that:

1. Ensures the minimum specified performance level
2. Includes a documented process for resolving problems

Submit the QA documentation as an informational submittal.

Submit the manufacturer's warranty documentation as an informational submittal before installing LED luminaires.

86-6.02A(4) Quality Control and Assurance

86-6.02A(4)(a) General

The Department may test random samples of the luminaires under section 86-2.14A. The Department tests luminaires under California Test 678 and may test any parameters specified in section 86-6.01.

Fit 1 sample luminaire with a thermistor or thermocouple temperature sensor. A temperature sensor must be mounted on the:

1. LED solder pad as close to the LED as possible
2. Power supply case
3. Light bar or modular system as close to the center of the module as possible

Other configurations must have at least 5 sensors per luminaire. The Engineer provides advice on sensor location. Thermocouples must be either Type K or C. Thermistors must be a negative-temperature-coefficient type with a nominal resistance of 20 kΩ. Use the appropriate thermocouple wire. The leads must be a minimum of 6 feet. Submit documentation with the test unit describing the type of sensor used.

Before performing any testing, energize the sample luminaires for a minimum of 24 hours at 100 percent on-time duty cycle and a temperature of +70 degrees F.

Depreciate the luminaire lighting's performance for the minimum operating life by using the LED manufacturer's data or the data from the LM-80 test report, whichever results in a higher lumen depreciation.

Failure of the luminaire that renders the unit noncompliant with section 86-6.02 specifications is cause for rejection.

86-6.02A(4)(b) Warranty

Provide a 7-year manufacturer's warranty against any defects or failures. The warranty period begins on the date of Contract acceptance. Furnish a replacement luminaire within 10 days after receipt of the failed luminaire. The Department does not pay for the replacement. Deliver replacement luminaires to the Department's Maintenance Electrical Shop at:

5065 Mountain Lakes Blvd
Redding, CA 96003-1458

86-6.02B Materials

86-6.02B(1) General

The luminaire must include an assembly that uses LEDs as the light source. The assembly must include a housing, an LED array, and an electronic driver. The luminaire must:

1. Be UL listed under UL 1598 for luminaires in wet locations or an equivalent standard from a recognized testing laboratory
2. Have a minimum operational life of 63,000 hours
3. Operate at an average operating time of 11.5 hours per night
4. Be designed to operate at an average nighttime operating temperature of 70 degrees F
5. Have an operating temperature range from -40 to +130 degrees F
6. Be defined by the following applications:

Application	Replaces
Roadway 1	200 W high-pressure sodium luminaire mounted at 34 ft
Roadway 2	310 W high-pressure sodium luminaire mounted at 40 ft
Roadway 3	310 W high-pressure sodium luminaire mounted at 40 ft with back side control
Roadway 4	400 W high-pressure sodium luminaire mounted at 40 ft

The individual LEDs must be connected such that a catastrophic loss or a failure of 1 LED does not result in the loss of more than 20 percent of the luminous output of the luminaire.

86-6.02B(2) Luminaire Identification

Each luminaire must have the following identification permanently marked inside the unit and outside of its packaging box:

1. Manufacturer's name
2. Trademark
3. Model number
4. Serial number
5. Month and year of manufacture
6. Lot number
7. Contract number
8. Rated voltage
9. Rated wattage
10. Rated power in VA

86-6.02B(3) Electrical Requirements

The luminaire must operate from a 60 ± 3 Hz AC power source. The fluctuations of line voltage must have no visible effect on the luminous output. The operating voltage may range from 120 to 480 V(ac). The luminaire must operate over the entire voltage range or the voltage range must be selected from either of the following options:

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1. Luminaire must operate over a voltage range of 95 to 277 V(ac). The operating voltages for this option are 120 V(ac) and 240 V(ac).
2. Luminaire must operate over a voltage range of 347 to 480 V(ac). The operating voltage for this option is 480 V(ac).

The power factor of the luminaire must be 0.90 or greater. The total harmonic distortion, current, and voltage induced into an AC power line by a luminaire must not exceed 20 percent. The maximum power consumption allowed for the luminaire must be as shown in the following table:

Application	Maximum consumption (watts)
Roadway 1	165
Roadway 2	235
Roadway 3	235
Roadway 4	300

86-6.02B(4) Surge Suppression and Electromagnetic Interference

The luminaire's on-board circuitry must include an SPD to withstand high repetition noise transients caused by utility line switching, nearby lightning strikes, and other interferences. The SPD must protect the luminaire from damage and failure due to transient voltages and currents as defined in Tables 1 and 4 of ANSI/IEEE C64.41.2 for location category C-High. The SPD must comply with UL 1449. The SPD must be tested under ANSI/IEEE C62.45 based on ANSI/IEEE C62.41.2 definitions for standard and optional waveforms for location category C-High.

The luminaires and associated on-board circuitry must comply with the Class A emission limits under 47 CFR 15, subpart B, for the emission of electronic noise.

86-6.02B(5) Compatibility

The luminaire must be operationally compatible with currently-used lighting control systems and photoelectric controls.

86-6.02B(6) Photometric Requirements

The luminaire must maintain a minimum illuminance level throughout the minimum operating life. The L70 of the luminaire must be the minimum operating life or greater. The measurements must be calibrated to

standard photopic calibrations. The minimum maintained illuminance values measured at a point must be as shown in the following table:

Application	Mounting height (ft)	Minimum maintained illuminance (fc)	Light pattern figure (isofootcandle curve)
Roadway 1	34	0.15	<p>Pattern defined by an ellipse with the equation:</p> $\frac{x^2}{(82)^2} + \frac{(y - 20)^2}{(52)^2} = 1$ <p>where: x = direction longitudinal to the roadway y = direction transverse to the roadway and the luminaire is offset from the center of the pattern by 20 feet to the house side of the pattern.</p>
Roadway 2	40	0.2	<p>Pattern defined by an ellipse with the equation:</p> $\frac{x^2}{(82)^2} + \frac{(y - 20)^2}{(52)^2} = 1$ <p>where: x = direction longitudinal to the roadway y = direction transverse to the roadway and the luminaire is offset from the center of the pattern by 20 feet to the house side of the pattern.</p>
Roadway 3	40	0.2	<p>Pattern defined by an ellipse with the equation:</p> $\frac{x^2}{(82)^2} + \frac{(y - 20)^2}{(52)^2} = 1$ <p>for $y \geq 0$ (street side)</p> <p>where: x = direction longitudinal to the roadway y = direction transverse to the roadway and the luminaire is offset from the center of the pattern by 20 feet to the house side of the pattern.</p>
Roadway 4	40	0.2	<p>Pattern defined by an ellipse with the equation:</p> $\frac{x^2}{(92)^2} + \frac{(y - 23)^2}{(55)^2} = 1$ <p>where: x = direction longitudinal to the roadway y = direction transverse to the roadway and the luminaire is offset from the center of the pattern by 23 feet to the house side of the pattern.</p>

The luminaire must have a correlated color temperature range from 3,500 to 6,500 K. The color rendering index must be 65 or greater.

The luminaire must not allow more than:

1. 10 percent of the rated lumens to project above 80 degrees from vertical
2. 2.5 percent of the rated lumens to project above 90 degrees from vertical

86-6.02B(7) Thermal Management

The passive thermal management of the heat generated by the LEDs must have enough capacity to ensure proper operation of the luminaire over the minimum operation life. The LED maximum junction temperature for the minimum operation life must not exceed 221 degrees F.

The junction-to-ambient thermal resistance must be 95 degrees F per watt or less. The use of fans or other mechanical devices is not allowed. The heat sink material must be aluminum or other material of equal or lower thermal resistance.

The luminaire must contain circuitry that automatically reduces the power to the LEDs so the maximum junction temperature is not exceeded when the ambient outside temperature is 100 degrees F or greater.

86-6.02B(8) Physical and Mechanical Requirements

The luminaire must:

1. Be a single, self-contained device not requiring job-site assembly for installation
2. Have an integral power supply
3. Weigh no more than 35 lb
4. Have a maximum-effective projected area of 1.4 sq ft when viewed from either side or end
5. Have a housing color that matches color number from 26152 to 26440, from 36231 to 36375, or 36440 of FED-STD-595.

The housing must be fabricated from materials designed to withstand a 3,000-hour salt spray test under ASTM B 117. All aluminum used in housings and brackets must be made of a marine-grade alloy with less than 0.2 percent copper. All exposed aluminum must be anodized.

Each refractor or lens must be made from UV-inhibited high-impact plastic such as acrylic or polycarbonate or heat- and impact-resistant glass and be resistant to scratching. Polymeric materials except lenses of enclosures containing either the power supply or electronic components of the luminaire must be made of UL94VO flame retardant materials. The housing's paint must comply with section 86-2.16. A chromate conversion undercoating must be used underneath a thermoplastic polyester powder coat.

Provide each housing with a slip fitter capable of mounting on a 2-inch pipe tenon. This slip fitter must fit on mast arms with outside diameters from 1-5/8 to 2-3/8 inches. The slip fitter must be capable of being adjusted a minimum of ± 5 degrees from the axis of the tenon in a minimum of 5 steps: +5, +2.5, 0, -2.5, -5. The clamping brackets of the slip fitter must not bottom out on the housing bosses when adjusted within the designed angular range. No part of the slip fitter's mounting brackets must develop a permanent set in excess of 1/32 inch when the bracket's two or four 3/8-inch-diameter cap screws are tightened to 10 ft-lb. Two sets of cap screws may be furnished to allow the slip fitter to be mounted on the pipe tenon in the acceptable range without the cap screws bottoming out in the threaded holes. The cap screws and the clamping brackets must be made of corrosion-resistant materials or treated to prevent galvanic reactions and be compatible with the luminaire housing and the mast arm.

The LED luminaire must be assembled and manufactured such that its internal components are adequately supported to withstand mechanical shock and vibration from high winds and other sources. When tested under California Test 611, the luminaire to be mounted horizontally on the mast arm must be capable of withstanding the following cyclic loading for a minimum of 2 million cycles without failure of any luminaire part:

Cyclic Loading

Plane	Power supply	Minimum peak acceleration level
Vertical	Installed	3.0 g peak-to-peak sinusoidal loading (same as 1.5 g peak)
Horizontal ^a	Installed	1.5 g peak-to-peak sinusoidal loading (same as 0.75 g peak)

^aPerpendicular to the direction of the mast arm

Physical property	Requirement
Particle size distribution Less than 45 microns Less than 10 microns	95 percent 50 percent
Strength activity index with portland cement ^b 7 days 28 days	95 percent (min percent of control) 110 percent (min percent of control)
Expansion at 16 days when testing project materials under ASTM C 1567 ^c	0.10 percent max
Surface area when testing by nitrogen adsorption under ASTM D 5604	40.0 m ² /g min

^aSiO₂ in crystalline form must not exceed 1.0 percent.

^bWhen tested under AASHTO M 307 for strength activity testing of silica fume.

^cIn the test mix, Type II or V portland cement must be replaced with at least 12 percent rice hull ash by weight.

For the purpose of calculating the equations for the cementitious material specifications, consider rice hull ash to be represented by the variable *UF*.

Fly ash may be eliminated if aggregate tests innocuous.

**REVISED STANDARD SPECIFICATIONS
APPLICABLE TO THE 2010 EDITION
OF THE STANDARD SPECIFICATIONS**

DATED 11-15-13

Each revision to the *Standard Specifications* begins with a revision clause that describes or introduces a revision to the *Standard Specifications*. For a revision clause that describes a revision, the date on the right above the clause is the publication date of the revision. For a revision clause that introduces a revision, the date on the right above a revised term, phrase, clause, paragraph, or section is the publication date of the revised term, phrase, clause, paragraph, or section. For a multiple-paragraph or multiple-section revision, the date on the right above a paragraph or section is the publication date of the paragraphs or sections that follow.

Any paragraph added or deleted by a revision clause does not change the paragraph numbering of the *Standard Specifications* for any other reference to a paragraph of the *Standard Specifications*.

ORGANIZATIONAL REVISIONS

07-19-13

Transfer section 36 from division IV to division V.

DIVISION I GENERAL PROVISIONS

1 GENERAL

11-15-13

Replace "current" in the 2nd paragraph of section 1-1.05 with:

04-20-12

most recent

Add to the 4th paragraph of section 1-1.05:

04-20-12

Any reference directly to a revised standard specification section is for convenience only. Lack of a direct reference to a revised standard specification section does not indicate a revised standard specification for the section does not exist.

Add to the 1st table in section 1-1.06:

04-19-13

LCS	Department's lane closure system
POC	pedestrian overcrossing
QSD	qualified SWPPP developer
QSP	qualified SWPPP practitioner
TRO	time-related overhead
WPC	water pollution control

Delete the abbreviation and its meaning for *UDBE* in the 1st table of section 1-1.06.

06-20-12

Delete "Contract completion date" and its definition in section 1-1.07B.

10-19-12

Delete "critical delay" and its definition in section 1-1.07B.

10-19-12

Replace "day" and its definition in section 1-1.07B with:

10-19-12

day: 24 consecutive hours running from midnight to midnight; calendar day.

1. **business day:** Day on the calendar except a Saturday and a holiday.
2. **working day:** Time measure unit for work progress. A working day is any 24-consecutive-hour period except:
 - 2.1. Saturday and holiday.
 - 2.2. Day during which you cannot perform work on the controlling activity for at least 50 percent of the scheduled work shift with at least 50 percent of the scheduled labor and equipment due to any of the following:
 - 2.2.1. Adverse weather-related conditions.
 - 2.2.2. Maintaining traffic under the Contract.
 - 2.2.3. Suspension of a controlling activity that you and the Engineer agree benefits both parties.
 - 2.2.4. Unanticipated event not caused by either party such as:
 - 2.2.4.1. Act of God.
 - 2.2.4.2. Act of a public enemy.
 - 2.2.4.3. Epidemic.
 - 2.2.4.4. Fire.
 - 2.2.4.5. Flood.
 - 2.2.4.6. Governor-declared state of emergency.
 - 2.2.4.7. Landslide.
 - 2.2.4.8. Quarantine restriction.
 - 2.2.5. Issue involving a third party, including:
 - 2.2.5.1. Industry or area-wide labor strike.
 - 2.2.5.2. Material shortage.
 - 2.2.5.3. Freight embargo.
 - 2.2.5.4. Jurisdictional requirement of a law enforcement agency.
 - 2.2.5.5. Workforce labor dispute of a utility or nonhighway facility owner resulting in a nonhighway facility rearrangement not described and not solely for the Contractor's convenience. Rearrangement of a nonhighway facility includes installation, relocation, alteration, or removal of the facility.
 - 2.3. Day during a concurrent delay.
3. **original working days:**
 - 3.1. Working days to complete the work shown on the *Notice to Bidders* for a non-cost plus time based bid.
 - 3.2. Working days bid to complete the work for a cost plus time based bid.

Where working days is specified without the modifier "original" in the context of the number of working days to complete the work, interpret the number as the number of original working days as adjusted by any time adjustment.

Replace "Contract" in the definition of "early completion time" in section 1-1.07B with:

10-19-12

work

Replace "excusable delay" and its definition in section 1-1.07B with:

10-19-12

delay: Event that extends the completion of an activity.

1. **excusable delay:** Delay caused by the Department and not reasonably foreseeable when the work began such as:
 - 1.1. Change in the work
 - 1.2. Department action that is not part of the Contract
 - 1.3. Presence of an underground utility main not described in the Contract or in a location substantially different from that specified
 - 1.4. Described facility rearrangement not rearranged as described, by the utility owner by the date specified, unless the rearrangement is solely for the Contractor's convenience
 - 1.5. Department's failure to obtain timely access to the right-of-way
 - 1.6. Department's failure to review a submittal or provide notification in the time specified
2. **critical delay:** Excusable delay that extends the scheduled completion date
3. **concurrent delay:** Occurrence of at least 2 of the following events in the same period of time, either partially or entirely:
 - 3.1. Critical delay
 - 3.2. Delay to a controlling activity caused by you
 - 3.3. Non-working day

Replace "project" in the definition of "scheduled completion date" in section 1-1.07B with:

10-19-12

work

Add to section 1-1.07B:

10-19-12

Contract time: Number of original working days as adjusted by any time adjustment.

06-20-12

Disadvantaged Business Enterprise: Disadvantaged Business Enterprise as defined in 49 CFR 26.5.

Replace "PO BOX 911" in the District 3 mailing address in the table in section 1-1.08 with:

04-20-12

703 B ST

Replace the Web site for the Department of General Services, Office of Small Business and DVBE Services in the table in section 1-1.11 with:

11-15-13

<http://www.dgs.ca.gov/dgs/ProgramsServices/BusServices.aspx>

Add to the table in section 1-1.11:

01-20-12

Office Engineer--All Projects Currently Advertised	http://www.dot.ca.gov/hq/esc/oe/weekly_ads/all_advertised.php	--	--
--	---	----	----

AA

2 BIDDING

07-19-13

01-20-12

Add a paragraph break between the 1st and 2nd sentences of the 5th paragraph of section 2-1.06B.

Add between "and" and "are" in item 2 in the list in the 7th paragraph of section 2-1.06B:

04-20-12

they

06-20-12

Delete "Underutilized" in "Underutilized Disadvantaged Business Enterprises" in the heading of section 2-1.12B.

06-20-12

Delete *U* in *UDBE* at each occurrence in section 2-1.12B.

Replace the 2nd paragraph of section 2-1.12B(1) with:

06-20-12

To ensure equal participation of DBEs provided in 49 CFR 26.5, the Department shows a goal for DBEs.

06-20-12

Delete the 3rd paragraph of section 2-1.12B(1):

Replace the 7th paragraph of section 2-1.12B(1) with:

06-20-12

All DBE participation will count toward the Department's federally-mandated statewide overall DBE goal.

Replace "offered" at the end of the 2nd sentence of item 7 in the list of 2nd paragraph of section 2-1.12B(3) with:

06-20-12

provided

Replace section 2-1.35 with:

07-19-13

2-1.35 RESERVED

Replace the 1st paragraph of section 5-1.09C with:

10-19-12

For a contract with a total bid over \$10 million and 100 or more working days, training in partnering skills development is required.

Delete the 2nd paragraph of section 5-1.09C.

10-19-12

Replace "at least 2 representatives" in the 5th paragraph of section 5-1.09C with:

10-19-12

field supervisory personnel

Replace the 1st and 2nd sentences in the 7th paragraph of section 5-1.13B(1) with:

06-20-12

If a DBE is decertified before completing its work, the DBE must notify you in writing of the decertification date. If a business becomes a certified DBE before completing its work, the business must notify you in writing of the certification date.

Replace "90" in the last sentence of the 7th paragraph of section 5-1.13B(1) with:

06-20-12

30

Replace "Underutilized" in "Underutilized Disadvantaged Business Enterprises" in the heading of section 5-1.13B(2) with:

06-20-12

Performance of

Delete *U* in *UDBE* at each occurrence in section 5-1.13B(2).

06-20-12

Replace the 3rd paragraph of section 5-1.13B(2) with:

06-20-12

Do not terminate or substitute a listed DBE for convenience and perform the work with your own forces or obtain materials from other sources without authorization from the Department.

Replace item 6 in the list in the 4th paragraph of section 5-1.13B(2) with:

06-20-12

6. Listed DBE is ineligible to work on the project because of suspension or debarment.

Add to the list in the 4th paragraph of section 5-1.13B(2):

06-20-12

8. Listed DBE voluntarily withdraws with written notice from the Contract.
9. Listed DBE is ineligible to receive credit for the type of work required.
10. Listed DBE owner dies or becomes disabled resulting in the inability to perform the work on the Contract.
11. Department determines other documented good cause.

Add between the 4th and 5th paragraphs of section 5-1.13B(2):

07-20-12

Notify the original DBE of your intent to use other forces or material sources and provide the reasons. Provide the DBE with 5 days to respond to your notice and advise you and the Department of the reasons why the use of other forces or sources of materials should not occur. Your request to use other forces or material sources must include:

1. 1 or more of the reasons listed in the preceding paragraph
2. Notices from you to the DBE regarding the request
3. Notices from the DBE to you regarding the request

Add between "terminated" and ", you" in the 5th paragraph of section 5-1.13B(2):

07-20-12

or substituted

Replace the paragraphs of section 5-1.13C with:

11-15-13

Section 5-1.13C applies to a non-federal-aid contract.

Use each DVBE as shown on the *Certified DVBE Summary* form unless you receive authorization from the Department for a substitution. The substitute must be another DVBE unless DVBEs are not available, in which case, you must substitute with a small business. Any authorization for a substitute is contingent upon the Department of General Services' approval of the substitute.

The requirement that DVBEs be certified by the bid opening date does not apply to DVBE substitutions after Contract award.

The Department authorizes substitutions for any of the reasons provided in 2 CA Code of Regs § 1896.73.

Include in your substitution request:

1. Copy of the written notice issued to the DVBE with proof of delivery
2. Copy of the DVBE's response to the notice
3. Name and certification number of the listed DVBE and the proposed substitute

Requests for substitutions of a listed DVBE with a small business must include documentation of the unavailability of DVBEs, including:

1. Contact with the small business/DVBE advocate from the Department and the Department of Veterans Affairs
2. Search results from the Department of General Services' website of available DVBEs
3. Communication with a DVBE community organization nearest the job site, if applicable
4. Documented communication with the DVBE and small businesses describing the work to be performed, the percentage of the total bid, the corresponding dollar amount, and the responses to the communication

The Department forwards your substitution request to the Department of General Services. The Department of General Services issues a notice of approval or denial. The Department provides you this notice.

If you fail to use a listed DVBE without an authorized substitution request, the Department issues a penalty of up to 10 percent of the dollar amount of the work of the listed DVBE.

Maintain records of subcontracts made with DVBEs. Include in the records:

1. Name and business address of each business
2. Total amount paid to each business

For the purpose of determining compliance with Pub Cont Code § 10115 et seq.:

Lance Gulch Road Phase 2 Project
Bid No. 14-ROAD-02

SP-73

1. Upon work completion, complete and submit *Final Report - Utilization of Disabled Veteran Business Enterprises (DVBE) State Funded Projects Only* form.
2. Upon reasonable notice and during normal business hours, permit access to its premises for the purposes of:
 - 2.1. Interviewing employees.
 - 2.2. Inspecting and copying books, records, accounts and other material that may be relevant to a matter under investigation.

Replace "Reserved" in section 5-1.20C with:

10-19-12

If the Contract includes an agreement with a railroad company, the Department makes the provisions of the agreement available in the *Information Handout* in the document titled "Railroad Relations and Insurance Requirements." Comply with the requirements in the document.

Add between the 2nd and 3rd paragraphs of section 5-1.23A:

10-19-12

Submit action and informational submittals to the Engineer.

Add between the 5th and 6th paragraphs of section 5-1.23B(1):

07-19-13

For a revised submittal, allow the same number of days for review as for the original submittal.

Delete the 1st sentence in the 10th paragraph of section 5-1.23B(2).

07-19-13

Add to the list in the 1st paragraph of section 5-1.36A:

07-19-13

10. Survey monuments

Add to section 5-1.36C:

07-20-12

If the Contract does not include an agreement with a railroad company, do not allow personnel or equipment on railroad property.

Prevent material, equipment, and debris from falling onto railroad property.

Add to section 5-1.36:

07-19-13

5-1.36E Survey Monuments

Protect survey monuments on and off the highway. Upon discovery of a survey monument not identified and located immediately:

1. Stop work near the monument
2. Notify the Engineer

Do not resume work near the monument until authorized.

10-19-12

10-19-12

10-19-12

10-19-12

10-19-12

AA

07-19-13

04-19-13

04-19-13

07-19-13

AA

07-19-13

07-19-13

SP-75

Replace "\$25" in the 2nd sentence in the 13th paragraph of section 7-1.02K(3) with:

07-19-13

\$100

Replace "20 days" in the 14th paragraph of section 7-1.04 with:

09-16-11

25 days

Replace "90 days" in the 14th paragraph of section 7-1.04 with:

09-16-11

125 days

Add between the 18th and 19th paragraphs of section 7-1.04:

09-16-11

Temporary facilities that could be a hazard to public safety if improperly designed must comply with design requirements described in the Contract for those facilities or, if none are described, with standard design criteria or codes appropriate for the facility involved. Submit shop drawings and design calculations for the temporary facilities and show the standard design criteria or codes used. Shop drawings and supplemental calculations must be sealed and signed by an engineer who is registered as a civil engineer in the State.

Replace the 2nd paragraph of section 7-1.11A with:

07-27-12

A copy of form FHWA-1273 is included in section 7-1.11B. The training and promotion section of section II refers to training provisions as if they were included in the special provisions. The Department specifies the provisions in section 7-1.11D of the *Standard Specifications*. If a number of trainees or apprentices is required, the Department shows the number on the *Notice to Bidders*. Interpret each FHWA-1273 clause shown in the following table as having the same meaning as the corresponding Department clause:

FHWA-1273 Nondiscrimination Clauses

FHWA-1273 section	FHWA-1273 clause	Department clause
Training and Promotion	In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision.	If section 7-1.11D applies, section 7-1.11D supersedes this subparagraph.
Records and Reports	If on-the-job training is being required by special provision, the contractor will be required to collect and report training data.	If the Contract requires on-the-job training, collect and report training data.

Replace the form in section 7-1.11B with:

07-20-12

REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS

- I. General
- II. Nondiscrimination
- III. Nonsegregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Compliance with Governmentwide Suspension and Debarment Requirements
- XI. Certification Regarding Use of Contract Funds for Lobbying

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under

this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are

applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar

with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor

will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions

of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b.(1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

- (i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
- (ii) The classification is utilized in the area by the construction industry; and
- (iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or

will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program. Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-

Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly

rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility.

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

- (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
- (2) the prime contractor remains responsible for the quality of the work of the leased employees;
- (3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
- (4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is

evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.
2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1. Instructions for Certification – First Tier Participants:

- a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.
- b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this

covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. Instructions for Certification - Lower Tier Participants:

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which

this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the

department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

AA

8 PROSECUTION AND PROGRESS

10-19-12

Replace "working days" in the 1st paragraph of section 8-1.02B(1) with:

10-19-12

original working days

Replace "working days" at each occurrence in the 1st paragraph of section 8-1.02C(1) with:

10-19-12

original working days

Delete the 4th paragraph of section 8-1.02C(1).

04-20-12

Replace "Contract" in the 9th paragraph of section 8-1.02C(1) with:

10-19-12

work

Replace the 1st paragraph of section 8-1.02C(3)(a) with:

04-20-12

Submit a description of your proposed schedule software for authorization.

Delete the last paragraph of section 8-1.02C(3)(a).

04-20-12

Replace section 8-1.02C(3)(b) with:

10-19-12

8-1.02C(3)(b) Reserved

Delete the 3rd paragraph of section 8-1.02C(5).

04-20-12

Replace "Contract" in the last paragraph of section 8-1.02C(5) with:

10-19-12

original

Replace "working days" in the 1st paragraph of section 8-1.02D(1) with:

10-19-12

original working days

Replace "8-1.02D(1)" in the 2nd paragraph of section 8-1.02D(1) with:

01-20-12

8-1.02C(1)

Replace "Contract" in the 3rd paragraph of section 8-1.02D(2) with:

10-19-12

work

Replace "Contract" in item 9 in the list in the 4th paragraph of section 8-1.02D(4) with:

10-19-12

work

Replace "Contract completion" in the 4th paragraph of section 8-1.02D(6) with:

10-19-12

work completion

Replace "Contract working days" in the 4th paragraph of section 8-1.02D(6) with:

10-19-12

original working days

Delete items 1.3 and 1.4 in the list in the 1st paragraph of section 8-1.02D(10).

04-20-12

Replace the last paragraph of section 8-1.04B with:

10-19-12

The Department does not adjust time for starting before receiving notice of Contract approval.

Replace the 1st paragraph of section 8-1.05 with:

10-19-12

Contract time starts on the last day specified to start job site activities in section 8-1.04 or on the day you start job site activities, whichever occurs first.

Replace the 2nd paragraph of section 8-1.05 with:

10-19-12

Complete the work within the Contract time.

Delete "unless the Contract is suspended for reasons unrelated to your performance" in the 4th paragraph of section 8-1.05.

10-19-12

Replace the headings and paragraphs in section 8-1.06 with:

10-19-12

The Engineer may suspend work wholly or in part due to conditions unsuitable for work progress. Provide for public safety and a smooth and unobstructed passageway through the work zone during the suspension as specified under sections 7-1.03 and 7-1.04. Providing the passageway is force account work. The Department makes a time adjustment for the suspension due to a critical delay.

The Engineer may suspend work wholly or in part due to your failure to (1) fulfill the Engineer's orders, (2) fulfill a Contract part, or (3) perform weather-dependent work when conditions are favorable so that weather-related unsuitable conditions are avoided or do not occur. The Department may provide for a smooth and unobstructed passageway through the work during the suspension and deduct the cost from payments. The Department does not make a time adjustment for the suspension.

Upon the Engineer's order of suspension, suspend work immediately. Resume work when ordered.

Replace the 1st sentence in the 1st paragraph of section 8-1.07B with:

10-19-12

For a critical delay, the Department may make a time adjustment.

10-19-12

10-19-12

08-05-11

10-19-12

8-1.10D Reserved

11-15-13

07-19-13

- 01-18-13

10-19-12

for

10-19-12

Cost	Percent markup
Labor	30
Materials	10
Equipment rental	10

04-20-12

Replace the formula in section 9-1.07B(2) with:

04-20-12

$$Qh = HMATT \times Xa$$

Replace "weight of dry aggregate" in the definition of the variable *Xa* in section 9-1.07B(2) with:

04-20-12

total weight of HMA

Replace the formula in section 9-1.07B(3) with:

04-20-12

$$Qrh = RHMATT \times 0.80 \times Xarb$$

Replace "weight of dry aggregate" in the definition of the variable *Xarb* in section 9-1.07B(3) with:

04-20-12

total weight of rubberized HMA

Replace the heading of section 9-1.07B(4) with:

04-20-12

Hot Mix Asphalt with Modified Asphalt Binder

Add between "in" and "modified" in the introductory clause of section 9-1.07B(4):

04-20-12

HMA with

Replace the formula in section 9-1.07B(4) with:

04-20-12

$$Qmh = MHMATT \times [(100 - Xam) / 100] \times Xmab$$

Replace "weight of dry aggregate" in the definition of the variable *Xmab* in section 9-1.07B(4) with:

04-20-12

total weight of HMA

Replace the formula in section 9-1.07B(5) with:

04-20-12

$$Qrap = HMATT \times Xaa$$

Replace "weight of dry aggregate" in the definitions of the variables *Xaa* and *Xta* in section 9-1.07B(5) with:

04-20-12

total weight of HMA

Add after the variable definitions in section 9-1.07B(9):

04-20-12

The quantity of extender oil is included in the quantity of asphalt.

Replace the headings and paragraphs in section 9-1.11 with:

10-19-12

9-1.11A General

Section 9-1.11 applies if a bid item for time-related overhead is included in the Contract. If a bid item for time-related overhead is included, you must exclude the time-related overhead from every other bid item price.

9-1.11B Payment Quantity

The TRO quantity does not include the number of working days to complete plant establishment work.

For a contract with a TRO lump sum quantity on the Bid Item List, the Department pays you based on the following conversions:

1. LS unit of measure is replaced with WDAY
2. Lump sum quantity is replaced with the number of working days bid
3. Lump sum unit price is replaced with the item total divided by the number of working days bid

9-1.11C Payment Inclusions

Payment for the TRO bid item includes payment for time-related field- and home-office overhead for the time required to complete the work.

The field office overhead includes time-related expenses associated with the normal and recurring construction activities not directly attributed to the work, including:

1. Salaries, benefits, and equipment costs of:
 - 1.1. Project managers
 - 1.2. General superintendents
 - 1.3. Field office managers
 - 1.4. Field office staff assigned to the project
2. Rent
3. Utilities
4. Maintenance
5. Security
6. Supplies
7. Office equipment costs for the project's field office

The home-office overhead includes the fixed general and administrative expenses for operating your business, including:

1. General administration
2. Insurance
3. Personnel and subcontract administration
4. Purchasing
5. Accounting
6. Project engineering and estimating

Payment for the TRO bid item does not include payment for:

1. The home-office overhead expenses specifically related to:
 - 1.1. Your other contracts or other businesses
 - 1.2. Equipment coordination
 - 1.3. Material deliveries
 - 1.4. Consultant and legal fees
2. Non-time-related costs and expenses such as mobilization, licenses, permits, and other charges incurred once during the Contract
3. Additional overhead involved in incentive/disincentive provisions to satisfy an internal milestone or multiple calendar requirements
4. Additional overhead involved in performing additional work that is not a controlling activity
5. Overhead costs incurred by your subcontractors of any tier or suppliers

9-1.11D Payment Schedule

For progress payments, the total work completed for the TRO bid item is the number of working days shown for the pay period on the *Weekly Statement of Working Days*.

For progress payments, the Department pays a unit price equal to the lesser of the following amounts:

1. Price per working day as bid or as converted under section 9-1.11B.
2. 20 percent of the total bid divided by the number of original working days

For a contract without plant establishment work, the Department pays you the balance due of the TRO item total as specified in section 9-1.17B.

For a contract with plant establishment work, the Department pays you the balance due of the TRO item total in the 1st progress payment after all non-plant establishment work is completed.

9-1.11E Payment Adjustments

The 3rd paragraph of section 9-1.17C does not apply.

The Department does not adjust the unit price for an increase or decrease in the TRO quantity except as specified in section 9-1.11E.

Section 9-1.17D(2)(b) does not apply except as specified for the audit report below.

If the TRO bid item quantity exceeds 149 percent of the quantity shown on the Bid Item List or as converted under section 9-1.11B, the Engineer may adjust or you may request an adjustment of the unit price for the excess quantity. For the adjustment, submit an audit report within 60 days of the Engineer's request. The report must be prepared as specified for an audit report for an overhead claim in section 9-1.17D(2)(b).

Within 20 days of the Engineer's request, make your financial records available for an audit by the State for the purpose of verifying the actual rate of TRO described in your audit. The actual rate of TRO described is subject to the Engineer's authorization.

The Department pays the authorized actual rate for TRO in excess of 149 percent of the quantity shown on the Bid Item List or as converted under section 9-1.11B.

The Department pays for 1/2 the cost of the report; the Contractor pays for the other 1/2. The cost is determined under section 9-1.05.

Replace the paragraphs of section 9-1.16D with:

07-19-13

9-1.16D(1) General

Section 9-1.16D applies if a bid item for mobilization is shown on the Bid Item List.

Payments for mobilization made under section 9-1.16D are in addition to the partial payments made under Pub Cont Code § 10261.

Section 9-1.16D(2) applies unless the Contract includes a special provision for section 9-1.16D(1) that specifies section 9-1.16D(3) applies.

11-15-13

9-1.16D(2) Mobilization for Projects Except for Those Over Water Requiring Marine Access

07-19-13

The Department makes partial payments for mobilization under Pub Cont Code § 10264(a) except the amount of work completed does not include the amount earned for mobilization. The partial payment amount is reduced by a prorated amount bid in excess of the maximum allowed under Pub Cont Code § 10264(a)(5).

The Department pays the item total for mobilization in excess of the maximum allowed under Pub Cont Code § 10264(a)(5) in the 1st payment after Contract acceptance.

The Department makes partial payments for mobilization under Pub Cont Code § 10264(b) except the amount of work completed does not include the amount earned for mobilization. The partial payment amount is reduced by a prorated amount bid in excess of the maximum allowed under Pub Cont Code § 10264(b)(6).

10-19-12

10-19-12

10-19-12

07-19-13

04-19-13

04-19-13

SP-94

10-1.05–10-1.10 RESERVED

10-2 SUSTAINABLE DESIGN REQUIREMENTS

10-2.01 GENERAL

10-2.01A General

Reserved

10-2.01B–10-2.01H Reserved

10-2.02 CALGREEN TIER 1

10-2.02A–10-2.02H Reserved

10-2.03 LEED

10-2.03A–10-2.03H Reserved

10-3–10-5 RESERVED

10-6 JOB SITE WATER CONTROL

10-6.01 GENERAL

Section 10-6 includes specifications for controlling water to provide a dry working area at the job site.

10-6.02 WATER-FILLED COFFERDAM

Reserved

10-6.03–10-6.10 RESERVED

10-7–10-20 RESERVED

AA

11 QUALITY CONTROL AND ASSURANCE

07-19-13

Replace section 11-2 with:

07-19-13

11-2 RESERVED

Replace the table in the 3rd paragraph of section 11-3.01A with:

07-19-13

AWS code	Year of adoption
D1.1	2010
D1.3	2008
D1.4	2011
D1.5	2010
D1.6	2007
D1.8	2009

Replace "does" in the definition of "continuous inspection" in section 11-3.01B with:

07-19-13

do

Replace "gross nonconformance" and its definition in section 11-3.01B with:

07-19-13

gross nonconformance: Rejectable indications are present in more than 20 percent of the tested weld length.

Replace the introductory clause in the 1st paragraph of section 11-3.01C with:

07-19-13

Replace clause 6.1.3 of AWS D1.1, the 1st paragraph of clause 7.1.2 of AWS D1.4, and clause 6.1.2 of AWS D1.5 with:

Replace the 3rd paragraph of section 11-3.01C with:

07-19-13

For each inspection, including fit-up, WPS verification, and final weld inspection, the QC Inspector must confirm and document compliance with the specifications, AWS welding codes, and any referenced drawings.

Replace the paragraphs in section 11-3.01D with:

07-19-13

The Engineer has the authority to verify the qualifications or certifications of any welder, QC Inspector, or NDT personnel to specified levels by retests or other means determined by the Engineer. If welding will be performed without gas shielding, then qualification must also include welding without gas shielding.

Replace clause 6.14.6.1 of AWS D1.1, clause 7.8 of AWS D1.4, and clause 6.1.3.4 of AWS D1.5 with:

Personnel performing NDT must be qualified and certified under American Society for Nondestructive Testing (ASNT) Recommended Practice No. SNT-TC-1A and the written practice of the NDT firm. The written practice of the NDT firm must comply with or exceed the guidelines of the ASNT Recommended Practice No. SNT-TC-1A. Individuals who perform NDT, review the results, and prepare the written reports must be one of the following:

1. Certified NDT Level II technicians
2. Level III technicians certified to perform the work of Level II technicians

Replace the heading and the 1st through 3rd paragraphs of section 11-3.01E with:

07-19-13

11-3.01E Weld Joint Details

If weld joint details proposed for use in the work are not prequalified under clause 3 of AWS D1.1 or figure 2.4 or 2.5 of AWS D1.5, submit the proposed WPS and the intended weld joint locations.

Upon authorization of the proposed joint detail locations and qualification of the proposed joint details, welders and welding operators using these details must weld an additional qualification test plate using the WPS variables and the weld joint detail to be used in production. The test plate must:

1. Have the maximum thickness to be used in production and a minimum length of 18 inches.
2. Be mechanically and radiographically tested. Mechanical and radiographic testing and acceptance criteria must comply with the applicable AWS codes.

If a nonprequalified weld joint configuration is proposed using a combination of WPSs for work welded under AWS D1.1, you may conduct a single test combining the WPSs to be used in production, if the essential variables, including weld bead placement, of each process are limited to those established in table 4.5 of AWS D1.1.

Replace the 1st paragraph of section 11-3.01F with:

07-19-13

Replace paragraph 3 of clause 6.26.3.2 of AWS D1.5 with:

3. If indications that exhibit these planar characteristics are present at scanning sensitivity, or other evidence exists to suggest the presence of transverse cracks, a more detailed evaluation of the discontinuity by other means must be performed (e.g., alternate UT techniques, RT, grinding, or gouging for visual inspection or MT of the excavated areas.). For welds that have

transverse cracks, excavate the full length of the crack plus 2 inches of weld metal on each side adjacent to the crack and reweld.

Replace "section" in the 2nd paragraph of section 11-3.01F with:

07-19-13

clause

Replace the 1st paragraph of section 11-3.02A with:

07-19-13

Except for stud welding, section 11-3.02 applies to (1) work welded under sections 49, 52, 55, and 75-1.03E and (2) work in section 99 that must comply with an AWS welding code.

Replace the 4th through 6th paragraphs of section 11-3.02C(2) with:

07-19-13

Submit an amended welding QC plan or an addendum to the welding QC plan for any changes to:

1. WPSs
2. NDT firms
3. QC personnel or procedures
4. NDT personnel or procedures
5. Systems for tracking and identifying welds
6. Welding personnel

Allow 15 days for the Engineer's review of an amended welding QC plan or an addendum to the welding QC plan.

Submit 7 copies of each authorized QC plan and any authorized addendums. Make 1 copy available at each location where work is performed.

Replace the 1st paragraph of section 11-3.02C(3) with:

07-19-13

Submit a welding report within 7 days following the performance of any welding. The welding report must include:

1. Daily production log for welding for each day that welding is performed
2. Reports of all visual weld inspections and NDT performed, whether specified, additional, or informational
3. Radiographs and radiographic reports, and other required NDT reports
4. Summary of welding and NDT activities that occurred during the reporting period
5. Reports of each application of heat straightening
6. Summarized log listing the rejected lengths of weld by welder, position, process, joint configuration, and piece number
7. Documentation that you have:
 - 7.1. Evaluated all radiographs and radiograph reports and NDT and NDT reports
 - 7.2. Corrected all rejectable deficiencies and that all repaired welds have been reexamined using the required NDT and found acceptable
8. Reports or chart recordings of each application of any stress relieving used
9. Reports and chart recordings for any electroslag welding used

Add between "radiographic" and "envelopes" in the introductory clause in the 3rd paragraph of section 11-3.02C(3):

07-19-13

film

07-19-13

Delete the 3rd sentence in the 5th paragraph of section 11-3.02C(3).

Replace the introductory clause in the 1st paragraph of section 11-3.02D with:

07-19-13

Clauses 6.1.4.1 and 6.1.4.3 of AWS D1.1, the 2nd paragraph of clause 7.1.2 of AWS D1.4, clauses 6.1.3.1 through 6.1.3.3 of AWS D1.5, and clause 7.2.3 of AWS D1.8 are replaced with:

Replace items 1 and 2 in the list in the 2nd paragraph of section 11-3.02D with:

07-19-13

1. Work is welded at a permanent fabrication or manufacturing plant that is certified under the AISC Certification Program for Steel Bridge Fabricators, Intermediate Bridges, and Fracture-Critical Member endorsement if required.
2. Structural steel for building construction work is performed at a permanent fabrication or manufacturing plant that is certified under the AISC Quality Certification Program, Category STD, Standard for Steel Building Structures.

07-19-13

Delete the 3rd paragraph of section 11-3.02D.

Replace the 1st sentence in the 4th paragraph of section 11-3.02D with:

07-19-13

Except for the exempt facilities identified above, an authorized independent third party must witness the qualification tests for welders or welding operators.

Replace the paragraph in section 11-3.02F with:

07-19-13

Welding procedures qualification for work welded under AWS D1.5 must comply with clause 5.12 or 5.12.4 of AWS D1.5 and the following:

1. Unless considered prequalified, qualify fillet welds in each position. Conduct the fillet weld soundness test using the essential variables of the WPS as established by the PQR.
2. For qualifying joints that do not comply with figures 2.4 and 2.5 of AWS D1.5, conduct the test complying with figure 5.3 using the welding parameters that were established for the test conducted complying with figure 5.1.
3. Macroetch tests are required for WPS qualification tests, and acceptance must comply with clause 5.19.3 of AWS D1.5.
4. If a nonstandard weld joint is to be made using a combination of WPSs, you may conduct a test under figure 5.3, combining the qualified or prequalified WPSs to be used in production, if the essential variables, including weld bead placement, of each process are limited to those established in table 5.3 of AWS D1.5.
5. Before preparing mechanical test specimens, inspect the PQR welds by visual and radiographic tests. The backing bar must be 3 inches in width and must remain in place during NDT. Results of the visual and radiographic tests must comply with clause 6.26.2 of AWS D1.5 excluding clause 6.26.2.2. All other requirements for clause 5.17 are applicable.

Add to the list in the 3rd paragraph of section 11-3.02G:

07-19-13

3. Repairs not included in the welding QC plan

07-19-13

AA

07-19-13

10-19-12

10-19-12

04-19-13

10-19-12

07-19-13

07-19-13

07-19-13

SP-99

12-4.03 CLOSURE SCHEDULES AND CONDITIONS

12-4.03A General

Submit closure schedule requests and closure schedule amendments using LCS to show the locations and times of the requested closures.

The Department provides LCS training. Request the LCS training at least 30 days before submitting the 1st lane closure request. The Department provides the training within 15 days after your request. The training may be web based.

Except for web-based training, the training is held at a time and location you and the Engineer agree to.

For web-based training, the Engineer provides you the website address to access the training.

Within 5 business days after completion of the training, the Department provides LCS accounts and user identifications to your assigned, trained representatives.

Each representative must maintain a unique password and current user information in the LCS.

12-4.03B Closure Schedules

Every Monday by noon, submit a closure schedule request of planned closures for the next week period. The next week period is defined as Sunday noon through the following Sunday noon.

Submit a closure schedule request not less than 25 days and not more than 125 days before the anticipated start of any activity that reduces:

1. Horizontal clearances of traveled ways, including shoulders, to 2 lanes or less due to activities such as temporary barrier placement and paving
2. Vertical clearances of traveled way, including shoulders, due to activities such as pavement overlays, overhead sign installation, falsework, or girder erection

Submit closure schedule amendments, including adding additional closures, by noon at least 3 business days before a planned closure.

Cancel closure requests using LCS at least 48 hours before the start time of the closure.

You will be notified through LCS of unauthorized closures or closures that require coordination with other parties as a condition for authorization.

The Engineer may reschedule a closure cancelled due to unsuitable weather.

If a closure is not opened to traffic by the specified time, suspend work. No further closures are allowed until the Engineer has reviewed and authorized a work plan submitted by you that ensures that future closures will be opened to traffic by the specified time. Allow 2 business days for review of your proposed work plan. The Department does not compensate you for your losses due to the suspension of work resulting from the late opening of closures.

Notify the Engineer of delays in your activities caused by:

1. Your closure schedule request being denied although your requested closures are within the specified time frame allowed for closures. The Department does not compensate you for your losses due to amendments to the closure schedule that are not authorized.
2. Your authorized closure being denied.

If you are directed to remove a closure before the time designated in the authorized closure schedule, you will be compensated for the delay.

12-4.03C Contingency Plan

Section 12-4.03C applies if a contingency plan is specified in the special provisions or if a contingency plan is requested.

If a contingency plan is requested, submit the contingency plan within 1 business day of the request.

The contingency plan must identify the activities, equipment, processes, and materials that may cause a delay in the opening of a closure to traffic. The plan must include:

1. List of additional or alternate equipment, materials, or workers necessary to ensure continuing activities and on-time opening of closures if a problem occurs. If the additional or alternate equipment, materials, or workers are not on site, specify their location, the method for mobilizing these items, and the required time to complete mobilization.
2. General time-scaled logic diagram displaying the major activities and sequence of planned operations. For each activity, identify the critical event when the contingency plan will be activated.

Based on the Engineer's review, additional materials, equipment, workers, or time to complete activities from that specified in the contingency plan may be required.

Submit revisions to a contingency plan at least 3 business days before starting the activity requiring a contingency plan. Allow 2 business days for review of the revised contingency plan.

Replace section 12-7 with:

07-19-13

12-7 TEMPORARY PEDESTRIAN FACILITIES

12-7.01 GENERAL

Section 12-7 includes specifications for constructing temporary pedestrian facilities.

Temporary pedestrian facilities must comply with the *California MUTCD*, Part 6, Chapter 6D, "Pedestrian and Worker Safety."

Design temporary pedestrian facilities with protective overhead covering to support all imposed loads.

The design load and maximum allowable stresses for temporary pedestrian facilities with protective overhead covering must comply with section 48-2.01D(3). The minimum design live load for the temporary pedestrian facilities with protective overhead covering must be 150 psf for the entire structure.

The minimum width of the temporary pedestrian facilities with protective overhead covering between the inside face of handrails must be 60 inches. The clear height of the temporary pedestrian facilities with protective overhead covering measured from the floor surface to the canopy overhead must be at least 8 feet. Provide adequate lighting at all times. Lighting must comply with section 86-6.13.

Submit shop drawings with supporting calculations for temporary pedestrian facilities with protective overhead covering. Shop drawings and calculations must be signed by an engineer who is registered as a civil engineer in the State.

12-7.02 MATERIALS

Walkways must be surfaced with HMA, portland cement concrete, or wood. The surface must be skid resistant and free of irregularities.

Hand railings must be S4S lumber and painted white.

Protective overhead covering of temporary pedestrian facilities must be plywood at least 3/4 inch thick or wood planking with a nominal thickness of 2 inches minimum.

12-7.03 CONSTRUCTION

Construct hand railings on each side of a temporary pedestrian facility as necessary to protect pedestrian traffic from hazards due to work activities or adjacent vehicular traffic.

Maintain temporary pedestrian facilities in good condition and keep them clear of obstructions.

12-7.04 PAYMENT

Not Used

AA

13 WATER POLLUTION CONTROL

11-15-13

04-19-13

Delete item 3 in the list in the 4th paragraph of section 13-1.01A.

Add to the list in the 1st paragraph of section 13-1.01D(3)(b):

10-21-11

3. Have completed SWRCB approved QSD training and passed the QSD exam

Add to the list in the 2nd paragraph of section 13-1.01D(3)(b):

10-21-11

3. Have completed SWRCB approved QSP training and passed the QSP exam

Replace "NEL violation" in item 3.6.2 in the list in the 1st paragraph of section 13-1.01D(3)(c) with:

04-19-13

receiving water monitoring trigger

Replace the 1st paragraph in section 13-2.01B with:

04-19-13

Within 7 days after Contract approval, submit 2 copies of your WPCP for review. Allow 5 business days for review.

After the Engineer authorizes the WPCP, submit an electronic copy and 3 printed copies of the authorized WPCP.

If the RWQCB requires review of the authorized WPCP, the Engineer submits the authorized WPCP to the RWQCB for its review and comment. If the Engineer orders changes to the WPCP based on the RWQCB's comments, amend the WPCP within 3 business days.

Replace the 1st paragraph in section 13-3.01B(2)(a) with:

04-19-13

Within 15 days of Contract approval, submit 3 copies of your SWPPP for review. The Engineer provides comments and specifies the date when the review stopped if revisions are required. Change and resubmit a revised SWPPP within 15 days of receiving the Engineer's comments. The Department's review resumes when a complete SWPPP has been resubmitted.

When the Engineer authorizes the SWPPP, submit an electronic copy and 4 printed copies of the authorized SWPPP.

If the RWQCB requires review of the authorized SWPPP, the Engineer submits the authorized SWPPP to the RWQCB for its review and comment. If the Engineer requests changes to the SWPPP based on the RWQCB's comments, amend the SWPPP within 10 days.

Replace "NELs" in item 3.1 in the 3rd paragraph of section 13-3.01B(2)(a) with:

04-19-13

receiving water monitoring triggers

Replace section 13-3.01B(6)(c) with:

04-19-13

13-3.01B(6)(c) Receiving Water Monitoring Trigger Report

Whenever a receiving water monitoring trigger is exceeded, notify the Engineer and submit a receiving water monitoring trigger report within 48 hours after conclusion of a storm event. The report must include:

1. Field sampling results and inspections, including:
 - 1.1. Analytical methods, reporting units, and detection limits
 - 1.2. Date, location, time of sampling, visual observation and measurements
 - 1.3. Quantity of precipitation from the storm event
2. Description of BMPs and corrective actions

Replace "NEL" in the 6th paragraph of section 13-3.01C(1) with:

04-19-13

receiving water monitoring trigger

Replace section 13-3.01C(3) with:

04-19-13

13-3.01C(3) Receiving Water Monitoring Trigger

For a risk level 3 project, receiving water monitoring triggers must comply with the values shown in the following table:

Receiving Water Monitoring Trigger				
Parameter	Test method	Detection limit (min)	Unit	Value
pH	Field test with calibrated portable instrument	0.2	pH	Lower limit = 6.0 Upper limit = 9.0
Turbidity	Field test with calibrated portable instrument	1	NTU	500 NTU max

The storm event daily average for storms up to the 5-year, 24-hour storm must not exceed the receiving water monitoring trigger for turbidity.

The daily average sampling results must not exceed the receiving water monitoring trigger for pH.

Delete "and NELs are violated" in the 3rd paragraph of section 13-3.03C.

04-19-13

Replace "working days" at each occurrence in section 13-3.04 with.

original working days

10-19-12

Delete the 1st sentence in the 2nd paragraph of section 13-4.03C(3).

04-19-13

Add between the 2nd and 3rd paragraphs of section 13-4.03C(3):

Manage stockpiles by implementing water pollution control practices on:

04-19-13

1. Active stockpiles before a forecasted storm event
2. Inactive stockpiles according to the WPCP or SWPPP schedule

Replace the paragraph in section 13-4.04 with:

Not Used

04-20-12

Replace "20-7.02D(6)" in section 13-5.02C with:

20-5.03E

07-19-13

Delete "or stockpile" in the 3rd paragraph of section 13-5.02F.

10-19-12

Replace "20-7.03I(10)" in section 13-5.03C with:

20-5.03E(3)

07-19-13

Replace section 13-5.03F with:

13-5.03F Reserved

04-20-12

Delete "or stockpile" in item 1 in the list in the 1st paragraph of section 13-5.03K.

10-19-12

Delete the 3rd paragraph of section 13-5.03K.

10-19-12

Replace the 2nd sentence in the 1st paragraph of section 13-9.01A with:

You may use any of the following systems for temporary concrete washout:

10-19-12

1. Temporary concrete washout facility
2. Portable temporary concrete washout
3. Temporary concrete washout bin

Replace the 2nd paragraph of section 13-9.01B with:

Retain and submit an informational submittal for records of disposed concrete waste.

10-19-12

Delete the 4th paragraph of section 13-9.01B.

10-19-12

Delete "if authorized" in the 1st sentence in the 1st paragraph of section 13-9.02A.

10-19-12

10-19-12

AA

07-19-13

07-19-13

07-19-13

07-19-13

07-19-13

07-19-13

Saw cut at longitudinal and transverse joints to remove entire slabs. For partial-slab areas, the Engineer determines the exact saw-cut locations.

15-2.02B(5)(c) Reserved

15-2.02B(6) Reserved

15-2.02B(7) Payment

Reserved

Replace section 15-2.02G with:

07-19-13

15-2.02G Remove Guardrail

Where removing guardrail, remove any concrete anchors and steel foundation tubes.

Replace the 1st paragraph of section 15-2.02K with:

07-19-13

Box culverts, concrete pipes, inlets, headwalls, and endwalls must be completely removed if any portion of these structures is (1) within 3 feet of the grading plane in excavation areas, (2) within 1 foot of original ground in embankment areas, or (3) shown to be removed.

Replace "Metal beam guard railing" in the table in the 2nd paragraph of section 15-2.03A(2)(a) with:

07-19-13

Guardrail

Replace the heading of section 15-2.03B with:

07-19-13

Salvage Guardrail

Replace the heading of section 15-2.04D with:

07-19-13

Reconstruct Guardrail

Replace section 15-2.09D with:

07-19-13

15-2.09D Reserved

Replace the 4th paragraph of section 15-2.10B with:

01-18-13

Instead of using new materials similar in character to those in the existing structure, you may use raising devices to adjust a manhole to grade. Before starting paving work, measure and fabricate raising devices. Raising devices must:

1. Comply with the specifications for section 75 except that galvanizing is not required
2. Have a shape and size that matches the existing frame
3. Be match marked by painting identification numbers on the device and corresponding structure
4. Result in an installation that is equal to or better than the existing one in stability, support, and nonrocking characteristics
5. Be fastened securely to the existing frame without projections above the surface of the road or into the clear opening

Replace the heading of section 15-2.10D with:

07-19-13

Adjust Guardrail

Replace the paragraphs of section 15-3.01 with:

07-19-13

Section 15-3 includes specifications for removing all or a portion of a concrete facility.

Concrete facilities include curbs, gutters, gutter depressions, sidewalks, driveways, slope paving, island paving, barriers, retaining walls, sound walls, minor structures, aprons, spillways, and dams.

Where broken-concrete slope protection is shown, use removed concrete for the construction of the broken-concrete slope protection.

Instead of disposing of removed concrete by removing it from the job site, you may dispose of it on the job site by one of the following methods:

1. Burying it in embankments at authorized locations. Removed concrete must be broken into pieces that can be readily handled and incorporated into embankments and placed at a depth of at least 3 feet below finished grade and slope lines. Concrete must not be buried in areas where piling is to be placed or within 10 feet of trees, pipelines, poles, buildings or other permanent objects or structures.
2. Placing it at authorized locations. The removed concrete must not present an unsightly appearance from the highway.

Replace the paragraph of section 15-3.02 with:

07-19-13

Not Used

Delete the 5th paragraph of section 15-3.03.

07-19-13

Add to the end of section 15-4.01A(2):

04-19-13

Allow 20 days for review of the bridge removal work plan.

Replace the 1st paragraph of section 15-5.01C(1) with:

10-19-12

Before starting deck rehabilitation activities, complete the removal of any traffic stripes, pavement markings, and pavement markers.

Replace the 2nd and 3rd paragraphs of section 15-5.01C(2) with:

10-19-12

Perform the following activities in the order listed:

1. Abrasive blast the deck surface with steel shot. Perform abrasive blasting after the removal of any unsound concrete and placement of any rapid setting concrete patches.
2. Sweep the deck surface.
3. Blow the deck surface clean using high-pressure air.

Replace the 2nd paragraph of section 15-5.01C(4) with:

10-19-12

Before removing asphalt concrete surfacing, verify the depth of the surfacing at the supports and midspans of each structure (1) in each shoulder, (2) in the traveled way, and (3) at the roadway crown, if a crown is present.

Delete "and concrete expansion dams" in the 3rd paragraph of section 15-5.01C(4).

04-19-13

Replace the 2nd paragraph of section 15-5.03A(2) with:

10-19-12

For a contract with less than 60 original working days, submit certificates of compliance for the filler material and bonding agents.

Replace "51-1.02C" in the 1st paragraph of section 15-5.03B with:

04-19-13

51-1.02F

Replace the 4th paragraph of section 15-5.03B with:

10-19-12

For a contract with less than 60 original working days, alternative materials must be authorized before use.

Add between the 5th and 6th paragraphs of section 15-5.03C:

10-19-12

The final surface finish of the patched concrete surface must comply with section 51-1.03F.

Delete the 4th paragraph of section 15-5.05C.

10-19-12

Replace "51-1.03F(5)" in the 3rd paragraph of section 15-5.06C(1) with:

07-19-13

51-1.01D(4)(b)

Replace "51-1.03E(5)" in the 5th paragraph of section 15-5.06C(1) with:

10-19-12

51-1.03F(5)

Delete the 9th paragraph of section 15-5.06C(1).

10-19-12

Delete the 15th paragraph of section 15-5.06C(1).

04-19-13

Add between the 18th and 19th paragraphs of section 15-5.06C(1):

07-19-13

Texture the polyester concrete surface before gelling occurs by longitudinal tining under 51-1.03F(5)(b)(iii), except do not perform initial texturing.

Replace section 15-5.06C(2) with:

04-19-13

15-5.06C(2) Reserved

Delete the 3rd paragraph of section 15-5.06D.

04-19-13

Replace the 1st paragraph in section 15-5.07B(4) with:

10-19-12

Payment for furnishing dowels is not included in the payment for core and pressure grout dowel.

Replace section 15-5.09 with:

04-19-13

15-5.09 POLYESTER CONCRETE EXPANSION DAMS

15-5.09A General

Section 15-5.09 includes specifications for constructing polyester concrete expansion dams.

Polyester concrete expansion dams must comply with the specifications for polyester concrete overlays in section 15-5.06, except a trial slab is not required.

Reinforcement must comply with section 52.

15-5.09B Materials

Not Used

15-5.09C Construction

For new asphalt concrete overlays, place the asphalt concrete overlay before starting polyester concrete activities. Saw cut and remove asphalt concrete at expansion dam locations.

For existing asphalt concrete overlays, remove expansion dams and asphalt concrete to the limits shown. Removing expansion dams must comply with section 15-4 except a bridge removal work plan is not required.

Where a portion of the asphalt concrete overlay is to remain, saw cut a 2-inch-deep neat line along the edge to remain in place before removing the asphalt concrete. Do not damage the existing surfacing to remain in place.

Prepare the deck surface under section 15-5.01C(2).

You may use a mechanical mixer to mix the polyester concrete for expansion dams. The mixer capacity must not exceed 9 cu ft unless authorized. Initiate the resin and thoroughly blend it immediately before mixing it with the aggregate. Mix the polyester concrete for at least 2 minutes before placing.

The application rate of methacrylate resin must be approximately 100 sq ft/gal.

You may place and finish expansion dams using hand methods.

Protect expansion dams from moisture, traffic, and equipment for at least 4 hours after finishing.

For expansion dams over 6 feet long, install 1/4-inch-wide joint material at 6-foot intervals across the width of the expansion dam. Joint material must be either expanded polyurethane or expanded polyethylene.

15-5.09D Payment

Not Used

07-19-13

Replace "41-1.01" in item 10.3 in the list in the 2nd paragraph of section 15-6.01A(3)(d) with:

07-19-13

Replace "41-1.02" in 1st paragraph of section 15-6.01B(2) with:

07-19-13

Replace the heading of section 15-6.04 with:

01-18-13

Replace the 1st paragraph of section 15-6.13A(1) with:

07-19-13

Replace the heading of section 15-6.13B with:

07-19-13

[illegible]

07-19-13

Replace "20-3.03B(4)" in the 3rd paragraph of section 16-1.01 with:

07-19-13

Replace "20-1.03D" in the 2nd paragraph of section 16-1.03B with:

07-19-13

AA

07-19-13

Replace "20-3.03B(4)" in the 2nd paragraph of section 19-1.01A with:

07-19-13

SP-110

Replace the 3rd paragraph in section 19-2.01A with:
Pavement removal within the limits of roadway excavation must comply with section 15-2.02B.

07-19-13

Delete the 2nd paragraph in section 19-2.03A.

07-19-13

Replace the 2nd paragraph of section 19-3.01A(2)(b) with:
For cofferdams on or affecting railroad property, allow 85 days for review.

07-01-11

Add to the list in the 1st paragraph of section 19-3.01A(2)(d):
9. Provisions for discontinuous rows of soil nails

01-20-12

Replace "sets" in the 3rd and 4th paragraphs of section 19-3.01A(2)(d) with:
copies

04-19-13

Add to section 19-3.01A(3)(b):
For soil nail walls, wall zones are specified in the special provisions.
For ground anchor walls, a wall zone is the entire wall unless otherwise specified in the special provisions.

01-20-12

Delete the 2nd sentence in the 4th paragraph of section 19-3.01A(3)(b).

01-20-12

Replace "90" in the paragraph of section 19-3.02G with:
90-1

01-18-13

Add to section 19-3.02:
19-3.02I Filter Fabric
Filter fabric must be Class A.

07-19-13

Replace the heading of section 19-3.03C with:
19-3.03B(4) Cofferdams

04-19-13

Replace the heading of section 19-3.03D with:
19-3.03B(5) Water Control and Foundation Treatment

04-19-13

Replace the 1st paragraph of section 19-3.03E(3) with:

01-20-12

Compact structure backfill behind lagging of soldier pile walls by hand tamping, mechanical compaction, or other authorized means.

Add to the end of section 19-3.03E(3):

07-19-13

If filter fabric is shown behind the lagging:

1. Immediately before placing the filter fabric, remove any loose or extraneous material and sharp objects from the surface to receive the filter fabric.
2. Handle and place the filter fabric under the manufacturer's instructions. Stretch, align, and place the fabric without wrinkling.
3. Stitch the adjacent borders of filter fabric or overlap the adjacent borders by 12 to 18 inches. If stitching the border, use yarn of a contrasting color. Yarn size and composition must be as recommended by the fabric manufacturer. Use 5 to 7 stitches per inch of seam.
4. Repair any damaged filter fabric by placing a piece of filter fabric large enough to cover the damaged area and comply with the overlapping or stitching requirements.

Replace the 2nd paragraph of section 19-3.03F with:

01-20-12

Do not backfill over or place material over slurry cement backfill until 4 hours after placement. When concrete sand is used as aggregate and the in-place material is free draining, you may start backfilling as soon as the surface water is gone.

Add between the 2nd and 3rd paragraphs of section 19-3.03K:

01-20-12

Before you excavate for the installation of ground anchors in a wall zone:

1. Complete stability testing
2. Obtain authorization of test data

Replace the 2nd sentence of the 7th paragraph of section 19-3.03K:

01-20-12

Stop construction in unstable areas until remedial measures have been taken. Remedial measures must be submitted and authorized.

Add between the 8th and 9th paragraphs of section 19-3.03K:

01-20-12

When your excavation and installation methods result in a discontinuous wall along any soil nail row, the ends of the structurally completed wall section must extend beyond the ends of the next lower excavation lift by a distance equal to twice the lift height. Maintain temporary slopes at the ends of each wall section to ensure slope stability.

Replace the 9th paragraph of section 19-3.03K:

01-20-12

Do not excavate to the next underlying excavation lift until the following conditions have been attained for the portion of the soil nail or ground anchor wall in the current excavation lift:

1. Soil nails or ground anchors are installed and grouted.
2. Reinforced shotcrete facing is constructed.

3. Grout and shotcrete have cured for at least 72 hours.
4. Specified tests are complete for that portion of wall and the results are authorized.
5. Soil nail facing anchorages are attached or ground anchors are locked off.

Replace the 2nd sentence in the 7th paragraph of section 19-3.04 with:

Structure excavation more than 0.5 foot from the depth shown is paid for as a work-character change if you request an adjustment or the Engineer orders an adjustment.

Replace "Contract completion time" in the 8th paragraph of section 19-6.03D with:

work completion date

Add to section 19:

19-10-19-20 RESERVED

AA

20 LANDSCAPE

11-15-13

Replace the headings and paragraphs in section 20 with:

20-1 GENERAL

20-1.01 GENERAL

20-1.01A Summary

Section 20-1 includes general specifications for performing landscaping.

If an irrigation system is to be installed in an existing planting area to be maintained, check for plant deficiencies under section 20-3.02A(4) before starting irrigation work.

Perform a functional test for each irrigation system under 20-2.01A(4)(d):

1. Before planting the plants
2. After planting the plants
3. Before the start of the plant establishment work

If a plant is to be transplanted or an irrigation component is to be relocated, transplant plant or protect irrigation components before performing other construction activities in the area.

Perform roadside clearing:

1. As required to prepare the job site for construction work
2. Until the start of the plant establishment work or Contract acceptance, whichever comes first

20-1.01B Definitions

Reserved

20-1.01C Submittals

At least 15 days before applying any pesticide, submit a copy of the licensed pest control adviser's recommendation.

At the end of each week, submit a report documenting the application of all pesticides as an informational submittal. Use form *Report of Chemical Spray Operations*.

Before mixing a pesticide, submit a copy of the registered label for the pesticide as an informational submittal. If unable to copy, allow the Engineer to read the label on the container.

20-1.01D Quality Control and Assurance

20-1.01D(1) General

Obtain a recommendation from a licensed pest control adviser for the use of all pesticides under the Food & Agri Code. The recommendation must include the pesticides to be used, rates of application, methods of application, and application areas.

The pesticide applicator must have an active and valid qualified applicator license or certificate from the Department of Pesticide Regulation.

20-1.01D(2) Progress Inspections

The Engineer will perform progress inspections before:

1. Cultivating work starts
2. Pressure testing of irrigation pipe on the supply side of control valves
3. Testing of low voltage conductors
4. Planting work starts
5. Completion of planting work

Notify the Engineer at least 4 business days before each inspection is required. Allow at least 3 business days for the Engineer's inspection.

Unless otherwise authorized, do not proceed with the next construction activity until the inspection has been completed and any required corrective work has been performed and authorized.

20-1.02 MATERIALS

20-1.02A General

Reserved

20-1.02B Water

Water available from an existing Department-owned facility within the project limits or an irrigation system to be installed under the Contract is furnished at no charge.

If water is not available, make arrangements for supplying water. Water must be of a quality that will promote plant growth.

20-1.02C Pesticides

Pesticides must comply with the Department of Pesticide Regulation.

Insecticide must be imidacloprid.

Rodenticides must be brodifacoum, bromadiolone, or diphacinone.

Do not use oil or pelleted forms of pesticides for weed control.

For weed control, use a pesticide with a photosensitive dye that produces a contrasting color when sprayed on the ground. The color must disappear between 2 to 3 days after being applied. The dye must not stain surfaces or injure plants or wildlife when applied at the manufacturer's recommended application rate.

20-1.03 CONSTRUCTION

20-1.03A General

Take precautions to prevent irrigation water from:

1. Wetting vehicles, pedestrians, and pavement
2. Eroding soil

Dispose of removed, pruned, and damaged vegetative material.

You may reduce removed vegetative material to chips with a maximum thickness of 1/2 inch and spread within the job site at locations determined by the Engineer. Chipped material must not be substituted for wood mulch, nor must the chipped material be placed within areas to receive wood mulch.

20-1.03B Pesticides

Notify the Engineer of pesticide application times at least 24 hours before each application.

Mix and apply pesticides under the requirements of the Department of Pesticide Regulation and the instructions on the pesticide product label.

Do not apply pesticides:

1. On Saturdays and holidays unless authorized
2. Whenever weather and wind conditions are unsuitable for application
3. Within the plant basin
4. On the foliage and woody parts of the plant

If a granular preemergent is used, it must be covered with mulch on the same work day. Do not apply granular preemergent in plant basins.

Do not apply preemergents:

1. To groundcover plants before the plants have been planted a minimum of 3 days and have been thoroughly watered
2. Within 18 inches of trees, shrubs, and seeded areas

20-1.03C Roadside Clearing

20-1.03C(1) General

Perform roadside clearing by:

1. Removing and disposing of trash and debris
2. Controlling the following pests:
 - 2.1. Rodents
 - 2.2. Insects
 - 2.3. Weeds
3. Removing existing plants as described

Control rodents by using rodenticides or traps.

20-1.03C(2) Remove Existing Plants

Remove existing plants as described. Removal of existing plants includes removing their stumps and roots 2 inches or larger in diameter to a minimum depth of 12 inches below finished grade. Backfill holes resulting from stump removal to finished grade with material obtained from adjacent areas.

If a plant is to be planted within existing groundcover area, remove existing groundcover from within an area 6 feet in diameter centered at each plant location.

20-1.03C(3) Weed Control

Control weeds by the use of pesticides, hand pulling, or mowing.

If pesticides are used to control weeds, apply pesticides before the weeds reach the seed stage of growth or exceed 4 inches in length, whichever occurs first. Do not use pesticides at cutting plant locations.

Where cuttings are to be planted, control weeds by hand pulling within an area 2 feet in diameter centered at each plant location.

If weeds are to be controlled by hand pulling, hand pull weeds before they reach the seed stage of growth or exceed 4 inches in length, whichever occurs first.

Where liner, plug, or seedling plants are to be planted 10 feet or more apart, control weeds by the use of pesticides or hand pulling within an area 2 feet in diameter centered at each plant location. Where liner, plug, or seedling plants are to be planted less than 10 feet apart, control weeds by the use of pesticides within the entire area.

Control weeds by mowing outside of mulched areas, plant basins, groundcover areas, and within areas to be seeded. Mowing must extend to the edges of pavement, dikes, curbs, sidewalks, walls, and fences.

If mowing is to be performed within areas to be seeded, perform mowing as needed until the start of the seeding operation specified in section 21.

Mowing must be performed before the weeds reach the seed stage of growth or exceed 6 inches in length, whichever occurs first. Mow weeds to a height of 3 inches.

20-1.03C(4) Disposal of Removed Groundcover, Weeds, and Mowed Material

Dispose of hand pulled weeds the same day they are pulled. Dispose of removed groundcover within 3 days.

Dispose of mowed material from the initial mowing. Disposal of material from subsequent mowing is not required.

20-1.03D Cultivation

Cultivation must be by mechanical methods and performed until the soil is in a loose condition to a minimum depth of 6 inches. Soil clods must not be larger than 2 inches in maximum dimension after cultivation.

The areas to be cultivated must extend 12 inches beyond the outer limit of each planting area requiring cultivation.

After initial cultivation, place soil amendment and fertilizer at specified rates.

Recultivate to thoroughly mix native soil and amendments.

Do not drive on cultivated areas after cultivation.

Planting areas that have been cultivated and become compacted must be recultivated.

Rocks and debris encountered during soil preparation in planting areas must be brought to the surface of the ground.

Remove rocks and debris as ordered. This work is change order work.

20-1.03E Weed Germination

Reserved

20-1.04 PAYMENT

Items paid for by area are measured parallel to the ground surface.

Planting areas that do not require cultivation but are within the cultivation areas will not be deducted.

20-2 IRRIGATION

20-2.01 GENERAL

20-2.01A General

20-2.01A(1) Summary

Section 20-2 includes specifications for installing irrigation systems.

The irrigation systems shown are diagrammatic.

20-2.01A(2) Definitions

Reserved

20-2.01A(3) Submittals

20-2.01A(3)(a) General

Submit shop drawings for the electrical components of the irrigation system except electrical service 30 days before installation. The drawings must:

1. Include schematic wiring diagrams showing wire sizes and routes between electrical components
2. Show conduit sizes

3. Bear the written approval of the controller manufacturer or the manufacturer's authorized agent
4. Be accompanied by:
 - 4.1. Colored wire and splice samples
 - 4.2. Manufacturer's descriptive and technical literature

After the work shown on the drawing is complete, submit 3 copies of the as-built shop drawings including any wire modifications for each controller installed.

For each controller, laminate and place in an envelope 1 copy of:

1. As-built schematic wiring diagram including wiring modifications
2. 11 by 17 inches as-built irrigation plan

The laminate must be clear, mat-finished plastic that is at least 10 mils thick. The envelope must be heavy-duty plastic.

Attach the envelope to the inside of the controller enclosure or cabinet door. If the door is not large enough to secure the envelope, submit the envelope and its contents.

20-2.01A(3)(b) Manufacturer's Instructions

Submit as an informational submittal the manufacturer's installation instructions 15 days before installing:

1. Couplings for conduits used for irrigation conduits
2. Plastic pipe and fittings
3. Solvent cement for plastic pipe and flexible hose
4. Sprinklers
5. Flow sensors

20-2.01A(3)(c) Maintenance and Operation Manuals

Before Contract acceptance, submit as an informational submittal a manufacturer's maintenance and operation manual for each type of controller installed.

20-2.01A(4) Quality Control and Assurance

20-2.01A(4)(a) General

Reserved

20-2.01A(4)(b) Pressure Testing

20-2.01A(4)(b)(i) General

Perform pressure testing for leakage on irrigation supply lines:

1. In the Engineer's presence
2. On business days between 8 a.m. and 5 p.m. unless authorized
3. Before backfilling supply line trenches
4. With irrigation system gate valves open
5. With open ends of the supply line and fittings plugged or capped

Notify the Engineer at least 48 hours before performing a pressure test.

Choose either Method A or B to test supply lines installed by trenching and backfilling and supply lines that are completely visible after installation.

All other supply lines, including those installed in the ground by methods other than trenching and backfilling must be tested by Method A.

Test irrigation supply line in conduit by Method A with the testing period modified to 0.5 hour and no allowable pressure drop.

20-2.01A(4)(b)(ii) Method A

Method A pressure testing procedures for leakage must comply with the following:

1. Pressure gauge must be calibrated from 0 to 200 psi in 5 psi increments and be accurate to within a tolerance of 2 psi.

2. Supply line must be filled with water and connected to a pressure gauge. Place the pipeline under a pressure of 125 psi. Remove the source of pressure and leave the line under the required pressure.
3. Test the supply line under the required pressure for a period of 1 hour. The pressure gauge must remain in place until each test period is complete.
4. Leaks that develop in the tested portion of the system must be located and repaired after each test period if a drop of more than 5 psi is indicated by the pressure gauge. After the leaks have been repaired, repeat the 1 hour pressure test until the drop in pressure is 5 psi or less.

If a system consists of a new supply line connected to an existing line, the new supply line must be isolated from the existing line and tested.

20-2.01A(4)(b)(iii) Method B

Method B pressure testing procedures for leakage must comply with the following:

1. Before any portion of the supply line on the upstream side of a control valve is backfilled, water must be turned on for that portion of the line and maintained at full pressure from the water source for a period not less than 8 consecutive hours after all air has been expelled from the line. Before any portion of the supply line on the downstream side of the control valve is backfilled, perform the same test for a period not less than 1 hour.
2. Repair leaks that develop in the tested portion of the system. After the leaks have been repaired, repeat the pressure test until no leaks occur as determined by the Engineer.

20-2.01A(4)(c) Sprinkler Coverage Check

After installation of the sprinklers, check and adjust the entire sprinkler system for proper orientation and uniform coverage.

20-2.01A(4)(d) Irrigation System Functional Tests

The functional tests for each irrigation controller or group of controllers and associated irrigation system served by a single electric service point must consist of at least 1 complete cycle of operation. The Engineer determines the length of the cycle.

Notify the Engineer at least 10 days before performing each functional test.

20-2.01A(4)(e) Final Irrigation System Check

Perform the final check of the existing and new irrigation system between 20 and 30 days before Contract acceptance. The Engineer determines the length of the cycle.

Remote control valves connected to existing and new irrigation controllers must be checked for automatic operation when the controllers are in automatic mode.

20-2.01B Materials

20-2.01B(1) General

Use minor concrete for replacing removed concrete facilities.

HMA for replacing removed asphalt concrete surfacing and facilities must comply with section 39. You may use minor HMA if authorized.

20-2.01B(2) Garden Valves

Each garden valve must:

1. Be inverted nose type and of brass or bronze construction with female thread inlet
2. Have a replaceable seat washer, rising valve stem within a protective collar, and male thread hose outlet
3. Have a loose key handle

20-2.01B(3) Recycled Water Identification

Irrigation components used for recycled water must be manufactured or painted purple. Recycled water irrigation pipe and tubing must have a permanent label with the wording "CAUTION RECYCLED WATER" every 24 inches in 2 rows spaced approximately 180 degrees apart in the longitudinal direction of the pipe or tubing.

The recycled water warning sign must be a decal or a decal attached to a 1/16-inch thick aluminum plate or tag.

Each warning sign decal must:

1. Show the phrase "Recycled Water, Do Not Drink" and the drinking glass graphic symbol
2. Be UV fade and weather resistant and manufactured from flexible vinyl with or without mylar
3. Have a purple background, black text, and self-adhesive backing

Each warning tag must:

1. Show the phrase "RECYCLED WATER" and the drinking glass graphic symbol
2. Be UV fade and weather resistant
3. Be purple, double-sided, and manufactured from polyurethane
4. Have an integral neck attachment and attachment hole capable of withstanding 178 lb of pull-out resistance
5. Have hot-stamped black lettering

Posts and hardware for warning signs must comply with section 56-4.

Concrete sprinkler protectors used with recycled water must be painted purple.

20-2.01B(4) Location Markers

Location markers must be schedule 40 white PVC plastic pipe.

20-2.01B(5) Pull Boxes

Pull boxes must comply with section 86-2.06 and be no. 5 or larger unless otherwise shown. Pull boxes for low voltage conductors must not have side openings.

Pull box covers used solely for irrigation electrical service must be marked "IRRIGATION".

20-2.01B(6) Unions

Unions must be brass or malleable iron capable of withstanding the maximum required working pressure.

20-2.01B(7) Valve Boxes and Covers

Valve boxes must be precast concrete.

Covers must be:

1. Concrete, steel, or cast iron.
2. Marked "WATER" in cast-in letters not less than 1 inch high.
3. 1 piece, except 2 pieces are required when the weight of the valve box cover exceeds 35 lb.

The valve box covers must include a polyurethane label with the appropriate controller letter and station number as shown.

20-2.01B(8) Wye Strainers

Wye strainers must:

1. Have a cast iron or all bronze body
2. Have a removable stainless steel strainer screen:
 - 2.1. With an open area equal to at least 3 times the cross-sectional area of the pipe based on an iron pipe size
 - 2.2. With 40-mesh woven wire, except:
 - 2.2.1. For a backflow preventer assembly, the screen must be 20-mesh woven wire mesh or perforated sheet with 0.045-inch diameter holes
 - 2.2.2. For a valve assembly, the screen must be 80-mesh woven wire mesh
3. Be capable of withstanding a working pressure of 150 psi
4. Be equipped with a garden valve at the outlet

The wye strainer filter housing must:

1. Withstand a working pressure of 150 psi

2. Be manufactured of reinforced polypropylene plastic

20-2.01C Construction

20-2.01C(1) General

Repair irrigation systems within 24 hours after a malfunction or damage occurs.

Connect underground metallic pipes, valves, or fittings made of dissimilar metals through a dielectric coupling or bushing.

You may install conduits, conductors, and supply lines by methods other than trenching provided that they are not damaged and are installed at the depths specified.

20-2.01C(2) Trenching and Backfilling

Trench and backfill under section 86-2.01.

Remove plants under 20-1.03C as necessary to perform trenching. If plants are to remain, adjust trench alignment to minimize damage.

If removal of:

1. Turf is required, remove to a maximum width of 12 inches.
2. Groundcover is required, remove to a maximum width of 6 feet. Existing *Carpobrotus* and *Delosperma* may be rototilled if the backfill for the trenches does not contain plants longer than 6 inches in length.

Make a 2-inch deep sawcut along neat lines around the perimeter of the pavement to be removed at locations determined by the Engineer.

The trench must have uniform bearing throughout the entire length and must be free of jagged rubble or sharp objects. Ensure conduit, supply line, and joints are not moved or damaged by backfill operations.

For a project with multiple water service points, excavate and backfill trenches for 1 service point at a time.

11-15-13

Trenches for irrigation supply lines and conduits 3 inches and larger must be 5 times the pipe or conduit diameter deep and 2 times the pipe or conduit diameter wide.

Trenches for irrigation supply lines and conduits 2-1/2 inches or less in diameter must be a minimum of 12 inches below finished grade, measured from the top of the installed pipe.

07-19-13

Trenches must be at least 4 feet from curbs, dikes, and paved shoulders.

Rocks and debris encountered during trenching operations must be brought to the surface of the ground. Remove rocks and debris as ordered. This work is change order work.

If trenching requires the removal of plants, in areas with:

1. Turf, replace turf with sod under section 20-3.03C(3)(e).
2. Groundcover, replace groundcover plants from flats and plant at 12 inches on center under section 20-3.03C. No replacement of *Carpobrotus* and *Delosperma* is required if removed by rototilling.

11-15-13

Where existing surfacing is removed, replace the structural section to match the materials removed. Replacement concrete must be of uniform smoothness, color, and texture equal to the adjacent concrete surface. Dispose of removed material. Install supply line and conduits at the bottom of trenches and backfill with sand to a depth of 2 inches over the top of the supply lines and conduits. Excluding the part of the trench backfilled with surfacing or pavement, the remainder of the trench must be backfilled with material that is excavated from the trench. Rock, broken concrete, asphalt concrete and other particles larger than 2 inches in greatest dimension must not be used.

07-19-13

20-2.01C(3) Pull Boxes

Install pull boxes under section 86-2.06 at the following locations:

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1. At all conductor splices except splices made in valve boxes
2. Within 5 feet of irrigation controllers
3. At ends of electrical conduits
4. At other locations shown

20-2.01C(4) Valve Boxes and Covers

Install and identify each valve box as shown.

In walkways and paved areas, install the top of the valve box flush with the surrounding finished grade.

20-2.01C(5) Recycled Water Warning Signs

Install recycled water warning signs on irrigation facilities using recycled water.

Install sign decals directly to clean, smooth surfaces. Clean the surface with alcohol or an equivalent cleaner before applying the decal.

Install a 4 by 4 inch warning sign decal to each:

1. Backflow preventer assembly
2. Irrigation controller enclosure cabinet door

Install a 2 by 2 inch warning tag to the each remote control valve and valve box cover.

Install a 2-1/2 by 3 inches sign decal to each sprinkler riser.

Under local regulations, install a 12 by 12 inch warning sign decal on an aluminum plate and attach to gates, fences, and walls located in the vicinity of a recycled water irrigation system. On gates and fences, install signs with S hooks and C clips or 14-gauge galvanized steel wire. On concrete walls or other rough surfaces, install signs with a silicon-based adhesive.

20-2.01C(6) Garden Valves

Furnish 3 keys for each garden valve before Contract acceptance.

20-2.01D Payment

Not Used

20-2.02 EXISTING IRRIGATION FACILITIES

20-2.02A General

20-2.02A(1) Summary

Section 20-2.02 includes specifications for checking, testing, operating, replacing, and relocating existing irrigation facilities.

