# **SPECIFICATIONS**

# **GOLDEN STATE BOULEVARD PHASE 1**

# **AMERICAN AVENUE TO MISSION STREET**

**BUDGET / ACCOUNT: 4510 / 7370** 



Department of Public Works and Planning

**CONTRACT NUMBER 22-14-C** 

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**CONTRACT NUMBER: 22-14-C** 

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Certifications Guaranty

Opt-Out of Asphalt Concrete Price Fluctuations Form

# **AGREEMENT**

# **PLANS**

PROJECT: GOLDEN STATE BOULEVARD

**CONTRACT NUMBER: 22-14-C** 

Brian Pacheco, Chairman 1st District
Sal Quintero, Vice Chairman 3rd District
Steve Brandau 2nd District
Ernest Buddy Mendes 4th District
Nathan Magsig 5th District

Paul Nerland, County Administrative Officer

Steven E. White, Director
Department of Public Works and Planning

Date Signed: 8/29/2022

Supervising Engineer:

Sebastian Artal, PE C76724

FRESNO COUNTY

Department of Public Works and Planning
m/a 2220 Tulare Street, Suite 720
Fresno, CA 93721-2106

PROJECT: GOLDEN STATE BOULEVARD

**CONTRACT NUMBER: 22-14-C** 

Date Signed: 2022-08-29

Consultant Engineer: \_

MARK THOMAS 7571 North Remington Ave., Suite 102 Fresno, CA 93711 Ed Noriega, PE C61555

# NOTICE TO BIDDERS

Sealed proposals will be received at:

https://www.bidexpress.com/businesses/36473/home

and at the Fresno County Department of Public Works and Planning (Department), Office of the Design Engineer, Seventh Floor, Fresno County Plaza Building, 2220 Tulare Street, Fresno, CA 93721 until

# 2:00 P.M., (1400 hours and 00 seconds) Thursday, September 29, 2022

If you have any questions about bid submission, please contact us at DesignServices@fresnocountyca.gov or calling (559) 600-4241.

Promptly following the closing of the bidding all timely submitted bids will be publicly opened and viewable via a livestream (the link for which will be posted at <a href="http://www.co.fresno.ca.us/planholders">http://www.co.fresno.ca.us/planholders</a>) for construction in accordance with the project specifications therefor, to which special reference is made as follows:

# **GOLDEN STATE BOULEVARD PHASE 1**

# AMERICAN AVENUE TO MISSION STREET

# **CONTRACT NUMBER 22-14-C**

The work to be done consists in general of improvements along Golden State Boulevard for approximately 14.1 miles from south of American Avenue to Mission Street in Kingsburg through Cities of Fowler, Selma, Kingsburg, and unincorporated areas of the County. The work will include pavement rehabilitation using an on-site Cold Central Plant Recycling technique, cement-treated base, laying hot-mix asphalt, excavation and trenching, intersection signalization and channelization, installing end terminals and wood post guardrails, striping, pipe installation, sidewalk installation and replacement, installation of street lights, landscaping including tree removals, and other items as specified in the plans and specifications. The project requires a ninety (90) days plant establishment period per Standard Specifications and Special provisions. The plans are divided into three sets, one for each region, however they will be constructed as one project. Intersection and signal work involving Union Pacific Railroad will be bid as Phase 2 of this project at a later time.

The County of Fresno is committed to increasing the availability of employment and training opportunities, and requires that the Contractor and each subcontractor employed on this Project shall use their best efforts to ensure that thirty-three percent (33%) of apprentice hours are performed by qualified participants in state approved apprenticeship programs who also are current or former "Welfare-to-Work" participants in the CalWORKs program. Attention is directed to "Apprentices" in Section 7 of these special provisions.

Incentives whereby the Contractor or subcontractor receives partial reimbursement for the wages paid to apprentices who qualify may be available. The incentive program is

administered by the County of Fresno, Department of Social Services, Employment Resource Center. For questions regarding the incentive program, contact the Employment Resource Center at (559) 600-5370.

Bidders may fill out a Request to be Added to Planholders list:

https://www.co.fresno.ca.us/departments/public-works-planning/divisions-of-public-works-and-planning/design-division/planholders-list-request-to-be-added

Requesters will then be listed as a planholder for the project on the website and receive notifications and addenda issued for the project.

Prospective bidders may also select the project on <a href="www.BidExpress.com">www.BidExpress.com</a>. Those that demonstrate interest in the project will be added to the planholders list, and receive notifications and addenda issued for the project.

Planholder and exchange/publication names may be obtained from the Fresno County website at <a href="http://www.co.fresno.ca.us/departments/public-works-and-planning/construction-bidding-opportunities/22-14-c-golden-state-boulevard-phase-1">http://www.co.fresno.ca.us/departments/public-works-and-planning/construction-bidding-opportunities/22-14-c-golden-state-boulevard-phase-1</a>.

Electronic copies, in ".pdf" file format, of the official project plans and specifications, bid books and proposal sheets, as well as cross sections and such additional supplemental project information as may be provided, are available to view, download, and print at <a href="http://www.co.fresno.ca.us/departments/public-works-and-planning/construction-bidding-opportunities/22-14-c-golden-state-boulevard-phase-1">http://www.co.fresno.ca.us/departments/public-works-and-planning/construction-bidding-opportunities/22-14-c-golden-state-boulevard-phase-1</a>.

If a bidder is unable to submit a bid via Bid Express, Bid Books, which contain bid proposal sheets necessary to submit a bid, may be obtained within the Specifications documents posted on the Fresno County website.

Electronic bids shall be submitted via the BidExpress website. Hardcopy bids shall be submitted in a sealed envelope addressed to the Department and labeled with the name of the bidder, the name of the project and the statement "Do Not Open Until The Time Of Bid Opening."

Bid security in the amount of ten (10) percent of the amount of the bid, and in the form of a bid bond issued by an admitted surety insurer licensed by the California Department of Insurance, cash, cashier's check or certified check shall accompany the bid. You must either attach an electronic bid bond or provide an original bid bond (or other form of bid security authorized by Public Contract Code Section 20129(a)), prior to the bid opening. Bid security shall be made in favor of the County of Fresno.

Hardcopy bid bonds shall be submitted in a sealed envelope addressed to the Department and labeled with the name of the bidder, the name of the project and the statement "Do Not Open Until The Time Of Bid Opening – BID BOND"

A Summary of Bids and a list of subcontractors for the apparent low bidder will be posted at the above listed website, generally within 24 hours of the Bid Opening.

All questions regarding this project shall be in writing and shall be received by the Department of Public Works and Planning, Design Division, no later than 2:00 P.M. on the seventh (7th) calendar

day before bid opening. Any questions received after this deadline will not receive a response unless the Department of Public Works and Planning elects to issue an addendum to revise the bid opening date. In the event that the bid opening date is revised, the deadline for questions will be extended to no later than 2:00 P.M. on the seventh (7th) calendar day before the revised bid opening date. Questions shall be submitted on the "Request for Clarification Form" provided on our website:

http://www.co.fresno.ca.us/departments/public-works-and-planning/construction-bidding-opportunities/22-14-c-golden-state-boulevard-phase-1/request-for-clarification-form.

Any changes to, or clarification of, the project plans and specifications shall be in the form of a written addendum issued to planholders of record. Questions that prompt a change or clarification shall be included in the addendum with the subsequent answer.

Any oral explanation or interpretations given to this project are not binding.

No contract will be awarded to a contractor who has not been licensed in accordance with the provisions of the Contractors State License Law, California Business and Professions Code, Division 3, Chapter 9, as amended, or whose bid is not on the proposal form included in the contract document. A valid California Contractor's License, Class A (General Engineering) or C-12 (Earthwork and Paving), is required for this project.

Pursuant to Section 1773 of the Labor Code, the general prevailing wage rates in the county, or counties, in which the work is to be done have been determined by the Director of the California Department of Industrial Relations. These wages are set forth in the General Prevailing Wage Rates for this project, available at County of Fresno, Department of Public Works and Planning, 2220 Tulare Street, Sixth Floor, Fresno CA 93721-2104 and available from the California Department of Industrial Relations' Internet web site at <a href="http://www.dir.ca.gov/DLSR/PWD">http://www.dir.ca.gov/DLSR/PWD</a>. Future effective general prevailing wage rates, which have been predetermined and are on file with the California Department of Industrial Relations are referenced but not printed in the general prevailing wage rates.

This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)].

No contractor or subcontractor may be awarded a contract for public work on a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.

This contract is subject to state contract nondiscrimination and compliance requirements pursuant to Government Code, Section 12990.

The U.S. Department of Transportation (DOT) provides a toll-free "hotline" service to report bid rigging activities. Bid rigging activities can be reported Mondays through Fridays, between 8:00 a.m. and 5:00 p.m., Eastern Time, Telephone No. 1-800-424-9071. Anyone with knowledge of possible bid rigging, bidder collusion, or other fraudulent activities should use the "hotline" to report these activities. The "hotline" is part of the DOT's continuing effort to identify and investigate highway

construction contract fraud and abuse and is operated under the direction of the DOT Inspector General. All information will be treated confidentially and caller anonymity will be respected.

Bids are required for the entire work described herein. Bids will be compared on the basis of the cumulative sum of the bid amounts listed for the individual line items.

The successful bidder shall furnish a faithful performance bond in the amount of 100 percent of the contract amount and a payment bond in the amount of 100 percent of the contract amount. Each bond specified in this Notice (bid bond, faithful performance bond and payment bond) shall meet the requirements of all applicable statutes, including but not limited to those specified in Public Contract Code section 20129 and Civil Code section 3248.

Each bond specified in this Notice shall be issued by a surety company designated as an admitted surety insurer in good standing with and authorized to transact business in this state by the California Department of Insurance, and acceptable to the County of Fresno. Bidders are cautioned that representations made by surety companies will be verified with the California Department of Insurance. Additionally, the County of Fresno, in its discretion, when determining the sufficiency of a proposed surety company, may require the surety company to provide additional information supported by documentation. The County generally requires such information and documentation whenever the proposed surety company has either a Best's Key Rating Guide of less than A and a financial size designation of less than VIII. Provided, however, that the County expressly reserves its right to require all information and documentation to which the County is legally entitled from any proposed surety company.

Pursuant to Public Contract Code Section 22300, substitution of securities for any moneys withheld by the County of Fresno to ensure performance under the contract shall be permitted.

The Board of Supervisors reserves the right to reject any or all bids.