20-2.02A(2) Definitions

Reserved

20-2.02A(3) Submittals

Submit a list of irrigation system deficiencies within 7 days after checking the existing facilities.

20-2.02A(4) Quality Control and Assurance

After irrigation facilities have been relocated, demonstrate in the presence of the Engineer that the relocated facilities function properly.

Certify each existing backflow preventer under section 20-2.03A(4).

20-2.02B Materials

Valve box covers must be the same size as the covers they replace.

Control and neutral conductors must be the same size and color as the control and neutral conductors they replace.

20-2.02C Construction

20-2.02C(1) General

Notify the Engineer at least 4 business days before shutting off the water supply to any portion of the existing irrigation system and immediately after restoring the water supply to any portion of the existing irrigation system.

If an irrigation facility to be relocated is determined unsuitable by the Engineer, replace irrigation facility under section 20-2. This work is change order work.

20-2.02C(2) Check and Test Existing Irrigation Facilities

Before performing irrigation system work, check existing irrigation facilities to remain in place or to be relocated. The Engineer determines the test watering cycle lengths. Check for deficiencies including missing parts, damaged components, and improper operation. Correct deficiencies as ordered. The correction of deficiencies is change order work.

20-2.02C(3) Operate Existing Irrigation Facilities

If the Contract includes a bid item for operate existing irrigation facilities, after performing work under section 20-2.02C(2), operate existing irrigation facilities through Contract acceptance.

Operate existing irrigation facilities except for water meters, underground supply lines, control and neutral conductors, and electrical conduits.

Check for proper operation at least once every 30 days. Adjust, repair, or replace existing irrigation facilities within 7 days of finding any deficiency.

Operate irrigation systems using the automatic irrigation controller until Contract acceptance. You may operate irrigation controllers manually during plant replacement, fertilization, weed germination, and repair work.

Program the irrigation controllers for seasonal requirements.

20-2.02C(4) Replace Valve Box Covers

Existing valve box covers shown to be replaced must remain in place until the new covers are ready to be installed.

Dispose of removed valve box covers.

20-2.02C(5) Relocate Backflow Preventer Assemblies

Relocate backflow preventer assembly as shown and install under section 20-2.03C.

20-2.02C(6) Relocate Water Meters

Relocate water meter as shown.

20-2.02C(7) Relocate Irrigation Controllers

Relocate irrigation controller as shown and install under section 20-2.07C.

20-2.02D Payment

Not Used

20-2.03 BACKFLOW PREVENTER ASSEMBLIES

20-2.03A General

20-2.03A(1) Summary

Section 20-2.03 includes specifications for installing a backflow preventer assembly.

20-2.03A(2) Definitions

Reserved

20-2.03A(3) Submittals

Reserved

20-2.03A(4) Quality Control and Assurance

Each backflow preventer assembly must be certified by a backflow preventer tester. The tester must have an active and valid certification from the water purveyor having jurisdiction.

If the local water purveyor does not have a certification program, the tester must be certified by AWWA or a nearby county with a certification program.

Notify the Engineer at least 5 business days before certifying backflow preventer assembly.

Certify each backflow preventer assembly annually and within 10 days before Contract acceptance.

20-2.03B Materials

20-2.03B(1) General

Each backflow preventer assembly must include:

1. Backflow preventer including gate valve, wye strainer, brass or malleable iron unions, fittings, and supports
2. Blanket
3. Enclosure
4. Concrete pad

Concrete for the pad must be minor concrete, except the concrete must not contain less than 463 pounds of cementitious material per cubic yard. Hand mixing of the concrete is allowed.

20-2.03B(2) Backflow Preventers

Each backflow preventer must:

1. Be reduced-pressure principle type.
2. Comply with the requirements of the water purveyor that has jurisdiction.
3. Be factory-assembled with:
 - 3.1. 2 check valves
 - 3.2. 1 pressure differential relief valve
 - 3.3. 4 test cocks
 - 3.4. 2 shut-off valves manufactured from iron or bronze. Shut-off valves must be one of the following:
 - 3.4.1. Resilient wedge gate valves
 - 3.4.2. Resilient seated and fully ported ball valves
 - 3.4.3. Resilient seated butterfly valves

Backflow preventer components must be capable of withstanding a working pressure of 150 psi.

20-2.03B(3) Backflow Preventer Blankets

Each backflow preventer blanket must:

1. Be polyester fabric coated with vinyl or polymeric resin
2. Be resistant to UV light, water, mildew, and fire
3. Have an R-value from R-30 to R-38

Blankets must have a securing mechanism that includes either zippers, hook-pile tape, grommets, snaps, buttons, or any combination of these. Wherever the backflow preventer is not in an enclosure, the securing mechanism must be capable of accepting a padlock.

20-2.03B(4) Backflow Preventer Enclosures

Each backflow preventer enclosure must:

1. Have expanded metal sides, ends, and top panels fabricated from 9-gauge minimum thickness stainless sheet steel with openings of approximately 3/4 by 1-3/4 inches
2. Have expanded metal panels attached to the 3/16-inch thick steel frame by a series of welds not less than 1/4 inch in length and spaced not more than 4 inches on center, along the edges of the enclosure
3. Have Type 304 stainless steel lock guards with a minimum thickness of 12 gauge.
4. Have hexagonal nuts and lock-type washers

5. Be powder coated by the manufacturer to match color no. 20450 of FED-STD-595.
6. Have padlock clasp or latch and lock mechanism

20-2.03C Construction

Finish exposed top surfaces of concrete pad with a medium broom finish applied parallel to the long dimension of pads.

Install hold-downs for the backflow preventer assembly enclosure when concrete is still plastic.

20-2.03D Payment

Not Used

20-2.04 CAM COUPLER ASSEMBLIES

20-2.04A General

Section 20-2.04 includes specifications for installing a cam coupler assembly.

20-2.04B Materials

Each cam coupler assembly must consist of a cam coupler, dust cap, check valve, pipes, fittings, concrete thrust block, and valve box with woven wire cloth and gravel.

Cam couplers and keys must be manufactured of brass or bronze and be able to withstand a working pressure of 150 psi.

Furnish 3 loose cam coupler keys before Contract acceptance.

20-2.04C Construction

Install cam coupler assemblies in valve boxes as shown.

20-2.04D Payment

Not Used

20-2.05 CONTROL AND NEUTRAL CONDUCTORS

20-2.05A General

20-2.05A(1) Summary

Section 20-2.05 includes specifications for installing control and neutral conductors.

20-2.05A(2) Definitions

Reserved

20-2.05A(3) Submittals

Reserved

20-2.05A(4) Quality Control and Assurance

Perform field tests on control and neutral conductors. Field tests must comply with the specifications for lighting circuits in section 86-2.14B.

Where the conductors are installed by trenching and backfilling, perform field tests after a minimum of 6 inches of backfill material has been placed and compacted over the conductors.

20-2.05B Materials

Control and neutral conductors must comply with the requirements in section 86-2.08.

For connections between 24-volt irrigation controllers and valve solenoids, use control and neutral conductors. Conductors must include a control conductor for each valve and a common neutral.

Conductor insulation color, except for the stripes, must be continuous throughout. The color of the conductors must be consistent from the controller to each valve. Neutral conductors must be white. Do not use white for control conductors. Do not use conductors with green insulation except as permitted by the NEC.

Conductors must be:

1. No. 12 AWG or larger or no. 14 AWG or larger for armor-clad
2. Rated for 36 V or 600 V for armor-clad
3. Rated for direct burial
4. Underground feeder cable Type UF and TWU
5. Solid, uncoated copper for armor-clad
6. Not less than 90 percent of the AWG diameter required

No. 10 and smaller conductors must be insulated with a minimum of 56 mils of PVC or a minimum of 41 mils of polyethylene. No. 8 and larger conductors must be insulated with a minimum of 70 mils of PVC.

No. 10 and smaller armor-clad conductors must be insulated with a minimum of 41 mils of polyethylene. No. 8 and larger armor-clad conductors must be insulated with 54 to 60 mils of PVC.

Armor-clad conductors must include:

1. Stainless steel tape armor, Type 304 and helically wrapped with a 33 percent minimum overlap. The tape must be 0.5 inch wide and at least 0.005 inch thick.
2. PVC outer conductor jacket that is UV resistant and complies with the ICEA S-61-402, NEMA standard WC5 and UL listing 1263. The jacket nominal thickness must be 24 to 30 mils thick.

20-2.05C Construction

20-2.05C(1) General

Reserved

20-2.05C(2) In Open Trenches

Do not install control and neutral conductors above each other in an open trench. Wrap conductors together with electrical tape at 5 foot intervals.

Where conductors are installed in the same trench as supply line, install at the same depth as the line. At other locations, install conductors not less than 12 inches below finished grade.

Where conductors are not in a supply line trench, install conductors at least 4 feet from curbs, dikes, and paved shoulders.

20-2.05C(3) In Conduits

Install conductors in electrical conduit if conductors are to be:

1. Surface mounted
2. Installed in or on structures
3. Installed under paved areas
4. Installed in irrigation conduits
5. Placed in concrete

20-2.05C(4) Splicing

Splice low voltage control and neutral conductors under sections 86-2.09C, 86-2.09D, and 86-2.09E, except do not use method B. Tape used for splice insulation must be PVC tape.

Leave at least 2 feet of slack for each conductor at each:

1. Pull box
2. Valve box for each conductor that is connected to other facilities within the box or spliced within the box

Do not splice conductors in irrigation controller cabinets.

Permanent splice connections must be made with freshly cut and skinned conductors. Do not use temporary splices made for testing valve circuits as permanent splices.

20-2.05C(5) Marking

Mark control and neutral conductors in pull boxes, valve boxes, at irrigation control terminals, and at splices.

Mark conductor terminations and splices with adhesive cloth wrap-around markers. Seal markers with clear, heat-shrinkable sleeves.

Mark nonspliced conductors with clip-on C-shaped white extruded PVC sleeves. Sleeves must have black indented legends of uniform depth with transparent overlays over the legends and chevron cuts for the alignment of 2 or more sleeves.

Identify markers for the control conductors with the appropriate irrigation controller and station number.

20-2.05D Payment

Not Used

20-2.06 FLOW SENSORS

20-2.06A General

Section 20-2.06 includes specifications for installing a flow sensor.

20-2.06B Materials

Each flow sensor must be an inline type with a nonmagnetic spinning impeller as the only moving part.

The electronics housing must:

1. Be schedule 80 PVC or cast 85-5-5-5 bronze
2. Include glass-filled polyphenylene sulfide
3. Be easily removable from the meter body and include 2 ethylene-propylene O-rings

The impeller must be tungsten carbide.

The electronics must be rated to withstand prolonged water immersion conditions and include 2 single conductor 18 AWG leads, 48 inches long.

The insulation must be direct burial UF type colored red for the positive lead and black for the negative lead.

The flow sensor must be capable of withstanding:

1. 100 to 400 psi operating pressure depending on sensor size shown
2. Liquid temperatures up to 220 degrees F
3. Flows from 1/2 to 15 ft/sec

20-2.06C Construction

Install flow sensor as shown.

20-2.06D Payment

Not Used

20-2.07 IRRIGATION CONTROLLERS

20-2.07A General

20-2.07A(1) Summary

Section 20-2.07 includes specifications for installing irrigation controllers.

20-2.07A(2) Definitions

irrigation controller: "Smart" irrigation controller as defined by the Irrigation Association.

remote irrigation control system (RICS): Centralized water management system that consists of a base station, centralized server, satellite controllers.

base station: Designated computer located at a Department maintenance facility or District Office that collects data from a series of satellite controllers through a centralized server.

centralized server: Designated server or web-based application that collects data from all base stations.

web-based application: Encrypted managing software that is coded in a browser-supported language and is executable via a common internet web browser (e.g., Microsoft Internet Explorer, Firefox, Safari, etc.).

satellite controller: Irrigation controller that communicates directly to a base station or centralized server.

network communication: Identified means through which satellite controllers, base stations, and a centralized server communicate to one another (i.e., fiber optics, spread spectrum, phone line, etc.).

remote access device: Device (i.e., FCC compliant radio remote, cell phone or wireless, etc.) used to communicate with satellite controllers from a remote location.

20-2.07A(3) Submittals

Submit as an informational submittal, a complete manufacturer's maintenance and operations manual for each type of controller installed. Submit the manual at the time the wiring plans and diagrams are placed inside the controller enclosure or cabinet door.

20-2.07A(4) Quality Control and Assurance

Provide training by a qualified person on the use and adjustment of the irrigation controllers installed 30 days before Contract acceptance.

Modifications to electrical components must be done by the manufacturer before shipment to the job site.

The installation date and expiration date of the manufacturer's guarantee for the controllers must be permanently marked on the inside face of the controller.

20-2.07B Materials

20-2.07B(1) General

Conventional A/C powered irrigation controllers must operate on 110/120 V, 60 Hz(ac) and supply 24 to 30 VAC, 60 Hz(ac) for operating electrical remote control valves.

Concrete for the pad and foundation must be minor concrete, except the concrete must not contain less than 463 pounds of cementitious material per cubic yard. Hand mixing of the concrete is allowed.

20-2.07B(2) Irrigation Controllers

20-2.07B(2)(a) General

The irrigation controllers must:

1. Be A/C, battery, solar, or 2-wire as shown
2. Be from a single manufacturer.
3. Be fully automatic and capable of operating a complete 30-day or longer irrigation program.
4. Have a switch or button on the face of the irrigation control panel showing that the irrigation controller can be turned on or off and provide for automatic or manual operation. Manual operation must allow cycle start at the desired station and allow for the minimum activation of a single station or have the option to operate multiple stations in sequential or simultaneous operation modes.
5. Have non-volatile memory.
6. Have a watering time display on the face of the control panel.
7. Have a panel and circuit board connected to the low voltage control and neutral conductors by means of a plug and receptacle connectors located within the cabinet enclosure.
8. Have a variable or incremental timing adjustment ranging from 1 minute to 360 minutes per station.
9. Be capable of operating at least 3 program schedules.
10. Be capable of having at least 4 start times per program schedule.
11. Have an output that can energize a pump start circuit or a remote control master valve.
12. Be protected by fuses and circuit breakers.
13. Display a program and station affected by a sensory alert without altering other watering schedules not affected by the alert.
14. Be capable of global manual and automatic seasonal adjustments to all valves in any given program.
15. Automatically alter watering schedule in accordance with evapotranspiration data provided by a local weather station or have an internal programmed default of historical evapotranspirational data for a given region.
16. Support a flow sensor, rain sensor, or weather station and have automatic shut-off capability.

17. Be capable of communicating with the remote access device.

If the irrigation controller is installed in an enclosure cabinet, the cabinet must be stainless steel and must comply with section 86-3.04A.

Irrigation controllers not installed in enclosure cabinets must be weatherproof, constructed of fiberglass or metal and have a door lock with 2 keys provided.

RICS must meet the requirements of an irrigation controller and be capable of being accessible only through a secured and encrypted server that is password and firewall protected by the Department or be accessible through a firewall secure remote server that is independent from any Department servers. The Department will set up and manage the network communication.

20-2.07B(2)(b) Battery Powered Irrigation Controllers

Reserved

20-2.07B(2)(c) Solar Powered Irrigation Controllers

Reserved

20-2.07B(2)(d) Two-wire Irrigation Controllers

Reserved

20-2.07B(3) Irrigation Controller Enclosure Cabinets

The irrigation controller enclosure cabinet must:

1. Be stainless steel.
2. Include a mounting panel. Fabricate mounting panels with one of the following:
 - 2.1. 3/4-inch exterior AC grade veneer plywood. Paint panels with 1 application of an exterior, latex based, wood primer and 2 applications of an exterior, vinyl acrylic enamel, white in color. Paint panels on all sides and edges before installation of the panels in the cabinets and the equipment on the panels.
 - 2.2. 3/16-inch thick aluminum sheets.
 - 2.3. 10-gauge cold-rolled steel sheets.
 - 2.4. 0.157-inch stainless steel metal sheets.
3. Provide cross ventilation, roof ventilation, or a combination of both. Ventilation must not compromise the weather resistance properties of the cabinet and must be fabricated by the cabinet manufacturer.
4. Include protection against lightning damage.
5. Have an area inside the cabinet doors for storage of the as-built schematic wiring diagram and irrigation plans.
6. Have padlock clasp or latch and lock mechanism.

20-2.07B(4) Rain Sensors

A rain sensor unit must be a solid state, automatic shut-off type, and compatible with the irrigation controller. The rain sensor unit must automatically interrupt the master remote control valves when approximately 1/8 inch of rain has fallen. The irrigation controller must automatically be enabled again when the accumulated rainfall evaporates from the rain sensor unit collection cup.

Rain sensor units must be one of the following:

1. Rated 24 V(ac) to 30 V(ac)
2. Wireless and FCC compliant

20-2.07C Construction

Finish exposed top surface of concrete pad with a medium broom finish applied parallel to the long dimension.

Locate irrigation controllers in pedestal or wall mounted enclosures as shown.

Install electrical components for automatic irrigation systems under section 86-1.02.

Install irrigation controllers under the manufacturer's instructions and as shown.

If 2 or more irrigation controllers operate the same remote master control valve, furnish and install an isolation relay under the controller manufacturer's instructions.

Where direct burial conductors are to be connected to the terminal strip, connect the conductors with the open-end-crimp-on wire terminals. Exposed wire must not extend beyond the crimp of the terminal and the wires must be parallel on the terminal strip.

Install rain sensor units for irrigation controllers on the irrigation controller enclosure cabinets. Provide protection against lightning damage.

20-2.07D Payment

Payment for electrical service for 120-volt or higher is not included in the payment for irrigation controller.

20-2.08 IRRIGATION CONDUIT

20-2.08A General

20-2.08A(1) Summary

Section 20-2.08 includes specifications for installing irrigation conduit under a roadway or other facility to accommodate electrical conduit for control and neutral conductors and irrigation supply lines.

Before performing work on irrigation systems, locate existing conduits shown to be incorporated into the new work.

Before removing or disturbing existing Type A pavement markers that show the location of the existing conduit, mark the location of the existing conduit on the pavement.

20-2.08A(2) Definitions

Reserved

20-2.08A(3) Submittals

Reserved

20-2.08A(4) Quality Control and Assurance

Demonstrate the conduits are free of obstructions after placement of base and surfacing.

Before and after extending the irrigation supply line in a conduit, pressure test the supply line under section 20-2.01A(4)(b).

After conductors are installed in a conduit, test the conductors under section 20-2.05A(4).

Assign a technical representative to direct and control the directional bore activities. The representative must be present during directional bore activities. Unless otherwise authorized, perform directional bore activities in the presence of the Engineer.

20-2.08B Materials

20-2.08B(1) General

Reserved

20-2.08B(2) ABS Composite Pipe Conduit

ABS composite pipe and couplings must comply with ASTM D 2680. Couplings must be solvent cement type.

20-2.08B(3) Corrugated High Density Polyethylene Pipe Conduit

Corrugated high density polyethylene pipe must comply with ASTM F 405 and F 667 or be Type S and comply with AASHTO M252 and M294. Couplings and fittings must be as recommended by the pipe manufacturer.

20-2.08B(4) Corrugated Steel Pipe Conduit

Corrugated steel pipe conduit must comply with section 66. The nominal thickness of metal sheets for pipe must be 0.064 inch for corrugated steel pipe and 0.060 inch for corrugated aluminum pipe. Coupling bands and hardware must comply with section 66.

20-2.08B(5) Polyvinyl Chloride Pipe Conduit

PVC pipe conduit must be schedule 40 and comply with ASTM D 1785.

Fittings must be schedule 80.

20-2.08B(6) Welded Steel Pipe Conduit

Welded steel pipe must comply with ASTM A 53. Pipe must be black and have either welded or threaded joints.

The minimum wall thickness for the various sizes of welded steel pipe must comply with the dimensions shown in the following table:

Pipe size, nominal (inch)	Minimum wall thickness (inch)
3	0.216
4	0.237
6	0.280
8	0.277
10	0.279
12	0.330

20-2.08C Construction**20-2.08C(1) General**

When existing conduits are to be incorporated in new work, excavate exploratory holes for locating existing conduits at the locations indicated by existing markers or as directed. Excavate and backfill exploratory holes to a maximum size of 2-1/2 feet in width, 5 feet in depth, and 5 feet on each side of the marker or directed location parallel to the roadway. If the conduit is not found and if ordered, increase the size of the exploratory holes beyond the dimensions specified. The additional excavation and backfill is change order work.

If extending an existing conduit, remove conductors from the conduit.

Use a coupling band if the new conduit matches the existing conduit diameter, otherwise overlap the conduit at least 12 inches.

After extending existing conduits, install conductors that match the color and size of the existing conductors without splices. Splice conductors in adjacent pull boxes.

If installing a control and neutral conductor and electrical conduit through the irrigation conduit, install a no. 5 pull box at each end.

Remove debris found in the conduit before performing other work. Debris found more than 3 feet from the ends of the conduits is removed as change order work.

Extend conduit 2 feet beyond all paving unless otherwise shown.

Cap the ends of unused conduit.

Designate the location of each conduit by cementing a Type A pavement marker as shown. Type A pavement markers and adhesive must comply with section 85.

20-2.08C(2) Welded Steel Pipe Conduit**20-2.08C(2)(a) General**

Install welded steel pipe by directional boring or jack and drill.

Install top of conduits:

1. 18 to 30 inches below the finished surface in sidewalk areas
2. 40 to 52 inches below the finished grade in other paved areas

20-2.08C(2)(b) Directional Boring

Notify the Engineer 2 business days before starting directional bore activities.

The diameter of the boring tool for directional boring must be only as large as necessary to install the conduit.

Mineral slurry or wetting solution may be used to lubricate the boring tool and to stabilize the soil surrounding the boring path. The mineral slurry or wetting solution must be water based.

The directional bore equipment must have directional control of the boring tool and have an electronic boring tool location detection system. During operation, the directional bore equipment must be able to determine the location of the tool both horizontally and vertically.

20-2.08C(2)(c) Jack and Drill

Notify the Engineer 2 business days before starting jack and drill activities.

Jacking or drilling pits must be no closer than 2 feet from pavement edge whenever possible.

If authorized, small holes may be cut in the pavement to locate or remove obstructions.

Do not use excessive water that will soften subgrade or undermine pavement.

20-2.08C(3) Schedule 40 Pipe Conduit

Where schedule 40 pipe conduit 2 inches or less in outside diameter is installed under surfacing, you may install by directional boring under section 20-2.08C(2)(b).

For conduit 2 inches or less in diameter, the top of the conduit must be a minimum of 18 inches below surfacing.

Extend schedule 40 pipe conduit 6 inches beyond surfacing. Cap ends of conduit until used.

20-2.08D Payment

Schedule 40 PVC pipe conduit is paid for as plastic pipe (schedule 40) (supply line).

20-2.09 IRRIGATION SUPPLY LINE

20-2.09A General

20-2.09A(1) Summary

Section 20-2.09 includes specifications for installing irrigation supply line.

If the supply line location interferes with the excavation of plant holes, relocate the plant hole to clear the supply line. Do not install supply lines through plant holes unless shown.

Supply lines, control and neutral conductors and electrical conduits installed in common trenches must not be installed above each other.

20-2.09A(2) Definitions

Reserved

20-2.09A(3) Submittals

Submit a certificate of compliance for polyethylene pipe and plastic pipe supply line.

20-2.09A(4) Quality Control and Assurance

Solvent cement must comply with the local Air Quality Management District requirements.

20-2.09B Materials

20-2.09B(1) General

Irrigation supply pipe must be metal or plastic as shown.

PCC for thrust blocks must be produced from commercial-quality aggregates. The concrete must contain at least 295 pounds of cementitious material per cubic yard.

20-2.09B(2) Copper Pipe Supply Line

Copper pipe must be Type K rigid pipe and comply with ASTM B 88. Fittings must be wrought copper or cast bronze either soldered or threaded.

Solder must be 95 percent tin and 5 percent antimony.

20-2.09B(3) Galvanized Steel Pipe Supply Line

Galvanized steel pipe supply line and couplings must be standard weight and comply with ASTM A 53, except that the zinc coating must not be less than 90 percent of the specified amount. Except for couplings, fittings must be galvanized malleable iron, banded and threaded, and comply with ANSI B16.3, Class 150.

Joint compound must be nonhardening and noncorrosive. Do not use pipe thread sealant tape.

20-2.09B(4) Drip Irrigation Tubing

Drip irrigation tubing must be virgin polyethylene plastic and comply with ASTM D 2737.

The drip irrigation tubing must be distribution tubing with preinstalled in-line emitters.

If preinstalled in-line drip irrigation tubing is not shown, you may install emitters that match the distribution requirements shown. The emitters must be barbed or threaded-type outlet devices with dual silicone diaphragms and installed under the manufacturer's instructions.

The emitters must meet the flow rate and operating pressure range shown.

The wall thickness of polyethylene tubing must comply with the following requirements when tested under ASTM D 2122:

Pipe size, nominal (inch)	Minimum wall thickness (inch)	Maximum wall thickness (inch)
1/2	0.050	0.070
5/8	0.055	0.075
3/4	0.060	0.080

The polyethylene tubing fittings must be leak-free, compression type and have female sockets with an internal barb to provide a positive pipe-to-fitting connection that will not separate at the designed pressure.

20-2.09B(5) Plastic Pipe Supply Line

Plastic pipe supply line must be PVC pipe that is NSF approved.

Schedule 40 plastic pipe supply line must comply with ASTM D 1785.

Class 315 plastic pipe supply line must comply with ASTM D 2241.

PVC gasketed bell joints must comply with ASTM D 2672, ASTM D2241, ASTM D 3139, and ASTM F 477.

For solvent-cemented type joints, the primer and solvent cement must be made by the same manufacturer. The primer color must contrast with the color of the pipe and fittings.

Solvent-cemented fittings must be injection molded PVC, schedule 40, and comply with ASTM D 2466.

Fittings for supply line placed in irrigation conduit must be schedule 80.

Fittings for plastic pipe supply line larger than 4 inches must be ductile iron under section 20-2.14C(2)(b).

If UV-resistant plastic pipe supply line is required, the pipe must be homogeneous, uniform color and be manufactured of:

1. At least 80 percent vinyl chloride resin with UV stabilizers
2. Non-PVC resin modifiers and coloring ingredients
3. Coloring ingredients with UV stabilizers

20-2.09C Construction**20-2.09C(1) General**

Cut pipe straight and true. After cutting, ream out the ends to the full inside diameter of the pipe.

Prevent foreign material from entering the irrigation system during installation. Immediately before assembling, clean all pipes, valves, and fittings. Flush lines before attaching sprinklers, emitters, and other terminal fittings.

Pipe supply lines installed between the water meter and backflow preventer assembly must be installed not less than 18 inches below finished grade measured to the top of the pipe.

Where a connection is made to existing supply lines, bell and gasketed fittings or compression fittings may be used.

Install a thrust block at each change in direction on the main supply line, terminus run, and at other locations shown.

Where supply lines cross paved ditches more than 3 feet deep at their flow line, install galvanized steel pipe for the entire span of the ditch.

Secure UV resistant plastic pipe supply line on grade as shown.

20-2.09C(2) Galvanized Steel Pipe Supply Line

Coat male pipe threads on galvanized steel pipe according to the manufacturer's instructions.

20-2.09C(3) Drip Irrigation Tubing

Install drip irrigation tubing on grade and under manufacturer's instructions.

Install a flush valve and an air-relief valve if recommended by the drip valve assembly manufacturer.

20-2.09C(4) Plastic Pipe Supply Line

For PVC pipe 1-1/2 inches in diameter or smaller, cut the pipe with PVC cutters.

For solvent-cemented type joints, apply primer and solvent-cement separately under the manufacturer's instructions.

Wrap the male portion of each threaded plastic pipe fitting with at least 2 layers of pipe thread sealant tape.

Install plastic pipe supply line mains with solvent-cemented type joints not less than 18 inches below finished grade measured to the top of the pipe.

Install plastic pipe supply line laterals with solvent-cemented type joints not less than 12 inches below finished grade measured to the top of the pipe.

Snake plastic pipe installed by trenching and backfilling methods.

20-2.09D Payment

Supply line pipe and drip irrigation tubing are measured along the slope.

20-2.10 SPRINKLER ASSEMBLIES

20-2.10A General

Section 20-2.10 includes specifications for installing sprinkler assemblies.

20-2.10B Materials

20-2.10B(1) General

Each sprinkler assembly must meet the characteristics shown in the irrigation legend.

Where shown, a sprinkler assembly must have a flow shut-off device that automatically stops the flow of water on the downstream side of the device when the assembly is broken. You may use a sprinkler assembly with a preinstalled flow shut-off device or you must install a flow shut-off device under the manufacturer's instructions.

Flexible hose for sprinkler assembly must be leak-free, nonrigid and comply with ASTM D 2287, cell Type 6564500. The hose wall thickness must comply with ASTM D 2122 for the hose diameters shown in the following table:

Hose diameter, nominal (inch)	Minimum wall thickness (inch)
1/2	0.127
3/4	0.154
1	0.179

Solvent cement and fittings for flexible hose must comply with section 20-2.09B(5).

20-2.10B(2) Pop-Up Sprinkler Assemblies

Each pop-up sprinkler assembly must include a body, nozzle, swing joint, pressure compensation device, check valve, sprinkler protector, and fittings as shown.

20-2.10B(3) Riser Sprinkler Assemblies

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Each riser sprinkler assembly must include a riser or flexible hose, threaded nipple, swing joint, check valve, and nozzle as shown. The riser must be UV resistant schedule 80, PVC 1120 or PVC 1220 pipe and comply with ASTM D 1785.

20-2.10B(4) Tree Well Sprinkler Assemblies

Each tree well sprinkler assembly must include a body, riser, swing joint, perforated drainpipe, and drain cap.

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The perforated drainpipe must be commercial grade, rigid, PVC pipe with holes spaced not more than 6 inches on center on 1 side of the pipe.

Drain cap must be commercially available, 1 piece, injection molded drain grate manufactured from structural foam polyolefins with UV light inhibitors. Drain grate must be black.

Gravel for filling the drainpipe must be graded such that 100 percent passes the 3/4-inch sieve and 100 percent is retained on the 1/2-inch sieve. Gravel must be clean, washed, dry, and free from clay or organic material.

20-2.10C Construction

Install pop-up and riser sprinkler assembly:

1. 6-1/2 to 8 feet from curbs, dikes, and sidewalks
2. 10 feet from paved shoulders
3. 3 feet from fences and walls

If sprinkler assembly cannot be installed within these limits, the location will be determined by the Engineer.

Set sprinkler assembly riser on slopes perpendicular to the plane of the slope.

Install tree well sprinkler assembly as shown.

20-2.10D Payment

Not Used

20-2.11 VALVES

20-2.11A General

Section 20-2.11 includes specifications for installing valves.

20-2.11B Materials

20-2.11B(1) General

Valves must:

1. Include a valve box and cover
2. Be the same size as the supply line that the valve serves unless otherwise shown
3. Be bottom, angled, or straight inlet configuration

20-2.11B(2) Ball Valves

Ball valve must be a two-piece brass or bronze body and comply with the requirements shown in the following table:

Property	Requirements
Nonshock working pressure, min	400 psi
Seats	PTFE
O-ring seals	PTFE

Ball valve must be the same size as the supply line that the valve serves.

20-2.11B(3) Check Valves

Each check valve must:

1. Be schedule 80 PVC and factory set to 5 psi for adjustable spring check valve
2. Be Class 200 PVC for swing check valves on non pressurized plastic irrigation supply line

20-2.11B(4) Drip Valve Assemblies

Each drip valve assembly must include:

1. Remote control valve
2. Wye filter with:
 - 2.1. Filter housing that:
 - 2.1.1. Can withstand a working pressure of 150 psi
 - 2.1.2. Is manufactured of reinforced polypropylene plastic
 - 2.2. Reusable stainless steel filter cartridge with a 200 mesh size filtration
3. Ball valve under 20-2.11B(2)
4. Schedule 80 PVC pipes and fittings
5. Pressure regulator

20-2.11B(5) Garden Valve Assemblies

Each garden valve assembly must have:

1. Garden valve
2. Location marker

20-2.11B(6) Gate Valves

Gate valves must be:

1. Flanged or threaded type
2. Iron or bronze body
3. Bronze trimmed with one of the following:
 - 3.1. Internally threading rising stem
 - 3.2. Nonrising stem
4. Able to withstand a working pressure of 150 psi
5. Same size as the pipeline that the valves serves unless otherwise shown

Gate valves smaller than 3 inches must have a cross handle.

Gate valves 3 inches or larger must be flanged type with a square nut. Furnish 3 long shank keys before Contract acceptance.

Gate valves attached to the outlets of a wye strainer must have seating rings on the discharge side of the gate valves must be PTFE. Valve wedges must be driven obliquely by cam action into the seating rings.

20-2.11B(7) Pressure Regulating Valves

Pressure regulating valve must be:

1. Flanged or threaded type
2. Brass, bronze, cast iron, or plastic body
3. Spring diaphragm type

4. Pilot controlled

Pressure regulating valve must have no internal filter screens.

20-2.11B(8) Pressure Relief Valves

Pressure relief valve must have a brass or bronze body, stainless steel springs, bronze nickel chrome seats, composition seat discs, female bottom inlets, and female side outlets.

20-2.11B(9) Quick Coupling Valves

Quick coupling valve must be 3/4 inch double slotted with a self-closing cap, 3/4-inch brass key and 3/4-inch brass hose swivel unless otherwise shown. Except for the cap, quick coupling valve must be brass or bronze construction. Furnish 3 loose quick coupling brass keys and brass hose swivels before Contract acceptance.

20-2.11B(10) Remote Control Valves

20-2.11B(10)(a) General

Each remote control valve must:

1. Be normally closed type.
2. Be glass filled nylon, brass, or bronze.
3. Be completely serviceable from the top without removing the valve body from the system.
4. Be equipped with a device that regulates and adjusts the flow of water and be provided with a manual shut-off. The manual shut-off for valves larger than 3/4 inch must be operated by a cross handle.
5. Have solenoids compatible with the irrigation controller.
6. Have a manual bleed device.
7. Be capable of withstanding a pressure of 200 psi
8. Have replaceable compression discs or diaphragms.
9. Have threaded fittings for inlets and outlets.
10. Have DC latching solenoids when used with solar or battery controllers. Solenoids must operate on 3.5 V.

20-2.11B(10)(b) Remote Control Valves with Flow Sensor

Reserved

20-2.11B(10)(c) Remote Control Valves with Pressure Regulator

Each remote control valve with pressure regulator must be factory assembled as 1 unit.

20-2.11B(11) Wye Strainer Assemblies

Each wye strainer assembly must include:

1. Wye strainer
2. Garden valve

20-2.11C Construction

20-2.11C(1) General

Install control valves:

1. 6-1/2 to 8 feet from curbs, dikes, and sidewalks
2. 10 feet from paved shoulders
3. 3 feet from fences, walls, or both

If a control valve cannot be installed within these limits, the location will be determined by the Engineer.

20-2.11C(2) Check Valves

Unless otherwise shown, install spring-action check valves as necessary to prevent low head drainage.

20-2.11C(3) Garden Valve Assemblies

Install a location marker 8 to 10 inches from the back of each garden valve.

20-2.11C(4) Pressure Regulating Valves

Install pressure regulating valves with threaded connections and a union on the inlet side of the valves.

20-2.11C(5) Wye Strainer Assemblies

Unless shown, install wye strainer assembly on the upstream side of the remote control valves.

Install garden valve so that when the system is flushed, the discharge sprays out of the valve box.

20-2.11D Payment

Not Used

20-2.12 WATER METERS

Reserved

20-2.13 RESERVED**20-2.14 SUPPLY LINE ON STRUCTURES****20-2.14A General****20-2.14A(1) General****20-2.14A(1)(a) Summary**

Section 20-14 includes specifications for installing water supply lines through bridges and on the exterior of concrete structures.

20-2.14A(1)(b) Definitions

Reserved

20-2.14A(1)(c) Submittals

Submit a work plan for temporary casing support at the abutments as an informational submittal.

20-2.14A(1)(d) Quality Control and Assurance**20-2.14A(1)(d)(i) General**

Before installing seismic expansion assemblies or expansion assemblies, the Engineer must authorize the extension setting.

20-2.14A(1)(d)(ii) Regulatory Requirements

Piping materials must bear the label, stamp, or other markings of the specified standards.

20-2.14A(1)(d)(iii) Site Tests

Test water supply lines before:

1. Backfilling
2. Beginning work on box girder cell decks
3. Otherwise covering the water supply lines

Furnish pipe anchorages to resist thrust forces occurring during testing.

Test the water supply lines as 1 unit. The limits of the unit must be 5 feet beyond the casing at each end of the bridge.

Cap each end of the water supply lines before testing. Caps must be rated for the test pressure.

Test water supply lines under section 20-2.01A(4)(b), except that the testing period must be 4 hours with no pressure drop.

For water supply lines 4 inches and larger testing must meet the following additional requirements:

1. Testing pressure must be at least 120 psi
2. Air relief valve must not be subjected to water pressure due to testing

If water supply lines fail testing, retest the lines after repair.

20-2.14A(2) Materials

20-2.14A(2)(a) General

Protect stored piping from moisture and dirt. Elevate piping above grade. Support piping to prevent sagging and bending.

Protect flanges, fittings, and assemblies from moisture and dirt.

20-2.14A(2)(b) Air Release Valve Assemblies

Air release valve assemblies include an air release valve, ball valve, tank vent, nipples, and pipe saddle. Assemblies must comply with the following:

1. Air release valves must have a cast iron body with stainless steel trim and float, 1-inch NPT inlet, 1/2-inch NPT outlet, and 3/16-inch orifice.
2. Ball valves must have a 2-piece bronze body with chrome plated or brass ball, 1-inch full-size port, and be rated for at least 400 psi.
3. Tank vents must have a 1/2-inch NPT inlet and downward-facing double openings with screened covers.
4. Nipples must be schedule 40 galvanized steel pipe.
5. Pipe saddle must be rated for at least 150 psi and compatible with water supply line. Pipe saddle must be (1) single strap pipe saddle for water supply lines smaller than 4 inches or (2) double strap pipe saddle for water supply lines 4 inches and larger. You may use a tee fitting for galvanized steel water supply lines.

20-2.14A(2)(c) Casings

Casings must be welded steel pipe casing complying with section 70-7.

20-2.14A(2)(d) Pipe Wrap Tape

Pipe wrap tape must be pressure sensitive tape made from PVC or polyethylene. Pipe wrap tape must be at least 50 mils thick and not wider than 2 inches.

20-2.14A(2)(e) Pipe Hangers

Pipe hangers must comply with section 70-7.02C.

The pipe hanger must be rated for the water supply line. If casings are shown, include the casings weight.

20-2.14A(2)(f) Epoxy Adhesives

Epoxy used for anchoring concrete pipe supports must comply with section 70-7.02D.

20-2.14A(2)(g) Concrete Pipe Supports

Concrete pipe supports must comply with section 70-7.02D.

20-2.14A(2)(h) Pipe Clamps and Anchors

Metal clamps must be commercial quality steel complying with section 75-1.02. Anchors must comply with the specifications for concrete anchorage devices in section 75-1.03C.

20-2.14A(2)(i) Pull Boxes

Pull boxes and covers must comply with section 20-2.01B(5).

20.2.14A(3) Construction

20-2.14A(3)(a) General

Support water supply lines as described.

Where water supply lines penetrate bridge superstructure concrete, either form or install pipe sleeves at least 2 pipe sizes larger than the pipe.

20-2.14A(3)(b) Preparation

Clean the interior of the pipe before installation. Cap or plug openings as pipe is installed to prevent the entrance of foreign material. Leave caps or plugs in place until the next pipe section is installed.

20-2.14A(3)(c) Installation**20-2.14A(3)(c)(i) General**

Reserved

20-2.14A(3)(c)(ii) Casings

Install casings under section 70-7.03.

Seal casing end with 8 inches of polyurethane foam at dirt stop or pipe end seal.

20-2.14A(3)(c)(iii) Wrapping Water Supply Line

Wrap damaged supply line coatings with pipe wrap tape. Wrap field joints and fittings that are in contact with the earth.

Wrapping must comply with the following:

1. Clean and prime area as recommended by the tape manufacturer.
2. Tightly wrap tape with 1/2 uniform overlap, free from wrinkles and voids, to provide not less than a 100 mil thickness.
3. The tape must conform to joint or fitting contours.
4. Extend tape at least 6 inches over adjacent pipe.

20-2.14A(3)(c)(iv) Pipe Clamps and Anchors

Install water supply lines on the exterior surfaces of bridges or other concrete structures with metal clamps and anchors.

Drilling of holes for anchors must comply with the following:

1. Drill holes to manufacturers recommended depth.
2. Drilling tools must be authorized.
3. Do not drill holes closer than 6 inches to the edge of a concrete structure.
4. Relocate holes if reinforcing steel is encountered. Fill abandoned holes with mortar. Mortar must comply with section 51-1.02F.

Where water supply lines are mounted vertically for more than 2 feet, install clamps and anchors within 6 inches of the elbows.

Where water supply lines are mounted vertically for more than 10 feet, install additional clamps and anchors at 10 foot centers unless otherwise shown.

20-2.14A(3)(d) Sequences of Operation

If the bridge superstructure is to be prestressed do not place mortar around casings in abutments and hinges until bridge superstructure prestressing has been completed.

20-2.14A(4) Payment

Supply line on structures is measured from end to end, along the centerline.

The Department does not pay for failed tests.

20-2.14B Supply Line on Structures, Less than 4 Inches**20-2.14B(1) General****20-2.14B(1)(a) Summary**

Section 20-2.14B includes specifications for installing water supply lines smaller than 4 inches.

20-2.14B(1)(b) Definitions

Reserved

20-2.14B(1)(c) Submittals

Product data for materials includes catalog cuts, performance data, and installation instructions.

Submit product data for:

1. Water supply line

2. Expansion assemblies
3. Casing insulators
4. Pipe end seals
5. Pipe anchorages
6. Air release valve assemblies
7. Casings
8. Pipe hangers
9. Epoxy adhesives
10. Concrete pipe supports

20-2.14B(1)(d) Quality Control and Assurance

Reserved

20-2.14B(2) Materials

20-2.14B(2)(a) General

Reserved

20-2.14B(2)(b) Water Supply Line

Water supply lines must comply with section 20-2.09.

20-2.14B(2)(c) Expansion Assemblies

Expansion assemblies must consist of a hose with ends, insulated flange connections, and elbows. Expansion assemblies must have the same nominal inside diameter as the water supply line. Working pressure must be at least 150 psi.

Hose must be medium or heavy weight, crush and kink resistant, rated for at least 150 psi. Cover must be flexible, oil resistant rubber or synthetic, reinforced with at least 2-ply synthetic yarn or steel wire. The inner tube must meet FDA and USDA Standards for potable water. Hose ends must be stainless steel flanged connections with stainless steel crimped bands or swaged end connectors. Do not use barbed ends with band clamps.

Elbows must be 45 degree, standard weight galvanized steel fittings.

20-2.14B(2)(d) Casing Insulators

Casing insulators must be:

1. 2-piece, high-density, injection-molded polyethylene, nonconductive inner liner, with cadmium-plated nuts and bolts.
2. Factory constructed to ensure the water supply line is centered in the casing. Insulators must not allow any contact between pipe and casing and have at least 2 runners seated on the bottom of the casing.
3. Sized for the casing and water supply line shown.

20-2.14B(2)(e) Pipe Anchorages

Pipe anchorages must consist of an I-beam, U-bolts, anchors, and double nuts.

Use concrete anchorage devices for anchors on existing bridges. Use L-anchor bolts for anchors on new bridges.

Fabricate the I-beam from 1/2-inch steel plate. Steel plate, U-bolts, L-anchors, and nuts must comply with section 75-1.02. Concrete anchorage devices must comply with section 75-1.03C.

20-2.14B(2)(f) Pipe End Seals

Pipe end seals must consist of a pipe end seal, stainless steel bands, and polyurethane foam.

Pipe end seal must be factory constructed from seamless neoprene and sized for the casing and water supply line shown. Neoprene must be at least 1/8 inch thick. Stainless steel bands must be crimped.

Polyurethane foam must be expanding foam spray that is water resistant and moisture cured.

20-2.14B(3) Construction

Locate pipe anchorage halfway between expansion assemblies.

Pipe end seal must be pulled onto the casing during pipe installation. Do not use wrap-around type end seals.

20-2.14B(4) Payment

Supply line on structures is paid for as galvanized steel pipe (supply line on bridge).

20-2.14C Supply Line on Structures, 4 Inches and Larger

20-2.14C(1) General

20-2.14C(1)(a) Summary

Section 20-2.14C includes specifications for installing water supply lines 4 inches and larger.

20-2.14C(1)(b) Definitions

Reserved

20-2.14C(1)(c) Submittals

Product data for materials includes catalog cuts, performance data, and installation instructions.

Submit product data for:

1. Water supply line
2. Expansion assemblies
3. Flange insulating gaskets
4. Casing insulators
5. Seismic expansion assemblies
6. Lateral restraint assemblies
7. Air release valve assemblies
8. Casings
9. Pipe hangers
10. Epoxy adhesives
11. Concrete pipe supports

Submit the maximum range and preset dimension for each expansion assembly or seismic expansion assembly as an informational submittal.

Submit at least 5 sets of product data to OSD, Documents Unit. Each set must be bound together and include an index stating equipment names, manufacturers, and model numbers. Two sets will be returned. Notify the Engineer of the submittal. Include in the notification the date and contents of the submittal.

20-2.14C(1)(d) Quality Control and Assurance

Reserved

20-2.14C(2) Materials

20-2.14C(2)(a) General

Reserved

20-2.14C(2)(b) Water Supply Line

Water supply lines must consist of ductile iron pipe and fittings. Pipe must comply with ANSI/AWWA C151/A21.51, Class 350. Fittings must comply with ANSI/AWWA C110/A21.10, rated for a working pressure of 350 psi.

Ductile iron pipe connections to expansion assemblies must be a flanged joint complying with ANSI/AWWA C115/A21.15. Flange gaskets must be rated for a working pressure of 350 psi. Fasteners must comply with section 75-1.02, except that stainless steel fasteners must not be used.

All other ductile iron pipe and fitting joints must be push-on, restrained type complying with ANSI/AWWA C111/A21.11. Push-on, restrained type joints may use proprietary dimensions and proprietary restrained joint locking systems.

Ductile iron pipe and fittings must have an asphaltic coating complying with ANSI/AWWA C151/A21.51, and a cement mortar lining complying with ANSI/AWWA C104/A21.4.

20-2.14C(2)(c) Expansion Assemblies

Expansion assemblies must be a sleeve type expansion joint. The expansion assembly must have:

1. Ductile iron body complying with ANSI/AWWA C153/A21.53
2. Flanged ends complying with ANSI/AWWA C110/A21.10
3. Fusion bonded epoxy internal lining complying with ANSI/AWWA C213 at least 15 mils thick
4. Internal expansion sleeve limiting stop collars and be pressure balanced
5. Working pressure of at least 350 psi for sizes 24 inches and smaller and 250 psi for sizes larger than 24 inches
6. NSF 61 certification

The expansion assembly must be factory set at 1/2 the extension capacity.

20-2.14C(2)(d) Flange Insulating Gaskets

Flange insulating gaskets must consist of a dielectric flange gasket, insulating washers and sleeves, and commercial quality steel bolts and nuts. Dielectric flange gasket must have a dielectric strength of at least 500 vpm.

20-2.14C(2)(e) Casing Insulators

Casing insulators must be:

1. 2-piece, 8-inch, 14-gauge epoxy-coated or galvanized steel band, four 2-inch-wide glass-reinforced polyester or polyethylene runners, with cadmium-plated nuts and bolts.
2. Coated with at least 15-mils heat-fused PVC to provide a nonconductive inner liner.
3. Factory constructed to ensure the water supply line is centered in the casing. Insulators must not allow any pipe to casing contact and have at least 2 runners seated on the bottom of the casing.
4. Sized for the casing and water supply line shown.

20-2.14C(2)(f) Dirt Stops

Dirt stops must consist of a redwood cover with polyurethane foam.

Use construction heart grade redwood complying with 57-2.01B(2). Construct cover to fit snugly around the water supply line. The cover must be 2 inches taller and 2 inches wider than the casing.

Polyurethane foam must be expanding foam spray that is water resistant and moisture cured.

20-2.14C(2)(g) Seismic Expansion Assemblies

Seismic expansion assemblies must be a sleeve type expansion joint with integral ball joints at each end.

Seismic expansion assemblies must have:

1. Ability to withstand at least 15 degree angular deflection at each end and maximum movement in all 3 planes at the same time
2. Ductile iron body complying with ANSI/AWWA C153/A21.53
3. Flanged ends complying with ANSI/AWWA C110/A21.10
4. Fusion bonded epoxy internal lining complying with ANSI/AWWA C213 at least 15 mils thick
5. Internal expansion sleeve limiting stop collars and pressure balanced
6. Ball joints contained in flanged retainers with seal gaskets
7. Working pressure of at least 350 psi for sizes 24 inches and smaller and 250 psi for sizes larger than 24 inches
8. NSF 61 certification

The seismic expansion assembly must be factory set at 1/2 the extension capacity.

20-2.14C(2)(h) Lateral Restraint Assemblies

Lateral restraint assemblies must be (1) constructed from commercial quality steel components complying with section 75-1.02, (2) adjustable, and (3) able to resist a horizontal force of 10 percent of the contributory dead load.

20-2.14C(3) Construction

Each ductile iron pipe must be connected and fully extended (pulled out) after joint assembly before the next pipe section is added.

Install flange insulating gaskets on the outside flange of seismic expansion assemblies and expansion assemblies.

20-2.14C(4) Payment

Supply line on structures is paid for as supply line (bridge).

20-2.15 TEMPORARY IRRIGATION SYSTEMS

Reserved

20-2.16–20-2.19 RESERVED

20-3 PLANTING

20-3.01 GENERAL

20-3.01A General

20-3.01A(1) Summary

Section 20-3 includes specifications for performing planting work in new and existing landscapes.

20-3.01A(2) Definitions

Reserved

20-3.01A(3) Submittals

20-3.01A(3)(a) General

Submit nursery invoices showing species or variety and inspection certificates for plants.

Submit documentation of clearance from the county agricultural commissioner for plants obtained from a county outside the project limits.

If a root stimulant is required, submit a copy of the root stimulant manufacturer's product sheet and instructions for the application of the root stimulant.

If cuttings are to be taken from outside the right-of-way, submit proof of permits and payment of associated fees. Notify the Engineer of the location at least 15 days before taking cuttings.

20-3.01A(3)(b) Vendor Statements

At least 60 days before planting the plants, submit a statement from the vendor that the order for the plants required, including sample plants used for inspection, has been received and accepted by the vendor. The statement from the vendor must include the plant names, sizes, and quantities and the anticipated delivery date.

20-3.01A(3)(c) Certificates of Compliance

Submit a certificate of compliance for:

1. Sod
2. Soil amendment

20-3.01A(4) Quality Control and Assurance

Plants must comply with federal and state laws requiring inspection for diseases and infestations. Inspection certificates required by law must accompany each shipment of plants.

Obtain clearance from the county agricultural commissioner before planting plants delivered from a county outside the project limits.

The Engineer inspects the roots of container-grown sample plants by removing earth from the rootball of not less than 2 plants, nor more than 2 percent of the total number of plants of each species or variety. If container-grown plants are purchased from several sources, the Engineer inspects the roots of not less than 2 of each sample plant species or variety from each source. The rootball of container grown plants must not show evidence of being underdeveloped, deformed, or having been restricted.

If the Engineer finds noncompliant plants, the entire lot represented by the noncompliant sample plants will be rejected.

Cuttings with mature or brown stems and cuttings that have been trimmed will be rejected.

20-3.01B Materials

20-3.01B(1) General

Notify the Engineer at least 10 days before the plants are shipped to the job site.

20-3.01B(2) Plants

20-3.01B(2)(a) General

Plants must be the variety and size shown and true to the type or name shown. Plants must be individually tagged or tagged in groups identifying the plants by species or variety. Tagging is not required for cuttings.

Plants must be healthy, well-formed, not root-bound, free from insect pests and disease, and grown in nurseries inspected by the Department of Food and Agriculture.

The plants must comply with the size and type shown in the following table:

Plant group designation	Description	Container size (cu in)
A	No. 1 container	152–251
B	No. 5 container	785–1242
C	Balled and burlapped	--
E	Bulb	--
F	In flats	--
H	Cutting	--
I	Pot	--
K	24-inch box	5775–6861
M	Liner ^a	--
O	Acorn	--
P	Plugs ^{a, b}	--
S	Seedling ^c	--
U	No. 15 container	2768–3696

^aDo not use containers made of biodegradable material.

^bGrown in individual container cells.

^cBare root.

Trucks used for transporting plants must be equipped with covers to protect plants from windburn.

Handle and pack plants in an authorized way for the species or variety.

20-3.01B(2)(b) Cuttings

20-3.01B(2)(b)(i) General

Take cuttings at random from healthy, vigorous plants. Make cuts with sharp, clean tools. Do not take more than 25 percent of an individual plant and not more than 50 percent of the plants in an area.

Keep cuttings covered and wet until planted. Do not allow cuttings to dry or wither.

Plant cuttings no more than 2 days after being cut.

20-3.01B(2)(b)(ii) *Carpobrotus* and *Delosperma* Cuttings

You may take cuttings for new *Carpobrotus* and *Delosperma* groundcover from the existing highway planting areas, but these areas may not provide enough material to complete the work. Contact the local District's encroachment permit office to obtain a permit to harvest cuttings, identify acceptable cutting harvest areas, and to determine acceptable quantities to take.

Take tip cuttings from healthy, vigorous *Carpobrotus* and *Delosperma* plants that are free of pests and disease.

Carpobrotus cuttings must be 10 inches or more in length and not have roots.

Delosperma cuttings must be 6 inches or more in length and not have roots.

20-3.01B(2)(b)(iii) Willow Cuttings

Take willow cuttings from areas shown or designated by the Engineer.

Willow cuttings must be:

1. Reasonably straight
2. 20 to 24 inches in length
3. 3/4 to 1-1/2 inch in diameter at the base of the cutting

Cut the top of each willow cutting square above a leaf bud. Cut the base below a leaf bud at approximately a 45 degree angle. Trim off leaves and branches flush with the stem of the cutting.

20-3.01B(2)(b)(iv) Cottonwood Cuttings

Cottonwood cuttings must comply with the requirements for willow cuttings in section 20-3.01B(2)(b)(iii).

20-3.01B(2)(b)(v)–20-3.01B(2)(b)(viii) Reserved**20-3.01B(2)(c) Sod**

Sod must:

1. Be grown to comply with the Food & Agri Code
2. Be free from weeds and undesirable types of grasses and clovers
3. Be field-grown on soil containing less than 50 percent silt and clay
3. Have less than 1/2-inch-thick thatch
4. Not be less than 8 months or more than 16 months old
5. Be machine-cut to a uniform soil thickness of $5/8 \pm 1/4$ inch, not including top growth and thatch

Protect sod with tarps or other protective covers during delivery. Do not allow sod to dry out during delivery or before placement.

20-3.01B(3) Soil Amendment

Soil amendment must comply with the requirements in the Food & Agri Code. Soil amendment must be one or a combination of the following:

1. Sphagnum peat moss
2. Nitrolized fir bark
3. Vermiculite
4. Perlite

20-3.01B(4) Fertilizers**20-3.01B(4)(a) General**

Deliver fertilizer in labeled containers showing weight, chemical analysis, and manufacturer's name.

Fertilizer must comply with the requirements of the Food & Agri Code.

20-3.01B(4)(b) Slow-release Fertilizers

Slow-release fertilizer must be a pelleted or granular form with a nutrient release over an 8 to 12 month period and must comply with the chemical analysis ranges shown in the following table:

Ingredient	Content (percent)
Nitrogen (N)	16–21
Phosphoric acid (P)	6–8
Water soluble potash (K)	4–10

20-3.01B(4)(c) Packet Fertilizers

Packet fertilizer must be a biodegradable packet with a nutrient release over a 12 month period. Each packet must have a weight of 10 ± 1 grams and must comply with the chemical analysis shown in the following table:

Ingredient	Content (percent)
Nitrogen(N)	20
Phosphoric acid (P)	10
Water soluble potash (K)	5

20-3.01B(4)(d) Organic Fertilizers

Organic fertilizer must be pelleted or granular with a cumulative nitrogen release rate of no more than 70 percent for the first 70 days after incubation at 86 degrees F with 100 percent at 350 days or more. Organic fertilizer must comply with the chemical analysis shown in the following table:

Ingredient	Content (percent)
Nitrogen (N)	5–7
Phosphoric acid (P)	1–5
Water soluble potash (K)	1–10

20-3.01B(5) Root Stimulants

Root stimulant must be a commercial quality product.

20-3.01B(6) Plaster Sand

Backfill material for the transplant palm tree planting holes must be 100 percent commercial quality washed plaster sand.

20-3.01B(7) Root Barrier

Root barrier must be an injection molded or extruded modular panel made of high-density polypropylene or polyethylene plastic.

Each panel must:

1. Be at least 1/16-inch thick
2. Have at least 4 molded root-deflecting vertical ribs 0.5- to 0.8-inch wide, 6 to 8 inches apart
3. Have a locking strip or an integral male-female sliding lock designed to resist slippage between panels
4. Be at least 2 feet wide and 2 feet in depth

20-3.01B(8) Root Protectors

Each root protector must be:

1. Fabricated from 1-inch, hexagonal pattern, 20-gauge mesh wire
2. Closed bottom design with a height and diameter that provides a minimum of 6 inches of clearance between the root ball and the sides and bottom of the wire cylinder

Wire edges at the top of the cylinder must be the uncut manufactured finished edge free of sharp points.

20-3.01B(9) Foliage Protectors

Each foliage protector must be:

1. Fabricated from 1-inch, hexagonal pattern, 20-gauge mesh wire
2. Approximately 4 feet high and 2 feet in diameter

Wire edges at the top of the cylinder must be the uncut manufactured finished edge free of sharp points. Other wire edges that are cut must be free of sharp points.

Support stakes must be one of the following:

1. 3/4-inch reinforcing steel bar a minimum of 5 feet long with an orange or red plastic safety cap that fits snugly onto the top of the reinforcing steel bar
2. 2 inch nominal diameter or 2 by 2 inch nominal size wood stakes a minimum of 5 feet long. Wood stakes must be straight

The jute mesh cover must comply with section 21-1.02O(2). Twine required to hold the jute mesh cover in place must be 1/8-inch diameter manila hemp twine.

20-3.01B(10) Wood Plant Stakes

Each plant stake must be nominal 2 by 2 inch or nominal 2-inch diameter and of sufficient length to keep the plant in an upright position.

Plant stakes for vines must be nominal 1 by 1 inch, 18 inches long.

20-3.01B(11) Plant Ties

Plant ties must be extruded vinyl-based tape, 1 inch wide and at least 10 mils thick.

20-3.01C Construction

20-3.01C(1) General

Apply a root stimulant under the manufacturer's instructions to the plants specified in the special provisions.

Before transporting the plants to the planting area, thoroughly wet the root ball.

20-3.01C(2) Pruning

Prune plants under the latest edition of ANSI A300 part 1, *Pruning*, published by the Tree Care Industry Association.

Do not use tree seal compounds to cover pruning cuts.

20-3.01C(3) Watering

Water existing plants to be maintained, transplanted trees, and new plants as needed to keep the plants in a healthy growing condition.

20-3.01C(4) Replacement Plants

Plants that show signs of failure to grow at any time or are so injured or damaged as to render them unsuitable for the purpose intended, must be removed, replaced, and replanted. Replace unsuitable plants within 2 weeks after the Engineer marks or indicates that the plants must be replaced.

Replacement planting must comply with the original planting requirements, spacing, and size provisions described for the plants being replaced.

Replacement planting for transplanted trees must comply with the work plan and be planted in the same planting hole.

Replacement ground cover plants must be the same species specified for the ground cover being replaced. Other replacement plants must be the same species as the plants being replaced.

Place orders for replacement plants with the vendor at the appropriate time so that the replacement plants are not in a root-bound condition.

The Department does not pay for replacement plants or the planting of replacement plants.

20-3.01C(5) Maintain Plants

Maintain plants from the time of planting until Contract acceptance if no plant establishment period is specified or until the start of the plant establishment period.

20-3.01D Payment

Reserved

20-3.02 EXISTING PLANTING

20-3.02A General

20-3.02A(1) Summary

Section 20-3.02 includes specifications for pruning existing plants, transplanting trees, and maintaining existing planted areas.

Transplant palm trees between March 15 and October 15.

20-3.02A(2) Definitions

Reserved

20-3.02A(3) Submittals

Submit a work plan for:

1. Transplanting trees. The work plan must include methods for lifting, transporting, storing, planting, guying, and maintaining each tree to be transplanted. Include root ball size, method of root ball containment, and a maintenance program for each tree.
2. Maintaining existing planted areas. The work plan must include weed control, fertilization, mowing and trimming of turf areas, watering, and controlling rodents and pests.

Submit a copy of the manufacturer's product sheet for root stimulant including application instructions.

20-3.02A(4) Quality Control and Assurance

Inspect for deficiencies of existing planted areas in the presence of the Engineer. Complete the inspection within 15 days after the start of job site activities.

Deficiencies requiring corrective action include:

1. Weeds
2. Dead, diseased, or unhealthy plants
3. Missing plant stakes and tree ties
4. Inadequate plant basins and basin mulch
5. Other deficiencies needing corrective action to promote healthy plant life
6. Rodents and pests

20-3.02B Materials

Not Used

20-3.02C Construction

20-3.02C(1) General

Correct deficiencies of existing planted areas as ordered within 15 days of the order. Correction of deficiencies is change order work.

After deficiencies are corrected, perform work to maintain existing planted areas in a neat and presentable condition and to promote healthy plant growth through Contract acceptance.

20-3.02C(2) Prune Existing Plants

Prune existing plants as shown.

If no bid item for prune existing plants is included, prune existing plants as ordered. Pruning existing plants is change order work.

20-3.02C(3) Transplant Trees

Prune each tree to be transplanted immediately before lifting.

If the tree to be transplanted is a palm, prune by removing dead fronds and frond stubs from the trunk. Remove green fronds up to 2 rows of fronds away from the center of growth. Tie the remaining 2 rows of fronds in an upright position with light hemp or manila rope. Remove fronds and frond stubs at the trunk in a manner that will not injure the trunk. Remove fronds and frond stubs for *Phoenix dactylifera* (Date Palm) approximately 4 inches from the trunk.

Prepare each hole in the new location before lifting the tree to be transplanted.

Lift tree to be transplanted as described in the work plan.

Comply with section 20-3.03C(3) for handling and planting each tree to be transplanted.

Until replanted, cover exposed root ball with wet burlap or canvas and cover the crown with 90 percent shade cloth.

Replant each tree on the same day it is lifted if possible. If the transplant location is not ready to receive the tree, store and maintain the tree to be transplanted until the transplant location is authorized. Store tree in an upright position.

Replace damaged transplanted tree under 20-3.01C(4) and with the number of trees specified in the special provisions.

The replacement trees must be planted in individual plant holes at the location determined by the Engineer within the area of the tree being replaced. Comply with section 20-3.03C(2) for the planting of the replacement trees.

20-3.02C(4) Maintain Existing Planted Areas

If a bid item for maintain existing planted areas is included, the existing plant basins must be kept well-formed and free of sediment. If the existing plant basins need repairs, and the basins contain mulch, replace the mulch after the repairs are done.

Control weeds within the existing planted area and:

1. From the existing planted area limit to the adjacent edges of paving and fences if less than or equal to 12 feet
2. From the existing planted area limit to 6 feet beyond the outer limit of the existing planted area if the adjacent edge of paving or fence is more than 12 feet away
3. Within a 3-foot radius from each existing tree and shrub

If no bid item for maintain existing planted areas is included, maintain existing planted areas as ordered. Maintain existing planted areas is change order work.

20-3.02D Payment

Not Used

20-3.03 PLANTING WORK

20-3.03A General

Section 20-3.03 includes specifications for planting plants.

20-3.03B Materials

Not Used

20-3.03C Construction

20-3.03C(1) General

Do not begin planting until authorized.

If an irrigation system is required, do not begin planting in an area until the functional test has been completed and authorized for the irrigation system serving that area.

20-3.03C(2) Preparing Planting Areas

The location of each plant is as shown unless the Engineer designates otherwise. If the Engineer designates the location, it will be marked by a stake, flag, or other marker.

Conduct work so the existing flow line in drainage ditches is maintained. Material displaced by your operations that interferes with drainage must be removed.

Where a minimum distance to a drainage ditch is shown, locate the plant so that the outer edge of its basin wall is at least the minimum distance shown for each plant involved.

Excavate each planting hole by hand digging or by drilling. The bottom of each planting hole must be flat. Do not use water for excavating the hole.

Unless a larger planting hole is specified, the planting hole must be large enough to receive the root ball or the total length and width of roots, backfill, amendments, and fertilizer. Where rock or other hard material prohibits the hole from being excavated, a new hole must be excavated and the abandoned hole backfilled.

20-3.03C(3) Planting Plants

20-3.03C(3)(a) General

Do not plant plants in soil that is too wet, too dry, not properly conditioned as specified, or in an unsatisfactory condition for planting.

Do not distribute more plants than can be planted and watered on that day.

Water plants immediately after planting. Apply water until the backfill soil around and below the roots or ball of earth around the roots of each plant is thoroughly saturated. When watering with a hose, use a nozzle, water disbursement device, or pressure reducing device. Do not allow the full force of the water from the open end of the hose to fall within the basin around any plant. Groundcover plants in areas with an irrigation system must be watered by sprinklers. Several consecutive watering cycles may be necessary to thoroughly saturate the soil.

If shown, install root barriers between trees and concrete sidewalk or curb. Install panels flush with finished grade and join with locking strips or integral male-female sliding locks. Install barriers with root deflectors facing inward.

If a tree grate is shown, install root barrier panels 0.5 inch above finish grade or as shown.

Adjust planting locations so that each tree or shrub is at least 8 feet away from any sprinkler.

Where a tree, shrub, or vine is to be planted within a groundcover area or cutting planting area, plant it before planting groundcover or cuttings.

Where shrubs and groundcovers are shown to be planted in groups, the outer rows directly adjacent to the nearest roadway or highway fence must be parallel to the nearest roadway or highway fence. Stagger shrubs and groundcovers in adjacent rows. Adjust the alignment of the plants within the outer rows.

Core holes in concrete masonry block wall as shown.

Where a vine is to be planted against a wall or fence, plant it as close as possible to the wall or fence. If a vine planted next to a wall is to be staked, stake and tie the vine at the time of planting. A vine planted next to a fence must be tied to the fence at the time of planting.

Protect tree trunks from injury. Do not:

1. Drag tree
2. Use chains to move a tree
3. Lay tree on the ground

20-3.03C(3)(b) Trees, Shrubs, and Vines

After preparing holes, thoroughly mix soil amendment and granular fertilizer at the rate shown with native soil to be used as backfill material. Remove containers from plants in such a manner that the ball of earth surrounding the roots is not broken. Do not cut plant containers before delivery of the plants to the planting area. Plant and water plants immediately after removal from their containers.

Place packet fertilizer in the backfill within 6 to 8 inches of the ground surface and approximately 1 inch from the root ball. If more than 1 packet is required per plant, distribute the packets evenly around the root ball.

If a root stimulant is to be used, apply it according to the manufacturer's instructions.

If required, install root protectors in the plant holes as shown.

Ensure roots are not restricted or distorted.

Distribute backfill uniformly throughout the entire depth of the plant hole without clods or lumps. After the planting holes have been backfilled, jet water into the backfill with a pipe or tube inserted into the bottom of the hole until the backfill material is saturated for the full depth. If the backfill material settles below this level, add additional backfill to the required level. If a plant settles deeper than shown, replant it at the required level.

Remove nursery stakes after planting.

Install 2 plant stakes for each plant to be staked at the time of planting as shown. Ensure the rootball is not damaged.

Tie the plant to the stakes with 2 plant ties, 1 tie to each stake. Each tie must form a figure 8 by crossing the tie between the plant and the stake as shown. Install ties at the lowest position that will support the plant in an upright position. Ties must provide trunk flexibility but not allow the trunk to rub against the stakes. Wrap each end of the tie 1-1/2 turns around the stake and securely tie.

Construct a watering basin around each plant as shown.

If required, install a foliage protector:

1. Over the plant within 2 days after planting.
2. Vertically and centered over the plant as shown

If foliage protectors are required:

1. Cut the bottom of the wire cylinder to match the slope of the ground. Do not leave sharp points of wire after cutting. Sharp points must be bent over or blunted.
2. Install 2 support stakes for foliage protectors vertically and embed in the soil on opposite sides of the plant as shown and in a transverse direction to the prevailing wind.
3. Either weave the support stakes through the wire cylinder mesh at 6 inch maximum centers or fasten the wire cylinder to the support stakes at 6 inch maximum centers.
4. Wire cylinder must be snug against the support stakes but loose enough to be raised for pesticide application or to perform weeding within the plant basin.
5. Install jute mesh cover over the foliage protector and secure with twine as shown.

20-3.03C(3)(c) Groundcover Plants

Each groundcover planting area irrigated by a single control valve must be completely planted and watered before planting other groundcover planting areas.

Plant groundcover plants in moist soil, and in neat, straight rows, spaced as shown.

Apply fertilizer to groundcover plants and water into the soil immediately after planting.

20-3.03C(3)(d) Cuttings, Liners, Plugs, and Seedling Plants

20-3.03C(3)(d)(i) General

Apply fertilizer to cuttings, liners, plugs, and seedling plants and water immediately after planting.

Ensure the soil is moist to a minimum depth of 8 inches before planting cuttings.

If a root stimulant is to be used, apply it according to the manufacturer's instructions.

20-3.03C(3)(d)(ii) Willow Cuttings

Unless otherwise shown, for willow cuttings excavate planting holes perpendicular to the ground line by using a steel bar, auger, post hole digger, or similar tools. Holes must be large enough to receive the cuttings and fertilizer packet. Plant willow cuttings to the specified depths without damaging the bark.

Where rock or other hard material prohibits the excavation of the planting holes, excavate new holes and backfill the unused holes.

Plant willow cuttings during the period specified in the special provisions.

Apply root stimulant according to the manufacturer's instructions.

Plant the base of the cutting 10 to 12 inches deep with 3 to 5 bud scars exposed above the ground. If more than 5 bud scars are exposed, trim off the excess willow cutting length.

Place 1 fertilizer packet in the backfill of each cutting, 6 to 8 inches below the ground surface and approximately 1 inch from the cutting.

Backfill the plant holes with excavated material after planting. Distribute the excavated material evenly within the hole without clods, lumps, or air pockets. Compact the backfill so that the cutting cannot be easily removed from the soil. Do not damage the cutting's bark.

Dispose of trimmings and unused cuttings.

20-3.03C(3)(d)(iii) Cottonwood Cuttings

Reserved

20-3.03C(3)(d)(iv) *Carpobrotus* and *Delosperma* Cuttings

Plant *Carpobrotus* cuttings to a depth so that not less than 2 nodes are covered with soil. The basal end of *Delosperma* cuttings must not be less than 2 inches below the surface of the soil and the basal end of *Carpobrotus* cuttings must not be less than 4 inches below the surface of the soil.

Apply root stimulant to *Delosperma* cuttings before planting.

Do not plant *Carpobrotus* or *Delosperma* cuttings in soil that does not contain sufficient moisture at an average depth of 2 inches below the surface.

20-3.03C(3)(d)(v) Liner Plants

Plant liner plants during the period specified in the special provisions.

If a foliage protector is required, install under section 20-3.03C(3)(b).

20-3.03C(3)(d)(vi) Plug Plants

Plant plug plants during the period specified in the special provisions.

20-3.03C(3)(d)(vii) Seedling Plants

Plant seedling plants during the period specified in the special provisions.

20-3.03C(3)(e) Sod

After all other planting is performed, grade sod areas to drain and to a smooth and uniform surface. Fine grade and roll sod areas before placing sod.

Areas adjacent to sidewalks, edging, and other paved borders and surfaced areas must be 1 inch below the finished surface elevation of the facilities, after fine grading, rolling, and settlement of the soil.

Place sod such that the end of each adjacent strip is staggered a minimum of 2 feet. Place the edge and end of sod firmly against adjacent sod and against sidewalks, edging, and other paved borders and surfaced areas.

Lightly roll the entire sodded area to eliminate air pockets and ensure close contact with the soil after placement of sod. Water the sodded areas so that the soil is moist to a minimum depth of 4 inches after rolling. Do not allow the sod to dry out.

If irregular or uneven areas appear in the sodded areas, restore to a smooth and even appearance.

Trim sod to a uniform edge at sidewalks, edging, and other paved borders and surfaced areas. Trimming must be repeated whenever the edge of sod extends 1 inch beyond the edge of the edging, sidewalks, and other paved borders and surfaced areas. Remove and dispose of trimmed sod.

Mow sod when it has reached a height of 4 inches. Mow sod to a height of 2.5 inches.

20-3.03D Payment

Soil amendment is measured in the vehicle at the point of delivery.

Measurement for slow-release fertilizer, organic fertilizer, or iron sulfate is determined from marked weight or sack count.

Various sizes and types of plants are measured by either the product of the average plant density and the total area planted or by actual count of the living plants in place, determined by the Engineer. The average plant density is the number of living plants per sq yd determined from actual count of test areas chosen representing the total planted area. The size and location of the test areas is determined by you and the Engineer, except that the total area tested must be equal to not less than 3 percent nor more than 5 percent of the planted area being determined. The Engineer makes the final determination of the areas to be tested.

20-3.04–20-3.08 RESERVED

20-4 PLANT ESTABLISHMENT WORK

20-4.01 GENERAL

20-4.01A Summary

Section 20-4 includes specifications for performing plant establishment work.

Plant establishment consists of caring for the plants, including watering, fertilizing, pruning, replacing damaged plants, pest control, and operating and repairing of all existing irrigation facilities used and irrigation facilities installed as part of the new irrigation system.

Working days on which no work is required, as determined by the Engineer, will be credited as a plant establishment working day, regardless of whether or not you perform plant establishment work.

Working days whenever you fail to adequately perform plant establishment work will not be credited toward the plant establishment working days.

20-4.01B Definitions

Type 1 plant establishment: Plant establishment period with the number of working days specified for plant establishment beginning after all work has been completed except for plant establishment work and other bid items specified to be performed until Contract acceptance.

Type 2 plant establishment: Plant establishment period with the number of working days specified for plant establishment beginning after all planting work has been completed except for plant establishment work and other bid items specified to be performed until Contract acceptance, provided that the Contract must not be accepted unless the plant establishment work has been satisfactorily performed for at least the number of working days specified for plant establishment.

If maintenance and protection relief is granted for a completed portion of the work under section 5-1.38, Type 2 plant establishment period for the completed portion of the work is the time between completion of all planting work except for plant establishment work, and the granting of maintenance and protection relief, provided that the relief must not be granted unless the plant establishment work in the completed portion of the work has been satisfactorily performed for at least the number of working days specified for the plant establishment period.

20-4.01C Submittals

20-4.01C(1) General

Submit seasonal watering schedules for use during the plant establishment period within 10 days after the start of the plant establishment period. Remote irrigation control system watering schedule must utilize the remote irrigation control system software program.

Submit updated watering schedules within 5 business days after any changes have been made to the authorized schedules.

Submit a revised watering schedule for each irrigation controller not less than 30 days before completion of the plant establishment period.

20-4.01C(2) Notification

The Engineer will notify you in writing when the plant establishment period begins and will furnish statements regarding the number of working days credited to the plant establishment period after the notification.

Notify the Engineer at least 5 business days before applying each application of fertilizer.

20-4.01D Quality Control and Assurance

Provide training by a qualified person on the use and adjustment of the irrigation controllers installed, 30 days before completion of the plant establishment period.

Perform a final inspection of the plant establishment work in the presence of the Engineer between 20 and 30 days before Contract acceptance.

20-4.02 MATERIALS

20-4.02A General

Reserved

20-4.02B Fertilizers

Fertilizer must comply with section 20-3.01B(5).

20-4.03 CONSTRUCTION

20-4.03A General

Remove trash and debris.

Surplus earth accumulated in roadside clearing and planting areas must be removed.

Trim and mow turf areas as specified for sod in section 20-3.03C(3)(e). Dispose of trimmed and mowed material.

If irregular or uneven areas appear within turf areas, restore to a smooth and even appearance. Reseed turf seed areas.

Remove the tops of foliage protectors if plants become restricted.

Remove foliage protectors, including support stakes, within 30 days before the completion of the plant establishment period.

Keep plant basin walls well formed.

Clean new wye strainers and existing wye strainers that are a part of the new irrigation system annually until the completion of the plant establishment period. The last cleaning must be done within 15 days before the completion of the plant establishment period.

Remove, clean, and reinstall new filters and existing filters that are a part of the new irrigation system annually until the completion of the plant establishment period. The last cleaning must be done within 15 days before the completion of the plant establishment period.

20-4.03B Plant Growth Control

Prune plants planted as part of the Contract as authorized.

Remove plant growth that extends within 2 feet of sidewalks, curbs, dikes, shoulders, walls or fences.

Remove proposed and existing ground cover from within the plant basins, including basin walls, turf areas, and planting areas within edging.

Vines next to walls and fences must be kept staked and tied. Train vines on fences and walls or through cored holes in walls.

20-4.03C Fertilizers

Apply fertilizer to the plants as specified and water into the soil after each application.

Apply fertilizer at the rates shown and spread with a mechanical spreader, whenever possible.

20-4.03D Weed Control

Control weeds under section 20-1.03C(3).

20-4.03E Plant Staking

Replace the plant stakes that are inadequate to support plants with larger stakes.

Remove plant stakes when the Engineer determines they are no longer needed.

20-4.03F Replacement Plants

Replacement plants must comply with section 20-3.01C(4).

Replacement of plants up to and including the 125th plant establishment working day must be with a plant of the same size as originally specified. Plants of a larger container size than those originally specified for replacement plants may be used during the first 125 working days of the plant establishment period.

Replacement of plants after the 125th plant establishment working day must comply with the following size requirements:

Plant size (Original)	Plant size (Replacement)
Pot/liner/plug/ seedling	No. 1 container
No. 1 container	No. 5 container
No. 5 container	No. 15 container

Other replacement plants must be the same size as originally specified.

Replacement ground cover plants must comply with the following spacing requirements:

Original spacing (inches)	On center spacing of replacement ground cover plants (inches)		
	Number of completed plant establishment working days		
	1–125	126–190	191–End of plant establishment period
9	9	6	6
12	12	9	6
18	18	12	9
24	24	18	12
36	36	24	18

20-4.03G Watering

Operate the electric automatic irrigation systems in the automatic mode unless authorized.

If any component of the electric automatic irrigation system is operated manually, the day will not be credited as a plant establishment working day unless the manual operation is authorized.

Water plants utilizing the remote irrigation control system software program unless authorized.

Implement the watering schedule at least 10 days before completion of the plant establishment period.

20-4.04 PAYMENT

Not Used

20-5 LANDSCAPE ELEMENTS

20-5.01 GENERAL

20-5.01A General

Section 20-5 includes specifications for constructing and installing landscape elements.

20-5.01B Materials

Not Used

20-5.01C Construction

Earthwork must comply with section 19.

20-5.01D Payment

Not Used

20-5.02 EDGING

20-5.02A General

Section 20-5.02 includes specifications for constructing landscape edging.

20-5.02B Materials

20-5.02B(1) General

Reserved

20-5.02B(2) Header Board Edging

Lumber for header board edging must be one of the following types:

1. Construction grade cedar
2. Pressure-treated Douglas fir
3. Construction heart grade redwood complying with section 57-2.01B(2)

Lumber must be:

1. Rough cut from sound timber.
2. Straight. Sweep must not exceed 1 inch in 6 feet.
3. Free from loose or unsound knots. Knots must be sound, tight, well spaced, and not to exceed 2 inches in size on any face.
4. Free of shakes in excess of 1/3 the thickness of the lumber.
5. Free of splits longer than the thickness of the lumber.
6. Free of other defects that would render the lumber unfit structurally for the purpose intended.

Edging anchors for header board edging must be stakes of the size and shape shown.

20-5.02B(3) Metal Edging

Metal edging must be commercial quality, made of aluminum or steel, and have an L-shaped design. Edging must be a minimum of 4 inches in height. The thickness must be as recommended by the manufacturer for the use intended.

Edging anchors must be from the same manufacturer as the metal edging.

20-5.02B(4) High Density Polyethylene Edging

HDPE edging must be commercial quality and a minimum of 4 inches in height. The thickness must be as recommended by the manufacturer for commercial installation for the use intended.

Edging anchors must be from the same manufacturer as HDPE edging.

20-5.02B(5) Concrete Edging

Concrete for edging must be minor concrete.

20-5.02B(6)–20-5.02B(10) Reserved

20-5.02C Construction

20-5.02C(1) General

Where edging is used to delineate the limits of inert ground cover or mulch areas, install edging before installing inert ground cover or mulch areas.

Saw cut surfaces where (1) asphalt concrete or concrete surfacing must be removed to permit the installation of edging and (2) no joint exists between the surfacing to be removed and the surfacing to remain in place. The surfacing must be cut in a straight line to a minimum depth of 2 inches with a power-driven saw before the surfacing is removed. Spike or stake spacing must comply with the manufacturer's instructions for use and site conditions.

20-5.02C(2) Header Board Edging

Each stake must be driven flush with the top edge of the header board edging and the stake top must be beveled away from the header board at a 45 degree angle. Attach stake to header board with a minimum of two 12-penny hot dipped galvanized nails per stake.

20-5.02C(3) Metal and High Density Polyethylene Edging

Spike or stake spacing must comply with the manufacturer's instructions for use and site conditions.

20-5.02C(4) Concrete Edging

Construct and finish minor concrete edging under section 73-2.

20-5.02C(5)–20-5.02C(9) Reserved

20-5.02D Payment

Edging is measured parallel to the ground surface.

20-5.03 INERT GROUND COVERS AND MULCHES

20-5.03A General

20-5.03A(1) General

20-5.03A(1)(a) Summary

Section 20-5.03 includes specifications for installing inert ground covers and mulches.

20-5.03A(1)(b) Definitions

Reserved

20-5.03A(1)(c) Submittals

Submit:

1. Filter fabric product data including the manufacturer's product sheet and installation instructions
2. Certificate of compliance for filter fabric at least 5 business days before delivery of the material to the job site

20-5.03A(1)(d) Quality Control and Assurance

Reserved

20-5.03A(2) Materials

Soil sterilant must be oxadiazon granular preemergent and must comply with section 20-1.02C.

Filter fabric must be Class A. Staples for filter fabric must comply with section 21-1.02R.

20-5.03A(3) Construction

20-5.03A(3)(a) General

Before performing inert ground cover and mulch work, remove plants and weeds to ground level.

20-5.03A(3)(b) Earthwork

Excavate areas to receive inert ground cover or mulch to the depth shown. Maintain the planned flow lines, slope gradients, and contours of the job site. Grade subgrade to a smooth and uniform surface and compact to not less than 90 percent relative compaction.

20-5.03A(3)(c) Treatment of Soil

After compaction, apply soil sterilant at the maximum label rate. Do not apply soil sterilant more than 12 inches beyond the inert ground cover or mulch limits. The soil sterilant application and inert ground cover or mulch placement must be completed within the same work day.

20-5.03A(3)(d) Filter Fabric

Immediately before placing filter fabric, surfaces to receive filter fabric must be free of loose or extraneous material and sharp objects that may damage the filter fabric during installation.

Align fabric and place in a wrinkle-free manner.

Overlap adjacent rolls of the fabric from 12 to 18 inches. Spread each overlapping roll in the same direction. Fasten fabric with staples flush with the adjacent fabric to prevent movement of fabric by placement of inert ground cover or mulch.

Repair or replace fabric damaged during placement of inert ground cover or mulch with sufficient fabric to comply with overlap requirements.

20-5.03A(4) Payment

Not Used

20-5.03B Rock Blanket**20-5.03B(1) General****20-5.03B(1)(a) Summary**

Section 20-5.03B includes specifications for placing rock blanket.

20-5.03B(1)(b) Definitions

Reserved

20-5.03B(1)(c) Submittals

Submit a 1 sq yd sample of the various rock sizes.

20-5.03B(1)(d) Quality Control and Assurance

Reserved

20-5.03B(2) Materials**20-5.03B(2)(a) General**

Do not use filter fabric.

20-5.03B(2)(b) Concrete

Concrete must be minor concrete.

20-5.03B(2)(c) Rock

Rock must be clean, smooth, and obtained from a single source and must comply with the following grading requirements:

Grading Requirements

Screen size (inches)	Percentage passing
8	100
6	50-85
4	0-50

20-5.03B(2)(d) Mortar

Mortar must comply with section 51-1.02F.

20-5.03B(3) Construction

Place concrete as shown.

Rock must be placed while concrete is still plastic. Remove concrete adhering to the exposed surfaces of the rock.

Loose rocks or rocks with a gap greater than 3/8 inch must be reset by an authorized method. The rock gap is measured from the edge of the rock to the surrounding concrete bedding.

Place mortar as shown.

20-5.03B(4) Payment

Rock blanket is measured parallel to the rock blanket surface.

20-5.03C Gravel Mulch**20-5.03C(1) General****20-5.03C(1)(a) Summary**

Section 20-5.03C includes specifications for placing gravel mulch.

20-5.03C(1)(b) Definitions

Reserved

20-5.03C(1)(c) Submittals

Submit a 5-lb sample of the gravel mulch.

20-5.03C(1)(d) Quality Control and Assurance

Reserved

20-5.03C(2) Materials

Gravel mulch must be:

1. Uniform gray color
2. From a single source only
3. Crushed rock that complies with the following grading requirements:

Grading Requirements

Sieve size	Percent passing
1-1/4 inch	100
3/4 inch	60-80
1/2 inch	45-65
No. 40	5-20

20-5.03C(3) Construction

Place gravel and compact by rolling.

The finished gravel mulch surface must be smooth and uniform, maintaining original flow lines, slope gradients, and contours of the job site.

20-5.03C(4) Payment

Gravel mulch is measured parallel to the gravel mulch surface.

20-5.03D Decomposed Granite**20-5.03D(1) General****20-5.03D(1)(a) Summary**

Section 20-5.03D includes specifications for placing decomposed granite.

20-5.03D(1)(b) Definitions

Reserved

20-5.03D(1)(c) Submittals

Five business days before delivery of the materials to the job site, submit:

1. Solidifying emulsion product data including the manufacturers' product sheets and installation instructions
2. Certificate of compliance for solidifying emulsion
3. 5-lb sample of the decomposed granite

20-5.03D(1)(d) Quality Control and Assurance

Test plot must be:

1. Constructed at an authorized location
2. At least 3 by 12 feet
3. Constructed using the materials, equipment, and methods to be used in the work
4. Authorized before starting work

Notify the Engineer not less than 7 days before constructing the test plot.

The Engineer uses the authorized test plot to determine acceptability of the work.

If ordered, prepare additional test plots. Additional test plots are change order work.

If the test plot is not incorporated into the work, the Engineer may order you to remove it.

20-5.03D(2) Materials**20-5.03D(2)(a) General**

Decomposed granite must be:

1. Uniform gray or tan color
2. From one source only
3. Crushed granite rock that complies with grading requirements shown in the following table:

Grading Requirements	
Sieve size	Percent passing
3/8 inch	100
No. 4	95–100
No. 8	75–80
No. 16	55–65
No. 30	40–50
No. 50	25–35
No. 100	20–25
No. 200	5–15

Note:

Grading based upon AASHTO T11-82 and T27-82

20-5.03D(2)(b) Solidifying Emulsion

Solidifying emulsion must be either a water-based polymer or nontoxic organic powdered binder specifically manufactured to harden decomposed granite. The solidifying emulsion must not alter the decomposed granite color.

20-5.03D(3) Construction

Do not place decomposed granite during rainy conditions.

Mix solidifying emulsion thoroughly and uniformly throughout the decomposed granite and under the manufacturer's instructions. Mix the material in the field using portable mixing equipment, or delivered in mixer trucks from a local ready-mixed plant.

Place decomposed granite uniformly in layers no more than 1-1/2 inch thick. Compact each layer of decomposed granite to a relative compaction of not less than 90 percent. Begin compaction within 6 to 48 hours of placement.

If the material was mixed in the field, apply an application of solidifying emulsion after compaction as recommended by the manufacturer. Prevent runoff or overspray of solidifying emulsion onto adjacent paved or planting areas.

The finished decomposed granite surface must be smooth and uniform, compacted to a relative compaction of not less than 90 percent, maintaining original flow lines, slope gradients, and contours of the job site.

20-5.03D(4) Payment

Not Used

20-5.03E Wood Mulch**20-5.03E(1) General****20-5.03E(1)(a) Summary**

Section 20-5.03E includes specifications for placing wood mulch.

20-5.03E(1)(b) Definitions

Reserved

20-5.03E(1)(c) Submittals

Submit a certificate of compliance for mulch.

Submit a 2 cu ft mulch sample with the mulch source listed on the bag and obtain approval before delivery of mulch to the job site.

20-5.03E(1)(d) Quality Control and Assurance

Reserved

20-5.03E(2) Materials

20-5.03E(2)(a) General

Mulch must not contain more than 0.1 percent of deleterious materials such as rocks, glass, plastics, metals, clods, weeds, weed seeds, coarse objects, sticks larger than the specified particle size, salts, paint, petroleum products, pesticides or other chemical residues harmful to plant or animal life.

Do not use filter fabric.

20-5.03E(2)(b) Tree Bark Mulch

Tree bark mulch must be derived from cedar, Douglas fir, or redwood species.

Tree bark mulch must be ground so that at least 95 percent of the material by volume is less than 2 inches and no more than 30 percent by volume is less than 1 inch.

20-5.03E(2)(c) Wood Chip Mulch

Wood chip mulch must:

1. Be derived from clean wood
2. Not contain leaves or small twigs
3. Contain at least 95 percent wood chips by volume with average thickness of 1/16 to 3/8 inch in any direction and 1/2 to 3 inches in length

20-5.03E(2)(d) Shredded Bark Mulch

Shredded bark mulch must:

1. Be derived from trees
2. Be a blend of loose, long, thin wood, or bark pieces
3. Contain at least 95 percent wood strands by volume with average thickness of 1/8 to 1-1/2 inches in any direction and 2 to 8 inches in length

20-5.03E(2)(e) Tree Trimming Mulch

Tree trimming mulch must:

1. Be derived from chipped trees and may contain leaves and small twigs.
2. Contain at least 95 percent material by volume less than 3 inches and no more than 30 percent by volume less than 1 inch

20-5.03E(2)(f)–20-5.03E(2)(j) Reserved

20-5.03E(3) Construction

Spread mulch placed in areas outside of plant basins to a uniform thickness as shown.

Mulch must be placed at the rate described and placed in the plant basins or spread in areas as shown after the plants have been planted. Mulch placed in plant basins must not come in contact with the plant crown and stem.

Spread mulch from the outside edge of the proposed plant basin or plant without basin to the adjacent edges of shoulders, paving, retaining walls, dikes, edging, curbs, sidewalks, walls, fences, and existing plantings. If the proposed plant or plant without basin is 12 feet or more from the adjacent edges of shoulders, paving, retaining walls, dikes, edging, curbs, sidewalks, walls, fences, and existing plantings, spread the mulch 6 feet beyond the outside edge of the proposed plant basin or plant without basin.

Do not place mulch within 4 feet of:

1. Flow line of earthen drainage ditches
2. Edge of paved ditches
3. Drainage flow lines

Mulch is measured in the vehicle at the point of delivery.

20-5.04 RESERVED

20-5.05 SITE FURNISHINGS

Section 20-5.05 includes specifications for installing site furnishings.

20-5.06–20-5.10 RESERVED

10-19-12

1. 8 to 10 inches in diameter and at least 1.1 lb/ft
2. 10 to 12 inches in diameter and at least 3 lb/ft

01-18-13

01-18-13

04-19-13

04-20-12

10-19-12

01-18-13

[illegible]

11-15-13

07-19-13

SP-163

Replace section 28-2 with:

07-19-13

28-2 LEAN CONCRETE BASE

28-2.01 GENERAL

28-2.01A Summary

Section 28-2 includes specifications for constructing lean concrete base (LCB).

28-2.01B Definitions

coarse aggregate: Aggregate retained on a no. 4 sieve.

fine aggregate: Aggregate passing a no. 4 sieve.

28-2.01C Submittals

28-2.01C(1) General

At least 25 days before field qualification, submit the name of your proposed testing laboratory.

At least 10 days before field qualification, submit:

1. Aggregate qualification test results
2. Proposed aggregate gradation
3. Mix design, including:
 - 3.1. Proportions
 - 3.2. Types and amounts of chemical admixtures
4. Optional notice stating intent to produce LCB qualifying for a transverse contraction joint waiver under section 28-2.03D

Submittals for cementitious material must comply with section 90-1.01C(3).

Submit QC test results within 24 hours of test completion.

28-2.01C(2) Field Qualification

11-15-13

For each field qualification for each mix design, manufacture 12 specimens under ASTM C 31 and submit six of the specimens from 24 to 72 hours after manufacture. Use one batch for all 12 specimens.

07-19-13

Submit field qualification data and test reports including:

1. Mixing date
2. Mixing equipment and procedures used
3. Batch volume in cu yd, the minimum is 5 cu yd
4. Type and source of ingredients used
5. Age and strength from compression strength results

Field qualification test reports must be signed by the official in responsible charge of the laboratory performing the tests.

28-2.01D Quality Control and Assurance

28-2.01D(1) General

Stop LCB activities and immediately notify the Engineer whenever:

1. Any quality control or acceptance test result does not comply with the specifications
2. Visual inspection shows noncompliant LCB

If LCB activities are stopped, before resuming activities:

1. Inform the Engineer of the adjustments you will make
2. Remedy or replace the noncompliant LCB
3. Obtain authorization

Molds for compressive strength testing under ASTM C 31 or ASTM C 192 must be 6 by 12 inches.

Quality control and assurance for cementitious materials and admixtures must comply with section 90-1.01D(1)

28-2.01D(2) Aggregate Qualification Testing

Qualify the aggregate for each proposed aggregate source and gradation. Qualification tests include (1) sand equivalent and (2) average 7-day compressive strength under ASTM C 39 on 3 specimens manufactured under ASTM C 192. The cement content for this test must be 300 lb/cu yd, and the 7-day average compressive strength must be at least 610 psi. Cement must be Type II portland cement under section 90-1.02B(2).

LCB must have from 3 to 4 percent air content during aggregate qualification testing.

28-2.01D(3) Field Qualification Testing

Before placing LCB, you must perform field qualification testing and obtain authorization for each mix design. Retest and obtain authorization for changes to authorized mixed designs.

Proposed mix designs must be field qualified before you place the LCB represented by those mix designs. Use an American Concrete Institute (ACI) certified "Concrete Laboratory Technician, Grade I" to perform field qualification tests and calculations.

Notify the Engineer at least 5 days before field qualification. Perform field qualification within the job site or a location authorized by the Engineer.

Field qualification testing includes compressive strength, air content, and penetration or slump in compliance with the table titled "Quality Control Requirements."

Field qualification testing for compressive strength must comply with the following:

1. Manufacture 12 cylinders under ASTM C 31 from a single batch
2. Perform 3 tests; each test consists of determining the average compressive strength of 2 cylinders at 7 days under ASTM C 39
3. The average compressive strength for each test must be at least 530 psi

If you submitted a notice to produce LCB qualifying for a transverse contraction joint waiver, manufacture additional specimens and test LCB for compressive strength at 3 days. Prepare compressive strength cylinders under ASTM C 31 at the same time using the same material and procedures as the 7-day compressive strength cylinders except do not submit 6 additional test cylinders. The average 3-day compressive strength for each test must be not more than 500 psi.

28-2.01D(4) Quality Control Testing

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

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

Perform quality control sampling, testing, and inspection throughout LCB production and placement. LCB must comply with the requirements for the quality characteristics shown in the following table:

Quality Control Requirements

Quality characteristic	Test method	Minimum sampling and testing frequency	Requirement
Sand equivalent (min)	ASTM D 2419	1 per 500 cubic yards but at least 1 per day of production	18
Aggregate gradation	ASTM C 136		Note a
Air content (max, percent) ^b	ASTM C 231		4
Penetration (inches)	ASTM C 360		0 to 1-1/2 nominal ^{c, d}
Slump (inches)	ASTM C 143		0–3 nominal ^{c, d}
Compressive strength (min, psi at 7 days)	ASTM C 39 ^e		530
Compressive strength (max, psi at 3 days) ^f	ASTM C 39 ^e		500

^a Comply with the table titled "Aggregate Grading" in section 28-2.02C.

^b If no single test in the first 5 air content tests exceeds 1-1/2 percent, no further air content tests are required.

^c Maximum penetration must not exceed 2 inches and maximum slump must not exceed 4 inches

^d Test for either penetration or slump

^e Prepare cylinders under ASTM C 31

^f Only applicable if you (1) submitted a notice stating intent to produce LCB qualifying for a transverse contraction joint waiver and (2) successfully field qualified the LCB for 3-day compressive strength. Make cylinders at the same time using the same material and procedures as QC testing for 7-day compressive strength.

28-2.01D(5) Acceptance Criteria

For acceptance, properties of LCB must comply with values shown in the following table:

Acceptance Criteria Testing

Property	Test method	Value
Compressive strength (min, psi at 7 days)	ASTM C 39 ^a	530 ^b

^a Cylinders prepared under ASTM C 31

^b A compressive strength test represents up to (1) 1,000 cu yd or (2) 1 day's production if less than 1,000 cu yd.

28-2.02 MATERIALS

28-2.02A General

Water must comply with section 90-1.02D.

The air content in LCB must not exceed 4 percent. If the aggregate used for LCB is produced from processed reclaimed asphalt concrete or other material that may cause the air content to exceed 4 percent, reduce the air content with an admixture.

A water-reducing chemical admixture may be used. Water-reducing chemical admixture must comply with ASTM C 494, Type A or Type F.

Air-entraining admixtures must comply with section 90-1.02E.

28-2.02B Cementitious Material

Portland cement must comply with section 90-1.02B. Portland cement content must not exceed 300 lb/cu yd.

SCM must comply with section 90-1.02B except the equations for SCM content under 90-1.02B(3) do not apply.

For aggregate qualification testing, use Type II portland cement under section 90-1.02B(2) without SCM.

28-2.02C Aggregate

Aggregate must be clean and free from decomposed material, organic material, and other deleterious substances. Aggregate samples must not be treated with lime, cement, or chemicals before testing for sand equivalent.

Use either 1-1/2 inch or 1 inch grading. Do not change your selected aggregate grading without authorization.

When tested under ASTM C 136, the percentage composition by weight of the aggregate must comply with the grading requirements for the sieve sizes shown in the following table:

Sieve sizes	Aggregate Grading			
	Percentage passing			
	1-1/2" maximum		1" maximum	
	Operating range	Contract compliance	Operating range	Contract compliance
2"	100	100	--	--
1-1/2"	90-100	87-100	100	100
1"	--	--	90-100	87-100
3/4"	50-85	45-90	50-100	45-100
3/8"	40-75	35-80	40-75	35-80
No. 4	25-60	20-65	35-60	30-65
No. 30	10-30	6-34	10-30	6-34
No. 200	0-12	0-15	0-12	0-15

Aggregate must comply with the quality requirements shown in the following table:

Aggregate Quality			
Property	Test Method	Operating range	Contract compliance
Sand equivalent (min)	ASTM D 2419	21	18
Compressive strength (min, psi at 7 days)	ASTM C 192 ASTM C 39	--	610 at 300 lb/cu yd cement content

Note: Cement must be Type II portland cement under section 90-1.02B(2).

If the aggregate grading or the sand equivalent test results, or both comply with contract compliance requirements but not operating range requirements, you may continue placing LCB for the remainder of the work day. Do not place additional LCB until you demonstrate the LCB to be placed complies with the operating range requirements.

28-2.03 CONSTRUCTION

28-2.03A General

Do not allow traffic or equipment on the LCB for at least 72 hours after the 1st application of the curing compound and completion of contraction joints. Limit traffic and equipment on the LCB to that is required for placing additional layers of LCB or paving.

28-2.03B Subgrade

Immediately before spreading LCB, the subgrade must:

1. Comply with the specified compaction and elevation tolerance for the material involved
2. Be free from loose or extraneous material
3. Be uniformly moist

Areas of subgrade lower than the grade established by the Engineer must be filled with LCB. The Department does not pay for filling low areas of subgrade.

28-2.03C Proportioning, Mixing, and Transporting

Proportion LCB under section 90-1.02F except aggregate does not have to be separated into sizes.

Mix and transport LCB under section 90-1.02G except the 5th and 7th paragraphs in section 90-1.02G(6) do not apply.

28-2.03D Placing

Place LCB under section 40-1.03H(1) except the 3rd paragraph does not apply.

Unless otherwise described, construct LCB in minimum widths of 12 feet separated by construction joints. For LCB constructed monolithically in widths greater than 26 feet, construct a longitudinal contraction joint offset no more than 3 feet from the centerline of the width being constructed.

Contraction joints must comply with section 40-1.03D(3).

Construct transverse contraction joints in intervals that result in LCB areas where the lengths and widths are within 20 percent of each other. Measure the widths from any longitudinal construction or longitudinal contraction joints.

The Engineer waives the requirement for transverse contraction joints if you:

1. Submitted a notice under 28-2.01C(1)
2. Successfully field qualified LCB for 3-day compressive strength testing
3. Submit QC test results for 3-day compressive strength under section 28-2.01D(4).

If concrete pavement will be placed on LCB, construct longitudinal construction and longitudinal contraction joints in the LCB. Provide at least 1 foot horizontal clearance from planned longitudinal construction and longitudinal contraction joints in the concrete pavement.

Do not mix or place LCB when the atmospheric temperature is below 35 degrees F. Do not place LCB on frozen ground.

28-2.03E Finishing

Place LCB under section 40-1.03H(4) or under section 40-1.03H(5) except where there are confined work areas and when authorized:

1. Spread and shape LCB using suitable powered finishing machines and supplement with hand work as necessary
2. Consolidate LCB using high-frequency internal vibrators within 15 minutes after LCB is deposited on the subgrade
3. Vibrate with care such that adequate consolidation occurs across the full paving width and do not use vibrators for extensive weight shifting of the LCB

For LCB to be paved with HMA, before curing operation texture the LCB finished surface by dragging a broom, burlap, or a spring steel tine device. If using a spring steel tine device, the device must produce a scored surface with scores parallel or transverse to the pavement centerline. Texture at a time and in a manner that produces the coarsest texture for the method used.

For LCB to be paved with HMA, the finished surface must not vary more than 0.05 foot from the grade established by the Engineer.

Do not texture LCB that will be covered with concrete pavement. Before applying curing compound, finish LCB to a smooth surface free from mortar ridges and other projections.

For LCB to be paved with concrete pavement, the finished surface must not be above the grade, or more than 0.05 foot below the grade established by the Engineer.

The finished surface must be free from porous areas.

28-2.03F Curing

After finishing LCB, cure LCB with pigmented curing compound under section 90-1.03B(3) and 40-1.03K except for LCB to be paved with concrete pavement, comply with section 36-2. Apply curing compound to the area to be paved with concrete pavement:

1. In 2 separate applications
2. Before the atmospheric temperature falls below 40 degrees F
3. At a rate of 1 gal/150 sq ft for the first application

29 TREATED PERMEABLE BASES

Replace "section 68-4.02C" in the 6th paragraph of section 29-1.03A with:

04-20-12

07-19-13

AA

04-20-12

30-1 GENERAL

Section 30 includes specifications for reclaiming the pavement section and constructing a base.

Reserved

[illegible]

07-19-13

36-1 GENERAL

Section 36 includes general specifications for constructing surfacings and pavements.

Reserved

AA

37 BITUMINOUS SEALS

07-19-13

Replace section 37-1.01 with:

01-18-13

37-1.01 GENERAL

37-1.01A Summary

Section 37-1 includes general specifications for applying bituminous seals.

37-1.01B Definitions

Reserved

37-1.01C Submittals

Reserved

37-1.01D Quality Control and Assurance

37-1.01D(1) General

Reserved

37-1.01D(2) Prepaving Conference

For seal coats and micro-surfacing, schedule a prepaving conference at a mutually agreed upon time and place to meet with the Engineer.

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

1. Project superintendent
2. Paving construction foreman
3. Traffic control foreman

Be prepared to discuss:

1. Quality control
2. Acceptance testing
3. Placement
4. Training on placement methods
5. Checklist of items for proper placement
6. Unique issues specific to the project, including:
 - 6.1. Weather
 - 6.2. Alignment and geometrics
 - 6.3. Traffic control issues
 - 6.4. Haul distances
 - 6.5. Presence and absence of shaded areas
 - 6.6. Any other local issues

37-1.02 MATERIALS

Not Used

37-1.03 CONSTRUCTION

Not Used

37-1.04 PAYMENT

Not Used

Replace section 37-2 with:

07-19-13

37-2 SEAL COATS

37-2.01 GENERAL

37-2.01A General

37-2.01A(1) Summary

Section 37-2 includes specifications for applying seal coats.

37-2.01A(2) Definitions

Reserved

37-2.01A(3) Submittals

Reserved

37-2.01A(4) Quality Control and Assurance

The following personnel must attend the prepaving conference:

1. Aggregate suppliers
2. Chip spreader operators
3. Emulsion and binder distributor
4. Coated chips producer if coated chips are used

37-2.01B Materials

Screenings must be broken stone, crushed gravel, or both. At least 90 percent of screenings by weight must be crushed particles as determined under California Test 205.

Screenings for seal coats must have the properties specified in the following table:

Seal Coat Screenings

Properties	Test method	Specification
Los Angeles Rattler, %, max	California Test	
Loss at 100 revolutions.	211	10
Loss at 500 revolutions.		40
Film stripping, %, max	California Test	25
	302	

37-2.01C Construction

37-2.01C(1) General

Wherever final sweeping or brooming of the seal coat surface is complete, place permanent traffic stripes and pavement markings within 10 days.

If you fail to place the permanent traffic stripes and pavement markings within the specified time, the Department withholds 50 percent of the estimated value of the seal coat work completed that has not received permanent traffic stripes and pavement markings.

37-2.01C(2) Equipment

Equipment for seal coats must include and comply with the following:

1. Screenings haul trucks. Haul trucks must have:
 - 1.1. Tailgates that discharge screenings
 - 1.2. Devices to lock onto the rear screenings spreader hitch
 - 1.3. Dump beds that will not push down on the spreader when fully raised
 - 1.4. Dump beds that will not spill screenings on the roadway when transferred to the spreader hopper
 - 1.5. Tarpaulins to cover precoated screenings when haul distance exceeds 30 minutes or ambient temperature is less than 65 degrees F
2. Self-propelled screenings spreader. The spreader must have:
 - 2.1. Screenings hopper in the rear
 - 2.2. Belt conveyors that carry the screenings to the front

- 2.3. Spreading hopper capable of providing a uniform screening spread rate over the entire width of the traffic lane in 1 application.
3. Self-propelled power brooms. Do not use gutter brooms or steel-tined brooms. Brooms must be capable of removing loose screenings adjacent to barriers that prevent screenings from being swept off the roadway, including curbs, gutters, dikes, berms, and railings.
4. Pneumatic-tired rollers. Pneumatic-tired rollers must be an oscillating type at least 4 feet wide. Each roller must be self-propelled and reversible. Pneumatic tires must be of equal size, diameter, type, and ply. The roller must carry at least 3,000 lb of load on each wheel and each tire must have an air pressure of 100 ± 5 psi.

37-2.01C(3) Surface Preparation

Before applying seal coat, cover manholes, valve and monument covers, grates, or other exposed facilities located within the area of application, using a plastic or oil resistant construction paper secured by tape or adhesive to the facility being covered. Reference the covered facilities with a sufficient number of control points to relocate the facilities after the application of the seal coat.

After completion of the seal coat operation, remove covers from the facilities.

Immediately before applying seal coat, clean the surface to receive seal coat by removing extraneous material and drying. Cleaning the existing pavement includes the use of brooms.

37-2.01C(4) Applying Emulsion and Asphalt Binder

Prevent spray on existing pavement not intended for seal coat or on previously applied seal coat using a material such as building paper. Remove the material after use.

Align longitudinal joints between seal coat applications with designated traffic lanes.

For emulsion, overlap longitudinal joints by not more than 4 inches. You may overlap longitudinal joints up to 8 inches if authorized.

For areas not accessible to a truck distributor bar, apply the emulsion with a squeegee or other authorized means. For asphalt binder, hand spray nonaccessible areas. You may overlap the emulsion or asphalt binder applications before the application of screenings at longitudinal joints.

Do not apply the emulsion or asphalt binder unless there are sufficient screenings at the job site to cover the emulsion or asphalt binder.

Discontinue application of emulsion or asphalt binder early enough to comply with lane closure specifications and darkness. Apply to 1 lane at a time and cover the lane entirely in 1 operation.

37-2.01C(5) Spreading Screenings

Prevent vehicles from driving on asphaltic emulsion or asphalt binder before spreading screenings.

Spread screenings at a uniform rate over the full lane width in 1 application.

Broom excess screenings at joints before spreading adjacent screenings.

Operate the spreader at speeds slow enough to prevent screenings from rolling over after dropping.

If the spreader is not moving, screenings must not drop. If you stop spreading and screenings drop, remove the excess screenings before resuming activities.

37-2.01C(6) Finishing

Remove piles, ridges, or unevenly distributed screenings. Repair permanent ridges, bumps, or depressions in the finished surface. Spread additional screenings and roll if screenings are picked up by rollers or vehicles.

Seal coat joints between adjacent applications of seal coat must be smooth, straight, uniform, and completely covered. Longitudinal joints must be at lane lines and not overlap by more than 4 inches. Blend the adjacent applications by brooming.

A coverage is the number of passes a roller needs to cover the width. A pass is 1 roller movement parallel to the seal coat application in either direction. Overlapping passes are part of the coverage being

made and are not part of a subsequent coverage. Do not start a coverage until completing the previous coverage.

Before opening to traffic, finish seal coat in the following sequence:

1. Perform initial rolling consisting of 1 coverage with a pneumatic-tired roller
2. Perform final rolling consisting of 3 coverages with a pneumatic-tired roller
3. Broom excess screenings from the roadway and adjacent abutting areas
4. Apply flush coat if specified

The Engineer may order salvaging of excess screenings.

Dispose of excess screenings the Engineer determines are not salvageable. Dispose of screenings in any of the following ways or locations:

1. Under section 14-10
2. On embankment slopes
3. In authorized areas

Salvaging and stockpiling excess screenings is change order work.

37-2.01C(7) Seal Coat Maintenance

Seals coat surfaces must be maintained for 4 consecutive days from the day screenings are applied. Maintenance must include brooming to maintain a surface free of loose screenings, to distribute screenings over the surface so as to absorb any free asphaltic material, to cover any areas deficient in cover coat material, and to prevent formation of corrugations.

After 4 consecutive days, excess screenings must be removed from the paved areas. Brooming must not displace screenings set in asphaltic material.

The exact time of brooming will be determined by the Engineer. As a minimum, brooming will be required at the following times:

1. On 2-lane 2-way roadways, from 2 to 4 hours after traffic, controlled with pilot cars, has been routed on the seal coat
2. On multilane roadways, from 2 to 4 hours after screenings have been placed
3. In addition to previous brooming, immediately before opening any lane to public traffic, not controlled with pilot cars
4. On the morning following the application of screenings on any lane that has been open to public traffic not controlled with pilot cars and before starting any other activities

For 2-lane 2-way roadways under 1-way traffic control, upon completion of secondary rolling, public traffic must be controlled with pilot cars and routed over the new seal coat for a period of 2 to 4 hours. The Engineer will determine the exact period of time.

Schedule the operations so that seal coat is placed on both lanes of the traveled way each work shift and so that 1-way traffic control is discontinued 1 hour before darkness. At the end of the work shift, the end of the seal coat on both lanes must generally match.

On multilane roadways, initial brooming must begin after the screenings have been in place for a period of 2 to 4 hours. If the initial brooming is not completed during the work shift in which the screenings were placed, the initial brooming must be completed at the beginning of the next work shift.

Public traffic must be controlled with pilot cars and be routed on the new seal coat surface of the lane for a minimum of 2 hours after completion of the initial brooming and before opening the lane to traffic not controlled with pilot cars. When traffic is controlled with pilot cars, a maximum of 1 lane in the direction of travel must be open to public traffic. Once traffic controlled with pilot cars is routed over the seal coat at a particular location, continuous control must be maintained at that location until the seal coat placement and brooming on adjacent lanes to receive seal coat is completed.

37-2.01D Payment

If there is no bid item for a traffic control system, furnishing and using a pilot car is included in the various items of the work involved in applying the seal coat.

If test results for the screenings grading do not comply with specifications, you may remove the seal coat represented by these tests or request that it remain in place with a payment deduction. The deduction is \$1.75 per ton for the screenings represented by the test results.

37-2.02 FOG SEAL

37-2.02A General

37-2.02A(1) Summary

Fog seal coat includes applying a slow-setting asphaltic emulsion.

37-2.02A(2) Definitions

Reserved

37-2.02A(3) Submittals

Submit a 1/2-gallon sample of the asphaltic emulsion in a plastic container. Take the sample from the distributor truck spray bar at mid-load.

37-2.02A(4) Quality Control and Assurance

Reserved

37-2.02B Material

The Engineer selects the grade of slow-setting asphaltic emulsion to be used.

If additional water is added to the asphaltic emulsion, the resultant mixture must not be more than 1 part asphaltic emulsion to 1 part water. The Engineer determines the exact amount of additional water.

37-2.02C Construction

Apply asphaltic emulsion for fog seal coat at a residual asphalt rate from 0.02 to 0.06 gal/sq yd. The Engineer determines the exact rate.

Apply fog seal coat when the ambient air temperature is above 40 degrees F.

Sprinkle water on fog seal coat that becomes tacky in an amount determined by the Engineer.

If fog seal coat and seal coat with screenings are specified on the same project, apply fog seal coat at least 4 days before applying the adjoining seal coat with screenings. The joint between the seal coats must be neat and uniform.

37-2.02D Payment

The Department does not adjust the unit price for an increase or decrease in the asphaltic emulsion (fog seal coat) quantity.

37-2.03 FLUSH COATS

37-2.03A General

Flush coat includes applying a fog seal coat to the surface of a seal coat, followed by sand.

37-2.03B Material

The Engineer selects the grade of slow-setting or quick-setting asphaltic emulsion to be used.

Sand for flush coat must comply with the material specifications for fine aggregate grading in section 90-1.02C(3). Sand must not include organic material or clay.

37-2.03C Construction

Apply asphaltic emulsion for flush coat at a residual asphalt rate from 0.02 to 0.06 gal/sq yd. The Engineer determines the exact rate.

During flush coat activities, close adjacent lanes to traffic. Do not track asphaltic emulsion on existing pavement surfaces.

Apply sand immediately after the asphaltic emulsion application.

Spread sand with a self-propelled screenings spreader equipped with a mechanical device that spreads sand at a uniform rate over the full width of a traffic lane in a single application. Spread sand at a rate from 2 to 6 lb/sq yd. The Engineer determines the exact rate.

37-2.03D Payment

The Department does not adjust the unit price for an increase or decrease in the sand cover for the flush coat quantity.

37-2.04 ASPHALTIC EMULSION SEAL COAT

37-2.04A General

37-2.04A(1) General

37-2.04A(1)(a) Summary

Section 37-2.04 includes specifications for applying asphaltic emulsion seal coat. Asphaltic emulsion seal coat includes applying asphaltic emulsion, followed by screenings, and then a flush coat.

Asphaltic emulsion seal coat includes one or more of the following types:

1. Nonpolymer asphaltic emulsion seal coat
2. Polymer asphaltic emulsion seal coat

A double asphaltic emulsion seal coat is the application of asphaltic emulsion, followed by screenings applied twice in sequence.

37-2.04A(1)(b) Definitions

Reserved

37-2.04A(1)(c) Submittals

Submit a 1/2-gallon sample of asphaltic emulsion in a plastic container. Take the sample from the distributor truck spray bar at mid load.

At least 10 days before starting asphaltic emulsion seal coat application, submit the name of an authorized laboratory that will be performing asphaltic emulsion QC testing.

Submit a sample of asphaltic emulsion to the authorized laboratory and the Engineer. Each sample must be submitted in an insulated shipping container within 24 hours of sampling.

Within 7 days after taking samples, submit the authorized laboratory's test results for asphaltic emulsion.

37-2.04A(1)(d) Quality Control and Assurance

Samples for the screenings grading and cleanness value must be taken from the spreader conveyor belt.

Within 3 business days of sampling, the authorized laboratory must test asphaltic emulsion for:

1. Viscosity under AASHTO T 59
2. Sieve test under AASHTO T 59
3. Demulsibility under AASHTO T 59
4. Torsional recovery under California Test 332 for polymer asphaltic emulsion

Circulate polymer asphaltic emulsion in the distributor truck before sampling. Take samples from the distributor truck at mid load or from a sampling tap or thief. Before taking samples, draw and dispose of 1 gallon. Take two 1/2-gallon samples in the presence of the Engineer.

If test results for asphaltic emulsion are not in compliance with the specifications, you may request that the asphaltic emulsion seal coat represented by the tests remain in place with a payment deduction based on the pay factors.

37-2.04A(2) Materials

Not Used

37-2.04A(3) Construction

The Engineer determines the exact application rate.

At the time of application, the temperature of the asphaltic emulsion must be from 130 to 180 degrees F.

When tested under California Test 339, the application rate for asphaltic emulsion must not vary from the average by more than:

1. 15 percent in the transverse direction
2. 10 percent in the longitudinal direction

37-2.04A(4) Payment

Not Used

37-2.04B Nonpolymer Asphaltic Emulsion Seal Coat

37-2.04B(1) General

37-2.04B(1)(a) Summary

Section 37-2.04B includes specifications for applying a nonpolymer asphaltic emulsion seal coat.

37-2.04B(1)(b) Definitions

Reserved

37-2.04B(1)(c) Submittals

Reserved

37-2.04B(1)(d) Quality Control and Assurance

For nonpolymer asphaltic emulsion seal coat, if a test result for the screenings cleanness value is from 75 to 80, you may request that the asphaltic emulsion seal coat represented by the test remain in place. A payment deduction is made as specified in section 37-2.04D. If the screenings cleanness value is less than 75, remove the asphaltic emulsion seal coat.

37-2.04B(2) Materials

Screenings for nonpolymer asphaltic emulsion seal coat must have the gradation as determined under California Test 202 in the following table.

**Nonpolymer Asphaltic Emulsion Seal Coat Screenings
Gradation**

Sieve sizes	Percentage passing			
	Coarse 1/2" max	Medium 3/8" max	Medium fine 5/16" max	Fine 1/4" max
3/4"	100	--	--	--
1/2"	95–100	100	--	--
3/8"	50–80	90–100	100	100
No. 4	0–15	5–30	30–60	60–85
No. 8	0–5	0–10	0–15	0–25
No. 16	--	0–5	0–5	0–5
No. 30	--	--	0–3	0–3
No. 200	0–2	0–2	0–2	0–2

The cleanness value determined under California Test 227 must be 80.

37-2.04B(3) Construction

Asphaltic emulsion must be applied within the application rate ranges shown in the following table:

Asphaltic Emulsion Application Rates

Screenings	Application rate range(gallons per square yard)
Fine	0.15–0.30
Medium fine	0.25–0.35
Medium	0.25–0.40
Coarse	0.30–0.40

Apply asphaltic emulsion when the ambient air temperature is from 65 to 110 degrees F and the pavement surface temperature is at least 80 degrees F.

Do not apply asphaltic emulsion when weather forecasts predict the ambient air temperature will fall below 39 degrees F within 24 hours after application.

For double asphaltic emulsion seal coat, the asphaltic emulsion must be applied within the application rates shown in the following table:

Asphaltic Emulsion Application Rates	
Screenings	Application rate range (gal/sq yd)
Double	
1st application	0.20–0.35
2nd application	0.20–0.30

You may stockpile screenings for asphaltic emulsion seal coat if you prevent contamination. Screenings must have damp surfaces at spreading. If water visibly separates from the screenings, do not spread. You may redampen them in the delivery vehicle.

Spread screenings before the asphaltic emulsion sets or breaks.

Spread screenings within 10 percent of the rate determined by the Engineer. Screenings must have a spread rate within the ranges shown in the following table:

Screening Spread Rates	
Seal coat type	Range (lb/sq yd)
Fine	12–20
Medium fine	16–25
Medium	20–30
Coarse	23–30

Do not spread screenings more than 2,500 feet ahead of the completed initial rolling.

For double asphaltic emulsion seal coat, screenings must have a spread rate within the ranges shown in the following table:

Screening Spread Rates	
Seal coat type	Range (lb/sq yd)
Double	
1st application	23–30
2nd application	12–20

Remove excess screenings on the 1st application before the 2nd application of asphaltic emulsion.

37-2.04B(4) Payment

If asphaltic emulsion seal coat with screenings does not comply with the cleanness value specifications, you may request that the seal coat remain in place with a pay deduction corresponding to the cleanness value shown in the following table:

Asphaltic Emulsion Seal Coat Cleanness Value Deductions	
Cleanness value	Deduction
80 or over	None
79	\$2.00 /ton
77–78	\$4.00 /ton
75–76	\$6.00 /ton

37-2.04C Polymer Asphaltic Emulsion Seal Coat

37-2.04C(1) General

37-2.04C(1)(a) Summary

Section 37-2.04C includes specifications for applying a polymer asphaltic emulsion seal coat.

37-2.04C(1)(b) Definitions

Reserved

37-2.04C(1)(c) Submittals

At least 10 days before starting polymer asphaltic emulsion seal coat application, submit a signed copy of the test result report of the Vialit test method for aggregate retention in chip seals (french chip) to the Engineer and to:

DEPARTMENT OF TRANSPORTATION
Division of Maintenance, Roadway Maintenance Office
1120 N Street, MS 31
Sacramento, CA 95814

37-2.04C(1)(d) Quality Control and Assurance

The authorized laboratory must test screenings for retention under the Vialit test method for aggregate in chip seals (french chip). The Vialit test results are not used for acceptance. The Vialit test is available at the METS Web site.

If the test results for polymer asphaltic emulsion do not comply with the specifications, the Engineer assesses a pay factor value for the following properties and increments:

Polymer Asphaltic Emulsion Pay Factor Table

Test method and property	Increment	Pay factor
Test on polymer asphaltic emulsion		
AASHTO T 59 (Viscosity, sec Saybolt Furol, at 50 °C)	Each 10 seconds above max or below min	1
AASHTO T 59 (settlement, 5 days, percent)	Each 1.5 percent above max	1
AASHTO T 59 (sieve test, percent max)	Each 0.2 percent above max	1
AASHTO T 59 (demulsibility percent)	Each 2 percent below min	1
Test on residue from evaporation test		
AASHTO T 49 (penetration, 25 °C)	Each 2 dm above max or below min	1
ASTM D 36 (field softening point °C)	2 °C below min	1
California Test 332 (torsional recovery ^a)	For each 1 increment below the min value of 18	1
	For each 2 increments below the min value of 18	3
	For each 3 or more increments below the min value of 18	10

^a The highest pay factor applies

The Engineer assesses a pay factor of 1 for sampling not performed in compliance with the specifications, including shipping and sampling containers.

For polymer asphaltic emulsion seal coat, if a test result for the screenings cleanness value is from 75 to 86, you may request that the asphaltic emulsion seal coat represented by the test remain in place. A payment deduction is made as specified in section 37-2.04D. If the screenings cleanness value is less than 75, remove the asphaltic emulsion seal coat.

37-2.04C(2) Materials

Polymer asphaltic emulsion must include elastomeric polymer.

Polymer asphaltic emulsion must comply with section 94, Table 3, under the test on residue from evaporation test for Grades PMRS2, PMRS2h, PMCRS2, and PMCRS2h and the following:

1. The penetration at 39.2 degrees F (200g for 60 seconds) determined under AASHTO T 49 must be at least 6.
2. Test elastic recovery under AASHTO T 301.
3. Polymer content in percent by weight does not apply.
4. The minimum ring and ball softening point temperature determined under AASHTO T 53 for Test on Residue from Evaporation Test must comply with the following:
 - 4.1. 126 degrees F for a geographical ambient temperature from 32 to 104 degrees F
 - 4.2. 129 degrees F for a geographical ambient temperature from 18 to 104 degrees F
 - 4.3. 135 degrees F for a geographical ambient temperature from 18 to greater than 104 degrees F

Screenings for polymer asphaltic emulsion seal coat must have the gradation as determined under California Test 202 in the following table:

Polymer Asphaltic Emulsion Seal Coat Screenings Gradation

Sieve sizes	Percentage passing			
	Coarse 1/2" max	Medium 3/8" max	Medium fine 5/16" max	Fine 1/4" max
3/4"	100	--	--	--
1/2"	85–100	100	--	--
3/8"	0–30	85–100	100	100
No. 4	0–5	0–15	0–50	60–85
No. 8	--	0–5	0–15	0–25
No. 16	--	--	0–5	0–5
No. 30	--	--	0–3	0–3
No. 200	0–2	0–2	0–2	0–2

The cleanness value determined under California Test 227 must be 86.

37-2.04C(3) Construction

Polymer asphaltic emulsion must be applied within the application rate ranges shown in the following table:

Polymer Asphaltic Emulsion Application Rates

Screenings	Application rate range(gallons per square yard)
Fine	0.15–0.30
Medium fine	0.25–0.35
Medium	0.25–0.40
Coarse	0.30–0.40

The Engineer determines the exact application rate.

At the time of application, the temperature of polymer asphaltic emulsion must be from 130 to 180 degrees F.

Apply polymer asphaltic emulsion when the ambient air temperature is from 60 to 105 degrees F and the pavement surface temperature is at least 55 degrees F.

Do not apply polymer asphaltic emulsion when weather forecasts predict the ambient air temperature will fall below 39 degrees F within 24 hours after application.

When tested under California Test 339, the application rate for polymer asphaltic emulsion must not vary from the average by more than:

1. 15 percent in the transverse direction
2. 10 percent in the longitudinal direction

For double asphaltic emulsion seal coat, polymer asphaltic emulsion must be applied within the application rates shown in the following table:

Polymer Asphaltic Emulsion Application Rates	
Screenings	Application rate range (gal/sq yd)
Double	
1st application	0.20–0.35
2nd application	0.20–0.30

You may stockpile screenings for polymer emulsion seal coat if you prevent contamination. Screenings must have damp surfaces at spreading. If water visibly separates from the screenings, do not spread. You may redampen them in the delivery vehicle.

Spread screenings before the polymer emulsion sets or breaks.

Spread screenings within 10 percent of the rate determined by the Engineer. Screenings must have a spread rate within the ranges shown in the following table:

Screening Spread Rates	
Seal coat type	Range (lb/sq yd)
Fine	12–20
Medium fine	16–25
Medium	20–30
Coarse	23–30

Do not spread screenings more than 2,500 feet ahead of the completed initial rolling.

For double seal coat, screenings must have a spread rate within the ranges shown in the following table:

Screening Spread Rates	
Seal coat type	Range (lb/sq yd)
Double	
1st application	23–30
2nd application	12–20

Remove excess screenings on the 1st application before the 2nd application of asphaltic emulsion.

37-2.04C(4) Payment

If polymer asphaltic emulsion seal coat with screenings does not comply with the specifications for cleanness value you may request that the seal coat remain in place with a pay deduction corresponding by the cleanness value shown in the following table:

Polymer Asphaltic Emulsion Seal Coat Cleanness Value Deductions	
Cleanness value	Deduction
86 or over	None
81–85	\$2.20/ton
77–80	\$4.40/ton
75–76	\$6.60/ton

If test results for polymer asphaltic emulsion aggregate grading and cleanness value test results do not comply with the specifications, all deductions are made. A test for polymer asphaltic emulsion represents the smaller of 55 tons or 1 day's production. A test for the screenings grading or cleanness value represents the smaller of 300 tons or 1 day's production.

The payment deduction for noncompliant polymer asphaltic emulsion is based on the total pay factor value determined from the table titled, "Polymer Asphaltic Emulsion Pay Factor Deduction." You must remove polymer asphaltic emulsion seal coat with a pay factor value greater than 20. You may request seal coat with noncompliant polymer asphaltic emulsion to remain in place with a pay deduction for the total pay factor value shown in the following table:

Polymer Asphaltic Emulsion Pay Factor Deductions

Total pay factor value	Deduction
0	none
1–2	\$5.00/ton
3–5	\$10.00/ton
6–9	\$15.00/ton
10–14	\$25.00/ton
15–20	\$50.00/ton

37-2.05 ASPHALT BINDER SEAL COATS

37-2.05A General

Reserved

37-2.05B Asphalt Rubber Binder Seal Coats

37-2.05B(1) General

37-2.05B(1)(a) Summary

Section 37-2.05B includes specifications for applying asphalt rubber binder seal coat. Asphalt rubber seal coat includes applying heated asphalt rubber binder, followed by heated screenings precoated with asphalt binder, followed by a flush coat.

37-2.05B(1)(b) Definitions

crumb rubber modifier: Ground or granulated high natural crumb rubber or scrap tire crumb rubber.

descending viscosity reading: Subsequent viscosity reading at least 5 percent lower than the previous viscosity reading.

high natural crumb rubber: Material containing 40 to 48 percent natural rubber.

scrap tire crumb rubber: Any combination of:

1. Automobile tires
2. Truck tires
3. Tire buffing

37-2.05B(1)(c) Submittals

For each delivery of asphalt rubber binder ingredients and asphalt rubber binder to the job site, submit a certificate of compliance and a copy of the specified test results.

Submit MSDS for each asphalt rubber binder ingredient and the asphalt rubber binder.

At least 15 days before use, submit:

1. Four 1-quart cans of mixed asphalt rubber binder
2. Samples of each asphalt rubber binder ingredient
3. Asphalt rubber binder formulation and data as follows:
 - 3.1. For asphalt binder and asphalt modifier submit:
 - 3.1.1. Source and grade of asphalt binder
 - 3.1.2. Source and type of asphalt modifier
 - 3.1.3. Percentage of asphalt modifier by weight of asphalt binder
 - 3.1.4. Percentage of combined asphalt binder and asphalt modifier by weight of asphalt rubber binder
 - 3.1.5. Test results for the specified quality characteristics

- 3.2. For crumb rubber modifier submit:
 - 3.2.1. Each source and type of scrap tire crumb rubber and high natural rubber
 - 3.2.2. Percentage of scrap tire crumb rubber and high natural rubber by total weight of asphalt rubber binder
 - 3.2.3. Test results for the specified quality characteristics
- 3.3. For asphalt rubber binder submit:
 - 3.3.1. Test results for the specified quality characteristics
 - 3.3.2. Minimum reaction time and temperature

At least 5 business days before use, submit the permit issued by the local air quality agency for asphalt rubber binder:

- 1. Field blending equipment
- 2. Application equipment

If an air quality permit is not required by the local air quality agency for producing asphalt rubber binder or spray applying asphalt rubber binder, submit verification from the local air quality agency that an air quality permit is not required for this Contract.

Submit a certified volume or weight slip for each delivery of asphalt rubber binder ingredients and asphalt rubber binder.

Submit a certificate of compliance and accuracy verification of test results for viscometers.

When determined by the Engineer, submit notification 15 minutes before each viscosity test or submit a schedule of testing times.

Submit the log of asphalt rubber binder viscosity test results each day of asphalt rubber seal coat work.

37-2.05B(1)(d) Quality Control and Assurance

Equipment used in producing asphalt rubber binder must be permitted for use by the local air quality agency. Equipment used in spreading asphalt rubber binder must be permitted for use by the local air quality agency.

Each asphalt rubber binder ingredient must be sampled and tested for compliance with the specifications by the manufacturer.

Test and submit results at least once per project or the following, whichever frequency is greater:

- 1. For crumb rubber modifier except for grading, at least once per 250 tons. Samples of scrap tire crumb rubber and high natural crumb rubber must be sampled and tested separately. Test each delivery of crumb rubber modifier for grading.
- 2. For asphalt binder, test and submit at least once per 200 tons of asphalt binder production.
- 3. For asphalt modifier, test and submit at least once per 25 tons of asphalt modifier production.

Scrap tire crumb rubber and high natural crumb rubber must be delivered to the asphalt rubber production site in separate bags.

Take viscosity readings of asphalt rubber binder under ASTM D7741 during asphalt rubber binder production. Start taking viscosity readings of samples taken from the reaction vessel at least 45 minutes after adding crumb rubber modifier and continue taking viscosity readings every 30 minutes until 2 consecutive descending viscosity readings have been obtained and the final viscosity meets the specification requirement. After meeting the 2 descending viscosity readings requirement, continue to take viscosity readings hourly and within 15 minutes before use. Log the test results, including time of testing and temperature of the asphalt rubber binder.

37-2.05B(2) Material

37-2.05B(2)(a) General

Reserved

37-2.05B(2)(b) Asphalt Binder

Asphalt binder must comply with the specifications for asphalt binder. Do not modify asphalt binder with polymer.

37-2.05B(2)(c) Asphalt Modifier

Asphalt modifier must be a resinous, high flash point, and aromatic hydrocarbon. Asphalt modifier must have the values for the quality characteristics shown in the following table:

Asphalt Modifier for Asphalt Rubber Binder		
Quality characteristic	Test method	Value
Viscosity, m ² /s (x 10 ⁻⁶) at 100 °C	ASTM D 445	X ± 3 ^a
Flash point, CL.O.C., °C	ASTM D 92	207 min
Molecular analysis		
Asphaltenes, percent by mass	ASTM D 2007	0.1 max
Aromatics, percent by mass	ASTM D 2007	55 min

^a "X" denotes the proposed asphalt modifier viscosity from 19 to 36. A change in "X" requires a new asphalt rubber binder submittal.

37-2.05B(2)(d) Crumb Rubber Modifier

Crumb rubber modifier must be ground or granulated at ambient temperature.

Scrap tire crumb rubber and high natural crumb rubber must be delivered to the asphalt rubber binder production site in separate bags.

Steel and fiber must be separated. If steel and fiber are cryogenically separated, it must occur before grinding and granulating. Cryogenically-produced crumb rubber modifier particles must be large enough to be ground or granulated.

Wire must not be more than 0.01 percent by weight of crumb rubber modifier. Crumb rubber modifier must be free of contaminants except fabric, which must not exceed 0.05 percent by weight of crumb rubber modifier. Method for determining the percent weight of wire and fabric is available under Laboratory Procedure 10 at the following METS Web site:

<http://www.dot.ca.gov/hq/esc/Translab/ofpm/fpmlab.htm>

The length of an individual crumb rubber modifier particle must not exceed 3/16 inch.

Crumb rubber modifier must be dry, free-flowing particles that do not stick together. A maximum of 3 percent calcium carbonate or talc by weight of crumb rubber modifier may be added. Crumb rubber modifier must not cause foaming when combined with the asphalt binder and asphalt modifier.

Specific gravity of crumb rubber modifier must be from 1.1 to 1.2 determined under California Test 208.

When tested under ASTM D 297, crumb rubber modifier must comply with the requirements shown in the following table:

Crumb Rubber Modifier

Quality characteristic	Scrap tire crumb rubber (percent)		High natural rubber (percent)	
	Min	Max	Min	Max
Acetone extract	6.0	16.0	4.0	16.0
Rubber hydrocarbon	42.0	65.0	50.0	--
Natural rubber content	22.0	39.0	40.0	48.0
Carbon black content	28.0	38.0	--	--
Ash content	--	8.0	--	--

Scrap tire crumb rubber must have the gradation shown in the following table:

Scrap Tire Crumb Rubber Gradation

Percentage passing

Sieve size	Gradation limit	Operating range	Contract compliance
No. 8	100	100	100
No. 10	98–100	95–100	90–100
No. 16	45–75	35–85	32–88
No. 30	2–20	2–25	1–30
No. 50	0–6	0–10	0–15
No. 100	0–2	0–5	0–10
No. 200	0	0–2	0–5

High natural crumb rubber must have the gradation shown in the following table:

High Natural Crumb Rubber Gradation

Percentage passing

Sieve size	Gradation limit	Operating range	Contract compliance
No. 10	100	100	100
No. 16	95–100	92–100	85–100
No. 30	35–85	25–95	20–98
No. 50	10–30	6–35	2–40
No. 100	0–4	0–7	0–10
No. 200	0–1	0–3	0–5

Test the crumb rubber modifier gradation under ASTM C 136 except

1. Split or quarter 100 ± 5 g from the crumb rubber modifier sample and dry to a constant mass at a temperature from 57 to 63 degrees C and record the dry sample mass. Place the crumb rubber modifier sample and 5 g of talc in a 1/2-liter jar. Seal the jar, then shake the jar by hand for at least 1 minute to mix the crumb rubber modifier and the talc. Continue shaking or open the jar and stir until the particle agglomerates and clumps are broken and the talc is uniformly mixed.
2. Place 1 rubber ball on each sieve. Each ball must weigh 8.5 ± 0.5 g, measure 24.5 ± 0.5 mm in diameter, and have a Shore Durometer "A" hardness of 50 ± 5 determined under ASTM D 2240. After sieving the combined material for 10 ± 1 minutes, disassemble the sieves. Brush material adhering to the bottom of a sieve into the next finer sieve. Weigh and record the mass of the material retained on the 2.36-millimeter sieve and leave this material (do not discard) on the scale or balance. Fabric balls must remain on the scale or balance and be placed together on the side to prevent them from being covered or disturbed when the material from finer sieves is placed onto the scale or balance. The material retained on the 2.00-millimeter sieve must be added to the scale or balance. Weigh and record that mass as the accumulative mass retained on the 2.00-millimeter sieve. Continue weighing

and recording the accumulated masses retained on the remaining sieves until the accumulated mass retained in the pan has been determined. Before discarding the crumb rubber modifier sample, separately weigh and record the total mass of fabric balls in the sample.

3. Determine the mass of material passing the 75-micrometer sieve by subtracting the accumulated mass retained on the 75-micrometer sieve from the accumulated mass retained in the pan. If the material passing the 75-micrometer sieve has a mass of 5 g or less, cross out the recorded number for the accumulated mass retained in the pan and copy the number recorded for the accumulated mass retained on the 75-micrometer sieve and record that number, next to the crossed out number, as the accumulated mass retained in the pan. If the material passing the 75-micrometer sieve has a mass greater than 5 g, cross out the recorded number for the accumulated mass retained in the pan, subtract 5 g from that number and record the difference next to the crossed out number. The adjustment to the accumulated mass retained in the pan accounts for the 5 g of talc added to the sample. For calculation purposes, the adjusted total sample mass is the same as the adjusted accumulated mass retained in the pan. Determine the percent passing based on the adjusted total sample mass and record to the nearest 0.1 percent.

37-2.05B(2)(e) Asphalt Rubber Binder

Asphalt rubber binder must be a combination of:

1. Asphalt binder
2. Asphalt modifier
3. Crumb rubber modifier

Asphalt rubber binder blending equipment must be authorized under the Department's material plant quality program.

The blending equipment must allow the determination of weight percentages of each asphalt rubber binder ingredient.

Asphalt rubber binder must be 79 ± 1 percent by weight asphalt binder and 21 ± 1 percent by weight of crumb rubber modifier. The minimum percentage of crumb rubber modifier must be 20.0 percent and lower values may not be rounded up.

Crumb rubber modifier must be 76 ± 2 percent by weight scrap tire crumb rubber and 24 ± 2 percent by weight high natural rubber.

Asphalt modifier and asphalt binder must be blended at the production site. Asphalt modifier must be from 2.5 to 6.0 percent by weight of the asphalt binder in the asphalt rubber binder. The asphalt rubber binder supplier determines the exact percentage.

If blended, the asphalt binder must be from 375 to 440 degrees F when asphalt modifier is added and the mixture must circulate for at least 20 minutes. Asphalt binder, asphalt modifier, and crumb rubber modifier may be proportioned and combined simultaneously.

The blend of asphalt binder and asphalt modifier must be combined with crumb rubber modifier at the asphalt rubber binder production site. The asphalt binder and asphalt modifier blend must be from 375 to 440 degrees F when crumb rubber modifier is added. Combined ingredients must be allowed to react at least 45 minutes at temperatures from 375 to 425 degrees F except the temperature must be at least 10 degrees F below the flash point of the asphalt rubber binder.

After reacting, the asphalt rubber binder must have the values for the quality characteristics shown in the following table:

Asphalt Rubber Binder

Quality characteristic	Test method	Requirement	
		Min	Max
Cone penetration @ 25 °C, 1/10 mm	ASTM D 217	25	60
Resilience @ 25 °C, percent rebound	ASTM D 5329	18	50
Field softening point, °C	ASTM D 36	55	88
Viscosity @190 °C, Pa • s (x10 ⁻³)	ASTM D 7741	1500	2500

Maintain asphalt rubber binder at a temperature from 375 to 415 degrees F.

Stop heating unused asphalt rubber binder 4 hours after the 45-minute reaction period. Reheating asphalt rubber binder that cools below 375 degrees F is a reheat cycle. Do not exceed 2 reheat cycles. If reheating, asphalt rubber binder must be from 375 to 415 degrees F before use.

During reheating, you may add scrap tire crumb rubber. Scrap tire crumb rubber must not exceed 10 percent by weight of the asphalt rubber binder. Allow added scrap tire crumb rubber to react for at least 45 minutes. Reheated asphalt rubber binder must comply with the specifications for asphalt rubber binder.

37-2.05B(2)(f) Screenings

Before precoating with asphalt binder and when tested under California Test 202, screenings for asphalt rubber seal coat must have the gradation shown in the following table:

Asphalt Rubber Seal Coat Screenings Gradation

Sieve sizes	Percentage passing by weight		
	Coarse 1/2" max	Medium 1/2" max	Fine 3/8" max
3/4"	100	100	100
1/2"	75–90	85–90	95–100
3/8"	0–20	0–30	70–85
No. 4	0–2	0–5	0–15
No. 8	--	--	0–5
No. 200	0–1	0–1	0–1

Screenings must have the values for the properties shown in the following table:

Seal Coat Screenings

Properties	Test method	Value
Cleanness value, min	California Test 227	80
Durability, min	California Test 229	52

37-2.05B(3) Construction

37-2.05B(3)(a) General

Reserved

37-2.05B(3)(b) Equipment

Self-propelled distributor truck for applying asphalt rubber binder must have the following features:

1. Heating unit
2. Internal mixing unit
3. Pumps that spray asphalt rubber binder within 0.05 gal/sq yd of the specified rate
4. Fully circulating spray bar that applies asphalt rubber binder uniformly
5. Tachometer
6. Pressure gages

7. Volume measuring devices
8. Thermometer
9. Observation platform on the rear of the truck for an observer on the platform to see the nozzles and unplug them if needed

37-2.05B(3)(c) Precoating Screenings

For asphalt rubber seal coat, do not recombine fine materials collected in dust control systems except cyclone collectors or knock-out boxes with any other aggregate used in the production of screenings.

For asphalt rubber seal coat, screenings must be preheated from 260 to 325 degrees F. Coat with any of the asphalts specified in the table titled "Performance Graded Asphalt Binder" in section 92. Coat at a central mixing plant. The asphalt must be from 0.5 to 1.0 percent by weight of dry screenings. The Engineer determines the exact rate.

Plant must be authorized under the Department's material plant quality program.

Do not stockpile preheated or precoated screenings.

37-2.05B(3)(d) Asphalt Rubber Binder Application

Apply asphalt rubber binder immediately after the reaction period. At the time of application, the temperature of asphalt rubber binder must be from 385 to 415 degrees F.

Apply asphalt rubber binder at a rate from 0.55 to 0.65 gal/sq yd. The Engineer determines the exact rate.

Apply asphalt rubber binder when the atmospheric temperature is from 60 to 105 degrees F and the pavement surface temperature is at least 55 degrees F.

Do not apply asphalt rubber binder unless there are sufficient screenings available to cover the asphalt rubber binder within 2 minutes. Intersections, turn lanes, gore points, and irregular areas must be covered within 15 minutes.

Do not apply asphalt rubber binder when weather or road conditions are unsuitable, including high wind or when the pavement is damp. In windy conditions you may adjust the distributor bar height and distribution speed, and use shielding equipment, if the Engineer authorizes your request.

37-2.05B(3)(e) Screenings Application

During transit, cover precoated screenings for asphalt rubber seal coat with tarpaulins if the ambient air temperature is below 65 degrees F or the haul time exceeds 30 minutes.

At the time of application, screenings for asphalt rubber seal coat must be from 225 to 325 degrees F.

Spread screenings at a rate from 28 to 40 lb/sq yd. The exact rate is determined by the Engineer. Spread to within 10 percent of the determined rate.

37-2.05B(3)(f) Rolling and Sweeping

Perform initial rolling within 90 seconds of spreading screenings. Do not spread screenings more than 200 feet ahead of the initial rolling.

For final rolling, you may request use of a steel-wheeled roller weighing from 8 to 10 tons, static mode only.

Perform a final sweeping before Contract acceptance. The final sweeping must not dislodge screenings.

Dispose of swept screenings at least 150 feet from any waterway.

37-2.05B(4) Payment

Screenings for asphalt rubber seal coat are measured by coated weight after they are preheated and precoated with asphalt binder. The weight of screenings must be the coated weight.

If recorded batch weights are printed automatically, the bid item for screenings for asphalt-rubber seal coat are measured using the printed batch weights, provided:

1. Total aggregate weight for screenings per batch is printed
2. Total asphalt binder weight per batch is printed

Add to the end of the paragraph in section 39-1.02A:

10-19-12

as shown

Replace "less than 10 percent" in note "b" in the table in the 5th paragraph of section 39-1.02E with:

01-20-12

10 percent or less

Replace the paragraphs in section 39-1.02F with:

02-22-13

39-1.02F(1) General

You may produce HMA Type A or B using RAP. HMA produced using RAP must comply with the specifications for HMA, except aggregate quality specifications do not apply to RAP. You may substitute RAP at a substitution rate not exceeding 25 percent of the aggregate blend. Do not use RAP in OGFC and RHMA-G.

Assign the substitution rate of RAP aggregate for virgin aggregate with the JMF submittal. The JMF must include the percent of RAP used.

Provide enough space for meeting RAP handling requirements at your facility. Provide a clean, graded, well-drained area for stockpiles. Prevent material contamination and segregation.

If RAP is from multiple sources, blend the RAP thoroughly and completely. RAP stockpiles must be homogeneous.

Isolate the processed RAP stockpiles from other materials. Store processed RAP in conical or longitudinal stockpiles. Processed RAP must not be agglomerated or be allowed to congeal in large stockpiles.

AASHTO T 324 (Modified) is AASHTO T 324, "Hamburg Wheel-Track Testing of Compacted Hot Mix Asphalt (HMA)," with the following parameters:

07-19-13

1. Target air voids must equal 7 ± 1 percent
2. Specimen height must be $60 \text{ mm} \pm 1 \text{ mm}$
3. Number of test specimens must be 4
4. Test specimen must be a 150mm gyratory compacted specimen
5. Test temperature must be set at:
 - 5.1. 122 ± 2 degrees F for PG 58
 - 5.2. 131 ± 2 degrees F for PG 64
 - 5.3. 140 ± 2 degrees F for PG 70 and above
6. Measurements for impression must be taken at every 100 passes
7. Inflection point defined as the number of wheel passes at the intersection of the creep slope and the stripping slope
8. Testing shut off must be set at 25,000 passes

02-22-13

39-1.02F(2) Substitution Rate of 15 Percent or Less

For a RAP substitution rate of 15 percent or less, you may stockpile RAP during the entire project.

39-1.02F(3) Substitution Rate Greater than 15 Percent

07-19-13

For a RAP substitution rate greater than 15 percent, fractionate RAP into 2 sizes, a coarse fraction RAP retained on 3/8-inch screen and a fine fraction RAP passing 3/8-inch screen.

Sample and test processed RAP at a minimum frequency of 1 sample per 1000 tons with a minimum of 6 samples for each processed RAP stockpile. If a processed RAP stockpile is augmented, sample and test processed RAP quality characteristics at a minimum frequency of 1 sample per 500 tons of augmented RAP.

When tested under California Test 202 with a total mechanical shaking time of 10 minutes \pm 15 seconds, the processed RAP must meet the grading requirements shown in the following table:

**Processed RAP Gradation
(Percentage Passing)**

Sieve sizes	TV limits	Allowable tolerance
1/2"	100	--
3/8"	97	TV + 3

02-22-13

The processed RAP asphalt binder content must be within \pm 2.0 percent of the average processed RAP stockpile asphalt binder content when tested under ASTM D 2172, Method B. If a new processed RAP stockpile is required, the average binder content of the new processed RAP stockpile must be within \pm 2.0 percent of the average binder content of the original processed RAP stockpile.

The maximum specific gravity for processed RAP must be within \pm 0.06 when tested under California Test 309 of the average maximum specific gravity reported on page 4 of your *Contractor Hot Mix Asphalt Design Data* form.

Replace items 7 and 8 in the 5th paragraph of section 39-1.03A with:

02-22-13

7. Substitution rate by more than 5 percent if your assigned RAP substitution rate is 15 percent or less
8. Substitution rate by more than 3 percent if your assigned RAP substitution rate is greater than 15 percent
9. Average binder content by more than 2 percent from the average binder content of the original processed RAP stockpile used in the mix design
10. Maximum specific gravity of processed RAP by more than \pm 0.060 from the average maximum specific gravity of processed RAP reported on page 4 of your *Contractor Hot Mix Asphalt Design Data* form
11. Any material in the JMF

Replace the 1st paragraph of section 39-1.03B with:

02-22-13

Perform a mix design that produces HMA with the values for the quality characteristics shown in the following table:

HMA Mix Design Requirements

Quality characteristic	Test method	HMA type		
		A	B	RHMA-G
Air void content (%)	California Test 367	4.0	4.0	Section 39-1.03B
Voids in mineral aggregate (% min.)	California Test 367			
No. 4 grading		17.0	17.0	--
3/8" grading		15.0	15.0	--
1/2" grading		14.0	14.0	18.0–23.0
3/4" grading		13.0	13.0	18.0–23.0
Voids filled with asphalt (%)	California Test 367			Note a
No. 4 grading		65.0–75.0	65.0–75.0	
3/8" grading		65.0–75.0	65.0–75.0	
1/2" grading		65.0–75.0	65.0–75.0	
3/4" grading		65.0–75.0	65.0–75.0	
Dust proportion	California Test 367			Note a
No. 4 and 3/8" gradings		0.6–1.2	0.6–1.2	
1/2" and 3/4" gradings		0.6–1.2	0.6–1.2	
Stabilometer value (min.)	California Test 366			--
No. 4 and 3/8" gradings		30	30	
1/2" and 3/4" gradings		37	35	23

^a Report this value in the JMF submittal.

For RAP substitution rate greater than 15 percent, the mix design must comply with the additional quality characteristics shown in the following table:

Additional HMA Mix Design Requirements for RAP Substitution Rate Greater Than 15 Percent

Quality characteristic	Test method	HMA type		
		A	B	RHMA-G
Hamburg wheel track (minimum number of passes at 0.5 inch average rut depth)	AASHTO T 324 (Modified) ^a			
PG-58		10,000	10,000	--
PG-64		15,000	15,000	
PG-70		20,000	20,000	
PG-76 or higher		25,000	25,000	
Hamburg wheel track (inflection point minimum number of passes)	AASHTO T 324 (Modified) ^a			
PG-58		10,000	10,000	--
PG-64		10,000	10,000	
PG-70		12,500	12,500	
PG-76 or higher		15000	15000	
Moisture susceptibility (minimum dry strength, psi)	California Test 371 ^a	120	120	--
Moisture susceptibility (tensile strength ration, %)	California Test 371 ^a	70	70	--

^aTest plant produced HMA.

For HMA with RAP, the maximum binder replacement must be 25.0 percent of OBC for surface course and 40.0 percent of OBC for lower courses.

For HMA with a binder replacement less than or equal to 25 percent of OBC, you may request that the PG asphalt binder grade with upper and lower temperature classifications be reduced by 6 degrees C from the specified grade.

For HMA with a binder replacement greater than 25 percent but less than or equal to 40 percent of OBC, you must use a PG asphalt binder grade with upper and lower temperature classifications reduced by 6 degrees C from the specified grade.

Replace item 4 in the list in the 1st paragraph of section 39-1.03C with:

01-20-12

4. JMF renewal on a *Caltrans Job Mix Formula Renewal* form, if applicable

Add to the end of section 39-1.03C:

02-22-13

For RAP substitution rate greater than 15 percent, submit with the JMF submittal:

1. California Test 371 tensile strength ratio and minimum dry strength test results
2. AASHTO T 324 (Modified) test results

For RAP substitution rate greater than 15 percent, submit California Test 371 and AASHTO T 324 (Modified) test results to the Engineer and to:

Moisture_Tests@dot.ca.gov

Replace the 2nd paragraph of section 39-1.03E with:

04-20-12

Use the OBC specified on your *Contractor Hot Mix Asphalt Design Data* form. No adjustments to asphalt binder content are allowed. Based on your testing and production experience, you may submit an adjusted aggregate gradation TV on a *Contractor Job Mix Formula Proposal* form before verification testing. Aggregate gradation TV must be within the TV limits specified in the aggregate gradation tables.

Add between the 3rd and 4th paragraphs of section 39-1.03E:

04-20-12

Asphalt binder set point for HMA must be the OBC specified on your *Contractor Hot Mix Asphalt Design Data* form. When RAP is used, asphalt binder set point for HMA must be:

$$\text{Asphalt Binder Set Point} = \frac{\frac{BC_{OBC}}{\left(1 - \frac{BC_{OBC}}{100}\right)} - R_{RAP} \left[\frac{BC_{RAP}}{\left(1 - \frac{BC_{RAP}}{100}\right)} \right]}{100 + \frac{BC_{OBC}}{\left(1 - \frac{BC_{OBC}}{100}\right)}}$$

Where:

BC_{OBC} = optimum asphalt binder content, percent based on total weight of mix

R_{RAP} = RAP ratio by weight of aggregate

BC_{RAP} = asphalt binder content of RAP, percent based on total weight of RAP mix

Replace item 4 in the list in the 8th paragraph of section 39-1.03E with:

04-20-12

4. HMA quality specified in the table titled "HMA Mix Design Requirements" except:
 - 4.1. Air void content, design value ± 2.0 percent
 - 4.2. Voids filled with asphalt, report only
 - 4.3. Dust proportion, report only

Replace the 12th paragraph of section 39-1.03E with:

04-20-12

If tests on plant-produced samples do not verify the JMF, the Engineer notifies you and you must submit a new JMF or submit an adjusted JMF based on your testing. JMF adjustments may include a change in aggregate gradation TV within the TV limits specified in the aggregate gradation tables.

Replace the 14th paragraph of section 39-1.03E with:

01-20-12

A verified JMF is valid for 12 months.

Replace the last sentence in the 15th paragraph of section 39-1.03E with:

01-20-12

This deduction does not apply to verifications initiated by the Engineer or JMF renewal.

Replace the 16th paragraph of section 39-1.03E with:

02-22-13

Except for RAP substitution rate greater than 15 percent, for any HMA produced under the QC/QA process the Department does not use California Test 371 test results for verification.

Add between the 1st and 2nd paragraphs of section 39-1.03F:

04-20-12

Target asphalt binder content on your Contractor *Job Mix Formula Proposal* form and the OBC specified on your *Contractor Hot Mix Asphalt Design Data* form must be the same.

01-20-12

Delete the 4th paragraph of section 39-1.03F.

Replace items 3 and 5 in the list in the 6th paragraph of section 39-1.03F with:

01-20-12

3. Engineer verifies each proposed JMF renewal within 20 days of receiving verification samples.
5. For each HMA type and aggregate gradation specified, the Engineer verifies at the Department's expense 1 proposed JMF renewal within a 12-month period.

Add between the 6th and 7th paragraphs of section 39-1.03F:

01-20-12

The most recent aggregate quality test results within the past 12 months may be used for verification of JMF renewal or the Engineer may perform aggregate quality tests for verification of JMF renewal.

Replace section 39-1.03G with:

04-20-12

39-1.03G Job Mix Formula Modification

For an accepted JMF, you may change asphalt binder source one time during production.

Submit your modified JMF request a minimum of 3 business days before production. Each modified JMF submittal must consist of:

1. Proposed modified JMF on *Contractor Job Mix Formula Proposal* form

2. Mix design records on *Contractor Hot Mix Asphalt Design Data* form for the accepted JMF to be modified
3. JMF verification on *Hot Mix Asphalt Verification* form for the accepted JMF to be modified
4. Quality characteristics test results for the modified JMF as specified in section 39-1.03B. Perform tests at the mix design OBC as shown on the *Contractor Asphalt Mix Design Data* form
5. If required, California Test 371 test results for the modified JMF.

With an accepted modified JMF submittal, the Engineer verifies each modified JMF within 5 business days of receiving all verification samples. If California Test 371 is required, the Engineer tests for California Test 371 within 10 days of receiving verification samples.

The Engineer verifies the modified JMF after the modified JMF HMA is placed on the project and verification samples are taken within the first 750 tons following sampling requirements in section 39-1.03E, "Job Mix Formula Verification." The Engineer tests verification samples for compliance with:

1. Stability as shown in the table titled "HMA Mix Design Requirements"
2. Air void content at design value ± 2.0 percent
3. Voids in mineral aggregate as shown in the table titled "HMA Mix Design Requirements"
4. Voids filled with asphalt, report only
5. Dust proportion, report only

If the modified JMF is verified, the Engineer revises your *Hot Mix Asphalt Verification* form to include the new asphalt binder source. Your revised form will have the same expiration date as the original form.

If a modified JMF is not verified, stop production and any HMA placed using the modified JMF is rejected.

The Engineer deducts \$2,000 from payments for each modified JMF verification. The Engineer deducts an additional \$2,000 for each modified JMF verification that requires California Test 371.

Add to section 39-1.03:

01-20-12

39-1.03H Job Mix Formula Acceptance

You may start HMA production if:

1. The Engineer's review of the JMF shows compliance with the specifications.
2. The Department has verified the JMF within 12 months before HMA production.
3. The Engineer accepts the verified JMF.

Replace "3 days" in the 1st paragraph of section 39-1.04A with:

01-20-12

3 business days

Replace the 2nd sentence in the 2nd paragraph of section 39-1.04A with:

01-20-12

During production, take samples under California Test 125. You may sample HMA from:

Replace "batch" in the 2nd sentence in the 2nd paragraph of section 39-1.04C with:

07-19-13

lot. Each asphalt binder lot consist of 1 or multiple batches of combined asphalt binder, asphalt modifier, and CRM proportioned under section 39-1.02D.

Replace the 2nd paragraph of section 39-1.04E with:

02-22-13

For RAP substitution rate of 15 percent or less, sample RAP once daily.

For RAP substitution rate of greater than 15percent, sample processed RAP twice daily.

Perform QC testing for processed RAP aggregate gradation under California Test 367, appendix B, and submit the results with the combined aggregate gradation.

Replace "5 days" in the 1st paragraph of section 39-1.06 with:

01-20-12

5 business days

Replace the 3rd paragraph of section 39-1.08A with:

04-20-12

During production, you may adjust hot or cold feed proportion controls for virgin aggregate and RAP.

Add to section 39-1.08A:

04-20-12

During production, asphalt binder set point for HMA Type A, HMA Type B, HMA Type C, and RHMA-G must be the OBC shown in *Contractor Hot Mix Asphalt Design Data* form. For OGFC, asphalt binder set point must be the OBC shown on *Caltrans Hot Mix Asphalt Verification* form. If RAP is used, asphalt binder set point for HMA must be calculated as specified in section 39-1.03E.

07-19-13

For RAP substitution rate of 15 percent or less, you may adjust the RAP by -5 percent.

For RAP substitution greater than 15, you may adjust the RAP by -3 percent.

04-20-12

You must request adjustments to the plant asphalt binder set point based on new RAP stockpiles average asphalt binder content. Do not adjust the HMA plant asphalt binder set point until authorized.

Replace the 3rd paragraph of section 39-1.08B with:

09-16-11

Asphalt rubber binder must be from 375 to 425 degrees F when mixed with aggregate.

Add to the beginning of section 39-1.08C:

07-19-13

Asphalt rubber binder blending plants must have current qualification under the Department's Material Plant Quality Program.

Replace section 39-1.11 with:

01-18-13

39-1.11 CONSTRUCTION

39-1.11A General

Do not place HMA on wet pavement or a frozen surface.

You may deposit HMA in a windrow and load it in the paver if:

1. Paver is equipped with a hopper that automatically feeds the screed
2. Loading equipment can pick up the windrowed material and deposit it in the paver hopper without damaging base material
3. Activities for deposit, pickup, loading, and paving are continuous
4. HMA temperature in the windrow does not fall below 260 degrees F

You may place HMA in 1 or more layers on areas less than 5 feet wide and outside the traveled way, including shoulders. You may use mechanical equipment other than a paver for these areas. The equipment must produce uniform smoothness and texture.

HMA handled, spread, or windrowed must not stain the finished surface of any improvement, including pavement.

Do not use petroleum products such as kerosene or diesel fuel to release HMA from trucks, spreaders, or compactors.

HMA must be free of:

1. Segregation
2. Coarse or fine aggregate pockets
3. Hardened lumps

39-1.11B Longitudinal Joints

39-1.11B(1) General

Longitudinal joints in the top layer must match specified lane edges. Alternate the longitudinal joint offsets in the lower layers at least 0.5 foot from each side of the specified lane edges. You may request other longitudinal joint placement patterns.

A vertical longitudinal joint of more than 0.15 ft is not allowed at any time between adjacent lanes open to traffic.

For HMA thickness of 0.15 ft or less, the distance between the ends of the adjacent surfaced lanes at the end of each day's work must not be greater than can be completed in the following day of normal paving.

For HMA thickness greater than 0.15 ft, you must place HMA on adjacent traveled way lanes so that at the end of each work shift the distance between the ends of HMA layers on adjacent lanes is from 5 to 10 feet. Place additional HMA along the transverse edge at each lane's end and along the exposed longitudinal edges between adjacent lanes. Hand rake and compact the additional HMA to form temporary conforms. You may place Kraft paper or another authorized bond breaker under the conform tapers to facilitate the taper removal when paving operations resume.

39-1.11B(2) Tapered Notched Wedge

For divided highways with an HMA lift thickness greater than 0.15 foot, you may construct a 1-foot wide tapered notched wedge joint as a longitudinal joint between adjacent lanes open to traffic. A vertical notch of 0.75 inch maximum must be placed at the top and bottom of the tapered wedge.

The tapered notched wedge must retain its shape while exposed to traffic. Pave the adjacent lane within 1 day.

Construct the tapered portion of the tapered notched wedge with an authorized strike-off device. The strike-off device must provide a uniform slope and must not restrict the main screed of the paver.

You may use a device attached to the screed to construct longitudinal joints that will form a tapered notched wedge in a single pass. The tapered notched wedge must be compacted to a minimum of 91 percent compaction.

Perform QC testing on the completed tapered notch wedge joint as follows:

1. Perform field compaction tests at the rate of 1 test for each 750-foot section along the joint. Select random locations for testing within each 750-foot section.
2. Perform field compaction tests at the centerline of the joint, 6 inches from the upper vertical notch, after the adjacent lane is placed and before opening the pavement to traffic.
3. Determine maximum density test results.
4. Determine percent compaction of the longitudinal joint as the ratio of the average of the field compaction values and the maximum density test results.

For HMA under QC/QA construction process, the additional quality control compaction results associated with the tapered notch wedge will not be included in the computation of any quality factor and process control.

For acceptance of the completed tapered notch wedge joint, take two 4- or 6-inch diameter cores 6 inches from the upper vertical notch of the completed longitudinal joint for every 3,000 feet at locations designated by the Engineer. Take cores after the adjacent lane is placed and before opening the pavement to traffic. Cores must be taken in the presence of the Engineer and must be marked to identify the test sites. Submit the cores. One core will be used for determination of the field density and 1 core will be used for dispute resolution. The Engineer determines:

1. Field compaction by measuring the bulk specific gravity of the cores under California Test 308, Method A
2. Percent compaction as the ratio of the average of the bulk specific gravity of the core for each day's production to the maximum density test value

For HMA under QC/QA construction process, the additional quality assurance testing by the Engineer to determine field compaction associated with the tapered notch wedge will not be included in the Engineer's verification testing and in the computation of any quality factor and process control.

Determine percent compaction values each day the joint is completed and submit values within 24 hours of testing. If the percent compaction of 1 day's production is less than 91 percent, that day's notched wedge joint is rejected. Discontinue placement of the tapered notched wedge and notify the Engineer of changes you will make to your construction process in order to meet the specifications.

For HMA under QC/QA construction process, quantities of HMA placed in the completed longitudinal joint will have a quality factor QF_{QC5} of 1.0.

39-1.11C Widening Existing Pavement

If widening existing pavement, construct new pavement structure to match the elevation of the existing pavement's edge before placing HMA over the existing pavement.

39-1.11D Shoulders, Medians, and Other Road Connections

Until the adjoining through lane's top layer has been paved, do not pave the top layer of:

1. Shoulders
2. Tapers
3. Transitions
4. Road connections
5. Driveways
6. Curve widenings
7. Chain control lanes
8. Turnouts
9. Turn pockets

If the number of lanes changes, pave each through lane's top layer before paving a tapering lane's top layer. Simultaneous to paving a through lane's top layer, you may pave an adjoining area's top layer, including shoulders. Do not operate spreading equipment on any area's top layer until completing final compaction.

39-1.11E Leveling

If leveling with HMA is specified, fill and level irregularities and ruts with HMA before spreading HMA over the base, existing surfaces, or bridge decks. You may use mechanical equipment other than a paver for these areas. The equipment must produce uniform smoothness and texture. HMA used to change an existing surface's cross slope or profile is not paid for as HMA (leveling).

If placing HMA against the edge of existing pavement, sawcut or grind the pavement straight and vertical along the joint and remove extraneous material.

39-1.11F Compaction

Rolling must leave the completed surface compacted and smooth without tearing, cracking, or shoving. Complete finish rolling activities before the pavement surface temperature is:

1. Below 150 degrees F for HMA with unmodified binder
2. Below 140 degrees F for HMA with modified binder
3. Below 200 degrees F for RHMA-G

If a vibratory roller is used as a finish roller, turn the vibrator off.

Do not use a pneumatic-tired roller to compact RHMA-G.

For Standard and QC/QA construction processes, if 3/4-inch aggregate grading is specified, you may use a 1/2-inch aggregate grading if the specified total paved thickness is at least 0.15 foot and less than 0.20 foot thick.

Spread and compact HMA under sections 39-3.03 and 39-3.04 if any of the following applies:

1. Specified paved thickness is less than 0.15 foot.
2. Specified paved thickness is less than 0.20 foot and 3/4-inch aggregate grading is specified and used.
3. You spread and compact at:
 - 3.1. Asphalt concrete surfacing replacement areas
 - 3.2. Leveling courses
 - 3.3. Areas for which the Engineer determines conventional compaction and compaction measurement methods are impeded

Do not open new HMA pavement to public traffic until its mid-depth temperature is below 160 degrees F.

If you request and if authorized, you may cool HMA Type A and Type B with water when rolling activities are complete. Apply water under section 17-3.

Spread sand at a rate from 1 to 2 lb/sq yd on new RHMA-G, RHMA-O, and RHMA-O-HB pavement when finish rolling is complete. Sand must be free of clay or organic matter. Sand must comply with section 90-1.02C(4)(c). Keep traffic off the pavement until spreading sand is complete.

Replace the 5th and 6th paragraphs of section 39-1.12C with:

07-20-12

On tangents and horizontal curves with a centerline radius of curvature 2,000 feet or more, the PI_0 must be at most 2.5 inches per 0.1-mile section.

On horizontal curves with a centerline radius of curvature between 1,000 feet and 2,000 feet including pavement within the superelevation transitions, the PI_0 must be at most 5 inches per 0.1-mile section.

Add to section 39-1.12:

01-20-12

39-1.12E Reserved

Add to section 39-1.14:

01-20-12

Prepare the area to receive HMA for miscellaneous areas and dikes, including any excavation and backfill as needed.