Board of Supervisors, County of Fresno

Paul Nerland, County Administrative Officer

Bernice E. Seidel, Clerk of the Board

Issue Date: August 30, 2022

# **Special Provisions**

# 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 project plans.

ABBREVIATIONS, LINES, SYMBOLS, AND LEGEND

A3A Abbreviations (Sheet 1 of 3)
A3B Abbreviations (Sheet 2 of 3)
A3C Abbreviations (Sheet 3 of 3)

A10A Legend - Lines and Symbols (Sheet 1 of 5)
RSP A10B Legend - Lines and Symbols (Sheet 2 of 5)
A10C Legend - Lines and Symbols (Sheet 3 of 5)
A10D Legend - Lines and Symbols (Sheet 4 of 5)
A10E Legend - Lines and Symbols (Sheet 5 of 5)

PAVEMENT MARKERS, TRAFFIC LINES, AND PAVEMENT MARKINGS

RSP A20A Pavement Markers and Traffic Lines - Typical Details
RSP A20B Pavement Markers and Traffic Lines - Typical Details
RSP A20C Pavement Markers and Traffic Lines - Typical Details
RSP A20D Pavement Markers and Traffic Lines - Typical Details

RSP A20E Pavement Markers and Traffic Lines - Typical Details for Contrast Striping

A24A Pavement Markings - Arrows

A24B Pavement Markings - Arrows and Symbols
A24C Pavement Markings - Symbols and Numerals

A24D Pavement Markings - Words

A24E Pavement Markings - Words, Limit and Yield Lines

A24F Pavement Markings - Crosswalks

MIDWEST GUARDRAIL SYSTEM - STANDARD RAILING SECTIONS

A77N4 Midwest Guardrail System - Typical Railing Delineation and Dike Positioning

**Details** 

RSP A77R3 Midwest Guardrail System - Typical Layouts for Roadside Fixed Objects

MIDWEST GUARDRAIL SYSTEM - END ANCHORAGE AND RAIL TENSIONING

**ASSEMBLY** 

A77S1 Midwest Guardrail System - End Anchor Assembly (Type SFT)

A77T1 Metal Railing End Anchor Assembly (Type CA)

CURBS, DRIVEWAYS, DIKES, CURB RAMPS, AND ACCESSIBLE PARKING

A87A Curbs and Driveways
RSP A87B Hot Mix Asphalt Dikes

DRAINAGE INLETS, PIPE INLETS AND GRATES

RSP D74 Drainage Inlet Details
D75B Concrete Pipe Inlets
D77A Grate Details No. 1
D77B Grate Details No. 2

**CONCRETE PIPE - DIRECT DESIGN METHOD** 

D79 Precast Reinforced Concrete Pipe - Direct Design Method
D79A Precast Reinforced Concrete Pipe - Direct Design Method

# **FLARED END SECTIONS**

	FLARED END SECTIONS
D94A	Metal and Plastic Flared End Sections
D94B	Concrete Flared End Sections
T1A	TEMPORARY CRASH CUSHIONS, RAILING AND TRAFFIC SCREEN 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)
	ROADSIDE SIGNS
RS1	Roadside Signs - Typical Installation Details No. 1
RS2	Roadside Signs - Wood Post - Typical Installation Details No. 2
RS3	Roadside Signs - Laminated Wood Box Post - Typical Installation Details No. 3
RS4	Roadside Signs - Typical Installation Details No. 4
	<b>ELECTRICAL SYSTEMS - LEGEND AND ABBREVIATIONS</b>
RSP ES-1A	Electrical Systems (Legend)
RSP ES-1B	Electrical Systems (Legend)
RSP ES-1C	Electrical Systems (Legend and Abbreviations)
ES-2A	ELECTRICAL SYSTEMS - SERVICE EQUIPMENT AND WIRING DIAGRAMS Electrical Systems (Service Equipment)
RSP ES-2D	Electrical Systems (Service Equipment Enclosure and Typical Wiring Diagram, Type III - A Series)
ES-3A	ELECTRICAL SYSTEMS - CONTROLLER CABINETS Electrical Systems (Controller Cabinet Details)
RSP ES-3C	Electrical Systems (Controller Cabinet Foundation and Pad Details)
ES-3H	ELECTRICAL SYSTEMS - IRRIGATION CONTROLLER ENCLOSURE CABINET Electrical Systems (Irrigation Controller Enclosure Cabinet)
	ELECTRICAL SYSTEMS - ELECTRONICS ASSEMBLY CONNECTION DIAGRAMS
RSP ES-3I	Electrical Systems (Electronics Assembly Connection Diagram, with Bypass Control Line)
ES-4A	ELECTRICAL SYSTEMS - SIGNAL HEADS, SIGNAL FACES AND MOUNTINGS Electrical Systems (Signal Heads and Mountings)
ES-4B	Electrical Systems (Pedestrian Signal Heads)
RSP ES-4C	Electrical Systems (Signal Heads and Mountings)
RSP ES-4D	Electrical Systems (Signal Head Mounting)
RSP ES-4E	Electrical Systems (Signal Heads and Optical Detector Mounting)
	ELECTRICAL SYSTEMS - DETECTORS
RSP ES-5A	Electrical Systems (Loop Detectors)
RSP ES-5B	Electrical Systems (Detectors)
ES-5C	Electrical Systems (Accessible Pedestrian Signal and Push Button Assemblies)
ES-5D	Electrical Systems (Curb and Shoulder Termination, Trench, and Handhole Details)
	<b>ELECTRICAL SYSTEMS - LIGHTING STANDARDS</b>
RSP ES-6A	Electrical Systems (Lighting Standard, Types 15 and 21)
RSP ES-6D	Electrical Systems (Lighting Standard, Types 15D and 21D, Double Luminaire Mast Arm)

	ELECTRICAL SYSTEMS - SIGNAL AND LIGHTING STANDARD, TYPE TS, AND PUSH BUTTON ASSEMBLY POST
RSP ES-7A	Electrical Systems (Signal and Lighting Standard, Type TS, and Push Button Assembly Post)
RSP ES-7B	ELECTRICAL SYSTEMS - SIGNAL AND LIGHTING STANDARDS Electrical Systems (Signal and Lighting Standard, Type 1 and Equipment Identification Characters)
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-7D	Electrical Systems (Signal and Lighting Standard, Case 2 Signal Mast Arm Loading, Wind Velocity = 100 mph and Signal Mast Arm Lengths 15' to 30')
RSP ES-7E	Electrical Systems (Signal and Lighting Standard, Case 3 Signal Mast Arm Loading, Wind Velocity = 100 mph and Signal Mast Arm Lengths 15' to 45')
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')
RSP ES-7H	Electrical Systems (Signal and Lighting Standard, Case 5 Signal Mast Arm Loading, Wind Velocity = 100 mph and Signal Mast Arm Lengths 60' to 65')
RSP ES-7J	ELECTRICAL SYSTEMS - FLASHING BEACONS Electrical Systems (Flashing Beacon on a Type 1, Type 15-FBS and Type 40 Standard)
RSP ES-7M	ELECTRICAL SYSTEMS - SIGNAL AND LIGHTING STANDARD DETAILS Electrical Systems (Signal and Lighting Standard - Detail No. 1)
RSP ES-7N	Electrical Systems (Signal and Lighting Standard - Detail No. 2)
ES-70	Electrical Systems (Signal and Lighting Standard - Detail No. 3)
	ELECTRICAL SYSTEMS - PEDESTRIAN BARRICADES
ES-7Q	Electrical Systems (Pedestrian Barricades)
	ELECTRICAL SYSTEMS - SIGNAL AND LIGHTING, MISCELLANEOUS ATTACHMENT
ES-7R	Electrical Systems (Signal and Lighting, Miscellaneous Attachment)
	ELECTRICAL SYSTEMS - PULL BOX
RSP ES-8A	Electrical Systems (Non-Traffic Pull Box)
RSP ES-8B	Electrical Systems (Traffic Pull Box)
	ELECTRICAL SYSTEMS - SPLICE INSULATION METHODS, FUSE RATING, KINKING AND BANDING DETAILS
RSP ES-13A	Electrical Systems (Splice Insulation Methods Details)
RSP ES-13B	Electrical Systems (Fuse Rating, Kinking, and Banding Detail)
EC 1EA	ELECTRICAL SYSTEMS - SIGN ILLUMINATION EQUIPMENT AND CONTROLS
ES-15A	Electrical Systems (Sign Illumination Equipment)  ELECTRICAL SYSTEMS - CLOSED CIRCUIT TELEVISION POLE AND FOUNDATION DETAILS
RSP ES-16A	Electrical Systems (Closed Circuit Television, 5' to 15' Overhead Sign Mounted Pole)

# City of Kingsburg 2009 Standard Plans

D-1	Curb Inlet	
D-4	Manhole Type A	

D-5	Manhole Frame and Cover
E-1 thru E-15	Street Lighting
M-7 thru M-9	Chain Link Fence
ST-9	Median Curb
ST-18	Street Name Sign
ST-24	Curb, Gutter, and Sidewalk
ST-26	Commercial Driveway
ST-30	<b>Curb Ramp Details and Grooves</b>
ST-46	Valley Gutter
W-9	Pavement Markers

# City of Selma 2015 Standard Plans

SD-1 thru SD-5	Storm Drain Facilities
ST-1	Sidewalk Construction Details
ST-2	Curb and Gutter Construction Details
ST-3 thru ST-5	Curb Ramps
ST-6	Driveway
ST-7	Commercial Driveway
ST-9	Valley Gutter
ST-14	Center Island Turnout for One Way Left Turns
ST-15	Accessible Facilities Detail

# **City of Fowler 2009 Standard Plans**

D-1	Curb inlet
ST-10	Curb & Gutter Detail
ST-12A thru ST-	Curb Ramp Details & Grooves

Courb Inda4

# DIVISION I GENERAL PROVISIONS 1 GENERAL

# 1-1.01 **GENERAL**

# Add to the beginning of Section 1:

The work is done in accordance with the 2015 *Standard Specifications*, 2015 *Standard Plans* and the following special provisions.

Where these special provisions indicate to replace, add to, delete, delete from, or otherwise modify a "section," or a portion thereof, the section or portion thereof to which such modification is to be applied is the section or portion thereof with the corresponding numbering in the 2015 *Standard Specifications*.

Except to the extent that they may conflict with these special provisions, revised standard specifications apply if included in the project details section of the book entitled "Specifications."

Revised standard plans apply if listed on the "List of Revised Standard Plans," if any, in these special provisions; or if shown or referenced on the project plans or in the project details section of the book entitled "Specifications."

In case of conflict between the *Standard Specifications* and these special provisions, the special provisions shall take precedence over and be used in lieu of such conflicting portions.

In case of conflict between applicable revised standard specifications and these special provisions, the special provisions shall take precedence over and be used in lieu of such conflicting portions.

# Add to the end of section 1-1.01:

**Bid Items and Applicable Sections** 

Item	Item description	Applicable
code	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	section
070030	Lead Compliance Plan	7
090124A	Compensation for Adjustments for Price Fluctuations	9
	Supplemental Work	9
	Mobilization	9
100300A	Furnish Field Office	10
	Construction Project Funding Sign	12
120100	Temporary Traffic Control	12
	Job Site Management	13
130300	Prepare Storm Water Pollution Prevention Plan	13
130310	Rain Event Action Plan	13
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305000	Crack and Seat	30
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# Add to the 1st table of section 1-1.06:

APCD	air pollution control district
AQMD	air quality management district
CISS	cast-in-steel shell
CSL	crosshole sonic logging
GGL	gamma-gamma logging
METS	Caltrans Material Engineering and Testing Services

# Add to section 1-1.06:

Abbreviations in the Bid Item List are also used in Proposal Sheet 2.

# Replace Section 1-1.07 with:

# 1-1.07 DEFINITIONS

# 1-1.07A General

Interpret terms as defined in the Contract documents.

#### 1-1.07B Glossary

abandon: Render unserviceable in place.

acts of God: Acts of God as defined in Pub Cont Code § 7105.

**activity:** Task, event, or other project element on a schedule that contributes to completing the project. An activity has a description, start date, finish date, duration, and one or more logic ties.

adjust: Raise or lower a facility to match a new grade line.

**aerially deposited lead:** Lead primarily from vehicle emissions deposited within unpaved areas or formerly unpaved areas.

**Authorized Facility Audit List:** Caltrans-developed list of facilities. For the Authorized Facility Audit List, go the METS website.

**authorized laboratory:** Independent testing laboratory (1) not employed or compensated by any subcontractor or subcontractor's affiliate providing other services for the Contract and (2) authorized by the Department.

**Authorized Material List:** Caltrans-developed list of authorized materials. For the Authorized Material List go to the METS website.

**Authorized Material Source List:** Caltrans-developed list of authorized source materials. For the Authorized Material Source List go to the METS website.

**base:** Layer of specified material of planned thickness placed immediately below the pavement or surfacing.

basement material: Material in an excavation or embankment under the lowest layer to be placed.

bid item: Work unit for which the Bidder provides a price.

**Bid Item List:** List of bid items, units of measure, and the associated quantities. The verified Bid Item List is the Bid Item List with verified prices. The Contract Proposal (Proposal 2) of Low Bidder at the Department's website is the verified Bid Item List. After contract award, interpret a reference to the Bid Item List as a reference to the verified Bid Item List.

borrow: Fill acquired from an excavation source outside the described cut area.

- local borrow: Material obtained by widening cuts or excavating from sources outside the planned or authorized cross section on the job site. The location of the local borrow is described or designated by the Engineer.
- 2. **imported borrow:** Borrow that is not local borrow.

bridge: Structure that:

- 1. Has a bridge number
- 2. Carries a (1) utility, (2) railroad, or (3) vehicle, pedestrian, or other traffic over, under, or around obstructions or waterways

**building-construction contract:** Contract that has *Building Construction* on the cover of the *Notice to Bidders and Special Provisions*.

**California Test:** Caltrans-developed test for determining work quality. For California Tests, go to the METS website.

**Caltrans**: State of California Department of Transportation

certificate of compliance: Certificate stating the material complies with the Contract.

**Certified Industrial Hygienist:** Industrial hygienist certified in comprehensive practice by the American Board of Industrial Hygiene.

**change order work:** Work described in a Change Order, including extra work and work described in the Contract as change order work.

**closure:** Closure of a traffic lane or lanes, including shoulder, ramp, or connector lanes, within a single traffic control system.

commercial quality: Quality meeting the best general practices.

**commercial source**: Established business operating as a material source for the general public.

**Contract:** Written and executed contract between the Department and the Contractor.

**Contract acceptance:** Director's written acceptance of a completed Contract.

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

**Contractor:** Person or business or its legal representative entering into a Contract with the Department for performance of the work.

controlling activity: Construction activity that will extend the scheduled completion date if delayed.

County: The County of Fresno

**critical path:** Longest continuous chain of activities for the project that has the least amount of total float of all chains. In general, a delay on the critical path extends the scheduled completion date.

**critical path method:** Network-based planning technique using activity durations and relationships between activities to calculate a schedule for the entire project.

**culvert:** Structure other than a bridge that provides an opening under a roadway.

**data date:** Day after the date through which a schedule is current. Everything occurring earlier than the data date is as-built and everything on or after the data date is planned.

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 a 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. Traffic maintenance 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.

**deduction:** Money permanently taken from a progress payment or the final payment. Deductions are cumulative and are not retentions under Pub Cont Code § 7107.

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

**Department:** The Fresno County Board of Supervisors and its authorized representatives.

District Office: County of Fresno Department of Public Works and Planning

**detour:** Temporary route for traffic around a closed road part. A passageway through a job site is not a detour.

**Director:** Department's Chairman

disadvantaged business enterprise: Disadvantaged business enterprise as defined in 49 CFR 26.5.

dispose of: Remove from the job site.

divided highway: Highway with separated traveled ways for traffic, generally in opposite directions.

**Engineer:** The County's Director of Public Works and Planning, acting through their authorized designees.

**early completion time:** Difference in time between an early scheduled completion date and the work completion date.

**environmentally sensitive area:** Area within or near construction limits where access is prohibited or limited to protect environmental resources.

**estimated cost**: Estimated cost of the project as shown on the *Notice to Bidders*.

extra work: Any work, desired or performed, but not included in the original Contract.

federal-aid contract: Contract that has a federal-aid project number on the cover of the Specifications.

final pay item: Bid item whose quantity shown on the Bid Item List is the quantity paid.

**finished grade:** Final surface of the completed facility. If the work under the Contract includes stage construction, the relation between the finished grade and the work under the Contract is shown.

**fixed cost:** Labor, material, or equipment cost directly incurred by the Contractor as a result of performing or supplying a particular bid item that remains constant regardless of the item's quantity.

float: Difference between the earliest and latest allowable start or finish times for an activity.

1. **Department-owned float:** Time saved on the critical path by actions of the Department. It is the last activity shown on the schedule before the scheduled completion date.

**force account work:** Work ordered on a construction project without an existing agreement on its cost, and performed with the understanding that the contractor will bill the owner according to the cost of labor, materials, and equipment, plus a certain percentage for overhead and profit.

**grading plane:** Basement material surface on which the lowest layer of subbase, base, pavement, surfacing, or other specified layer is placed.

highway: Whole right-of-way or area reserved for use in constructing the roadway and its appurtenances.

holiday: Holiday shown in the following table:

<u> </u>	lol	lid	ay	/S

	, =	
Holiday	Date observed	
Every Sunday	Every Sunday	
New Year's Day	January 1st	
Birthday of Martin Luther King, Jr.	3rd Monday in January	
Presidents' Day	3rd Monday in February	
Cesar Chavez Day	March 31 <sup>st</sup>	
Memorial Day	Last Monday in May	
Independence Day	July 4 <sup>th</sup>	
Labor Day	1st Monday in September	
Veterans Day	November 11 <sup>th</sup>	
Thanksgiving Day	4th Thursday in November	
Day after Thanksgiving Day	Day after Thanksgiving Day	
Christmas Day	December 25 <sup>th</sup>	

If January 1st, March 31st, July 4th, November 11th, or December 25th fall on a Sunday, the Monday following is a holiday. If January 1st, March 31st, July 4th, November 11th, or December 25th fall on a Saturday, the preceding Friday is a holiday.

hours of darkness: Hours of darkness as defined in Veh Code § 280.

idle equipment: Equipment:

- 1. On the job site at the start of a delay
- 2. Idled because of the delay
- 3. Not operated during the delay

**informal-bid contract**: Contract that has *Informal Bid Authorized by Pub Cont Code* § 10122 on the cover of the *Notice to Bidders and Special Provisions*.

**job site:** Area within the defined boundaries of a project.

**Labor Surcharge and Equipment Rental Rates:** Caltrans publication that lists labor surcharge and equipment rental rates.

landscaping: Practice of a landscaping contractor under 16 CA Code of Regs § 832.27.

material: Any product or substance specified for use in the construction of a project.

#### material shortage:

- 1. Shortage of raw or produced material that is area-wide and caused by an unusual market condition except if any of the following occurs:
  - 1.1. Shortage relates to a produced, nonstandard material
  - 1.2. Supplier's and the Contractor's priority for filling an order differs
  - 1.3. Event outside the United States for a material produced outside the United States
- 2. Unavailability of water that delays a controlling activity

**material source facility audit:** Self-audit and a Caltrans audit evaluating a facility's capability to consistently produce materials that comply with Caltrans standards.

median: Portion of a divided highway separating the traveled ways including inside shoulders.

**milestone:** Event activity that has zero duration and is typically used to represent the start or end of a certain stage of the project.

**mobilization:** Preparatory work that must be performed or costs incurred before starting work on the various items on the job site (Pub Cont Code § 10104).

modify: Add to or subtract from an appurtenant part.

**narrative report:** Document submitted with each schedule that discusses topics related to project progress and scheduling.

**near critical path:** Chain of activities with total float exceeding that of the critical path but having not more than 10 working days of total float.

**obliterate:** Place an earth cover over or root, plow, pulverize, or scarify.

Office engineer: The Director of Public Works and Planning for the County of Fresno

pavement: Uppermost layer of material placed on a traveled way or shoulder.

plans: Standard plans, revised standard plans, and project plans.

- standard plans: Drawings standard to Department construction projects. These plans are in a book titled Standard Plans.
- 2. **revised standard plans:** New or revised standard plans. These plans are listed in the *List of Revised Standard Plans* in a book titled *Specifications*.
- 3. **project plans:** Drawings specific to the project, including authorized shop drawings. These plans also include a section titled *Project Details* of a book titled *Specifications*.

plant establishment period: Number of days shown on the Notice to Bidders for plant establishment.

**quality characteristic:** Characteristic of a material that is measured to determine conformance with a given requirement.

quality control plan: Contractor's plan to ensure QC.

reconstruct: Remove and disassemble and construct again at an existing or new location.

**relocate:** Remove and install or place in a new location.

remove: Remove and dispose of.

**reset:** Remove and install or place laterally at the same station location.

**roadbed:** Roadway portion extending from the curb line to curb line or the shoulder line to shoulder line. A divided highway has 2 roadbeds.

roadside: Area between the outside shoulder edge and the right-of-way limits.

**roadway:** Portion of the highway within the outside lines of curbs, sidewalks, slopes, ditches, channels, or waterways. A roadway includes the structures and features necessary for safety, protection of facilities, and drainage.

salvage: Remove, clean, and haul to a specified location.

schedule:

- 1. **baseline schedule:** Initial schedule showing the original work plan starting on the date of Contract approval. This schedule shows no completed work to date and no negative float or negative lag to any activity.
- revised schedule: Schedule that incorporates a proposed or past change to logic or activity durations.
- 3. **updated schedule:** Current schedule developed from the accepted baseline and any subsequent accepted updated or revised schedules through regular monthly review to incorporate actual past progress.

scheduled completion date: Planned work completion date shown on the current schedule.

**shoulder:** Roadway portion contiguous with the traveled way for accommodation of a stopped vehicle, emergency use, and lateral support of base and surface courses.

**small tool**: Tool or piece of equipment not listed in Labor Surcharge and Equipment Rental Rates that has a replacement value of \$500 or less.

specifications: Standard specifications, revised standard specifications, and special provisions.

- 1. **standard specifications**: Specifications standard to Department construction projects. These specifications are in a book titled *Standard Specifications*.
- 2. **revised standard specifications:** New or revised standard specifications. These specifications are in a section titled *Revised Standard Specifications* of a book titled *Specifications*.
- 3. **special provisions:** Specifications specific to the project. These specifications are in a section titled *Special Provisions* of a book titled *Specifications*.

**State:** State of California, including its agencies, departments or divisions whose conduct or action is related to the work.

**Structure Design:** Offices of Structure Design of the Department of Transportation.

**subbase:** Layer of material between a base and the basement material.

**subgrade:** Roadbed portion on which pavement, surfacing, base, subbase, or a layer of any other material is placed.

#### submittal:

- 1. **action submittal:** Written and graphic information and samples that require the Department's response.
- 2. **informational submittal:** Written information that does not require the Department's response.

**substantial defects:** Defects plainly seen as damaged, displaced, or missing parts or improper functioning of materials, parts, equipment, or systems.

**substructure:** Bridge parts below the bridge seats, pier tops, and haunches for rigid-framed bridges or spring lines for arched bridges; includes abutment backwalls, abutment parapets, and wingwalls.

**superstructure:** Bridge parts except the substructure.

**supplemental project information:** Information relevant to the project, specified as supplemental project information, and made available to bidders.

surfacing: Uppermost layer of material placed on a traveled way or shoulders; pavement.

**time impact analysis:** Analysis using a CPM schedule developed specifically to demonstrate the effect a proposed or past change or delay has on the current scheduled completion date.

**time-scaled network diagram:** Graphic depiction of a CPM schedule comprised of activity bars with relationships for each activity represented by arrows. The tail of each arrow connects to the activity bar for the predecessor and points to the successor.

total bid: Sum of the item totals as verified by the Department; original Contract price.

**total float:** Amount of time that an activity or chain of activities can be delayed before extending the scheduled completion date.

**traffic:** Pedestrians, bicyclists, ridden or herded animals, vehicles, streetcars, and other conveyances either singularly or together while using any highway for purposes of travel.

traffic lane: Portion of traveled way used for the movement of a single line of vehicles.

**traveled way:** Portion of the roadway for the movement of vehicles, exclusive of the shoulders, berms, sidewalks, and parking lanes.

tunnel: Tunnel as defined in 8 CA Code of Regs § 8405 et seq.

**unauthorized work:** Work performed beyond the lines and grades described in the Contract or established by the Engineer or extra work performed without Department authorization.

**unsuitable material:** Material encountered below the natural ground surface in embankment areas or below the grading plane in excavation areas that the Engineer determines to be in any of the following conditions:

- 1. Of such unstable nature that it cannot be compacted to the specified density using ordinary methods at optimum moisture content.
- 2. Too wet to be properly compacted and cannot be dried before incorporating it into the work. Excessive moisture alone is not sufficient cause for determining that the material is unsuitable.
- 3. Inappropriate for the planned use.

withhold: Money temporarily or permanently taken from a progress payment.

work: Resources and activities required for Contract acceptance, including labor, materials, equipment, and the created product.

work plan: Detailed formulation of a program of action.

work zone: Area of a highway with construction, maintenance, or utility work activities.

Add to the end of Section 1-1.09

This project is not in a freeze-thaw area.

#### Replace Section 1-1.10 with:

#### 1-1.10 PAVEMENT CLIMATE REGIONS

To help account for the effects of various climatic conditions on pavement performance, the State has been divided into 9 climate regions. The project's pavement climate region is "Inland Valley".