Replace "6.8" in item 3 in the list in the 4th paragraph of section 39-1.14 with:

04-20-12

6.4

Replace "6.0" in item 3 in the list in the 4th paragraph of section 39-1.14 with:

04-20-12

5.7

Replace "6.8" in the 1st paragraph of section 39-1.15B with:

04-20-12

6.4

Replace "6.0" in the 1st paragraph of section 39-1.15B with:

04-20-12

5.7

Replace the 1st paragraph of section 39-2.02B with:

02-22-13

Perform sampling and testing at the specified frequency for the quality characteristics shown in the following table:

Minimum Quality Control—Standard Construction Process

Quality characteristic	Test method	Minimum sampling and testing frequency	HMA type			
			A	B	RHMA-G	OGFC
Aggregate gradation ^a	California Test 202	1 per 750 tons and any remaining part at the end of the project	JMF ± Tolerance ^b	JMF ± Tolerance ^b	JMF ± Tolerance ^b	JMF ± Tolerance ^b
Sand equivalent (min) ^c	California Test 217		47	42	47	--
Asphalt binder content (%)	California Test 379 or 382		JMF±0.40	JMF±0.40	JMF ± 0.40	JMF ± 0.40
HMA moisture content (% max)	California Test 226 or 370	1 per 2,500 tons but not less than 1 per paving day	1.0	1.0	1.0	1.0
Field compaction (% max. theoretical density) ^{d,e}	QC plan	2 per business day (min.)	91–97	91–97	91–97	--
Stabilometer value (min) ^c No. 4 and 3/8" gradings 1/2" and 3/4" gradings	California Test 366	1 per 4,000 tons or 2 per 5 business days, whichever is greater	30	30	--	--
			37	35	23	--
Air void content (%) ^{c,f}	California Test 367		4 ± 2	4 ± 2	TV ± 2	--
Aggregate moisture content at continuous mixing plants and RAP moisture content at continuous mixing plants and batch mixing plants ^g	California Test 226 or 370	2 per day during production	--	--	--	--
Percent of crushed particles coarse aggregate (% min) One fractured face Two fractured faces Fine aggregate (% min) (Passing no. 4 sieve and retained on no. 8 sieve.) One fractured face	California Test 205	As designated in the QC plan. At least once per project	90 75 70	25 -- 20	-- 90 70	90 75 90

Los Angeles Rattler (% max) Loss at 100 rev. Loss at 500 rev.	California Test 211		12 45	-- 50	12 40	12 40
Flat and elongated particles (% max by weight @ 5:1)	California Test 235		Report only	Report only	Report only	Report only
Fine aggregate angularity (% min) ^h	California Test 234		45	45	45	--
Voids filled with asphalt (%) ⁱ No. 4 grading 3/8" grading 1/2" grading 3/4" grading	California Test 367		65.0–75.0 65.0–75.0 65.0–75.0 65.0–75.0	65.0–75.0 65.0–75.0 65.0–75.0 65.0–75.0	Report only	--
Voids in mineral aggregate (% min) ⁱ No. 4 grading 3/8" grading 1/2" grading 3/4" grading	California Test 367		17.0 15.0 14.0 13.0	17.0 15.0 14.0 13.0	-- -- 18.0–23.0 18.0–23.0	--
Dust proportion ⁱ No. 4 and 3/8" gradings 1/2" and 3/4" gradings	California Test 367		0.6-1.2 0.6–1.2	0.6-1.2 0.6–1.2	Report only	--
Hamburg wheel track (minimum number of passes at 0.5 inch average rut depth) ^j PG-58 PG-64 PG-70 PG-76 or higher	AASHTO T 324 (Modified)	1 per 10,000 tons or 1 per project whichever is more	10,000 15,000 20,000 25,000	10,000 15,000 20,000 25,000	--	--
Hamburg wheel track (inflection point minimum number of passes) ^j PG-58 PG-64 PG-70 PG-76 or higher	AASHTO T 324 (Modified)	1 per 10,000 tons or 1 per project whichever is more	10,000 10,000 12,500 15000	10,000 10,000 12,500 15000	--	--
Moisture susceptibility (minimum dry strength, psi) ^j	California Test 371	For RAP ≥15% 1 per 10,000 tons or 1 per project whichever is greater	120	120	--	--

Moisture susceptibility (tensile strength ratio, %) ^j	California Test 371	For RAP ≥15% 1 per 10,000 tons or 1 per project whichever is greater	70	70	--	--
Smoothness	Section 39-1.12	--	12-foot straight-edge, must grind, and PI ₀	12-foot straight-edge, must grind, and PI ₀	12-foot straight-edge, must grind, and PI ₀	12-foot straight-edge, must grind, and PI ₀
Asphalt rubber binder viscosity @ 375 °F, centipoises	Section 39-1.02D	Section 39-1.04C	--	--	1,500–4,000	1,500–4,000
Asphalt modifier	Section 39-1.02D	Section 39-1.04C	--	--	Section 39-1.02D	Section 39-1.02D
CRM	Section 39-1.02D	Section 39-1.04C	--	--	Section 39-1.02D	Section 39-1.02D

^a Determine combined aggregate gradation containing RAP under California Test 367.

^b The tolerances must comply with the allowable tolerances in section 39-1.02E.

^c Report the average of 3 tests from a single split sample.

^d Determine field compaction for any of the following conditions:

1. 1/2-inch, 3/8-inch, or no. 4 aggregate grading is used and the specified total paved thickness is at least 0.15 foot.
2. 3/4-inch aggregate grading is used and the specified total paved thickness is at least 0.20 foot.

^e To determine field compaction use:

1. In-place density measurements using the method specified in your QC plan.
2. California Test 309 to determine the maximum theoretical density at the frequency specified in California Test 375, Part 5C.

^f Determine the bulk specific gravity of each lab-compacted briquette under California Test 308, Method A, and theoretical maximum specific gravity under California Test 309.

^g For adjusting the plant controller at the HMA plant.

^h The Engineer waives this specification if HMA contains 10 percent or less of nonmanufactured sand by weight of total aggregate. Manufactured sand is fine aggregate produced by crushing rock or gravel.

ⁱ Report only.

^j Applies to RAP substitution rate greater than 15 percent.

Replace the 1st paragraph of section 39-2.03A with:

02-22-13

The Department samples for acceptance testing and tests for the quality characteristics shown in the following table:

HMA Acceptance—Standard Construction Process

Quality characteristic				Test method	HMA type			
					A	B	RHMA-G	OGFC
Aggregate gradation ^a				California Test 202	JMF ± tolerance ^c	JMF ± tolerance ^c	JMF ± tolerance ^c	JMF ± tolerance ^c
Sieve	3/4"	1/2"	3/8"					
1/2"	X ^b							
3/8"		X						
No. 4			X					
No. 8	X	X	X					
No. 200	X	X	X					
Sand equivalent (min) ^d				California Test 217	47	42	47	--
Asphalt binder content (%)				California Test 379 or 382	JMF±0.40	JMF±0.40	JMF ± 0.40	JMF ± 0.40
HMA moisture content (% max)				California Test 226 or 370	1.0	1.0	1.0	1.0
Field compaction (% max. theoretical density) ^{e, f}				California Test 375	91–97	91–97	91–97	--
Stabilometer value (min) ^d No. 4 and 3/8" gradings				California Test 366	30	30	--	--
1/2" and 3/4" gradings					37	35	23	--
Air void content (%) ^{d, g}				California Test 367	4 ± 2	4 ± 2	TV ± 2	--
Percent of crushed particles Coarse aggregate (% min) One fractured face Two fractured faces				California Test 205	90	25	--	90
Fine aggregate (% min) (Passing no. 4 sieve and retained on no. 8 sieve.) One fractured face					75	--	90	75
					70	20	70	90
Los Angeles Rattler (% max) Loss at 100 rev. Loss at 500 rev.				California Test 211	12 45	-- 50	12 40	12 40
Fine aggregate angularity (% min) ^h				California Test 234	45	45	45	--
Flat and elongated particles (% max by weight @ 5:1)				California Test 235	Report only	Report only	Report only	Report only
Voids filled with asphalt (%) ⁱ No. 4 grading 3/8" grading 1/2" grading 3/4" grading				California Test 367	65.0–75.0 65.0–75.0 65.0–75.0 65.0–75.0	65.0–75.0 65.0–75.0 65.0–75.0 65.0–75.0	Report only	--
Voids in mineral aggregate (% min) ⁱ No. 4 grading 3/8" grading 1/2" grading 3/4" grading				California Test 367	 17.0 15.0 14.0 13.0	 17.0 15.0 14.0 13.0	-- -- 18.0–23.0 18.0–23.0	--
Dust proportion ⁱ No. 4 and 3/8" gradings 1/2" and 3/4" gradings				California Test 367	0.6-1.2 0.6–1.2	0.6-1.2 0.6–1.2	Report only	--

Hamburg wheel track (minimum number of passes at 0.5 inch average rut depth) ^j PG-58 PG-64 PG-70 PG-76 or higher	AASHTO T 324 (Modified)	10,000 15,000 20,000 25,000	10,000 15,000 20,000 25,000	--	--
Hamburg wheel track (inflection point minimum number of passes) ^j PG-58 PG-64 PG-70 PG-76 or higher	AASHTO T 324 (Modified)	10,000 10,000 12,500 15000	10,000 10,000 12,500 15000	--	--
Moisture susceptibility (minimum dry strength, psi) ^j	California Test 371	120	120	--	--
Moisture susceptibility (tensile strength ration, %) ^j	California Test 371	70	70	--	--
Smoothness	Section 39-1.12	12-foot straight- edge, must grind, and PI ₀	12-foot straight- edge, must grind, and PI ₀	12-foot straight- edge, must grind, and PI ₀	12-foot straight- edge and must grind
Asphalt binder	Various	Section 92	Section 92	Section 92	Section 92
Asphalt rubber binder	Various	--	--	Section 92- 1.01D(2) and section 39-1.02D	Section 92-1.01D(2) and section 39-1.02D
Asphalt modifier	Various	--	--	Section 39-1.02D	Section 39-1.02D
CRM	Various	--	--	Section 39-1.02D	Section 39-1.02D

^a The Engineer determines combined aggregate gradations containing RAP under California Test 367.

^b "X" denotes the sieves the Engineer tests for the specified aggregate gradation.

^c The tolerances must comply with the allowable tolerances in section 39-1.02E.

^d The Engineer reports the average of 3 tests from a single split sample.

^e The Engineer determines field compaction for any of the following conditions:

1. 1/2-inch, 3/8-inch, or no. 4 aggregate grading is used and the specified total paved thickness is at least 0.15 foot.
2. 3/4-inch aggregate grading is used and the specified total paved thickness is at least 0.20 foot.

^f To determine field compaction, the Engineer uses:

1. California Test 308, Method A, to determine in-place density of each density core.
2. California Test 309 to determine the maximum theoretical density at the frequency specified in California Test 375, Part 5C.

^g The Engineer determines the bulk specific gravity of each lab-compacted briquette under California Test 308, Method A, and theoretical maximum specific gravity under California Test 309.

^h The Engineer waives this specification if HMA contains 10 percent or less of nonmanufactured sand by weight of total aggregate. Manufactured sand is fine aggregate produced by crushing rock or gravel.

ⁱ Report only.

^j Applies to RAP substitution rate greater than 15 percent.

Replace the 5th paragraph of section 39-2.03A with:

01-20-12

The Engineer determines the percent of maximum theoretical density from density cores taken from the final layer measured the full depth of the total paved HMA thickness if any of the following applies:

1. 1/2-inch, 3/8-inch, or no. 4 aggregate grading is used and the specified total paved thickness is at least 0.15 foot and any layer is less than 0.15 foot.
2. 3/4-inch aggregate grading is used and the specified total paved thickness is at least 0.2 foot and any layer is less than 0.20 foot.

Replace the 1st paragraph of section 39-3.02A with:

02-22-13

The Department samples for acceptance testing and tests for the quality characteristics shown in the following table:

HMA Acceptance—Method Construction Process

Quality characteristic	Test method	HMA type			
		A	B	RHMA-G	OGFC
Aggregate gradation ^a	California Test 202	JMF ± tolerance ^b	JMF ± tolerance ^b	JMF ± tolerance ^b	JMF ± tolerance ^b
Sand equivalent (min) ^c	California Test 217	47	42	47	--
Asphalt binder content (%)	California Test 379 or 382	JMF±0.40	JMF±0.40	JMF ± 0.40	JMF ± 0.40
HMA moisture content (% max)	California Test 226 or 370	1.0	1.0	1.0	1.0
Stabilometer value (min) ^c No. 4 and 3/8" gradings 1/2" and 3/4" gradings	California Test 366	30 37	30 35	-- 23	-- --
Percent of crushed particles Coarse aggregate (% min) One fractured face Two fractured faces Fine aggregate (% min) (Passing no. 4 sieve and retained on no. 8 sieve.) One fractured face	California Test 205	90 75 70	25 -- 20	-- 90 70	90 75 90
Los Angeles Rattler (% max) Loss at 100 rev. Loss at 500 rev.	California Test 211	12 45	-- 50	12 40	12 40
Air void content (%) ^{c, d}	California Test 367	4 ± 2	4 ± 2	TV ± 2	--
Fine aggregate angularity (% min) ^e	California Test 234	45	45	45	--
Flat and elongated particles (% max by weight @ 5:1)	California Test 235	Report only	Report only	Report only	Report only
Voids filled with asphalt (%) ^f No. 4 grading 3/8" grading 1/2" grading 3/4" grading	California Test 367	65.0–75.0 65.0–75.0 65.0–75.0 65.0–75.0	65.0–75.0 65.0–75.0 65.0–75.0 65.0–75.0	Report only	--
Voids in mineral aggregate (% min) ^f No. 4 grading 3/8" grading 1/2" grading 3/4" grading	California Test 367	17.0 15.0 14.0 13.0	17.0 15.0 14.0 13.0	-- -- 18.0–23.0 18.0–23.0	--
Dust proportion ^f No. 4 and 3/8" gradings 1/2" and 3/4" gradings	California Test 367	0.6–1.2 0.6–1.2	0.6–1.2 0.6–1.2	Report only	--
Hamburg wheel track (minimum number of passes at 0.5 inch average rut depth) ^g PG-58 PG-64 PG-70 PG-76 or higher	AASHTO T 324 (Modified)	10,000 15,000 20,000 25,000	10,000 15,000 20,000 25,000	--	--

Hamburg wheel track (inflection point minimum number of passes) ^g PG-58 PG-64 PG-70 PG-76 or higher	AASHTO T 324 (Modified)	10,000 10,000 12,500 15000	10,000 10,000 12,500 15000	--	--
Moisture susceptibility (minimum dry strength, psi) ^g	California Test 371	120	120	--	--
Moisture susceptibility (tensile strength ration, %) ^g	California Test 371	70	70	--	--
Smoothness	Section 39-1.12	12-foot straight- edge and must-grind	12-foot straight- edge and must-grind	12-foot straight- edge and must-grind	12-foot straight- edge and must-grind
Asphalt binder	Various	Section 92	Section 92	Section 92	Section 92
Asphalt rubber binder	Various	--	--	Section 92- 1.01D(2) and section 39-1.02D	Section 92- 1.01D(2) and section 39-1.02D
Asphalt modifier	Various	--	--	Section 39-1.02D	Section 39-1.02D
CRM	Various	--	--	Section 39-1.02D	Section 39-1.02D

^a The Engineer determines combined aggregate gradations containing RAP under California Test 367.

^b The tolerances must comply with the allowable tolerances in section 39-1.02E.

^c The Engineer reports the average of 3 tests from a single split sample.

^d The Engineer determines the bulk specific gravity of each lab-compacted briquette under California Test 308, Method A, and theoretical maximum specific gravity under California Test 309.

^e The Engineer waives this specification if HMA contains 10 percent or less of nonmanufactured sand by weight of total aggregate. Manufactured sand is fine aggregate produced by crushing rock or gravel.

^f Report only.

^g Applies to RAP substitution rate greater than 15 percent.

Replace "280 degrees F" in item 2 in the list in the 6th paragraph of section 39-3.04 with:

285 degrees F

01-20-12

Replace "5,000" in the 5th paragraph of section 39-4.02C with:

10,000

02-22-13

Replace the 7th paragraph of section 39-4.02C with:

Except for RAP substitution rate of greater than 15 percent, the Department does not use results from California Test 371 to determine specification compliance.

02-22-13

Replace the 8th paragraph of section 39-4.02C with:

02-22-13

Comply with the values for the HMA quality characteristics and minimum random sampling and testing for quality control shown in the following table:

Minimum Quality Control—QC/QA Construction Process

Quality characteristic	Test method	Minimum sampling and testing frequency	HMA Type			Location of sampling	Maximum report -ing time allowance
			A	B	RHMA-G		
Aggregate gradation ^a	California Test 202	1 per 750 tons	JMF ± tolerance ^b	JMF ± tolerance ^b	JMF ± tolerance ^b	California Test 125	24 hours
Asphalt binder content (%)	California Test 379 or 382		JMF±0.40	JMF±0.40	JMF ±0.40	Loose mix behind paver See California Test 125	
Field compaction (% max. theoretical density) ^{c,d}	QC plan		92–96	92–96	91–96	QC plan	
Aggregate moisture content at continuous mixing plants and RAP moisture content at continuous mixing plants and batch mixing plants ^e	California Test 226 or 370	2 per day during production	--	--	--	Stock-piles or cold feed belts	--
Sand equivalent (min) ^f	California Test 217	1 per 750 tons	47	42	47	California Test 125	24 hours
HMA moisture content (% max)	California Test 226 or 370	1 per 2,500 tons but not less than 1 per paving day	1.0	1.0	1.0	Loose Mix Behind Paver See California Test 125	24 hours
Stabilometer value (min) ^f	California Test 366	1 per 4,000 tons or 2 per 5 business days, whichever is greater	30	30	--		48 hours
No. 4 and 3/8" gradings 1/2" and 3/4" gradings			37	35	23		
Air void content (%) ^{f,g}	California Test 367		4 ± 2	4 ± 2	TV ± 2		

Percent of crushed particles coarse aggregate (% min.): One fractured face Two fractured faces	California Test 205	As designated in QC plan. At least once per project.	90	25	--	California Test 125	48 hours
			75	--	90		
Fine aggregate (% min) (Passing no. 4 sieve and retained on no. 8 sieve): One fractured face			70	20	70		
Los Angeles Rattler (% max): Loss at 100 rev. Loss at 500 rev.	California Test 211		12 45	-- 50	12 40	California Test 125	
Fine aggregate angularity (% min) ^h	California Test 234		45	45	45	California Test 125	
Flat and elongated particle (% max by weight @ 5:1)	California Test 235		Report only	Report only	Report only	California Test 125	
Voids filled with asphalt (%) ⁱ No. 4 grading 3/8" grading 1/2" grading 3/4" grading	California Test 367		65.0–75.0 65.0–75.0 65.0–75.0 65.0–75.0	65.0–75.0 65.0–75.0 65.0–75.0 65.0–75.0	Report only		
Voids in mineral aggregate (% min.) ⁱ No. 4 grading 3/8" grading 1/2" grading 3/4" grading	California Test 367		17.0 15.0 14.0 13.0	17.0 15.0 14.0 13.0	-- -- 18.0–23.0 18.0–23.0		

Dust proportion ⁱ	California Test 367						
No. 4 and 3/8" gradings			0.6–1.2	0.6–1.2	Report only		
1/2" and 3/4" gradings			0.6–1.2	0.6–1.2			
Hamburg wheel track (minimum number of passes at 0.5 inch average rut depth) ⁱ	AASHTO T 324 (Modified)	1 per 10,000 tons or 1 per project whichever is greater			--	--	
PG-58			10,000	10,000			
PG-64			15,000	15,000			
PG-70			20,000	20,000			
PG-76 or higher			25,000	25,000			
Hamburg wheel track (inflection point minimum number of passes) ^j	AASHTO T 324 (Modified)	1 per 10,000 tons or 1 per project whichever is greater			--	--	
PG-58			10,000	10,000			
PG-64			10,000	10,000			
PG-70			12,500	12,500			
PG-76 or higher			15000	15000			
Moisture susceptibility (minimum dry strength, psi) ^j	California Test 371	1 per 10,000 tons or 1 per project whichever is greater	120	120	--	--	
Moisture susceptibility (tensile strength ratio, %) ^j	California Test 371	1 per 10,000 tons or 1 per project whichever is greater	70	70	70	--	
Smoothness	Section 39-1.12	--	12-foot straight-edge, must-grind, and PI ₀	12-foot straight-edge, must-grind, and PI ₀	12-foot straight-edge, must-grind, and PI ₀	--	
Asphalt rubber binder viscosity @ 375 °F, centipoises	Section 39-1.02D	--	--	--	1,500–4,000	Section 39-1.02D	24 hours
CRM	Section 39-1.02D	--	--	--	Section 39-1.02D	Section 39-1.02D	48 hours

- ^a Determine combined aggregate gradation containing RAP under California Test 367.
- ^b The tolerances must comply with the allowable tolerances in section 39-1.02E.
- ^c Determines field compaction for any of the following conditions:
 1. 1/2-inch, 3/8-inch, or no. 4 aggregate grading is used and the specified total paved thickness is at least 0.15 foot.
 2. 3/4-inch aggregate grading is used and the specified total paved thickness is at least 0.20 foot.
- ^d To determine field compaction use:
 1. In-place density measurements using the method specified in your QC plan.
 2. California Test 309 to determine the maximum theoretical density at the frequency specified in California Test 375, Part 5C.
- ^e For adjusting the plant controller at the HMA plant.
- ^f Report the average of 3 tests from a single split sample.
- ^g Determine the bulk specific gravity of each lab-compacted briquette under California Test 308, Method A, and theoretical maximum specific gravity under California Test 309.
- ^h The Engineer waives this specification if HMA contains 10 percent or less of nonmanufactured sand by weight of total aggregate. Manufactured sand is fine aggregate produced by crushing rock or gravel.
- ⁱ Report only.
- ^j Applies to RAP substitution rate greater than 15 percent.

Replace the 1st sentence in the 1st paragraph of section 39-4.03B(2) with:

01-20-12

For aggregate gradation and asphalt binder content, the minimum ratio of verification testing frequency to quality control testing frequency is 1:5.

Replace the 2nd "and" in the 7th paragraph of section 39-4.03B(2) with:

01-20-12

or

Replace the 1st paragraph of section 39-4.04A with:

02-22-13

The Engineer samples for acceptance testing and tests for the following quality characteristics:

HMA Acceptance—QC/QA Construction Process

Index (i)	Quality characteristic				Weight -ing factor (w)	Test method	HMA type		
							A	B	RHMA-G
		Aggregate gradation ^a			0.05 0.05 0.05 0.10 0.15	California Test 202	JMF ± Tolerance ^c		
	Sieve	3/4"	1/2"	3/8"					
1	1/2"	X ^b	--	--					
1	3/8"	--	X	--					
1	No. 4	--	--	X					
2	No. 8	X	X	X					
3	No. 200	X	X	X					
4	Asphalt binder content (%)				0.30	California Test 379 or 382	JMF±0.40	JMF±0.40	JMF ± 0.40
5	Field compaction (% max. theoretical density) ^{d, e}				0.40	California Test 375	92–96	92–96	91–96
	Sand equivalent (min) ^f					California Test 217	47	42	47
	Stabilometer value (min) ^f No. 4 and 3/8" gradings 1/2" and 3/4" gradings					California Test 366	30 37	30 35	-- 23
	Air void content (%) ^{f, g}					California Test 367	4 ± 2	4 ± 2	TV ± 2
	Percent of crushed particles coarse aggregate (% min) One fractured face Two fractured faces Fine aggregate (% min) (Passing no. 4 sieve and retained on No. 8 sieve.) One fractured face					California Test 205	90 75	25 --	-- 90
	HMA moisture content (%, max)					California Test 226 or 370	1.0	1.0	1.0
	Los Angeles Rattler (% max) Loss at 100 rev. Loss at 500 rev.					California Test 211	12 45	-- 50	12 40
	Fine aggregate angularity (% min) ^h					California Test 234	45	45	45
	Flat and elongated particle (% max by weight @ 5:1)					California Test 235	Report only	Report only	Report only
	Voids in mineral aggregate (% min) ⁱ No. 4 grading 3/8" grading 1/2" grading 3/4" grading					California Test 367	17.0 15.0 14.0 13.0	17.0 15.0 14.0 13.0	-- -- 18.0–23.0 18.0–23.0
	Voids filled with asphalt (%) ⁱ No. 4 grading 3/8" grading 1/2" grading 3/4" grading					California Test 367	65.0–75.0 65.0–75.0 65.0–75.0 65.0–75.0	65.0–75.0 65.0–75.0 65.0–75.0 65.0–75.0	Report only

	Dust proportion ⁱ No. 4 and 3/8" gradings 1/2" and 3/4" gradings		California Test 367	0.6–1.2 0.6–1.2	0.6–1.2 0.6–1.2	Report only
	Hamburg Wheel Tracker (minimum number of passes at 0.5 inch average rut depth) ^j PG-58 PG-64 PG-70 PG-76 or higher		AASHTO T 324 (Modified)	10,000 15,000 20,000 25,000	10,000 15,000 20,000 25,000	--
	Hamburg Wheel Tracker (inflection point minimum number of passes) ^j PG-58 PG-64 PG-70 PG-76 or higher		AASHTO T 324 (Modified)	10,000 15,000 20,000 25,000	10,000 15,000 20,000 25,000	--
	Moisture susceptibility (minimum dry strength, psi) ^j		California Test 371	120	120	--
	Moisture susceptibility (tensile strength ratio %) ^j		California Test 371	70	70	70
	Smoothness		Section 39-1.12	12-foot straight- edge, must grind, and PI ₀	12-foot straight- edge, must grind, and PI ₀	12-foot straight- edge, must grind, and PI ₀
	Asphalt binder		Various	Section 92	Section 92	Section 92
	Asphalt rubber binder		Various	--	--	Section 92-1.01D(2) and section 39-1.02D
	Asphalt modifier		Various	--	--	Section 39-1.02D
	CRM		Various	--	--	Section 39-1.02D

^a The Engineer determines combined aggregate gradations containing RAP under California Test 367.

^b "X" denotes the sieves the Engineer tests for the specified aggregate gradation.

^c The tolerances must comply with the allowable tolerances in section 39-1.02E.

^d The Engineer determines field compaction for any of the following conditions:

1. 1/2-inch, 3/8-inch, or no. 4 aggregate grading is used and the specified total paved thickness is at least 0.15 foot and less than 0.20 foot.
2. 3/4-inch aggregate grading is used and the specified total paved thickness is at least 0.20 foot.

^e To determine field compaction, the Engineer uses:

1. California Test 308, Method A, to determine in-place density of each density core.
2. California Test 309 to determine the maximum theoretical density at the frequency specified in California Test 375, Part 5C.

^f The Engineer reports the average of 3 tests from a single split sample.

^g The Engineer determines the bulk specific gravity of each lab-compacted briquette under California Test 308, Method A, and theoretical maximum specific gravity under California Test 309.

^h The Engineer waives this specification if HMA contains 10 percent or less of nonmanufactured sand by weight of total aggregate. Manufactured sand is fine aggregate produced by crushing rock or gravel.

ⁱ Report only.

^j Applies to RAP substitution rate greater than 15 percent.

01-20-12

11-15-13

- 01-20-12

40 CONCRETE PAVEMENT

Replace the headings and paragraphs in section 40 with:

07-19-13

SP-219

7. Epoxy powder coating

40-1.01C(3) Quality Control Plan

Submit a concrete pavement QC plan. Allow 30 days for review.

40-1.01C(4) Mix Design

At least 15 days before testing for mix proportions, submit a copy of the AASHTO accreditation for your laboratory determining the mix proportions. At least 15 days before starting field qualification, submit the proposed concrete mix proportions, the corresponding mix identifications, and laboratory test reports including the modulus of rupture for each trial mixture at 10, 21, 28, and 42 days.

40-1.01C(5) Concrete Field Qualification

Submit field qualification data and test reports including:

1. Mixing date
2. Mixing equipment and procedures used
3. Batch volume in cubic yards. The minimum batch size is 5 cu yd.
4. Type and source of ingredients used
5. Penetration of the concrete
6. Air content of the plastic concrete
7. Age and strength at time of concrete beam testing

Field qualification test reports must be certified with a signature by an official in responsible charge of the laboratory performing the tests.

40-1.01C(6) Cores

Submit for authorization the name of the laboratory you propose to use for testing the cores for air content.

Submit each core in an individual plastic bag marked with a location description.

40-1.01C(7) Profile Data and Straightedge Measurements

At least 5 business days before start of initial profiling or changing profiler or operator, submit:

1. Inertial profiler (IP) certification issued by the Department. The certification must not be more than 12 months old.
2. Operator certification for the IP issued by the Department. The operator must be certified for each different model of IP device operated. The certification must not be more than 12 months old.
3. List of manufacturer's recommended test procedures for IP calibration and verification.

Within 2 business days after cross correlation testing, submit ProVAL profiler certification analysis report for cross correlation test results performed on test section. ProVAL is FHWA's software. Submit the certification analysis report to the Engineer and to the electronic mailbox address:

smoothness@dot.ca.gov

Within 2 business days after each day of inertial profiling, submit profile data to the Engineer and to the electronic mailbox address:

smoothness@dot.ca.gov

Within 2 business days of performing straightedge testing, submit a report of areas requiring smoothness correction.

40-1.01C(8)–40-1.01C(12) Reserved

40-1.01D Quality Control and Assurance

40-1.01D(1) General

If the pavement quantity is at least 2000 cu yd, provide a QC manager.

Core pavement as described for, thickness, bar placement, and air content.

For the Department's modulus of rupture testing, assist the Engineer in fabricating test beams by providing materials and labor.

Allow at least 25 days for the Department to schedule testing for coefficient of friction. Notify the Engineer when the pavement is scheduled to be opened to traffic. Notify the Engineer when the pavement is ready for testing which is the latter of:

1. Seven days after paving
2. When the pavement has attained a modulus of rupture of at least 550 psi

The Department tests for coefficient of friction within 7 days of receiving notification that the pavement is ready for testing.

40-1.01D(2) Prepaving Conference

Schedule a prepaving conference at a mutually agreed upon time and place to meet with the Engineer. Make the arrangements for the conference facility. Discuss QC plan and methods of performing each item of the work.

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

1. Project superintendent
2. QC manager
3. Paving construction foreman
4. Workers and your subcontractor's workers, including:
 - 4.1. Foremen including subcontractor's Foremen
 - 4.2. Concrete plant manager
 - 4.3. Concrete plant operator

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

40-1.01D(3) Just-In-Time-Training

Reserved

40-1.01D(4) Quality Control Plan

Establish, implement, and maintain a QC plan for pavement. The QC plan must describe the organization and procedures used to:

1. Control the production process
2. Determine if a change to the production process is needed
3. Implement a change

The QC plan must include action and suspension limits and details of corrective action to be taken if any process is out of those limits. Suspension limits must not exceed specified acceptance criteria.

The QC plan must address the elements affecting concrete pavement quality including:

1. Mix proportions
2. Aggregate gradation
3. Materials quality
4. Stockpile management
5. Line and grade control
6. Proportioning
7. Mixing and transportation
8. Placing and consolidation
9. Contraction and construction joints
10. Bar reinforcement placement and alignment
11. Dowel bar placement, alignment, and anchorage
12. Tie bar placement
13. Modulus of rupture
14. Finishing and curing

15. Protecting pavement
16. Surface smoothness

40-1.01D(5) Mix Design

Use a laboratory that complies with ASTM C 1077 to determine the mix proportions for concrete pavement. The laboratory must have a current AASHTO accreditation for:

1. AASHTO T 97 or ASTM C 78
2. ASTM C 192/C 192M

Make trial mixtures no more than 24 months before field qualification.

Using your trial mixtures, determine the minimum cementitious materials content. Use your value for minimum cementitious material content for *MC* in equation 1 and equation 2 of section 90-1.02B(3).

To determine the minimum cementitious materials content or maximum water to cementitious materials ratio, use modulus of rupture values of at least 570 psi for 28 days age and at least 650 psi for 42 days age.

If changing an aggregate supply source or the mix proportions, produce a trial batch and field-qualify the new concrete. The Engineer does not adjust contract time for performing sampling, testing, and qualifying new mix proportions or changing an aggregate supply source.

40-1.01D(6) Quality Control Testing

40-1.01D(6)(a) General

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

40-1.01D(6)(b) Concrete Mix

Before placing pavement, your mix design must be field qualified. Use an ACI certified "Concrete Laboratory Technician, Grade I" to perform field qualification tests and calculations. Test for modulus of rupture under California Test 523 at 10, 21, and 28 days of age.

When placing pavement, your quality control must include testing properties at the frequencies shown in the following table:

QC Testing Frequency

Property	Test method	Minimum frequency
Cleanness value	California Test 227	2 per day
Sand equivalent	California Test 217	2 per day
Aggregate gradation	California Test 202	2 per day
Air content (air entrainment specified)	California Test 504	1 per hour
Air content (air entrainment not specified)	California Test 504	1 per 4 hours
Density	California Test 518	1 per 4 hours
Penetration	California Test 533	1 per 4 hours
Aggregate moisture meter calibration ^a	California Test 223 or California Test 226	1 per day

^a Check calibration of the plant moisture meter by comparing moisture meter readings with California Test 223 or California Test 226 test results.

Maintain control charts to identify potential problems and assignable causes. Post a copy of each control chart at a location determined by the Engineer.

Individual measurement control charts must use the target values in the mix proportions as indicators of central tendency.

Develop linear control charts for:

1. Cleanness value
2. Sand equivalent

3. Fine and coarse aggregate gradation
4. Air content
5. Penetration

Control charts must include:

1. Contract number
2. Mix proportions
3. Test number
4. Each test parameter
5. Action and suspension limits
6. Specification limits
7. Quality control test results

For fine and coarse aggregate gradation control charts, record the running average of the previous 4 consecutive gradation tests for each sieve and superimpose the specification limits.

For air content control charts, the action limit is ± 1.0 percent of the specified value. If no value is specified, the action limit is ± 1.0 percent of the value used for your approved mix design.

As a minimum, a process is out of control if any of the following occurs:

1. For fine and coarse aggregate gradation, 2 consecutive running averages of 4 tests are outside the specification limits
2. For individual penetration or air content measurements:
 - 2.1. One point falls outside the suspension limit line
 - 2.2. Two points in a row fall outside the action limit line

Stop production and take corrective action for out of control processes or the Engineer rejects subsequent material.

Before each day's concrete pavement placement and at intervals not to exceed 4 hours of production, use a tachometer to test and record vibration frequency for concrete consolidation vibrators.

40-1.01D(6)(c) Pavement Smoothness

40-1.01D(6)(c)(i) General

Notify the Engineer 2 business days before performing smoothness testing including IP calibration and verification testing. The notification must include start time and locations by station.

Before testing the pavement smoothness, remove foreign objects from the surface, and mark the beginning and ending station on the pavement shoulder.

Test pavement smoothness using an IP except use a 12-foot straightedge at the following locations:

1. Traffic lanes less than 1,000 feet in length including ramps, turn lanes, and acceleration and deceleration lanes
2. Areas within 15 feet of manholes
3. Shoulders
4. Weigh-in-motion areas
5. Miscellaneous areas such as medians, gore areas, turnouts, and maintenance pullouts

40-1.01D(6)(c)(ii) Straightedge Testing

Identify locations of areas requiring correction by:

1. Location Number
2. District-County-Route
3. Beginning station or post mile to the nearest 0.01 mile
4. For correction areas within a lane:
 - 4.1. Lane direction as NB, SB, EB, or WB
 - 4.2. Lane number from left to right in direction of travel
 - 4.3. Wheel path as "L" for left, "R" for right, or "B" for both
5. For correction areas not within a lane:

- 5.1. Identify pavement area (e.g., shoulder, weight station, turnout)
- 5.2. Direction and distance from centerline as "L" for left or "R" for right
6. Estimated size of correction area

40-1.01D(6)(c)(iii) Inertial Profile Testing

IP equipment must display a current certification decal with expiration date.

Conduct cross correlation IP verification test in the Engineer's presence before performing initial profiling. Verify cross correlation IP verification test at least annually. Conduct 5 repeat runs of the IP on an authorized test section. The test section must be on an existing concrete pavement surface 0.1 mile long. Calculate a cross correlation to determine the repeatability of your device under Section 8.3.1.2 of AASHTO R 56 using ProVAL profiler certification analysis with a 3 feet maximum offset. The cross correlation must be a minimum of 0.92.

Conduct the following IP calibration and verification tests in the Engineer's presence each day before performing inertial profiling:

1. Block test. Verify the height sensor accuracy under AASHTO R 57, section 5.3.2.3.
2. Bounce test. Verify the combined height sensor and accelerometer accuracy under AASHTO R 57, section 5.3.2.3.2.
3. DMI test. Calibrate the accuracy of the testing procedure under AASHTO R 56, section 8.4.
4. Manufacturer's recommended tests.

Collect IP data using the specified ProVAL analysis with 250 mm and IRI filters. Comply with the requirements for data collection under AASHTO R 56.

For IP testing, wheel paths are 3 feet from and parallel to the edge of a lane. Left and right are relative to the direction of travel. The IRI is the pavement smoothness along a wheel path of a given lane. The MRI is the average of the IRI values for the left and right wheel path from the same lane.

Operate the IP according to the manufacturer's recommendations and AASHTO R 57 at 1-inch recording intervals and a minimum 4 inch line laser sensor.

Collect IP data under AASHTO R 56. IP data must include:

1. Raw profile data for each lane.
2. ProVAL ride quality analysis report for the international roughness index (IRI) of left and right wheel paths of each lane. Submit in pdf file format.
3. ProVAL ride quality analysis report for the mean roughness index (MRI) of each lane. Submit in pdf file format.
4. ProVAL smoothness assurance analysis report for IRIs of left wheel path. Submit in pdf file format.
5. ProVAL smoothness assurance analysis report for IRIs of right wheel path. Submit in pdf file format.
6. GPS data file for each lane in GPS exchange. Submit in GPS eXchange file format.
7. Manufacturer's recommended IP calibration and verification tests results.
8. AASHTO IP calibration and verification test results including bounce, block, and distance measurement instrument (DMI).

Submit the IP raw profile data in unfiltered electronic pavement profile file (PPF) format. Name the PPF file using the following naming convention:

YYYYMMDD_TTCCRRR_D_L_W_S_X_PT.PPF

where:

YYYY = year

MM = Month, leading zero

DD = Day of month, leading zero

TT = District, leading zero

CCC = County, 2 or 3 letter abbreviation as shown in section 1-1.08

RRR = Route number, no leading zeros

D = Traffic direction as NB, SB, WB, or EB

L = Lane number from left to right in direction of travel

W = Wheel path as "L" for left, "R" for right, or "B" for both

S = Beginning station to the nearest foot (e.g., 10+20) or beginning post mile to the nearest hundredth (e.g., 25.06) no leading zero
X = Profile operation as "EXIST" for existing pavement, "PAVE" for after paving, or "CORR" for after final surface pavement correction
PT = Pavement type (e.g., "concrete", etc.)

Determine IRIs using the ProVAL ride quality analysis with a 250 mm and IRI filters. While collecting the profile data to determine IRI, record the following locations in the raw profile data:

1. Begin and end of all bridge approach slabs
2. Begin and end of all bridges
3. Begin and end of all culverts visible on the roadway surface

For each 0.1 mile section, your IRI values must be within 10 percent of the Department's IRI values. The Engineer may order you to recalibrate your IP equipment and reprofile. If your results are inaccurate due to operator error, the Engineer may disqualify your IP operator.

Determine the MRI for 0.1-mile fixed sections. A partial section less than 0.1 mile that is the result of an interruption to continuous pavement surface must comply with the MRI specifications for a full section. Adjust the MRI for a partial section to reflect a full section based on the proportion of a section paved.

Determine the areas of localized roughness. Use the ProVAL smoothness assurance with a continuous IRI for each wheel path, 25-foot interval, and 250 mm and IRI filters.

40-1.01D(6)(c)(iv) Reserved

40-1.01D(6)(d)–40-1.01D(6)(h) Reserved

40-1.01D(7) Pavement Acceptance

40-1.01D(7)(a) Acceptance Testing

40-1.01D(7)(a)(i) General

The Department's acceptance testing includes testing the pavement properties at the minimum frequencies shown in the following table:

Property	Acceptance Testing		Frequency ^a
	CRCP	JPCP	
Modulus of rupture (28 day)	California Test 523		1,000 cu yd
Air content ^b	California Test 504		1 day's paving
Dowel bar placement	--	Measurement ^a	700 sq yd
Tie bar placement	--	Measurement ^a	4,000 sq yd
Thickness	California Test 531		1,200 sq yd
Coefficient of friction	California Test 342		1 day's paving

^aA single test represents no more than the frequency specified.

^bTested only when air entrainment is specified.

Pavement smoothness may be accepted based on your testing in the absence of the Department's testing.

40-1.01D(7)(a)(ii) Air Content

If air-entraining admixtures are specified, the Engineer uses a t-test to compare your QC test results with the Department's test results. The t-value for test data is determined using the following equation:

$$t = \frac{|\bar{X}_c - \bar{X}_v|}{S_p \sqrt{\frac{1}{n_c} + \frac{1}{n_v}}} \quad \text{and} \quad S_p^2 = \frac{S_c^2(n_c - 1) + S_v^2(n_v - 1)}{n_c + n_v - 2}$$

where:

n_c = Number of your quality control tests (minimum of 6 required)

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n_v	= Number of Department's tests (minimum of 2 required)
\bar{X}_c	= Mean of your quality control tests
\bar{X}_v	= Mean of the Department's tests
S_p	= Pooled standard deviation (When $n_v = 1$, $S_p = S_c$)
S_c	= Standard deviation of your quality control tests
S_v	= Standard deviation of the Department's tests (when $n_v > 1$)

The Engineer compares your QC test results with the Department's test results at a level of significance of $\alpha = 0.01$. The Engineer compares the t-value to tcrit, using degrees of freedom showing in the following table:

degrees of freedom ($nc+nv-2$)	tcrit (for $\alpha = 0.01$)
1	63.657
2	9.925
3	5.841
4	4.604
5	4.032
6	3.707
7	3.499
8	3.355
9	3.250
10	3.169

If the t-value calculated is less than or equal to tcrit, your quality control test results are verified. If the t-value calculated is greater than tcrit, quality control test results are not verified.

If your quality control test results are not verified, core at least 3 specimens from concrete pavement under section 40-1.03P. The Engineer selects the core locations. The authorized laboratory must test these specimens for air content under ASTM C 457. The Engineer compares these test results with your quality control test results using the t-test method. If your quality control test results are verified based on this comparison, the Engineer uses the quality control test results for acceptance of concrete pavement for air content. If your quality control test results are not verified based on this comparison, the Engineer uses the air content of core specimens determined by the authorized laboratory under ASTM C 457 for acceptance.

40-1.01D(7)(a)(iii) Dowel and Tie Bar Placement

For JPCP, drill cores under section 40-1.03P for the Department's acceptance testing.

The Engineer identifies which joint and dowel or tie bar are to be tested. Core each day's paving within 2 business days. Each dowel or tie bar test consists of 2 cores, 1 on each bar end to expose both ends and allow measurement.

If the tests indicate dowel or tie bars are not placed within the specified tolerances or if there is unconsolidated concrete around the dowel or tie bars, core additional specimens identified by Engineer to determine the limits of unacceptable work.

40-1.01D(7)(a)(iv) Thickness

Drill cores under section 40-1.03P for the Department's acceptance testing in the primary area, which is the area placed in 1 day for each thickness. Core at locations determined by the Engineer and in the Engineer's presence.

Do not core until any grinding has been completed.

The core specimen diameter must be 4 inches. To identify the limits of concrete pavement deficient in thickness by more than 0.05 foot, you may divide primary areas into secondary areas. The Engineer

measures cores under California Test 531 to the nearest 0.01 foot. Core at least 1 foot from existing, contiguous, and parallel concrete pavement not constructed as part of this Contract.

You may request the Engineer make additional thickness measurements and use them to determine the average thickness variation. The Engineer determines the locations with random sampling methods.

If each thickness measurement in a primary area is less than 0.05 foot deficient, the Engineer calculates the average thickness deficiency in that primary area. The Engineer uses 0.02 foot for a thickness difference more than 0.02 foot over the specified thickness.

For each thickness measurement in a primary area deficient by more than 0.05 foot, the Engineer determines a secondary area where the thickness deficiency is more than 0.05 foot. The Engineer determines this secondary area by measuring the thickness of each concrete pavement slab adjacent to the measurement found to be more than 0.05 foot deficient. The Engineer continues to measure the thickness until an area that is bound by slabs with thickness deficient by 0.05 foot or less is determined.

Slabs without bar reinforcement are defined by the areas bound by longitudinal and transverse joints and concrete pavement edges. Slabs with bar reinforcement are defined by the areas bound by longitudinal joints and concrete pavement edges and 15-foot lengths. Secondary area thickness measurements in a slab determine that entire slab's thickness.

The Engineer measures the remaining primary area thickness after removing the secondary areas from consideration for determining the average thickness deficiency.

40-1.01D(7)(a)(v)–40-1.01D(7)(a)(ix) Reserved

40-1.01D(7)(b) Acceptance Criteria

40-1.01D(7)(b)(i) General

Reserved

40-1.01D(7)(b)(ii) Modulus of Rupture

For field qualification, the modulus of rupture at no later than 28 days must be at least:

1. 550 psi for each single beam
2. 570 psi for the average of 5 beams

For production, the modulus of rupture for the average of the individual test results of 2 beams aged for 28 days must be at least 570 psi.

40-1.01D(7)(b)(iii) Air Content

The air content must be within ± 1.5 percent of the specified value. If no value is specified, the air content must be within ± 1.5 percent of, the value used for your approved mix design.

40-1.01D(7)(b)(iv) Bar Reinforcement

In addition to requirements of Section 52, bar reinforcement must be more than 1/2 inch below the saw cut depth at concrete pavement joints.

40-1.01D(7)(b)(v) Dowel Bar and Tie Bar Placement

Tie bar placement must comply with the tolerances shown in the following table:

Tie Bar Tolerance	
Dimension	Tolerance
Horizontal and vertical skew	5 1/4 inch, max
Longitudinal translation	± 2 inch
Horizontal offset (embedment)	± 2 inch
Vertical depth	1. At least 1/2 inch below the bottom of the saw cut 2. When measured at any point along the bar, not less than 2 inches clear of the pavement's surface and bottom

NOTE: Tolerances are measured relative to the completed joint.

Dowel bar placement must comply with the tolerances shown in the following table:

Dowel Bar Tolerances	
Dimension	Tolerance
Horizontal offset	±1 inch
Longitudinal translation	±2 inch
Horizontal skew	5/8 inch, max
Vertical skew	5/8 inch, max
Vertical depth	<p>The minimum distance measured from concrete pavement surface to any point along the top of dowel bar must be: DB + 1/2 inch</p> <p>where: DB = one third of pavement thickness in inches, or the saw cut depth, whichever is greater</p> <p>The maximum distance below the depth shown must be 5/8 inch.</p>

NOTE: Tolerances are measured relative to the completed joint.

The Engineer determines the limits for removal and replacement.

40-1.01D(7)(b)(vi) Pavement Thickness

Concrete pavement thickness must not be deficient by more than 0.05 foot.

The minimum thickness is not reduced for specifications that may affect concrete pavement thickness such as allowable tolerances for subgrade construction.

The Engineer determines the areas of noncompliant pavement, the thickness deficiencies, and the limits where removal is required.

Pavement with an average thickness deficiency less than 0.01 foot is acceptable. If the thickness deficiency is 0.01 foot or more and less than 0.05 foot, you may request authorization to leave the pavement in place and accept a pay adjustment. If the deficiency is more than 0.05 foot the pavement must be removed and replaced.

40-1.01D(7)(b)(vii) Pavement Smoothness

Where testing with an IP is required, the pavement surface must have:

1. No areas of localized roughness with an IRI greater than 120 in/mi
2. MRI of 60 in/mi or less within a 0.1 mile section

Where testing with a straightedge is required, the pavement surface must not vary from the lower edge of the straightedge by more than:

1. 0.01 foot when the straightedge is laid parallel with the centerline
2. 0.02 foot when the straightedge is laid perpendicular to the centerline and extends from edge to edge of a traffic lane
3. 0.02 foot when the straightedge is laid within 24 feet of a pavement conform

40-1.01D(7)(b)(viii) Coefficient of Friction

Initial and final texturing must produce a coefficient of friction of at least 0.30. Do not open the pavement to traffic unless the coefficient of friction is at least 0.30.

40-1.01D(7)(b)(ix)–40-1.01D(7)(b)(xii) Reserved

40-1.02 MATERIALS

40-1.02A General

Water for coring must comply with section 90.

Tack coat must comply with section 39.

40-1.02B Concrete

40-1.02B(1) General

PCC for pavement must comply with section 90-1 except as otherwise specified.

40-1.02B(2) Cementitious Material

Concrete must contain from 505 pounds to 675 pounds cementitious material per cubic yard. The specifications for reducing cementitious material content in section 90-1.02E(2) do not apply .

40-1.02B(3) Aggregate

Aggregate must comply with section 90-1.02C except the specifications for reduction in operating range and contract compliance for cleanness value and sand equivalent specified in section 90-1.02C(2) and section 90-1.02C(3) do not apply.

For coarse aggregate in high desert and high mountain climate regions, the loss must not exceed 25 percent when tested under California Test 211 with 500 revolutions.

For combined aggregate gradings, the difference between the percent passing the 3/8-inch sieve and the percent passing the no. 8 sieve must not be less than 16 percent of the total aggregate.

40-1.02B(4) Air Entrainment

The second paragraph of section 90-1.02I(2)(a) does not apply.

For a project shown in the low and south mountain climate regions, add air-entraining admixture to the concrete at the rate required to produce an air content of 4 percent in the freshly mixed concrete.

For a project shown in the high desert and high mountain climate regions, add air-entraining admixture to the concrete at the rate required to produce an air content of 6 percent in the freshly mixed concrete.

40-1.02B(5)–40-1.02B(8) Reserved

40-1.02C Reinforcement, Bars, and Baskets

40-1.02C(1) Bar Reinforcement

Bar reinforcement must be deformed bars.

If the project is not shown to be in high desert or any mountain climate region, bar reinforcement must comply with section 52.

If the project is shown to be in high desert or any mountain climate regions, bar reinforcement must be one of the following:

1. Epoxy-coated bar reinforcement under section 52-2.03B except bars must comply with either ASTM A 706/A 706M; ASTM A 996/A 996M; or ASTM A 615/A 615M, Grade 40 or 60. Bars must be handled under ASTM D 3963/D 3963M and section 52-2.02C.
2. Low carbon, chromium steel bar complying with ASTM A 1035/A 1035M

40-1.02C(2) Dowel Bars

Dowel bars must be plain bars. Fabricate, sample, and handle epoxy-coated dowel bars under ASTM D 3963/D 3963M and section 52-2.03C except each sample must be 18 inches long.

If the project is not shown to be in high desert or any mountain climate region, dowel bars must be one of the following:

1. Epoxy-coated bars. Bars must comply with ASTM A 615/A 615M, Grade 40 or 60. Epoxy coating must comply with either section 52-2.02B or 52-2.03B.
2. Stainless-steel bars. Bars must be descaled solid stainless-steel bars under ASTM A 955/A 955M, UNS Designation S31603 or S31803.

3. Low carbon, chromium-steel bars under ASTM A 1035/A 1035M.

If the project is shown to be in high desert or any mountain climate region, dowel bars must be one of the following:

1. Epoxy-coated bars. Bars must comply with ASTM A 615/A 615M, Grade 40 or 60. Epoxy coating must comply with section 52-2.03B.
2. Stainless-steel bars. Bars must be descaled solid stainless-steel bars under ASTM A 955/A 955M, UNS Designation S31603 or S31803.

40-1.02C(3) Tie Bars

Tie bars must be deformed bars.

If the project is not shown to be in high desert or any mountain climate region, tie bars must be one of the following:

1. Epoxy-coated bar reinforcement. Bars must comply with either section 52-2.02B or 52-2.03B except bars must comply with either ASTM A 706/A 706M; ASTM A 996/A 996M; or ASTM A 615/A 615M, Grade 40 or 60.
2. Stainless-steel bars. Bars must be descaled solid stainless-steel bars under ASTM A 955/A 955M, UNS Designation S31603 or S31803.
3. Low carbon, chromium-steel bars under ASTM A 1035/A 1035M.

If the project is shown to be in high desert or any mountain climate region, tie bars must be one of the following:

1. Epoxy-coated bar reinforcement. Bars must comply with section 52-2.03B except bars must comply with either ASTM A 706/A 706M; ASTM A 996/A 996M; or ASTM A 615/A 615M, Grade 40 or 60.
2. Stainless-steel bars. Bars must be descaled solid stainless-steel bars under ASTM A 955/A 955M, UNS Designation S31603 or S31803.

Fabricate, sample, and handle epoxy-coated tie bars under ASTM D 3963/D 3963M, section 52-2.02, or section 52-2.03.

Do not bend tie bars.

40-1.02C(4) Dowel and Tie Bar Baskets

For dowel and tie bar baskets, wire must comply with ASTM A 82/A 82M and be welded under ASTM A 185/A 185M, Section 7.4. The minimum wire-size no. is W10. Use either U-frame or A-frame shaped assemblies.

If the project is not shown to be in high desert or any mountain climate region, baskets may be epoxy-coated, and the epoxy coating must comply with either section 52-2.02B or 52-2.03B.

If the project is shown to be in high desert or any mountain climate region, wire for dowel bar and tie bar baskets must be one of the following:

1. Epoxy-coated wire complying with section 52-2.03B
2. Stainless-steel wire. Wire must be descaled solid stainless-steel. Wire must comply with (1) the chemical requirements in ASTM A 276/A 276M, UNS Designation S31603 or S31803 and (2) the tension requirements in ASTM A 1022/ A 1022M.

Handle epoxy-coated tie bar and dowel bar baskets under ASTM D 3963/D 3963M and either section 52-2.02 or 52-2.03.

Fasteners must be driven fasteners under ASTM F 1667. Fasteners on lean concrete base or HMA must have a minimum shank diameter of 3/16 inch and a minimum shank length of 2-1/2 inches. For asphalt treated permeable base or cement treated permeable base, the shank diameter must be at least 3/16 inch and the shank length must be at least 5 inches.

Fasteners, clips, and washers must have a minimum 0.2-mil thick zinc coating applied by either electroplating or galvanizing.

40-1.02D Dowel Bar Lubricant

Dowel bar lubricant must be petroleum paraffin based or a curing compound. Paraffin-based lubricant must be Dayton Superior DSC BB-Coat or Valvoline Tectyl 506 or an approved equal and must be factory-applied. Curing compound must be curing compound no. 3.

40-1.02E Joint Filler

Joint filler for isolation joint must be preformed expansion joint filler for concrete (bituminous type) under ASTM D 994.

40-1.02F Curing Compound

Curing compound must be curing compound no. 1 or 2.

40-1.02G Nonshrink Hydraulic Cement Grout

Nonshrink hydraulic cement grout must comply with ASTM C 1107/C 1107M. Clean, uniform, rounded aggregate filler may be used to extend the grout. Aggregate filler must not exceed 60 percent of the grout mass or the maximum recommended by the manufacturer, whichever is less. Aggregate filler moisture content must not exceed 0.5 percent when tested under California Test 223 or California Test 226. Aggregate filler tested under California Test 202 must comply with the grading shown in the following table:

Aggregate Filler Grading	
Sieve size	Percentage passing
1/2-inch	100
3/8-inch	85–100
No. 4	10–30
No. 8	0–10
No. 16	0–5

40-1.02H Temporary Roadway Pavement Structure

Temporary roadway pavement structure must comply with section 41-1.02E.

40-1.02I–40-1.02N Reserved

40-1.03 CONSTRUCTION

40-1.03A General

Aggregate and bulk cementitious material must be proportioned by weight by means of automatic proportioning devices of approved types.

For widenings and lane reconstruction, construct only the portion of pavement where the work will be completed during the same lane closure. If you fail to complete the construction during the same lane closure, construct a temporary pavement structure under section 41-1.

40-1.03B Water Supply

Before placing concrete pavement, develop enough water supply.

40-1.03C Test Strips

Construct a test strip for each type of pavement with a quantity of more than 2,000 cu yd. Obtain authorization of the test strip before constructing pavement. Test strips must be:

1. 700 to 1,000 feet long
2. Same width as the planned paving, and
3. Constructed using the same equipment proposed for paving

The Engineer selects from 6 to 12 core locations for dowel bars and up to 6 locations for tie bars per test strip. If you use mechanical dowel bar inserters, the test strip must demonstrate they do not leave voids, segregations, or surface irregularities such as depressions, dips, or high areas.

Test strips must comply with the acceptance criteria for:

1. Smoothness, except IP is not required
2. Dowel bars and tie bars placement

3. Pavement thickness
4. Final finishing, except the coefficient of friction is not considered

Allow 3 business days for evaluation. If the test strip is noncompliant, stop paving and submit a plan for changed materials, methods, or equipment. Allow 3 business days for authorization of the plan. Construct another test strip per the authorized plan.

Remove and dispose of noncompliant test strips.

If the test strip is compliant except for smoothness and final finishing, you may grind the surface. After grinding retest the test strip smoothness under section 40-1.01D(6)(c).

If the test strip is compliant for smoothness and thickness, construction of an additional test strip is not required and the test strip may remain in place.

Construct additional test strips if you:

1. Propose different paving equipment including:
 - 1.1. Paver
 - 1.2. Dowel bar inserter
 - 1.3. Tie bar inserter
 - 1.4. Tining
 - 1.5. Curing equipment
2. Change concrete mix proportions

You may request authorization to eliminate the test strip if you use paving equipment and personnel from a Department project (1) for the same type of pavement and (2) completed within the past 12 months. Submit supporting documents and previous project information with your request.

40-1.03D Joints

40-1.03D(1) General

Do not bend tie bars or reinforcement in existing concrete pavement joints.

For contraction joints and isolation joints, saw cut a groove with a power-driven saw. After cutting, immediately wash slurry from the joint with water at less than 100 psi pressure.

Keep joints free from foreign material including soil, gravel, concrete, and asphalt. To keep foreign material out of the joint, you may use filler material. Filler material must not react adversely with the concrete or cause concrete pavement damage. After sawing and washing, install filler material that keeps moisture in the adjacent concrete during the 72 hours after paving. If you install filler material, the specifications for spraying the sawed joint with additional curing compound in section 40-1.03K does not apply. If using absorptive filler material, moisten the filler immediately before or after installation.

40-1.03D(2) Construction Joints

Construction joints must be vertical.

Before placing fresh concrete against hardened concrete, existing concrete pavement, or structures, apply curing compound no. 1 or 2 to the vertical surface of the hardened concrete, existing concrete pavement, or structures and allow it to dry.

At joints between concrete pavement and HMA, apply tack coat between the concrete pavement and HMA.

Use a metal or wooden bulkhead to form transverse construction joints. If dowel bars are described, the bulkhead must allow dowel bar installation.

40-1.03D(3) Contraction Joints

Saw contraction joints before cracking occurs and after the concrete is hard enough to saw without spalling, raveling, or tearing.

Saw cut using a power saw with a diamond blade. After cutting, immediately wash slurry from the joint with water at less than 100 psi pressure.

Except for longitudinal joints parallel to a curving centerline, transverse and longitudinal contraction joints must not deviate by more than 0.1 foot from either side of a 12-foot straight line

Cut transverse contraction joints within 0.5 foot of the spacing described. Adjust spacing if needed such that slabs are at least 10 feet long.

For widenings, do not match transverse contraction joints with existing joint spacing or skew unless otherwise described.

Cut transverse contraction joints straight across the full concrete pavement width, between isolation joints and edges of pavement. In areas of converging and diverging pavements, space transverse contraction joints such that the joint is continuous across the maximum pavement width. Longitudinal contraction joints must be parallel with the concrete pavement centerline, except when lanes converge or diverge.

40-1.03D(4) Isolation Joints

Before placing concrete at isolation joints, prepare the existing concrete face and secure joint filler. Prepare by saw cutting and making a clean flat vertical surface. Make the saw cut the same depth as the depth of the new pavement.

40-1.03E Bar Reinforcement

Place bar reinforcement under section 52.

40-1.03F Dowel Bar Placement

If using curing compound as lubricant, apply the curing compound to dowels in 2 separate applications. Lubricate each dowel bar entirely before placement. The last application must be applied not more than 8 hours before placing the dowel bars. Apply each curing compound application at a rate of 1 gallon per 150 square feet.

Install dowel bars using one of the following methods:

1. Drill and bond bars. Comply with section 41-10.
2. Mechanical insertion. Eliminate evidence of the insertion by reworking the concrete over the dowel bars.
3. Dowel bar baskets. Anchor baskets with fasteners. Use at least 1 fastener per foot for basket sections. Baskets must be anchored at least 200 feet in advance of the concrete placement activity unless your waiver request is authorized. If requesting a waiver, describe the construction limitations or restricted access preventing the advanced anchoring. After the baskets are anchored and before the concrete is placed, cut and remove temporary spacer wires and demonstrate the dowel bars do not move from their specified depth and alignment during concrete placement.

If dowel bars are noncompliant, stop paving activities, demonstrate your correction, and obtain verbal approval from the Engineer.

40-1.03G Tie Bar Placement

Install tie bars at longitudinal joints using one of the following methods:

1. Drill and bond bars. Comply with section 41-10.
2. Insert bars. Mechanically insert tie bars into plastic slip-formed concrete before finishing. Inserted tie bars must have full contact between the bar and the concrete. Eliminate evidence of the insertion by reworking the concrete over the tie bars.
3. Threaded couplers. Threaded tie bar splice couplers must be fabricated from deformed bar reinforcement and free of external welding or machining.
4. Tie bar baskets. Anchor baskets at least 200 feet in advance of pavement placement activity. If you request a waiver, describe the construction limitations or restricted access preventing the advanced anchoring. After the baskets are anchored and before paving, demonstrate the tie bars do not move from their specified depth and alignment during paving. Use fasteners to anchor tie bar baskets.

If tie bars are noncompliant, stop paving activities, demonstrate your correction, and obtain verbal approval from the Engineer.

40-1.03H Placing Concrete

40-1.03H(1) General

Immediately prior to placing concrete, the surface to receive concrete must be:

1. In compliance with specified requirements, including compaction and elevation tolerances
2. Free of loose and extraneous material
3. Uniformly moist, but free of standing or flowing water

Place concrete pavement with stationary side forms or slip-form paving equipment.

Place consecutive concrete loads within 30 minutes of each other. Construct a transverse construction joint when concrete placement is interrupted by more than 30 minutes. The transverse construction joint must coincide with the next contraction joint location, or you must remove fresh concrete pavement to the preceding transverse joint location.

Place concrete pavement in full slab widths separated by construction joints or monolithically in multiples of full lane widths with a longitudinal contraction joint at each traffic lane line.

Do not retemper concrete.

If the concrete pavement surface width is constructed as specified, you may construct concrete pavement sides on a batter not flatter than 6:1 (vertical:horizontal).

40-1.03H(2) Paving Adjacent to Existing Concrete Pavement

Where pavement is placed adjacent to existing concrete pavement:

1. Grinding adjacent pavement must be completed before placing the pavement
2. Use paving equipment with padded crawler tracks or rubber-tired wheels with enough offset to prevent damage
3. Match pavement grade with the elevation of existing concrete pavement after grinding.

40-1.03H(3) Concrete Pavement Transition Panel

For concrete pavement placed in a transition panel, texture the surface with a drag strip of burlap, broom, or spring steel tine device that produces scoring in the finished surface. Scoring must be either parallel or transverse to the centerline. Texture at the time that produces the coarsest texture.

40-1.03H(4) Stationary Side Form Construction

Stationary side forms must be straight and without defects including warps, bends, and indentations. Side forms must be metal except at end closures and transverse construction joints where other materials may be used.

You may build up side forms by attaching a section to the top or bottom. If attached to the top of metal forms, the attached section must be metal.

The side form's base width must be at least 80 percent of the specified concrete pavement thickness.

Side forms including interlocking connections with adjoining forms must be rigid enough to prevent springing from subgrading and paving equipment and concrete pressure.

Construct subgrade to final grade before placing side forms. Side forms must bear fully on the foundation throughout their length and base width. Place side forms to the specified grade and alignment of the finished concrete pavement's edge. Support side forms during concrete placing, compacting, and finishing.

After subgrade work is complete and immediately before placing concrete, true side forms and set to line and grade for a distance that avoids delays due to form adjustment.

Clean and oil side forms before each use.

Side forms must remain in place for at least 1 day after placing concrete and until the concrete pavement edge no longer requires protection from the forms.

Spread, screed, shape, and consolidate concrete with 1 or more machines. The machines must uniformly distribute and consolidate the concrete. The machines must operate to place the concrete pavement to the specified cross section with minimal hand work.

Consolidate the concrete without segregation. If vibrators are used:

1. The vibration rate must be at least 3,500 cycles per minute for surface vibrators and 5,000 cycles per minute for internal vibrators
2. Amplitude of vibration must cause perceptible concrete surface movement at least 1 foot from the vibrating element
3. Use a calibrated tachometer for measuring frequency of vibration
4. Vibrators must not rest on side forms or new concrete pavement
5. Power to vibrators must automatically cease when forward or backward motion of the paving machine is stopped
6. Uniformly consolidate the concrete across the paving width including adjacent to forms by using high-frequency internal vibrators within 15 minutes of depositing concrete on the subgrade
7. Do not shift the mass of concrete with vibrators.

40-1.03H(5) Slip-Form Construction

If slip-form construction is used, spread, screed, shape, and consolidate concrete to the specified cross section with slip-form machines and minimal hand work. Slip-form paving machines must be equipped with traveling side forms and must not segregate the concrete.

Do not deviate from the specified concrete pavement alignment by more than 0.1 foot.

Slip-form paving machines must use high frequency internal vibrators to consolidate concrete. You may mount vibrators with their axes parallel or normal to the concrete pavement alignment. If mounted with axes parallel to the concrete pavement alignment, space vibrators no more than 2.5 feet measured center to center. If mounted with axes normal to the concrete pavement alignment, space the vibrators with a maximum 0.5-foot lateral clearance between individual vibrators.

Each vibrator must have a vibration rate from 5,000 to 8,000 cycles per minute. The amplitude of vibration must cause perceptible concrete surface movement at least 1 foot from the vibrating element. Use a calibrated tachometer to measure frequency of vibration.

40-1.03I Edge Treatment

Construct edge treatments as shown. Regrade when required for the preparation of safety edge areas.

Sections 40-1.03J(2) and 40-1.03J(3) do not apply to safety edges.

For safety edges placed after the concrete pavement is complete, concrete may comply with the requirements for minor concrete.

For safety edges placed after the concrete pavement is complete, install connecting bar reinforcement under section 52.

Saw cutting or grinding may be used to construct safety edges.

For safety edges, the angle of the slope must not deviate by more than ± 5 degrees from the angle shown. Measure the angle from the plane of the adjacent finished pavement surface.

40-1.03J Finishing

40-1.03J(1) General

Reserved

40-1.03J(2) Preliminary Finishing

40-1.03J(2)(a) General

Preliminary finishing must produce a smooth and true-to-grade finish. After preliminary finishing, mark each day's paving with a stamp. The stamp must be authorized before paving starts. The stamp must be approximately 1 by 2 feet in size. The stamp must form a uniform mark from 1/8 to 1/4 inch deep. Locate the mark 20 ± 5 feet from the transverse construction joint formed at each day's start of paving and 1 ± 0.25 foot from the pavement's outside edge. The stamp mark must show the month, day, and year of

placement and the station of the transverse construction joint. Orient the stamp mark so it can be read from the pavement's outside edge.

Do not apply water to the pavement surface before float finishing.

40-1.03J(2)(b) Stationary Side Form Finishing

If stationary side form construction is used, give the pavement a preliminary finish by the machine float method or the hand method.

If using the machine float method:

1. Use self-propelled machine floats.
2. Determine the number of machine floats required to perform the work at a rate equal to the pavement delivery rate. If the time from paving to machine float finishing exceeds 30 minutes, stop pavement delivery. When machine floats are in proper position, you may resume pavement delivery and paving.
3. Run machine floats on side forms or adjacent pavement lanes. If running on adjacent pavement, protect the adjacent pavement surface under section 40-1.03L. Floats must be hardwood, steel, or steel-shod wood. Floats must be equipped with devices that adjust the underside to a true flat surface.

If using the hand method, finish pavement smooth and true to grade with manually operated floats or powered finishing machines.

40-1.03J(2)(c) Slip-Form Finishing

If slip-form construction is used, the slip-form paver must give the pavement a preliminary finish. You may supplement the slip-form paver with machine floats.

Before the pavement hardens, correct pavement edge slump in excess of 0.02 foot exclusive of edge rounding.

40-1.03J(3) Final Finishing

After completing preliminary finishing, round the edges of the initial paving widths to a 0.04-foot radius. Round transverse and longitudinal construction joints to a 0.02-foot radius.

Before curing, texture the pavement. Perform initial texturing with a burlap drag or broom device that produces striations parallel to the centerline. Perform final texturing with a steel-tined device that produces grooves parallel with the centerline.

Construct longitudinal grooves with a self-propelled machine designed specifically for grooving and texturing pavement. The machine must have tracks to maintain constant speed, provide traction, and maintain accurate tracking along the pavement surface. The machine must have a single row of rectangular spring steel tines. The tines must be from 3/32 to 1/8 inch wide, on 3/4-inch centers, and must have enough length, thickness, and resilience to form grooves approximately 3/16 inch deep. The machine must have horizontal and vertical controls. The machine must apply constant down pressure on the pavement surface during texturing. The machines must not cause raveling.

Construct grooves over the entire pavement width in a single pass except do not construct grooves 3 inches from the pavement edges and longitudinal joints. Final texture must be uniform and smooth. Use a guide to properly align the grooves. Grooves must be parallel and aligned to the pavement edge across the pavement width. Grooves must be from 1/8 to 3/16 inch deep after the pavement has hardened.

For irregular areas and areas inaccessible to the grooving machine, you may hand-construct grooves using the hand method. Hand-constructed grooves must comply with the specifications for machine-constructed grooves.

For ramp termini, use heavy brooming normal to the ramp centerline to produce a coefficient of friction of at least 0.35 determined on the hardened surface under California Test 342.

40-1.03K Curing

Cure the concrete pavement's exposed area under section 90-1.03B using the waterproof membrane method or curing compound method. If using the curing compound method use curing compound no. 1 or 2. When side forms are removed within 72 hours of the start of curing, also cure the concrete pavement edges.

Apply curing compound with mechanical sprayers. Reapply curing compound to saw cuts and disturbed areas.

40-1.03L Protecting Concrete Pavement

Protect concrete pavement under section 90-1.03C.

Maintain the concrete pavement surface temperature at not less than 40 degrees F for the initial 72 hours.

Protect the concrete pavement surface from activities that cause damage and reduce texture and coefficient of friction. Do not allow soil, gravel, petroleum products, concrete, or asphalt mixes on the concrete pavement surface.

Construct crossings for traffic convenience. If authorized, you may use RSC for crossings. Do not open crossings until the Department determines that the pavement's modulus of rupture is at least 550 psi under California Test 523 or California Test 524.

Do not open concrete pavement to traffic or use equipment on the concrete pavement for 10 days after paving nor before the concrete has attained a modulus of rupture of 550 psi based on Department's testing except:

1. If the equipment is for sawing contraction joints
2. If authorized, one side of paving equipment's tracks may be on the concrete pavement after a modulus of rupture of 350 psi has been attained, provided:
 - 2.1. Unit pressure exerted on the concrete pavement by the paver does not exceed 20 psi
 - 2.2. You change the paving equipment tracks to prevent damage or the paving equipment tracks travel on protective material such as planks
 - 2.3. No part of the track is closer than 1 foot from the concrete pavement's edge

If concrete pavement damage including visible cracking occurs, stop operating paving equipment on the concrete pavement and repair the damage.

40-1.03M Early Use of Concrete Pavement

If requesting early use of concrete pavement:

1. Furnish molds and machines for modulus of rupture testing
2. Sample concrete
3. Fabricate beam specimens
4. Test for modulus of rupture under California Test 523

If you request early use, concrete pavement must have a modulus of rupture of at least 350 psi. Protect concrete pavement under section 40-1.03L.

40-1.03N Reserved

40-1.03O Shoulder Rumble Strip

40-1.03O(1) General

Construct shoulder rumble strips by rolling or grinding indentations in new concrete pavement.

Do not construct shoulder rumble strips on structures or approach slabs.

Construct rumble strips within 2 inches of the specified alignment. Rumble strip equipment must be equipped with a sighting device enabling the operator to maintain the rumble strip alignment.

Indentations must not vary from the specified dimensions by more than 1/16 inch in depth nor more than 10 percent in length and width.

Grind or remove and replace noncompliant rumble strip indentations at locations determined by the Engineer. Ground surface areas must be neat and uniform in appearance.

Remove grinding residue under section 42-1.03B.

40-1.03O(2) Rolled-In Indentations

Construct rolled-in indentations before final concrete set. Indentation construction must not displace adjacent concrete.

40-1.03O(3) Ground-In Indentations

Concrete pavement must be hardened before grinding rumble strips indentations. Do not construct indentations until the following occurs:

1. 10 days elapse after concrete placement
2. Concrete has developed a modulus of rupture of 550 psi determined under California Test 523,

40-1.03P Drilling Cores

Drill concrete pavement cores under ASTM C 42/C 42M. Use diamond impregnated drill bits.

Clean, dry, and fill core holes with hydraulic cement grout (nonshrink) or pavement concrete. Coat the core hole walls with epoxy adhesive for bonding new concrete to old concrete under section 95. Finish the backfill to match the adjacent surface elevation and texture.

40-1.03Q Pavement Repair and Replacement

40-1.03Q(1) General

If surface raveling or full-depth cracks occur within one year of Contract acceptance, repair or replace the pavement under section 6-3.06.

Repair and replace pavement in the following sequence:

1. Replace pavement
2. Repair spall, ravel, and working cracks
3. Correct smoothness and coefficient of friction
4. Treat partial depth cracks
5. Replace damaged joint seals under section 41-5

In addition to removing pavement for other noncompliance, remove and replace JPCP slabs that:

1. Have one or more full depth crack
2. Have raveled surfaces such that either:
 - 2.1. Combined raveled areas are more than 5 percent of the total slab area
 - 2.2. Single area is more than 4 sq ft

Remove and replace JPCP 3 feet on both sides of a joint with a rejected dowel bar.

40-1.03Q(2) Spall and Ravel Repair

Repair spalled or raveled areas that are:

1. Deeper than 0.05 foot
2. Wider than 0.10 foot
3. Longer than 0.3 foot

Repairs must comply with section 41-4 and be completed before opening pavement to traffic.

40-1.03Q(3) Crack Repair

Treat partial depth cracks for JPCP under section 41-3.

If the joints are sealed, repair working cracks by routing and sealing. Use a powered rotary router mounted on wheels, with a vertical shaft and a routing spindle that casters as it moves along the crack. Form a reservoir 3/4 inch deep by 3/8 inch wide in the crack. Equipment must not cause raveling nor spalling

Treat the contraction joint adjacent to the working crack by either:

1. Epoxy resin under ASTM C 881/C 881M, Type IV, Grade 2
2. Pressure injecting epoxy resin under ASTM C 881/C881M, Type IV, Grade 1

40-1.03Q(4) Smoothness and Friction Correction

Correct pavement that is noncompliant for:

1. Smoothness by grinding under section 42-3
2. Coefficient of friction by grooving or grinding under section 42

Do not start corrective work until:

1. Pavement has cured 10 days
2. Pavement has at least a 550 psi modulus of rupture
3. Your corrective method is authorized

Correct the entire lane width. Begin and end grinding at lines perpendicular to the roadway centerline. The corrected area must have a uniform texture and appearance.

If corrections are made within areas where testing with an IP is required, retest the entire lane length with an IP under sections 40-1.01D(6)(c) and 40-1.01D(7)(b)(vii).

If corrections are made within areas where testing with a 12-foot straightedge is required, retest the corrected area with a straightedge under sections 40-1.01D(6)(c) and 40-1.01D(7)(b)(vii).

Allow 25 days for the Department's coefficient of friction retesting.

40-1.03R–40-1.03U Reserved

40-1.04 PAYMENT

The payment quantity for pavement is based on the dimensions shown.

The deduction for pavement thickness deficiency in each primary area is shown in the following table:

Deduction for Thickness Deficiency	
Average thickness deficiency (foot) ^a	Deduction(\$/sq yd)
0.01	0.90
0.02	2.30
0.03	4.10
0.04	6.40
0.05	9.11

^aValues greater than 0.01 are rounded to the nearest 0.01 foot.

Shoulder rumble strips are measured by the station along each shoulder on which the rumble strips are constructed without deductions for gaps between indentations.

If the initial cores show that dowel bars or tie bars are within alignment tolerances and the Engineer orders more dowel or tie bar coring, the additional cores are paid for as change order work.

The Department does not pay for additional coring to check dowel or tie bar alignment which you request.

If the Engineer accepts a test strip and it remains as part of the paving surface, the test strip is paid for as the type of pavement involved.

If the curvature of a slab affects tie bar spacing and additional tie bars are required, no additional payment is made for the additional tie bars.

Payment for grinding existing pavement is not included in the payment for the type of pavement involved.

40-2 CONTINUOUSLY REINFORCED CONCRETE PAVEMENT

40-2.01 GENERAL

40-2.01A Summary

Section 40-2 includes specifications for constructing CRCP.

Terminal joints include saw cutting, dowel bars, drill and bond dowel bars, support slab, support slab reinforcement, tack coat, and temporary hot mix asphalt.

Expansion joints include polystyrene, support slab, support slab reinforcement, dowel bars, drill and bond dowel bars, and bond breaker.

Wide flange beam terminals include polyethylene foam, support slab, and support slab reinforcement.

Pavement anchors include cross drains, anchor reinforcement, filter fabric, and permeable material.

40-2.01B Definitions

Reserved

40-2.01C Submittals

Reserved

40-2.01D Quality Control and Assurance

40-2.01D(1) General

Reserved

40-2.01D(2) Testing for Coefficient of Thermal Expansion

For field qualification, test coefficient of thermal expansion under AASHTO T 336. The coefficient of thermal expansion must not exceed 6.0 microstrain/degree Fahrenheit.

40-2.02 MATERIALS

40-2.02A General

Class 1 permeable material, filter fabric, and slotted plastic pipe cross drain as shown for pavement anchors must comply with section 68-3.

40-2.02B Concrete

Concrete for terminal joints, support slabs, and pavement anchors must comply with section 40-1.02.

40-2.02C Transverse Bar Assembly

Instead of transverse bar and other support devices, you may use transverse bar assemblies to support longitudinal bar. Bar reinforcement and wire must comply with section 40-1.02C.

40-2.02D Wide Flange Beam

Wide flange beams and studs must be either rolled structural steel shapes under ASTM A 36/A 36M or structural steel under ASTM A 572/A 572M.

40-2.02E Joints

Joint seals for wide flange beam terminals must comply with section 51-2.02.

Joint seals for transverse expansion joints must comply with section 51-2.02.

Expanded polystyrene for transverse expansion joints must comply with section 51-2.01B(1).

40-2.03 CONSTRUCTION

40-2.03A General

Reserved

40-2.03B Test Strips

Comply with section 40-1.03C except during the evaluation, the Engineer visually checks reinforcement, dowel and tie bar placement.

40-2.03C Construction Joints

Transverse construction joints must be perpendicular to the lane line. Construct joints to allow for lap splices of the longitudinal bar. Comply with the lap splice lengths shown for CRCP.

Clean construction joint surfaces before placing fresh concrete against the joint surfaces. Remove surface laitance, curing compound, and other foreign materials.

40-2.03D Bar Reinforcement

Place bar reinforcement under section 52-1.03D, except you may request to use plastic chairs. Plastic chairs will only be considered for support directly under the transverse bars. Your request to use plastic chairs must include a sample of the plastic chair, the manufacturer's written recommendations for the applicable use and load capacity, chair spacing, and your calculation for the load on a chair for the area of bar reinforcement sitting on it. Vertical and lateral stability of the bar reinforcement and plastic chairs must be demonstrated during construction of the test strip. Obtain authorization before using the proposed plastic chairs for work after the test strip is accepted.

For transverse bar in a curve with a radius under 2,500 feet, place the reinforcement in a single continuous straight line across the lanes and aligned with the radius point as shown.

40-2.03E Wide Flange Beams

Weld stud ends with an electric arc welder completely fusing the studs to the wide flange beam. Replace studs dislodged in shipping or that can be dislodged with a hammer.

40-2.03F Repair and Replacement

40-2.03F(1) General

Requirements for repair of cracks under section 40-1.03Q do not apply to CRCP. High molecular weight methacrylate is not to be applied to cracks in CRCP.

New CRCP will be monitored for 1 year from contract acceptance or relief from maintenance, whichever is less. CRCP that develops raveling areas of 6 inches by 6 inches or greater will require partial depth repair under section 6-3.06. CRCP that develops one or more full-depth transverse cracks with faulting greater than 0.25 inch or one or more full-depth longitudinal cracks with faulting greater 0.50 inch will require full depth repair.

40-2.03F(2) Partial Depth Repair

Partial depth repair must comply with section 41-4 except:

1. Determine a rectangular boundary which extends 6 inches beyond the damaged area. The limits of saw depth must be between 2 inches from the surface to 1/2 inch above the longitudinal bars.
2. If each length of the repair boundaries is equal to or greater than 3 ft, additional reinforcement is needed for the repair area. Submit a plan for authorization before starting the repair.

40-2.03F(3) Full Depth Repair

40-2.03F(3)(a) General

Removal of CRCP must be full depth except for portion of reinforcement to remain. Provide continuity of reinforcement. Comply with section 52-6. Submit a plan for authorization, before starting the repair. Do not damage the base, concrete and reinforcement to remain. Place concrete in the removal area.

40-2.03F(3)(b) Transverse Cracks

Make initial full-depth transverse saw cuts normal to the lane line a distance of 3 feet on each side of the transverse crack.

40-2.03F(3)(c) Longitudinal Cracks

Remove the cracked area normal to the lane line for the full width of the lane a distance of 1 foot beyond the ends of the crack. You may propose alternate limits with your repair plan for authorization.

40-2.03G Reserved

40-2.04 PAYMENT

Not Used

40-3 RESERVED

40-4 JOINTED PLAIN CONCRETE PAVEMENT

40-4.01 GENERAL

40-4.01A Summary

Section 40-4 includes specifications for constructing JPCP.

40-4.01B Definitions

Reserved

40-4.01C Submittals

40-4.01C(1) General

Reserved

40-4.01C(2) Early Age Crack Mitigation System

At least 24 hours before each paving shift, submit the following information as an informational submittal:

1. Early age stress and strength predictions
2. Scheduled sawing and curing activities
3. Contingency plan if cracking occurs

40-4.01C(3)–40-4.01C(8) Reserved

40-4.01D Quality Control and Assurance

40-4.01D(1) General

Reserved

40-4.01D(2) Quality Control Plan

The QC plan must include a procedure for identifying transverse contraction joint locations relative to the dowel bars longitudinal center and a procedure for consolidating concrete around the dowel bars.

40-4.01D(3) Early Age Crack Mitigation System

For JPCP, develop and implement a system for predicting stresses and strength during the initial 72 hours after paving. The system must include:

1. Subscription to a weather service to obtain forecasts for wind speed, ambient temperatures, humidity, and cloud cover
2. Portable weather station with an anemometer, temperature and humidity sensors, located at the paving site
3. Early age concrete pavement stress and strength prediction plan
4. Analyzing, monitoring, updating, and reporting the system's predictions

40-4.01D(4)–40-4.01D(9) Reserved

40-4.02 MATERIALS

Not Used

40-4.03 CONSTRUCTION

40-4.03A General

Transverse contraction joints on a curve must be on a single straight line through the curve's radius point. If transverse joints do not align in a curve, drill a full depth 2" diameter hole under ASTM C 42/C 42M where the joint meets the adjacent slab. Fill the hole with joint filler. If joints are not sealed, avoid joint filler material penetration into the joint.

40-4.03B Repair and Replacement

If replacing concrete, saw cut and remove to full depth.

Saw cut full slabs at the longitudinal and transverse joints. Saw cut partial slabs at joints and at locations determined by the Engineer. Saw cut must be vertical.

After lifting the slab, paint the cut ends of dowels and tie bars.

Construct transverse and longitudinal construction joints between the new slab and existing concrete. If slabs are constrained at both longitudinal edges by existing pavement, use dowel bars instead of tie bars. For longitudinal joints, offset dowel bar holes from original tie bars by 3 inches. For transverse joints, offset dowel bar holes from the original dowel bar by 3 inches.

Drill and bond bars to the existing concrete. Comply with section 41-10. Clean the faces of joints and underlying base from loose material and contaminants. Coat the faces with a double application of

You may use any accelerating chemical admixtures complying with ASTM C494/C494M, Type C and section 90-1.02E.