# Replace Section 1-1.11 with:

# 1-1.11 WEBSITES, ADDRESSES, AND TELEPHONE NUMBERS

Websites, Addresses, and Telephone Numbers

	1		
Reference or			
agency or	144 1 24		<b>-</b>
department unit	Website	Address	Telephone no.
Authorized Material Lists Authorized Material Source Lists	https://dot.ca.gov/program s/engineering- services/authorized- materials-lists		
CA Unified Certification Program's list of certified DBEs	https://dot.ca.gov/program s/civil-rights/dbe-search		
California MUTCD	http://www.dot.ca.gov/trafficops/camutcd/		
Department	http://www.co.fresno.ca.us	2220 Tulare Street Design Division – Seventh Floor Fresno, CA 93721	(559) 600-9908
Department of Conservation, Office of Mine Reclamation	http://www.conservation.c a.gov/dmr/		
Department of Industrial Relations	http://www.dir.ca.gov	455 Golden Gate Ave San Francisco CA 94102	
Design Services - Contract Administration, Planholders, Bid Results	https://www.co.fresno.ca.u s/departments/public- works-planning/contractor- bids-plan-holders- electronic-plans-bid- results	2220 Tulare Street Design Division – Seventh Floor Fresno, CA 93721	Tel: (559) 600- 9908 Fax:(559) 455- 4609 Email: DesignServices@ fresnocountyca.g
Division of Accounting, Office of External Accounts Payable	https://dot.ca.gov/program s/accounting	Major Construction Payment and Information Unit Office of External Accounts Payable Division of Accounting Department of Transportation P.O. Box 168043 Sacramento, CA 95816-8043	(916) 227-9013
Division of Construction	http://www.dot.ca.gov/hq/c onstruc/		
Geotechnical Services	https://dot.ca.gov/program s/engineering-services	Geotechnical Services Department of Transportation 5900 Folsom Blvd Sacramento, CA 95819-4612	(916) 227-7000
METS	https://dot.ca.gov/program s/engineering-services	Materials Engineering and Testing Services Department of Transportation 5900 Folsom Blvd Sacramento, CA 95819-4612	(916) 227-7000
MPQP	https://dot.ca.gov/program s/construction/material- plant-quality-program		

Office Engineer	 Director of Public Works & Planning Fresno County 2220 Tulare St, 8 <sup>th</sup> Floor Fresno, CA 93721	(559) 600-4078
Offices of Structure Design, Documents Unit	 MSC 9-4/4I Documents Unit Offices of Structure Design Department of Transportation 1801 30th St Sacramento, CA 95816-7006	(916) 227-0716
Publication Distribution Unit	 Publication Unit Department of Transportation 1900 Royal Oaks Dr Sacramento, CA 95815-3800	

# Replace Section 1-1.12 with:

# 1-1.12 MISCELLANY

Make checks and bonds payable to the County of Fresno.

# Replace Section 2 with:

# 2 BIDDING

#### 2-1.01 **GENERAL**

Section 2 includes specifications related to bid eligibility and the bidding process.

#### 2-1.02 BID INELIGIBILITY

A firm that has provided architectural or engineering services to the Department for this contract before bid submittal for this contract is prohibited from any of the following:

- 1. Submitting a bid
- 2. Subcontracting for a part of the work
- 3. Supplying materials

#### 2-1.03 CONTRACTOR REGISTRATION

No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)].

#### 2-1.04-2-1.05 RESERVED

# 2-1.06 BID DOCUMENTS

#### 2-1.06A General

The *Bid* book includes bid forms and certifications and may be requested from Design Services and are available online at <a href="http://www.BidExpress.com">http://www.BidExpress.com</a>.

The *Specifications* includes the *Notice to Bidders*, revised standard specifications, project details, and special provisions.

The *Specifications*, project plans, and any addenda to these documents may be accessed at Design Services.

The *Standard Specifications* and *Standard Plans* may be purchased at the Publication Distribution Unit or accessed online at <a href="https://www.co.fresno.ca.us/home/showpublisheddocument/58025">https://www.co.fresno.ca.us/home/showpublisheddocument/58025</a>.

# 2-1.06B Supplemental Project Information

The Department makes the following supplemental project information available:

**Supplemental Project Information** 

Cappiemental i reject information		
Where Available	Description	
Included in Project Details	<ul> <li>Soil Testing</li> <li>Air Impact Assessment Information &amp; Dust Control Plan Dummy Permit</li> <li>Caltrans Traffic Encroachment Permit (contractor responsible for fees)</li> <li>Construction Funding Sign</li> <li>Mitigation Monitoring and Reporting Program</li> <li>Local Agency Standard Plans</li> </ul>	
Included as supplemental information Cross Sections		

If as-built drawings are available they may not show existing dimensions and conditions. Where new construction dimensions are dependent on existing bridge dimensions, verify the field dimensions and adjust the dimensions of the work to fit the existing conditions.

#### 2-1.06C-2-1.06D Reserved

#### 2-1.07 JOB SITE AND DOCUMENT EXAMINATION

Examine the job site and bid documents. Notify the Department of apparent errors and patent ambiguities in the plans, specifications, and Bid Item List. Failure to do so may result in rejection of a bid or rescission of an award.

Bid submission is your acknowledgment that you have examined the job site and bid documents and are satisfied with:

- 1. General and local conditions to be encountered
- 2. Character, quality, and scope of work to be performed
- 3. Quantities of materials to be furnished
- 4. Character, quality, and quantity of surface and subsurface materials or obstacles
- 5. Requirements of the contract

# 2-1.08 RESERVED

#### 2-1.09 BID ITEM LIST

Submit a bid based on the bid item quantities the Department shows on Bid Item List.

# 2-1.10 SUBCONTRACTOR LIST

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.).

For each subcontractor listed, the Subcontractor List form must show:

- 1. Business name and the location of its place of business.
- 2. California contractor license number for a non-federal-aid contract.
- 3. Public works contractor registration number.
- 4. Portion of work it will perform. Show the portion of the work by:
  - 4.1. Bid item numbers for the subcontracted work
  - 4.2. Percentage of the subcontracted work for each bid item listed
  - 4.3. Description of the subcontracted work if the percentage of the bid item listed is less than 100 percent

# 2-1.13-2-1.32 RESERVED

#### 2-1.33 BID DOCUMENT COMPLETION AND SUBMITTAL

# 2-1.33A General

Complete forms in the Bid book.

Submit an electronic bid online at http://www.BidExpress.com (Section 2-1.33D) or submit a hardcopy bid:

- 1. Under sealed cover
- 2. Marked as a bid
- 3. Identifying the contract number and the bid opening date

Certain bid forms must be submitted with the bid and properly executed.

Certain other forms and information must be submitted either with the bid or within the prescribed period after bid opening as specified elsewhere in these special provisions.

Failure to submit the forms and information as specified results in a nonresponsive bid.

If an agent other than the authorized corporation officer or a partnership member signs the bid, file a Power of Attorney with the Department either before opening bids or with the bid. Otherwise, the bid may be nonresponsive.

# 2-1.33B Bid Item List and Bid Comparison

Submit a bid based on the bid item quantities the Department shows on Proposal 2. Bids will be evaluated and the low bidder determined as indicated in the *Notice to Bidders*.

Do not submit an unbalanced bid. An unbalanced is a bid is one in which one or more bid items is/are considered by the Department to have been bid at an amount that is unreasonably high or unreasonably low. A bid may be considered to be non-responsive and may be rejected if it is considered by the Department to be unbalanced.

# 2-1.33C Bid Document Completion

Proposal items are identified by title and by the word "Proposal" followed by the number assigned to the proposal item in question. Proposal items are included in the *Bid Book*.

# 2-1.33C(1) Proposal 1 - Proposal to the Board of Supervisors of Fresno County

# 2-1.33C(2) Proposal 2 - Bid Item List

One or more sheet(s) or list(s) upon which the bidder completes the bid.

Fill out completely including a unit price and total for each unit price-based item and a total for each lump sum item.

Do not make any additions such as "plus tax", "plus freight", or conditions such as "less 2% if paid by 15th".

Use ink or typewriter for paper bids.

# 2-1.33C(3) Proposal 3 - Evaluation of Bid Item List

Describes how inconsistences and irregularities are evaluated and corrected when Design Services reviews the Bid Item List.

#### 2-1.33C(4) Proposal 4 - Bid Security and Signature

Submit one of the following forms of bidder's security equal to at least 10 percent of the bid:

- Cash
- Cashier's check
- Certified check
- · Signed bidder's bond by an admitted surety insurer

Indicate type of bid security provided.

- Cash Acceptable but not recommended. Cash is deposited in a clearing account and is returned to bidders by County warrant. This process may take several weeks.
- Cashier's or Certified Checks. This type of security is held until the bid is no longer under consideration. If submitted by a potential awardee, they will be returned when the contract is fully executed by the bidder and bonds and insurance have been approved.
- Bid Bonds Must be signed by the bidder and by the attorney-in-fact for the bonding company. Provide notarized signature of attorney-in-fact accompanied by bonding company's affidavit authorizing attorney-in-fact to execute bonds. An unsigned bid bond will be cause for rejection.

Provide contractor's license information.

State business name and if business is a:

- Corporation list officers
- Partnership list partners
- Joint Venture list members; if members are corporations or partnerships, list their officers or partners.
- Individual list Owner's name and firm name style

Signature of Bidder - the following lists types of companies and corresponding authorized signers.

- · Corporation by an officer
- Partnership by a partner
- Joint Venture by a member
- Individual by the Owner

If signature is by a Branch Manager, Estimator, Agent, etc., the bid must be accompanied by a power of attorney authorizing the individual to sign the bid in question or to sign bids more generally, otherwise the bid may be rejected.

Business Address - Firm's Street Address

Mailing Address - P.O. Box or Street Address

Complete, sign, and return with bid.

# 2-1.33C(5) Proposal 5 - Noncollusion Declaration

Must be completed, signed, and returned with bid.

# 2-1.33C(6) Proposal 6 - Public Contract Code Section 10285.1 Statement

Select "has" or "has not" in accordance with instructions on form, return with completed for with bid. Note that signing the bid constitutes signing this statement.

# 2-1.33C(7) Proposal 7 - Public Contract Code Section 10162 Questionnaire And Public Contract Code 10232 Statement

Select: "yes" or "no" accordance with instructions on form, include explanation if "yes" is selected. Return completed form with bid. Note that signing the bid constitutes signing this questionnaire and statement.

# 2-1.33C(8) Proposal 8(a) through Proposal 8(f) - Subcontractors

Sheet(s) or spaces where bidders list subcontractors. 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* submitted with the bid must show the name, location of business, work portions to be performed, and the contractor's license number for each subcontractor listed.

- Use subcontractor's business name style as registered with the License Board.
- Specify the city in which the subcontractor's business is located and the state if other than California.
- Description of the work to be performed by the subcontractor. Indicate with bid item numbers from the bid item list and/or work descriptions similar to those on bid item list.
- List license number and Department of Industrial Relations registration number for each subcontractor.

Upon request from Design Services, provide the following additional information within 24 hours of bid opening if not included on the *Subcontractor List* submitted with the bid:

- Complete physical address for each subcontractor listed.
- Percentage of the total bid or dollar amount associated with each subcontractor listed.

# 2-1.33C(15) Proposal 15 - Opt out of payment adjustments for price index fluctuations

You may opt out of the payment adjustments for price index fluctuations specified in section 9-1.07. To opt out, submit a completed *Opt Out of Payment Adjustments for Price Index Fluctuations* form with your bid.

# 2-1.33C(16) Proposal 16 - Guaranty

Does not need to be signed with the bid. Part of the contract which must be signed by the contractor when contract is executed.

#### 2-1.34 BIDDER'S SECURITY

Submit one of the following forms of bidder's security equal to at least 10 percent of the bid:

- 1. Cash
- 2. Cashier's check
- 3. Certified check
- 4. Signed bidder's bond by an admitted surety insurer

Submit cash, cashier's check, certified check, or bidder's bond with your bid.