Fast-setting concrete properties must have the values shown in the following table:

Fast-Setting Concrete		
Property	Test method	Value
Compressive strength ^a (psi, min)		
at 3 hours	California Test 551	3,000
at 24 hours	California Test 551	5,000
Flexural strength ^a (psi, min, at 24 hours)	California Test 551	500
Bond strength ^a (psi, min, at 24 hours)		
Saturated surface dry concrete	California Test 551	300
Dry concrete	California Test 551	400
Water absorption (% max)	California Test 551	10
Abrasion resistance ^a (g max, at 24 hours)	California Test 550	25
Drying shrinkage (% max, at 4 days)	ASTM C596	0.13
Water soluble chlorides ^b (% max, by weight)	California Test 422	0.05
Water soluble sulfates ^b (% max, by weight)	California Test 417	0.25
Thermal stability (% min)	California Test 553	90

^aPerform test with aggregate filler if used.

^bTest must be performed on a cube specimen, fabricated under California Test 551, cured at least 14 days, and then pulverized to 100% passing the no. 50 sieve.

Aggregate filler may be used to extend prepackaged concrete. Aggregate filler must:

1. Be clean and uniformly rounded.
2. Have a moisture content of 0.5-percent by weight or less when tested under California Test 226.
3. Comply with sections 90-1.02C(2) and 90-1.02C(3).
4. Not exceed 50 percent of the concrete volume or the maximum recommended by the fast-setting concrete manufacturer, whichever is less.

When tested under California Test 202, aggregate filler must comply with the grading in the following table:

Aggregate Filler Grading	
Sieve size	Percentage passing
3/8 inch	100
No. 4	50–100
No. 16	0–5

41-1.02C Polyester Concrete

Polyester concrete consists of polyester resin binder and dry aggregate. The polyester resin binder must be an unsaturated isophthalic polyester-styrene copolymer.

Polyester resin binder properties must have the values shown in the following table:

Polyester Resin Binder

Property	Test method	Value
Viscosity ^a (Pa·s) RVT, No. 1 spindle, 20 RPM at 77 °F	ASTM D2196	0.075–0.200
Specific gravity ^a (77 °F)	ASTM D1475	1.05–1.10
Elongation (% min) Type I specimen, 0.25 ± 0.03 inch thick Speed of testing = 0.45 inch/minute Condition 18/25/50+5/70: T—23/50	ASTM D638	35
Tensile strength (psi min) Type I specimen, 0.25 ± 0.03 inch thick Speed of testing = 0.45 inch/minute Condition 18/25/50+5/70: T—23/50	ASTM D638 ASTM D618	2,500
Styrene content ^a (% by weight)	ASTM D2369	40–50
Silane coupler (% min, by weight of polyester resin binder)	--	1.0
PCC saturated surface-dry bond strength at 24 hours and 70 ± 2 °F (psi min)	California Test 551	500
Static volatile emissions ^a (g/sq m, max)	South Coast Air Quality Management District, Method 309-91 ^b	60

^aPerform the test before adding initiator.

^bFor the test method, go to:

<http://www.aqmd.gov/tao/methods/lab/309-91.pdf>

Silane coupler must be an organosilane ester, gamma-methacryloxypropyltrimethoxysilane. Promoter must be compatible with suitable methyl ethyl ketone peroxide (MEKP) and cumene hydroperoxide (CHP) initiators.

Aggregate for polyester concrete must comply with section 90-1.02C(1), 90-1.02C(2), and 90-1.02C(3).

When tested under California Test 202, the combined aggregate grading must comply with one of the gradations in the following table:

Combined Aggregate Grading

Sieve size	Percentage passing		
	A	B	C
1/2"	100	100	100
3/8"	83–100	100	100
No. 4	65–82	62–85	45–80
No. 8	45–64	45–67	35–67
No. 16	27–48	29–50	25–50
No. 30	12–30	16–36	15–36
No. 50	6–17	5–20	5–20
No. 100	0–7	0–7	0–9
No. 200	0–3	0–3	0–6

Aggregate retained on the no. 8 sieve must have a maximum of 45 percent crushed particles under California Test 205. Fine aggregate must be natural sand.

The weighted average absorption must not exceed 1 percent when tested under California Tests 206 and 207.

You may submit an alternative grading or request to use manufactured sand as fine aggregate but 100 percent of the combined grading must pass the 3/8 inch sieve. Allow 21 days for authorization.

Polyester concrete must have a minimum compressive strength of 1250 psi at 3 hours and 30 minutes under California Test 551 or ASTM C109.

41-1.02D Bonding Agent

Bonding agent must comply with the concrete manufacturer's recommendations.

41-1.02E Temporary Pavement Structure

Temporary pavement structure consists of RSC or aggregate base with HMA. RSC not conforming to the specifications may serve as temporary pavement structure if:

1. The modulus of rupture is at least 200 psi before opening to traffic
2. RSC thickness is greater than or equal to the existing concrete pavement surface layer
3. RSC is replaced during the next paving shift

Aggregate base for temporary pavement structure must comply with the 3/4-inch maximum grading specified in section 26-1.02B.

HMA must comply with section 39-1.15 except do not use HMA Type B.

41-1.02F Reserved

41-1.03 CONSTRUCTION

41-1.03A General

Repair only the portion of pavement where the work will be completed during the same lane closure. If removal is required, remove only the portion of pavement where the repair will be completed during the same traffic closure. Completion of concrete repair includes curing until the concrete attains the specified minimum properties required before opening the repaired pavement to traffic.

If you fail to complete the concrete pavement repair during the same lane closure, construct temporary pavement before opening the lane to traffic.

Before starting repair work, except saw cutting: the equipment, materials, and personnel for constructing temporary pavement structure must be at the job site or an approved location. If HMA can be delivered to the job site within 1 hour, you may request 1-hour delivery as an alternative to having the HMA at the job site.

Maintain the temporary pavement structure and replace it as a first order of work as soon as you resume concrete pavement repair work.

After removing temporary pavement structure, you may stockpile that aggregate base at the job site and reuse it for temporary pavement structure.

41-1.03B Mixing and Applying Bonding Agent

Mix and apply the bonding agent at the job site under the manufacturer's instructions and in small quantities.

Apply bonding agent after cleaning the surface and before placing concrete.

Apply a thin, even coat of bonding agent with a stiff bristle brush until the entire repair surface is scrubbed and coated with bonding agent.

41-1.03C Mixing Concrete

41-1.03C(1) General

Mix concrete in compliance with the manufacturer's instructions. For repairing spalls, mix in a small mobile drum or paddle mixer. Comply with the manufacturer's recommended limits for the quantity of aggregate filler, water, and liquid activator.

Mix the entire contents of prepackaged dual-component magnesium phosphate concrete as supplied by the manufacturer. Use the full amount of each component and do not add water to dual-component magnesium phosphate concrete.

Magnesium phosphate concrete must not be mixed in containers or worked with tools containing zinc, cadmium, aluminum, or copper.

Modified high-alumina based concrete must not be mixed in containers or worked with tools containing aluminum.

41-1.03C(2) Polyester Concrete

When mixing with resin, the moisture content of the combined aggregate must not exceed 1/2 of the average aggregate absorption when tested under California Test 226.

Proportion the polyester resin and aggregate to produce a mixture with suitable workability for the intended work. Only a minimal amount of resin may rise to the surface after finishing.

41-1.03D Placing Concrete

The pavement surface temperature must be at least 40 degrees F before placing concrete. You may propose methods to heat the surfaces.

Place magnesium phosphate concrete on a dry surface.

Place portland cement and modified high-alumina concrete on surfaces treated with a bonding agent recommended by the concrete manufacturer. If no bonding agent is recommended by the manufacturer, place concrete on damp surfaces that are not saturated.

Do not retemper concrete. Use dry finishing tools cleaned with water before working the concrete.

41-1.03E Curing Concrete

Cure concrete under the manufacturer's instructions. When curing compound is used, comply with section 90-1.03B for curing compound no. 1 or 2.

41-1.03F Reserved

41-1.04 PAYMENT

Not Used

41-2 SUBSEALING AND JACKING

41-2.01 GENERAL

41-2.01A Summary

Section 41-2 includes specifications for filling voids under existing concrete pavement.

41-2.01B Definitions

Reserved

41-2.01C Submittals

Submit shipping invoices with packaged or bulk fly ash and cement.

Before grouting activities begin, submit a proposal for the materials to be used. Include authorized laboratory test data for the grout indicating:

1. Time of initial setting under ASTM C266.
2. Compressive strength results at 1, 3, and 7 days for 10, 12, and 14-second grout efflux times.

If requesting a substitution of grout materials, submit a proposal that includes test data.

41-2.01D Quality Control and Assurance

Reserved

41-2.02 MATERIALS

41-2.02A General

Reserved

41-2.02B Grout

Grout must consist of Type II portland cement, fly ash, and water. Use from 2.4 to 2.7 parts fly ash to 1 part portland cement by weight. Use enough water to produce the following grout efflux times determined under California Test 541, Part D:

1. From 10 to 16 seconds for subsealing

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2. From 10 to 26 seconds for jacking

Cement for grout must comply with the specifications for Type II portland cement in section 90-1.02B(2).

Fly ash must comply with AASHTO M 295, Class C or Class F. Fly ash sources must be on the Authorized Material List.

You may use chemical admixtures and calcium chloride. Chemical admixtures must comply with section 90-1.02E(2). Calcium chloride must comply with ASTM D98.

Test grout compressive strength under California Test 551, Part 1 at 7-days with 12 seconds efflux time. Follow the procedures for moist cure. The 7-day compressive strength must be at least 750 psi.

41-2.02C Mortar

Mortar must be a prepackaged fast-setting mortar that complies with ASTM C928.

41-2.02D Reserved

41-2.03 CONSTRUCTION

41-2.03A General

Drill holes in the pavement, inject grout, plug the holes, and finish the holes with mortar.

Drill holes through the pavement and underlying base to a depth from 15 to 18 inches below the pavement surface. The hole diameter must match the fitting for the grout injecting equipment.

41-2.03B Injecting Grout

41-2.03B(1) General

Inject grout within 2 days of drilling holes.

Immediately before injecting grout, clean the drilled holes with water at a minimum pressure of 40 psi. The cleaning device must have at least 4 jets that direct water horizontally at the slab-base interface.

Do not inject grout if the atmospheric or subgrade temperature is below 40 degrees F. Do not inject grout in inclement weather. If water is present in the holes, obtain the Engineer's authorization before injecting grout.

Do not inject grout until at least 2 consecutive slabs requiring subsealing are drilled ahead of the grouting activities.

The grout plant must have a positive displacement cement injection pump and a high-speed colloidal mixer capable of operating from 800 to 2,000 rpm. The injection pump must sustain 150 psi if pumping grout with a 12-second efflux time. A pressure gauge must be located immediately adjacent to the supply valve of the grout hose supply valve and positioned for easy monitoring.

Before mixing, weigh dry cement and fly ash if delivered in bulk. If the materials are packaged, each container must weigh the same.

Introduce water to the mixer through a meter or scale.

Inject grout under pressure until the voids under the pavement slab are filled. The injection nozzle must not leak. Do not inject grout if the nozzle is below the bottom of the slab. Inject grout 1 hole at a time.

Stop injecting grout in a hole if either:

1. Grout does not flow under a sustained pump gauge pressure of 150 psi after 7 seconds and there is no indication the slab is moving.
2. Injected grout rises to the surface at any joint or crack, or flows into an adjacent hole.

Dispose of unused grout within 1 hour of mixing.

41-2.03B(2) Subsealing

If a slab raises more than 1/16 inch due to grout injection, stop injecting grout in that hole.

41-2.03B(3) Jacking

The positive displacement pump used for grout injection must be able to provide a sustained gauge pressure of 200 psi. Gauge pressures may be from 200 to 600 psi for brief periods to start slab movement.

You may add additional water to initiate pressure injection of grout. Do not reduce the grout efflux time below 10 seconds.

Raise the slabs uniformly. Use string lines to monitor the pavement movement.

Do not move adjacent slabs not specified for pavement jacking. If you move adjacent slabs, correct the grade within the tolerances for final pavement elevation.

41-2.03B(4) Finishing

Immediately after removing the injection nozzle, plug the hole with a round, tapered wooden plug. Do not remove plugs until adjacent holes are injected with grout and no grout surfaces through previously injected holes.

After grouting, remove grout from drilled holes at least 4 inches below the pavement surface. Clean holes and fill with mortar. Finish filled holes flush with the pavement surface.

41-2.03B(5) Tolerances

The final pavement elevation must be within 0.01 foot of the required grade. If the final pavement elevation is between 0.01 and 0.10 foot higher than the required grade, grind the noncompliant pavement surface under section 42 to within 0.01 foot of the required grade.

If the final pavement elevation is higher than 0.10 foot from the required grade, remove and replace the noncompliant pavement under section 41-9.

41-2.04 PAYMENT

The payment quantity for subsealing is calculated by adding the dry weight of cement and fly ash used for the placed grout. The payment quantity for jacking is calculated by adding the dry weight of cement and fly ash used for the placed grout.

The Department does not pay for wasted grout.

The Department does not adjust the unit price for an increase or decrease in the subsealing quantity.

The Department does not adjust the unit price for an increase or decrease in the jacking quantity.

41-3 CRACK TREATMENT

41-3.01 GENERAL

41-3.01A Summary

Section 41-3 includes specifications for applying high-molecular-weight methacrylate (HMWM) to concrete pavement surface cracks that do not extend the full slab depth.

41-3.01B Definitions

Reserved

41-3.01C Submittals

41-3.01C(1) General

Submit HMWM samples 20 days before use.

If sealant is to be removed, submit the proposed removal method at least 7 days before sealant removal. Do not remove sealant until the proposed sealant removal method is authorized.

41-3.01C(2) Public Safety and Placement Plans

Before starting crack treatment, submit a public safety plan for HMWM and a placement plan for construction activity as shop drawings.

The public safety and placement plans must identify the materials, equipment, and methods to be used.

In the public safety plan, include the MSDS for each component of HMWM and details for:

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1. Shipping
2. Storage
3. Handling
4. Disposal of residual HMWM and containers

If the project is in an urban area adjacent to a school or residence, the public safety plan must also include an airborne emissions monitoring plan prepared by a CIH certified in comprehensive practice by the American Board of Industrial Hygiene. Submit a copy of the CIH's certification. The CIH must monitor the emissions at a minimum of 4 points including the mixing point, the application point, and the point of nearest public contact. At work completion, submit a report by the industrial hygienist with results of the airborne emissions monitoring plan.

The placement plan must include:

1. Crack treatment schedule including coefficient of friction testing
2. Methods and materials including:
 - 2.1. Description of equipment for applying HMWM
 - 2.2. Description of equipment for applying sand
 - 2.3. Gel time range and final cure time for resin

Revise rejected plans and resubmit. With each plan rejection, the Engineer gives revision directions including detailed comments in writing. The Engineer notifies you of a plan's acceptance or rejection within 2 weeks of receiving that plan.

41-3.01C(3) Reserved

41-3.01D Quality Control and Assurance

41-3.01D(1) General

Use test tiles to evaluate the HMWM cure time. Coat at least one 4 by 4 inch smooth glazed tile for each batch of HMWM. Place the coated tile adjacent to the area being treated. Do not apply sand to the test tiles.

Use the same type of crack treatment equipment for testing and production.

41-3.01D(2) Test Area

Before starting crack treatment, treat a test area of at least 500 square feet within the project limits at a location accepted by the Engineer. Use test areas outside the traveled way if available.

Treat the test area under weather and pavement conditions similar to those expected during crack treatment production.

The Engineer evaluates the test area based on the acceptance criteria. Do not begin crack treatment until the Engineer accepts the test area.

41-3.01D(3) Reserved

41-3.01D(4) Acceptance Criteria

The Engineer accepts a treated area if:

1. Corresponding test tiles are dry to the touch
2. Treated surface is tack-free and not oily
3. Sand cover adheres enough to resist hand brushing
4. Excess sand is removed
5. Coefficient of friction is at least 0.30 when tested under California Test 342

41-3.02 MATERIALS

HMWM consists of compatible resin, promoter, and initiator. HMWM resin may be prepromoted by mixing promoter and resin together before filling containers. Identify prepromoted resin on the container label.

Adjust the gel time to compensate for temperature changes throughout the application.

HMWM resin properties must have the following values:

Property	Test method	Value
Viscosity ^a (cP, max, Brookfield RVT with UL adapter, 50 RPM at 77 °F)	ASTM D2196	25
Specific gravity ^a (min, at 77 °F)	ASTM D1475	0.90
Flash point ^a (°F, min)	ASTM D3278	180
Vapor pressure ^a (mm Hg, max, at 77 °F)	ASTM D323	1.0
Tack-free time (minutes, max, at 77 °F)	Specimen prepared under California Test 551	400
Volatile content ^a (% , max)	ASTM D2369	30
PCC saturated surface-dry bond strength (psi, min, at 24 hours and 77 ± 2 °F)	California Test 551	500

^aPerform the test before adding initiator.

Sand must be commercial quality dry blast sand. At least 95 percent of the sand must pass the no. 8 sieve and at least 95 percent must be retained on the no. 20 sieve when tested under California Test 202.

41-3.02D Reserved

41-3.03 CONSTRUCTION

41-3.03A General

Before applying HMWM, clean the pavement surface by abrasive blasting and blow loose material from visible cracks with high-pressure air. Remove concrete curing seals from the pavement to be treated. The pavement must be dry when blast cleaning is performed. If the pavement surface becomes contaminated before applying the HMWM, clean the pavement surface by abrasive blasting.

If performing abrasive blasting within 10 feet of a lane occupied by traffic, operate abrasive blasting equipment with a concurrently operating vacuum attachment.

During pavement treatment, protect pavement joints, working cracks, and surfaces not being treated.

The equipment applying HMWM must combine the components by either static in-line mixers or by external intersecting spray fans. The pump pressure at the spray bars must not cause atomization. Do not use compressed air to produce the spray. Use a shroud to enclose the spray bar apparatus.

You may apply HMWM manually to prevent overspray onto adjacent traffic. If applying resin manually, limit the batch quantity of HMWM to 5 gallons.

Apply HMWM at a rate of 90 square feet per gallon. The prepared area must be dry and the surface temperature must be from 50 to 100 degrees F while applying HMWM. Do not apply HMWM if the ambient relative humidity is more than 90 percent.

Protect existing facilities from HMWM. Repair or replace existing facilities contaminated with HMWM at your expense.

Flood the treatment area with HMWM to penetrate the pavement and cracks. Apply HMWM within 5 minutes after complete mixing. Mixed HMWM viscosity must not increase. Redistribute excess material with squeegees or brooms within 10 minutes of application. Remove excess material from tined grooves.

Wait at least 20 minutes after applying HMWM before applying sand. Apply sand at a rate of approximately 2 pounds per square yard or until refusal. Remove excess sand by vacuuming or sweeping.

Do not allow traffic on the treated surface until:

1. Treated surface is tack-free and non-oily
2. Sand cover adheres enough to resist hand brushing
3. Excess sand is removed
4. Coefficient of friction is at least 0.30 determined under California Test 342

41-3.04 PAYMENT

Not Used

41-4 SPALL REPAIR

41-4.01 GENERAL

Section 41-4 includes specifications for repairing spalls in concrete pavement.

41-4.02 MATERIALS

Repair spalls using polyester concrete with a bonding agent. The bonding agent must comply with the requirements for HMWM in section 41-3.02 except tack-free time requirements do not apply and the HMWM must not contain wax.

Form board must be corrugated cardboard with a 6-mil polyethylene covering.

41-4.03 CONSTRUCTION

41-4.03A General

Prepare spall areas by removing concrete and cleaning. Use a form board to provide compression relief at joints and cracks.

After completing spall repairs do not allow traffic on the repairs for at least 2 hours after the time of final setting under ASTM C403/403M.

41-4.03B Remove Pavement

The Engineer determines the rectangular limits of unsound concrete pavement. Before removing pavement, mark the saw cut lines and spall repair area on the pavement surface.

Do not remove pavement until the Engineer verbally authorizes the saw cut area.

Use a power-driven saw with a diamond blade.

Remove pavement as shown and:

1. From the center of the repair area towards the saw cut
2. To the full saw cut depth
3. At least 2 inches beyond the saw cut edge to produce a rough angled surface

Produce a rough surface by chipping or other removal methods that do not damage the pavement remaining in-place. Completely remove any saw overcuts. Pneumatic hammers used for concrete removal must weigh 15 lbs or less.

If you damage concrete pavement outside the removal area, enlarge the area to remove the damaged pavement.

If dowel bars are exposed during removal, remove concrete from the exposed surface and cover with duct tape.

41-4.03C Cleaning

After pavement has been removed, clean the exposed faces of the concrete by:

1. Sand or water blasting. Water blasting equipment must be capable of producing a blast pressure of 3,000 to 6,000 psi.
2. Blowing the exposed concrete area with compressed air free of moisture and oil to remove debris after blasting. Air compressors must deliver air at a minimum of 120 cfm and develop 90 psi of nozzle pressure.

41-4.03D Form Board Installation

After cleaning, place the form board to match the existing joint or crack alignment. Extend the form board at least 3 inches beyond each end of the repair and at least 1 inch deeper than the repair. Remove the form board before sealing joints or cracks.

41-4.03E–41-4.03I Reserved

41-4.04 PAYMENT

Payment is calculated based on the authorized saw cut area.

The Department does not adjust the unit price for an increase or decrease in the spall repair quantity.

41-5 JOINT SEALS

41-5.01 GENERAL

41-5.01A Summary

Section 41-5 includes specifications for sealing concrete pavement joints or replacing existing concrete pavement joint seals. Pavement joints include isolation joints.

41-5.01B Definitions

Reserved

41-5.01C Submittals

At least 15 days before delivery to the job site, submit a certificate of compliance, MSDS, manufacturer's recommendations, and instructions for storage and installation of:

1. Liquid joint sealant.
2. Backer rods. Include the manufacturer data sheet verifying compatibility with the liquid joint sealant.
3. Preformed compression joint seal. Include the manufacturer data sheet used to verify the seal for the joint dimensions shown.
4. Lubricant adhesive.

Asphalt rubber joint sealant containers must comply with ASTM D6690. Upon delivery of asphalt rubber joint sealant to the job site, submit a certified test report for each lot based on testing performed within 12 months.

Submit a work plan for removing pavement and joint materials. Allow 10 days for authorization. Include descriptions of the equipment and methods for removal of existing pavement and joint material.

41-5.01D Quality Control and Assurance

41-5.01D(1) General

Before sealing joints, arrange for a representative from the manufacturer to provide training on cleaning and preparing the joint and installing the liquid joint sealant or preformed compression joint seal. Do not seal joints until your personnel and the Department's personnel have been trained.

The Engineer accepts joint seals based on constructed dimensions and visual inspection of completed seals for voids.

41-5.01D(2) Reserved

41-5.02 MATERIALS

41-5.02A General

Use the type of seal material described.

Silicone or asphalt rubber joint sealant must not bond or react with the backer rod.

41-5.02B Silicone Joint Sealant

Silicone joint sealant must be on the Authorized Material List.

41-5.02C Asphalt Rubber Joint Sealant

Asphalt rubber joint sealant must:

1. Be paving asphalt mixed with not less than 10 percent ground rubber by weight. Ground rubber must be vulcanized or a combination of vulcanized and devulcanized materials that pass a no. 8 sieve.
2. Comply with ASTM D6690 for Type II.
3. Be capable of melting at a temperature below 400 degrees F and applied to cracks and joints.

41-5.02D Backer Rods

Backer rods must:

1. Comply with ASTM D5249:
 - 1.1. Type 1 for asphalt rubber joint sealant
 - 1.2. Type 1 or Type 3 for silicone joint sealant
2. Be expanded, closed-cell polyethylene foam
3. Have a diameter at least 25 percent greater than the saw cut joint width

41-5.02E Preformed Compression Joint Seals

Preformed compression joint seals must:

1. Comply with ASTM D2628
2. Have 5 or 6 cells, except seals 1/2 inch wide or less may have 4 cells

Lubricant adhesive used to install seals must comply with ASTM D2835.

41-5.02F–41-5.02K Reserved

41-5.03 CONSTRUCTION

41-5.03A General

If joint sealing is described for new concrete pavement, do not start joint sealing activities until the pavement has been in place for at least 7 days. Seal new concrete pavement joints at least 7 days after concrete pavement placement if shown.

Remove existing pavement and joint material by sawing, rectangular plowing, cutting, or manual labor. Saw cut the reservoir before cleaning the joint. Use a power-driven saw with a diamond blade.

If you damage a portion of the pavement to remain in place, repair the pavement under section 41-4.

41-5.03B Joint Cleaning

41-5.03B(1) General

Clean the joint after removal and any repair is complete before installing joint seal material. Cleaning must be completed no more than 4 hours before installing backer rods, liquid joint seal, or preformed compression seals using the following sequence:

1. Removing debris
2. Drying
3. Sandblasting
4. Air blasting
5. Vacuuming

Clean in 1 direction to minimize contamination of surrounding areas.

41-5.03B(2) Removing Debris

Remove debris including dust, dirt, and visible traces of old sealant from the joint after sawing, plowing, cutting, or manual removal. Do not use chemical solvents to wash the joint.

41-5.03B(3) Drying

After removing debris, allow the reservoir surfaces to dry or remove moisture and dampness at the joint with compressed air that may be moderately hot.

41-5.03B(4) Sandblasting

After the joint is dry, sandblast the reservoir to remove remaining residue using a 1/4-inch diameter nozzle and 90 psi minimum pressure. Do not sandblast straight into the reservoir. Angle the sandblasting nozzle within 1 to 2 inches from the concrete and make at least 1 pass to clean each reservoir face.

41-5.03B(5) Air Blasting

After sandblasting, air blast the reservoir to remove sand, dirt, and dust 1 hour before sealing the joint. Use compressed air free of oil and moisture delivered at a minimum rate of 120 cfm and 90 psi nozzle pressure.

41-5.03B(6) Vacuuming

After air blasting, use a vacuum sweeper to remove debris and contaminants from the pavement surfaces surrounding the joint.

41-5.03B(7) Reserved

41-5.03C Installing Liquid Joint Sealant

Where backer rods are shown, place the rods before installing liquid joint sealant. Place backer rods under the manufacturer's instructions unless otherwise specified. The pavement and reservoir surfaces must be dry and the ambient air temperature must be at least 40 degrees F and above the dew point. The reservoir surface must be free of residue or film. Do not puncture the backer rod.

Immediately after placing the backer rod, install liquid joint sealant under the manufacturer's instructions unless otherwise specified. Before installing, demonstrate that fresh liquid sealant is ejected from the nozzle free of cooled or cured material. For asphalt rubber joint sealant, the pavement surface temperature must be at least 50 degrees F before installing.

Pump liquid joint sealant through a nozzle sized for the width of the reservoir so that liquid joint sealant is placed directly onto the backer rod. The installer must draw the nozzle toward his body and extrude liquid joint sealant evenly. Liquid joint sealant must maintain continuous contact with the reservoir walls during extrusion.

After placing liquid joint sealant, recess it to the depth shown within 10 minutes of installation and before a skin begins to form.

After each joint is sealed, remove excess liquid joint sealant on the pavement surface. Do not allow traffic over the sealed joints until the liquid joint sealant is set, tack free, and firm enough to prevent embedment of roadway debris.

41-5.03D Installing Preformed Compression Joint Seals

Install preformed compression joint seals using lubricant adhesive as shown and under the manufacturer's instructions.

Install longitudinal seals before transverse seals. Longitudinal seals must be continuous except splicing is allowed at intersections with transverse seals. Transverse seals must be continuous for the entire transverse length of concrete pavement except splices are allowed for widening and staged construction. With a sharp instrument, cut across the longitudinal seal at the intersection with transverse construction joints. If the longitudinal seal does not relax enough to properly install the transverse seal, trim the longitudinal seal to form a tight seal between the 2 joints.

If splicing is authorized, comply with the manufacturer's instructions.

Use a machine specifically designed for preformed compression joint seal installation. The machine must install the seal:

1. To the specified depth
2. To make continuous contact with the joint walls
3. Without cutting, nicking, or twisting the seal
4. Without stretching the seal more than 4 percent

Cut preformed compression joint seal material to the exact length of the pavement joint to be sealed. The Engineer measures this length. After you install the preformed compression joint seal, the Engineer measures the excess length of material at the joint end. The Engineer divides the excess length by the measured cut length to determine the stretch percentage.

Seals must be compressed from 30 to 50 percent of the joint width when complete in place.

41-5.03E Reserved

41-5.04 PAYMENT

Not Used

41-6 CRACK AND SEAT

41-6.01 GENERAL

41-6.01A Summary

Section 41-6 includes specifications for cracking, seating, and preparing the surface of existing concrete pavement.

41-6.01B Definitions

Reserved

41-6.01C Submittals

Submit each core in a plastic bag or tube for acceptance at the time of sampling. Mark each core with a location description.

41-6.01D Quality Control and Assurance

41-6.01D(1) General

If cracking is noncompliant:

1. Stop crack and seat work
2. Modify your equipment and procedures and crack the noncompliant pavement again
3. Construct another test section
4. Take additional core samples to verify compliance
5. Construct an inspection strip if the concrete pavement has HMA on the surface

41-6.01D(2) Test Section

The Engineer determines and marks a test section up to 1000 square feet within the crack and seat area shown. Construct the test section and obtain the Engineer's verbal authorization before starting crack and seat work.

Immediately before cracking the test section, apply water to the pavement surface so that cracking can be readily evaluated. Crack the test section and vary impact energy and striking patterns to verify your procedure.

41-6.01D(3) Coring

Drill cores at least 6 inches in diameter under ASTM C42 to verify cracking in the Engineer's presence. Take at least 2 cores per test section and 1 core per lane mile for each pavement cracking machine used. The Engineer determines the core locations.

41-6.01D(4) Reserved

41-6.02 MATERIALS

41-6.02A General

Use fast-setting or polyester concrete to fill core holes.

41-6.03 CONSTRUCTION

41-6.03A Cracking

Crack existing concrete pavement using the procedures and equipment from the authorized test section.

Do not allow flying debris during cracking operations.

Crack existing concrete pavement into segments that nominally measure 6 feet transversely by 4 feet longitudinally. If the existing pavement is already cracked into segments, crack it into equal-sized square or rectangular pieces that nominally measure not more than 6 feet transversely and from 3 to 5 feet longitudinally. Do not impact the pavement within 1 foot of another break line, pavement joint, or edge of pavement.

Cracks must be vertical, continuous, and penetrate the full depth of pavement. Cracks must be within 6 inches of vertical along the full depth of pavement. Do not cause surface spalling over 0.10-foot deep or excessive shattering of the pavement or base.

Cracking equipment must impact the pavement with a variable force in a controlled location. Do not use unguided free-falling weights such as "headache balls."

If the concrete pavement has no more than 0.10 foot of asphalt concrete on the surface, you may crack the pavement without removing the asphalt concrete. After cracking, construct an inspection strip by removing at least 500 square feet of asphalt concrete at a location determined by the Engineer. Construct additional inspection strips to demonstrate compliance where ordered by the Engineer.

After cracking, allow public traffic on the cracked or initial pavement layer for no more than 15 days.

41-6.03B Seating

Seat cracked concrete by making at least 5 passes over the cracked concrete with either:

1. Oscillating pneumatic-tired roller under section 39-3.03 and at least 15 tons
2. Vibratory pad-foot roller exerting a dynamic centrifugal force of at least 10 tons

A pass is 1 movement of a roller in either direction at 5 mph or less.

After all segments have been seated, clean loose debris from joints and cracks using compressed air free of moisture and oil.

Reseat any segment of cracked pavement that has not been overlaid within 24 hours of seating.

41-6.03C Surface Preparation

Before opening cracked and seated pavement to traffic or overlaying:

1. Fill joints, cracks, and spalls wider than 3/4 inch and deeper than 1 inch by applying tack coat and placing HMA under section 39-1.15, except use the no. 4 gradation instead of 3/8-inch.
2. Remove all loose debris and sweep the pavement.

41-6.03D Reserved

41-6.04 PAYMENT

Crack and seat existing concrete pavement is measured from the area of pavement cracked and seated. No deduction is made for existing cracked segments. The Department does not pay for HMA used to fill joints, cracks, and spalls.

41-7 TRANSITION TAPER

41-7.01 GENERAL

Section 41-7 includes specifications for constructing transition tapers in existing pavement.

41-7.02 MATERIALS

Not Used

41-7.03 CONSTRUCTION

Construct transition tapers by either grinding or removing and replacing the existing concrete. Do not allow flying debris during the construction of tapers.

Grinding must comply with section 42.

Replacement concrete must comply with section 41-9 except place concrete to the taper level shown and finish the surface with a coarse broom.

If the transition taper will be overlaid with HMA that is not placed before opening to traffic and there is a grade difference of more than 0.04 foot, construct a temporary taper by placing HMA that complies with section 39-1.15. Remove the temporary HMA taper before constructing the transition taper.

41-7.04 PAYMENT

Pavement transition tapers are measured using the dimensions shown. The Department does not pay for temporary HMA tapers.

41-8 DOWEL BAR RETROFIT

Reserved

41-9 INDIVIDUAL SLAB REPLACEMENT WITH RAPID STRENGTH CONCRETE

41-9.01 GENERAL

41-9.01A Summary

Section 41-9 includes specifications for removing existing concrete pavement and constructing individual slab replacement with rapid strength concrete (ISR—RSC).

41-9.01B Definitions

concrete raveling: Disintegration of the concrete surface layer from aggregate loss.

early age: Any age less than 10 times the time of final setting for concrete determined under ASTM C403/C403M.

full-depth crack: Crack that runs from one edge of the concrete slab to the opposite or adjacent side of the slab.

opening age: Age when the minimum modulus of rupture specified for opening to traffic and equipment is attained.

time of final setting: Elapsed time required to develop a concrete penetration resistance that is at least 4,000 psi under ASTM C403/C403M.

41-9.01C Submittals

41-9.01C(1) General

At least 15 days before delivery to the job site, submit manufacturer's recommendations, MSDS and instructions for storage and installation of joint filler material.

At least 45 days before starting ISR—RSC work submit a sample of cement from each proposed lot and samples of proposed admixtures in the quantities ordered by the Engineer.

During ISR—RSC placement operations, submit uniformity reports for hydraulic cement at least once every 30 days to the Engineer and METS, attention Cement Laboratory. Uniformity reports must comply with ASTM C917 except testing age and water content may be modified to suit the particular material.

Except for modulus of rupture tests, submit QC test result forms within 48 hours of the paving shift. Submit modulus of rupture results within:

1. 15 minutes of opening age test completion
2. 24 hours of 3-day test completion

41-9.01C(2) Quality Control Plan

If the quantity of ISR—RSC is at least 300 cu yd, submit a QC plan at least 20 days before placing trial slabs. If the quantity of ISR—RSC is less than 300 cu yd, submit proposed forms for RSC inspection, sampling, and testing.

41-9.01C(3) Mix Design

At least 10 days before use in a trial slab, submit a mix design. The maximum ambient temperature range for a mix design is 18 degrees F. Submit more than 1 mix design based on ambient temperature variations anticipated during RSC placement. Each mix design must include:

1. Mix design identification number
2. Aggregate source
3. Opening age
4. Aggregate gradation
5. Types of cement and chemical admixtures
6. Mix proportions
7. Maximum time allowed between batching and placing
8. Range of effective ambient temperatures
9. Time of final setting
10. Modulus of rupture development data from laboratory-prepared samples, including tests at:
 - 10.1. 1 hour before opening age
 - 10.2. Opening age
 - 10.3. 1 hour after opening age

- 10.4. 1 day
- 10.5. 3 days
- 10.6. 7 days
- 10.7. 28 days
- 11. Shrinkage test data
- 12. Any special instructions or conditions such as water temperature requirements

41-9.01C(4) Reserved

41-9.01D Quality Control and Assurance

41-9.01D(1) General

Designate a QC manager and assistant QC managers to administer the QC plan. The QC managers must hold current American Concrete Institute (ACI) certification as a Concrete Field Testing Technician-Grade I and a Concrete Laboratory Testing Technician-Grade II, except the assistant QC managers may hold Concrete Laboratory Testing Technician-Grade I instead of Grade II.

The QC manager responsible for the production period involved must review and sign the sampling, inspection, and test reports before submitting them. The QC manager must be present for:

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

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

Testing laboratories and equipment must comply with the Department's Independent Assurance Program. At the time of the QC plan submittal, the Department evaluates the quality control samplers and testers.

41-9.01D(2) Just-in-time Training

Reserved

41-9.01D(3) Quality Control Plan

Establish, implement, and maintain a QC plan for pavement. The QC plan must describe the organization and procedures used to:

- 1. Control the production process
- 2. Determine if a change to the production process is needed
- 3. Implement a change

The QC plan must include:

- 1. Names, qualifications, and certifications of QC personnel, including:
 - 1.1. QC manager
 - 1.2. Assistant QC managers
 - 1.3. Samplers and testers
- 2. Outline of procedure for the production, transportation, placement, and finishing of RSC
- 3. Outline of procedure and forms for concrete QC, sampling, and testing to be performed during and after RSC construction, including testing frequencies for modulus of rupture
- 4. Contingency plan for identifying and correcting problems in production, transportation, placement, or finishing RSC including:
 - 4.1. Action limits
 - 4.2. Suspension limits that do not exceed specified material requirements
 - 4.3. Detailed corrective action if limits are exceeded
 - 4.4. Temporary pavement structure provisions, including:
 - 4.4.1. The quantity and location of standby material
 - 4.4.2. Determination of need
- 5. Location of your quality control testing laboratory and testing equipment during and after paving operations
- 6. List of the testing equipment to be used, including the date of last calibration

7. Production target values for material properties that impact concrete quality or strength including cleanness value and sand equivalent
8. Outline procedure for placing and testing trial slabs, including:
 - 8.1. Locations and times
 - 8.2. Production procedures
 - 8.3. Placing and finishing methods
 - 8.4. Sampling methods, sample curing, and sample transportation
 - 8.5. Testing and test result reporting
9. Name of source plant with approved Material Plant Quality Program (MPQP)
10. Procedures or methods for controlling pavement quality including:
 - 10.1. Materials quality
 - 10.2. Contraction and construction joints
 - 10.3. Protecting pavement before opening to traffic

41-9.01D(4) Prepaving Conference

Schedule a prepaving conference and provide a facility to meet with the Engineer.

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

1. Project superintendent
2. Project manager
3. QC manager
4. Workers and your subcontractor's workers, including:
 - 4.1. Foremen
 - 4.2. Concrete plant manager
 - 4.3. Concrete plant operator
 - 4.4. Concrete plant inspectors
 - 4.5. Personnel performing saw cutting and joint sealing
 - 4.6. Paving machine operators
 - 4.7. Inspectors
 - 4.8. Samplers
 - 4.9. Testers

The purpose of the prepaving conference is to familiarize personnel with the project's specifications. Discuss the QC plan and processes for constructing each item of work, including:

1. Production
2. Transportation
3. Trial slabs
4. Pavement structure removal
5. Placement
6. Contingency plan
7. Sampling
8. Testing
9. Acceptance

Do not start trial slabs or paving activities until the listed personnel have attended the prepaving conference.

41-9.01D(5) Trial Slabs

Before starting individual slab replacement work, complete 1 trial slab for each mix design.

Place trial slabs near the job site at a mutually-agreed location that is neither on the roadway nor within the project limits. Trial slabs must be 10 by 20 feet and at least 10 inches thick.

During trial slab construction, sample and split the aggregate for grading, cleanness value, and sand equivalent testing.

Fabricate and test beams under California Test 524 to determine the modulus of rupture values.

Cure beams fabricated for early age testing such that the monitored temperatures in the beams and the slab are always within 5 degrees F of each other.

Monitor and record the internal temperatures of trial slabs and early age beams at intervals of at least 5 minutes. Install thermocouples or thermistors connected to strip-chart recorders or digital data loggers to monitor the temperatures. Temperature recording devices must be accurate to within 2 degrees F. Measure internal temperatures at 1 inch from the top, 1 inch from the bottom, and no closer than 3 inches from any edge until early age testing is completed.

Cure beams fabricated for 3-day testing under California Test 524 except place them into sand at a time that is from 5 to 10 times the time of final setting measured under ASTM C403/403M or 24 hours, whichever is earlier.

Trial slabs must have an opening age modulus of rupture of not less than 400 psi and a 3-day modulus of rupture of not less than 600 psi.

After authorization, remove and dispose of trial slabs and testing materials.

41-9.01D(6) Quality Control Testing

41-9.01D(6)(a) General

Provide continuous process control and quality control sampling and testing throughout RSC production and placement. Notify the Engineer at least 2 business days notice before any sampling and testing. Establish a testing facility at the job site or at an authorized location.

Sample under California Test 125.

During ISR—RSC placement, sample and fabricate beams for modulus of rupture testing within the first 30 cubic yards, at least once every 130 cu yd, and within the final truckload. Submit split samples and fabricate test beams for the Department's testing unless the Engineer informs you otherwise.

Determine the modulus of rupture at opening age under California Test 524, except beam specimens may be fabricated using an internal vibrator under ASTM C 31. Cure beams under the same conditions as the pavement until 1 hour before testing. Test 3 beam specimens in the presence of the Engineer and average the results. A single test represents no more than that day's production or 130 cu yd, whichever is less.

Determine the modulus of rupture at other ages using beams cured and tested under California Test 524 except place them in sand from 5 to 10 times the time of final setting under ASTM C403/C403M or 24 hours, whichever is earlier.

41-9.01D(6)(b) Rapid Strength Concrete

Your quality control must include testing RSC for the properties at the frequencies shown in the following table:

RSC Minimum Quality Control		
Property	Test method	Minimum testing frequency ^a
Cleanness value	California Test 227	650 cu yd or 1 per shift
Sand equivalent	California Test 217	650 cu yd or 1 per shift
Aggregate gradation	California Test 202	650 cu yd or 1 per shift
Air content	California Test 504	130 cu yd or 2 per shift
Yield	California Test 518	2 per shift
Slump or penetration	ASTM C143 or California Test 533	1 per 2 hours of paving
Unit weight	California Test 518	650 cubic yards or 2 per shift
Aggregate Moisture Meter Calibration ^b	California Test 223 or California Test 226	1 per shift
Modulus of rupture	California Test 524	Comply with section 41-9.01D(6)(a)

^aTest at the most frequent interval.

^bCheck calibration of the plant moisture meter by comparing moisture meter readings with California Test 223 or California Test 226 test results

Maintain control charts to identify potential problems and causes. Post a copy of each control chart at a location determined by the Engineer.

Individual measurement control charts must use the target values in the mix proportions as indicators of central tendency.

Develop linear control charts for:

1. Cleanness value
2. Sand equivalent
3. Fine and coarse aggregate gradation
4. Air content
5. Penetration

Control charts must include:

1. Contract number
2. Mix proportions
3. Test number
4. Each test parameter
5. Action and suspension limits
6. Specification limits
7. Quality control test results

For fine and coarse aggregate gradation control charts, record the running average of the previous 4 consecutive gradation tests for each sieve and superimpose the specification limits.

For air content control charts, the action limit is ± 1.0 percent and the suspension limit is ± 1.5 percent of the specified values. If no value is specified, apply the air content value used in the approved mix design.

As a minimum, a process is out of control if any of the following occurs:

1. For fine and coarse aggregate gradation, 2 consecutive running averages of 4 tests are outside the specification limits
2. For individual penetration or air content measurements:
 - 2.1. One point falls outside the suspension limit line
 - 2.2. Two points in a row fall outside the action limit line

Stop production and take corrective action for out of control processes or the Engineer rejects subsequent RSC.

Before each day's concrete pavement placement and at intervals not to exceed 4 hours of production, use a tachometer to test and record vibration frequency for concrete consolidation vibrators.

41-9.01D(6)(c) Reserved

41-9.01D(7) Acceptance Criteria

41-9.01D(7)(a) General

The final texture of ISR—RSC must pass visual inspection and have a coefficient of friction of at least 0.30 determined under California Test 342.

Allow at least 25 days for the Department to schedule testing for coefficient of friction. Notify the Engineer when the pavement is scheduled to be opened to traffic.

41-9.01D(7)(b) Modulus of Rupture

ISR—RSC is accepted based on your testing for modulus of rupture at opening age and the Department's testing for modulus of rupture at 3 days.

ISR—RSC must have a modulus of rupture at opening age that is at least 400 psi and a modulus of rupture at 3 days that is at least 600 psi.

Calculate the test result as the average from testing 3 beams for each sample. The test result represents 1 paving shift or 130 cu yd, whichever is less.

41-9.01D(7)(c) Concrete Pavement Smoothness

The Department tests for concrete pavement smoothness using a 12-foot straightedge. Straightedge smoothness specifications do not apply to the pavement surface placed within 12 inches of existing concrete pavement except parallel to the centerline at the midpoint of a transverse construction joint.

The concrete pavement surface must not vary from the lower edge of a 12-foot straightedge by more than:

1. 0.01 feet when parallel to the centerline
2. 0.02 feet when perpendicular to the centerline extending from edge to edge of a traffic lane

41-9.01D(7)(d) Cracking and Raveling

The Engineer rejects an ISR—RSC slab under section 6-3.06 if within 1 year of contract acceptance there is either:

1. Partial or full-depth cracking
2. Concrete raveling consisting of either:
 - 2.1. Combined raveled areas more than 5 percent of each ISR—RSC slab area
 - 2.2. Any single raveled area of more than 4 sq ft

41-9.01D(8) Reserved

41-9.02 MATERIALS

41-9.02A General

Reserved

41-9.02B Rapid Strength Concrete

RSC for ISR—RSC must comply with section 90-3.

Use either the 1-1/2 inch maximum or the 1-inch maximum combined grading specified in section 90-1.02C(4)(d).

Air content must comply with the minimum requirements in section 40-1.02B(4).

41-9.02C Base Bond Breaker

Use base bond breaker no. 3, 4, or 5 under section 36-2.

41-9.02D Reserved

41-9.03 CONSTRUCTION

41-9.03A General

Complete ISR—RSC adjacent to new pavement or existing pavement shown for construction as a 1st order of work. Replace individual slabs damaged during construction before placing final pavement delineation.

41-9.03B Removing Existing Pavement

Remove pavement under section 15-2.02. The Engineer determines the exact ISR—RSC limits after overlying layers are removed.

After removing pavement to the depth shown, grade to a uniform plane. Water as needed and compact the material remaining in place to a firm and stable base. The finished surface of the remaining material must not extend above the grade established by the Engineer.

41-9.03C Drill and Bond Dowel Bars

Drill existing concrete and bond dowel bars under section 41-10 if described. Do not install dowel bars in contraction joints.

41-9.03D Base Bond Breaker

Place base bond breaker before placing ISR—RSC. Comply with section 36-2.

41-9.03E Placing Rapid Strength Concrete

Do not place RSC if the ambient air temperature is forecast by the National Weather Service to be less than 40 degrees F within 72 hours of final finishing.

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

Use metal or wood side forms. Wood side forms must not be less than 1-1/2 inches thick. Side forms and connections must be of sufficient rigidity that movement will not occur under forces from equipment or RSC. Clean and oil side forms before each use. Side forms must remain in place until the pavement edge no longer requires the protection of forms.

After you place RSC, consolidate it using high-frequency internal vibrators adjacent to forms and across the full paving width. Place RSC as nearly as possible to its final position. Do not use vibrators for extensive shifting of concrete pavement.

Spread and shape RSC with powered finishing machines supplemented by hand finishing. After you mix and place RSC, do not add water to the surface to facilitate finishing. You may request authorization to use surface finishing additives. Submit the manufacturer's instructions with your request.

Place consecutive concrete loads without interruption. Do not allow cold joints where a visible lineation forms after concrete is placed, sets, and hardens before additional concrete placed.

Where the existing transverse joint spacing in an adjacent lane exceeds 15 feet, construct an additional transverse contraction joint midway between the existing joints. Complete sawing of contraction joints within 2 hours of completion of final finishing.

Cut contraction joints a minimum of 1/3 the slab depth.

41-9.03F Final Finishing

After preliminary finishing, round the edges of the initial paving width to a 0.04-foot radius. Round transverse and longitudinal construction joints to a 0.02-foot radius. Mark each ISR—RSC area with a stamp. The stamp mark must show the month, day, and year of placement and contract number. Level the location of the stamp with a steel trowel below the pavement texture. Orient the stamp mark so it can be read from the outside edge of ISR—RSC.

Before curing, texture the pavement. Perform initial texturing with a burlap drag or broom device that produces striations parallel to the centerline. Perform final texturing with a steel-tined device that produces grooves parallel with the centerline.

Tines must be from 3/32 to 1/8 inch wide on 3/4-inch centers and have enough length, thickness, and resilience to form grooves from 1/8 to 3/16 inch deep after the concrete has hardened. Grooves must extend over the entire pavement width except do not construct grooves 3 inches from longitudinal pavement edges or joints.

Final texture must be uniform and smooth. Grooves must be parallel and aligned to the pavement edge across the pavement width. The groove alignment must not vary more than 0.1 foot for every 12 foot length.

Protect RSC under section 90-1.03C.

41-9.03G Temporary Pavement Structure

Temporary pavement structure must be RSC or 3-1/2 inch thick HMA over aggregate base.

41-9.03H Noncompliant Individual Slab Replacement

Replace an ISR—RSC slab with any of the following:

1. One or more full-depth cracks.
2. Concrete raveling.

3. Noncompliant smoothness except you may request authorization for grinding under section 42 and retesting. Grinding that causes a depression will not be considered. Smoothness must be corrected within 48 hours of placing ISR—RSC.
4. Noncompliant modulus of rupture.

If the modulus of rupture at opening age is at least 400 psi and the modulus of rupture at 3 days is at least 500 psi but less than 600 psi, you may request authorization to leave the ISR—RSC in place and accept the specified deduction.

If pavement is noncompliant for coefficient of friction, groove or grind the pavement under section 42. Comply with section 40-1.03Q(4) and groove or grind before the installation of any required joint seal or edge drains adjacent to the areas to the noncompliant area.

If an ISR—RSC slab has partial depth cracking, treat it with high-molecular-weight methacrylate under section 41-3.

41-9.03I Replace Pavement Delineation

Replace traffic stripes, pavement markings, and markers that are removed, obliterated, or damaged by ISR—RSC under sections 84 and 85.

41-9.03J Reserved

41-9.04 PAYMENT

Replace base is not included in the payment for individual slab replacement (RSC).

Drill and bond dowel bars are not included in payment for individual slab replacement (RSC).

For individual slab replacement (RSC) with a modulus of rupture at opening age that is at least 400 psi and a modulus of rupture at 3 days that is greater than or equal to 500 psi but less than 550 psi, the Department deducts 10 percent of the payment for individual slab replacement (RSC).

For individual slab replacement (RSC) with a modulus of rupture at opening age that is at least 400 psi and a modulus of rupture at 3 days that is greater than or equal to 550 psi but less than 600 psi, the Department deducts 5 percent of the payment for individual slab replacement (RSC).

41-10 DRILL AND BOND BARS

41-10.01 GENERAL

41-10.01A Summary

Section 41-10 includes specifications for drilling, installing, and bonding tie bars and dowel bars in concrete pavement.

41-10.01B Definitions

Reserved

41-10.01C Submittals

Submit a certificate of compliance for:

1. Tie bars
2. Dowel bars
3. Dowel bar lubricant
4. Chemical adhesive
5. Epoxy powder coating

At least 15 days before delivery to the job site, submit the manufacturer's recommendations and instructions for storage, handling, and use of chemical adhesive.

41-10.01D Quality Control and Assurance

41-10.01D(1) General

Drill and bond bar is accepted based on inspection before concrete placement.

41-10.01D(2) Reserved

41-10.02 MATERIALS

41-10.02A General

Dowel bar lubricant must comply with section 40-1.02D.

Chemical adhesive for drilling and bonding bars must be on the Authorized Material List. The Authorized Material List indicates the appropriate chemical adhesive system for concrete temperature and installation conditions.

Each chemical adhesive system container must clearly and permanently show the following:

1. Manufacturer's name
2. Model number of the system
3. Manufacture date
4. Batch number
5. Expiration date
6. Current International Conference of Building Officials Evaluation Report number
7. Directions for use
8. Storage requirement
9. Warnings or precautions required by state and federal laws and regulations

41-10.02B Reserved

41-10.03 CONSTRUCTION

41-10.03A General

Drill holes for bars. Clean drilled holes in compliance with the chemical adhesive manufacturer's instructions. Holes must be dry at the time of placing the chemical adhesive and bars. Use a grout retention ring when drilling and bonding dowel bars. Immediately after inserting the bar into the chemical adhesive, support the bar to prevent movement until chemical adhesive has cured the minimum time recommended by the manufacturer.

Apply dowel bar lubricant to the entire exposed portion of the dowel bar.

If the Engineer rejects a bar installation: stop paving, drilling, and bonding activities. Adjust your procedures and obtain the Engineer's verbal authorization before resuming paving, drilling, and bonding.

Cut the rejected bar flush with the pavement joint surface and coat the exposed end of the bar with chemical adhesive. Offset the new hole 3 inches horizontally from the rejected hole's center.

41-10.03B Tie Bar Tolerance

Place tie bars within the tolerances shown in the following table:

Tie Bar Tolerances	
Dimension	Tolerance
Horizontal skew (vertical skew: bar length)	1:6
Vertical skew (vertical skew: bar length)	1:6
Longitudinal translation (inch)	±1
Horizontal offset (embedment, inch)	±1
Height relative to the adjacent bar	±1
Vertical Depth (clearance from the pavement surface or bottom, inches, min)	3

41-10.03C Dowel Bar Tolerance

Place dowel bars within the tolerances specified in section 40-1.01D(7)(b)(v).

41-10.03D Reserved

41-10.04 PAYMENT

Not Used

AA

42 GROOVE AND GRIND CONCRETE

07-19-13

Replace the paragraph of section 42-1.01A with:

07-19-13

Section 42-1 includes general specifications for grooving and grinding concrete.

Replace the headings and paragraphs in section 42-3 with:

07-19-13

42-3.01 GENERAL

42-3.01A Summary

Section 42-3 includes specifications for grinding the surfaces of pavement, bridge decks, and approach slabs.

42-3.01B Definitions

Reserved

42-3.01C Submittals

Reserved

42-3.01D Quality Control and Assurance

Reserved

42-3.02 MATERIALS

Not Used

42-3.03 CONSTRUCTION

42-3.03A General

Grind surfaces in the longitudinal direction of the traveled way and grind the full lane width. Begin and end grinding at lines perpendicular to the roadway centerline.

Grinding must result in a parallel corduroy texture with grooves from 0.08 to 0.12 inch wide and from 55 to 60 grooves per foot of width. Grooves must be from 0.06 to 0.08 inch from the top of the ridge to the bottom of the groove.

Grind with abrasive grinding equipment using diamond cutting blades mounted on a self-propelled machine designed for grinding and texturing concrete pavements.

42-3.03B Pavement

Grind existing concrete pavement that is adjacent to an individual slab replacement. Grind the replaced individual slab and all the existing slabs immediately surrounding it. Grind after the individual slab is replaced.

Grind existing concrete pavement that is adjacent to new lanes of concrete pavement. Grind before paving.

After grinding, the existing pavement must comply with requirements for smoothness and coefficient of friction in section 40 except:

1. At the midpoint of a joint or crack, test smoothness with a straightedge. Both sides must have uniform texture.
2. Straightedge and inertial profiler requirements do not apply to areas abnormally depressed from subsidence or other localized causes. End smoothness testing 15 feet before and resume 15 feet after these areas.

3. Cross-slope must be uniform and have positive drainage across the traveled way and shoulder.

As an alternative to grinding existing concrete pavement, you may replace the existing pavement. The new concrete pavement must be the same thickness as the removed pavement. Replace existing pavement between longitudinal joints or pavement edges and transverse joints. Do not remove portions of slabs.

Replacement of existing concrete pavement must comply with requirements for individual slab replacement in section 41-9.

42-3.03C Bridge Decks, Approach Slabs, and Approach Pavement

Grind bridge decks, approach slabs, and approach pavement only if described.

The following ground areas must comply with the specifications for smoothness and concrete cover over reinforcing steel in section 51-1.01D(4):

1. Bridge decks
2. Approach slabs
3. Adjacent 50 feet of approach pavement

After grinding, the coefficient of friction must comply with section 51-1.01D(4).

42-3.04 PAYMENT

Grinding existing approach slabs and adjacent 50 feet of approach pavement is paid for as grind existing bridge deck.

The Department does not pay for grinding replacement concrete pavement or for additional grinding to comply with smoothness requirements.

Add to section 42:

42-4-42-9 RESERVED

07-19-13

[illegible]

DIVISION VI STRUCTURES

46 GROUND ANCHORS AND SOIL NAILS

07-19-13

Replace the 1st paragraph of section 46-1.01C(2) with:

04-19-13

Submit 5 copies of shop drawings to OSD, Documents Unit. Notify the Engineer of the submittal. Include in the notification the date and contents of the submittal. Allow 30 days for the Department's review. After review, submit from 6 to 12 copies, as requested, for authorization and use during construction.

Shop drawings and calculations must be sealed and signed by an engineer who is registered as a civil engineer in the State.

Replace the 3rd paragraph of section 46-1.01C(2) with:

01-18-13

Ground anchor shop drawings must include:

1. Details and specifications for the anchorage system and ground anchors.
2. Details for the transition between the corrugated plastic sheathing and the anchorage assembly.
3. If shims are used during lock-off, shim thickness and supporting calculations.
4. Calculations for determining the bonded length. Do not rely on any capacity from the grout-to-ground bond within the unbonded length.

01-18-13

Delete the 5th and 6th paragraphs of section 46-1.01C(2).

Replace the 4th paragraph of section 46-1.01D(2)(b) with:

01-18-13

Each jack and its gage must be calibrated as a unit under the specifications for jacks used to tension prestressing steel permanently anchored at 25 percent or more of its specified minimum ultimate tensile strength in section 50-1.01D(3).

Replace the 3rd paragraph of section 46-1.01D(2)(d) with:

07-19-13

The Department may verify the test loads using the Department's load cells. If requested, install and support the Department's testing equipment during testing and remove the equipment after testing is complete.

Add to section 46-1.02:

07-19-13

46-1.02C Grout

Grout must consist of cement and water and may contain an admixture if authorized. Cement must comply with section 90-1.02B(2). Water must comply with section 90-1.02D. Admixtures must comply with section 90, except they must not contain chloride ions in excess of 0.25 percent by weight. Do not exceed 5 gallons of water per 94 lb of cement.

Mix the grout as follows:

1. Add water to the mixer followed by cement and any admixtures or fine aggregate.
2. Mix the grout with mechanical mixing equipment that produces a uniform and thoroughly mixed grout.
3. Agitate the grout continuously until the grout is pumped.
4. Do not add water after the initial mixing.

Add to section 46-1.03B:

04-20-12

Dispose of drill cuttings under section 19-2.03B.

Add to the end of section 46-1.03C:

07-19-13

Grouting equipment must be:

1. Capable of grouting at a pressure of at least 100 psi
2. Equipped with a pressure gage having a full-scale reading of not more than 300 psi

07-19-13

Delete the 3rd paragraph of section 46-2.01A.

Add to the beginning of section 46-2.01C:

07-19-13

Submittals for strand tendons, bar tendons, bar couplers, and anchorage assemblies must comply with section 50-1.01C.

07-19-13

Strand tendons, bar tendons, bar couplers, and anchorage assemblies must comply with section 50-1.01D.

The Department tests the efflux time of the grout under California Test 541.

07-19-13

Strand tendons, bar tendons, and bar couplers must comply with section 50-1.02B.

07-19-13

The efflux time of the grout immediately after mixing must be at least 11 seconds.

07-19-13

If hot weather conditions will contribute to quick stiffening of the grout, cool the grout by authorized methods as necessary to prevent blockages during pumping activities.

07-19-13

Secure the ends of strand tendons with a permanent type anchorage system that:

1. Holds the prestressing steel at a force producing a stress of at least 95 percent of the specified ultimate tensile strength of the steel
2. Permanently secures the ends of the prestressing steel

07-19-13

The epoxy-coated prefabricated reinforcing bar must comply with section 52-2.03, except the epoxy thickness must be from 10 to 12 mils.

07-19-13

Concrete anchors on bearing plates must comply with the specifications for studs in clause 7 of AWS D1.1.

07-19-13

AA

47 EARTH RETAINING SYSTEMS

07-19-13

Replace the 2nd paragraph of section 47-2.01D with:

02-17-12

Coupler test samples must comply with minimum tensile specifications for steel wire in ASTM A 82/A 82M. Total wire slip must be at most 3/16 inch when tested under the specifications for tension testing of round wire test samples in ASTM A 370.

Replace "78-80" in the 1st table in the 2nd paragraph of section 47-2.02C with:

10-19-12

78-100

Replace the value for the sand equivalent requirement in the 2nd table in the 3rd paragraph of section 47-2.02C with:

01-20-12

12 minimum

Replace the 1st paragraph of section 47-2.02E with:

02-17-12

Steel wire must comply with ASTM A 82/A 82M. Welded wire reinforcement must comply with ASTM A 185/A 185M.

Replace section 47-3 with:

07-19-13

47-3 REINFORCED CONCRETE CRIB WALLS

47-3.01 General

Section 47-3 includes specifications for constructing reinforced concrete crib walls.

Reinforced concrete crib walls must comply with section 51.

Reinforcement must comply with section 52.

Concrete crib walls consist of a series of rectangular cells composed of interlocking, precast, reinforced concrete headers, stretchers, and blocks.

47-3.02 Materials

47-3.02A General

Pads shown to be placed between bearing surfaces must either be (1) neoprene complying with the specifications for strip waterstops in section 51-2.05 or (2) commercial quality no. 30 asphalt felt. The protective board is not required for neoprene pads.

47-3.02B Crib Members

47-3.02B(1) General

All members may be manufactured to dimensions 1/8 inch greater in thickness than shown. The thickness of the lowest step must not be less than the dimension shown.

Stretchers may be manufactured 1/2 inch less in length than shown.

When an opening is shown in the face of the wall, special length stretchers and additional headers may be necessary.

For non-tangent wall alignments, special length stretchers may be required.

For non-tangent wall alignments and at locations where filler blocks are required, special length front face closure members may be required.

47-3.02B(2) Reinforcement

Reinforcing wire must comply with ASTM A 496/A 496M.

For hoops or stirrups use either (1) reinforcing wire or (2) deformed steel welded wire reinforcement. The size must be equivalent to the reinforcing steel shown. Deformed steel welded wire reinforcement must comply with ASTM A 497/A 497M.

47-3.02B(3) Concrete

Concrete test cylinders must comply with section 90-1.01D(5), except when the penetration of fresh concrete is less than 1 inch, the concrete in the test mold must be consolidated by vibrating the mold equivalent to the consolidating effort being used to consolidate the concrete in the members.

Cure crib members under section 51-4.02C.

When removed from forms, the members must present a true surface of even texture, free from honeycombs and voids larger than 1 inch in diameter and 5/16 inch in depth. Clean and fill other pockets with mortar under sections 51-1.02F and 51-1.03E(2).

External vibration resulting in adequate consolidation may be used.

If the Engineer determines that rock pockets are of the extent or character as to affect the strength of the member or to endanger the life of the steel reinforcement, replace the member.

Finish concrete-to-concrete bearing surfaces to a smooth plane. Section 51-1.03F does not apply to concrete crib members.

47-3.03 Construction

Place reinforced concrete crib walls to the lines and grades established by the Engineer. The foundation must be accepted by the Engineer before any crib members are placed.

The gap between bearing surfaces must not exceed 1/8 inch.

Where a gap of 1/16 inch to 1/8 inch exists or where shown, place a 1/16-inch pad of asphalt felt or sheet neoprene between the bearing surfaces.

47-3.04 Payment

The area of reinforced concrete crib wall is measured on the batter at the outer face for the height from the bottom of the bottom stretcher to the top of the top stretcher and for a length measured from end to end of each section of wall.

Add between the 3rd and 4th paragraphs of section 47-5.01:

Reinforcement must comply with section 52.

10-19-12

Add to section 47-6.01A:

The alternative earth retaining system must comply with the specifications for the type of wall being constructed.

10-19-12

Replace "sets" at each occurrence in the 1st paragraph of section 47-6.01C with:

copies

04-19-13

AA

48 TEMPORARY STRUCTURES

07-19-13

Replace "previously welded splice" and its definition in section 48-2.01B with:

04-19-13

previously welded splice: Splice made in a falsework member in compliance with AWS D1.1 or other recognized welding standard before contract award.

Add to section 48-2.01B:

07-19-13

independent support system: Support system that is in addition to the falsework removal system employing methods of holding falsework from above by winches, hydraulic jacks with prestressing steel, HS rods, or cranes.

04-19-13

Delete "field" in the 1st sentence of the 5th paragraph of section 48-2.01C(1).

Replace item 1 in the list in the 6th paragraph of section 48-2.01C(1) with:

04-19-13

1. Itemize the testing, inspection methods, and acceptance criteria used

Replace "sets" at each occurrence in the 4th paragraph of section 48-2.01C(2) with:

07-19-13

copies

Replace the 7th paragraph of section 48-2.01C(2) with:

09-16-11

If you submit multiple submittals at the same time or additional submittals before review of a previous submittal is complete:

1. You must designate a review sequence for submittals
2. Review time for any submittal is the review time specified plus 15 days for each submittal of higher priority still under review

Add to section 48-2.01C(2):

07-19-13

Shop drawings and calculations for falsework removal systems employing methods of holding falsework from above by winches, hydraulic jacks with prestressing steel, HS rods, or cranes must include:

1. Design code used for the analysis of the structural members of the independent support system
2. Provisions for complying with current Cal/OSHA requirements
3. Load tests and ratings within 1 year of intended use of hydraulic jacks and winches
4. Location of the winches, hydraulic jacks with prestressing steel, HS rods, or cranes
5. Analysis showing that the bridge deck and overhang are capable of supporting all loads at all time
6. Analysis showing that winches will not overturn or slide during all stages of loading
7. Location of deck and soffit openings if needed
8. Details of repair for the deck and soffit openings after falsework removal

Replace the 1st paragraph of section 48-2.01D(2) with:

04-19-13

Welding must comply with AWS D1.1 or other recognized welding standard, except for fillet welds where the load demands are 1,000 lb or less per inch for each 1/8 inch of fillet weld.

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Replace the 1st through 3rd sentences in the 2nd paragraph of section 48-2.01D(2) with:

04-19-13

Perform NDT on welded splices using UT or RT. Each weld and any repair made to a previously welded splice must be tested.

Replace the 3rd paragraph of section 48-2.01D(2) with:

04-19-13

For previously welded splices, perform and document all necessary testing and inspection required to certify the ability of the falsework members to sustain the design stresses.

Add to section 48-2.01D(3)(a):

07-19-13

Falsework removal system employing methods of holding falsework from above and members of the independent support system must support the sum of the actual vertical and horizontal loads due to falsework materials, equipment, construction sequence or other causes, and wind loading. Identifiable mechanical devices used in the falsework removal plan must meet applicable industry standards and manufacturer instructions for safe load carrying capacity. Unidentifiable winches must be capable of carrying twice the design load.

The load used for the analysis of overturning moment and sliding of the winch system must be 150 percent of the design load.

Add to section 48-2.03D:

07-19-13

Falsework removal employing methods of holding falsework by winches, hydraulic jacks with prestressing steel, HS rods, or cranes must also be supported by an independent support system when the system is not actively lowering the falsework at vehicular, pedestrian, or railroad traffic openings.

Bridge deck openings used to facilitate falsework removal activities must be formed and located away from the wheel path. The formed openings must be wedge shaped with a 5-inch maximum diameter at the top and a 3-inch maximum diameter at the bottom.

Anchor 10-inch-square aluminum or galvanized steel wire, 1/4-inch-mesh hardware cloth with a 0.025-inch minimum wire diameter firmly to the inside of the soffit openings. Construct a 1/2-inch drip groove to the outside of soffit openings.

Clean and roughen openings made in the bridge deck. Fill the deck openings with rapid setting concrete complying with section 15-5.02.

AA

49 PILING

07-19-13

Replace "sets" in the 1st paragraph of section 49-1.01C(2) with:

04-19-13

copies

Replace "set" in the 2nd paragraph of section 49-1.01C(2) with:

04-19-13

copy

Replace "Load Applied to Pile by Hydraulic Jack(s) Acting at One End of Test Beam(s) Anchored to the Pile" in the 5th paragraph of section 49-1.01D(2) with:

"Tensile Load Applied by Hydraulic Jack(s) Acting Upward at One End of Test Beam(s)"

07-20-12

Add to section 49-1.03:

Dispose of drill cuttings under section 19-2.03B.

04-20-12

Replace the paragraph of section 49-2.01A(1) with:

Section 49-2.01 includes general specifications for fabricating and installing driven piles.

07-19-13

Epoxy-coated bar reinforcing steel used for pile anchors must comply with section 52-2.02.

Replace the 2nd paragraph of section 49-2.01D with:

Furnish piling is measured along the longest side of the pile from the specified tip elevation shown to the plane of pile cutoff.

01-20-12

Replace the paragraph of section 49-2.02A(1) with:

Section 49-2.02 includes specifications for fabricating and installing steel pipe piles.

07-19-13

Replace the definitions in section 49-2.02A(2) with:

shop welding: Welding performed at a plant on the Department's Authorized Facility Audit List.

07-19-13

field welding: Welding not performed at a plant on the Department's Authorized Facility Audit List.

Replace item 2 in the list in the paragraph of section 49-2.02A(3)(b) with:

2. Certified mill test reports for each heat number of steel used in pipe piles being furnished.

07-19-13

Replace the paragraph of section 49-2.02A(4)(a) with:

Section 11-3.02 does not apply to shop welds in steel pipe piles fabricated at a facility on the Department's Authorized Facility Audit List.

07-19-13

For groove welds using submerged arc welding from both sides without backgouging, qualify the WPS under Table 4.5 of AWS D1.1.

Replace "0.45" in the 2nd paragraph of section 49-2.02B(1)(a) with:

0.47

07-19-13

Replace the 1st paragraph of section 49-2.02B(1)(b) with:

Welds must comply with AWS D1.1. Circumferential welds must be CJP welds.
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07-19-13

Delete the 5th paragraph of section 49-2.02B(1)(b).

07-19-13

Add to section 49-2.02B(1):

49-2.02B(1)(d) Reserved

07-19-13

Replace "4.8.4" in item 2.3 in the list in the 2nd paragraph of section 49-2.02B(2) with:

4.9.4

07-19-13

Delete the 3rd paragraph of section 49-2.02C(2).

07-19-13

Replace the paragraph of section 49-2.03A(1) with:

Section 49-2.03 includes specifications for fabricating and installing structural shape steel piles.

07-19-13

Replace the paragraph of section 49-2.03A(3) with:

Submit a certified material test report and a certificate of compliance that includes a statement that all materials and workmanship incorporated in the work and all required tests and inspections of this work have been performed as described.

07-19-13

Replace the 1st paragraph of section 49-2.03B with:

Structural shape steel piles must comply with ASTM A 36/A 36M, ASTM A 572/A 572M, ASTM A 709/A 709M, or ASTM A 992/A 992M.

07-19-13

Replace "sets" in the 1st paragraph of section 49-2.04A(3) with:

copies

04-19-13

Delete the 1st paragraph of section 49-2.04A(4).

07-19-13

Replace the 3rd and 4th paragraphs of section 49-2.04B(2) with:

Piles in a corrosive environment must be steam or water cured under section 90-4.03.

10-19-12

If piles in a corrosive environment are steam cured, either:

1. Keep the piles continuously wet for at least 3 days. The 3 days includes the holding and steam curing periods.
2. Apply curing compound under section 90-1.03B(3) after steam curing.

Replace the 1st paragraph of section 49-3.01A with:

07-19-13

Section 49-3.01 includes general specifications for constructing CIP concrete piles.

Add to section 49-3.01A:

01-20-12

Concrete must comply with section 51.

Replace the 1st paragraph of section 49-3.01C with:

01-20-12

Except for CIDH concrete piles constructed under slurry, construct CIP concrete piles such that the excavation methods and the concrete placement procedures provide for placing the concrete against undisturbed material in a dry or dewatered hole.

Replace "Reserved" in section 49-3.02A(2) with:

01-20-12

dry hole:

1. Except for CIDH concrete piles specified as end bearing, a drilled hole that:
 - 1.1. Accumulates no more than 12 inches of water in the bottom of the drilled hole during a period of 1 hour without any pumping from the hole during the hour.
 - 1.2. Has no more than 3 inches of water in the bottom of the drilled hole immediately before placing concrete.
2. For CIDH concrete piles specified as end bearing, a drilled hole free of water without the use of pumps.

Replace "Reserved" in section 49-3.02A(3)(a) with:

01-20-12

If plastic spacers are proposed for use, submit the manufacturer's data and a sample of the plastic spacer. Allow 10 days for review.

Replace item 5 in the list in the 1st paragraph of section 49-3.02A(3)(b) with:

10-19-12

5. Methods and equipment for determining:
 - 5.1. Depth of concrete
 - 5.2. Theoretical volume of concrete to be placed, including the effects on volume if casings are withdrawn
 - 5.3. Actual volume of concrete placed

Add to the list in the 1st paragraph of section 49-3.02A(3)(b):

01-18-13

8. Drilling sequence and concrete placement plan.

Replace item 2 in the list in the 1st paragraph of section 49-3.02A(3)(g) with:

01-20-12

2. Be sealed and signed by an engineer who is registered as a civil engineer in the State. This requirement is waived for either of the following conditions:
 - 2.1. The proposed mitigation will be performed under the current Department-published version of *ADSC Standard Mitigation Plan 'A' - Basic Repair* without exception or modification.

- 2.2. The Engineer determines that the rejected pile does not require mitigation due to structural, geotechnical, or corrosion concerns, and you elect to repair the pile using the current Department-published version of *ADSC Standard Mitigation Plan 'B' - Grouting Repair* without exception or modification.

Replace "49-2.03A(4)(d)" in the 1st paragraph of section 49-3.02A(4)(d)(i) with:

07-19-13

49-3.02A(4)(d)

Add to the beginning of section 49-3.02A(4)(d)(ii):

07-19-13

If the drilled hole is dry or dewatered without the use of temporary casing to control ground water, installation of inspection pipes is not required.

Replace item 1 in the list in the 1st paragraph of section 49-3.02A(4)(d)(ii) with:

01-20-12

1. Inspection pipes must be schedule 40 PVC pipe complying with ASTM D 1785 with a nominal pipe size of 2 inches. Watertight PVC couplers complying with ASTM D 2466 are allowed to facilitate pipe lengths in excess of those commercially available. Log the location of the inspection pipe couplers with respect to the plane of pile cutoff.

Add to section 49-3.02A(4)(d)(iv):

01-20-12

If the Engineer determines it is not feasible to use one of ADSC's standard mitigation plans to mitigate the pile, schedule a meeting and meet with the Engineer before submitting a nonstandard mitigation plan.

The meeting attendees must include your representatives and the Engineer's representatives involved in the pile mitigation. The purpose of the meeting is to discuss the type of pile mitigation acceptable to the Department.

Provide the meeting facility. The Engineer conducts the meeting.

Replace the 1st paragraph of section 49-3.02B(5) with:

07-19-13

Grout must consist of cementitious material and water, and may contain an admixture if authorized. Do not exceed 5 gallons of water per 94 lb of cement.

Cementitious material must comply with section 90-1.02B, except SCMs are not required.

Water must comply with section 90-1.02D. If municipally supplied potable water is used, the testing specified in section 90-1.02D is waived.

Admixtures must comply with section 90, except admixtures must not contain chloride ions in excess of 0.25 percent by weight.

Use aggregate to extend the grout as follows:

1. Aggregate must consist of at least 70 percent fine aggregate and approximately 30 percent pea gravel, by weight.
2. Fine aggregate must comply with section 90-1.02C(3).
3. Size of pea gravel must be such that 100 percent passes the 1/2-inch sieve, at least 85 percent passes the 3/8-inch sieve, and not more than 5 percent passes the no. 8 sieve.
4. Minimum cementitious material content of the grout must not be less than 845 lb/cu yd of grout.

Mix the grout as follows:

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1. Add water to the mixer followed by cementitious material, aggregates, and any admixtures.
2. Mix the grout with mechanical mixing equipment that produces a uniform and thoroughly mixed grout.
3. Agitate the grout continuously until the grout is pumped.
4. Do not add water after initial mixing.

Replace section 49-3.02B(8) with:

01-20-12

49-3.02B(8) Spacers

Spacers must comply with section 52-1.03D, except you may use plastic spacers.

Plastic spacers must:

1. Comply with sections 3.4 and 3.5 of the Concrete Reinforcing Steel Institute's *Manual of Standard Practice*
2. Have at least 25 percent of their gross plane area perforated to compensate for the difference in the coefficient of thermal expansion between the plastic and concrete
3. Be of commercial quality

Add between the 1st and 2nd paragraphs of section 49-3.02C(2):

07-19-13

For CIDH concrete piles with a pile cap, the horizontal tolerance at the center of each pile at pile cut-off is the larger of 1/24 of the pile diameter or 3 inches. The horizontal tolerance for the center-to-center spacing of 2 adjacent piles is the larger of 1/24 of the pile diameter or 3 inches.

Add to section 49-3.02C(4):

01-20-12

Unless otherwise shown, the bar reinforcing steel cage must have at least 3 inches of clear cover measured from the outside of the cage to the sides of the hole or casing.

Place spacers at least 5 inches clear from any inspection tubes.

Place plastic spacers around the circumference of the cage and at intervals along the length of the cage, as recommended by the manufacturer.

07-19-13

For a single CIDH concrete pile supporting a column:

1. If the pile and the column share the same reinforcing cage diameter, this cage must be accurately placed as shown
2. If the pile reinforcing cage is larger than the column cage and the concrete is placed under dry conditions, maintain a clear horizontal distance of at least 3.5 inches between the two cages
3. If the pile reinforcing cage is larger than the column cage and the concrete is placed under slurry, maintain a clear horizontal distance of at least 5 inches between the two cages

Replace section 49-3.02C(6) with:

07-19-13

49-3.02C(6) Construction Joint

Section 49-3.02C(6) applies to CIDH concrete piles where a construction joint is shown.

If a permanent steel casing is not shown, you must furnish and install a permanent casing. The permanent casing must:

1. Be watertight and of sufficient strength to prevent damage and to withstand the loads from installation procedures, drilling and tooling equipment, lateral concrete pressures, and earth pressures.
2. Extend at least 5 feet below the construction joint. If placing casing into rock, the casing must extend at least 2 feet below the construction joint.

3. Not extend above the top of the drilled hole or final grade whichever is lower.
4. Not increase the diameter of the CIDH concrete pile more than 2 feet.
5. Be installed by impact or vibratory hammers, oscillators, rotators, or by placing in a drilled hole. Casings placed in a drilled hole must comply with section 49-3.02C(5).

Section 49-2.01A(4)(b) does not apply to permanent casings specified in this section.

Add to section 49-4.01:

07-19-13

Steel soldier piles must comply with section 49-2.03.

Replace the headings and paragraphs in section 49-4.02 with:

07-19-13

Concrete anchors must comply with the specifications for studs in clause 7 of AWS D1.1.

AA

50 PRESTRESSING CONCRETE

07-19-13

Replace "sets" at each occurrence in the 2nd and 3rd paragraphs of section 50-1.01C(3) with:

04-19-13

copies

Add to section 50-1.01C(3):

07-19-13

Include a grouting plan with your shop drawing submittal. The grouting plan must include:

1. Detailed grouting procedures
2. Type, quantity, and brand of materials to be used
3. Type of equipment to be used including provisions for backup equipment
4. Types and locations of grout inlets, outlets, and vents
5. Methods to clean ducts before grouting
6. Methods to control the rate of flow within ducts
7. Theoretical grout volume calculations for each duct
8. Duct repair procedures due to an air pressure test failure
9. Mixing and pumping procedures
10. Direction of grouting
11. Sequence of use of inlets and outlets
12. Procedure for handling blockages
13. Proposed forms for recording grouting information
14. Procedure for secondary grouting
15. Names of people who will perform grouting activities including their relevant experience and certifications

Add to section 50-1.01C:

07-19-13

50-1.01C(5) Grout

Submit a daily grouting report for each day grouting is performed. Submit the report within 3 days after grouting. The report must be signed by the technician supervising the grouting activity. The report must include:

1. Identification of each tendon

2. Date grouting occurred
3. Time the grouting started and ended
4. Date of placing the prestressing steel in the ducts
5. Date of stressing
6. Type of grout used
7. Injection end and applied grouting pressure
8. Actual and theoretical quantity of grout used to fill duct
9. Ratio of actual to theoretical grout quantity
10. Records of air, grout, and structure surface temperatures during grouting.
11. Summary of tests performed and results, except submit compressive strength and chloride ion test results within 48 hours of test completion
12. Names of personnel performing the grouting activity
13. Summary of problems encountered and corrective actions taken
14. Summary of void investigations and repairs made

Replace the introductory clause in the 1st paragraph of section 50-1.01C(4) with:

07-19-13

Submit test samples for the materials shown in the following table to be used in the work:

Add between "the" and "test samples" in the 1st paragraph of section 50-1.01D(2):

07-19-13

prestressing steel

Replace the 3rd paragraph of section 50-1.01D(2) with:

10-19-12

The Department may verify the prestressing force using the Department's load cells.

Replace the 3rd paragraph in section 50-1.01D(3) with:

07-19-13

Each pressure gage must be fully functional and have an accurately reading, clearly visible dial or display. The dial must be at least 6 inches in diameter and graduated in 100 psi increments or less.

Add between the 5th and 6th paragraphs of section 50-1.01D(3):

07-19-13

Each jack and its gages must be calibrated as a unit.

Replace the 6th paragraph in section 50-1.01D(3) with:

07-19-13

Each jack used to tension prestressing steel permanently anchored at 25 percent or more of its specified minimum ultimate tensile strength must be calibrated by METS within 1 year of use and after each repair. You must:

1. Schedule the calibration of the jacking equipment with METS
2. Mechanically calibrate the gages with a dead weight tester or other authorized means before calibration of the jacking equipment by METS
3. Verify that the jack and supporting systems are complete, with proper components, and are in good operating condition
4. Provide labor, equipment, and material to (1) install and support the jacking and calibration equipment and (2) remove the equipment after the calibration is complete
5. Plot the calibration results

Each jack used to tension prestressing steel permanently anchored at less than 25 percent of its specified minimum ultimate tensile strength must be calibrated by an authorized laboratory within 6 months of use and after each repair.

Add to section 50-1.01D:

07-19-13

50-1.01D(4) Pressure Testing Ducts

For post-tensioned concrete bridges, pressure test each duct with compressed air after stressing. To pressure test the ducts:

1. Seal all inlets, outlets, and grout caps.
2. Open all inlets and outlets on adjacent ducts.
3. Attach an air compressor to an inlet at 1 end of the duct. The attachment must include a valve that separates the duct from the air source.
4. Attach a pressure gage to the inlet at the end of the duct.
5. Pressurize the duct to 50 psi.
6. Lock-off the air source.
7. Record the pressure loss after 1 minute.
8. If there is a pressure loss exceeding 25 psi, repair the leaks with authorized methods and retest.

Compressed air used to clear and test the ducts must be clean, dry, and free of oil or contaminants.

50-1.01D(5) Duct Demonstration of Post-Tensioned Members

Before placing forms for deck slabs of box girder bridges, demonstrate that any prestressing steel placed in the ducts is free and unbonded. If no prestressing steel is in the ducts, demonstrate that the ducts are unobstructed.

If prestressing steel is installed after the concrete is placed, demonstrate that the ducts are free of water and debris immediately before installing the steel.

Before post-tensioning any member, demonstrate that the prestressing steel is free and unbonded in the duct.

The Engineer must witness all demonstrations.

50-1.01D(6) Void Investigation

In the presence of the Engineer, investigate the ducts for voids between 24 hours and 72 hours after grouting completion. As a minimum, inspect the inlet and outlet ports at the anchorages and at high points in the tendons for voids after removal. Completely fill any voids found with secondary grout.

50-1.01D(7) Personnel Qualifications

Perform post-tensioning field activities, including grouting, under the direct supervision of a technician certified as a level 2 Bonded PT Field Specialist through the Post-Tensioning Institute. Grouting activities may be performed under the direct supervision of a technician certified as a Grouting Technician through the American Segmental Bridge Institute.

Replace the 6th paragraph of section 50-1.02B with:

07-19-13

Package the prestressing steel in containers or shipping forms that protect the steel against physical damage and corrosion during shipping and storage.

Replace the 13th paragraph of section 50-1.02B with:

07-19-13

Prestressing steel is rejected if surface rust either:

1. Cannot be removed by hand-cleaning with a fine steel wool pad
2. Leaves pits visible to the unaided eye after cleaning

Replace the 4th paragraph of section 50-1.02C with:

07-19-13

Admixtures must comply with section 90, except admixtures must not contain chloride ions in excess of 0.25 percent by weight.

Delete the 5th paragraphs of section 50-1.02C.

07-19-13

Add to section 50-1.02C:

07-19-13

Secondary grout must:

1. Comply with ASTM C 1107
2. Not have a deleterious effect on the steel, concrete, or bond strength of the steel to concrete

Replace item 9 including items 9.1 and 9.2 in the list in the 1st paragraph of section 50-1.02D with:

07-19-13

9. Have an inside cross-sectional area of at least 2.5 times the net area of the prestressing steel for multistrand tendons

Replace "3/8" in item 10 in the list in the 1st paragraph of section 50-1.02D with:

07-19-13

1/2

Delete the 2nd sentences in the 1st paragraph of section 50-1.02E.

07-19-13

Replace section 50-1.02F with:

07-19-13

50-1.02F Permanent Grout Caps

Permanent grout caps for anchorage systems of post-tensioned tendons must:

1. Be glass-fiber-reinforced plastic with antioxidant additives. The environmental stress-cracking failure time must be at least 192 hours under ASTM D 1693, Condition C.
2. Completely cover and seal the wedge plate or anchorage head and all exposed metal parts of the anchorage against the bearing plate using neoprene O-ring seals.
3. Have a grout vent at the top of the cap.
4. Be bolted to the anchorage with stainless steel complying with ASTM F 593, alloy 316. All fasteners, including nuts and washers, must be alloy 316.
5. Be pressure rated at or above 150 psi.

Add to section 50-1.02:

09-16-11

50-1.02G Sheathing

Sheathing for debonding prestressing strand must:

1. Be split or un-split flexible polymer plastic tubing
2. Have a minimum wall thickness of 0.025 inch
3. Have an inside diameter exceeding the maximum outside diameter of the strand by 0.025 to 0.14 inch

Split sheathing must overlap at least 3/8 inch.

Waterproofing tape used to seal the ends of the sheathing must be flexible adhesive tape.

The sheathing and waterproof tape must not react with the concrete, coating, or steel.

Replace the 2nd paragraph of section 50-1.03A(3) with:

07-19-13

After installation, cover the duct ends and vents to prevent water or debris from entering.

Add to section 50-1.03A(3):

07-19-13

Support ducts vertically and horizontally during concrete placement at a spacing of at most 4 feet.

Delete "at least" in the 1st paragraph of section 50-1.03B(1).

07-19-13

Add to section 50-1.03B(1):

01-20-12

After seating, the maximum tensile stress in the prestressing steel must not exceed 75 percent of the minimum ultimate tensile strength shown.

Delete the 1st through 4th paragraphs of section 50-1.03B(2)(a).

07-19-13

Replace "temporary tensile strength" in the 7th paragraph of section 50-1.03B(2)(a) with:

07-19-13

temporary tensile stress

Add to section 50-1.03B(2)(a):

07-19-13

If prestressing strand is installed using the push-through method, use guide caps at the front end of each strand to protect the duct from damage.

Add to the list in the 2nd paragraph of section 50-1.03B(2)(c):

07-19-13

3. Be equipped with permanent grout caps

Replace section 50-1.03B(2)(d) with:

07-19-13

50-1.03B(2)(d) Bonding and Grouting

50-1.03B(2)(d)(i) General

Bond the post-tensioned prestressing steel to the concrete by completely filling the entire void space between the duct and the prestressing steel with grout.

Ducts, vents, and grout caps must be clean and free from water and deleterious materials that would impair bonding of the grout or interfere with grouting procedures. Compressed air used for cleaning must be clean, dry, and free of oil or contaminants.

Prevent the leakage of grout through the anchorage assembly by positive mechanical means.

Before starting daily grouting activities, drain the pump system to remove any water from the piping system.

Break down and thoroughly clean the pump and piping system after each grouting session.

After completing duct grouting activities:

1. Abrasive blast clean and expose the aggregate of concrete surfaces where concrete is to be placed to cover and encase the anchorage assemblies
2. Remove the ends of vents 1 inch below the roadway surface

50-1.03B(2)(d)(ii) Mixing and Proportioning

Proportion solids by weight to an accuracy of 2 percent.

Proportion liquids by weight or volume to an accuracy of 1 percent.

Mix the grout as follows:

1. Add water to the mixer followed by the other ingredients.
2. Mix the grout with mechanical mixing equipment that produces a uniform and thoroughly mixed grout without an excessive temperature increase or loss of properties of the mixture.
3. Do not exceed 5 gal of water per 94 lb of cement or the quantity of water in the manufacturer's instructions, whichever is less.
4. Agitate the grout continuously until the grout is pumped. Do not add water after the initial mixing.

50-1.03B(2)(d)(iii) Placing

Pump grout into the duct within 30 minutes of the 1st addition of the mix components.

Inject grout from the lowest point of the duct in an uphill direction in 1 continuous operation maintaining a one-way flow of the grout. You may inject from the lowest anchorage if complete filling is ensured.

Before injecting grout, open all vents.

Continuously discharge grout from the vent to be closed. Do not close any vent until free water, visible slugs of grout, and entrapped air have been ejected and the consistency of the grout flowing from the vent is equivalent to the injected grout.

Pump the grout at a rate of 16 to 50 feet of duct per minute.

Conduct grouting at a pressure range of 10 to 50 psi measured at the grout inlet. Do not exceed maximum pumping pressure of 150 psi at the grout inlet.

As grout is injected, close the vents in sequence in the direction of flow starting with the closest vent.

Before closing the final vent at the grout cap, discharge at least 2 gal of grout into a clean receptacle.

Bleed all high point vents.

Lock a pressure of 5 psi into the duct by closing the grout inlet valve.

50-1.03B(2)(d)(iv) Weather Conditions

If hot weather conditions will contribute to quick stiffening of the grout, cool the grout by authorized methods as necessary to prevent blockages during pumping activities.

If freezing weather conditions are anticipated during and following the placement of grout, provide adequate means to protect the grout in the ducts from damage by freezing.

50-1.03B(2)(d)(v) Curing

During grouting and for a period of 24 hours after grouting, eliminate vibration from contractor controlled sources within 100 feet of the span in which grouting is taking place, including from moving vehicles, jackhammers, large compressors or generators, pile driving activities, soil compaction, and falsework removal. Do not vary loads on the span.

For PC concrete members, do not move or disturb the members after grouting for 24 hours. If ambient temperature drops below 50 degrees F, do not move or disturb the members for 48 hours.

Do not remove or open valves until grout has cured for at least 24 hours.

50-1.03B(2)(d)(vi) Grouting Equipment

Grouting equipment must be:

1. Capable of grouting at a pressure of at least 100 psi
2. Equipped with a pressure gage having a full-scale reading of not more than 300 psi
3. Able to continuously grout the longest tendon on the project in less than 20 minutes

Grout must pass through a screen with clear openings of 1/16 inch or less before entering the pump.

Fit grout injection pipes, ejection pipes, and vents with positive mechanical shutoff valves capable of withstanding the pumping pressures. Do not remove or open valves until the grout has set. If authorized, you may substitute mechanical valves with suitable alternatives after demonstrating their effectiveness.

Provide a standby grout mixer and pump.

50-1.03B(2)(d)(vii) Grout Storage

Store grout in a dry environment.

50-1.03B(2)(d)(viii) Blockages

If the grouting pressure reaches 150 psi, close the inlet and pump the grout at the next vent that has just been or is ready to be closed as long as a one-way flow is maintained. Do not pump grout into a succeeding outlet from which grout has not yet flowed.

When complete grouting of the tendon cannot be achieved by the steps specified, stop the grouting operation.

50-1.03B(2)(d)(ix) Secondary Grouting

Perform secondary grouting by vacuum grouting under the direct supervision of a person who has been trained and has experience in the use of vacuum grouting equipment and procedures.

The vacuum grouting process must be able to determine the size of the void and measure the volume of grout filling the void.

Vacuum grouting equipment must consist of:

1. Volumeter for the measurement of void volume
2. Vacuum pump with capacity of at least 10 cfm and equipped with a flow meter capable of measuring the amount of grout being injected

50-1.03B(2)(d)(x) Vertical Tendon Grouting

Provide a standpipe at the upper end of the tendon to collect bleed water and allow it to be removed from the grout. The standpipe must be large enough to prevent the grout elevation from dropping below the highest point of the upper anchorage device. If the grout level drops to the highest point of the upper anchorage device, immediately add grout to the standpipe.

Remove the standpipe after the grout has hardened.

For vertical tendons in excess of 100 feet high or if grouting pressure exceeds 145 psi, inject grout at a higher vent from which grout has already flowed to maintain one-way flow.

50-1.03B(2)(d)(xi) Vents

Place vents at the following locations:

1. Anchorage areas at both ends of the tendon
2. Each high point
3. 4 feet upstream and downstream of each crest of a high point
4. Each change in the cross section of duct

09-16-11

Thoroughly seal the ends with waterproof tape to prevent the intrusion of water or cement paste before placing the concrete.

AA

07-19-13

10-19-12

You may use RSC for a concrete structure only where the specifications allow the use of RSC.

07-19-13

SP-287

Replace the heading of section 51-1.01D(4) with:

04-19-13

Testing Concrete Surfaces

Add to section 51-1.01D(4)(a):

04-19-13

The Engineer tests POC deck surfaces for smoothness and crack intensity.

Add to the list in the 1st paragraph of section 51-1.01D(4)(b):

04-19-13

3. Completed deck surfaces, including ramps and landings of POCs

Replace the 4th paragraph in section 51-1.01D(4)(b) with:

04-19-13

Except for POCs, surface smoothness is tested using a bridge profilograph under California Test 547. Two profiles are obtained in each lane approximately 3 feet from the lane lines and 1 profile is obtained in each shoulder approximately 3 feet from the curb or rail face. Profiles are taken parallel to the direction of traffic.

Add between the 5th and 6th paragraphs of section 51-1.01D(4)(b):

04-19-13

POC deck surfaces must comply with the following smoothness requirements:

1. Surfaces between grade changes must not vary more than 0.02 foot from the lower edge of a 12-foot-long straightedge placed parallel to the centerline of the POC
2. Surface must not vary more than 0.01 foot from the lower edge of a 6-foot-long straightedge placed perpendicular to the centerline of the POC

Add to section 51-1.01D(4)(d):

04-19-13

The Engineer measures crack intensity of POC deck surfaces after curing, before prestressing, and before falsework release. Clean the surface for the Engineer to measure surface crack intensity.

In any 100 sq ft portion of a new POC deck surface, if there are more than 10 feet of cracks having a width at any point of over 0.02 inch, treat the deck with methacrylate resin under section 15-5.05. Treat the entire deck width between the curbs to 5 feet beyond where the furthest continuous crack emanating from the 100 sq ft section is 0.02 inch wide. Treat the deck surface before grinding.

Replace the 2nd paragraph of section 51-1.02B with:

07-19-13

Except for minor structures, the minimum required 28-day compressive strength for concrete in structures or portions of structures is the compressive strength described or 3,600 psi, whichever is greater.

Add to section 51-1.03C(2)(c)(i):

04-20-12

Permanent steel deck forms are only allowed where shown or if specified as an option in the special provisions.

Replace the 3rd paragraph of section 51-1.03C(2)(c)(ii) with:

04-20-12

Compute the physical design properties under AISI's *North American Specification for the Design of Cold-Formed Steel Structural Members*.

Replace the 8th paragraph of section 51-1.03D(1) with:

10-19-12

Except for concrete placed as pipe culvert headwalls and endwalls, slope paving and aprons, and concrete placed under water, consolidate concrete using high-frequency internal vibrators within 15 minutes of placing concrete in the forms. Do not attach vibrators to or hold them against forms or reinforcing steel. Do not displace reinforcement, ducts, or prestressing steel during vibrating.

Add to section 51-1.03E(5):

08-05-11

Drill the holes without damaging the adjacent concrete. If reinforcement is encountered during drilling before the specified depth is attained, notify the Engineer. Unless coring through the reinforcement is authorized, drill a new hole adjacent to the rejected hole to the depth shown.

Add to section 51-1.03F(5)(a):

04-19-13

For approach slabs, sleeper slabs, and other roadway surfaces of concrete structures, texture the roadway surface as specified for bridge deck surfaces in section 51-1.03F(5)(b).

Replace "Reserved" in section 51-1.03F(5)(b) with:

04-20-12

51-1.03F(5)(b)(i) General

Except for bridge widenings, texture the bridge deck surfaces longitudinally by grinding and grooving or by longitudinal tining.

10-19-12

For bridge widenings, texture the deck surface longitudinally by longitudinal tining.

04-20-12

In freeze-thaw areas, do not texture PCC surfaces of bridge decks.

51-1.03F(5)(b)(ii) Grinding and Grooving

When texturing the deck surface by grinding and grooving, place a 1/4 inch of sacrificial concrete cover on the bridge deck above the finished grade shown. Place items to be embedded in the concrete based on the final profile grade elevations shown. Construct joint seals after completing the grinding and grooving.

Before grinding and grooving, deck surfaces must comply with the smoothness and deck crack treatment requirements.

Grind and groove the deck surface as follows:

1. Grind the surface to within 18 inches of the toe of the barrier under section 42-3. Grinding must not reduce the concrete cover on reinforcing steel to less than 1-3/4 inches.
2. Groove the ground surfaces longitudinally under section 42-2. The grooves must be parallel to the centerline.

51-1.03F(5)(b)(iii) Longitudinal Tining

When texturing the deck surface by longitudinal tining, perform initial texturing with a burlap drag or broom device that produces striations parallel to the centerline. Perform final texturing with spring steel tines that produce grooves parallel with the centerline.

The tines must:

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1. Be rectangular in cross section
2. Be from 3/32 to 1/8 inch wide on 3/4-inch centers
3. Have enough length, thickness, and resilience to form grooves approximately 3/16 inch deep

Construct grooves to within 6 inches of the layout line of the concrete barrier toe. Grooves must be from 1/8 to 3/16 inch deep and 3/16 inch wide after concrete has hardened.

For irregular areas and areas inaccessible to the grooving machine, you may hand construct grooves. Hand-constructed grooves must comply with the specifications for machine-constructed grooves.

Tining must not cause tearing of the deck surface or visible separation of coarse aggregate at the surface.

Add to section 51-1.03F:

04-19-13

51-1.03F(6) Finishing Pedestrian Overcrossing Surfaces

Construct deck surfaces, including ramps and landings of POCs to the grade and cross section shown. Surfaces must comply with the specified smoothness, surface texture, and surface crack requirements.

The Engineer sets deck elevation control points for your use in establishing the grade and cross section of the deck surface. The grade established by the deck elevation control points includes all camber allowances. Except for landings, elevation control points include the beginning and end of the ramp and will not be closer together than approximately 8 feet longitudinally and 4 feet transversely to the POC centerline. Landing elevation control points are at the beginning and the end of the landing.

Broom finish the deck surfaces of POCs. Apply the broom finish perpendicular to the path of travel. You may apply water mist to the surface immediately before brooming.

Clean any discolored concrete by abrasive blast cleaning or other authorized methods.

Replace the paragraphs of section 51-1.04 with:

10-19-12

If concrete involved in bridge work is not designated by type and is not otherwise paid for under a separate bid item, the concrete is paid for as structural concrete, bridge.

The payment quantity for structural concrete includes the volume in the concrete occupied by bar reinforcing steel, structural steel, prestressing steel materials, and piling.

The payment quantity for seal course concrete is the actual volume of seal course concrete placed except the payment quantity must not exceed the volume of concrete contained between vertical planes 1 foot outside the neat lines of the seal course shown. The Department does not adjust the unit price for an increase or decrease in the seal course concrete quantity.

Structural concrete for pier columns is measured as follows:

1. Horizontal limits are vertical planes at the neat lines of the pier column shown.
2. Bottom limit is the bottom of the foundation excavation in the completed work.
3. Upper limit is the top of the pier column concrete shown.

The payment quantity for drill and bond dowel is determined from the number and depths of the holes shown.

Replace section 51-2.01B(2) with:

04-19-13

51-2.01B(2) Reserved

Delete the 4th paragraph of section 51-2.01C.

04-19-13

Replace "SSPC-QP 3" in the 1st paragraph of section 51-2.02A(2) with:

AISC-420-10/SSPC-QP 3

10-19-12

Replace the 2nd and 3rd paragraphs of section 51-2.02B(3)(b) with:

04-20-12

Concrete saws for cutting grooves in the concrete must have diamond blades with a minimum thickness of 3/16 inch. Cut both sides of the groove simultaneously for a minimum 1st pass depth of 2 inches. The completed groove must have:

1. Top width within 1/8 inch of the width shown or ordered
2. Bottom width not varying from the top width by more than 1/16 inch for each 2 inches of depth
3. Uniform width and depth

Cutting grooves in existing decks includes cutting any conflicting reinforcing steel.

Replace "sets" in the 1st and 2nd paragraphs of section 51-2.02D(1)(c)(ii) with:

04-19-13

copies

Replace "set" in the 7th paragraph of section 51-2.02D(1)(c)(ii) with:

04-19-13

copy

Add to the 1st paragraph of section 51-2.02D(3):

04-19-13

POC deck surfaces must comply with section 51-1.03F(6) before placing and anchoring joint seal assemblies.

Replace "sets" in the 2nd paragraph of section 51-2.02E(1)(c) with:

04-19-13

copies

Replace "set" in the 6th paragraph of section 51-2.02E(1)(c) with:

04-19-13

copy

Replace the 2nd paragraph of section 51-2.02E(1)(e) with:

08-05-11

Except for components in contact with the tires, the design loading must be the AASHTO LRFD Bridge Design Specifications Design Truck with 100 percent dynamic load allowance. Each component in contact with the tires must support a minimum of 80 percent of the AASHTO LRFD Bridge Design Specifications Design Truck with 100 percent dynamic load allowance. The tire contact area must be 10 inches measured normal to the longitudinal assembly axis by 20 inches wide. The assembly must provide a smooth-riding joint without slapping of components or tire rumble.

Replace "sets" in the 1st and 2nd paragraphs of section 51-2.02F(1)(c) with:

04-19-13

copies

Add between the 1st and 2nd paragraphs of section 51-4.01A:

10-19-12

Prestressing concrete members must comply with section 50.

Delete the 2nd paragraph of section 51-4.01A.

04-20-12

Replace the 3rd paragraph of section 51-4.01C(2) with:

04-20-12

For segmental or spliced-girder construction, shop drawings must include the following additional information:

1. Details showing construction joints or closure joints
2. Arrangement of bar reinforcing steel, prestressing tendons, and pressure-grouting pipe
3. Materials and methods for making closures
4. Construction joint keys and surface treatment
5. Other requested information

For segmental girder construction, shop drawings must include concrete form and casting details.

Replace "sets" in the 1st paragraph of section 51-4.01C(3) with:

04-19-13

copies

Delete the 1st and 2nd paragraphs of section 51-4.02A.

10-19-12

Replace the 3rd paragraph of section 51-4.02B(2) with:

04-20-12

For segmental or spliced-girder construction, materials for construction joints or closure joints at exterior girders must match the color and texture of the adjoining concrete.

Add to section 51-4.02B(2):

04-20-12

At spliced-girder closure joints:

1. If shear keys are not shown, the vertical surfaces of the girder segment ends must be given a coarse texture as specified for the top surface of PC members.
2. Post-tensioning ducts must extend out of the vertical surface of the girder segment closure end sufficiently to facilitate splicing of the duct.

For spliced girders, pretension strand extending from the closure end of the girder segment to be embedded in the closure joint must be free of mortar, oil, dirt, excessive mill scale and scabby rust, and other coatings that would destroy or reduce the bond.

04-20-12

Temporary spliced-girder supports must comply with the specifications for falsework in section 48-2.

Add to section 51-5.01A:

07-19-13

Structure excavation and backfill must comply with section 19-3.

Treated permeable base must comply with section 29.

07-19-13

Delete the 1st paragraph of section 51-5.03B(3).

07-19-13

Delete the 2nd paragraph of section 51-5.03D(1).

Add between the 1st and 2nd paragraphs of section 51-7.01A:

10-19-12

Minor structures include:

1. Pipe culvert headwalls and endwalls for a pipe with a diameter less than 5 feet
2. Drainage inlets
3. Other structures described as minor structures

10-19-12

Delete the 4th paragraph of section 51-7.01A.

Replace the 1st and 2nd paragraphs of section 51-7.01B with:

10-19-12

Concrete must comply with the specifications for minor concrete.

Add to section 51:

10-19-12

51-8-51-15 RESERVED

AA

52 REINFORCEMENT

01-18-13

Add to section 52-1.01A:

07-20-12

Splicing of bar reinforcement must comply with section 52-6.

10-19-12

1. Deformed bars complying with ASTM A 615/A 615M, Grade 60, in:
 - 1.1. Junction structures
 - 1.2. Sign and signal foundations
 - 1.3. Minor structures
 - 1.4. Concrete crib members
 - 1.5. Mechanically-stabilized-embankment concrete panels
 - 1.6. Masonry block sound walls
2. Deformed or plain bars complying with ASTM A 615/A 615M, Grade 40 or 60, in:
 - 2.1. Slope and channel paving
 - 2.2. Concrete barriers Type 50 and 60
3. Plain bars for spiral or hoop reinforcement in structures and concrete piles

04-20-12

- 01-18-13

10-21-11

01-18-13

1. No. 14 bars
2. No. 18 bars
3. Hoops
4. Reinforcing bars where you cannot provide a minimum clear distance of 2 inches between the splice and the nearest adjacent bar

[illegible]

53 SHOTCRETE

07-19-13

Replace the 2nd and 3rd paragraphs of section 53-2.01D(1) with:

07-19-13

Obtain and test all cores for compressive strength under ASTM C 42/C 42M at an authorized laboratory. The compressive strength is the average strength of the 3 cores.

Shotcrete must have a minimum compressive strength of 3,600 psi, unless otherwise described. The shotcrete must attain the minimum compressive strength at 28 days, except 42 days are allowed for shotcrete with a described minimum compressive strength greater than 3,600 psi.

[illegible]

54 WATERPROOFING

07-19-13

Add between "be" and "3/8 inch" in the 3rd paragraph of section 54-4.02C:

04-20-12

at least

Add to section 54:

07-19-13

54-7 SILANE WATERPROOFING TREATMENT

Reserved

54-8-54-10 RESERVED

AA

55 STEEL STRUCTURES

07-19-13

07-19-13

Delete the 3rd paragraph in section 55-1.01C(1).

Replace the 3rd sentence of the 4th paragraph in section 55-1.01C(1) with:

07-19-13

For ASTM F 1554 anchor bolts, include chemical composition and carbon equivalence for each heat of steel.

Add to section 55-1.01C(1):

07-19-13

For HS connections, submit a record of which lots are used in each joint as an informational submittal.

Replace "sets" at each occurrence in the 1st paragraph of section 55-1.01C(2) with:

04-19-13

copies

Replace the list in the 2nd paragraph of section 55-1.01C(2) with:

07-19-13

1. Sequence of shop and field assembly and erection. For continuous members, include proposed steel erection procedures with calculations that show girder capacity and geometry will be correct.
2. Welding sequences and procedures.
3. Layout drawing of the entire structure with locations of butt welded splices.
4. Locations of temporary supports and welds.
5. Vertical alignment of girders at each stage of erection.
6. Match-marking diagrams.
7. Details for connections not shown or dimensioned on the plans.
8. Details of allowed options incorporated in the work.
9. Direction of rolling of plates where orientation is specified.
10. Distortion control plan.
11. Dimensional tolerances. Include measures for controlling accumulated error to meet overall tolerances.
12. Material specification and grade listed on the bill of materials.
13. Identification of tension members and fracture critical members.
14. Proposed deviations from plans, specifications, or previously submitted shop drawings.
15. Contract plan sheet references for details.

Replace items 2 and 3 in the list in the 1st paragraph of section 55-1.01C(3) with:

07-19-13

2. Tension flanges and webs of horizontally curved girders
3. Hanger plates

Replace the 2nd paragraph of section 55-1.01C(3) with:

07-19-13

Furnish plates, shapes, or bars with extra length to provide for removal of check samples.

Delete the 1st and 2nd sentences in the 3rd paragraph of section 55-1.01C(3).

07-19-13

Replace the 4th paragraph of section 55-1.01C(3) with:

07-19-13

Remove material for test samples in the Engineer's presence. Test samples for plates over 24 inches wide must be 10 by 12 inches with the long dimension transverse to the direction of rolling. Test samples for other products must be 12 inches long taken in the direction of rolling with a width equal to the product width.

Replace the 1st sentence of the 6th paragraph in section 55-1.01C(3) with:

07-19-13

Results of check testing are delivered to you within 20 days of receipt of samples at METS.

Delete the 2nd paragraph of section 55-1.01D(1).

07-19-13

Replace the 2nd sentence of the 4th paragraph in section 55-1.01D(1) with:

07-19-13

The calibration must be performed by an authorized repair and calibration center approved by the tool manufacturer.

Add to section 55-1.01D(1):

07-19-13

For bolts installed as snug tight, rotational capacity testing and installation tension testing are not required.

In addition to NDT requirements in AWS D1.5, ultrasonically test 25 percent of all main member tension butt welds in material over 1/2 inch thick.

Perform NDT on 100 percent of each pin as follows:

1. MT under ASTM A 788, S 18, with no linear indication allowed exceeding 3 mm
2. UT under ASTM A 788, S 20, level S and level DA in two perpendicular directions

The Engineer determines the location of all NDT testing for welding.

07-19-13

Delete the 2nd paragraph of section 55-1.01D(3)(a).

Replace section 55-1.01D(4)(b) with:

07-19-13

Perform rotational capacity testing on each rotational capacity lot under section 55-1.01D(3)(b) at the job site before installation.

Replace the 1st sentence of the 2nd paragraph in section 55-1.01D(4)(c) with:

07-19-13

Test 3 representative HS fastener assemblies under section 8 of *Specification for Structural Joints Using High-Strength Bolts* of the RCSC.

Replace the 1st paragraph in section 55-1.01D(4)(d) with:

07-19-13

Perform fastener tension testing to verify minimum tension in HS bolted connections no later than 48 hours after all fasteners in a connection have been tensioned.

Replace the 3rd paragraph in section 55-1.01D(4)(d) with:

07-19-13

Test 10 percent of each type of fastener assembly in each HS bolted connection for minimum tension using the procedure described in section 10 of *Specification for Structural Joints Using High-Strength Bolts* of the RCSC. Check at least 2 assemblies per connection. For short bolts, determine the inspection torque using steps 1 through 7 of "Arbitration of Disputes, Torque Method-Short Bolts" in *Structural Bolting Handbook* of the Steel Structures Technology Center.

Replace the 1st table in the 1st paragraph of section 55-1.02A(1) with:

07-19-13

Structural Steel

Material	Specification
Carbon steel	ASTM A 709/A 709M, Grade 36 or {ASTM A36/A36M} ^a
HS low alloy columbium vanadium steel	ASTM A 709/A 709M, Grade 50 or {ASTM A 992/A 992M or ASTM A 572/A 572M, Grade 50} ^a
HS low alloy structural steel	ASTM A 709/A 709M, Grade 50W or Grade HPS 50W, or {ASTM A 588/A 588M} ^a
HS low alloy structural steel plate	ASTM A 709/A 709M, Grade HPS 70W
High-yield strength quenched and tempered alloy steel plate suitable for welding	ASTM A 709/A 709M, Grade 100, Grade 100W, or Grade HPS 100W, or {ASTM A 514/A 514M} ^a

^aGrades you may substitute for the equivalent ASTM A 709 steel subject to the modifications and additions specified and to the requirements of ASTM A 709.

Replace the 2nd table in the 1st paragraph of section 55-1.02A(1) with:

07-19-13

Fasteners

Material	Specification
Steel fastener components for general applications:	
Bolts and studs	ASTM A 307
Anchor bolts	ASTM F 1554 ^a
HS bolts and studs	ASTM A 449, Type 1 ^a
HS threaded rods	ASTM A 449, Type 1 ^a
HS nonheaded anchor bolts	ASTM F 1554, Grade 105, Class 2A ^a
Nuts	ASTM A 563, including appendix X1 ^b
Washers	ASTM F 844
Hardened Washers	ASTM F 436, Type 1, including S1 supplementary requirements
Components of HS steel fastener assemblies for use in structural steel joints:	
Bolts	ASTM A 325, Type 1
Tension control bolts	ASTM F 1852, Type 1
Nuts	ASTM A 563, including appendix X1 ^b
Hardened washers	ASTM F 436, Type 1, Circular, including S1 supplementary requirements
Direct tension indicators	ASTM F 959, Type 325, zinc-coated

^aUse hardened washers.

^bZinc-coated nuts tightened beyond snug or wrench tight must be furnished with a dry lubricant complying with supplementary requirement S2 in ASTM A 563.

Replace the 3rd table in the 1st paragraph of section 55-1.02A(1) with:

07-19-13

Other Materials

Material	Specification
Carbon steel for forgings, pins, and rollers	ASTM A 668/A 668M, Class D
Alloy steel for forgings	ASTM A 668/A 668M, Class G
Pin nuts	ASTM A 709/A 709M or ASTM A 563, including appendix X1 ^a
Carbon-steel castings	ASTM A 27/A 27M, Grade 65-35, Class 1
Malleable iron castings	ASTM A 47/A 47M, Grade 32510
Gray iron castings	ASTM A 48, Class 30B
Carbon steel structural tubing	ASTM A 500/A 500M, Grade B, ASTM A 501, ASTM A 847/A 847M, or ASTM A 1085
Steel pipe ^b	ASTM A 53, Type E or S, Grade B; ASTM A 106, Grade B; or ASTM A 139, Grade B
Stud connectors	ASTM A 108

^aZinc-coated nuts tightened beyond snug or wrench tight must be furnished with a dry lubricant complying with supplementary requirement S2 in ASTM A 563.

^bHydrostatic testing will not apply.

Replace the table in the 1st paragraph in section 55-1.02A(2) with:

07-19-13

Material complying with ASTM A 709/A 709M	CVN impact value (ft-lb at temperature)
Grade 36	15 at 40 °F
Grade 50 ^a (Thickness up to 2 inches)	15 at 40 °F
Grade 50W ^a (Thickness up to 2 inches)	15 at 40 °F
Grade 50 ^a (Thickness over 2 inches up to 4 inches)	20 at 40 °F
Grade 50W ^a (Thickness over 2 inches up to 4 inches)	20 at 40 °F
Grade HPS 50W ^a (Thickness up to 4 inches)	20 at 10 °F
Grade HPS 70W (Thickness up to 4 inches)	25 at -10 °F
Grade 100 (Thickness of 2-1/2 inches or less)	25 at 0 °F
Grade 100W (Thickness over 2-1/2 inches up to 4 inches)	35 at 0 °F
Grade HPS 100W (Thickness of 2-1/2 inches or less)	25 at -30 °F
Grade HPS 100W (Thickness over 2-1/2 inches up to 4 inches)	35 at -30 °F

^aIf the material yield strength is more than 65,000 psi, reduce the temperature for the CVN impact value 15 degrees F for each increment of 10,000 psi above 65,000 psi.

Replace the 1st sentence of the 1st paragraph in section 55-1.02A(5) with:

07-19-13

Steel, gray iron, and malleable iron castings must have continuous fillets cast in place in reentrant angles.

Delete the 3rd and 4th sentences in the 2nd paragraph in section 55-1.02A(5).

07-19-13

Replace the 1st paragraph of section 55-1.02B(1) with:

07-19-13

Section 55-1.02B(1) applies to work performed at the source and at the job site.

Replace the 4th paragraph in section 55-1.02B(1) with:

07-19-13

Ends of girder stiffeners shown as tight-fit must bear on the girder flange with at least point bearing. Local clearances between the end of the stiffener and the girder flange must be at most 1/16 inch.

Replace the 1st sentence of the 5th paragraph in section 55-1.02B(1) with:

07-19-13

Fabricate floor beams, stringers, and girders having end connection angles to exact length back to back of connection angles.

Add to the 7th paragraph in section 55-1.02B(1):

07-19-13

Use low-stress stamps for fracture critical members and tension members.

Replace the 2nd sentence of the 9th paragraph in section 55-1.02B(1) with:

07-19-13

Slightly round edges and sharp corners, including edges marred, cut, or roughened during handling or erection.

Replace the 3rd paragraph in section 55-1.02B(2) with:

07-19-13

Instead of machining, you may heat straighten steel not in contact with other metal bearing surfaces if the above tolerances are met.

Replace item 2 in the list in the 1st paragraph of section 55-1.02B(3) with:

07-19-13

2. Radius of bend measured to the concave face must comply with *Manual of Steel Construction* of the AISC

Replace the 1st sentence of the 2nd paragraph in section 55-1.02B(3) with:

07-19-13

Plates to be bent to a smaller radius than specified in *Manual of Steel Construction* of the AISC must be bent hot.

Replace the introductory clause of the 2nd paragraph of section 55-1.02B(4) with:

07-19-13

Threads for pin ends and pin nuts 1-1/2 inches or more in diameter must comply with the following:

Replace the 3rd paragraph in section 55-1.02B(5) with:

07-19-13

Holes for pins must be:

1. True to the diameter specified.
2. At right angles to the member axis.

3. Parallel with each other except for pins where nonparallel holes are required.
4. Smooth and straight with the final surface produced by a finishing cut.

Replace the 1st paragraph in section 55-1.02B(6)(c) with:

07-19-13

Bolted connections using HS fastener assemblies must comply with *Specification for Structural Joints Using High-Strength Bolts* of the RCSC.

Replace the 7th paragraph in section 55-1.02B(6)(c) with:

07-19-13

For all bolts, thread stickout after tensioning must be at least flush with the outer nut face. At least 3 full threads must be located within the grip of the connection.

Delete the 3rd paragraph in section 55-1.02B(7)(a).

07-19-13

Add to section 55-1.02B(7)(a):

07-19-13

For welds indicated to be subject to tensile forces that are to receive RT, grind smooth and flush on both sides of welds before testing.

For groove weld surface profiles that interfere with NDT procedures, grind welds smooth and blend with the adjacent material.

For fillet weld surface profiles that interfere with NDT procedures, grind welds and blend the toes smoothly with the adjacent base metal.

Add to section 55-1.02B(7):

07-19-13

55-1.02B(7)(c) Steel Pedestrian Bridges

Reserved

Replace the 1st paragraph in section 55-1.02B(9) with:

07-19-13

Prepare and paint contact surfaces of HS bolted connections before assembly. Thoroughly clean all other surfaces of metal in contact to bare metal before assembly. Remove all rust, mill scale, and foreign material.

Replace the 1st sentence of the 4th paragraph in section 55-1.02B(9) with:

07-19-13

Preassemble truss work in lengths of at least 3 abutting panels and adjust members for line and camber.

Replace the 1st sentence of the 5th paragraph in section 55-1.02B(9) with:

07-19-13

Preassemble bolted splice joints for plate girders in lengths of at least 3 abutting sections and adjust abutting sections for line and camber.

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SP-304

59-2.03B(3) Containment Systems

59-2.03B(3)(a) General

Construct containment systems when disturbing existing paint systems during bridge rehabilitation.

The containment system must be one of the following:

1. Ventilated containment system
2. Vacuum-shrouded surface preparation equipment and drapes and ground covers
3. Equivalent containment system if authorized

The containment system must contain all water, resulting debris, and visible dust produced when the existing paint system is disturbed.

Properly maintain the containment system while work is in progress and do not change the containment system unless authorized.

Containment systems over railroad property must provide the minimum clearances as specified in section 5-1.20C for the passage of railroad traffic.

59-2.03B(3)(b) Ventilated Containment Systems

59-2.03B(3)(b)(i) General

If flexible framing is used, support and fasten it to (1) prevent the escape of abrasive and blast materials due to whipping from traffic or wind and (2) maintain clearances.

If the wind speed reaches 50 mph or greater, relieve the wind pressure on the containment system using an authorized method.

59-2.03B(3)(b)(ii) Design Criteria

Scaffolding or supports for the ventilated containment system must not extend below the vertical clearance level nor to the ground line at locations within the roadbed.

For truss-type bridges, all connections of the ventilated containment system to the existing structure must be made through the deck, girder, stringer, or floor beam system. No connections are allowed that will cause bending stresses in a truss member.

The ventilated containment system must comply with section 7-1.02K(6)(e).

The minimum total design load for the ventilated containment system must consist of the sum of the dead and live vertical loads.

Dead and live loads are as follows:

1. Dead load must consist of the actual load of the ventilated containment system
2. Live loads for bridges with only spot blast cleaning work must consist of:
 - 2.1. Uniform load of at least 25 psf applied over the supported area
 - 2.2. Moving concentrated load of 1000 lb to produce maximum stress in the main supporting elements of the ventilated containment system
3. Live loads for bridges with 100 percent blast cleaning to bare metal must consist of:
 - 3.1. Uniform load of at least 45 psf, which includes 20 psf of sand load, applied over the supported area
 - 3.2. Moving concentrated load of 1000 lb to produce maximum stress in the main supporting elements of the ventilated containment system

Assumed horizontal loads do not need to be included in the design of the ventilated containment system.

Maximum allowable stresses must comply with section 48-2.01D(3)(c).

59-2.03B(3)(b)(iii) Ventilation

The ventilation system in the ventilated containment system must be of the forced input airflow type with fans or blowers.

Negative air pressure must be employed within the ventilated containment system and will be verified by visual methods by observing the concave nature of the ventilated containment system while taking into account wind effects or by using smoke or other visible means to observe airflow. The input airflow must be properly balanced with the exhaust capacity throughout the range of operations.

The exhaust airflow of the ventilation system in the ventilated containment system must be forced into wet or dry dust collectors or bag houses.

Replace item 1 in the list in the 2nd paragraph of section 59-2.03C(1) with:

10-19-12

1. Apply a stripe coat of undercoat paint on all edges, corners, seams, crevices, interior angles, junctions of joining members, weld lines, and similar surface irregularities. The stripe coat must completely hide the surface being covered. If spot blast cleaning portions of the bridge, apply the stripe coat of undercoat paint before each undercoat and follow with the undercoat as soon as practical. If removing all existing paint from the bridge, apply the undercoat first as soon as practical and follow with the stripe coat of undercoat paint for each undercoat.

Replace the heading of section 59-2.03C(2) with:

04-19-13

Zinc Coating System

Add to section 59-2.03C(2)(a):

04-19-13

Coatings for new structural steel and connections between new and existing structural steel must comply with the requirements shown in the following table:

Zinc Coating System		
Description	Coating	Dry film thickness (mils)
All new surfaces:		
Undercoat	Inorganic zinc primer, AASHTO M 300 Type I or II	4–8
Finish coat ^a	Exterior grade latex ^b , 2 coats	2 minimum each coat, 4–8 total
Total thickness, all coats		8–14
Connections to existing structural steel: ^c		
Undercoat	Inorganic zinc primer, AASHTO M 300 Type I or II	4–8
Finish coat ^a	Exterior grade latex ^b , 2 coats	2 minimum each coat, 4–8 total
Total thickness, all coats		8–14

^aIf no finish coats are described, a final coat of inorganic zinc primer is required.

^bExterior grade latex must comply with section 91-2.02 unless otherwise specified.

^cIncludes the following locations:

1. New and existing contact surfaces
2. Existing member surfaces under new HS bolt heads, nuts, or washers
3. Bare surfaces of existing steel after trimming, cutting, drilling, or reaming
4. Areas within a 4-inch radius from the point of application of heat for welding or flame cutting

Replace "**Specification for Structural Joints Using ASTM A325 or A 490 Bolts**" in the 7th paragraph of section 59-2.03C(2)(b)(i) with:

07-19-13

Specification for Structural Joints Using High-Strength Bolts

Add to section 59-2.03C:

04-19-13

59-2.03C(3) Moisture-Cured Polyurethane Coating System

Reserved

59-2.03C(4) State Specification Paint Waterborne Coating System

59-2.03C(4)(a) General

The State Specification PWB coating system for existing structural steel must comply with the requirements shown in the following table:

State Specification PWB Coating System

Surface	Description	State Specification PWB Coating	Dry film thickness (mils)
Surfaces cleaned to bare metal ^a :	1st undercoat	145	2–3
	2nd undercoat	146	2–3
	1st finish coat	171	1.5–3
	2nd finish coat	172	1.5–3
	Total thickness, all coats	--	7–12
Existing painted surfaces to be topcoated:	Undercoat	146	2–3
	1st finish coat	171	1.5–3
	2nd finish coat	172	1.5–3
	Total thickness, new coats	--	5–9

^aIncludes locations of spot blast cleaning

59-2.03C(4)(b) Finish Coats

11-15-13

Reserved

Add to section 59-5.01:

04-19-13

Where specified, prepare and paint sign structures under sections 59-2 and 59-3.

Instead of submitting proof of the certification complying with SSPC-QP 1, you may submit documentation with the painting quality work plan showing compliance with the requirements in section 3 of SSPC-QP 1.

Instead of submitting proof of the certification complying with SSPC-QP 2, you may submit documentation with the painting quality work plan showing compliance with the requirements in sections 4.2 through 4.4 of SSPC-QP 2, Category A.

Instead of submitting proof of the certification complying with AISC-420-10/SSPC-QP 3 (Enclosed Shop), you may submit documentation with the painting quality work plan showing compliance with the requirements in sections 5 through 18 of AISC-420-10/SSPC-QP3.

Replace the paragraphs of section 59-5.03 with:

04-19-13

59-5.03A General

You may prepare and paint sign structures before or after erection. After erection, repair damaged paint to the satisfaction of the Engineer.

The total dry film thickness of finish coats on contact surfaces of galvanized HS bolted connections (1) must be from 1 to 4 mils and (2) may be applied in 1 application.

59-5.03B Undercoating of Ungalvanized Surfaces

Blast-cleaned surfaces must receive a single undercoat consisting of an inorganic zinc coating as specified in AASHTO M 300, Type I or Type II, except:

1. The first 2 sentences of section 5.6 do not apply
2. Section 5.6.1 does not apply

If you propose to use a coating that is not on the Authorized Material List, submit the required documentation specified in section 5.6 of AASHTO M 300. Allow 30 days for the Engineer's review.

59-5.03C Testing of Inorganic Zinc Coating

Perform adhesion and hardness testing no sooner than 72 hours after application of the single undercoat of inorganic zinc coating.

59-5.03D Finish Coating

The exposed area of inorganic zinc coating must receive a minimum of 2 finish coats of exterior grade latex paint.

The 1st finish coat color must match no. 24558 of FED-STD-595. The 2nd finish coat color must match no. 24491 of FED-STD-595. The total dry film thickness of the applications of the 2nd finish coat must be not less than 2 mils.

Replace section 59-7 with:

07-19-13

59-7 STAINING CONCRETE AND SHOTCRETE

59-7.01 GENERAL

59-7.01A General

59-7.01A(1) Summary

Section 59-7.01 includes specifications for preparing and staining concrete and shotcrete surfaces using an acid stain.

59-7.01A(2) Definitions

Reserved

59-7.01A(3) Submittals

Submit stain manufacturer's product data and application instructions at least 7 days before starting staining activities.

59-7.01A(4) Quality Control and Assurance

Reserved

59-7.01B Materials

59-7.01B(1) General

Reserved

59-7.01B(2) Stain

Stain must:

1. Be a water-based solution of inorganic metallic salts
2. Contain dilute acid that penetrates and etches the concrete or shotcrete surface
3. Be a commercial quality product designed specifically for exterior applications
4. Produce abrasion-resistant color deposits

59-7.01B(3) Sealer

Reserved

59-7.01B(4) Joint Sealing Compound

Reserved

59-7.01C Construction

59-7.01C(1) General

Seal joints between concrete and shotcrete surfaces to be stained and adjacent metal with joint sealing compound before applying the stain.

Test surfaces for acceptance of the stain before applying the stain. Clean surfaces that resist accepting the stain and retest until passing.

Apply the stain under the manufacturer's instructions.

Before staining, the concrete or shotcrete surfaces must be:

1. At least 28 days old
2. Prepared under SSPC-SP 13/NACE no. 6
3. Thoroughly dry

Apply the stain uniformly to avoid excessive rundown. Work the stain into the concrete using a nylon bristle brush in a circular motion.

After the last coat of stain has dried, rinse stained surfaces with water and wet scrub with a stiff bristle nylon brush until the rinse water runs clear. Collect all rinse water.

Protect adjacent surfaces during staining.

Thoroughly cure each application of the stain and correct skips, holidays, thin areas, or other deficiencies before the next application.

Drips, puddles, or other irregularities must be worked into the concrete or shotcrete surface.

59-7.01C(2) Test Panel

For staining concrete or shotcrete, stain a test panel complying with section 51-1.01D(3).

For staining sculpted shotcrete, stain a test panel complying with section 53-3.01D(3).

The test panel must be:

1. Stained using the same personnel, materials, equipment and methods to be used in the work
2. Accessible for viewing
3. Displayed in an upright position near the work
4. Authorized for staining before starting the staining work

If ordered, construct additional test panels until a satisfactory color is attained.

The Engineer uses the authorized stained test panel to determine the acceptability of the stained surface.

Dispose of the test panels after the staining work is complete and authorized. Notify the Engineer before disposing of the test panels.

59-7.01D Payment

Not Used

59-7.02 SCULPTED SHOTCRETE AND TEXTURED CONCRETE

59-7.02A General

59-7.02A(1) Summary

Section 59-7.02 includes specifications for preparing and staining sculpted shotcrete and textured concrete surfaces using an acid stain.

59-7.02A(2) Definitions

Reserved

59-7.02A(3) Submittals**59-7.02A(3)(a) General**

Reserved

59-7.02A(3)(b) Experience Qualifications

Submit the following documentation of the staining subcontractor's experience at least 10 days before the preconstruction meeting:

1. Summary of the staining subcontractor's experience that demonstrates compliance with section 59-7.02A(4)(b).
2. List of at least 3 projects completed in the last 5 years that demonstrate the staining subcontractor's ability to stain textured concrete or sculpted shotcrete surfaces similar to the textured concrete or sculpted shotcrete for this project. For each project include:
 - 2.1. Project description
 - 2.2. Name and phone number of the owner
 - 2.3. Staining completion date
 - 2.4. Color photos of the completed stained surface

59-7.02A(3)(c) Installation Plan

Submit an installation plan at least 10 days before the preconstruction meeting. The installation plan must include details for preparing and staining the textured concrete or sculpted shotcrete to achieve the required color, including:

1. Number of applications that will be used to apply the stain
2. For each application of the stain, a description of:
 - 2.1. Manufacturer, color, finish, and percentage strength mixture of the stain that will be applied
 - 2.2. Methods and tools that will be used to apply the stain
3. Methods for protecting adjacent surfaces during staining
4. Rinse water collection plan for containing all liquid, effluent, and residue resulting from preparing and staining textured concrete or sculpted shotcrete

59-7.02A(4) Quality Control and Assurance**59-7.02A(4)(a) General**

Reserved

59-7.02A(4)(b) Contractor Qualifications

The staining subcontractor must:

1. Have experience in staining textured concrete or sculpted shotcrete surfaces to simulate the appearance of natural rock formations or stone masonry
2. Have successfully completed at least 3 projects in the past 5 years involving staining of concrete or sculpted shotcrete surfaces similar to the textured concrete or sculpted shotcrete for this project

59-7.02A(4)(c) Preconstruction Meeting

Before starting staining activities, conduct a meeting to discuss the installation plan. Meeting attendees must include the Engineer and all staining subcontractors.

59-7.02B Materials

Not Used

59-7.02C Construction

Not Used

59-7.02D Payment

Prepare and stain concrete and prepare and stain shotcrete are measured by the area of the vertical or sloped wall face stained.

Replace "solider" in the 5th paragraph of section 59-9.03 with:

04-19-13

soldier

Replace section 59-11 with:

07-19-13

59-11 STAINING GALVANIZED SURFACES

Reserved

Replace section 59-12 with:

07-19-13

59-12 ROCK STAINING

59-12.01 GENERAL

59-12.01A Summary

Section 59-12 includes specifications for applying stain to the exterior surface of landscape boulders, native rock that has been damaged or scarred, rock energy dissipaters, rock slope protection and gabion surfaces.

59-12.01B Submittals

Submit the following:

1. Work plan showing methods to control overspray and spillage, and to protect adjacent surfaces
2. Product data including the manufacturer's product sheet and the instructions for the application of the stain

59-12.01C Quality Control and Assurance

59-12.01C(1) General

Reserved

59-12.01C(2) Test Plot

Apply the stain to a test plot rock area of at least 3 by 3 feet at a location designated by the Engineer. Notify the Engineer at least 7 days before staining the test plot. Prepare and stain the test plot with the same materials, tools, equipment, and methods to be used in staining the final surfaces. Separate test plots are required for staining rock slope protection and native rock.

If ordered, prepare additional test plots. Additional test plots are change order work.

Obtain authorization of the test plot before starting the staining work. Use the authorized test plot as the standard for comparison in determining acceptability of staining. If the test plot is not incorporated into the work and the Engineer determines it is no longer needed, dispose of it.

59-12.02 MATERIALS

59-12.02A General

Reserved

59-12.02B Stain

Reserved

59-12.03 CONSTRUCTION

59-12.03A General

Reserved

59-12.03B Preparation

Before applying the stain:

1. Identify and obtain authorization for the areas to be stained
2. Remove oils, dirt, and other contaminants from the surfaces to be stained

65 CONCRETE PIPE

07-19-13

Replace the 2nd paragraph of section 65-1.01 with:

Concrete pipe includes all necessary elbows, wyes, tees, other branches, concrete collars or tees, and reinforcement.

Replace section 65-2.02D with:

65-2.02D Reserved

07-19-13

AA

70 MISCELLANEOUS DRAINAGE FACILITIES

07-19-13

Replace section 70-5.02A(2) with:

70-5.02A(2) Plastic Flared End Sections

01-20-12

Plastic flared end sections must comply with ASTM D 3350.

Replace "40-1.03N" in item 2.4 of the 1st paragraph of section 70-5.06C with:

40-1.03K

07-19-13

Replace the 2nd, 3rd, and 4th paragraphs of section 70-7.02B with:

Before shipping, the exterior surfaces of the casing must be cleaned, primed, and coated to comply with ANSI/AWWA C213 or ANSI/AWWA C214.

Wrapping tape for repairing damaged coating and wrapping field joints and fittings must be a pressure-sensitive PVC or polyethylene tape with a minimum thickness of 50 mils, 2 inches wide.

Add to section 70-7.03:

Repair damaged coating on the casing and wrap field joints and fittings with wrapping tape as follows:

1. Before wrapping, thoroughly clean and prime the pipe casing, joints, and fittings under the tape manufacturer's instructions.
2. Wrap the tape tightly with 1/2 uniform lap, free from wrinkles and voids to provide not less than a 100-mil thickness.
3. Wrapping at joints must extend at least 6 inches over adjacent pipe casing coverings. Apply tension such that the tape will conform closely to contours of the joint.

Add to section 70:

70-8-70-15 RESERVED

07-19-13

[illegible]

DIVISION VIII MISCELLANEOUS CONSTRUCTION

72 SLOPE PROTECTION

11-15-13

Replace the table in the 3rd paragraph of section 72-2.02A with:

11-15-13

Rock Material Properties

Property	California Test	Value
Apparent specific gravity	206	2.5 minimum
Absorption	206	4.2% maximum
Durability Index	229	52 minimum

Notes:

Durability absorption ratio (DAR) = course durability index/(% absorption + 1)

If the DAR is greater than 10, the absorption may exceed 4.2 %

If the DAR is greater than 24, the durability index may be less than 52

Replace the row under "Class" in the table in the 1st paragraph of section 72-3.02B with:

01-20-12

1/2 T	1/4 T	Light	Facing	Cobble
-------	-------	-------	--------	--------

Replace the table in the 2nd paragraph of section 72-3.02B with:

11-15-13

Rock Material Properties

Property	California Test	Value
Apparent specific gravity	206	2.5 minimum
Absorption	206	4.2% maximum
Durability index	229	52 minimum

Notes:

Durability absorption ratio (DAR) = course durability index/(% absorption + 1)

If the DAR is greater than 10, the absorption may exceed 4.2 %

If the DAR is greater than 24, the durability index may be less than 52

Replace the row under "Rock class" in the table in the 2nd paragraph of section 72-3.03E with:

01-20-12

1/2 T	1/4 T	Light	Facing	Cobble
-------	-------	-------	--------	--------

Delete the 5th and 6th paragraphs of section 72-11.01B.

07-19-13

Add to section 72-11.01B:

01-18-13

Expanded polystyrene and premolded expansion joint filler must comply with section 51-2.

Delete the 2nd paragraph of section 72-11.01C(1).

07-19-13

Replace item 1 in the list in section 80-2.02E with:

10-19-12

Comply with ASTM A 116, Type Z, Grade 60, Class 1

Add after "galvanized wire" in the 1st paragraph of section 80-2.02F:

10-19-12

complying with ASTM A 641

Replace the 3rd and 4th paragraphs of section 80-2.02F with:

10-19-12

Each staple used to fasten barbed wire and wire mesh fabric to wood posts must:

1. Comply with ASTM F 1667
2. Be at least 1-3/4 inches long
3. Be manufactured from 9-gage galvanized wire

Wire ties used to fasten barbed wire and wire mesh to metal posts must be at least 11-gage galvanized wire complying with ASTM F 626. Clips and hog rings used for metal posts must be at least 9-gage galvanized wire complying with ASTM F 626.

Replace the 8th through 14th paragraphs of section 80-2.03 with:

10-19-12

Attach the wire mesh and barbed wire to each post.

Securely fasten tension wires to wood posts. Make a single or double loop around each post at each attachment point and staple the wire to the post. Use wire ties, hog rings, or wire clips to fasten the wires to the metal posts.

Connect each wood brace to its adjacent post with a 3/8 by 4-inch steel dowel. Twist the tension wires until the installation is rigid.

Stretch barbed wire and wire mesh fabric and fasten to each wood or steel end, corner, or gate post. Apply tension according to the manufacturer's instructions using a mechanical stretcher or other device designed for such use. If no tension is specified by the manufacturer, use 250 pounds for the required tension. Evenly distribute the pull over the longitudinal wires in the wire mesh such that no more than 50 percent of the original depth of the tension curves is removed. Do not use a motorized vehicle, truck, or tractor to stretch the wire.

Attach barbed wire and wire mesh fabric to the private-property side of posts. On curved alignments, place the wire mesh and barbed wire on the face of the post against which the normal pull of the wire mesh and wire will be exerted. Terminate the wire mesh and barbed wire at each end, corner, pull, and gate post in the new fence line. Attach wire mesh and barbed wire to each wood or steel end, corner, pull, or gate post by wrapping each horizontal strand around the post and tying it back on itself with at least 4 tightly-wound wraps.

At line posts, fasten the wire mesh to the post at the top and bottom and at intermediate points not exceeding 10 inches apart. Fasten each line of barbed wire to each line post. Use wire ties or clips to fasten the wires to metal posts under the post manufacturer's instructions. Drive staples crosswise with the grain of the wood and pointed slightly downward. Drive staples just short of actual contact with the wires to allow free longitudinal movement of those wires and to prevent damage to the wire's protective coating. Secure all wires to posts to maintain horizontal alignment.

Splices in barbed wire and wire mesh are allowed provided there are no more than 2 splices per 50 feet of fence. Use commercially-available galvanized mechanical wire splices or a wire splice created by tying off wire. Install mechanical wire splices with a tool designed for that purpose under the manufacturer's instructions. Tie off the wire as follows:

1. Carry the ends of each wire 3 inches past the tied-off knot location and wrap around the wire for at least 6 turns in opposite directions.

- Add to "≤ 6" in the table in the 4th paragraph of section 80-3.02B:**
- feet
- 10-19-12

DIVISION IX TRAFFIC CONTROL FACILITIES

83 RAILINGS AND BARRIERS

Replace "metal beam guard railing" at each occurrence in sections 83-1.02 and 83-1.03 with:

07-19-13

guardrail

07-19-13

Midwest Guardrail System

07-19-13

midspan between

07-19-13

Metal box spacers and

07-19-13

07-19-13

Type WB-31

07-19-13

Temporary Midwest Guardrail System

07-19-13

86 ELECTRICAL SYSTEMS

11-15-13

Replace the paragraphs in section 86-1.01 with:

07-19-13

Section 86 includes general specifications for constructing and rehabilitating electrical systems.

Electrical systems must comply with the material and installation specifications in section 86-2.

Section 86-3 includes specifications for constructing controller assemblies.

Section 86-4 includes specifications for constructing traffic signal faces, programmed visibility signal faces, pedestrian signal faces, flashing beacons, ramp metering signs, and signal mounting assemblies.

Section 86-5 includes specifications for constructing vehicle detectors and pedestrian push button assemblies.

Section 86-6 includes specifications for constructing lighting systems.

Section 86-7 includes specifications for constructing rehabilitating electrical equipment.

Comply with Part 4 of the *California MUTCD*. Nothing in section 86 is to be construed as to reduce the minimum standards in this manual.

The locations shown for electrical systems are approximate; the Engineer determines the final locations.

Replace the paragraphs in section 86-1.015 with:

07-19-13

actuation: Actuation as defined in the *California MUTCD*.

channel: Discrete information path.

controller assembly: Assembly for controlling a system's operations, consisting of a controller unit and auxiliary equipment housed in a rainproof cabinet.

controller unit: Part of the controller assembly performing the basic timing and logic functions.

detector: Detector as defined in the *California MUTCD*.

electrolier: Assembly of a lighting standard and luminaire.

flasher: Device for opening and closing signal circuits at a repetitive rate.

flashing beacon control assembly: Assembly of switches, circuit breakers, terminal blocks, flasher, wiring, and other necessary electrical components housed in a single enclosure for operating a beacon.

inductive loop detector: Detector capable of being actuated by an inductance change caused by a vehicle passing or standing over the loop.

lighting standard: Pole and mast arm supporting the luminaire.

luminaire: Assembly that houses the light source and controls the light emitted from the light source.

magnetic detector: Detector capable of being actuated by an induced voltage caused by a vehicle passing through the earth's magnetic field.

powder coating: Coating applied electrostatically using exterior-grade UV-stable polymer powder.

pretimed controller assembly: Assembly operating traffic signals under a predetermined cycle length.

pull box: A box with a cover that is installed in an accessible place in a run of conduit to facilitate the pulling in of wires or cables.

signal face: Signal face as defined in the *California MUTCD*.

signal head: Signal head as defined in the *California MUTCD*.

signal indication: Signal indication as defined in the *California MUTCD*.

signal section: Signal section as defined in the *California MUTCD*.

signal standard: Pole and mast arm supporting 1 or more signal faces with or without a luminaire mast arm.

traffic-actuated controller assembly: Assembly for operating traffic signals under the varying demands of traffic as registered by detector actuation.

traffic phase: Signal phase as defined in the *California MUTCD*.

vehicle: Vehicle as defined in the *California Vehicle Code*.

Replace the paragraphs in section 86-1.02 with:

07-19-13

Comply with 8 CA Code of Regs § 2299 et seq.

Electrical equipment must comply with one or more of the following standards:

1. ANSI
2. ASTM
3. EIA
4. NEMA
5. NETA
6. UL
7. Public Utilities Commission, General Order No. 95, "Rules for Overhead Electrical Sign Construction"
8. Public Utilities Commission, General Order No. 128, "Rules for Construction of Underground Electric Supply and Communication Systems"

Materials and workmanship must comply with:

1. FCC rules
2. ITE standards
3. NEC
4. California Electrical Code

Electrical equipment and materials must be NRTL certified wherever applicable.

Replace the paragraphs in section 86-1.03 with:

07-19-13

Submit a schedule of values within 15 days after Contract approval.

Determine the quantities required to complete the work. Submit the quantities as part of the schedule of values.

Provide a schedule of values for each lump sum bid item.

Do not include costs for the traffic control system in the schedule of values.

The schedule of values must include the type, size, and installation method for:

1. Foundations
2. Standards and poles
3. Conduit
4. Pull boxes
5. Conductors and cables
6. Service equipment enclosures
7. Telephone demarcation cabinets
8. Vehicle signal heads and hardware
9. Pedestrian signal heads and hardware

10. Push buttons
11. Loop detectors
12. Luminaires and lighting fixtures
13. Materials shown in the quantity tables on plan sheets labeled *E*

Replace the paragraphs in section 86-1.04 with:

07-19-13

Within 15 days of Contract approval, submit a list of equipment and materials that you propose to install. Submit the list before shipping equipment or materials to the job site. The list must include the following information:

1. Manufacturer's name
2. Make and model number
3. Month and year of manufacture
4. Lot and serial numbers
5. Dimensions
6. List of components
7. Manufacturer's installation instructions
8. Contract number
9. Your contact information

Supplement the list with 2 copies of the following data:

1. Schematic wiring diagrams
2. Scale drawings of cabinets showing location and spacing of shelves, terminal blocks, and equipment, including dimensions
3. Operation manual

Electrical equipment constructed as shown does not require detailed drawings and diagrams.

Submit 3 sets of computer-generated schematic wiring diagrams for the cabinet.

Place the schematic wiring diagram in a heavy-duty plastic envelope and attach it to the inside of the cabinet door.

Prepare diagrams, plans, and drawings using graphic symbols in IEEE 315, "Graphic Symbols for Electrical and Electronic Diagrams."

Replace the 5th paragraph of section 86-2.04B(2) with:

07-19-13

HS bolts, nuts, and flat washers used to connect slip base plates must comply with the requirements for HS fastener assemblies for use in structural steel joints in section 55-1.02A(1) except rotational capacity testing and tension testing are not required.

07-19-13

Delete the row for standard Type 36-20A in the table in the 6th paragraph of section 86-2.04B(2).

Replace the 10th paragraph of section 86-2.04B(2) with:

07-19-13

Bolted connections attaching signal or luminaire arm to the pole must be considered slip critical. Galvanized faying surfaces of plates on luminaire arm, signal arm, and pole must be roughened by hand using a wire brush before assembly and must comply with requirements for Class C surface conditions for slip-critical connections in *Specification for Structural Joints Using High-Strength Bolts* of the RCSC. Coatings for faying surfaces must comply with the RCSC specification for Class B coatings.

Replace the 1st sentence of item 8 in the list in the 1st paragraph of section 86-2.04B(3) with:

07-19-13

During manufacturing, longitudinal seams on vertical tubular members of cantilevered support structures must be within 90 degrees circumferentially of the center of the longest mast arm connection.

Delete item 15.3 in the list in the 1st paragraph of section 86-2.04B(3).

07-19-13

Add between "Exposed" and "conduit" in the 2nd paragraph of section 86-2.05B:

07-19-13

Type 1

Replace the 1st sentence of the 10th paragraph of section 86-2.05C with:

07-19-13

After installing conduit, install the pull tape.

Replace the 1st sentence of the 15th paragraph of section 86-2.05C with:

11-15-13

Conduit runs shown to be located behind curbs may be installed in the street within 3 feet of and parallel to the face of the curb by the trenching in pavement method.

Replace the 1st and 2nd sentences of the 2nd paragraph of section 86-2.05D with:

07-19-13

Install an expansion-deflection fitting for expansion joints with a 1-1/2-inch movement rating. The fitting must be watertight and include a molded neoprene sleeve, a bonding jumper, and 2 silicon bronze or zinc-plated iron hubs.

Replace section 86-2.06 with:

07-19-13

86-2.06 PULL BOXES

86-2.06A General

86-2.06A(1) Cover Marking

The cover marking must be clearly defined, uniform in depth, and parallel to either the long or short sides of the cover.

Marking letters must be 1 to 3 inches high.

Before galvanizing steel or cast iron cover, apply marking by one of the following methods:

1. Use cast iron strip at least 1/4 inch thick with letters raised a minimum of 1/16 inch. Fasten strip to cover with 1/4-inch flathead stainless steel machine bolts and nuts. Peen bolts after tightening.
2. Use sheet steel strip at least 0.027 inch thick with letters raised a minimum of 1/16 inch. Fasten strip to cover by spot welding, tack welding, or brazing, with 1/4-inch stainless steel rivets or 1/4-inch roundhead stainless steel machine bolts and nuts. Peen bolts after tightening.
3. Bead weld the letters on cover such that the letters are raised a minimum of 3/32 inch.

86-2.06A(2) Installation and Use

Space pull boxes no more than 200 feet apart. You may install additional pull boxes to facilitate the work.

You may use a larger standard size pull box than that shown on the plans or specified.

A pull box in ground or sidewalk area must be installed as follows:

1. Embed bottom of the pull box in crushed rock.

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2. Place a layer of roofing paper on the crushed rock.
3. Place grout over the layer of roofing paper. Grout must be 0.50 to 1 inch thick and sloped toward the drain hole.
4. Make a 1-inch drain hole in the center of the pull box through the grout and roofing paper.
5. Place grout between the pull box and the pull box extension, and around conduits.

The top of the pull box must be flush with the surrounding grade or the top of an adjacent curb, except in unpaved areas where the pull box is not immediately adjacent to and protected by a concrete foundation, pole, or other protective construction. Place the pull box 1-1/4 inches above the surrounding grade. Where practical, place a pull box shown in the vicinity of curbs or adjacent to a standard on the side of the foundation facing away from traffic. If a pull box is installed in a sidewalk area, adjust the depth of the pull box so that the top of the pull box is flush with the sidewalk.

Reconstruct the sump of an existing pull box if disturbed by your activities. Remove old grout and replace with new if the sump was grouted.

86-2.06B Non-Traffic Pull Boxes

Reserved

86-2.06C Traffic Pull Boxes

The traffic pull box and cover must comply with ASTM C857, "Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures," for HS20 loading. You must be able to place the load anywhere on the box and cover for 1 minute without causing cracks or permanent deformations.

Frame must be anchored to the box with 1/4 by 2-1/4 inch concrete anchors. Four concrete anchors must be included for No. 3-1/2(T) pull box; one placed in each corner. Six concrete anchors must be included for No. 5(T) and No. 6(T) pull boxes; one placed in each corner and one near the middle of each of the longer sides.

Nuts must be zinc-plated carbon steel, vibration resistant, and have a wedge ramp at the root of the thread.

After installation of traffic pull box, install the steel cover and keep it bolted down when your activities are not in progress at the pull box. When the steel cover is placed for the final time, the cover and Z bar frame must be cleaned of debris and tightened securely.

Steel cover must be countersunk approximately 1/4 inch to accommodate the bolt head. When tightened, the bolt head must not exceed more than 1/8 inch above the top of the cover.

Concrete placed around and under traffic pull boxes must be minor concrete.

Replace the 11th row in the table in the 1st paragraph of section 86-2.08B with:

07-19-13

Grounded circuit conductor	Pedestrian push buttons	Wht	Blk	NBR	14
	Signals and multiple lighting	Wht	None	NBR	10
	Flashing beacons and sign lighting	Wht	None	NBR	12
	Lighting control	Wht	None	C-3	14
	Service	Wht	None	NBR	14

Replace the 1st sentence of the 1st paragraph of section 86-2.08C with:

07-19-13

Circuit conductors, connectors, and terminals must be UL or NRTL listed and rated for 600 V(ac) operation.

Add to the beginning of section 86-2.09A:

07-19-13

Provide enough traffic signal light conductors for functional operation of the signal. Provide 3 spare conductors in all conduits containing traffic signal light conductors.

Replace the paragraphs in section 86-2.09C with:

07-19-13

Connectors must be crimp type. Use a manufacturer-recommended tool for connectors and terminals to join conductors. Comply with SAE-AS7928.

Terminate stranded conductors smaller than no. 14 in crimp style terminal lugs.

Terminate field conductors no. 12 and smaller with spade type terminals. Terminate field conductors no. 10 and larger with spade type or ring type terminals.

Replace the value for resistivity in the table in the 6th paragraph of section 86-2.09E with:

07-19-13

25 x 10¹³ Ω per inch, minimum

Add between "the" and "head" in the 3rd sentence of the 2nd paragraph of 86-2.09F:

07-19-13

connector

Replace "project" in the 3rd paragraph of section 86-2.11A with:

10-19-12

work

Replace "Contract" in item 2 in the list in the 11th paragraph of section 86-2.11A with:

10-19-12

work

Delete the 12th paragraph of section 86-2.11A.

07-19-13

Replace section 86-2.11C with:

07-19-13

86-2.11C Electrical Service for Booster Pumps

Provide electrical service from the service point to the booster pump.

Furnish conductors, conduit, and pull boxes from the service point to the booster pump.

Do not use Type 3 conduit unless shown otherwise.

Replace section 86-2.14A with:

07-19-13

86-2.14A General

Deliver material and equipment for acceptance testing to either METS or a testing location as ordered.

Allow 30 days for testing. The Department notifies you when testing is complete. You must pick up the material or equipment from the test site and deliver it to the job site.

If material or equipment is rejected, allow 30 days for retesting. The retesting period starts when replacement material or equipment is delivered to the test site.

If material or equipment submitted for testing does not comply with the specifications, remove it within 5 business days after you are notified that the equipment is rejected. If equipment is not removed within that period, the Department may ship it to you and deduct the shipping cost.

Testing and quality control procedures for traffic signal controller assemblies must comply with NEMA TS standards for traffic control systems.

Replace the 2nd paragraph of section 86-3.02A(1) with:

07-19-13

The Department furnishes the BBS components under section 6-2.03.

Replace the 9th paragraph of section 86-3.02B with:

07-19-13

The couplings between the external cabinet and Model 332L cabinet must include a conduit for power connections between the 2 cabinets. Couplings must include:

1. 2-inch nylon-insulated steel chase nipple
2. 2-inch sealing steel locknut
3. 2-inch nylon-insulated steel bushing

Delete item 1.3 in the list in the 7th paragraph of section 86-3.04A.

07-19-13

Replace the 2nd paragraph of section 86-4.01A with:

07-19-13

The housing must not fail structurally as described in the following table:

Housing Structural Failure

Housing type	Test method	Description of structural failure
Metal	California Test 666	Fracture within the housing assembly or deflection of more than half the lens diameter of the signal section during the wind load test
Plastic	California Test 605	Fracture within the housing assembly or deflection of more than 10 degrees in either the vertical or horizontal plane after the wind load has been removed from the front of the signal face or deflection of more than 6 degrees in either the vertical or horizontal plane after the wind load has been removed from the back of the signal face

Replace the 1st sentence of section 86-4.01A(1) with:

07-19-13

Each metal housing must have a metal visor.

Replace the 1st sentence of section 86-4.01A(2) with:

07-19-13

Each plastic housing must be molded in 1 piece or fabricated from 2 or more pieces and joined into a single piece.

Delete item 1 in the list in section 86-4.01D(1)(b).

07-19-13

Replace the paragraphs in section 86-4.01D(1)(c)(i) with:

07-19-13

LED signal modules must be on the Authorized Material List for LED traffic signals.

The Department tests modules under section 86-2.14A, ANSI/ASQ Z1.4, and:

1. California Test 604 for LED and circular LED signal modules
2. California Test 3001 for arrow, U-turn, and bicycle LED signal modules

The LED signal modules submitted for testing must be typical production units. LEDs must be spread evenly across the module.

The Department may test the modules on all parameters specified in section 86-4.01D.

Replace the 1st and 2nd sentences of the 3rd paragraph of 86-4.01D(2)(b) with:

07-19-13

The electrical connection for each flashing LED signal module must be 4 secured, color-coded, jacketed copper wires. The wire must comply with the NEC.

Replace the heading of section 86-4.02 with:

07-19-13

PROGRAMMED VISIBILITY VEHICLE SIGNAL SECTION

Replace "face" in the 1st paragraph of section 86-4.02 with:

07-19-13

section

Add before the 1st sentence in section 86-4.03A:

07-19-13

The pedestrian signal face must be Type A.

Replace the 1st sentence of the 2nd paragraph of section 86-4.03B with:

07-19-13

The Department tests the pedestrian signal's front screen in a horizontal position with its edges supported.

Delete items 1 and 4 in the list in section 86-4.03I(1)(b).

07-19-13

Replace the paragraphs of section 86-4.03I(1)(c)(i) with:

07-19-13

The LED PSF module must be on the Authorized Material List for LED traffic signals.

The Department tests LED PSF modules under section 86-2.14A, ANSI/ASQ Z1.4, and California Test 606.

The LED PSF modules submitted for testing must be representative of typical production units.

The Department may test the modules on all parameters specified in section 86-4.03I.

Replace item 1 in the list in the 1st paragraph of section 86-4.03I(2) with:

07-19-13

1. Not include reflectors.

Replace item 6 in the list in the 1st paragraph of section 86-4.03I(2) with:

07-19-13

6. Be able to replace signal lamp optical units and pedestrian signal faces with LEDs.

Replace the table titled "Chromaticity Standards (CIE Chart)" in the 16th paragraph of section 86-4.03I(2) with:

07-19-13

Chromaticity Standards (CIE Chart)

Upraised hand	X: not greater than 0.659 or less than 0.600 Y: not greater than 0.390 or less than 0.331 Y= 0.990-X
Walking person	X: not greater than 0.440 or less than 0.280 Y: not greater than 0.0483 + 0.7917(X) or less than 0.0983 + 0.7917(X)

Add between "beacon" and "must" in the 1st sentence of section 86-4.05:

07-19-13

signal face

Delete "face" in item 1 in the list in the 1st paragraph of section 86-4.05.

07-19-13

Replace the row for viscosity in the table in the 2nd paragraph of section 86-5.01A(3)(c) with:

07-19-13

Viscosity, Brookfield Thermosel, no. 27 Spindle, 20 rpm, 190 °C	D 4402	2.5–3.5 Pa·s
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Replace the paragraph in section 86-5.01A(3)(d) with:

07-19-13

Use epoxy sealant for repair work in and around sawcuts housing inductive loops.

Replace "all loop conductors" in the 3rd paragraph of section 86-5.01A(4) with:

07-19-13

the detector lead-in cable

Replace "Encase the loop wires" in the 1st sentence of the 3rd paragraph of section 86-5.01A(5) with:

07-19-13

The loop wires must be encased

07-19-13

07-19-13

The push button's switch must be a single-pole, double-throw switching unit with screw-type terminals rated 15 A at 125 V(ac). The switch must have:

- Where a push button is attached to a pole, the housing must be shaped to fit the pole's curvature. Use saddles if needed to make a neat and secure fit.

Install the push button and the sign on the crosswalk side of the pole.

Attach the sign on a Type B push button assembly.

For a Type C push button assembly, mount the instruction sign on the same standard as the assembly using 2 straps and saddle brackets.

07-19-13

07-19-13

Reserved

Replace "the amp" in item 2 in the list in the 1st paragraph of section 86-6.01A(2) with:

the lamp

07-19-13

[illegible]

88 GEOSYNTHETICS

07-19-13

Add to section 88-1.01C:

07-19-13

Geosynthetics must be on the DataMine list for geotextiles and geosynthetics at the National Transportation Product Evaluation Program Web site. The product name, manufacturing source, and date of manufacture must be printed every 5 meters along the edge of the material.

Exceptions are:

1. Paving mat
2. Paving grid, Class 2 and 3
3. Biaxial geogrid

Replace the row for hydraulic bursting strength in the table in the 2nd paragraph of section 88-1.02B with:

10-19-12

Puncture strength, lb min	ASTM D 6241	310
Trapezoid tearing strength, lb min	ASTM D 4533	56

Replace the 3rd paragraph in section 88-1.02C with:

10-19-12

Geocomposite wall drain must be from 0.25 to 2 inches thick.

Replace the value for permittivity of woven fabric in the table in the 1st paragraph of section 88-1.02E with:

01-20-12

0.05

Replace the value for apparent size opening of nonwoven fabric in the table in the 1st paragraph of section 88-1.02E with:

01-20-12

0.012

Replace the table in the 1st paragraph of section 88-1.02G with:

01-20-12

Sediment Filter Bag

Property	Test	Values	
		Woven	Nonwoven
Grab breaking load, lb, 1-inch grip min, in each direction	ASTM D 4632	200	250
Apparent elongation, percent min, in each direction	ASTM D 4632	10	50
Water flow rate, gal per minute/sq ft min and max average roll value	ASTM D 4491	100-200	75-200
Permittivity, sec ⁻¹ min	ASTM D 4491	1.0	1.0
Apparent opening size, inches max average roll value	ASTM D 4751	0.023	0.012
Ultraviolet resistance, % min retained grab breaking load, 500 hr.	ASTM D 4355	70	70

Replace the table in the 1st paragraph of section 88-1.02H with:

01-20-12

Temporary Cover

Property	Test	Values	
		Woven	Nonwoven
Grab breaking load, lb, 1-inch grip min, in each direction	ASTM D 4632	200	200
Apparent elongation, percent min, in each direction	ASTM D 4632	15	50
Water flow rate, gal per minute/sq ft min and max average roll value	ASTM D 4491	4-10	80-120
Permittivity, sec ⁻¹ min	ASTM D 4491	0.05	1.0
Apparent opening size, inches max average roll value	ASTM D 4751	0.023	0.012
Ultraviolet resistance, % min retained grab breaking load, 500 hr.	ASTM D 4355	70	70

Replace section 88-1.02P with:

01-18-13

88-1.02P Biaxial Geogrid

Geosynthetics used for biaxial geogrid must be a punched and drawn polypropylene material formed into an integrally formed biaxial grid. When tested under the referenced test methods, properties of biaxial geogrid must have the values shown in the following table:

Biaxial Geogrid

Property	Test	Value
Aperture size, inch ^a min and max	Calipered	0.8-1.3 x 1.0-1.6
Rib thickness, inch min	Calipered	0.04
Junction thickness, inch min	Calipered	0.150
Tensile strength, 2% strain, lb/ft ^a min	ASTM D 6637	410 x 620
Tensile strength at ultimate, lb/ft ^a min	ASTM D 6637	1,310 x 1,970
Ultraviolet resistance, percent min retained tensile strength, 500 hours	ASTM D 4355	100
Junction strength, lb/ft ^a min	ASTM D 7737	1,220 x 1,830
Overall flexural rigidity, mg-cm min	ASTM D 7748	750,000
Torsional rigidity at 20 cm-kg, mm-kg/deg ^b min	GRI:GG9	0.65

^aMachine direction x cross direction

^bGeosynthetic Research Institute, Test Method GG9, *Torsional Behavior of Bidirectional Geogrids When Subjected to In-Plane Rotation*

Replace section 88-1.02Q with:

07-19-13

88-1.02Q Geosynthetic Bond Breaker

Geosynthetic bond breaker must be nonwoven; needle punched; not heat treated; polypropylene, polyethylene material.

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When tested under the referenced test methods, properties of geosynthetic bond breaker material must have the values shown in the following table:

Geosynthetic Bond Breaker		
Property	Test	Value
Mass per unit area, oz/sq yd min	ASTM D 5261	14.7
Thickness at 29 psi, mm min	ASTM D 5199	1.0
Tensile strength at ultimate, lbs/ft min	ASTM D 4595	685
Elongation, percent max	ASTM D 4595	130
Permittivity at 2.9 psi, m/s min	ASTM D 5493	0.0001
Hydraulic transmissivity at 29 psi, m/s min	ASTM D 6574	0.0002
Ultraviolet resistance, percent min retained grab breaking load, 500 hours	ASTM D 4355	60

AA

90 CONCRETE

07-19-13

Replace the 3rd paragraph of section 90-1.01C(7) with:

08-05-11

Submit weighmaster certificates in printed form or, if authorized, in electronic media. Present electronic media in a tab-delimited format on a CD or DVD. Captured data for the ingredients represented by each batch must be line feed carriage return and one line separate record with sufficient fields for the specified data.

Replace the 3rd paragraph of section 90-3.01C(5) with:

08-05-11

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

Replace the 1st paragraph of section 90-4.01A with:

07-19-13

Section 90-4 includes specifications for fabricating PC concrete members.

Replace the paragraphs in section 90-4.01C with:

07-19-13

90-4.01C(1) General

For reports and logs, type or clearly print the name next to the signature of the person signing the report or log.

Submit expansion test data under section 90-4.02, if required.

90-4.01C(2) Certificates of Compliance

Submit a certificate of compliance for the cementitious material used in PC concrete members. The certificate must be signed by the PC concrete product manufacturer.

Submit a certificate of compliance for each PC concrete member. The certificate of compliance for tier 1 and tier 2 members must be signed by the QC manager. The certificate of compliance for tier 3 members must be signed by the QC Inspector.

90-4.01C(3) Precast Concrete Quality Control Plan

Before performing any precasting activities for tier 1 and tier 2 PC concrete members, submit 3 copies of the project-specific QC plan for the PC plant. The QC plan must supplement the information from the authorized facility audit. Submit a separate QC plan for each plant. Allow 25 days for review.

Each project-specific QC plan must include:

1. Name of the precasting plant, concrete plants, and any testing laboratory to be used.
2. Manual prepared by the precasting plant that includes:
 - 2.1. Equipment description
 - 2.2. Testing procedures
 - 2.3. Safety plan
 - 2.4. Personnel names, qualifications, and copies of certifications
3. QC manager and QC inspector names, qualifications, and copies of certifications.
4. Organizational chart showing QC personnel and their assigned QC responsibilities.
5. Methods and frequencies for performing QC procedures including inspections, material testing, and any survey performed for all components of PC concrete members. Components include prestressing, concrete, grout, reinforcement, steel, miscellaneous metal, and formwork.
6. System for reporting noncompliant PC concrete members to the Engineer.
7. System for identification and tracking repairs and repair methods.
8. Procedure for the reinspection of repaired PC concrete members.
9. Forms for certificates of compliance, daily production logs, and daily reports.

Submit a revised QC plan for any changes to:

1. Concrete plants
2. Material sources
3. Material testing procedures
4. Testing laboratory
5. Procedures and equipment
6. Updated systems for tracking and identifying PC concrete members
7. QC personnel

After authorization, submit 7 copies of each authorized QC plan and make 1 copy available at each location where work is performed.

Allow 7 days for review of a revised QC plan.

90-4.01C(4) Daily Production Log

The QC inspector must provide reports to the QC manager for each day that precasting activities are performed.

The QC manager must maintain a daily production log of PC activities for each day's precasting. PC activities include setting forms, placing reinforcement, setting prestressing steel, casting, curing, post tensioning, and form release. This daily log must be available at the precasting plant. The daily log must include:

1. Plant location
2. Specific description of casting or related activities
3. Any problems or deficiencies discovered
4. Any testing or repair work performed
5. Names of QC inspectors and the specific QC inspections they performed that day
6. Reports for that day's precasting activities from each QC inspector including before, during, and after precast inspections

Immediately notify the Engineer when any precasting problems or deficiencies are discovered, and submit the proposed repair or process changes necessary to correct them.

90-4.01C(5) Precast Concrete Report

Before shipping PC concrete members, submit a PC concrete report. The report must include:

1. Reports of all material tests and any survey checks
2. Documentation that:
 - 2.1. You have evaluated all tests
 - 2.2. You corrected all rejected deficiencies
 - 2.3. Repairs have been reexamined with the required tests and found acceptable
3. Daily production logs
4. Certificates of compliance
5. Documentation of inspections

Each person who performs a material test or survey check must sign the corresponding report and submit the report directly to the QC manager.

Replace the paragraphs in section 90-4.01D with:

07-19-13

90-4.01D(1) General

Quality control and assurance for PC concrete includes:

1. Your QC program
2. Department's acceptance of PC concrete members

PC concrete members are categorized into the following 4 tiers:

1. Tier 1 consists of:
 - 1.1. Components of bridge structures, including girders, deck panels, bent caps, abutments, slabs, closure wall panels, and piling
 - 1.2. Prestressed pavement
2. Tier 2 consists of:
 - 2.1. Components of earth retaining systems
 - 2.2. Wingwalls
 - 2.3. Types A, B, and C pipe culvert headwalls, endwalls, and wingwalls
 - 2.4. Pavement
 - 2.5. Box culverts
 - 2.6. Sound wall panels and supports
3. Tier 3 consists of:
 - 3.1. Pipes
 - 3.2. Pipe drainage facilities
 - 3.3. Straight and "L" pipe culvert headwalls except those listed under tier 2
 - 3.4. Drainage Inlets
 - 3.5. Flared end sections
4. Tier 4 consists of any member not described as tier 1, tier 2, or tier 3

90-4.01D(2) Quality Control

90-4.01D(2)(a) General

For tier 1 and tier 2 PC concrete members:

1. Fabricate PC concrete members at a plant on the Authorized Facility Audit List
2. Assign a PC concrete QC manager to the plant
3. Assign a QC inspector who is either registered as a civil engineer in the State or:
 - 3.1. For tier 1, has a Plant Quality Personnel Level II certification from the Precast/Prestressed Concrete Institute
 - 3.2. For tier 2, has a Plant Quality Personnel Level I certification from the Precast/Prestressed Concrete Institute

4. Prepare a PC concrete QC plan
5. Perform PC concrete materials testing
6. Maintain a daily production log
7. Prepare a PC concrete report
8. Prepare a certificate of compliance

For tier 3 PC concrete members:

1. Assign a QC inspector who has one of the following qualifications:
 - 1.1. Registration as a civil engineer in the State.
 - 1.2. Plant Quality Personnel, Level I certification from the Precast/Prestressed Concrete Institute.
 - 1.3. Competency to perform inspection of PC operations. An inspector is competent if the individual has completed training or has experience in PC operations and inspection.
2. Prepare a certificate of compliance

For tier 4 PC concrete members, prepare a certificate of compliance.