# 2-1.35-2-1.39 RESERVED

#### 2-1.40 BID WITHDRAWAL

- 1. An authorized agent may withdraw a bid before the bid opening date and time by submitting a written bid withdrawal request at the location where the bid was submitted. Withdrawing a bid does not prevent you from submitting a new bid. An authorized agent is an individual authorized to submit a bid.
- 2. After the bid opening time, you cannot withdraw a bid.

#### 2-1.41-2-1.42 RESERVED

#### 2-1.43 BID OPENING

The Department publicly opens and reads bids at the time and place shown on the Notice to Bidders.

# 2-1.44-2-1.45 RESERVED

#### 2-1.46 DEPARTMENT'S DECISION ON BID

The Department's decision on the bid amount is final.

The Department may reject:

- 1. All bids
- 2. A nonresponsive bid

#### **2-1.47 BID RELIEF**

The Department may grant bid relief under Pub Cont Code § 5100 et seq. Submit any request for bid relief to Design Services.

# **2-1.48 RESERVED**

#### 2-1.49 SUBMITTAL FAILURE HISTORY

The Department considers a bidder's past failure to submit documents required after bid opening in determining a bidder's responsibility.

# 2-1.51 DISCLOSURE OF SELF-DEALING TRANSACTIONS

This provision is only applicable if the contractor is operating as a corporation (a for-profit or non-profit corporation) or if during the term of this agreement, the contractor changes its status to operate as a corporation.

Members of the contractor's Board of Directors shall disclose any self-dealing transactions that they are a party to while contractor is providing goods or performing services under this agreement. A self-dealing transaction shall mean a transaction to which the contractor is a party and in which one or more of its directors has a material financial interest. Members of the Board of Directors shall disclose any self-dealing transactions that they are a party to by completing and signing a Self-Dealing Transaction Disclosure Form which is included in *Project Details* of these special provisions.

In the event that the Contractor (to whom the project is awarded) is operating as a corporation or incorporates during the course of the construction contract, and any member of its board of directors is engaged or intends to become engaged in self-dealing transaction(s), each member of its board of directors who is engaged or intends to become engaged in a self-dealing transaction or transactions must complete and submit to the County a completed Self-Dealing Transaction Disclosure Form (in Project Details) for each such transaction prior to engaging therein or immediately thereafter.

# 3 CONTRACT AWARD AND EXECUTION

# Replace the headings and paragraphs of Section 3 with:

# **3-1.01 GENERAL**

Section 3 includes specifications related to contract award and execution.

# 3-1.02 CONSIDERATION OF BIDS

#### 3-1.02A General

Bids will be compared on the basis listed in the Notice to Bidders.

# 3-1.02B Tied Bids

The Department breaks a tied bid with a coin toss:

# 3-1.03 CONTRACTOR REGISTRATION

No contractor or subcontractor may be awarded a contract for public work on a public works project (awarded on or after April 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.

# 3-1.04 CONTRACT AWARD

#### **3-1.04A BID PROTEST PROCEDURES**

Any bid protest must be submitted in writing and delivered by the Bidder by either of the following means: (1) via e-mail to <a href="mailto:DesignServices@fresnocountyca.gov">DesignServices@fresnocountyca.gov</a>; or (2) via certified mail, return receipt requested to the following address: Design Division, Department of Public Works and Planning, 2220 Tulare Street, Sixth Floor, Fresno, CA 93721.

The bid protest <u>must</u> be <u>received</u> no later than 5:00 p.m. of the seventh (7<sup>th</sup>) calendar day following the deadline for submittal of the specific bid document(s) placed at issue by the protest. Any Bidder filing a protest is encouraged to submit the bid protest via e-mail, because the deadline is based on the Department's <u>receipt</u> of the bid protest. A bid protest accordingly may be rejected as untimely if it is not received by the deadline, regardless of the date on which it was postmarked. The Bidder's compliance with the following additional procedures also is mandatory:

- a. The initial protest document shall contain a complete statement of the grounds for the protest, including a detailed statement of the factual basis and any supporting legal authority.
- b. The protest shall identify and address the specific portion of the document(s) forming the basis for the protest.
- c. The protest shall include the name, address and telephone number of the person representing the protesting party.
- d. The Department will provide a copy of the initial protest document and any attached documentation to all other Bidders or proposers who appear to have a reasonable prospect of receiving an award depending upon the outcome of the protest.
- e. The Board of Supervisors will issue a decision on the protest. If the Board of Supervisors determines that a protest is frivolous, the party originating the protest may be determined to be irresponsible and that party may be determined to be ineligible for future contract awards.
- f. The procedure and time limits set forth herein are mandatory and are the Bidder's sole and exclusive remedy in the event of a bid protest. Failure by the Bidder to comply with these procedures shall constitute a waiver of any right to further pursue the bid protest, including the subsequent filing of a Government Code Claim or legal proceedings.

# 3-1.04B AWARD PERIOD

If the Department awards the contract, the award is made to the lowest responsible bidder within 54 calendar days after bid opening.

The Department may extend the specified award period if the Bidder agrees.

You may request to extend the award period by faxing a request to Design Services before 4:00 p.m. on or before the last day of the award period. If you do not make this request, after the specified award period:

- 1. Your bid becomes invalid
- 2. You are not eligible for the award of the contract

# **3-1.05 CONTRACT BONDS (PUB CONT CODE §§ 10221 AND 10222)**

The successful bidder must furnish 2 bonds conforming to the requirements in the *Agreement* of these special provisions.

# **3-1.06 CONTRACTOR LICENSE**

For a federal-aid contract, the Contractor must be properly licensed as a contractor from contract award through Contract acceptance (Pub Cont Code § 10164).

For a non-federal-aid contract:

- Contractor must be properly licensed as a contractor from bid opening through Contract acceptance (Bus & Prof Code § 7028.15)
- 2. Joint venture bidders must obtain a joint venture license before contract award (Bus & Prof Code § 7029.1)

# **3-1.07 INSURANCE POLICIES**

The successful bidder must submit copies of its insurance policies conforming to the requirements in the *Agreement* of these special provisions.

#### 3-1.08 -3-1.10 RESERVED

#### 3-1.11 PAYEE DATA RECORD

Complete and deliver to the Engineer a Payee Data Record form when requested by the Engineer.

#### **3-1.12 RESERVED**

#### 3-1.14-3-1.17 RESERVED

#### **3-1.18 CONTRACT EXECUTION**

The successful bidder must sign the Agreement.

Deliver to Design Services:

- 1. Signed Agreement including the attached form FHWA-1273
- 2. Contract bonds
- 3. Documents identified in section 3-1.07
- 4. For a federal-aid contract, Local Agency Bidder DBE Information form

Design Services must receive these documents before the 10th business day after the bidder receives the contract.

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

#### 3-1.19 BIDDERS' SECURITIES

The Department keeps the securities of the 1st, 2nd, and 3rd low bidders until the contract has been executed. The other bidders' securities, other than bidders' bonds, are returned upon determination of the 1st, 2nd, and 3rd low bidders, and their bidders' bonds are of no further effect (Pub Cont Code § 10184).

# 4 SCOPE OF WORK

# Replace Section 4-1.02 with:

#### 4-1.02 INTENT

The Contract intent is to provide for work completion using the best general practices.

Nothing in the specifications, special provisions, Standard Specifications, or in any other Contract document voids the Contractor's public safety responsibilities.

# Replace Section 4-1.07C with:

#### 4-1.07C Reserved

# Replace Section 4-1.13 with:

#### **4-1.13 CLEANUP**

Before final inspection, leave the job site neat and presentable and dispose of:

- 1. Rubbish
- 2. Excess materials
- 3. Falsework
- 4. Temporary structures
- 5. Equipment

Remove warning, regulatory, and guide signs when directed by the Engineer.

# **5 CONTROL OF WORK**

Delete the 9th Paragraph of Section 5-1.01

# Add the following before the last sentence in Section 5-1.02

Caltrans Standard Plans, City of Fowler, City of Fresno, City of Kingsburg, City of Selma, and any other other-agency Standard Drawings included in the "Project Details" section of the book entitled "Specifications" have the same ranking as Standard Plans."

All other drawings in the "Project Details" section of the book entitled "Specifications" have the same ranking as Project Plans.

Tables and other documents in the "Project Details" section of the book entitled "Specifications" have the same ranking as Special Provisions. If a portion of a document in the Project Details section conflicts with the Special Provisions, the Special Provisions shall prevail.

Replace Section 5-1.09 with:

#### **5-1.09 RESERVED**

# Replace Section 5-1.12 with:

# 5-1.12 ASSIGNMENT

No third-party agreement relieves you or your surety of the responsibility to complete the work. Do not sell, transfer, or otherwise dispose of any Contract part without prior written consent from the Department.

If you assign the right to receive Contract payments, the Engineer accepts the assignment upon the Engineer's receipt of a notice. Assigned payments remain subject to deductions and withholds described in the Contract. The Department may use withheld payments for work completion whether payments are assigned or not.

A pending or disapproved request for assignment does not relieve you of the responsibility to commence and pursue work timely and in strict accordance with contract documents.

## Replace Section 5-1.13C with:

#### 5-1.13C RESERVED

## Replace Section 5-1.13D with:

#### 5-1.13D RESERVED

## Add the following paragraph to the end of section 5-1.16 with:

Submit Daily Log records to the Engineer weekly for the entire course of work unless the Engineer requests another interval.

## Replace Section 5-1.20B(4) with:

## 5-1.20B(4) Contractor-Property Owner Agreement

Before procuring material from or disposing or stockpiling of material on non-highway property:

- 1. Provide proof that the property where materials are to be stockpiled or equipment parked/stored is appropriately zoned and/or permitted for the use proposed by the Contractor.
- 2. Obtain written authorization from each and every owner of the property where materials are to be stockpiled or equipment parked/stored.
- 3. Provide proof that the signor(s) of the authorization are the owners of the property.
- 4. Provide an executed release from the property owner(s) absolving the Department from any and all responsibility in connection with the stockpilling of materials or parking/storage of equipment on said property.
- 5. Obtain written permission from the Engineer to stockpile materials or park/store equipment at the location designated in said authorization.

Before Contract acceptance, submit a document signed by the owner of the material source or disposal site stating that the Contractor has complied with the Contractor-owner agreement.

Failure by the Contractor to provide written authorization shall result in the withholding of all funds due to the Contractor until said authorization is received by the County.

## Replace Section 5-1.20C with:

## 5-1.20C Railroad Relations

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

## Replace Section 5-1.23A with:

## 5-1.23A General

Section 5-1.23 includes specifications for action and informational submittals.

Any submittal not specified as an informational submittal is an action submittal.

Submit action and informational submittals to the Engineer. Unless otherwise specified in these Specifications, submittals shall be provided via email in .pdf format.

Each submittal must have a cover sheet that must include:

- 1. Contract number
- Project Name
- 3. Date
- 4. Submittals (and resubmittals if applicable) must be numbered sequentially5. Structure number if applicable
- 6. Contractor

- 7. Person responsible for submitting the submittal
- 8. Signature of Contractor's representative sending submittal
- 9. Section number and/or item submittal is referencing
- 10. Pages of submittal, excluding cover sheet

The Department rejects a submittal if it has any error or omission.

If the last day for submitting a document falls on a Saturday or holiday, it may be submitted on the next business day with the same effect as if it had been submitted on the day specified.

Documents must be submitted in the English language.

Convert documents to US customary units.

## Replace Section 5-1.26 with:

# **5-1.26 CONSTRUCTION SURVEYS**

The Engineer places stakes and/or marks as the Engineer determines to be necessary to establish the lines and grades required for the work.

Submit your request for Engineer-furnished stakes:

- 1 Once staking area is ready for stakes
- 2. On a Request for Construction Stakes form

After your submittal, the Engineer starts staking within 2 working days.

Preserve stakes and marks placed by the Engineer. If the stakes or marks are destroyed, the Engineer replaces them at the Engineer's earliest convenience and deducts the cost.