For each ASTM test method specified in this section, the material's test result must comply with the requirement specified for the comparable test in section 90 unless otherwise specified.

If curing compound is used, provide certificate of compliance as specified in section 90-1.01C(5).

If PC concrete is manufactured at an established PC concrete plant, a trial batch and prequalification of the materials, mix proportions, mixing equipment, and procedures under section 90-1.01D(5)(b) are not required.

90-4.01D(2)(b) Quality Control Meeting

After submitting the PC concrete QC plan, hold a meeting to discuss the requirements for PC concrete QC. The meeting attendees must include the Engineer, the PC concrete QC manager, and a representative from each plant performing PC concrete activities for the Contract.

90-4.01D(2)(c) Sampling, Testing, and Inspecting

The QC laboratory testing personnel or the QC inspector must witness sampling. The QC laboratory testing personnel must perform testing.

QC laboratory testing personnel must have the following certifications, as applicable:

1. ACI Strength Testing Technician
2. ACI Concrete Laboratory Testing Technician Level 1
3. ACI Aggregate Testing Technician Level 2

The QC Inspector must perform inspections before, during, and after casting is complete.

QC field testing and inspection personnel must have an ACI Concrete Field Testing Technician, Grade I certification.

For each mix design used for tier 1 and tier 2 PC concrete members, perform sampling and testing at the minimum frequencies shown in the following tables:

Aggregate QC Tests

Property	Test method	Minimum testing frequency
Aggregate gradation	ASTM C136	Once per 400 cu yd of concrete cast or once a week, whichever is more frequent
Sand equivalent	ASTM D2419	
Percent fines under 75 microns ^a	ASTM C117	
Moisture content of fine aggregate	ASTM C566, or electronically actuated moisture meter ^b	1–2 times per each day of pour, depending on conditions

^aPercent fines under 75 microns test replaces the cleanliness test in section 90-1.02C with the requirements of 1.5 percent maximum for "Operating Range" and 2.0 percent maximum for "Contract Compliance." The 5th paragraph of section 90-1.02C(2) does not apply.

^bElectronically actuated moisture meter must be calibrated once per week per ASTM C566.

Concrete QC Tests

Property	Test method	Minimum testing frequency
Compressive strength ^b	ASTM C172/C172M, ASTM C31/C31M, and ASTM C39/C39M	Once per 100 cu yd of concrete cast, or every day of casting, whichever is more frequent
Slump	ASTM C143/C143M	
Temperature	ASTM C1064/C1064M	
Density	ASTM C138	Once per 600 cu yd of concrete cast or each week of batching, whichever is more frequent
Air content	ASTM C231/C231M or ASTM C173/C173M ^a	If concrete is air entrained, once for each set of cylinders, and when conditions warrant

^aASTM C173/C173M must be used for lightweight concrete.

^bCylinders must be 6 by 12 inches.

If concrete is batched at more than 1 plant, perform the tests at each plant.

Cure test cylinders for determining time of prestressing loading in the same manner as the concrete in the member.

Cure test cylinders for determining compliance with 28-day strength requirements in the same manner as the member until completion of the steam curing process followed by a water bath or moist room at 60 to 80 degrees F until tested.

For PC concrete that is steam cured, concrete designated by compressive strength is acceptable if its compressive strength reaches the described 28-day compressive strength in no more than the maximum number of days specified or allowed after the concrete is cast.

For PC concrete that is steam cured, the Engineer evaluates the compressive strength based on individual tests representing specific portions of production.

07-19-13

If municipally supplied potable water is used for PC concrete, the testing specified in section 90-1.02D is waived unless requested.

07-19-13

For tier 1 and tier 2 PC concrete members, apply curing compound using power-operated spraying equipment. You may request application by hand spraying for small quantities of PC concrete members. For tier 3 and tier 4 PC concrete members, the application of curing compound may be hand sprayed.

07-19-13

- AA

10-19-12

10-19-12

Reserved

10-19-12

AA

07-19-13

07-19-13

modified asphalt binder: Asphalt binder modified with polymers, crumb rubber, or both.

Replace the row for dynamic shear for original binder in the table in the 1st paragraph of section 92-1.02B with:

01-20-12

Dynamic shear, Test temperature at 10 rad/s, °C	T 315	58	64	64	64	70
min $G^*/\sin(\delta)$, kPa		1.00	1.00	1.00	1.00	1.00
max $G^*/\sin(\delta)$, kPa		2.00	2.00	2.00	2.00	2.00

Replace 2nd paragraph of section 92-1.02B with:

07-19-13

PG modified asphalt binder must comply with the requirements shown in the following table:

PG Modified Asphalt Binder				
Property	AASHTO Test Method	Grade		
		PG 58–34 M	PG 64–28 M	PG 76–22 M
Original Binder				
Flash point, min °C	T 48	230	230	230
Solubility, min %	T 44 ^a	97.5	97.5	97.5 ^b
Viscosity at 135 °C ^c , max, Pa·s	T 316	3.0	3.0	3.0
Dynamic shear, Test temperature at 10 rad/s, °C min G*/sin(delta), kPa	T 315	58 1.00	64 1.00	76 1.00
RTFO test ^d , Mass loss, max, %	T 240	1.00	1.00	1.00
RTFO Test Aged Binder				
Dynamic shear, Test temperature at 10 rad/s, °C min G*/sin(delta), kPa	T 315	58 2.20	64 2.20	76 2.20
Dynamic shear, Test temperature at 10 rad/s, °C max (delta), degree	T 315	80 ^e	80 ^e	80 ^e
Elastic recovery ^f , Test temperature °C min recovery, %	T 301	25 75	25 75	25 65
PAV ^g , temperature, °C	R 28	100	100	110
RTFO Test and PAV Aged Binder				
Dynamic shear, Test temperature at 10 rad/s, °C max G* sin(delta), kPa	T 315	16 5000	22 5000	31 5000
Creep stiffness, Test temperature, °C max S-value, MPa min M-value	T 313	-24 300 0.300	-18 300 0.300	-12 300 0.300

^aThe Department allows ASTM D 5546 or ASTM D 7753 instead of AASHTO T 44. Particles recovered from ASTM D 5546 or ASTM D 7753 or AASHTO T 44 must be less than 250 µm.

^bReport only for spray application.

^cThe Engineer waives this specification if the supplier provides written certification the asphalt can be adequately pumped and mixed at temperatures meeting applicable safety standards.

^d"RTFO Test" means the asphaltic residue obtained using the Rolling Thin Film Oven Test, AASHTO Test Method T 240 or ASTM D 2872. The residue from mass change determination may be used for other tests.

^eTest temperature is the temperature at which G*/sin(delta) is 2.2 kPa. A graph of log G*/sin(delta) plotted against temperature may be used to determine the test temperature when G*/sin(delta) is 2.2 kPa. A graph of (delta) versus temperature may be used to determine delta at the temperature when G*/sin(delta) is 2.2 kPa. The graph must have at least two points that envelope G*/sin(delta) of 2.2 kPa and the test temperature must not be more than 6 degree C apart. The Engineer also accepts direct measurement of (delta) at the temperature when G*/sin(delta) is 2.2 kPa.

^fTests without a force ductility clamp may be performed.

^g"PAV" means "Pressure Aging Vessel."

EXHIBIT A – ARMY CORP OF ENGINEERS PERMIT



-REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
1455 MARKET STREET, 16TH FLOOR
SAN FRANCISCO, CALIFORNIA 94103-1398

DEC 3 - 2013

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TRINITY COUNTY
DEPT. OF TRANSPORTATION

Regulatory Division

Subject: File Number 2002-268720N

Mr. Richard Tippet
Trinity County Department of Transportation
P.O. Box 2490
Weaverville, California 96093

Dear Mr. Tippet:

This correspondence is in reference to your submittal of October 24, 2013, concerning Department of the Army (DA) authorization to reduce traffic congestion, improve circulation and create an alternate route for use during emergencies by constructing a new arterial roadway located at the intersection of State Highway 299 at Glen Road and north to State Highway 3 at Five Cent Gulch Street, in the town of Weaverville, Trinity County, California (Lat. 40.7315°N Long. -122.9265°W).

Work within U.S. Army Corps of Engineers' (Corps) jurisdiction would include: construction of a new bridge spanning East Weaver Creek; construction of two, cast in place or pre-cast, 6-foot high by 6-foot wide concrete box culverts on Lance Gulch, with outlets armored with light rock for energy dissipation; construction of one 24-inch culvert and rock lined outlet protection within an unnamed tributary to Lance Gulch; filling and rerouting of 76-feet of an ephemeral tributary to Lance Gulch; filling of 0.096 acre of seasonal wetlands with roadway and embankment fill; filling three intermittent and two ephemeral tributaries to Lance Gulch and placing them into a subsurface drainage system beneath the new road; re-routing of one ephemeral tributary to Lance Gulch into the newly constructed mitigation wetlands, which, after passing through the wetlands, the drainage will join the roadside drainage system and ultimately reach Lance Gulch; and re-routing a section of Lance Gulch to form a meander bend which will be vegetated with enhanced riparian vegetation as mitigation for riparian and Waters of the U.S. impacts. Temporary dewatering of Lance Gulch may be needed for the construction of the two concrete box culverts. For the East Weaver Creek bridge construction, temporary equipment crossing may be built using a flat rail car or similar structure placed below the plane of ordinary high water, but set on approaches outside the low-flow channel. All structures and fill associated with the East Weaver Creek bridge construction will be removed from the limits of ordinary high water by October 15 of the construction year. Work will require permanent placement of a combined total of approximately 326 cubic yards of fill within 0.096 acre of seasonal wetland and a combined 0.155 acre of various tributaries to Lance Gulch. Approximately 0.067 acre of tributaries to Lance Gulch will be temporarily impacted during construction.

Section 404 of the Clean Water Act (CWA) generally regulates the discharge of dredged or fill material below the plane of ordinary high water in non-tidal waters of the United States, below the high tide line in tidal waters of the United States, and within the lateral extent of wetlands adjacent to these waters. Section 10 of the Rivers and Harbors Act generally regulates construction of structures and work, including excavation, dredging, and discharges of dredged or fill material, occurring below the plane of mean high water in tidal waters of the United States; in former diked baylands currently below mean high water; outside the limits of mean high water but affecting the navigable capacity of tidal waters; or below the plane of ordinary high water in non-tidal waters designated as navigable waters of the United States. Navigable waters of the United States generally include all waters subject to the ebb and flow of the tide; and/or all waters presently used, or have been used in the past, or may be susceptible for future use to transport interstate or foreign commerce.

Based on a review of the information in your submittal and the current condition of the site, as verified during a field investigation on April 9, 2013, the project qualifies for authorization under Department of the Army Nationwide Permit (NWP) 14 for *Linear Transportation Projects*, 77 Fed. Reg. 10,184, February 21, 2012, (enclosure 1), pursuant to Section 404 of the CWA of 1972, as amended (33 U.S.C. § 1344 *et seq.*). The project must be in compliance with the terms of the NWP, the general conditions of the Nationwide Permit Program, and the San Francisco District regional conditions cited in enclosure 2. You must also be in compliance with any special conditions specified in this letter for the NWP authorization to remain valid. Non-compliance with any term or condition could result in the revocation of the NWP authorization for your project, thereby requiring you to obtain an Individual Permit from the Corps. This NWP authorization does not obviate the need to obtain other State or local approvals required by law.

All work shall be completed in accordance with the plans and drawings titled "*Project Plans for Construction on Lance Gulch Road in Trinity County, in Weaverville, Along and Between State Route 3 and State Route 299*," in sheets 1-187, dated October 7, 2013 and prepared by Quincy Engineering, provided as enclosure 3. All compensatory mitigation work shall be completed in accordance with the plans and drawings titled "*Trinity County East Connector Roadway Project, Draft Habitat Mitigation and Monitoring Plan (HMMP)*," in sheets 1-14, fourth revision dated October 7, 2013, and prepared by Quincy Engineering and Restoration Resources, provided as enclosure 4.

This verification will remain valid until March 18, 2017, unless the NWP authorization is modified, suspended, or revoked. Activities which have commenced (i.e., are under construction) or are under contract to commence in reliance upon a NWP will remain authorized provided the activity is completed within 12 months of the date of a NWP's expiration, modification, or revocation, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend, or revoke the authorization in accordance with 33 C.F.R. § 330.4(e) and 33 C.F.R. §§ 330.5 (c) or (d). This verification will remain valid if, during the time period

between now and March 18, 2017, the activity complies with any subsequent modification of the NWP authorization. The Chief of Engineers will periodically review NWPs and their conditions and will decide to either modify, reissue, or revoke the permits. If a NWP is not modified or reissued within five years of its effective date, it automatically expires and becomes null and void. It is incumbent upon you to remain informed of any changes to the NWPs. Changes to the NWPs would be announced by Public Notice posted on our website (<http://www.spn.usace.army.mil/Missions/Regulatory.aspx>). Upon completion of the project and all associated mitigation requirements, you shall sign and return the Certification of Compliance, enclosure 5, verifying that you have complied with the terms and conditions of the permit.

This authorization will not be effective until you have obtained a Section 401 water quality certification from the North Coast Regional Water Quality Control Board (RWQCB). If the RWQCB fails to act on a valid request for certification within two months after receipt of a complete application, the Corps will presume a waiver of water quality certification has been obtained. You shall submit a copy of the certification to the Corps prior to the commencement of work.

General Condition 18 stipulates that project authorization under a NWP does not allow for the incidental take of any federally-listed species in the absence of a biological opinion (BO) with incidental take provisions. As the principal federal lead agency for this project, the Federal Highway Administration (FHA) initiated consultation with the National Marine Fisheries Service (NMFS) to address project related impacts to listed species, pursuant to Section 7(a) of the Endangered Species Act of 1973, as amended (16 U.S.C. § 1531 *et seq.*). By letter of October 26, 2006, NMFS issued a BO (NMFS File No. 151422SWR02AR6405:SL) cited in enclosure 6, with an incidental take statement for Southern Oregon/Northern California Coast (SONCC) coho salmon (*Oncorhynchus kisutch*). As the principal federal lead agency for this project, the Federal Highways Administration initiated consultation with the National Marine Fisheries Service (NMFS) to address project related impacts to Essential Fish Habitat (EFH) for various life stages of fish species managed with the Pacific Groundfish Fishery Management Plan, Coastal Pelagics Fishery Management Plan, and Pacific Coast Salmon Fishery Management Plan, pursuant to Magnuson-Stevens Fishery Conservation and Management Act of 1996, as amended (16 U.S.C. § 1801 *et seq.*). NMFS issued conservation recommendations by letter of October 26, 2006, cited in enclosure 6.

General Condition 20 stipulates that any project affecting a historic property may not commence construction until the provisions of 33 C.F.R. pt. 325, Appendix C, have been satisfied. As the Federal lead agency for this project, the Federal Highway Administration (FHA) initiated consultation with the State Historic Preservation Officer (SHPO). The FHA initiated consultation with the SHPO to address project related impacts to 5 historical sites: the Trinity River Lumber Company; dragline dredge tailings; hydraulic mine tailings; a water conveyance feature (ditch); and a historic debris scatter site, none of which were determined to

be eligible for listing in the National Register of Historic Places. The FHA made a determination that the undertaking will not affect historic properties. In a letter dated November 21, 2003, the SHPO concurred with the FHA determination.

In order to ensure compliance with this NWP authorization, the following special conditions shall be implemented:

1. To remain exempt from the prohibitions of Section 9 of the Endangered Species Act, the non-discretionary Terms and Conditions for incidental take of federally-listed SONCC coho salmon shall be fully implemented as stipulated in the Biological Opinion entitled, "*Funding of Trinity County Department of Transportation Road and Bridge Construction Project*," (pages 1-3 of enclosure included with BO, as Incidental Take Statement was revised) dated October 26, 2006. Project authorization under the NWP is conditional upon compliance with the mandatory terms and conditions associated with incidental take. Failure to comply with the terms and conditions for incidental take, where a take of a federally-listed species occurs, would constitute an unauthorized take and non-compliance with the NWP authorization for your project. The NMFS is, however, the authoritative federal agency for determining compliance with the incidental take statement and for initiating appropriate enforcement actions or penalties under the Endangered Species Act.
2. The FHA initiated consultation with the National Marine Fisheries Service (NMFS) to address project related impacts to Essential Fish Habitat. The conservation recommendations outlined on page 2, of Enclosure 2 accompanying the BO issued October 26, 2006 (enclosure 6), shall be fully implemented as stipulated.
3. Compensatory mitigation for the permanent loss of 0.096-acre of seasonal wetland will be completed on-site, in-kind, and will be permittee responsible for the establishment (*i.e.* creation) of 0.491-acre of seasonal wetlands and preservation of 0.126-acre of seasonal wetland. Compensatory mitigation for the permanent loss of 0.155-acre of Other Waters of the U.S. will also be completed on-site, in-kind, and will be permittee responsible for the establishment of 0.107-acre of Other Waters of the U.S. and preservation of 0.073-acre of Other Waters of the U.S.
4. All compensatory mitigation work shall be completed in accordance with the plans and drawings titled "*Trinity County East Connector Roadway Project, Draft Habitat Mitigation and Monitoring Plan (HMMP)*," in sheets 1-14, fourth revision dated October 7, 2013, and prepared by Quincy Engineering and Restoration Resources, provided as enclosure 4. A final HMMP shall be submitted to and approved by this office prior to initiation of work.

5. An annual monitoring report of the compensatory mitigation areas documenting the vegetative and hydrological performance of the areas shall be submitted to this office no later than December 31 during each year of the 5-year maintenance and establishment period and each year thereafter until the mitigation is deemed complete.

You may refer any questions on this matter to Mr. Jim Mazza of my Regulatory staff by telephone at (415) 503-6775 or by e-mail at James.C.Mazza@usace.army.mil. All correspondence should be addressed to the Regulatory Division, North Branch, referencing the file number at the head of this letter.

The San Francisco District is committed to improving service to our customers. My Regulatory staff seeks to achieve the goals of the Regulatory Program in an efficient and cooperative manner, while preserving and protecting our nation's aquatic resources. If you would like to provide comments on our Regulatory Program, please complete the Customer Service Survey Form available on our website: <http://per2.nwp.usace.army.mil/survey.html>.

Sincerely,



 Jane M. Hicks
Chief, Regulatory Division

Enclosures

Copy Furnished (w/ encl 1 only):

CA RWQCB, Santa Rosa, CA

Copies Furnished (w/o encls):

U.S. EPA, San Francisco, CA

U.S. NMFS, Arcata, CA

CA SWRCB, Sacramento, CA

Enclosure 1. Department of the Army Nationwide Permit (NWP) 14 for *Linear Transportation Projects*

Nationwide Permit 14 - Linear Transportation Projects

Activities required for the construction, expansion, modification, or improvement of linear transportation projects (e.g., roads, highways, railways, trails, airport runways, and taxiways) in waters of the United States. For linear transportation projects in non-tidal waters, the discharge cannot cause the loss of greater than 1/2-acre of waters of the United States. For linear transportation projects in tidal waters, the discharge cannot cause the loss of greater than 1/3-acre of waters of the United States. Any stream channel modification, including bank stabilization, is limited to the minimum necessary to construct or protect the linear transportation project; such modifications must be in the immediate vicinity of the project. This NWP also authorizes temporary structures, fills, and work necessary to construct the linear transportation project. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate. This NWP cannot be used to authorize non-linear features commonly associated with transportation projects, such as vehicle maintenance or storage buildings, parking lots, train stations, or aircraft hangars.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if: (1) the loss of waters of the United States exceeds 1/10-acre; or (2) there is a discharge in a special aquatic site, including wetlands. (See general condition 31.) (Sections 10 and 404)

Note: Some discharges for the construction of farm roads or forest roads, or temporary roads for moving mining equipment, may qualify for an exemption under Section 404(f) of the Clean Water Act (see 33 CFR 323.4).

**Enclosure 2. Nationwide Permit Program General Conditions & San Francisco District's Regional
Conditions**

Nationwide Permit General Conditions

Note: To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as applicable, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification and/or Coastal Zone Management Act consistency for an NWP. Every person who may wish to obtain permit authorization under one or more NWPs, or who is currently relying on an existing or prior permit authorization under one or more NWPs, has been and is on notice that all of the provisions of 33 CFR §§ 330.1 through 330.6 apply to every NWP authorization. Note especially 33 CFR § 330.5 relating to the modification, suspension, or revocation of any NWP authorization.

1. Navigation. (a) No activity may cause more than a minimal adverse effect on navigation. (b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States. (c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species.

3. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. Shellfish Beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

7. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. Adverse Effects From Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. Management of Water Flows. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering. (f) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the U.S. FWS and NMFS or their world wide web pages at <http://www.fws.gov/> or <http://www.fws.gov/ipac> and <http://www.noaa.gov/fisheries.html> respectively.

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for obtaining any "take" permits required under the U.S. Fish and Wildlife Service's regulations governing compliance with the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act. The permittee should contact the appropriate local office of the U.S. Fish and Wildlife Service to determine if such "take" permits are required for a particular activity.

20. Historic Properties. (a) In cases where the district engineer determines that the activity may affect properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied. (b) Federal permittees should follow their own procedures for complying with the requirements of Section 106 of the National Historic Preservation Act. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will review the documentation and determine whether it is sufficient to address section 106 compliance for the NWP activity, or whether additional section 106 consultation is necessary. (c) Non-federal permittees must submit a pre-construction notification to the district engineer if the authorized activity may have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties may be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of or potential for the presence of historic resources can be sought from the State Historic Preservation Officer or Tribal Historic Preservation Officer, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of Section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted and these efforts, the district engineer shall determine whether the proposed activity has the potential to cause an effect on the historic properties. Where the non-Federal applicant has identified historic properties on which the activity may have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects or that consultation under Section 106 of the NHPA has been completed. (d) The district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA Section 106 consultation is required. Section 106 consultation is not required when the Corps determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR §800.3(a)). If NHPA section 106 consultation is required and will occur, the district engineer will notify the non-Federal applicant that he or she cannot begin work until Section 106 consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps. (e) Prospective permittees should be aware that section 110k of the NHPA (16 U.S.C. 470h-2(k)) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. Discovery of Previously Unknown Remains and Artifacts. If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

(f) Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the restoration or establishment, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, riparian areas may be the only compensatory mitigation required. Riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to establish a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or establishing a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

(g) Permittees may propose the use of mitigation banks, in-lieu fee programs, or separate permittee-responsible mitigation. For activities resulting in the loss of marine or estuarine resources, permittee-responsible compensatory mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee-responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management.

(h) Where certain functions and services of waters of the United States are permanently adversely affected, such as the conversion of a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse effects of the project to the minimal level.

24. **Safety of Impoundment Structures.** To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. **Water Quality.** Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA Section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. **Coastal Zone Management.** In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. **Regional and Case-By-Case Conditions.** The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. **Use of Multiple Nationwide Permits.** The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

29. **Transfer of Nationwide Permit Verifications.** If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:

(b) Contents of Pre-Construction Notification: The PCN must be in writing and include the following information: (1) Name, address and telephone numbers of the prospective permittee; (2) Location of the proposed project; (3) A description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause, including the anticipated amount of loss of water of the United States expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. The description should be sufficiently detailed to allow the district engineer to determine that the adverse effects of the project will be minimal and to determine the need for compensatory mitigation. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the project and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans); (4) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many waters of the United States. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate; (5) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse effects are minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan. (6) If any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, for non-Federal applicants the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work. Federal applicants must provide documentation demonstrating compliance with the Endangered Species Act; and (7) For an activity that may affect a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, for non-Federal applicants the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property. Federal applicants must provide documentation demonstrating compliance with Section 106 of the National Historic Preservation Act.

(c) Form of Pre-Construction Notification: The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is a PCN and must include all of the information required in paragraphs (b)(1) through (7) of this general condition. A letter containing the required information may also be used.

(d) Agency Coordination: (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level. (2) For all NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States, for NWP 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52 activities that require pre-construction notification and will result in the loss of greater than 300 linear feet of intermittent and ephemeral stream bed, and for all NWP 48 activities that require pre-construction notification, the district engineer will immediately provide (e.g., via e-mail, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (U.S. FWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Office (THPO), and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to telephone or fax the district engineer notice that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure the net adverse environmental effects to the aquatic environment of the proposed activity are minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will

San Francisco District Regional Conditions

A. General Regional Conditions that apply to all NWP's in the Sacramento, San Francisco, and Los Angeles Districts:

1. When pre-construction notification (PCN) is required, the permittee shall notify the U.S. Army Corps of Engineers, San Francisco District (Corps) in accordance with General Condition 31 using either the South Pacific Division Preconstruction Notification (PCN) Checklist or a signed application form (ENG Form 4345) with an attachment providing information on compliance with all of the General and Regional Conditions. In addition, the PCN shall include:
 - a. A written statement describing how the activity has been designed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States;
 - b. Drawings, including plan and cross-section views, clearly depicting the location, size and dimensions of the proposed activity, as well as the location of delineated waters of the U.S. on the site. The drawings shall contain a title block, legend and scale, amount (in cubic yards) and area (in acres) of fill in Corps jurisdiction, including both permanent and temporary fills/structures. The ordinary high water mark or, if tidal waters, the mean high water mark and high tide line, should be shown (in feet), based on National Geodetic Vertical Datum (NGVD) or other appropriate referenced elevation. All drawings for activities located within the boundaries of the Los Angeles District shall comply with the September 15, 2010 Special Public Notice: *Map and Drawing Standards for the Los Angeles District Regulatory Division*, (available on the Los Angeles District Regulatory Division website at: www.spl.usace.army.mil/regulatory/); and
 - c. Numbered and dated pre-project color photographs showing a representative sample of waters proposed to be impacted on the site, and all waters of the U.S. proposed to be avoided on and immediately adjacent to the activities site. The compass angle and position of each photograph shall be identified on the plan-view drawing(s) required in subpart b of this Regional Condition.
2. The permittee shall submit a PCN, in accordance with General Condition 31, For all activities located in areas designated as Essential Fish Habitat (EFH) by the Pacific Fishery Management Council (i.e., all tidally influenced areas - Federal Register dated March 12, 2007, 72 C.F.R. 11,092, in which case the PCN shall include an EFH assessment and extent of proposed impacts to EFH. Examples of EFH habitat assessments can be found at: <http://www.swr.noaa.gov/efh.htm>.
3. For activities in which the Corps designates another Federal agency as the lead for compliance with Section 7 of the Endangered Species Act (ESA) of 1973 as amended, 16 U.S.C. §§ 1531-1544, Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act (EFH), 16 U.S.C. § 1855(b)(4)(B) and/or Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, 16 U.S.C. §§ 470-470h, the lead Federal agency shall provide all relevant documentation to the appropriate Corps demonstrating any previous consultation efforts, as it pertains to the Corps Regulatory permit area (for Section 7 and EFH compliance) and the Corps Regulatory area of potential effect (APE) (for Section 106 compliance). For activities requiring a PCN, this information shall be submitted with the PCN. If the Corps does not designate another Federal agency as the lead for ESA, EFH and/or NHPA, the Corps will initiate consultation for compliance, as appropriate.

to Eelgrass Beds are required for any activity permitted by NWP if it will take place within or adjacent to **Eelgrass Beds**.

C. Regional Conditions that apply to specific NWPs in the San Francisco District:

3. MAINTENANCE:

1. To the extent practicable, excavation equipment shall work from an upland site (e.g., from the top of the bank, the road bed of the bridge, or culverted road crossing) to minimize adding fill into waters of the U.S. If it is not practicable to work from an upland site, or if working from the upland site would cause more environmental damage than working in the stream channel, the excavation equipment can be located within the stream channel but it must minimize disturbance to the channel (other than the removal of accumulated sediments or debris). As part of the notification to the Corps (in accordance with General Condition No. 31), an explanation as to the need to place excavation equipment in waters of the U.S. is required, as well as a statement of any additional necessary fill (e.g., cofferdams, access road, fill below the OHW mark for a staging area, etc.).
2. If the activity is proposed in a special aquatic site, the notification to the Corps (in accordance with General Condition No. 31) shall include an explanation of why the special aquatic site cannot be avoided, and the measures to be taken to minimize impacts to the special aquatic site.

11. TEMPORARY RECREATIONAL STRUCTURES:

1. Notification to the Corps (in accordance with General Condition No. 31) is required if any temporary structures are proposed in wetlands or vegetated shallow water areas (e.g. in eelgrass beds). The notification shall include the type of habitat and areal extent affected by the structures.

12. UTILITY LINE ACTIVITIES:

1. Excess material removed from a trench, associated with utility line construction, shall be disposed of at an upland site away from any wetlands or other waters of the U.S. so as to prevent this material from being washed into aquatic areas.
2. This NWP permit does not authorize the construction of substation facilities. Utility line substations can usually be constructed in uplands.

13. BANK STABILIZATION:

1. Notification to the Corps (in accordance with General Condition No. 31) is required for all activities stabilizing greater than 300 linear feet of channel. Where the removal of wetland vegetation (including riparian wetland trees, shrubs and other plants) or submerged, rooted, aquatic plants over a cumulative area greater than 1/10 acre or 300 linear feet is proposed, the Corps shall be notified (in accordance with General Condition No. 31). The notification shall include the type of vegetation and extent (e.g., areal dimension or number of trees) of the proposed removal. The notification shall also address the effect of the bank stabilization on the stability of the opposite side of the streambank (if it is not part of the stabilization activity), and on adjacent property upstream and downstream of the activity.
2. This permit allows excavating a toe trench in waters of the U.S., and, if necessary, to use the material for backfill behind the stabilizing structure. Excess material is to be disposed of in a manner that will have only minimal impacts to the aquatic environment. The notification to the Corps (in accordance with General Condition No. 31) shall include location of the disposal site.
3. For man-made banks, roads, or levees damaged by storms or high flows, the one cubic yard per running foot limit is counted only for that additional fill which encroaches (extends) beyond the pre-flood or pre-storm shoreline condition of the waterway. It is not counted for

- f. a clear and concise description of all project impacts including, but not necessarily limited to:
 - 1. quantification and description of permanent project impacts to areas within Corps jurisdiction,
 - 2. quantification and description of temporary impacts to areas within Corps jurisdiction, and
 - 3. linear extent of Corps jurisdiction affected by the project;
 - g. a general description of activities covered by the Cat/Ex that do not require Corps authorization but are connected or related to the activities in Corps jurisdiction;
 - h. a complete description of any proposed mitigation and/or restoration including, but not necessarily limited to, locations of any proposed planting, short- and long-term maintenance, proposed monitoring, success criteria and contingency plans;
 - i. written justification of how the project complies with the Nationwide Permit Program including less than minimal impact to the aquatic environment and compliance with the General Conditions.
 - j. For Federal Highway Administration (FHWA) Cat/Ex projects, the notification should describe how activities described in the Cat/Ex meet the description of the Cat/Ex project published in the August 28, 1987 Federal Register part 771.117 (a)(b)(c) and (d) (Volume 52, No. 167) or any updated version published in the Federal Register.
- 2. Only activities specifically described in the Cat/Ex project description will be covered by the NWP 23 authorization. If other activities not described in the Cat/Ex project description will be performed (e.g., dewatering, slope protection, etc.), these activities must receive separate NWP authorizations.
 - 3. Notification to the Corps (in accordance with General Condition 31) must include a copy of the signed Cat/Ex document and final agency determinations regarding compliance with Section 7 of the Endangered Species Act (ESA), Essential Fish Habitat (EFH) under the Magnusson-Stevens Act, and Section 106 of the National Historic Preservation Act.

27. Aquatic Habitat Restoration, Establishment, and Enhancement Activities

- 1. Notification to the Corps (in accordance with General Condition 31) must include documentation of a review of project impacts to demonstrate that at the conclusion of the work that the project would result in a net increase in aquatic function. Additionally, the documentation must include a review of project impacts on adjacent properties or structures and must also discuss cumulative impacts associated with the project.

29. Residential Developments:

- 1. When discharge of fill results in the replacement of wetlands or waters of the U.S. with impervious surfaces, to ensure that the authorized activity does not result in more than minimal degradation of water quality (in accordance with General Condition 25), the residential development shall incorporate low impact development concepts (e.g. native landscaping, bioretention and infiltration techniques, and constructed green spaces) to the extent practicable. A description of the low impact development concepts proposed in the project shall be included with the permit application. More information including low impact development concepts and definitions is available at the following website:
<http://www.epa.gov/owow/NPS/lid/>.
- 2. Use of this NWP is prohibited within the San Francisco Bay diked baylands (undeveloped areas currently behind levees that are within the historic margin of the Bay. Diked historic baylands are those areas on the Nichols and Wright map (see figure 1) below the 5-foot

estimated quantities for overdepth dredging. **All surveys shall be signed by the permittee to certify their accuracy. Please include the Corps file number.**

- c. Solid Debris Management Plan: Submit no earlier than 60 calendar days and no later than 20 calendar days before commencement of work, a plan which describes measures to ensure that solid debris generated during any dredging operation is retained and properly disposed in areas not under Corps jurisdiction. **At a minimum, the plan shall include the following: source and expected type of debris; debris retrieval method; Corps file number; disposal method and site; schedule of disposal operations; and debris containment method to be used, if floatable debris is involved.** (Please note that failure to provide all of the information requested in a, b, and c above may result in delays to your project. When your Dredge Operation Plan has been approved, you will receive a written authorization to commence with your project.)
- d. Post-Dredge Survey: Submit, **within 30 days of the last disposal activity** ("last" is defined as that activity after which no further activity occurs for 15 calendar days), a survey with accuracy to one-tenth foot that delineates and labels the areas dredged and provides the dredged depths. **Also, include the Corps file number, actual dates of dredging commencement and completion, actual quantities dredged for the project to the design depth, and actual quantities of overdepth.** The permittee shall substantiate the total quantity dredged by including calculations used to determine the volume difference (in cubic yards) between the Pre- and Post-Dredge Surveys and **explain any variation in quantities greater than 15% beyond estimated quantities or dredging deeper than is permitted (design plus overdepth allowance).** **All surveys shall be accomplished by a licensed surveyor and signed by the permittee to certify their accuracy.** A copy of the post dredge survey should be sent to the National Ocean Service for chart updating:
NOAA/National Ocean Service,
Nautical Data Branch
N/CS26, SSMC3, Room 7230
1315 East-West Highway
Silver Spring, Maryland 20910-3282.
- e. **The permittee or dredge contractor shall inform this office when: 1) a dredge episode actually commences, 2) when dredging is suspended (suspension is when the dredge contractor leaves the dredge site for more than 48 hours for reasons other than equipment maintenance), 3) when dredging is restarted, and 4) when dredging is complete. Each notification should include the Corps file number.** Details for submitting these notifications will be provided in the verification letter (to whom and how).

39. Commercial and Institutional Developments:

- 1. When discharge of fill results in the replacement of wetlands or waters of the U.S. with impervious surfaces, to ensure that the authorized activity does not result in more than minimal degradation of water quality (in accordance with General Condition 25), the commercial and institutional development shall incorporate low impact development concepts (e.g. native landscaping, bioretention and infiltration techniques, and constructed green spaces) to the extent practicable. A description of the low impact development concepts proposed in the project shall be included with the permit application. More information including low impact development concepts and definitions is available at the following website: <http://www.epa.gov/owow/NPS/lid/>.
- 2. Use of this NWP is prohibited within the San Francisco Bay diked baylands (undeveloped areas currently behind levees that are within the historic margin of the Bay. Diked historic baylands are those areas on the Nichols and Wright map (see figure 1) below the 5-foot

EXHIBIT B – U.S. FISH AND WILDLIFE PERMIT



California Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Region 1 – Northern
601 Locust Street
Redding, CA 96001
(530) 225-2300
www.wildlife.ca.gov

EDMUND G. BROWN, Jr., Governor
CHARLTON H. BONHAM, Director



December 3, 2013

Mr. Richard Tippet
Trinity County Planning Department
Post Office Box 2490
Weaverville, California 96093

Subject: Final Streambed Alteration Agreement
Notification No. 1600-2013-0192-R1
East Connector Roadway Project

Dear Mr. Tippet:

Enclosed is the final Streambed Alteration Agreement (Agreement) for the East Connector Roadway Project (Project). Before the California Department of Fish and Wildlife (Department) may issue an Agreement, it must comply with the California Environmental Quality Act (CEQA). In this case, the Department, acting as a responsible agency, filed a notice of determination (NOD) on the same date it signed the Agreement. The NOD was based on information contained in the Environmental Impact Report the lead agency prepared for the Project.

Under CEQA, filing a NOD starts a 30-day period within which a party may challenge the filing agency's approval of the project. You may begin your project before the 30-day period expires if you have obtained all necessary local, state, and federal permits or other authorizations. However, if you elect to do so, it will be at your own risk.

If you have any questions regarding this matter, please contact Kate Grossman at 530-225-2239 or katherine.grossman@wildlife.ca.gov.

Sincerely,

Kate Grossman
Environmental Scientist

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
REGION 1 - NORTHERN
601 LOCUST STREET
REDDING, CA 96001



STREAMBED ALTERATION AGREEMENT
NOTIFICATION No. 1600-2013-0192-R1
EAST WEAVER CREEK AND LANCE GULCH

TRINITY COUNTY DEPARTMENT OF TRANSPORTATION
EAST CONNECTOR ROADWAY PROJECT

This Streambed Alteration Agreement (Agreement) is entered into between the California Department of Fish and Wildlife (CDFW) and Trinity County Department of Transportation (Permittee) as represented by Mr. Richard Tippet.

RECITALS

WHEREAS, pursuant to Fish and Game Code (FGC) section 1602, Permittee notified CDFW on July 15, 2013 that Permittee intends to complete the project described herein.

WHEREAS, pursuant to FGC section 1603, CDFW has determined that the project could substantially adversely affect existing fish or wildlife resources and has included measures in the Agreement necessary to protect those resources.

WHEREAS, Permittee has reviewed the Agreement and accepts its terms and conditions, including the measures to protect fish and wildlife resources.

NOW THEREFORE, Permittee agrees to complete the project in accordance with the Agreement.

PROJECT LOCATION

The project is located at Lance Gulch and East Weaver Creek, tributaries to Weaver Creek, and thence the Trinity River in the County of Trinity, State of California; Sections 6, 7, & 18, Township 33N, Range 9W; U.S. Geological Survey (USGS) map Weaverville, Mount Diablo Base and Meridian.

PROJECT DESCRIPTION

The project involves construction of a new two-lane County roadway to alleviate congestion in downtown Weaverville by connecting SR 299 in the southeast end of town to SR 3 at the northern end of Weaverville. The project described in this Agreement is limited to the impacts this roadway will have on the streams and wetlands it crosses and or impacts, as well as restored or created wetlands and riparian areas. The Agreement includes construction of a new bridge over East Weaver Creek, two new box culverts in

Lance Gulch, a 24" culvert placed in an unnamed tributary to Lance Gulch, and grading/filling various jurisdictional channels and wetlands. Specific work includes:

- a. Construction of a new bridge over East Weaver Creek, a perennial salmonid-bearing stream. The bridge will be 200' long, spanning the channel in 3 sections. Two piers will be within the floodplain, but one will be outside of the ordinary high-water mark, and the other is partially within the ordinary high water mark, but outside of the low flow channel. The piers will be cast-in-place concrete with spread footings. Excavation will not occur in the wetted channel. Falsework will also be temporarily constructed in the stream, outside of the low flow channel. Rock slope protection, (rip-rap) will be placed around each abutment. A temporary equipment crossing may be built using a flat rail car or similar structure, set on approaches outside the low-flow channel.
- b. Construction of 2 concrete box culverts on Lance Gulch, a spring-fed intermittent stream. They will either be cast-in-place or pre-cast, with concrete bottoms. The upper crossing will be no larger than 6' x 8' wide, and the lower culvert will be no larger than 6' x 10' wide. This section of stream may need to be dewatered to construct or place the culverts.
- c. Construction of one 24" culvert in an unnamed tributary to Lance Gulch.
- d. Filling and rerouting of sections of Lance Gulch or its tributaries according to submitting plans.
- e. Removal of riparian habitat, including willows, alders, and cottonwood. There are approximately 50 trees that are larger than 10" in diameter at breast height. A total of 0.959 acres of montane riparian habitat will be impacted, either permanently or temporarily. As mitigation for these impacts, 0.433 acres of montane riparian habitat will be created, and 1.702 acres along East Weaver Creek will be enhanced. Enhancement of riparian habitat will include removal of invasive Himalayan blackberry. Restoration/revegetation will be conducted according to the Habitat Mitigation and Monitoring Plan submitted with the Notification and includes the creation of 0.598 acres of seasonal wetlands.
- f. Ongoing maintenance of bridge and culverts for road safety and flood protection.

PROJECT IMPACTS

Existing fish or wildlife resources the project could substantially adversely affect without implementation of the following measures include: Coho salmon (*Oncorhynchus kisutch*), Chinook salmon (*O. tshawytscha*), steelhead trout (*O. mykiss*), other game and non-game fishes, foothill yellow-legged frog (*Rana boylei*) and other amphibians, western pond turtle (*Emys marmorata*) and other reptiles, aquatic invertebrates, mammals, yellow-breasted chat (*Icteria virens*), willow flycatcher (*Empidonax traillii*), other riparian birds, and other aquatic and riparian species.

The adverse effects the project could have on the fish or wildlife resources identified above include: loss of occupied habitat and/or nests of migratory birds as a result of the removal of mature riparian vegetation or other nesting substrate, potential disruption to nesting migratory birds including decrease of reproductive success, temporary increase in turbidity and suspended sediment downstream of the construction site leading to respiratory problems in aquatic species and the smothering and/or shading of egg masses, submerged aquatic vegetation, and benthic communities due to settled sediment, diurnal noise disturbance from project activity, direct mortality of benthic macroinvertebrates, reptiles, and amphibians as a result of dewatering Lance Gulch, change in grade of bank or bed, change in composition of channel materials and natural bed substrate from rip rap and concrete box culverts, and the short-term release of contaminants that are incidental to construction.

MEASURES TO PROTECT FISH AND WILDLIFE RESOURCES

1. Administrative Measures

Permittee shall meet each administrative requirement described below.

- 1.1 Documentation at Project Site. Permittee shall make the Agreement, any extensions and amendments to the Agreement, and all related notification materials and California Environmental Quality Act (CEQA) documents, readily available at the project site at all times and shall be presented to CDFW personnel, or personnel from another state, federal, or local agency upon request.
- 1.2 Providing Agreement to Persons at Project Site. Permittee shall provide copies of the Agreement and any extensions and amendments to the Agreement to all persons who will be working on the project at the project site on behalf of Permittee, including but not limited to contractors, subcontractors, inspectors, and monitors.
- 1.3 Notification of Conflicting Provisions. Permittee shall notify CDFW if Permittee determines or learns that a provision in the Agreement might conflict with a provision imposed on the project by another local, state, or federal agency. In that event, CDFW shall contact Permittee to resolve any conflict.
- 1.4 Project Site Entry. Permittee agrees that CDFW personnel may enter the project site at any time to verify compliance with the Agreement, provided CDFW: a) provides 24 hours advance notice; and b) allows the Permittee or representatives to participate in the inspection and/or monitoring.
- 1.5 Stream Defined. A stream is defined as a body of water that flows perennially, intermittently, or ephemerally. Streams can include a channel, banks, bed, and floodplains where these features are present.

- 1.6 **Bank Defined.** The land, including its vegetation that confines or otherwise defines the outermost boundary of a lake, or stream when its waters rise to the highest level of confinement.
- 1.7 Permittee's notification (Notification of Lake or Streambed Alteration) together with all maps, plans, photographs, drawings, and all other supporting documents submitted with the notification to describe the activity (including but not limited to the Final Environmental Impact Report (EIR) for the East Connector Roadway Project, submitted construction and grading plans, the Habitat Monitoring and Mitigation Plan, and the Natural Environment Study) is hereby incorporated by reference into this Agreement. Permittee shall conduct project activities within the work areas and using the mitigative features described in the notification and supporting documents, unless such project activities, work areas or mitigative features are modified by the provisions of this Agreement, in which case the activities shall be conducted as described in this Agreement.

2. Avoidance and Minimization Measures

To avoid or minimize adverse impacts to fish and wildlife resources identified above, Permittee shall implement each measure listed below.

PROJECT TIMING AND COORDINATION

- 2.1 All work within jurisdictional areas of East Weaver Creek and Lance Gulch shall be confined to the period commencing June 15 and ending October 15, provided the stream is dry or at its lowest flow. If weather conditions permit and the stream is dry or at its lowest flow, the Permittee may perform work within the stream channel or on the banks outside of the above referenced work window, provided a written request is made to CDFW at least five (5) days before the proposed work period variance. Written approval from CDFW for the proposed work period variance must be received by the Permittee prior to the start or with the continuation of work outside of the above referenced work window.
- 2.2 If work is performed outside of the above referenced work window, the Permittee shall do all of the following:
- a. Stage erosion and sediment control materials at the work site.
 - b. Cease work and implement erosion control measures when there is a forecast of more than 30% chance of rain, or at the onset of any precipitation. Monitoring of the 72 hour forecast from the National Weather Service is recommended.
- 2.3 Notwithstanding Condition 2.1 above, removal of the above-ground portions of existing riparian vegetation shall occur after September 1 and before March 1 to avoid impacts to nesting birds. If vegetation must be removed during the nesting

season (March 1 to August 31) nest surveys shall be conducted prior to vegetation clearing.

- 2.4 The Permittee shall instruct all persons who will be completing any ground disturbing activity at a worksite to comply with the conditions set forth in this Agreement and shall inspect each work site before, during, and after completion of any ground-disturbing activity at the work site.
- 2.5 The Permittee shall notify CDFW in writing, at least five (5) days prior to initiation of project activities and at least five (5) days prior to completion of project activities.

WILDLIFE AND HABITAT PROTECTION

Nesting Birds and Habitat Removal

- 2.6 This Agreement does not allow the Permittee, any employees, or agents to destroy or disturb any active bird nest (Section 3503 Fish and Game Code) or any raptor nest (Section 3503.5) at any time of the year. Permittee shall not disturb trees that contain active bird nests without prior consultation and approval from a CDFW representative.
- 2.7 To avoid potential impact to tree nesting birds, trees and other riparian vegetation designated for removal shall be cut down during the time period of September 1-February 28. Trees/shrubs may be removed between March 1 and August 31, provided the Permittee has a qualified biologist conduct protocol level surveys in the proposed work area to verify the presence or absence of nesting birds. The detailed surveys shall be submitted to CDFW for review and comment prior to commencement of tree/shrub removal.
- 2.8 If active nests are discovered, CDFW shall be contacted to determine appropriate mitigation and avoidance measures including but not limited to:
 - a. Marking nest locations and delineating construction avoidance zones within the immediate area until August 31 or after fledging and dispersing of the young.
 - b. Implementing a CDFW approved phased construction schedule that is designed to avoid disturbance in suitable habitat areas that are known to be used for nesting.
- 2.9 All vegetation removal along the streambanks or within the floodplain shall be conducted provided the banks and floodplain are above stream flow levels. Work may continue during precipitation events provided stream flows have not risen into work areas, and provided project operations are conducted such that sediment delivery will not result.
- 2.10 Raptor surveys shall be conducted at the appropriate times of day, and during appropriate nesting times prior to the start of construction, and shall concentrate on

areas of suitable habitat within a 500-foot radius of construction activities. If any active nests are observed, CDFW shall be notified and a 500' buffer area designated as an Ecologically Sensitive Area (ESA) shall be maintained and protected (while occupied) during project construction.

- 2.11 Willow flycatcher (WIFL) is listed as endangered (January 2, 1991), pursuant to CESA. Habitat for this species is characterized by willow (*Salix* spp.) or alder (*Alnus* spp.) thickets adjacent to permanent water such as low-gradient streams, ponds, marshes or wet meadows within or adjacent to forested habitat. WIFL are typically found to breed in riparian areas with shrub thickets interspersed with openings such as moist meadows.

Permittee shall employ the following standard Protection measures to prevent significant negative effects to WIFL and to avoid unauthorized take of the species:

a. The Project Area has been surveyed and determined to be suitable WIFL habitat. Additional surveys shall be completed before construction begins to determine if WIFL are present, unless all operations are conducted outside the WIFL breeding season (May 1 - August 31). The currently accepted survey protocol is "A Willow Flycatcher Survey Protocol for California developed by Helen L. Bombay, Teresa M. Ritter and Brad E. Valentine, June 6 2000".

b. If current-year surveys (per the protocol) determine the presence of WIFL, the following measures shall be implemented:

- I. No operations shall occur during the breeding season (May 1 through August 31) in and within 300 feet of the WIFL habitat where WIFL have been found present.
- II. Any operations conducted within or adjacent to suitable WIFL habitat where WIFL have been found shall not damage or destroy willows or other riparian shrubs, unless agreed on through consultation with CDFW.

Other Sensitive Species

- 2.12 During any work in a wetted channel, a qualified biologist shall be on site to survey for and determine if special status species are present within 24 hours of the start of construction in that area which could be impacted. If any of these species are discovered, the Permittee shall implement mitigation measures outlined in the Mitigation Monitoring Plan.

- 2.13 The biologist shall be authorized to stop construction if necessary to protect fish and wildlife resources. If any sensitive State listed Species of Special Concern, or threatened or endangered species, are found the biologist shall inform CDFW.

- 2.14 Permittee shall visually check all sections of open pipe for the presence of wildlife sheltering within them prior to the pipe sections being placed in the trench and

attached together, or shall have the ends capped while stored on site so as to prevent wildlife from entering. After attachment of the pipe sections to one another, whether in the trench or not, the exposed end(s) of the pipeline shall be capped at the end of each day during construction to prevent wildlife from entering and being trapped within the pipeline.

- 2.15 At the end of each work day, Permittee shall place an escape ramp at each end of the open trench to allow any animals that may have become entrapped in the trench to climb out overnight. The ramp may be constructed of either dirt fill or wood planking or other suitable material that is placed at an angle no greater than 30 degrees.

Habitat Protection

- 2.16 The Permittee or Designated Representative shall demarcate the outer perimeter of the work area to prevent damage to adjacent habitat and to provide visual orientation to its limits. Marking shall be in place during all periods of operation. All persons employed or otherwise working on the project site shall be instructed about the restrictions that the marking represents.
- 2.17 The Permittee or Designated Representative shall demarcate the boundaries of the confirmed disturbance area within the stream to prevent damage to adjacent habitat. This shall include both the longitudinal distance upstream and downstream and the lateral distance including areas of riparian vegetation removal. All forms of markings shall be in place prior to and during periods of operation, including times of vegetation removal. All persons employed or otherwise working on the project site shall be instructed by Permittee or Designated Representative about the restrictions that the flagging represents. All temporary flagging, fencing, and/or barriers from the project site and vicinity of the stream shall be removed upon completion of project activities.
- 2.18 Disturbance or removal of riparian vegetation shall be kept to the minimum necessary to complete project related activities. Except for trees marked for removal in the areas of bridge or culvert construction, no native trees within the riparian zone with a trunk diameter at breast height (DBH) in excess of four (4) inches shall be removed or damaged. Vegetation marked for protection may only be trimmed with hand tools to the extent necessary to gain access to the work sites.
- 2.19 In order to provide future stream habitat, Permittee or Designated Representative shall leave the root mass and a stump four (4) feet above the ground surface on any trees outside of the bridge or culvert footprint.
- 2.20 Hand tools (e.g., trimmer, chain saw, etc.) shall be used to trim vegetation to the extent necessary to gain access to the work sites. The use of heavy equipment

may be used to clear large areas of non-native vegetation. No heavy equipment shall be used in riparian areas with slopes greater than 3:1 to remove vegetation.

- 2.21 All trimmed or cleared material/vegetation shall be removed from the area and deposited where it cannot re-enter the stream.
- 2.22 Large wood, trees, or other native material within the stream shall not be moved or removed from East Weaver Creek, unless it presents a hazard to project activities (i.e. bridge construction).
- 2.23 If large wood, trees, or other vegetative material within the East Weaver Creek stream channel is moved or removed during project activities, it shall be returned to near its original position following project completion.

EXCAVATION, FILL, AND STABILIZATION

- 2.24 No instream harvesting of gravel or cobble may occur for in-situ temporary landings or ramps. Where additional material is required within the stream the Permittee shall use off-site commercial/permitted clean round river cobble. Upon completion of the project, imported round river cobble may be removed from the stream or distributed on existing cobble bars near the flowing portion of the stream.
- 2.25 Permittee shall construct temporary fills of nonerrodible materials. All areas of temporary fill shall have a liner between the bottom of the fill and the native stream sediment. Permittee shall remove all temporary fills and the channel bottom returned to its previous contours, following project implementation. Minor amounts of gravel that have sunk into the mud below the natural channel bottom may remain only if there is no accretion in bed elevation above the original contour.
- 2.26 Fill construction materials shall consist of clean material.
- 2.27 No castings or spoils from project activities shall be placed where they may enter any waters of the State. Spoil sites shall not be located within an area that may be subjected to high storm flows or where spoils may be washed back into any stream or where it may impact streambed habitat, aquatic or riparian vegetation.
- 2.28 Permittee shall construct bank stabilization with suitable non-errodible materials that will withstand wash out. The bank stabilization material shall extend above the ordinary high-water mark. Only clean material such as, rock riprap that is free of trash, debris and deleterious material shall be used as bank stabilization. Asphalt shall not be considered an acceptable material.
- 2.29 Un-grouted rock slope protection (RSP) and energy dissipater materials shall consist of clean rock, competent for the application, sized and properly installed to resist washout. RSP slopes shall be supported with competent boulders keyed into a footing trench with a depth sufficient to properly seat the footing course

boulders and prevent instability (typically at least 1/3 diameter of footing course boulders).

2.30 RSP slopes and footing trenches shall feature an underlayment of appropriate grade geo-textile fabric, on slopes less than 1:1, or gravel blanket, on slopes greater than 1:1.

2.31 Topsoil shall be stockpiled and redistributed as close to its original location as possible over the construction area before revegetation procedures are undertaken.

DEWATERING AND TEMPORARY DIVERSIONS

2.32 When work in a flowing stream is unavoidable, Permittee shall divert the stream flow around or through the work area during construction operations. No excavation in the portion of the stream bed where flowing water is present or anticipated during the term of this agreement.

2.33 Stream flow shall be diverted using gravity flow through temporary culverts/pipes or pumped around the work site with the use of hoses.

2.34 CDFW has reviewed and approved the proposed water diversion method in Lance Gulch. No water diversion is authorized in East Weaver Creek without further consultation with CDFW.

2.35 When any dam or other artificial obstruction is being constructed, maintained, or placed in operation, Permittee shall allow sufficient water at all times to pass downstream to maintain aquatic life below the dam pursuant to Fish and Game Code §5937. Normal flow shall be restored to the affected stream immediately upon completion of work at that location.

2.36 The Permittee shall check daily for stranded aquatic life as the water level in the dewatering area drops. All reasonable efforts shall be made to capture and move all stranded aquatic life observed in the dewatered areas. Capture methods may include fish landing nets, dip nets, buckets and by hand. These activities shall be overseen by a qualified biologist. Captured aquatic life shall be released immediately in the closest body of water adjacent to the work site. This condition does not allow for the take or unnecessary disturbance of any State or federally listed species, or State listed species of special concern.

2.37 Permittee shall have extra sandbags readily available to provide additional freeboard to the diversion in the event it becomes evident flows may increase in due to rainy conditions. The sandbag diversion may be removed completely only if the stream bank is stable and no undue erosion will occur.

- 2.38 If the Permittee plans to use East Weaver Creek as a drafting source for water trucks, the inlets of the pump shall meet National Marine Fisheries Service's (NMFS) Water Drafting Specifications (August 2001). See criteria at: http://www.westcoast.fisheries.noaa.gov/publications/hydropower/water_drafting_specification_guidelines.pdf.
- 2.39 The excavation of streambed or bank material for intakes or approaches for water trucks shall be done in coordination with CDFW.

CULVERTS AND INSTREAM STRUCTURES

- 2.40 All crossing sites shall be designed to accommodate the estimated 100-year flow including sediment load and debris without diverting, and shall be installed in accordance with submitted plans and diagrams. Culvert sizing factors shall include culvert capacity loss from placement of the culvert pipe bottom below stream bed grade, transportation of bed load, and the abundance and size of woody debris likely to be introduced to the stream upstream of the culvert crossing, in addition to the 100 year flow.
- 2.41 All crossing structures shall be properly aligned within the stream and shall be otherwise designed and sized to assure resistance to washout and erosion of the streambed, stream banks, and/or fill.
- 2.42 Completed culvert installations shall result in water flow that is neither impeded nor impounded at the inlet, nor accelerated downstream of the crossing structure.
- 2.43 Installation of bridges, culverts or other structures shall be such that water flow is not impaired and upstream or downstream passage of fish and all aquatic life-forms is assured at all times. The Permittee shall ensure that any debris is cleared as long as the structure is in place provided the Permittee notifies CDFW prior to commencing any clearing activities.
- 2.44 Culvert inlets and outlets shall be protected from erosion as appropriate through armoring constructed of rock rip-rap or other non-erodible material (e.g., concrete head wall). Where used, rock rip-rap or armoring shall be of sufficient size and depth to remain in place during 100-year peak flows (generally 12 inch or greater diameter or equal to the largest size that naturally exists in the channel), extend at least as high as the top of the culvert on inlets, and shall extend sufficient distance upstream as wing walls to prevent bank erosion. Where armoring is used, the channel at the culvert outlet shall be rip-rapped in a U-shaped channel and rip-rap set below grade so as to allow the natural accumulation of bedload at watercourse grade.
- 2.45 Road approaches to new or re-constructed permanent crossings on watercourses shall be treated to minimize erosion and sediment delivery to the watercourse. Road approaches shall be armored from the crossing for a minimum of 50 feet in

both directions, or to the nearest effective water bar or point where road drainage does not drain to the crossing, with durable rock, compacted grindings, pavement, or chip-seal.

2.46 Woody debris shall not be incorporated into the crossing fill. Backfill soil material shall be layer-placed and machine compacted in one-foot lifts.

2.47 Culverts shall be aligned with the watercourse channel. Culverts shall extend beyond the road fill and shall not be perched (suspended).

2.48 Trashracks shall not be used.

2.49 Crossings shall be constructed in a manner that minimizes headcutting of the stream channel above the crossing to the extent feasible by installing grade control structures such as riprap, woody debris, or through other effective measures, and to preclude the development of an increase in stream gradient below the crossing through downcutting.

POLLUTION

2.50 Any equipment or vehicles driven and/or operated within or adjacent to a stream shall be checked and maintained daily to prevent leaks of materials that could be deleterious to aquatic and terrestrial life or riparian habitat.

2.51 Vehicles may enter and exit the project area as necessary for project activities, but may not be parked overnight within ten (10) feet of the drip line of any trees; nor shall vehicles be parked where mechanical fluid leaks may potentially enter the waters of the state.

2.52 Stationary equipment such as motors, pumps, generators, and welders, located within or adjacent to any stream shall be positioned over drip pans. Stationary heavy equipment shall have suitable containment to handle a catastrophic spill/leak.

2.53 No equipment maintenance or fueling shall be done within 100 feet of any stream channel where petroleum products or other pollutants from the equipment may enter these areas.

2.54 Staging and storage areas for equipment, materials, fuels, lubricants, and solvents shall be located 100 feet from the stream channel and banks. All equipment and fuel stored on site shall be bermed to contain any spilled material and shall be protected from rain. Berms shall consist of plastic covered dirt or sand bags.

2.55 Building materials and/or construction equipment shall not be stockpiled or stored where they may be washed into the water or cover aquatic or riparian vegetation. Stockpiles shall be covered when measurable rain is forecasted.

- 2.56 Prior to working within a stream, all equipment shall be closely examined for oil and fuel discharges. Any contaminants shall be cleaned prior to any work within a streambed and shall be maintained daily. In addition, equipment shall be cleaned prior to site entry or before equipment enters a new work area to ensure non-natives are not introduced into mitigation areas, or spread throughout project sites.
- 2.57 Project related structures and associated materials not designed to withstand high water flows or placed in seasonally dry portions of a stream that could be washed downstream or could be deleterious to aquatic life, wildlife, or riparian habitat shall be moved to areas above high water before such flows occur.
- 2.58 Permittee and all contractors, subcontractors, and employees shall not dump any litter or construction debris within the stream, or where it may pass into the stream. All project generated debris, building materials and rubbish shall be moved at least 150 feet away from the high water mark of any stream following completion of Project activities.
- 2.59 Permittee shall dispose of all project generated debris, materials and rubbish in a legal manner.
- 2.60 No debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or washings thereof, asphalt, paint or other coating material, oil or petroleum products or other organic or earthen material from any construction, or associated activity of whatever nature shall be allowed to enter into, or placed where it may be washed by rainfall or runoff into, waters of the State. Any of these materials, placed within or where they may enter the stream by Permittee or any party working under contract, or with the permission of Permittee, shall be removed immediately.
- 2.61 The Permittee shall install the necessary containment structures to control the placement of wet concrete and to prevent it from entering into the channel outside of those structures. If necessary, a secondary containment wall between the primary containment structures (i.e. headwall form, roadway forms) and the active channel should be utilized to prevent wet concrete from entering into the active channel upon failure or leak of primary structures.
- 2.62 At all times when the Permittee is pouring or working with wet concrete there shall be a designated monitor to inspect the containment structures and ensure that no concrete or other debris enters into the channel outside of those structures.
- 2.63 No concrete shall be poured within the ordinary high water mark if the 7 day National Weather Service forecast predicts precipitation. If enough rainfall occurs to raise the flow in the channel to reach areas where concrete has been poured within 30 days, a diversion method shall be ready onsite to keep streamflow away from the concrete.

- 2.64 Creosote-treated wood products shall not be used in State waters. Alternatives that may be appropriate include steel, concrete, plastic, or wood products treated with preservatives that do not contain creosote or other materials that are deleterious to aquatic life.
- 2.65 All activities performed in or near a stream shall have absorbent materials designated for spill containment and clean-up activities on-site for use in an accidental spill. The Permittee shall immediately notify the California Emergency Management Agency at 1-800-852-7550 and immediately initiate the clean-up activities. CDFW shall be notified by the Permittee and consulted regarding clean-up procedures.

EROSION, TURBIDITY, AND SILTATION

- 2.66 Permittee shall utilize erosion control measures throughout all phases of operation where sediment runoff from exposed slopes threatens to enter any stream.
- 2.67 At no time shall silt laden runoff be allowed to enter the stream or directed to where it may enter the stream. Erosion control measures, such as, silt fences, straw hay bales, gravel or rock lined ditches, water check bars, and broadcasted straw shall be used where ever silt laden water has the potential to leave the work site and enter East Weaver Creek or Lance Gulch.
- 2.68 Soils adjacent to the stream channel that are exposed by project operations shall be adequately stabilized when rainfall is reasonably expected during construction, and immediately upon completion of construction, to prevent the mobilization of such sediment into the stream channels or adjacent wetlands. National Weather Service forecasts shall be monitored by the Permittee to determine the chance of precipitation.
- 2.69 Permittee shall make modifications, repairs and improvements to erosion control measures whenever it is needed.
- 2.70 Permittee shall make preparations so that runoff from steep, erodible surfaces will be diverted into stable areas with little erosion potential or contained behind erosion control structures. Erosion control structures such as straw bales and/or siltation control fencing shall be placed and maintained until the threat of erosion ceases. Frequent water checks shall be placed on dirt roads, cat tracks, or other work trails to control erosion.
- 2.71 No phase of the project may be started if that phase and its associated erosion control measures cannot be completed prior to the onset of a storm event if that construction phase may cause the introduction of sediments into the stream. Permittee shall consult 72 hour weather forecasts from the National Weather Service prior to startup of any phase of the project that may result in sediment

runoff to the stream. Erosion control measures shall be inspected frequently, to minimize failure, conducting repairs as necessary.

- 2.72 Silty/turbid water shall not be discharged into the stream or into storm drains. The Permittee shall prevent water containing mud, silt or other pollutants from grading, aggregate washing, equipment washing, or other activities to enter a stream or to be placed in locations that may be subjected to high storm flows. Such water shall be settled, filtered, or otherwise treated prior to discharge back into the stream channel. Permittee shall place and maintain silt barriers, such as straw bales, "biologs," or filter fabric silt fencing, around the storm drain inlets until the threat of erosion from surrounding drainage ceases.
- 2.73 When operations require moving of equipment across a flowing stream, Permittee shall conduct such operations without increasing stream turbidity. For repeated crossings, Permittee shall install a bridge, culvert, or rock fill crossing, approved by CDFW prior to placement. Permittee shall restore all temporary access roads to pre-activity conditions upon project completion.
- 2.74 Upon CDFW determination that turbidity/siltation levels resulting from project related activities constitute a threat to aquatic life, activities associated with the turbidity/siltation shall be halted until effective CDFW approved control devices are installed or abatement procedures are initiated.
- 2.75 Permittee shall take precautions to minimize turbidity/siltation during all phases of construction and post-construction periods. Silt control structures shall be monitored for effectiveness and shall be repaired or replaced as needed. Precautions shall include, but are not limited to: pre-construction planning to identify site specific turbidity and siltation minimization measures and best management erosion control practices; best management erosion control practices during project activity; and settling, filtering, or otherwise treating silty and turbid water prior to discharge into a stream or storm drain.
- 2.76 Permittee shall pump all turbid or contaminated water from project activities into a holding facility or into a settling pond located in flat stable areas outside of the stream channel and/or sprayed over a large area outside the stream channel to allow for natural filtration of sediments. At no time shall turbid water from settling ponds be allowed to enter back into the stream channel until water is clear of silt. Upon completion of the project, Permittee shall remove all settling pond materials along with the trapped sediments in such a manner that said removal shall not introduce sediment to the stream.
- 2.77 Permittee shall maintain the sediment barrier(s) in good operating condition throughout the construction period and the following rainy season. Maintenance includes, but is not limited to, removal of accumulated silt and/or replacement of damaged silt fencing, coir logs, coir rolls, and/or straw bale dikes. If the sediment barrier fails to retain sediment, Permittee shall employ corrective measures, and

CDFW notified, immediately. Materials used in the sediment barriers shall not pose an entanglement risk to fish/wildlife.

- 2.78 The Permittee is responsible for the removal of non-biodegradable silt barriers after the disturbed areas have been stabilized with erosion control vegetation (usually after the first growing season).
- 2.79 All bare mineral soil exposed in conjunction with crossing construction, deconstruction, maintenance or repair, shall be treated for erosion prior to the onset of precipitation capable of generating run-off or the end of the yearly work period, whichever comes first. Restoration shall include mulching all bare mineral soil exposed in conjunction with encroachment work. Erosion control shall consist of at least 2 to 4 inches straw mulch and 100 pounds/acre equivalent barley seed, or native, tractor compacted slash (minimum 90% coverage), and native plants or regionally appropriate seeds, or sterile varieties or short-lived non-native annuals that are known not to persist or spread.
- 2.80 Upon completion of operations and/or onset of wet weather, Permittee shall remove all construction material and/or debris from the stream channel to an area not subject to inundation.
- 2.81 Permittee shall place rock, riprap, or other erosion protection in areas where vegetation cannot reasonably be expected to become reestablished. Permittee shall seed all other areas of disturbed soil which drains toward the stream channel with sterile or locally native plant seed, and mulch using a common recognized standard such as that utilized by the California Department of Transportation.
- 2.82 If a stream channel has been altered during the operations, Permittee shall return its low flow channel, as nearly as possible, to pre project conditions without creating a possible future bank erosion problem or a flat wide channel or sluice like area.
- 2.83 The gradient of the streambed shall also be restored to pre-project grade. If the stream channel is to be moved or displaced from its present course, Permittee shall place the new channel at the same grade and elevation as the present channel. The new channel shall not cause a sluice or flume like condition that increases the speed of water flows above that of the existing channel.

3. Compensatory Measures

To compensate for adverse impacts to fish and wildlife resources identified above that cannot be avoided or minimized, Permittee shall implement each measure listed below.

- 3.1 The Permittee shall follow all mitigation measures outlined in the Mitigation and Monitoring Report included as Appendix A of the Final EIR for the East Connector Roadway Project.

- 3.2 Permanent impacts to wetlands shall be mitigated and monitored to ensure a no-net loss of wetland or riparian habitat, according to the submitted Habitat Mitigation and Monitoring Plan (HMMP). All plant materials that die within the five-year monitoring period shall be replaced before the end of the year it was determined to have failed.

4. Reporting Measures

Permittee shall meet each reporting requirement described below.

- 4.1 The Permittee shall submit an annual mitigation status report by December 31 of each year that monitoring is conducted for five (5) years after completion of the revegetation portion of the project. This report shall outline the activities conducted under annual monitoring and maintenance, and discuss the mitigation performance as it relates to the success criteria. The report shall include the success of natural revegetation establishment, survival, percent cover, and height of tree and shrub species, the number by species of plants replaced (if applicable), and the method used to assess these parameters shall also be included. Monitoring reports should include photographs from designated photo stations. There should also be a summary of invasive species control and methods used to remove non-native plants.
- 4.2 A final report shall address the success of the mitigation, demonstrating that the success criteria have been met or why they cannot reasonably be accomplished, and specifying the effectiveness of the mitigation measures and any corrective actions recommended or taken.

CONTACT INFORMATION

Any communication that Permittee or CDFW submits to the other shall be in writing and any communication or documentation shall be delivered to the address below by U.S. mail, fax, or email, or to such other address as Permittee or CDFW specifies by written notice to the other.

To Permittee:

Trinity Co. Dept. of Transportation
Attn: Mr. Richard Tippet
Post Office Box 2490
Weaverville, CA 96093
(530)623-5312
rtippet@trinitycounty.org

To CDFW:

Department of Fish and Wildlife
Northern Region
601 Locust Street
Redding, California 96001
Attn: Kate Grossman
Notification #1600-2013-0192-R1
Fax: (530) 225-0324
katherine.grossman@wildlife.ca.gov

LIABILITY

Permittee shall be solely liable for any violations of the Agreement, whether committed by Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents or contractors and subcontractors, to complete the project or any activity related to it that the Agreement authorizes.

This Agreement does not constitute CDFW's endorsement of, or require Permittee to proceed with the project. The decision to proceed with the project is Permittee's alone.

SUSPENSION AND REVOCATION

CDFW may suspend or revoke in its entirety the Agreement if it determines that Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, is not in compliance with the Agreement.

Before CDFW suspends or revokes the Agreement, it shall provide Permittee written notice by certified or registered mail that it intends to suspend or revoke. The notice shall state the reason(s) for the proposed suspension or revocation, provide Permittee an opportunity to correct any deficiency before CDFW suspends or revokes the Agreement, and include instructions to Permittee, if necessary, including but not limited to a directive to immediately cease the specific activity or activities that caused CDFW to issue the notice.

ENFORCEMENT

Nothing in the Agreement precludes CDFW from pursuing an enforcement action against Permittee instead of, or in addition to, suspending or revoking the Agreement.

Nothing in the Agreement limits or otherwise affects CDFW's enforcement authority or that of its enforcement personnel.

OTHER LEGAL OBLIGATIONS

This Agreement does not relieve Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, from obtaining any other permits or authorizations that might be required under other federal, state, or local laws or regulations before beginning the project or an activity related to it.

This Agreement does not relieve Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, from complying with other applicable statutes in the FGC including, but not limited to, FGC sections 2050 *et seq.* (threatened and endangered species), 3503

(bird nests and eggs), 3503.5 (birds of prey), 5650 (water pollution), 5652 (refuse disposal into water), 5901 (fish passage), 5937 (sufficient water for fish), and 5948 (obstruction of stream).

Nothing in the Agreement authorizes Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, to trespass.

AMENDMENT

CDFW may amend the Agreement at any time during its term if CDFW determines the amendment is necessary to protect an existing fish or wildlife resource.

Permittee may amend the Agreement at any time during its term, provided the amendment is mutually agreed to in writing by CDFW and Permittee. To request an amendment, Permittee shall submit to CDFW a completed CDFW "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the corresponding amendment fee identified in CDFW's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5).

TRANSFER AND ASSIGNMENT

This Agreement may not be transferred or assigned to another entity, and any purported transfer or assignment of the Agreement to another entity shall not be valid or effective, unless the transfer or assignment is requested by Permittee in writing, as specified below, and thereafter CDFW approves the transfer or assignment in writing.

The transfer or assignment of the Agreement to another entity shall constitute a minor amendment, and therefore to request a transfer or assignment, Permittee shall submit to CDFW a completed CDFW "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the minor amendment fee identified in CDFW's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5).

EXTENSIONS

In accordance with FGC section 1605(b), Permittee may request one extension of the Agreement, provided the request is made prior to the expiration of the Agreement's term. To request an extension, Permittee shall submit to CDFW a completed CDFW "Request to Extend Lake or Streambed Alteration" form and include with the completed form payment of the extension fee identified in CDFW's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5). CDFW shall process the extension request in accordance with FGC 1605(b) through (e).

If Permittee fails to submit a request to extend the Agreement prior to its expiration, Permittee must submit a new notification and notification fee before beginning or continuing the project the Agreement covers (FGC section 1605(f)).

EFFECTIVE DATE

The Agreement becomes effective on the date of CDFW's signature, which shall be: 1) after Permittee's signature; 2) after CDFW complies with all applicable requirements under the California Environmental Quality Act (CEQA); and 3) after payment of the applicable FGC section 711.4 filing fee listed at:
http://www.dfg.ca.gov/habcon/ceqa/ceqa_changes.html.

TERM

This Agreement shall expire five (5) years from the effective date, unless it is terminated or extended before then. All provisions in the Agreement shall remain in force throughout its term. Permittee shall remain responsible for implementing any provisions specified herein to protect fish and wildlife resources after the Agreement expires or is terminated, as FGC section 1605(a)(2) requires.

AUTHORITY

If the person signing the Agreement (signatory) is doing so as a representative of Permittee, the signatory hereby acknowledges that he or she is doing so on Permittee's behalf and represents and warrants that he or she has the authority to legally bind Permittee to the provisions herein.

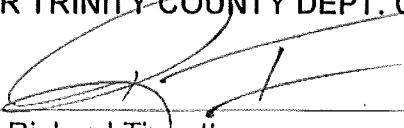
AUTHORIZATION

This Agreement authorizes only the project described herein. If Permittee begins or completes a project different from the project the Agreement authorizes, Permittee may be subject to civil or criminal prosecution for failing to notify CDFW in accordance with FGC section 1602.

CONCURRENCE

The undersigned accepts and agrees to comply with all provisions contained herein.


FOR TRINITY COUNTY DEPT. OF TRANSPORTATION



Mr. Richard Tippet
Director

26 Nov 13
Date

FOR DEPARTMENT OF FISH AND WILDLIFE



Donna L. Cobb
Aquatic Conservation Planning Supervisor

12/04/13
Date

Prepared by: Kate Grossman,
Environmental Scientist

EXHIBIT C – NOAA SECTION 7 CONSULTATIONS



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802- 4213

NOV - 3 2005

In reply refer to:
151422SWR02AR6405:SL

Mr. Gary Hamby
U.S. Department of Transportation
Federal Highway Administration
California Division
980 Ninth St, Suite 400
Sacramento, California 95814

Dear Mr. Hamby:

This letter transmits NOAA's National Marine Fisheries Service (NMFS) biological opinion (Opinion, enclosure 1) regarding the Federal Highway Administration's funding of the Trinity County East Connector Roadway Project (hereafter referred to as "Project") in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*). In addition, as required by the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), as amended (16 U.S.C. 1801 *et seq.*), NMFS' Essential Fish Habitat (EFH) consultation on Pacific coast salmon is enclosed (enclosure 2). Additionally, the incidental take statement for this Project is enclosed.

Endangered Species Act Consultation

The Project may affect threatened Southern Oregon/Northern California Coast (SONCC) coho salmon (listed on June 28, 2005, 70 FR 37160) and their critical habitat (designated on May 5, 1999, 64 FR 24049).

In the Opinion, NMFS concludes that the Project is not likely to jeopardize the continued existence of SONCC coho salmon or result in the destruction or adverse modification of their designated critical habitat.

This concludes formal consultation for the Project pursuant to section 7(a)(2) of the ESA. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of taking specified in the incidental take statement is exceeded, (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered, (3) the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion, or (4) a new species is listed or critical habitat designated that may be affected by the identified action.



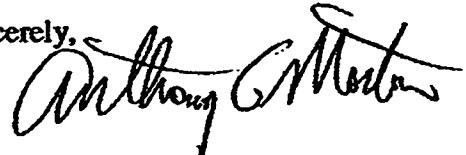
Essential Fish Habitat Consultation

In addition, the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267; U.S.C. 1801 *et seq.*), requires Federal agencies to consult with NMFS regarding any action or proposed action that may adversely affect essential fish habitat (EFH) for Federally-managed fish species. In Enclosure 2, NMFS evaluates the Project for potential adverse effects to EFH pursuant to section 305(b)(2) of the MSFCMA. The action area of the Project includes areas identified as EFH for various life stages of coho salmon Federally-managed under the Pacific Coast Salmon Fishery Management Plan. EFH consultation and Conservation Recommendations are provided in Enclosure 2.

Section 305(b)(4)(B) of the MSFCMA and the Federal regulations implementing the EFH provisions of the MSFCMA [50 CFR § 600.920(j)] require Federal action agencies to provide NMFS a detailed written response to EFH Conservation Recommendations within 30 days of its receipt, including a description of measures adopted by the agency for avoiding, mitigating, or offsetting the impact of the Project on EFH. In the case of a response that is inconsistent with NMFS' conservation recommendations, Trinity County Department of Transportation must explain their reasons for not following the recommendations, including the scientific justification for any disagreements with NMFS over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects [50 CFR § 600.920(j)].

Please contact Mr. Steve Liebhardt at (707) 825-5186, or via e-mail at steve.liebhardt@noaa.gov if you have any questions concerning these consultations.

Sincerely,



for Rodney R. McInnis
Regional Administrator

Enclosures:

1. Biological Opinion
2. EFH Consultation and Conservation Recommendation

DEPARTMENT OF TRANSPORTATION
DISTRICT 2 OFFICE OF LOCAL ASSISTANCE
1657 RIVERSIDE DRIVE (96001)
P. O. BOX 496073
REDDING, CA 96049-6073
PHONE (530) 225-3434
FAX (530) 225-3020
TTY (530) 225-2019



*Flex your power!
Be energy efficient!*

September 1, 2006

2-TRI-0-CR
RPSTPL-5905 (036)
EA 02-454184
Weaverville East Connector
New Road
Trinity County

Mr. Gene K. Fong
Division Administrator
U.S. Department of Transportation
Federal Highway Administration
650 Capitol Mall, Suite 4-100
Sacramento, CA 95814

Attention: Mr. Lanh Phan

Dear Mr. Phan:

Weaverville East Connector New Road Project NOAA Fisheries Biological Opinion: Request to Reinitiate Consultation

On behalf of Trinity County, Caltrans Local Assistance would like to request FHWA reinitiate consultation to amend the Biological Opinion (B0) for the Weaverville East Connector New Road Project (ref. # 151422SWR02AR6405:SL, issued November 3, 2005). Specifically, we are requesting to improve the wording of Term and Condition 1(e) of the B0.

Term 1(e) states:

The Contractor shall develop and implement site-specific best management practice, A water Pollution Control Plan, and emergency spill controls, and is responsible for containment and removal of any toxins released. TCDOT shall monitor the contractor to ensure compliance and allow NMFS to review and make any changes or additions to the best management practices, SWPPP, emergency spill controls, and grading and landscaping plans before construction begins. NFMS will review and make any changes or additions to the above plans within 30 days of receipt.

This wording conflicts with State Water Board's regulatory processes & permits and is inconsistent with business practices as outlined in the Local Assistance Procedurals Manual. Caltrans and Trinity County DPW is concerned that implementation of term 1(e) as currently written will result in increased project expenditures, project delays, and conflicts between two jurisdictional regulatory agencies' requirements (NPDES and NMFS BO permits).

On August 21 and August 30, 2006 Caltrans conducted a technical assistance consultation with Chuck Glasgow and Steve Liebhardt of the Arcata NMFS office via email. C. Glasgow has indicated that NFMS would be willing to amend the BO. He has also suggested that after consultation is reinitiated that Federal Highways and Trinity County work with the Arcata office to improve the wording of term and condition 1(e).

If you have questions or need additional information, please contact me at (530) 225-3034 or at julie_owen@dot.ca.gov.

Sincerely,

Julie Owen
NEPA Liaison

cc: Lanh Phan, FHWA
Gary Sweeten, FHWA
Jan Smith, Trinity County
Rick Somers, Caltrans



U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
CALIFORNIA DIVISION
650 Capitol Mall, Suite 4-100
Sacramento, CA. 95814
September 28, 2006

IN REPLY REFER TO

HDA-CA

File # 02-TRI-0-CR

RPSTPL-5905(036)

EA 02-454184

Weaverville East Connector

Document # P55522

Mr. Rodney R. McInnis, Regional Administrator
National Marine Fisheries Service
501 West Ocean Blvd., Suite 4200
Long Beach, CA 90802-4213

Dear Mr. McInnis:

The County of Trinity, in cooperation with the California Department of Transportation (Caltrans) and the Federal Highway Administration (FHWA), is proposing to construct a new 2.1 km (1.3 mile) long, two-lane minor arterial road along the east side of Weaverville, Trinity County, California. The proposed project would include constructing a new roadway, a new bridge crossing over East Weaver Creek, a new traffic signal, Class I & II bicycle trails, and a pedestrian/bicycle bridge. On November 3, 2005 your office issued a biological opinion (BO) and Essential Fish Habitat Conservation Recommendations (Reference # 151422SWR02AR6405:SL) for this proposed project.

This letter is to re-initiate formal Section 7 consultation, pursuant to the Endangered Species Act, and request an amendment to the BO for the Term and Condition [T&C] 1(e), which is currently written to state:

"The Contractor shall develop and implement site-specific best management practices, a Water Pollution Control Plan, and emergency spill controls, and is responsible for containment and removal of any toxins released. TCDOT shall monitor the contractor to ensure compliance and allow NMFS to review and make any changes or additions to the best management practices, SWPPP, emergency spill controls, and grading and landscaping plans before construction begins. NMFS will review and make any changes or additions to the above plans within 30 days of receipt."

This T&C conflicts with State Water Board's regulatory processes and permits (National Pollutant Discharge Elimination System permit and Clean Water Act Section 401 permit). Our concern is that implement the T&C 1(e), as currently written, would result in increased project expenditures, project delays, and conflicts between two jurisdictional regulatory agencies' requirements (the above permits and your office's BO).



On August 21 and August 30, 2006, Mr. Chuck Glasgow and Mr. Steve Liebhardt, of your office in Arcata, have been in discussion with Ms. Julie Owen, Caltrans NEPA Liaison, regarding this issue.

Your assistance in resolving this matter is greatly appreciated. If you have any questions, please contact Lanh Phan, Project Development Engineer, at (916) 498-5046 or Gary Sweeten, Environmental Specialist, at (916) 498-5128.

Sincerely,

/s/ Lanh Phan

For
Gene K. Fong
Division Administrator

cc: (E-mail)
Chuck Glasgow, NOAA Fisheries
Steve Liebhardt, NOAA Fisheries
Jay Norvell, Caltrans
Lena Ashley, Caltrans
Gina Moran, Caltrans
Katrina Pierce, Caltrans
Terry Abbott, Caltrans
Germaine Belanger, Caltrans
John Pedersen, Caltrans
Julie Owen, Caltrans
Gary Sweeten, FHWA
Larry Vinzant, FHWA
Lanh Phan, FHWA



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

OCT 26 2006

In reply refer to:
2006/05126

Mr. Gene Fong, Division Administrator
U.S. Department of Transportation
Federal Highways Administration
California Division
980 Ninth St, Suite 400
Sacramento, CA 95814

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**DISTRICT 2
LOCAL ASSISTANCE**

Dear Mr. Fong:

On October 5, 2006, NOAA's National Marine Fisheries Service (NMFS) received your September 28, 2006, letter reinitiating formal section 7 consultation pursuant to the Endangered Species Act, and requesting an amendment to term and condition (T&C) 1.e. in the biological opinion for the funding of Trinity County Department of Transportation's East Connector Roadway Project (Project).

On August 21 and 30, 2006, Ms. Julie Owen (California Department of Transportation), Mr. Charles Glasgow (NMFS), and Mr. Steve Liebhardt (NMFS) discussed T&C 1.e., reiterated below,

T&C 1.e. "The Contractor shall develop and implement site-specific best management practices, a Water Pollution Control Plan, and emergency spill controls, and is responsible for containment and removal of any toxins released. TCDOT shall monitor the contractor to ensure compliance and allow NMFS to review and make any changes or additions to the best management practices, SWPPP, emergency spill controls, and grading and landscaping plans before construction begins. NMFS will review and make any changes or additions to the above plans within 30 days of receipt." (NMFS 2005)

In addition, Ms. Owen, Mr. Glasgow, and Mr. Liebhardt agreed that T&C 1.e. from the old ITS should be replaced with T&Cs 1.e. through 1.i. in a new ITS. NMFS hereby amends the ITS of the Project biological opinion (NMFS 2005) and replaces it with a new ITS (enclosure).


NMFS has determined that your request and NMFS' amendment of the ITS would not result in different or additional adverse effects to Southern Oregon/Northern California Coast (SONCC) coho salmon (*Oncorhynchus kisutch*) or SONCC coho salmon critical habitat as analyzed in its November 3, 2005, biological opinion. Therefore, reinitiation of section 7 consultation is not warranted at this time. However, reinitiation of formal consultation is required where discretionary Federal involvement or control over the action has been retained or is authorized by law and: (1) if the amount or extent of taking specified in the incidental take statement is exceeded, (2) if new information reveals effects of the action that may affect listed species or



critical habitat in a manner or to an extent not previously considered, (3) if the Project is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion, or (4) if a new species is listed or critical habitat designated that may be affected by the Project (50 CFR § 402.16). In instances where the amount or extent of incidental take is exceeded, formal consultation shall be reinitiated immediately.

Please contact Mr. Steve Liebhardt at (707) 825-5186, or via e-mail at steve.liebhardt@noaa.gov if you have any questions concerning this letter or the new ITS.

Sincerely,


Rodney R. McInnis
Regional Administrator

Enclosure

cc: Julie Owen – California Department of Transportation, Redding
Copy to file: ARN# 151422SWR2006AR0061

Reference

National Marine Fisheries Service. 2005. Biological Opinion on the Funding of Trinity County East Connector Roadway Project. Southwest Region. November.

Endangered Species Act - Section 7 Consultation

BIOLOGICAL OPINION

ACTION AGENCY: Federal Highways Administration

ACTIVITY: Funding of Trinity County Department Of Transportation Road and Bridge Construction Project

CONSULTATION CONDUCTED BY: Southwest Region, National Marine Fisheries Service

FILE NUMBER: 151422SWR02AR6405:SL

DATE ISSUED:

I. BACKGROUND AND CONSULTATION HISTORY

The purpose of the proposed Trinity County East Connector Roadway Project (Project) is to construct new road, pedestrian / bike lanes and bridges across Weaver Creek in order to accommodate traffic problems resulting from the large volume of vehicles using State Route (SR) 299 and SR 3.

The consulting firm Jones & Stokes contacted the National Marine Fisheries Service (NMFS) via telephone in August 2001 to identify potential impacts to Southern Oregon/Northern California Coast (SONCC) coho salmon (*Oncorhynchus kisutch*) in East Weaver Creek resulting from implementation of the Project. The Trinity County Department of Transportation (TCDOT) sent a draft biological assessment (BA) and a Request for Technical Assistance to Irma Lagomarsino, NMFS, on May 16, 2002. Brad Wiley, NMFS, reviewed the draft BA and provided technical assistance. Jones & Stokes contacted Mr. Wiley on June 5, 2002, to discuss any issues and the species occupying East Weaver Creek. Jan Smith (environmental specialist, TCDOT) also contacted Brad Wiley on July 1, 2002, to discuss comments on the draft BA. NMFS provided written comments on September 20, 2002, and those comments were incorporated into the final BA. Jim Simondet, NMFS, also spoke with personnel at TCDOT about the proposed Project. While Mr. Simondet was preparing a biological opinion, the consultation was delayed due to litigation. The litigation was settled and consultation commenced. Steve Liebhardt, NMFS, conducted a site visit on October 14, 2004, with TCDOT personnel, and then requested more information regarding this Project. TCDOT then sent in the requested information for formal consultation.

II. DESCRIPTION OF THE PROPOSED ACTION

The proposed action is the Federal Highway Administration funding of the Project. The following description of the Project is from the biological assessment (BA) received by NMFS from the TCDOT in October 2002.

The TCDOT is proposing to construct a new two-lane, undivided, limited-access arterial road along the east side of Weaverville, in Trinity County, California, connecting (SR) 299 at Glen Road to SR 3 at Five Cent Gulch Street, and crossing East Weaver Creek (on county land). The proposed Project will include a bridge crossing over East Weaver Creek, a new traffic signal at the East Connector Roadway intersection with SR 299 and Glen Road, Class I and Class II bicycle trails, and a pedestrian/bicycle bridge crossing of East Weaver Creek.

A. Project Activities

The proposed Trinity County East Connector Roadway Project includes the following components:

1. A two-lane undivided, limited-access arterial with 3.6-m lanes (12 feet) and 1.8- to 2.4-m (6- to 8-feet) shoulders, including a Class II bicycle lane.
2. A new bridge over East Weaver Creek that will meet all NMFS fish passage criteria and pass the 50-year flow with at least 3 feet of clearance for debris, and pass the 100-year flow with approximately 1 foot of clearance for debris.
3. Two new culvert crossings of Lance Gulch designed to handle a 100-year storm event. These crossings are outside the range of anadromy due to a subsurface drainage system beneath SR 299 and the shopping center downstream. Culverts will be provided at two locations where the proposed East Connector crosses Lance Gulch in order to maintain existing drainage patterns.
4. A separate Class I bicycle trail adjacent to Levee Road on the east side, with a crossing of East Weaver Creek near Lowden Park.
5. Rezoning of a severed portion (2 acres) of property owned by the Trinity River Lumber Mill adjacent to Martin Road from an Industrial to a Residential zoning designation allowing up to 4 new residential parcels.

B. Construction Methodology

1. Schedule

Construction of the proposed Project will occur over 2 construction seasons. Construction in the creek or riparian areas will take place between June 15 and October 15. Riparian vegetation clearing involving cutting, trimming, and topping riparian trees and shrubs will take place

between August 1 and March 15. However, no root removal or other ground-disturbing clearing activities will occur until after June 15.

2. Drainage Design

During both the construction and operation phases of the proposed Project, direct discharge of surface runoff to East Weaver Creek and associated drainages would be avoided. New and existing drainage facilities, including channels, vegetated swales, detention basins, culverts, and drop inlets, would be sized to handle the anticipated flow from the proposed Project. Construction drainage would be addressed in a Storm Water Pollution Prevention Plan (SWPPP) for the Project.

3. Erosion Control/Winterization

After construction of the proposed Project, the right-of-way would be stabilized and landscaped in accordance with Trinity County and California Department of Transportation landscape guidelines and specifications. Erosion control will use either native or non-persistent nonnative grasses for quick establishment, followed up with native grasses and forbs. Native and/or nonnative shrubs and trees may be used for the final landscaping. No noxious or invasive weed species would be used. Erosion control will be discussed further in the Grading Plan and Landscape Plan, which would be prepared as part of the design phase.

Erosion and sediment control measures will be maintained during the non-work period (October 16 through June 14) and will be checked within 24 hours of each 0.5 inch or greater rainfall event, and every 14 calendar days between October 16 and June 14, until site stabilization is achieved. Significant amounts of sediment that leave the site (runoff) will be cleaned up (prevent erosion from continuing) within 24 hours of their deposition.

4. Disposal of Excavated Material/Importation of Fill Material

The Project design would attempt to balance cut and fill quantities to limit the amount of soils imported and waste soils requiring disposal. Clean excavated soil that is free of debris would be used for fill in creating road embankments.

If excavated material is generated that requires disposal, it may be stockpiled in the TCDOT maintenance yard at the north end of the Project, for use on other Projects. The TCDOT contractor would be responsible for transporting both excavated and imported materials, and for disposing of excavated materials, with TCDOT providing oversight. Spoils would be transported and stored in an area where no material would be able to get into area streams.

5. Other Construction Waste

The SWPPP would contain requirements for the cleanup of an accidental spill of petroleum-based products, cement, or other construction pollutants (see additional discussion below). Solid debris from the construction site or from other activities associated with the proposed activities

would be kept out of East Weaver Creek and associated drainages. Washing of construction vehicles or other equipment in drainage paths to the creek would be prohibited.

6. General Storm Water Construction Permit

The proposed Project will comply with regulations involving the control of pollution in storm water discharges under the National Pollutant Discharge Elimination System program (section 402[p], Clean Water Act). Under the program, TCDOT would file a Notice of Intent with the State Water Resources Control Board (SWRCB) to obtain a General Construction Activity Storm Water Permit prior to construction of the proposed Project. The SWRCB and Federal Law (40 CFR Parts 122-124) require that the best available technology (BAT) that is economically achievable, and best conventional pollutant control technology (BCT) is used to reduce pollutants.

TCDOT or its contractor would be required to prepare a SWPPP, which would include information on runoff, erosion control measures to be employed, and any toxic substances to be used during construction activities. A monitoring program would be implemented to evaluate the effectiveness of the measures included in the SWPPP.

The contractor shall provide temporary water pollution control measures, including, but not limited to, dikes, basins, ditches, and applying straw and seed, which become necessary as a result of the contractor's operations. The contractor shall coordinate water pollution control work with all other work done on the contract.

Before starting any work on the Project, the contractor shall submit, for acceptance by the engineer TCDOT, a program to control water pollution effectively during construction of the Project. The program shall show the schedule for the erosion control work included in the contract and for all water pollution control measures that the contractor proposes to take in connection with construction of the Project to minimize the effects of the operations upon adjacent streams and other bodies of water. The contractor shall not perform any clearing and grubbing or earthwork on the Project, other than that specifically authorized in writing by the engineer, until the program has been accepted.

If the measures being taken by the contractor are inadequate to control water pollution effectively, the engineer may direct the contractor to revise the operations and the water pollution control program. The directions will be in writing and will specify the items of work for which the contractor's water pollution control measures are inadequate. No further work shall be performed on those items until the water pollution control measures are adequate and, if also required, a revised water pollution control program has been accepted. The engineer will notify the contractor of the acceptance or rejection of any submitted or revised water pollution control program in not more than 5 working days. Unless otherwise approved by the engineer in writing, the contractor shall not expose a total area of erodible earth material, which may cause water pollution; exceeding 70,000 m² for each separate location, operation or spread of equipment before either temporary or permanent erosion control measures are accomplished.

Where erosion that will cause water pollution is probable due to the nature of the material or the season of the year, the contractor's operations shall be scheduled so that permanent erosion control features will be installed concurrently with or immediately following grading operations.

C. Construction Phasing

The proposed Project would be constructed in several stages, as described below.

1. Phase 1 - Clear and Grade Roadway

Phase 1 would consist of the removal of vegetation, drainage facilities, and existing improvements for the entire length of the proposed new two-lane, undivided, limited-access road, including one fire hydrant on Brown's Ranch Road. The earthwork would be completed, and the area would be graded to form the road prism. Construction of the proposed roadway bridge crossing and the bicycle trail crossing over East Weaver Creek also may begin at this time. Construction of the proposed Project will occur over 2 construction seasons. Construction in the creek or riparian areas will take place between June 15 and October 15. Riparian vegetation clearing involving cutting, trimming, and topping riparian trees and shrubs will take place between August 1 and March 15. However, no root removal or other ground-disturbing clearing activities will occur until after June 15.

2. Phase 2 - Relocation of Utilities

In cooperation with the utility companies, utility poles, and sewer and water service connections will be installed, relocated and/or placed under ground to the desired depth and location in the road prism. One fire hydrant on Brown's Ranch Road will be relocated. A utility pole at the intersection with SR 299 will be removed, and the overhead electric lines will be placed under ground. In addition, a water main for future use by the Weaverville Community Services District would be installed in the road prism. The water line will not extend into presently unserved areas, but will provide a looped system for better circulation and emergency backup water supply between the presently served areas on Martin Road/Pioneer Heights and Brown's Ranch Road.

3. Phase 3 - Construction of Lanes

After the utilities are placed under ground, the two-lane, undivided, limited-access arterial road and associated intersection improvements and Class II bike lanes, and the Class I bicycle trail along Levee Road would be constructed, including surfacing and striping.

D. Staging Areas

One or more staging areas, including a temporary office trailer, equipment and materials storage, and a parking area for construction workers and equipment, would be needed for the duration of the proposed Project. Four potential staging areas have been designated and included in the Project study area. Two of the staging areas are located at the northern end of the road corridor,

on County property between SR 3 and East Weaver Creek. Staging Area 3 would be located on a disturbed upland portion of the Trinity River Lumber Mill property, at the mid-point of the road corridor on the east side. Staging Area 4 spans Lance Gulch at the southern end of the road corridor on Trinity Plaza Shopping Center property. Staging areas will be designated to avoid (placed away from streams and riparian vegetation) any impacts to riparian areas. A temporary access agreement would be obtained from the property owner(s) for any temporary staging areas on private property. After construction is completed, the staging areas would be revegetated with native species, with the exception of Staging Area 1, which is scheduled to be converted (timber sale) to an extension of the County Department of Transportation's Maintenance Yard.

E. Roadway Bridge Specifications and Construction

1. Bridge Type

The proposed structure consists of a three-span cast-in-place pre-stressed box girder (CIP PS Box Girder) bridge. The structure proposed for Alternative 2 (proposed Project) alignment will have no skew and is 42.8 m (approximately 140 feet) long with a 17.2 m (approximately 56.5 feet) center span and 12.8 m (approximately 42 feet) end spans. The bridge will have reinforced concrete abutments at each end, placed outside of the ordinary high water level of East Weaver Creek. Approach fills will be placed up to each abutment wall at a slope of 1 (vertical) to 1.5 (horizontal). Rock slope protection will be placed on the fill slopes. The structure will be supported by either pier walls or standard column supports. If pier walls are selected, the pier wall will be approximately 1.5 to 2 feet wide. If columns are selected, a single column approximately 1.5 m (5 feet) in diameter is proposed at the center of each pier location. The pier wall and single column alternatives are proposed as the feasible alternatives because both options would minimize debris build-up at the structure. The most either of these alternatives would intrude on the ordinary high water mark would be approximately 0.4 meters.

2. Foundation

The preferred foundation type and one proposed for this Project will be a pile foundation most likely consisting of either driven pre-cast or steel piles, or piles cast in pre-drilled holes (CIDH piles) or cast-in-steel shells (CISS). Foundation exploration has not been completed at the bridge, but a preliminary site assessment has indicated that the stream bed material is generally a mix of large cobbles and sandy gravel. The presence of large cobbles may affect the practicality of using concrete driven piles. A geotechnical study of the site will reveal the size of underlying cobbles. The preliminary site assessment also uncovered evidence of high flow and a potential for scour at the proposed bridge foundations. The bridge pile foundations proposed have been selected to accommodate scour demands. Future hydraulic (to determine scour depth) and geotechnical surveys with boring logs and soil samples are necessary to determine the type of pile foundation system most suitable for this site. This information will ultimately be used to select the preferred foundation alternative.

3. Hydraulics

The proposed bridge is located in a reach of floodplain mapped by the Federal Emergency Management Agency (FEMA) by approximate study methods. The proposed bridge was designed to pass the most probable 100-year flood and also the most probable 50-year flood plus debris.

The relationship between the bridge opening and upstream water surface was used to identify a bridge length necessary to meet the requirements of FEMA (maximum increase in Base Flood elevation of 1.0 foot) and the recommended minimum design standards of Caltrans and FHWA. The structure profile was based on Caltrans and FHWA hydraulics requirements. The soffit elevation of the bridge was set for 3.0 ft above the 50-year flood water surface elevation. Given the size of East Weaver Creek and the potential for drift, the appropriate clearance to consider for drift was determined to be 3.0 ft.

4. In-Stream Construction

The proposed three-span East Connector Bridge will have no piers or columns located within the low flow channel of the creek. The piers or columns for the structures proposed will be partially located within the ordinary high water mark. If pier walls are used, there will be 4.6 m² of fill within ordinary high water. If columns are used, it would result in 6.9 m² of permanent fill and temporary forms within the limits of the ordinary high water mark.

All structure construction required for the foundation, piers, and temporary crossing structure will be outside of the low flow channel limits. All fill material required for bridge abutments and approaches for both the proposed roadway structure and temporary crossing will be placed above the ordinary high water mark. For the roadway structure, this will require construction of a retaining wall between Stations 102 and 103 (100 meters) for either alignment alternative. This retaining wall will keep the road fill from encroaching into the ordinary high water channel of East Weaver Creek, but the retaining wall itself would encroach into the ordinary high water mark.

Temporary falsework will be required during construction of the cast-in-place concrete structure. All falsework required for the construction of the proposed structure will be placed outside of the low flow channel. Falsework will not be placed in the ordinary high water channel until after June 15 and shall be removed from the ordinary high water channel no later than October 15. No equipment will be operated within the active creek during the erection or removal of falsework.

Access to the proposed bridge construction location can be obtained from both sides of the creek. Equipment will not need to work in the active creek (low flow/wetted channel) in order to construct the bridge, falsework, or the roadway approaches. The contractor may elect to construct a temporary creek crossing adjacent to the proposed permanent structure to provide convenient access to allow equipment to cross over the creek for purposes of building the new bridge. The temporary crossing would be approximately 16 ft wide and would consist of placement of a flat rail car or similar temporary bridge component on top of fill approaches on

either side of the creek. The temporary crossing structure and the fill approaches will not encroach into the low flow channel and will maintain passage of the low flow channel during construction. Once construction is completed the temporary crossing and all associated fill would be removed. If construction is not completed by October 15, any fill associated with the temporary crossing will be removed from the ordinary high water channel before October 15.

5. Pile System and Dewatering Activities

For the driven piles option, pre-cast concrete or steel piles will be driven at the abutment and pier locations. The number, depth, and size of pile will be determined by the subsequent foundation report once it is completed. Pile driving should take approximately 1 week to complete. The operations do not need to take place 24 hours a day. CISS piles would also involve driving the steel casings. Like all in stream construction activities, pile driving would be limited to the period between June 15 and October 15.

For the CIDH/CISS piles option, the hole will be drilled to a specified tip elevation. A dense drilling fluid (bentonite mud) will be used during the drilling operation. Once the drilled hole is finished, steel reinforcement will be placed in the drilled hole, and concrete will be pumped into the bottom of the hole, displacing the drilling fluid. As the concrete displaces the drilling fluid, it will be pumped to a tank and/or truck for re-use or removal to an off-site disposal facility. The soil removed from the hole during drilling will be placed in a staging area outside of the low flow channel by dropping it off the auger bit. Then a front end loader will pick it up and put it into a dump truck for transport to an off-site disposal area. The disposal area will be located outside of the ordinary high water mark, in a depression or bermed area where it will not be entrained in stormwater and re-deposited in the creek or tributary drainages.

Water containing sediment will be pumped directly into a tank and/or water truck for removal and transport to an off-site disposal area. The off-site disposal area will be the same or similar to the spoils disposal area, outside the ordinary high water in a depression or bermed area where it will percolate into the ground without being entrained in storm water and re-deposited in the creek or tributary drainages.

Variations of these techniques may be required depending on the geotechnical study. Use of a steel casing to assure caving of the hole does not occur may be necessary. The steel casing may be placed in the drilled hole or driven into the hole by the CISS method. A plan detailing the pile construction method used will be submitted to the TCDOT resident engineer for approval. The method must meet the terms and conditions of the contract and must conform to the permit requirements and mitigation measures in the environmental documents, which will be incorporated into the Project specifications.

It is not anticipated that cofferdams would be necessary to construct the structure foundation. However, if the construction of cofferdams is necessary for foundation construction, saturated material excavated from within the cofferdam will be placed in an adjacent temporary sediment stilling basin, located outside of the ordinary high water mark, in an area where it will percolate back into the soil without being entrained in storm water and re-deposited in the creek or

tributary drainages.

6. Concrete

Concrete casting for the structure would be done in tightly sealed forms to prevent any releases to East Weaver Creek. Structural elements would be placed on the site using cranes. No cement will be allowed to contact the live stream. Any water that does come in contact with wet concrete, such as groundwater in footing excavations isolated from the live stream, will not be allowed to enter the creek. It will be pumped to a truck for disposal or treatment, or it may be discharged to a sediment stilling basin located outside of the ordinary high water mark, in an area where it will percolate back into the soil without being entrained in storm water and re-deposited in the creek or tributary drainages.

7. Pedestrian/Bicycle Bridge Specifications and Construction

A prefabricated bridge that can span the entire width of the creek from levee to levee is proposed. The bridge construction will involve the following elements:

- Because the bridge structure itself is prefabricated, no construction will be required to construct the bridge itself. The prefabricated structure will be delivered to the Project site, assembled, and placed with a crane.
- The structure is a clear span; there will be no piers required within the creek.
- All construction will take place outside of the limits of the ordinary high water mark of the creek.

Access to the site is available from both sides of the creek. No equipment will need to be within the limits of the creek channel or the ordinary high water mark to construct/install the bridge. Falsework is not expected to be necessary for installation of this prefabricated bridge.

F. Mitigation Measures

The following proposed measures were developed as part of the natural environment study report and through coordination with the resource agencies to avoid and minimize potential impacts on fisheries resources.

1. Mitigation Measure 1: Minimize Removal and Disturbance of Riparian Habitat along East Weaver Creek.

The County will ensure that the removal or disturbance of riparian habitat that is not required for construction or access to the Project site will be prohibited by installing orange construction barrier fencing (and sedimentation fencing in some cases) between the construction site and the riparian/creek area. The protected area will be designated as an "Environmentally Sensitive Area."

The fencing will be installed before construction activities begin and will be maintained throughout the construction period. The following paragraph will be provided in the construction specifications for Environmentally Sensitive Areas:

"The Contractor's attention is directed to the areas designated as Environmentally Sensitive Areas. These areas are protected, and no entry by the Contractor for any purpose will be allowed. The Contractor shall take measures to ensure that Contractor's forces do not enter or disturb these areas, including giving written notice to his employees and subcontractors. Temporary fences around the Environmentally Sensitive Areas shall be installed as the first order of work."

2. Mitigation Measure 2: Avoid Long-Term Impacts on Woody Riparian Vegetation and Associated Habitat.

The County will avoid long-term impacts on woody riparian vegetation by trimming trees and shrubs rather than removing the entire woody species where possible when creating temporary access to the construction site. Where possible, shrubs and trees should be cut at least 1 foot above the ground level to leave the root systems intact and allow for more rapid regeneration after construction. Root removal or other ground-disturbing clearing activities would not be conducted until after June 15.-

3. Mitigation Measure 3: Develop and Implement a Riparian Revegetation Plan.

The County will prepare a riparian revegetation plan to compensate for the removal of riparian vegetation along East Weaver Creek. This measure applies to tree and shrub species that will be removed entirely (including their root systems) for construction of the bridge. The plan will focus on replanting or enhancing riparian habitat on a suitable site within the creek's watershed that does not require vegetation maintenance for flood control activities. Woody riparian vegetation will be replaced at a minimum of a 2:1 ratio (two trees/shrubs planted for every one tree/shrub removed). Enhancement of riparian habitat could be accomplished through the removal of invasive species and replacement with native riparian species.

The County will enhance the riparian habitat along East Weaver Creek, behind the County maintenance yard. This would involve planting approximately two riparian trees and shrubs for one removed within a 1,000-foot-long bank area along the County-owned side of the creek, upstream of the Project area, and outside of the flood control section. The County is evaluating the feasibility of planting additional riparian species in this area and determining whether the area will support the number of trees and shrubs required to meet the 2:1 compensatory mitigation requirement.

The riparian revegetation plan will be developed through coordination with DFG. The plan will include design specifications, an implementation plan, maintenance requirements, and a monitoring program. A brief report summarizing the results of monitoring and recommending additional needed actions will be submitted to DFG, the Corps, if required as part of the section 404 permit, and NMFS.

4. Mitigation Measure 4: Implement Avoidance and Minimization Measures to Avoid Short-Term and Long-Term Effects on East Weaver Creek and Associated Aquatic and Riparian Habitat.

The County will implement avoidance and minimization measures to minimize and avoid disturbance to East Weaver Creek and associated habitat for special-status and common species. Prior to construction, a SWPPP will be prepared and submitted to NMFS for review and comment.

- a. Construction activities will be scheduled so that they do not interfere with the reproductive cycles of fish species. Work within the ordinary high water zone and riparian zone of East Weaver Creek or Lance Gulch will take place from June 15 to October 15, except for tree trimming and cutting, which will take place as described in Minimization Measure 2. This time frame will avoid the majority of the adult and juvenile migration, spawning, and incubation of anadromous species (Trinity County East Connector Roadway Project BA).
- b. Activities that increase the erosion potential within the action area shall be restricted to the fullest extent possible to the relatively dry summer and early fall period to minimize the potential for rainfall to mobilize and transport sediment to East Weaver Creek. If these activities must take place during the late fall, winter, or spring, then temporary erosion and sediment control structures must be in place and operational at the end of each construction day and maintained until disturbed ground surfaces have been successfully re-vegetated.
- c. Hydro-seeding shall be implemented during construction of the proposed Project in non-riparian upland areas.
- d. Erosion control shall consist of one application of erosion control materials within non-riparian upland areas to embankment slopes, excavation slopes, and other areas designated by the Project engineer. These materials shall consist of fiber, seed, commercial fertilizer, and water. Commercial fertilizer used for non-riparian upland areas shall conform to the provisions in Section 20-2.02 of the Caltrans Standard Specifications.
- e. No contact of wet concrete with the live stream will be allowed. Groundwater that comes in contact with wet concrete during construction of the footing excavations will not be allowed to enter the creek, but will be pumped to a truck or upland area for disposal or treatment, or it may be discharged to a sediment-stilling basin and percolated back into the soil.
- f. If drilling muds are used to drill holes within the ordinary high-water zone, all drilling muds and fluid within all drilled holes will be pumped through a closed system, contained on-site in tanks, removed from the Project area, and disposed off-site at an appropriate facility.
- g. The TCDOT contractor will remove all spoil materials from the drilled pier holes and dispose of the material in a manner that will not result in discharge of runoff of sediment into area streams.

- h. Construction activities will be timed to avoid potential impacts on rearing juvenile salmonids. Pile driving will be limited to occur between 7 a.m. and 7 p.m., June 15 to October 15.
- i. Heavy equipment will not be operated in the active flow channel of East Weaver Creek.
- j. No diversion of surface flows will be allowed.
- k. Maintenance and refueling areas for equipment will be located a minimum of 150 ft away from the active stream channel. Washing equipment will occur where the water cannot flow into the creek channel.
- l. Spill containment booms will be maintained on-site at all times during construction operations and/or staging or fueling of equipment.
- m. The TCDOT contractor will conduct daily inspections and maintenance of erosion and sediment control measures. Failures will be repaired each work day if they occur.
- n. Soil exposure will be minimized through the use of BMPs, ground cover, and stabilization practices. Exposed dust-producing surfaces will be sprinkled daily until wet while avoiding producing runoff.
- o. All temporary erosion and sediment control measures will be removed after the working area is stabilized or as directed by the Project engineer.
- p. Prohibit using the portions of Staging Areas 1, 2, and 4 that run through and immediately adjacent to Lance Gulch and East Weaver Creek. TCDOT will limit the use of Staging Area 4 to the south side of Lance Gulch. The north side of Lance Gulch is heavily vegetated and shall not be used for staging equipment and material. All staging areas will be established at least 50 feet from the top of the stream bank or 50 feet from the outer edge of the riparian habitat, whichever is farther. This buffer will be clearly identified on the design drawings and delineated in the field with orange construction barrier fencing. Sedimentation fencing or other erosion and sediment control measures will be installed between the staging area and the riparian area to prevent sediment and pollutant discharges to Lance Gulch and East Weaver Creek. There will be no removal of riparian vegetation for staging purposes.

For more information on the proposed action please refer to the BA (2002).

G. Action Area

The action area is defined as: "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50 CFR § 402.02). The action area for the proposed Project includes the East Weaverville Basin from the Project area and downstream 1.25 miles to Weaver Creek, and Lance Gulch, a tributary to East Weaver Creek.

III. STATUS OF THE SPECIES AND CRITICAL HABITAT

NMFS listed the SONCC coho salmon Evolutionarily Significant Unit (ESU) as threatened

under the ESA on May 6, 1997 (62 FR 24588). Following updated status reviews, NMFS re-listed the SONCC coho salmon ESU as threatened under the ESA on June 28, 2005 (70 FR 37160). This ESU includes populations of coho salmon between Cape Blanco, Oregon and Punta Gorda, California. This section summarizes the status of SONCC coho salmon and their CH, and species' life history and population trends at the ESU scale. The *Environmental Baseline* section that follows summarizes SONCC coho salmon abundance and distribution, along with a description of SONCC coho salmon habitat and their CH, within the action area.

A. Status of SONCC Coho Salmon

1. General Life History

SONCC coho salmon exhibit anadromous and semelparous life histories. This means that as adults they migrate from a marine environment into the fresh water streams and rivers of their birth (anadromous) where they spawn and die (semelparous). In contrast to the life history patterns of other Pacific salmonids, coho salmon generally exhibit a comparatively simple 3-year life cycle, spending approximately 18 months in freshwater and 18 months in salt water (Gilbert 1912, Pritchard 1940, Briggs 1953, Shapovalov and Taft 1954, Loeffel and Wendler 1968). Coho salmon spawn from November to January (Hassler 1987), and occasionally into February and March (Weitkamp *et al.* 1995). Coho salmon river entry timing is influenced by many factors, one of which is river flow. In addition, many small California stream systems have their mouths blocked by sandbars for most of the year except winter. In these systems, coho salmon and other Pacific salmonid species are unable to enter the rivers until sufficiently strong freshets open passages through the bars (Weitkamp *et al.* 1995). In larger river systems like the Klamath River, coho salmon have a broad period of freshwater entry spanning from August until December (Leidy and Leidy 1984). Overall, earlier migrating fish spawn farther upstream within a basin than later migrating fish, which enter rivers in a more advanced state of sexual maturity (Sandercock 1991). Adult coho salmon normally migrate during daylight hours at water temperatures of 45-60°F, a minimum water depth of approximately 17.8 cm, and streamflow velocities less than 2.44 m/s (Bjornn and Reiser 1991). If conditions are not right, coho salmon will wait at the mouth of the river or stream for the correct conditions.

Although coho salmon may spawn in a few third-order streams, they typically choose fourth- and fifth-order streams (Bjornn and Reiser 1991), preferring streams with a gradient of 3 percent or less (Nickelson *et al.* 1992). Coho salmon build their redds at the head of riffles in clean gravel ranging in size from that of a pea to that of an orange (Nickelson *et al.* 1992), at stream velocities of 0.30 to 0.55 m/s (Gribanov 1948) and water temperatures of 42-56°F (Briggs 1953).

The favorable range for coho salmon egg incubation is 50-55°F (Bell 1991). Eggs typically hatch at approximately 35 to 50 days, and start emerging from the gravel 2 to 3 weeks after hatching (Hassler 1987, Nickelson *et al.* 1992), depending on ambient water temperature (Shapovalov and Taft 1954).

Following emergence, young coho salmon fry hide in gravel and under large rocks during daylight hours. After several days growth, attaining a length of 38-45 mm, the fry may migrate

upstream a considerable distance to reach lakes or other rearing areas (Godfrey 1965, Nickelson *et al.* 1992). These rearing areas may include streams of 4-5 percent gradient, and as small as one to two meters wide. Brett (1952) found that coho salmon juveniles had an upper lethal water temperature of 77°F with a preferred rearing and emigration range of 53.6-57.2°F. Coho salmon fry are most abundant in backwater pools during spring. During the summer, coho salmon fry prefer pools featuring adequate cover such as large woody debris (LWD), undercut banks, and overhanging vegetation. Juvenile coho salmon prefer to overwinter in large mainstem pools, backwater areas and secondary pools with LWD, and undercut bank areas (Heifetz *et al.* 1986, Hassler 1987). The ideal food channel for maximum coho salmon smolt production would have shallow depth (7-60 cm), fairly swift midstream flows (60 cm/sec), numerous marginal back-eddies, narrow width (3-6 cm), copious overhanging mixed vegetation (to lower water temperatures, provide leaf fall, and contribute terrestrial insects), and structural elements permitting hiding places (Boussu 1954). The early diets of emerging coho salmon fry include chironomid larvae and pupae (Mundie 1969). Juvenile coho salmon are carnivorous opportunists that primarily eat aquatic and terrestrial insects.

Coho salmon smolts typically migrate to the sea between March and June (Weitkamp *et al.* 1995), but some level of emigration may occur all year long. Taking advantage of cooler ambient temperatures and the afforded protection from predators, the bulk of seaward migration occurs at night. Peak outmigration generally occurs in May, about a year after they emerge from the gravel. In California, smolts migrate to the ocean somewhat earlier, from mid-April to mid-May.

Little is known about residence time or habitat use in estuaries during seaward migration, although it is usually assumed that coho salmon spend only a short time in the estuary before entering the ocean (Nickelson *et al.* 1992). Growth is very rapid once the smolts reach the estuary (Fisher *et al.* 1984). After entering the ocean, immature coho salmon initially remain in near-shore waters close to the parent stream. In general, coded-wire tag (CWT) recoveries indicate that coho salmon remain closer to their river of origin than do Chinook salmon. However, coho salmon have been captured several hundred to several thousand kilometers away from their natal stream (Hassler 1987). After about 12 months at sea, coho salmon gradually migrate south and along the coast, but some appear to follow a counterclockwise circuit in the Gulf of Alaska (Sandercock 1991). Coho salmon typically spend two growing seasons in the ocean before returning to their natal streams to spawn as three year-olds. Some precocious males, called "jacks," return to spawn after only 6 months at sea.

2. Range-Wide (ESU) Status and Trends of SONCC Coho Salmon

For a detailed summary of historical and current distributions of SONCC coho salmon in northern California, refer to the California Department of Fish and Game (CDFG) coho salmon status review (CDFG 2002), as well as the presence and absence update for the northern California portion of the SONCC coho salmon ESU (Brownell *et al.* 1999). NMFS summarized the available historic SONCC coho salmon abundance information in a coast-wide status review (Weitkamp *et al.* 1995), and status review updates (NMFS 2001, Good *et al.* 2005).

All SONCC coho salmon stocks between Punta Gorda and Cape Blanco are depressed relative to past abundance (Weitkamp *et al.* 1995). NMFS (2001b) concluded that population trend data for SONCC coho salmon taken from 1989-2000 show a continued downward trend throughout most of the California portion of the SONCC coho salmon ESU. The main stocks in the SONCC coho salmon ESU (Rogue River, Klamath River, and Trinity River) remain heavily influenced by hatcheries and have little natural production in mainstem rivers (Weitkamp *et al.* 1995). The Trinity River Hatchery maintains high production, with a significant number of hatchery SONCC coho salmon straying into the wild population (NMFS 2001). Mad River and Iron Gate Hatcheries have both reduced production in recent years (NMFS 2001). The apparent decline in wild production in these rivers, in conjunction with significant hatchery production, suggests that their natural populations are not self sustaining (Weitkamp *et al.* 1995).

Brown *et al.* (1994) surveyed 115 of the 396 streams within the SONCC coho salmon ESU identified as once having coho salmon runs and reported that 42 (36 percent) of those streams - all within the Eel and Klamath River systems - have lost their runs. A more recent update of the California portion of the SONCC coho salmon ESU reported that the percent of streams with at least one brood year of coho salmon present has declined from 80 percent of the streams surveyed between 1989 and 1995, to 69 percent in the most recent three-year interval (NMFS 2001). Nehlsen *et al.* (1991) considered all but one coho salmon population in Oregon south of Cape Blanco, to be at "high risk of extinction."

No regular spawning escapement estimates exist for natural SONCC coho salmon in California streams. Brown and Moyle (1991) suggested that naturally-spawned adult coho salmon runs in California streams were less than 1 percent of their abundance at mid-century, and estimated that wild coho salmon populations in California did not exceed 100 to 1,300 individuals. CDFG (1994 *op cit* Weitkamp *et al.* 1995) summarized most information for the northern California region of this ESU, and concluded that "coho salmon in California, including hatchery stocks, could be less than 6 percent of their abundance during the 1940's, and have experienced at least a 70 percent decline in numbers since the 1960's." Further, CDFG (1994) reported that coho salmon populations have been virtually eliminated in many streams, and that adults are observed only every third year in some streams, suggesting that two of three brood cycles may already have been eliminated. Weitkamp *et al.* (1995) estimated that the rivers and tributaries in the California portion of the SONCC coho salmon ESU had "recently" produced 7,080 naturally spawning coho salmon and 17,156 hatchery returns, including 4,480 "native" fish occurring in tributaries having little history of supplementation with nonnative fish. Combining the California run-size estimates with Rogue River estimates, Weitkamp *et al.* (1995) arrived at a rough minimum run-size estimate for the SONCC coho salmon ESU of about 10,000 natural fish and 20,000 hatchery fish.

Both presence-absence and trend data suggest that many populations within the SONCC coho salmon ESU continue to decline (NMFS 2001, Good *et al.* 2005). NMFS and the Biological Review Team (BRT) have concluded that the California portion of the SONCC coho salmon ESU is likely to become endangered in the foreseeable future (NMFS 2001).

An "Updated Status of Federally listed ESUs of West Coast Salmon and Steelhead" (including

SONCC coho salmon) was completed in June 2005 (Good *et al.* 2005). The status update included limited new information for SONCC coho salmon. In the status update, the BRT stated that, "None of these data contradict the conclusions the BRT reached previously. Nor do any recent data (1995 to present) suggest any marked change, either positive or negative, in the abundance or distribution of coho salmon within the SONCC ESU.

3. Status of SONCC Coho Salmon in the Trinity River Basin

In northern California, populations of SONCC coho salmon are present in the Klamath River Basin, inclusive of the Trinity River. However, population trend data is scarce (NMFS 2001).

Adult SONCC coho salmon counts at the Trinity River weir reflect the total number of adult SONCC coho salmon found in the Trinity River because the counts are made relatively low in the system, near the town of Willow Creek, California, below much of the spawning habitat. Unfortunately, these counts are incomplete as well because the weir is typically removed by the second week of November and trapping does not occur every day. Therefore, the trapping effort may not include a portion of the run and even relatively small day-to-day differences in fish counts may skew the results. In addition, the majority of the fish trapped are of hatchery origin, and 100 percent marking of hatchery SONCC coho salmon has only recently occurred, so estimates of naturally-produced SONCC coho salmon are only available since the 1997 return year (CDFG 2000). The results of counting from these 3 years yielded an estimated 198, 1,001, and 491 naturally produced adult SONCC coho salmon for the 1997-1998, 1998-1999, and 1999-2000 seasons, respectively (CDFG 2000).

Trapping near Willow Creek on the Trinity River yielded an average of 2,975 SONCC coho salmon smolts (range: 565 to 5,084) for the period of 1991 to 2000 (USFWS 2001). These low numbers provide insight into the limited size of SONCC coho salmon populations in the Trinity River Basin, although some early outmigrants were missed. Even if these numbers were doubled to account for time when trapping did not occur, these populations are extremely low.

a. Synthesis of Adult SONCC Coho Salmon Information

McElhany *et al.* (2000) suggested that for species like SONCC coho salmon, for which the age structure is relatively fixed (e.g., SONCC coho salmon often mature at 3 years), cohorts within a breeding group could technically belong to separate populations as NMFS has defined them. CDFG (1994) reported that SONCC coho salmon populations have been virtually eliminated in many streams, and that adults are observed only every third year, suggesting that two of three brood cycles (cohorts) may already have been eliminated. The limited adult SONCC coho salmon data indicates that there is high variance in abundance from year to year in the Trinity River Basin. This high variance in adult SONCC coho salmon from one year to the next makes the population more vulnerable to anthropogenic or natural perturbations, and therefore more at risk of extinction.

B. Status of SONCC Coho Salmon Critical Habitat

Critical habitat is defined in section 3(5)(A) of the ESA as "(i) the specific areas within the geographical area occupied by the species at the time it is listed . . . on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and (ii) specific areas outside the geographical area occupied by the species at the time it is listed . . . upon a determination by the Secretary of Commerce (Secretary) that such areas are essential for the conservation of the species" [16 U.S.C. 1532(5)(A)]. The term "conservation," as defined in section 3(3) of the ESA, means ". . . to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary" [16 U.S.C. 1532(3)]. Therefore, critical habitat includes geographic areas and habitat functions necessary for the recovery of the species.

Critical habitat for SONCC coho salmon encompasses accessible reaches of all rivers (including estuarine areas and tributaries) between the Elk River in Oregon and the Mattole River in California, inclusive (May 5, 1999 64 FR 24049). Excluded from SONCC coho salmon critical habitat are: (1) areas above specific dams identified in the FR notice; (2) areas above longstanding natural impassible barriers (*i.e.*, natural waterfalls in existence for at least several hundred years); and (3) tribal lands. No dams identified in the FR notice are present in the action area.

The final rule designating SONCC coho salmon critical habitat (May 5, 1999, 64 FR 24049) indicated that the essential habitat types for: (1) juvenile summer and winter rearing areas and adult spawning are often located in small headwater streams and side channels; (2) juvenile migration corridors and adult migration corridors include the small headwater streams and side channels as well as mainstem reaches and estuarine zones; and (3) growth and development to adulthood occurs primarily in near- and off-shore marine waters, although final maturation takes place in freshwater tributaries when the adults return to spawn. For the purpose of this consultation, "essential habitat types" represent the primary constituent elements (PCEs) of SONCC coho salmon critical habitat. Within the PCEs, essential features of SONCC coho salmon critical habitat include adequate: (1) substrate, (2) water quality, (3) water quantity, (4) water temperature, (5) water velocity, (6) cover/shelter, (7) food, (8) riparian vegetation, (9) space, and (10) safe passage conditions.

The current condition of SONCC coho salmon critical habitat is discussed in the *Factors Affecting the Species and Critical Habitat* section below. The *Environmental Baseline* section describes habitat conditions within the action area. Furthermore, the *Effects of the Action* section is largely organized around anticipated effects on SONCC coho salmon habitat and their critical habitat.

C. Factors Affecting the Species and Critical Habitat

SONCC coho salmon have experienced declines in abundance in the past several decades as a result of loss, damage or change to their habitat. Studies indicate that in most western states, about 80 to 90 percent of the historic riparian habitat has been eliminated (Norse 1990, California State Lands Commission 1993). Loss of habitat complexity and fragmentation of habitat have also contributed to the decline of SONCC coho salmon. For example, in national forests within the range of the northern spotted owl in western and eastern Washington, there has been a 58 percent reduction in large, deep pools due to sedimentation and loss of pool-forming structures such as boulders and large wood [Federal Ecosystem Management Team (FEMAT) 1993]. The California Advisory Committee on Salmon and Steelhead Trout (1988) reported habitat blockages and fragmentation, logging and agricultural activities, urbanization, and water withdrawals as the most predominant problems for anadromous salmonids in California's coastal basins. It identified factors associated with habitat degradation for each major river system in California. CDFG (1965, Vol. III, Part B) reported that the most vital habitat factor for coastal California streams was "Adegradation due to improper logging followed by massive siltation, log jams, etc." In addition, CDFG (1965) cited road building as another cause of siltation in some areas, and identified a variety of factors associated with habitat degradation in individual basins, including extremes of natural flows (Redwood Creek and Eel River), logging practices (Mad, Eel and Mattole Rivers), dams with no passage facilities (Eel River), and water diversions (Eel River).

The factors for decline among populations of SONCC coho salmon are discussed below. For more detailed discussions on factors for decline of SONCC coho salmon, refer to Weitkamp *et al.* (1995) as updated by Schiewe (1997) and CDFG (2002).

1. Timber Harvest

Timber harvest and associated activities occur over a large portion of the SONCC coho salmon ESU. Timber harvest has caused widespread increases in sediment delivery to channels through both increased landsliding and surface erosion from harvest units and log decks. Much of the riparian vegetation has been removed, reducing future sources of LWD needed to form and maintain stream habitat that salmonids depend on for various life stages. Cumulatively, the increased sediment delivery and reduced woody debris supply have led to widespread impacts to stream habitats and salmonids. These impacts include reduced spawning habitat quality, loss of pool habitat for adult holding and juvenile rearing, loss of velocity refugia, and increases in the levels and duration of turbidity which reduces the ability of juvenile fish to feed, and, in some cases may cause physical harm by abrading the gills of individual fish. These changes in habitat have led to widespread decreases in the carrying capacity of the streams that support salmonids.

Since adoption of the NWFP in 1994, timber harvest has decreased dramatically on Federal lands within in the range of the Northern spotted owl, including Federal lands contained within the SONCC coho salmon ESU. This reduction in the timber harvest is expected to result, over time, in an increase in LWD, a decrease in stream temperatures and a decrease in timber harvest-related sediment delivered to streams. Although the recovery times are expected to take decades,

over time the likelihood of recovery of SONCC coho salmon should increase due to reductions in timber harvest on Federal lands.

2. Road Construction

Road construction, whether associated with timber harvest or other activities, has caused widespread impacts to salmonids (Furniss *et al.* 1991). Where roads cross salmonid-bearing streams, improperly placed culverts have blocked access to many stream reaches. Landsliding and chronic surface erosion from road surfaces are large sources of sediment across the affected species' ranges. Roads also have the potential to increase peak flows with consequent effects on the stability of stream substrates and banks. Roads have led to widespread impacts on salmonids by increasing the sediment loads. The consequent impacts on habitat include reductions in spawning, rearing and holding habitat, and increases in turbidity. These effects are similar to those described for timber harvest above.

Adoption and implementation of the NWFP has also resulted in a reduction of road construction on Federal lands across the SONCC coho salmon ESU. This reduction in new road construction will result in a reduction of road-related impacts to SONCC coho salmon. NMFS anticipates that reductions in road construction on Federal lands will increase the likelihood of recovery for SONCC coho salmon.

3. Hatcheries

Artificial propagation is also a factor in the decline of salmonids due to the genetic impacts on indigenous, naturally-reproducing populations, disease transmission, predation of wild fish, depletion of wild stock to enhance brood stock, and replacement rather than supplementation of wild stocks through competition and the continued annual introduction of hatchery fish. Artificial propagation and other human activities such as harvest and habitat modification can genetically change natural populations so much that they no longer represent an evolutionarily significant component of the species (Waples 1991).

4. Water Diversions

Diversion of water, both on a large (*e.g.*, major dams) and small (*e.g.*, irrigation ditches) scale, have altered the hydrology, magnitude, and timing of water flows throughout the range of SONCC coho salmon. Unscreened diversions for agricultural, domestic and industrial uses are a significant factor for salmonid declines in many basins. Reduced streamflows due to diversions reduces the amount of habitat available to salmonids and can degrade existing water quality, particularly where return flows enter the river. Reductions in the quantity of water in a given stream reach will reduce the carrying capacity of the reach. Where warm return flows enter the stream, fish may seek reaches with cooler water, thus increasing competitive pressures in other areas. In the Trinity River Basin, water diversions have fragmented anadromous fish habitat and altered hydrographs, including within the action area. Initial diversions, began in the mid 1800s, were localized for irrigation and mining. Some of these, used for irrigation and domestic use, persist today. The Weaverville Community Service District (WCSD) withdraws significant

amounts of water from West and East Weaver Creek for domestic and irrigation purposes. Rush Creek Subdivision uses water from Rush Creek, resulting in very low late-summer flows. In 1963, Trinity Dam was completed, eliminating over 100 miles of important anadromous fish habitat. This facility changed the hydrograph and temperature regime for the remaining portion of the river that was available to anadromous fish by diverting up to 90 percent of the river's flow to the Sacramento River. Degraded habitat from the lack of river flow may be the single greatest limiting factor in anadromous fish populations of the Trinity River (USDA-FS 2005).

5. Predation

Predation was not thought to have been a major cause in the decline in population. However, it may have had substantial impacts in local areas. For example, Higgins *et al.* (1992) and CDFG (1994) reported that Sacramento pikeminnow have been found in the Eel River basin and are considered a major threat to native salmonids. Furthermore, California sea lions and Pacific harbor seals, which occur in most estuaries and rivers where salmonid runs occur on the West Coast, are known predators of salmonids. However, salmonids appear to be a minor component of the diet of marine mammals (Scheffer and Sperry 1931, Jameson and Kenyon 1977, Graybill 1981, Brown and Mate 1983, Roffe and Mate 1984, Hanson 1993). In the final rule listing the SONCC coho salmon ESU (May 6, 1997, 62 FR 24588), for example, NMFS indicated that it was unlikely that pinniped predation was a significant factor in the decline of SONCC coho salmon on the west coast, although it may be a threat to existing depressed local populations. Specific areas where predation may preclude recovery cannot be determined without extensive studies.

6. Disease

Infectious disease is one of many factors that can influence salmonid survival. Salmonids are exposed to numerous bacterial, protozoan, viral, and parasitic organisms in spawning and rearing areas, hatcheries, migratory routes, and the marine environment. Very little current or historical information exists to quantify changes in infection levels and mortality rates attributable to these diseases for salmonids. However, studies suggest that naturally spawned fish tend to be less susceptible to pathogens than hatchery-reared fish (Sanders *et al.* 1992).

7. Existing Regulatory Mechanisms

Existing regulatory mechanisms, including land management plans (e.g., National Forest Land and Resource Management Plans), California Forest Practice Rules, Clean Water Act (CWA) section 404 activities, urban growth management, and harvest and hatchery management all contributed to varying degrees to the decline of salmonids due to lack of protective measures, the inadequacy of existing measures to protect salmonids and/or their habitat, or the failure to carry out established protective measures.

Sections 303(d)(1)(C) and (D) of the CWA require states to prepare Total Maximum Daily Loads (TMDLs) for all water bodies that do not meet State water quality standards. Development of TMDLs is a method for quantitative assessment of environmental problems in a

watershed and identification of pollution reductions needed to protect drinking water, aquatic life, recreation, and other uses of rivers, lakes, and streams. Appropriately protective aquatic life criteria are critical to the TMDL process for affecting the recovery of salmonid populations, as the criteria's exceedence will determine which water bodies will engage in the TMDL process and criteria compliance goals are the impetus for developing mass loading strategies. The ability of these TMDLs to protect salmonids should be significant in the long term. However, developing them quickly in the short term will be difficult, and their efficacy in protecting salmonid habitat will be unknown for years to come.

CDFG completed a status review of coho salmon populations in northern California (CDFG 2002) and recommended to the California Fish and Game Commission (CFGC) that coho salmon occupying streams from Punta Gorda, Humboldt County, to the Oregon border be state listed as a threatened species. In August 2002, the CFGC issued a finding that the SONCC coho salmon ESU warranted listing as a threatened species under the California Endangered Species Act (CESA). The CFGC directed CDFG to develop a recovery strategy. Subsequently, the Director of CDFG initiated a multi-stakeholder statewide Coho Salmon Recovery Team to make recommendations on components of a plan to recover the species. As requested by CDFG, on February 4, 2005, the CFGC officially listed coho salmon populations from San Francisco to the Oregon border under the CESA (CFGC 2005). Implementation of the recovery plan and protective regulations will potentially have significant long-term benefits to SONCC coho salmon. However, we do not know the manner in which additional regulations and recovery actions will be implemented. Therefore, at this time, we cannot estimate how SONCC coho salmon will benefit from the state listing.

8. Sport and Commercial Harvest

Sport and commercial harvest is thought to have been a significant factor (June 28, 2005, 70 FR 37160) in the decline of salmonids. NMFS also notes that under some circumstances, the impacts of recreational freshwater fishing are of concern, particularly during years (e.g., drought) of decreased availability of refugia.

9. Watershed Restoration

Since implementation of the NWFP began in 1994, there have been at least 450 miles of roads decommissioned on the Klamath, Six Rivers, Mendocino, and Shasta-Trinity National Forests. Road decommissioning results in immediate reductions of chronic erosion to salmonid-bearing streams and also decreases the potential for catastrophic delivery of road-related sediment, especially associated with stream crossings. Road decommissioning also helps to reestablish natural drainage patterns, which can moderate peak flows. Also, over the last few years there has been a concerted effort to improve fish passage at road-stream crossings. These activities have resulted in both increased access for SONCC coho salmon to previously inaccessible habitat, and also reduces the probability of stream crossing failure during flood flows. Road rehabilitation and culvert upgrades are expected to promote the recovery of SONCC coho salmon.

D. Current Condition of Critical Habitat at the ESU Scale

As identified in the *Status of Critical Habitat* section, the essential habitat types of SONCC coho salmon critical habitat are areas for juvenile summer and winter rearing and out-migration, and adult spawning and migrating. As described in the previous sections, timber harvest and associated activities, road construction, and water diversions throughout a large portion of the freshwater range of the SONCC coho salmon ESU continue to result in increased sedimentation, reduction in pool-forming structures, blockages to spawning and rearing habitat, reduced water quality and reduced stream flows. Although watershed restoration activities have improved freshwater critical habitat conditions in isolated areas, reduced habitat complexity, poor water quality, and reduced habitat availability as a result of continuing land management practices continue to persist in many locations and are likely limiting the conservation value (*i.e.*, limiting the numbers of salmonids that can be supported) of critical habitat within these freshwater habitats at the ESU scale.

IV. ENVIRONMENTAL BASELINE

The environmental baseline establishes the base condition for natural resources, human usage, and species usage in an action-area which is used as a point of comparison for evaluating effects of an action. The environmental baseline "includes the past and present impacts of all Federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal Projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in progress" (50 CFR §402.02).

A. Description of Habitat Conditions

Weaver Creek and its tributaries (including the action area) is one of the most heavily impacted basins within the Trinity River watershed (NMFS 2003). Historic photos document hydraulic mining, timber harvest and residential activity, starting in the mid-1850s and continuing through present times. These activities loaded Weaver Creek with much more sediment than could be transported and resulted in braided channels with cobble and gravel substrate, few pools, little shade and no large woody debris. Past hydraulic mining in the action area washed away much of the soil, which resulted in a current soil composition that is high in cobble and gravels.

Current conditions have improved but ongoing impacts associated with urbanization on private lands continue to limit recovery and fish use. Major problems faced by fish today in East Weaver Creek include migration barriers (upstream of the Project area), poor water quality, lack of water due to domestic and industrial withdrawal, high summer water temperatures, simplified channels and lack of deep pool habitat.

East Weaver Creek is a tributary to Weaver Creek, which is a tributary to the Trinity River. In the action area, East Weaver Creek is a perennial creek characterized by low to moderate gradients and primarily cobble and gravel substrate, and provides migratory habitat for coho

salmon. Bankfull width at the bridge site is approximately 56 feet wide. East Weaver Creek has been simplified to a single channel with little complexity, side channels or channel variability.

Riparian forest and shade cover occurs along the banks of the creek in a portion of the Project area. The riparian forest community is variable, from an open canopy dominated by willows to a dense canopy dominated by alders and cottonwoods. Little herbaceous cover and a dense shrubby understory characterize the community. Common shrubs include blackberries, California grape, and Oregon ash. The riparian community is now reaching a functional size to supply East Weaver Creek with the large woody debris inputs that could potentially improve habitat complexity and conditions.

East Weaver Creek has water withdrawals for the Weaverville Community Services District taken out at Moon Lee Ditch on National Forest lands upstream of the Project area. These withdrawals have contributed to lethal water temperatures within East Weaver Creek. Data from CDFG (2001, 2002) shows temperatures within East Weaver Creek reaching 68°F by the end of July (~July 25, 2001, 2002), and continuing this warming trend through the summer. Water withdrawals not only exacerbate the stream temperature problems within East Weaver Creek, it also limits the amount of space and time rearing coho salmon can occupy the stream.

East Weaver Creek from 100 feet upstream of Brown's Ranch Road downstream to the SR 299 Bridge is designated as a local flood protection Project. The flood control facility consists of a graded trapezoidal channel with levees on both banks. Trinity County is responsible for maintaining the channel according to the terms of an agreement with the Corps Readiness Branch. Irregular maintenance has allowed a dense riparian habitat to develop. The County now has a 5-year routine maintenance agreement with DFG; the maintenance program was renewed in November 2001. The program consists of trimming all vegetation with hand crews from alternating 100-foot-long sections of banks between October and December of each year. In the following year, the alternate bank will be trimmed. Trees more than 6 inches in diameter at breast height will be left. All trees along the center of the channel will be cut. No roots will be dug out, and no sediment will be removed under the existing section 1601 agreement. No vegetation can be replanted in this section of creek.

The flood control maintenance activities will result in cumulative impacts on riparian habitat along East Weaver Creek. To minimize this effect, vegetation removal for the proposed East Connector Roadway Project will be timed to coincide with vegetation removal for flood control maintenance. This will minimize the amount of vegetation that is removed and the duration of the disturbance. In addition, TCDOT will compensate for the loss of riparian habitat caused by the East Connector Project by restoring habitat at a 2:1 ratio (two trees or shrubs planted for each one removed), upstream of the flood control section of East Weaver Creek. The flood control levees and their maintenance will maintain the currently degraded habitat conditions including reduced large woody debris (a lack of large woody debris results in channel simplification), and reduced stream shading and riparian cover (a reduction in stream shade can result in or exacerbate increased stream water temperatures).

The County has acquired from the BLM (in the early 1990s), the land at the north end of the Project that is adjacent to the County maintenance yard (the staging area on the north side of the alignment). The County is preparing a timber harvest plan to log this area (~ 4 acres) and then will grade and fill the area to expand the maintenance yard. This timber harvest and ware yard expansion are expected to be implemented at approximately the same time as the Project. Ware yard expansion would include the removal of conifers that are currently large enough to contribute to the complexity of the East Weaver Creek stream channel. A 50 foot no cut buffer would be utilized next to East Weaver Creek. The timber sale and expansion of the ware yard, located upstream of the East Connector Bridge will further reduce the potential for LWD and reduce shade trees located outside the 50 foot no cut buffer.

NMFS recently completed consultation on the Shasta-Trinity National Forest's proposed Browns Project. The Browns Project, which will be implemented beginning in 2006, includes about nine acres of timber harvest (thinning) and fuels treatment, and road rehabilitation and water drafting activities within upper areas of the East Weaver Creek watershed, several miles upstream of the Project. NMFS (2005) concluded that these activities would likely result in insignificant or discountable effects to SONCC coho salmon and their critical habitat based on the proximity of activities, probability of impact, and magnitude of effect. However, before concluding such, NMFS (2005) ascertained that these activities would likely have negative impacts on water quality (temperature, turbidity; nutrient), spawning substrate, pool depth, and flow.

Due to the reasons listed above (limited cover, high stream temperatures, lack of habitat complexity), the action area is primarily used by coho salmon as a migration route for juveniles and adults and has limited value for rearing or spawning. Thus, NMFS believes that the current and reasonably foreseeable conservation value of the designated critical habitat in the action area is low. East Weaver Creek is within a growing urban area and has low potential for habitat recovery.

B. SONCC Coho Salmon in East Weaver Creek

Fish captured during the summer (August – September) of 2000 and 2002 surveys of East Weaver Creek included steelhead trout (*O. mykiss*), coho salmon, brown trout (*Salmo trutta*), speckled dace (*Rhinichthys osculus*), Klamath small-scaled sucker (*Catostomus rimiculus*), and Pacific lamprey (*Lampetra tridentate*). Only four juvenile coho salmon (young of the year) were captured during electrofishing of East Weaver Creek, all in 2002, and all in the lowermost reach (approximately one-fourth mile upstream of 299 crossing). This is approximately 0.75 miles downstream from the proposed bridge site.

In East Weaver Creek upstream of the Project area, spawning coho salmon were observed by the general public in December, 2004. Coho salmon can spawn in East Weaver Creek upstream of the action area when favorable migration conditions exist. However, any juvenile coho salmon are generally displaced from the action area in the summer due to low flows and high water temperatures. It is highly unlikely that any coho salmon will be present in the project area during the construction phase of the Project.

V. EFFECTS OF THE ACTION

Pursuant to section 7(a)(2) of the ESA (16 U.S.C. §1536), Federal agencies are directed to insure that their activities are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat. The Opinion assesses the effects of the East Connector Roadway Project on SONCC coho salmon, and their designated critical habitat. In the *Description of the Proposed Action* section of the Opinion, NMFS provided an overview of the action. In the *Status of the Species and Critical Habitat* and *Environmental Baseline* sections of the Opinion, NMFS provided an overview of the threatened species and critical habitat that are likely to be affected by the Project.

Regulations that implement section 7(a)(2) of the ESA require NMFS to evaluate the direct and indirect effects of Federal actions and actions that are interrelated with or interdependent to the Federal action to determine if it would be reasonable to expect them to appreciably reduce listed species' likelihood of surviving and recovering in the wild by reducing their reproduction, numbers, or distribution (16 U.S.C. §1536, 50 CFR 402). Section 7 of the ESA and its implementing regulations also require biological opinions to determine if Federal actions would destroy or adversely modify critical habitat (16 U.S.C. §1536).

A. Effects Analysis

NMFS identified elements of the Project that could result in adverse effects to SONCC coho salmon or their designated critical habitat. Due to baseline conditions, it is unlikely that coho salmon would be present in East Weaver Creek, adjacent to the work sites, during the construction period. However, juvenile coho salmon are likely to be approximately 1.25 miles downstream (in Weaver Creek) where adequate flows and cooler water temperatures exist. Impacts may occur downstream of the Project area where coho salmon may reside during Project implementation. Construction impacts on SONCC coho salmon or their designated critical habitat may include:

- avoidance by rearing or migrating juveniles or migrating adults to areas affected by increased turbidity or construction waste materials (toxic chemicals),
- localized disturbance and sedimentation of food-producing areas (e.g., streambeds),
- increased peak flows,
- increased water temperatures, due to the removal of riparian vegetation, and
- loss of large woody debris potential from the removal of riparian vegetation.

1. Sediment

Project activities include: right-of-way clearing and grading (road and bicycle path) and use of heavy equipment in staging areas, would disturb soils and cause sediment to be transported to stream channels within the action area; thereby resulting in increased turbidity and sedimentation. Due to the gentle terrain of the Project area, NMFS expects that only ground disturbing activities associated with bridge and road construction within approximately 200 feet of East Weaver Creek would transport significant amounts of sediment. Project-related increases in sediment delivery and turbidity are expected to occur during the first few heavy rainfall events after project implementation, when overland flow would transport Project-related soils to streams.

In East Weaver Creek downstream of the project area and in Weaver Creek immediately downstream of the confluence with East Weaver Creek, where flows are sufficiently low for settling of fines to occur, project-related sediment is expected to fill interstitial spaces in the stream channel; thereby altering macro-invertebrate (salmonid food base) abundance and distribution. NMFS expects that the affected area would be small due to the flashy nature of the flows in East Weaver Creek, the low amount of fines in the project area, and because of the limited amount of ground-disturbing activities proposed to occur close to the stream. The flashy nature of East Weaver Creek is expected to flush these sediments during the first few significant run-off events of the season, and the areas could be rapidly re-colonized from upstream source populations of macro-invertebrates. Project-related increases in turbidity is expected to reduce feeding efficiency (due to a reduction in the ability to locate prey) and result in displacement of SONCC coho salmon juveniles rearing in the action area. Project-related increases in channel embeddedness is likely to result in reduced coho prey species in the action area. The reduction in feeding efficiency and reduction in prey species is expected to reduce survival of juvenile coho salmon individuals residing in the action area. The displacement of individual juvenile coho salmon would reduce the distribution of coho salmon in the action area. Due to the limited duration of expected increases in turbidity and also the limited area and duration of channel embeddedness, NMFS expects that the reduction in survival and reduction in distribution would be limited to a few juvenile coho salmon.

Other ground disturbing activities as part of this project would transport insignificant amounts of sediment. The Project includes minimization measures that will substantially reduce the amount sediment transported to East Weaver Creek. These measures include: seasonally restricting ground disturbing activities, set back of staging areas, erosion control (silt fences, straw, *etc.*), landscaping, Storm Water Pollution Prevention Plan, and other measures to minimize direct runoff into East Weaver Creek. NMFS anticipates that coho salmon would not be present within the Project area during construction and would be downstream (~0.75 miles) where adverse affects by increases in turbidity would result in a short term reduction in invertebrate production, until higher flows can transport project related sediment out of Weaver Creek. We expect that sediment would be transported out of Weaver Creek during the first few significant rain fall events.

2. Short-Term Degradation of Water Quality and Fish Habitat from Seepage of Hazardous Materials during Construction

Various contaminants, such as concrete, fuel oils, grease, and other petroleum products used in construction activities, would be introduced into East Weaver Creek either directly or through surface runoff. Contaminants can be toxic to fish or cause altered oxygen diffusion rates, and acute and chronic toxicity to aquatic organisms, thereby reducing growth and survival. Toxic inputs into East Weaver Creek will be held to a minimum due to design features. During construction, NMFS anticipates that some toxic materials would enter the stream channel, through leaching or direct runoff. Toxic materials could also be delivered to the stream channel during the first hard rain of the season (in the fall). During project implementation and the early fall, any coho salmon are expected to be downstream of the project area where levels of toxic materials would be diluted to insignificant levels. Therefore, NMFS does not expect that hazardous materials will result in any adverse effects to SONCC coho salmon or their designated critical habitat.

3. Riparian Habitat Loss

As described in the *Environmental Baseline* section, riparian vegetation: (1) increases channel complexity, (2) provides cover for rearing and migrating coho salmon, (3) shades the stream channel, thereby reducing water temperatures, and (4) provides a source of food input (*i.e.*, terrestrial invertebrates, allochthonous inputs).

Riparian habitat along East Weaver Creek will be removed or destroyed during construction of the two-lane arterial road and associated bicycle lanes, Roadway Bridge, and bicycle/pedestrian Bridge over East Weaver Creek and the grading of the TCDOT ware yard (4 acre timber sale). Under Alternative 1, approximately 0.53 hectare (1.3 acres) of riparian forest habitat consisting of 89 mature alder and cottonwood trees would be removed or disturbed from road construction. Under Alternative 2, approximately 0.38 hectare (0.95 acre) of riparian forest habitat consisting of 49 mature alder and cottonwood trees would be removed or disturbed from road construction. The proposed bicycle/pedestrian bridge could result in the loss or disturbance of 0.06 hectare (0.15 acre) of riparian habitat (Option A) or 0.01 hectare (0.03 acre) of riparian habitat (Option B), consisting of riparian shrubs but no large trees. The Project includes minimization measures and habitat compensation measures to replant various woody species at a rate of 2:1. The trees removed for this Project cannot be replaced from where they came from due to the road and bridge placement, but would be planted upstream of the Project site.

The construction area, where these trees would be removed, is already lacking in sufficient quantities of LWD. The project area has approximately 500 feet of stream channel (ware yard to flood control area) where future LWD would be left onsite and would improve baseline habitat conditions for rearing coho salmon. Farther downstream is the flood protection area where all large woody debris is removed periodically for maintenance of the levees, therefore, a reduction of potential LWD would not change the baseline conditions in the flood protection zone.

Removal of riparian vegetation immediately adjacent to the stream channel could weaken the stream bank by loosening the soil, thus increasing the bank's susceptibility to erosion. Alteration of East Weaver Creek (stream banks falling onto the channel) would occur if channel bed and banks are disturbed, or if sites that have been disturbed mechanically were further disturbed by high-flow events before they are stabilized by vegetation. Bank failure would increase the local turbidity. The removal of riparian vegetation would reduce the amount of vegetation available for recruitment to East Weaver Creek (cutting mature trees and replanting seedlings). Although cottonwoods and alders do not typically last very long within stream channels and no conifers would be removed for the road or trail construction, the stream channel would have utilized any recruited cottonwoods and alders for cover and complexity for a short period of time (5-10 years, *i.e.*, until they decomposed). The trees that could have potentially provided complexity and cover take approximately 15 years to grow to a larger functional size. Therefore, the reduction in LWD potential would not be regained till these species are able to grow to the size they are now.

Removal of large woody species further exacerbates the currently high stream temperatures. However, the reduction in riparian vegetation is not expected to have a measurable increase in stream temperatures due to the limited extent of riparian vegetation proposed for removal.

4. Bridge abutments within East Weaver Creek

If pier walls are used, there will be 4.62 square meters of fill within ordinary high water mark. If columns are used, this would result in 6.9 square meters of permanent stationary material (concrete) within the limits of the ordinary high water mark. East Weaver Creek would have 2 bridge abutments (one on each side) placed within the high water mark. These abutments would be placed during the low water season. During high water events within East Weaver Creek flows would get constricted creating a higher hydraulic force that could cause scouring and bedload movement.

Pier walls would extend into the ordinary high water area approximately 1.5 meters (4.5 feet) on each side of the stream. As described previously bankfull width is 56 feet; therefore, this alternative would constrict the channel by 9 feet. If columns are used, this would result in 6.9 square m within the ordinary high water area, and would extend into the channel approximately 0.8 meters (2.4 feet) on each side of the stream, which would reduce the bank full width by 4.8 feet.

The impacts to East Weaver Creek from the abutments within the channel would vary, depending on which type of abutment is used. The farther into the stream channel that these abutments reach, the more they would constrict the flow and cause more of a hydraulic force. This increase in water pressure could cause scouring and bedload movement. Abutments would also create small back water pools behind the abutments during high flows. Back water pools and cover are limiting factors of coho salmon production within this stretch of East Weaver Creek.

5. Increases in surface runoff

Construction of more roads in an urban area often increases peak flows. Although all of the runoff from the proposed 1.3 miles of road construction may not run directly into East Weaver Creek, the road's impermeable surface will modify the natural drainage patterns and deliver slightly higher peak flows. The impacts of peak flows would be difficult to measure and may be insignificant. Higher peak flows can cause scouring of stream channels, and decrease the amount of habitat complexity within stream channels. Increases in surface runoff can also reduce the base flow, due to water reaching area streams right away rather than percolating through the ground and contributing to the flow after stream levels have come down. East Weaver Creek is already a flashy system that does not have a lot of water storage within the watershed due to the area geology and the urbanization of the Weaver Creek basin. Increased peak flows from road construction (non-permeable surface) could further scour out the channel bed that will keep East Weaver Creek in its current shape (simplified channel). East Weaver Creek already has limited refuge for juvenile coho within the channel in the action area. Any increases in flow would exacerbate this limiting factor (simplified channel) for coho salmon production.

6. Increased Population

There is a 2-acre property at the end of Martin Road that is owned by the mill and currently zoned Industrial. As part of the acquisition of property from the mill for the East Connector, this property would be rezoned to Rural Residential 0.5 acre minimum, resulting in four new residential parcels. These parcels would not access East Connector, but would connect to Martin Road, an existing residential area. This action is being implemented by the County as part of this Project, in compensation for severing this piece of property from the mill. Development of these parcels would have an increase in the residential impacts on East Weaver Creek. These impacts include, but are not limited to: increased flows from non-permeable surfaces (driveways, roof tops, etc.). These impacts would be consistent with the anticipated effects of new road construction, as described in the previous section.

VI. EFFECTS OF INTERRELATED AND INTERDEPENDENT ACTIONS

In considering the effects of the proposed action, NMFS analyzes the effects of any interrelated or interdependent actions that are likely to occur. NMFS does not anticipate any interrelated or interdependent actions associated with this project.

VII. CUMULATIVE EFFECTS

Cumulative effects are "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject

to consultation" (50 CFR §402.02). NMFS assumes that future private and State actions, including home construction and other urban uses, will continue at similar intensities as in recent years. These activities are expected to help maintain the degraded condition of the action area.

VI. INTEGRATION AND SYNTHESIS

A. Effects on SONCC Coho Salmon

As described in the *Environmental Baseline* section, due to limited habitat complexity and high stream temperatures the action area is primarily used by juvenile and adult SONCC coho salmon as a migration corridor and has limited value for rearing. Coho salmon are, however, known to spawn upstream of the project area. Due to the simplified habitat and high stream temperatures in the action area, NMFS concluded that few juvenile coho salmon rear in the action area, and few would be present during project implementation.

As described in the *Effects of the Action* section, NMFS expects that the Project is likely to increase turbidity and increase channel substrate embeddedness in the action area. The ground disturbing activities that are expected to result in increased sediment delivery to East Weaver Creek, *i.e.*, right-of-way clearing and grading and use of heavy equipment in staging areas proximal to East Weaver Creek, are expected to occur over one dry season. The resultant increases in turbidity and channel embeddedness are expected to be greatest during the first few storms after project implementation, and will taper off with subsequent storms to pre-project levels. Consequently, NMFS concluded that the Project would reduce the survival of a few coho salmon juveniles and result in a reduction in distribution of a few juvenile coho salmon for a short duration (*i.e.*, the first few storms following project implementation) in the action area.

After consideration of the above information, and how the effects described in the *Effects of the Action* and *Cumulative Effects* sections, when added to the *Environmental Baseline*, affect SONCC coho salmon, NMFS expects a slight reduction in SONCC coho salmon numbers and distribution in the action area. However, because the action area only contributes marginally to the overall reproduction, numbers, and distribution in the Trinity River Basin, NMFS does not anticipate that the Project would appreciably diminish the likelihood of survival and recovery of the SONCC coho salmon ESU.

B. Effects on SONCC Coho Salmon Critical Habitat

Three of the five primary constituent elements (PCEs), as described in the SONCC coho salmon critical habitat designation (May 5, 1999, 64 FR 24049), occur within the action area: (1) juvenile summer and winter rearing, (2) juvenile migration corridors, and (3) adult migration corridors. The Project is likely to adversely affect SONCC coho salmon critical habitat because the increased sedimentation and turbidity is expected to diminish the value of juvenile summer and winter rearing habitat; and the reduction in riparian vegetation is expected to diminish the value of juvenile and adult migration corridors and juvenile summer and winter rearing. As described in the *Effects of the Action* section of the Opinion, Project-related increases in

sedimentation and turbidity are expected to occur during the first few storms of sufficient magnitude and duration following Project implementation, and then taper off throughout the first winter to background levels. As described in the *Effects of the Action* section, the reduction in shade due to removal or prevention of riparian vegetation would insignificantly raise the baseline water temperatures. This is due to, in part, on the extensive water diversions upstream of the action area effectively remove most of the water in the channel before it flows through the action area in the summer. Also, as previously described in the Opinion, NMFS concluded that the reduction in riparian vegetation has the potential to reduce potential recruitment of LWD in a 500 foot stretch of East Weaver Creek. This reduction in potential LWD reduces the potential for creation of additional holding areas for migrating juvenile and adult SONCC coho salmon in the 500 foot stretch of East Weaver Creek.

As described in the *Environmental Baseline* section, NMFS believes that the current and reasonably foreseeable conservation value of the designated critical habitat in the action area is low. Project-related adverse effects associated with increases in sediment or turbidity are expected to be of short duration, *i.e.*, greatest during the first few storms following implementation and tapering off over the first winter to background levels. Also, the expected reduction in shade and potential LWD is not expected to reduce the conservation value of the critical habitat for SONCC coho salmon rearing in the summer, because juvenile coho salmon are generally displaced from the action area in the summer due to low flows and high water temperatures. NMFS believes the cumulative effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area would not diminish the value of SONCC coho salmon critical habitat, but would have an inconsequential impact on the overall conservation value of the critical habitat. NMFS has considered how the effects described in the *Effects of the Action* and *Cumulative Effects* sections, when added to the *Environmental Baseline*, impact critical habitat. For these reasons, NMFS concluded that the Project is not likely to appreciably diminish the conservation value of SONCC coho salmon critical habitat at the ESU scale.

VII. CONCLUSION

After reviewing the best available scientific and commercial information, the current status of SONCC coho salmon, the environmental baseline for the action area, the anticipated effects of the Project, and the cumulative effects, it is NMFS' biological opinion that the implementation of the Project, as proposed, is not likely to jeopardize the continued existence of SONCC coho salmon, and is not likely to destroy or adversely modify SONCC coho salmon critical habitat.

VIII. INCIDENTAL TAKE STATEMENT

Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. ^{Revised 10/26/06 See Attached} NMFS further defines "harm" as, "an act which kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures fish or wildlife by significantly impairing essential behavioral

2. To Implement Reasonable and Prudent Measure #2, above TCDOT shall ensure that:

- a. A post-construction report shall be sent to NMFS by December 31, of each year the Project is implemented. This report shall include the status of the Project; best management practices used to avoid or minimize effects to listed species during construction; fish habitat enhancement or preservation measures incorporated; and photographs of the Project. The report shall be submitted to:

Irma Lagomarsino, Arcata Field Office Supervisor
National Marine Fisheries Service
1655 Heindon Road
Arcata, California, 95521

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, the level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The FHA must immediately provide an explanation of the causes of the taking and review with NMFS the need for possible modification of the reasonable and prudent measures.

IX. REINITIATION OF CONSULTATION

This concludes formal consultation on the FHA's proposed funding of the Trinity County East Connector Roadway Project outlined in the request for consultation. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of taking specified in the incidental take statement is exceeded, (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered, (3) the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion, or (4) a new species is listed or critical habitat designated that may be affected by the identified action. In instances where the amount or extent of incidental take is exceeded, formal consultation shall be reinitiated immediately.

VIII. INCIDENTAL TAKE STATEMENT

Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. NMFS further defines "harm" as, "an act which kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding or sheltering" (November 8, 1999, 64 FR 60727). Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be undertaken by FHA and TCDOT so that they become binding conditions for the exemption in section 7(o)(2) to apply. FHA and TCDOT have a continuing duty to regulate the activity covered by this incidental take statement. If FHA or TCDOT (1) fail to assume and implement the terms and conditions, or (2) fail to require contractors to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to contracts, the protective coverage of section 7(o)(2) may lapse. In order to monitor the effect of incidental take, FHA and TCDOT must report what alternatives are chosen, design features that would be implemented, the progress of the action and its effect on the species to NMFS as specified in the incidental take statement [50 CFR §402.14(i)(3)].

A. Amount or Extent of Take

NMFS anticipates that during Project construction and the first fall following construction, individual coho salmon in the action area would be exposed to decreased water quality (primarily increases in sediment and turbidity), resulting in decreased growth. Due to the currently degraded conditions, few coho salmon are expected to occupy the action area; therefore, only a few (less than five) individual juvenile coho salmon are expected, and authorized, to be harmed by the Project.

The Project would also help maintain the currently degraded habitat conditions, resulting in a chronic reduction in habitat available to a few individual juvenile coho salmon.

B. Reasonable and Prudent Measures

NMFS believes the following reasonable and prudent measures are necessary and appropriate to minimize incidental take of SONCC coho salmon.

1. To minimize the amount and extent of incidental take from construction activities near the East Weaver Creek, effective erosion and pollution control measures shall be

developed and implemented to minimize the movement of soils, sediment and construction wastes both into and within East Weaver Creek.

2. To ensure effectiveness of implementation of the reasonable and prudent measures, and erosion control measures, monitoring and evaluation shall be conducted and reported both during and following construction.

C. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, FHA and TCDOT must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline reporting/monitoring requirements. These terms and conditions are non-discretionary.

TCDOT and FHA must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

1. To implement Reasonable and Prudent Measure #1 above, TCDOT shall ensure that:

- a. Vehicle maintenance, re-fueling of vehicles and storage of fuel shall be done at least 150 feet from the 2-year flood elevation or within an adequate fueling containment area.
- b. At the end of each work shift, vehicles shall be stored greater than 150 feet (horizontal distance) from the 2-year flood elevation.
- c. Any settling basins shall be sized appropriately to allow percolation of the effluent through the bottom and sides rather than overflow. The settling basin shall be cleaned out each time it reaches 2/3 of capacity and be clean prior to re-contouring the site.
- d. Structures placed to prevent materials from escaping the construction site shall not contact water flowing in the stream channel.
- e. Working waters from the project area shall not be discharged directly to the live stream, but will be directed to sediment basins and allowed to percolate into the ground.
- f. A construction inspector shall monitor in-channel activities and performance of sediment control or detention devices for the purpose of identifying and reconciling any condition that could adversely affect salmonids or their habitat. If sediment run-off does occur, work activities that are the cause of the sediment shall be halted and corrective measures implemented until the sediment source is eliminated.

- g. TCDOT shall provide NMFS a copy of the final SWPPP, which specifies BMPs proposed to be implemented to control mobilization of sediment from the Project.
- h. When updates to the SWPPP occur, TCDOT shall notify NMFS of these changes. TCDOT shall submit any modifications of the SWPPP to NMFS.
- i. All necessary erosion control BMPs shall be in place by October 31 of each construction season. TCDOT shall provide NMFS with a site tour to view the BMPs during the month of November, if desired by NMFS.
- j. Appropriate monitoring measures shall be implemented by TCDOT to document compliance with management practices, *e.g.*, turbidity monitored below the work site following the California State Regional Water Quality Control Board criteria.
- k. Any water pumping activities from locations that may contain SONCC coho salmon must conform to NMFS' water drafting guidelines. These guidelines are available at: <http://swr.nmfs.noaa.gov/hcd/WaterDrafting-02.htm>

2. To Implement Reasonable and Prudent Measure #2, above TCDOT shall ensure that:

- a. A post-construction report shall be sent to NMFS by December 31, of each year the Project is implemented. This report shall include the status of the Project; best management practices used to avoid or minimize effects to listed species during construction; fish habitat enhancement or preservation measures incorporated; and photographs of the Project. The report shall be submitted to:

Irma Lagomarsino, Arcata Field Office Supervisor
 National Marine Fisheries Service
 1655 Heindon Road
 Arcata, California, 95521

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, the level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The FHA must immediately provide an explanation of the causes of the taking and review with NMFS the need for possible modification of the reasonable and prudent measures.

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Magnuson-Stevens Fishery Conservation and Management Act

ESSENTIAL FISH HABITAT CONSULTATION

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) set forth new mandates for the National Marine Fisheries Service (NMFS), regional fishery management councils, and federal action agencies to identify and protect important marine and anadromous fish habitat. The Councils, with assistance from NMFS, are required to delineate "essential fish habitat" (EFH) in fishery management plans (FMPs) or FMP amendments for all managed species. Federal action agencies which fund, permit, or carry out activities that may adversely affect EFH are required to consult with NMFS regarding potential adverse effects of their actions on EFH, and respond in writing to NMFS' conservation recommendations. In addition, NMFS is required to comment on any state agency activities that would affect EFH. Although the concept of EFH is similar to that of "Critical Habitat" under the Endangered Species Act, measures recommended to protect EFH are advisory, not proscriptive.

The Pacific Fisheries Management Council has delineated EFH for Pacific Coast Salmon (PFMC 1999). Species from the above FMP occur within the action area of the preceding biological opinion and require EFH consultation.

Identification of Essential Fish Habitat

EFH is defined in the MSFCMA as "...those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity...". NMFS regulations further define "waters" to include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrate" to include sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" to mean the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" to cover a species' full life cycle.

Proposed Action

The Proposed Action is detailed in the *Description of the Proposed Action* section of the biological opinion (Enclosure 1). TCDOT is proposing to construct a two-lane, undivided, limited-access arterial road along the east side of Weaverville, in Trinity County, California, connecting SR 299 at Glen Road to SR 3 at Five Cent Gulch and crossing East Weaver Creek. The waters of the Trinity River are part of the designated EFH for Chinook salmon (*Oncorhynchus tshawytscha*) and coho salmon (*Oncorhynchus kisutch*).

Effects of the Proposed Action

As described in the *Effects of the Action* section of the accompanying biological opinion, the Proposed Action is likely to adversely affect designated critical habitat for SONCC coho salmon.

Chinook salmon do not utilize East Weaver Creek like coho salmon do, but may use the Mainstem Weaver Creek. Therefore, the Proposed Action may adversely affect coho salmon EFH as described in the Effects section of the biological opinion.

Conclusion

NMFS believes that the Proposed Action may adversely affect EFH for coho salmon.

EFH Conservation Recommendations

NMFS recommends that the Terms and Conditions of the Incidental Take Statement of the accompanying biological opinion be adopted as the EFH conservation recommendations.

Should these EFH conservation recommendations be adopted, potential adverse effects to EFH are expected to be minimized.

Statutory Requirements

The MSFCMA and Federal regulations (50 CFR section 600.920) to implement the EFH provisions require Federal action agencies to provide a written response to EFH Conservation Recommendations within 30 days of receipt. The final response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity. If the response is inconsistent with the EFH Conservation Recommendations, an explanation of the reasons for not implementing them must be included.

Reference

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APPENDIX A – TRAFFIC MANAGEMENT PLAN

Pending