## Replace Section 5-1.27E with:

#### 5-1.27E CHANGE ORDER BILLS

Maintain separate records for change order work costs.

#### 5-1.32 AREAS FOR USE

Occupy the highway only for purposes necessary to perform the work.

Defend, indemnify, and hold the Department harmless to the same extent as under section 7-1.05.

The Department does not allow temporary residences within the County right-of-way.

# **6 CONTROL OF MATERIALS**

# Replace section 6-1.05 with:

## 6-1.05 SPECIFIC BRAND OR TRADE NAME AND SUBSTITUTION

Unless substitution is expressly precluded in the special provisions, a reference to a specific brand or trade name establishes a quality standard and is not intended to limit competition. Unless the Department has made a public interest finding expressly authorizing sole source procurement of a particular item, you may use a product that is equal to or better than the specified brand or trade name if authorized.

Submit a substitution request with a time period that:

- 1. Follows Contract award
- 2. Allows 30 days for review
- 3. Causes no delay

Include substantiating data with the substitution request that proves that substitution:

- 1. Causes no delay
- 2. Is of equal or better quality and suitability

If the special provisions disallow substitution of a particular item, provide the specified item and do not propose substitution.

# 7 LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

# Replace the 2<sup>nd</sup> Paragraph of Section 7-1.02K(2) with:

The general prevailing wage rates and any applicable changes to these wage rates are available:

- 1. From Design Services
- 2. From the Department of Industrial Relations' Web site

## Replace section 7-1.02K(3) with:

Keep accurate payroll records.

Submit a copy of your certified payroll records, weekly, including those of subcontractors. Include:

- 1. Each employee's:
  - 1.1. Full name
  - 1.2. Address
  - 1.3. Social security number
  - 1.4. Work classification
  - 1.5. Straight time and overtime hours worked each day and week
  - 1.6. Actual wages paid for each day to each:
    - 1.6.1. Journeyman
    - 1.6.2. Apprentice
    - 1.6.3. Worker
    - 1.6.4. Other employee you employ for the work
  - 1.7. Pay rate
  - 1.8. Itemized deductions made
  - 1.9. Check number issued
  - 1.10. Fringe Benefits
- 2. Apprentices and the apprentice-to-journeyman ratio

Each certified payroll record must include a Statement of Compliance form signed under penalty of perjury that declares:

- 1. Information contained in the payroll record is true, correct, and complete
- 2. Employer has complied with the requirements of sections 1771, 1811, and 1815 for any work performed by his or her employees on the public works project
- 3. Wage rates paid are at least those required by the Contract

Submitted certified payrolls for hauling and delivering ready-mixed concrete must be accompanied by a written time record. The time record must include:

- 1. Truck driver's full name and address
- 2. Name and address of the factory or batching plant
- 3. Time the concrete was loaded at the factory or batching plant
- 4. Time the truck returned to the factory or batching plant
- 5. Truck driver's signature certifying under penalty of perjury that the information contained in this written time record is true and correct

Make certified payroll records available for inspection at all reasonable hours at your main office on the following basis:

- 1. Upon the employee's request or upon request of the employee's authorized representative, make available for inspection a certified copy of the employee's payroll record.
- 2. Refer the public's requests for certified payroll records to the Department. Upon the public's request, the Department makes available for inspection or furnishes copies of your certified payroll records. Do not give the public access to the records at your main office.

Make all payroll records available for inspection and copying or furnish a copy upon request of a representative of the:

- 1. Department
- 2. Division of Labor Standards Enforcement of the Department of Industrial Relations
- 3. Division of Apprenticeship Standards of the Department of Industrial Relations

Furnish the Department the location of the records. Include the street address, city, and county. Furnish the Department a notification of a location and address change within 5 business days of the change.

Comply with a request for the records within 10 days after you receive a written request. If you do not comply within this period, the Department withholds from progress payments a \$100 penalty for each day or part of a day for each worker until you comply. You are not assessed this penalty for a subcontractor's failure to comply with Labor Code § 1776.

The Department withholds from progress payments for delinquent or inadequate records (Labor Code § 1771.5). If you have not submitted an adequate record by the month's 15th day for the period ending on or before the 1st of that month, the Department withholds up to 10 percent of the monthly progress estimate, exclusive of mobilization. The Department does not withhold more than \$10,000 or less than \$1,000.

## 7-1.02K(4)i Apprenticeship Requirements for non-Federal Projects

- A. Pursuant to Sections 1770-1780 of the Labor Code of the State of California, the Director of the Department of Industrial Relations has determined the general prevailing rate of wages in the locality for each craft or type of worker needed to execute the work. Said wage rates pursuant to Section 1773.2 of the Labor Code are on file with the Clerk to the Fresno County Board of Supervisors, and will be made available to any interested person on request. A copy of this wage scale may also be obtained at the following Web Site: www.dir.ca.gov/dlsr.
- B. Pursuant to Section 1775 of the Labor Code of the State of California, nothing in this Article shall prevent the employment of properly registered apprentices upon public works. Every such apprentice shall be paid the standard wage paid to apprentices under the regulations of the craft or trade at which he/she is employed, and shall be employed only at the work of the craft or trade to which he/she is registered.
- C. Only apprentices, as defined in Section 3077, who are in training under apprenticeship standards and written apprentice agreements under Chapter 4 (commencing at Section 3070), Division 3, of the Labor Code, are eligible to be employed on public works. The employment and training of each apprentice shall be in accordance with the provisions of the apprenticeship standards and apprentice agreements under which he/she is training.
- D. Fresno County is committed to increasing the availability of employment and training opportunities, with particular attention to the plight of those who are most economically disadvantaged. In an effort to advance that purpose, the County will require that the Contractor and each subcontractor employed on this Project shall use their best efforts to

ensure that thirty-three percent (33%) of apprentice hours, as determined by California Labor Code Section 1777.5 for each contractor and subcontractor of any tier on this Project, are performed by qualified participants in state approved apprenticeship programs who also are current or former "Welfare-to-Work" participants in the CalWORKs program. Provided, that nothing contained in this Paragraph D shall be interpreted to relieve or in any way diminish the obligation of the Contractor and each subcontractor to comply fully with all applicable apprenticeship laws in accordance with the California Labor Code and the California Code of Regulations; and accordingly such requirements as are contractually imposed by this Paragraph D shall be in addition to such legally mandated requirements, and applicable only to the extent fully consistent therewith.

# Replace Section 7-1.02K(6)(j)(iii) with:

# 7-1.02K(6)(j)(iii) Earth Material Containing Lead

Section 7-1.02K(6)(j)(iii) includes specifications for handling, removing, and disposing of earth material containing lead.

Lead is present in earth material on the job site. Management of this material exposes workers to health hazards that must be addressed in your lead compliance plan. The average lead concentrations are below 1,000 mg/kg total lead and below 5 mg/L soluble lead. The material on the job site:

- 1. Soil in areas with average lead concentrations below 80 mg/kg is not a hazardous waste and does not require disposal at a permitted landfill or solid waste disposal facility.
- 2. Soil in areas with average lead concentrations above 80 mg/kg and below 320 mg/kg does not require disposal at a permitted landfill or solid waste disposal facility as long as the soil is reutilized/kept within the existing road Right of Way.

Lead is typically found within the top 2 feet of material in unpaved areas of the highway. Excavated material may be reused within the project limits. Haul and place the surplus excavated material per paragraph 7 and 8 of this section.

Lead has been detected in material to a depth of 1 foot in unpaved areas of the highway. Levels of lead found on the job site range from 2 to 250 mg/kg total lead with an average concentration of 147.4 mg/kg total lead as analyzed by EPA test method 6010 or EPA test method 7000 series and based upon a 95 percent upper confidence limit. Levels of lead found within the project limits have a predicted average soluble concentration of 11.0 mg/L as analyzed by the California Waste Extraction Test and based upon a 95 percent upper confidence limit.

Handle the material under all applicable laws, rules, and regulations, including those of the following agencies:

- 1. Cal/OSHA
- 2. CA RWQCB, Region 5-Central Valley
- 3. CA Department of Toxic Substances Control

Manage the material as shown in the following table.

**Earth Material Management** 

Location	Depth	Management requirements
STA 53+00 - 95+00 STA 136+50 - 250+00 STA 394+00 - 455+00 STA 480+00 - 514+00 STA 625+00 - 690+00	Full Depth	Excavate to a total depth. Do no excavate in lifts.     Stockpile all excavated earth material within the project limits before reuse.     Stockpile all excavated earth material within the project limits before disposal.     Reuse earth material on the job site when possible.

If the material is disposed of:

- 1. Disclose the lead concentration of the material to the receiving property owner when obtaining authorization for disposal on the property
- 2. Obtain the receiving property owner's acknowledgment of lead concentration disclosure in the written authorization for disposal
- 3. You are responsible for any additional sampling and analysis required by the receiving property owner

If you choose to dispose of the material at a commercial landfill:

- 1. Transport it to a Class III or Class II landfill appropriately permitted to receive the material
- 2. You are responsible for identifying the appropriately permitted landfill to receive the material and for all associated trucking and disposal costs, including any additional sampling and analysis required by the receiving landfill

# Add between the 9th and 10th paragraphs of section 7-1.03:

07-15-16

If a height differential of more than 0.04 foot is created by construction activities at a joint transverse to the direction of traffic on the traveled way or a shoulder subject to public traffic, construct a temporary taper at the joint with a slope complying with the requirements shown in the following table:

**Temporary Tapers** 

Height differential	Slope (horizontal:vertical)		
(foot)	Taper use of 14 days or less	Taper use of more than 14 days	
Greater than 0.08	100:1 or flatter	200:1 or flatter	
0.04-0.08	70:1 or flatter	70:1 or flatter	

For a taper on existing asphalt concrete or concrete pavement, construct the taper with minor HMA under section 39-2.07.

Grind existing surfaces to accommodate a minimum taper thickness of 0.10 foot under either of the following conditions:

- 1. HMA material such as rubberized HMA, polymer-modified bonded wearing course, or open-graded friction course is unsuitable for raking to a maximum 0.02 foot thickness at the edge
- 2. Taper will be in place for more than 14 days

For a taper on a bridge deck or approach slab, construct the taper with polyester concrete under section 60-3.04B.

The completed surface of the taper must be uniform and must not vary more than 0.02 foot from the lower edge of a 12-foot straightedge when placed on its surface parallel and perpendicular to traffic.

If authorized, you may use alternative materials or methods to construct the required taper.

## Replace Section 7-1.04 with:

# 7-1.04 PUBLIC SAFETY 7-1.04A GENERAL

You are responsible to provide for public safety.

Do not construct a temporary facility that interferes with the safe passage of traffic.

Control dust resulting from the work, inside and outside the right-of-way.

Move workers, equipment, and materials without endangering traffic.

Whenever your activities create a condition hazardous to the public, furnish, erect and maintain those fences, temporary railing, barricades, lights, signs, and other devices and take any other necessary protective measures to prevent damage or injury to the public.

Any fences, temporary railing, barricades, lights, signs, or other devices furnished, erected and maintained by you are in addition to those for which payment is provided elsewhere in the specifications.

Provide flaggers whenever necessary to ensure that the public is given safe guidance through the work zone. At locations where traffic is being routed through construction under one-way controls, move your equipment in compliance with the one-way controls unless otherwise ordered.

Use of signs, lights, flags, or other protective devices must comply with the *California MUTCD* and any directions of the Engineer. Signs, lights, flags or other protective devices must not obscure the visibility of, nor conflict in intent, meaning, and function of either existing signs, lights and traffic control devices, or any construction area signs.

Keep existing traffic signals and highway lighting in operation. Other forces within the Department will perform routine maintenance of these facilities during the work.

Cover signs that direct traffic to a closed area.

Install temporary illumination in a manner which the illumination and the illumination equipment does not interfere with public safety. The installation of general roadway illumination does not relieve you from furnishing and maintaining any protective devices.

Equipment must enter and leave the highway via existing ramps and crossovers and must move in the direction of traffic. All movements of workmen and construction equipment on or across lanes open to traffic must be performed in a manner that do not endanger the public. Your vehicles or other mobile equipment leaving an open traffic lane to enter the construction area must slow down gradually in advance of the location of the turnoff to give the traffic following an opportunity to slow down. When leaving a work area and entering a roadway carrying traffic, your vehicles and equipment must yield to traffic.

Immediately remove hauling spillage from a roadway lane or shoulder open to traffic. When hauling on roadways, trim loads and remove material from shelf areas to minimize spillage.

Notify the Engineer not less than 5 days before the anticipated start of an activity that will change the vertical or horizontal clearance available to traffic, including shoulders.

Do not store vehicles, material, or equipment in a way that:

- 1. Creates a hazard to the public
- 2. Obstructs traffic control devices

Do not install or place temporary facilities used to perform the work which interfere with the free and safe passage of traffic.

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.

If you appear to be neglectful or negligent in furnishing warning devices and taking protective measures, the Engineer may direct your attention to the existence of a hazard. You must furnish and install the necessary warning devices. If the Engineer points out the inadequacy of warning devices and protective measures, that action on the part of the Engineer does not relieve you from your responsibility for public safety or abrogate your obligation to furnish and pay for these devices and measures.

Install Type K temporary railing or other authorized protective systems under any of the following conditions:

- 1. Excavations: Where the near edge of the excavation is within 15 feet from the edge of an open traffic lane
- 2. Temporarily unprotected permanent obstacles: When the work includes the installation of a fixed obstacle together with a protective system, such as a sign structure together with protective railing, and you elect to install the obstacle before installing the protective system; or you, for your convenience and as authorized, remove a portion of an existing protective railing at an obstacle and do not replace such railing completely the same day
- 3. Storage areas: When material or equipment is stored within 15 feet of the edge of an open traffic lane and the storage is not otherwise prohibited by the Contract
- 4. Height differentials: When construction operations create a height differential greater than 0.15 feet within 15 feet of the edge of traffic lane

Installation of Type K temporary railing is not required if an excavation within 15 feet from the edge of an open traffic lane is protected by any of the following:

- 1. Steel plate or concrete covers of adequate thickness to prevent accidental entry by traffic or the public
- 2. Side slope where the downhill slope is 4:1 (horizontal: vertical) or less unless a naturally occurring condition
- 3. Barrier or railing

Offset the approach end of Type K temporary railing a minimum of 15 feet from the edge of an open traffic lane. Install the temporary railing on a skew toward the edge of the traffic lane of not more than 1 foot transversely to 10 feet longitudinally with respect to the edge of the traffic lane. If the 15-foot minimum offset cannot be achieved, the temporary railing must be installed on the 10 to 1 skew to obtain the maximum available offset between the approach end of the railing and the edge of the traffic lane, and an array of temporary crash cushion modules must be installed at the approach end of the temporary railing.

Secure Type K temporary railing in place before starting work for which the temporary railing is required.

Where 2 or more lanes in the same direction are adjacent to the area where the work is being performed, including shoulders, the adjacent lane must be closed under any of the following conditions:

- 1. Work is off the traveled way but within 6 feet of the edge of the traveled way, and the approach speed is greater than 45 miles per hour
- 2. Work is off the traveled way but within 3 feet of the edge of the traveled way, and the approach speed is less than 45 miles per hour

Closure of the adjacent traffic lane is not required when performing any of the following:

1. Working behind a barrier

- 2. Paving, grinding, or grooving
- 3. Installing, maintaining, or removing traffic control devices except Type K temporary railing

Do not reduce an open traffic lane width to less than 10 feet. When traffic cones or delineators are used for temporary edge delineation, the side of the base of the cones or delineators nearest to traffic is considered the edge of the traveled way.

If a traffic lane is closed with channelizers for excavation work, move the devices to the adjacent edge of the traveled way when not excavating. Space the devices as specified for the lane closure.

Do not move or temporarily suspend anything over a traffic lane open to the public unless the public is protected.

# 7-1.04B WORK ZONE SAFETY AND MOBILITY

## 7-1.04B(1) POLICY

In order to ensure safe and efficient flow of traffic through work zones, the County of Fresno, via its General Plan, Transportation and Circulation Element, Policy TRA-1, has adopted the use of AASHTO Standards as supplemented by Caltrans and County Department of Public Works and Planning Standards.

# 7-1.04B(2)TRAFFIC MANAGEMENT PLAN

Perform traffic management shall be in accordance with Section 12, "TEMPORARY TRAFFIC CONTROL," of these special provisions.

## 7-1.04B(3)TEMPORARY TRAFFIC CONTROL PLAN

Prepare traffic control plan(s) in accordance with Section 12, "TEMPORARY TRAFFIC CONTROL," of these special provisions.

## 7-1.04B(4)PUBLIC INFORMATION

Provide notice to public agencies and others to the extent required, if any, elsewhere in these special provisions. The Engineer provides other noticing not identified to be performed by the Contractor.

# Replace Section 7-1.06 with:

## 7-1.06 INSURANCE

# 7-1.06A General

Nothing in the Contract is intended to establish a standard of care owed to any member of the public or to extend to the public the status of a third-party beneficiary for any of these insurance specifications.

# 7-1.06B Casualty Insurance

Obtain and maintain insurance on all of your operations with companies acceptable to the Department as follows:

- 1. Keep all insurance in full force and effect from the start of the work through Contract acceptance.
- 2. All insurance must be with an insurance company with a rating from A.M. Best Financial Strength Rating of A or better and a Financial Size Category of VIII or better.
- 3. Maintain completed operations coverage with a carrier acceptable to the State through the expiration of the patent deficiency in construction statute of repose set forth in Civ Pro Code § 337.1.

## 7-1.06C Workers' Compensation and Employer's Liability Insurance

Under Labor Code § 1860, secure the payment of worker's compensation under Labor Code § 3700.

Submit to the Department the following certification before performing the work (Labor Code § 1861):

I am aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this contract.

Contract signing constitutes certification submittal.

Provide Employer's Liability Insurance in amounts not less than:

- 1. \$1,000,000 for each accident for bodily injury by accident
- 2. \$1,000,000 policy limit for bodily injury by disease
- 3. \$1,000,000 for each employee for bodily injury by disease

If there is an exposure of injury to your employees under the U.S. Longshoremen's and Harbor Workers' Compensation Act, the Jones Act, or under laws, regulations, or statutes applicable to maritime employees, coverage must be included for such injuries or claims.

# 7-1.06D Liability Insurance

## 7-1.06D(1) General

Carry General Liability and Umbrella or Excess Liability Insurance covering all operations by or on behalf of you providing insurance for bodily injury liability and property damage liability for the following limits and including coverage for:

- 1. Premises, operations and mobile equipment
- 2. Products and completed operations
- 3. Broad form property damage (including completed operations)
- 4. Explosion, collapse, and underground hazards
- 5. Personal injury
- 6. Contractual liability

## 7-1.06D(2) Liability Limits/Additional Insureds

Refer to the Agreement of these special provisions

Additional insured coverage must be provided by a policy provision or by an endorsement providing coverage at least as broad as *Additional Insured* (Form B) endorsement form CG 2010, as published by the Insurance Services Office (ISO), or other form designated by the Department.

## 7-1.06D(3) Contractor's Insurance Policy is Primary

The policy must stipulate that the insurance afforded the additional insureds applies as primary insurance. Any other insurance or self-insurance maintained by the State is excess only and must not be called upon to contribute with this insurance.

## 7-1.06E Automobile Liability Insurance

Comply with requirements in the *Agreement* of these special provisions

# 7-1.06F Policy Forms, Endorsements, and Certificates

Provide your General Liability Insurance under Commercial General Liability policy form no. CG0001 as published by the Insurance Services Office (ISO) or under a policy form at least as broad as policy form no. CG0001.

#### 7-1.06G NOT USED

# 7-1.06H Enforcement

The Department may assure your compliance with your insurance obligations. Ten days before an insurance policy lapses or is canceled during the Contract period you must submit to the Department evidence of renewal or replacement of the policy.

If you fail to maintain any required insurance coverage, the Department may maintain this coverage and withhold or charge the expense to you or terminate your control of the work.

You are not relieved of your duties and responsibilities to indemnify, defend, and hold harmless the State, its officers, agents, and employees by the Department's acceptance of insurance policies and certificates.

Minimum insurance coverage amounts do not relieve you for liability in excess of such coverage, nor do they preclude the State from taking other actions available to it, including the withholding of funds under this Contract.

#### 7-1.06 | Self-Insurance

Comply with the Agreement of these special provisions

# Replace Section 7-1.07 with:

## 7-1.07 LEGAL ACTIONS AGAINST THE DEPARTMENT

### 7-1.07A General

If legal action is brought against the Department over compliance with a State or federal law, rule, or regulation applicable to highway work, then:

- 1. If the Department in complying with a court order prohibits you from performing work, the resulting delay is a suspension related to your performance, unless the Department terminates the Contract.
- 2. If a court order other than an order to show cause or the final judgment in the action prohibits the Department from requiring you to perform work, the Department may delete the prohibited work or terminate the Contract.

#### 7-1.07B Seal Coat Claims

This section applies to seal coat projects. Pay for claims for personal property damage caused by screening and bituminous binder. Seal coat claims are limited to:

- 1. 10 percent of the total bid
- 2. Damage occurring between the 1st day of screening spreading and 4 days after the last day of screening spreading for each seal coat location

Within 30 days of the last screening spreading, do the following:

- 1. Process and resolve all claims reported or submitted to you by the public as follows:
  - 1.1. Within 3 business days of receipt of a claim, submit to the Department a copy of the claim, a written analysis of the claim, and a statement indicating whether or not you will pay the claim. If you reject a claim, provide the reasons for rejection in writing.
  - 1.2. If the claimant becomes dissatisfied with your handling of the claim, immediately refer the claimant to the local district claims office for assistance in resolving the claim.
- 2. Submit to the Department evidence of your paid claims.

All claims presented to the Department, any district claims office, or the State Board of Control (Govt Code § 900 et seg.) are processed and resolved by the Department as follows:

- 1. The claims are processed as formal government claims subject to all laws and policies and are resolved as the Department determines including referring the claim to you for handling.
- 2. If the Department or the State Board of Control approves settlement of a claim or is ordered to pay pursuant to a court order, the claim is paid from funds withheld from you.
- 3. Within 3 business days of the Department's determination that you are responsible for resolving the claim, the Department sends a copy of the claim to you for resolution or notifies you of the Department's decision to resolve the claim.

The Department withholds an amount not to exceed 5 percent of the total bid to resolve all claims. The amount is held no longer than 60 days following the last spreading of screenings so that the Department

has ample time to resolve any pending claims. After 60 days, any remaining amount withheld is returned to you.

If no withheld funds remain or have been returned, the Department may pay any claims and seek reimbursement from you through an offset or any other legal means. Any reimbursement or offset to be recovered from you, including all other paid claims, is limited to 10 percent of the total bid.

Section 7-1.07B does not limit your obligation to defend and indemnify the Department.

## 7-1.07C Claims

This section applies to non-seal coat projects which involve asphalt concrete paving. Pay for claims for personal property damage caused by your work. Claims are limited to:

1. 10 percent of the total bid

Within 30 days of the last working day placement of hot mix asphalt, do the following:

- 1. Process and resolve all claims reported or submitted to you by the public as follows:
  - 1.1. Within 3 business days of receipt of a claim, submit to the Department a copy of the claim, a written analysis of the claim, and a statement indicating whether or not you will pay the claim. If you reject a claim, provide the reasons for rejection in writing.
  - 1.2. If the claimant becomes dissatisfied with your handling of the claim, immediately refer the claimant to the local district claims office for assistance in resolving the claim.
- 2. Submit to the Department evidence of your paid claims.

All claims presented to the Department, (Govt Code § 900 et seq.) are processed and resolved by the Department as follows:

- 1. The claims are processed as formal government claims subject to all laws and policies and are resolved as the Department determines including referring the claim to you for handling.
- 2. If the Department approves settlement of a claim or is ordered to pay pursuant to a court order, the claim is paid from funds withheld from you.
- 3. Within 3 business days of the Department's determination that you are responsible for resolving the claim, the Department sends a copy of the claim to you for resolution or notifies you of the Department's decision to resolve the claim.

The Department withholds an amount not to exceed 5 percent of the total bid to resolve all claims. The amount is held no longer than 60 days following the last working day so that the Department has ample time to resolve any pending claims. After 60 days, any remaining amount withheld is returned to you.

If no withheld funds remain or have been returned, the Department may pay any claims and seek reimbursement from you through an offset or any other legal means. Any reimbursement or offset to be recovered from you, including all other paid claims, is limited to 10 percent of the total bid.

Section 7-1.07C does not limit your obligation to defend and indemnify the Department.

Add between the 1st and 2nd paragraphs of section 7-1.11A:

Comply with 46 CFR 381.7(a)-(b).

# **8 PROSECUTION AND PROGRESS**

Replace the headings and paragraphs in Section 8 with:

# **8-1.01 GENERAL**

Section 8 includes specifications related to prosecuting the Contract and work progress.

## 8-1.01A Work Hours

Perform all work on working days during daytime.

You may request approval to work on a holiday or on a non-working day. If, pursuant to such request, the Engineer authorizes you to work on a holiday or on a non-working day, you pay the actual cost incurred by the Department to perform all inspection, surveying, testing, and all other project-related work by the Department on such holiday or non-working day. Such payment will be deducted from monies due or which may become due to the Contractor.

Plan work so that all construction operations performed each day, including cleanup of the project site, establishment of appropriate traffic control and any other work necessary for the safety of the public shall be completed within the daytime hours.

Do not perform work during nighttime unless approved by the Engineer

Request approval to work during nighttime in writing and include the appropriate traffic control plan(s) and work plan(s) which clearly identify all provisions for illuminating all portions of the work site, including any flagging operations.

If you fail to complete work during the daytime hours, the Engineer may stop all work upon the onset of nighttime and order you to perform any and all work the Engineer deems necessary to ensure the safety of the public during the nighttime hours.

You are not entitled to any additional compensation or extension of the contract time as a result of the Engineer stopping the work due to the onset of nighttime.

#### 8-1.02 SCHEDULE

#### 8-1.02A General

Upon completion of all work, the Department returns the withholds associated with section 8-1.02 and makes a payment adjustment for work not performed in the same manner as work-character changes.

## 8-1.02B Level 1 Critical Path Method Schedule

## 8-1.02B(1) General

No pay item is provided for Level 1 Critical Path Project Schedule. Payment is considered to be included in the various items of work.

Before or at the preconstruction conference, submit a CPM baseline schedule.

For each schedule, submit:

- Plotted original, time-scaled network diagram on a sheet at least 8-1/2 by 11 inches with a title block and timeline
  - 2. A electronic copy in PDF (Adobe Acrobat compatible) format via email to the Engineer.

## 8-1.02B(2) Schedule Format

On each schedule, show:

- 1. Planned and actual start and completion dates of each work activity, including applicable:
  - 1.1. Submittal development
  - 1.2. Submittal review and acceptance
  - 1.3. Material procurement
  - 1.4. Contract milestones and constraints
  - 1.5. Equipment and plant setup
  - 1.6. Interfaces with outside entities
  - 1.7. Erection and removal of falsework and shoring
  - 1.8. Test periods
  - 1.9. Major traffic stage change
  - 1.10. Final cleanup
- 2. Order that you propose to prosecute the work
- 3. Logical links between the time-scaled work activities
- 4. All controlling activities

- 5. Legible description of each activity
- At least 1 predecessor and 1 successor to each activity except for project start and project end milestones
- 7. Duration of at least 1 working day for each activity
- 8. Start milestone date as the Contract approval date

## 8-1.02B(3) Updated Schedule

Submit a monthly updated schedule that includes the status of work completed to date and the work yet to be performed as planned.

You may include changes to updated schedules that do not alter a critical path or extend the scheduled completion date compared to the current schedule. Changes may include:

- 1. Adding or deleting activities
- 2. Changing activity constraints
- 3. Changing durations
- 4. Changing logic

If any proposed change in planned work would alter the critical path or extend the scheduled completion date, submit a revised schedule within 15 days of the proposed change.

#### 8-1.02C-8-1.02F Reserved

## 8-1.03 PRECONSTRUCTION CONFERENCE

Attend a preconstruction conference with key personnel, including your assigned representative, at a time and location determined by the Engineer. Submit documents as required before the preconstruction conference.

Be prepared to discuss the topics and documents shown in the following table:

Topic	Document
Potential claim and dispute	Potential claim forms
resolution	
Contractor's representation	Assignment of Contractor's representative
DBE	Final utilization reports
Equipment	Equipment list
Labor compliance and equal	Job site posters and benefit and payroll reports
employment opportunity	
Material inspection	Notice of Materials to be Used form
Materials on hand	Request for Payment for Materials on Hand form
Measurements	
Partnering	
Quality control	QC plans
Safety	Injury and Illness Prevention Program and job site posters
Schedule	Baseline schedule and Weekly Statement of Working Days form
Subcontracting	Subcontracting Request form
Surveying	Survey Request form
Traffic control	Traffic contingency plan and traffic control plans
Utility work	
Weight limitations	
Water pollution control	SWPPP or WPCP
Work restrictions	PLACs
Action submittals	

## 8-1.04 START OF JOB SITE ACTIVITIES

#### 8-1.04A General

Provide signed contracts, bonds, and evidence of insurance timely as required.

This section, 8-1.04, "Start of Job Activities," does not modify remedies available to the Department should you fail to provide signed contracts bonds and insurance timely.

Submit a notice 72 hours before starting job site activities. If the project has more than 1 location of work, submit a separate notice for each location.

You may start job site activities before receiving notice of Contract approval if you:

- 1. Deliver the signed Contract, bonds, and evidence of insurance to the Department
- 2. Submit 72-hour notice
- 3. Obtain an encroachment permit from the Department
- 4. Are authorized by the Department to start
- 5. Perform work at your own risk
- 6. Perform work under the Contract

If the Contract is approved, work already performed that complies with the Contract is authorized.

If the Contract is not approved, leave the job site in a neat condition. If a facility has been changed, restore it to its former condition or an equivalent condition. The Department does not pay for the restoration.

## Replace Section 8-1.04B with:

#### 8-1.04B Reserved

# Replace "Reserved" of Section 8-1.04C with:

## 8-1.04C Long Lead Time Equipment Start

Section 8-1.04B, Standard Start, does not apply to this project

This project includes two, non-concurrent phases.

The first order of work (submittals) involves potholing, submittals and equipment procurement.

The second order of work involves physical construction upon the project site.

# 8-1.04C(1) First Order of Work, Submittals

Be prepared to begin the first order of work no later than the 20th business day after award of the Contract by the Department.

The Engineer may issue a notice to proceed with the first order of work as soon as the Contracts, including bonds and insurance certificates, have been approved.

Start the first order of work on the day shown in the notice to proceed, unless an early start has been approved.

Potholing at the project site shall be completed within the first ten working days of the first order of work. No submittals will receive final approval until field verification of the final pole location has been approved by the Engineer. Compensation for potholing shall be considered to be included in the various items of work.

The Engineer may issue a notice of commencement of contract time for the first order of work if you fail to provide Contracts, including bonds and insurance certificates or other required documents timely.

The Engineer shall have a maximum of ten (10) working days in which to review and approve or reject each submittal from the Contractor. In the event that the Engineer rejects any of the Contractor's initial submittals, the Engineer shall have a maximum of ten (10) working days in which to review and approve or reject each re-submittal from the Contractor. The ten (10) working day time period for the Engineer's

review shall commence on the day upon which the Engineer receives the submittal or re-submittal in question.

In the event that the Engineer's review of a submittal or re-submittal requires in excess of ten (10) working days, the Engineer shall extend the number of working days allowed for the completion of the first order of work by one working day for each working day of delay in the Engineer's completion of the review.

The first order of work is complete when you:

- have completed potholing at the project site
- have completed a staging plan clearly depicting all phases of the work and intended traffic control plan at each phase.
- have approval of the Dust Control Plan.
- have approval of Traffic Control Encroachment Permit from all Agencies, including Caltrans. Fees charged by Caltrans shall be paid by the Contractor.
- have received approval for all submittals required for the project.
- have furnished a statement from the vendors that the orders for required equipment and materials has been received and accepted by said vendor
- have furnished a statement from vendors which indicates that the anticipated delivery date for the equipment and materials ordered is in conformance with contract requirements.
- Receive a written statement that the first order of work is complete.

# Complete the first order of work before the expiration of (40) WORKING DAYS

from the date shown in said Notice to Proceed, or in the Notice of Commencement of Contract Time, whichever was issued first.

## Pay to the County of Fresno the sum of

(\$2,000.00)

per day for each and every calendar day's delay in finishing the first order of work in excess of the number of working days prescribed above.

## 8-1.04C(2) Second Order of Work

The Engineer, in their sole discretion, may issue the Notice to Proceed – Second Order of Work immediately upon delivery to the Contractor of the materials and equipment necessary to construct the project. Alternatively, the Engineer may defer issuance of the Notice to Proceed – Second Order of Work to the extent the Engineer, in their sole discretion, deems appropriate.

Begin work at the site on the date shown on the Notice to Proceed – Second Order of Work. Do not begin site work prior to the date shown on the Notice to Proceed – Second Order of Work. The date shown on the Notice to Proceed – Second Order of Work will be the first working day charged against the allotted number of working days for the second order of work.

# Complete the second order of work before the expiration of

## (220) WORKING DAYS

from the date shown in said Notice to Proceed – Second Order of Work.

Complete all work, including corrective work and punch list work, prior to the expiration of the allotted working days. Working days continue to accrue until corrective work and punch list work is completed and accepted.

## Pay to the County of Fresno the sum of

(\$10,000.00)

per day for each and every calendar day's delay in finishing the second order of work, including corrective work and punch list work, in excess of the number of working days prescribed above.

Such payment is in addition to payment, if any, for failure to complete the first order of work as specified.

#### 8-1.05 TIME

Contract time starts on the day specified in the notice to proceed or in the notice of commencement of contract time as described in section 8-1.04 or on the day you start job site activities, whichever occurs first.

Complete the work within the Contract time.

Meet each specified interim work completion date.

The Engineer issues a Weekly Statement of Working Days by the end of the following week.

The Weekly Statement of Working Days shows:

- 1. Working days and non-working days during the reporting week
- 2. Time adjustments
- 3. Work completion date computations, including working days remaining
- 4. Controlling activities

#### 8-1.06 SUSPENSIONS

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 in 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.

## 8-1.07 DELAYS

## 8-1.07A General

To request a delay-related time or payment adjustment, submit an RFI.

## 8-1.07B Time Adjustments

The Department may make a time adjustment for a critical delay. The Engineer uses information from the schedule to evaluate requests for time adjustments.

To request an adjustment, submit a revised schedule showing the delay's effect on the controlling activity. If the delay has:

- 1. Occurred, submit records of the dates and what work was performed during the delayed activity
- 2. Not occurred, submit the expected dates or duration of the delayed activity

Update the schedule to the last working day before the start of the delay if ordered.

## 8-1.07C Payment Adjustments

The Department may make a payment adjustment for an excusable delay that affects your costs.

Only losses for idle equipment, idle workers, and moving or transporting equipment are eligible for delayrelated payment adjustments.

The Engineer determines payment for idle time of equipment in the same manner as determinations are made for equipment used in the performance of force account work under section 9-1.04 with the following exceptions:

- 1. Delay factor in the *Labor Surcharge and Equipment Rental Rates* applies to each equipment rental rate.
- 2. Daily number of payable hours equals the normal working hours during the delay, not to exceed 8 hours per day.
- 3. Delay days exclude non-working days.
- 4. Markups are not added.

The Engineer determines payment adjustment for the idle workers under section 9-1.04B, but does not add markups.

The Engineer includes costs due to necessary extra moving or transporting of equipment.

The Department does not make a payment adjustment for overhead incurred during non-working days of additional construction seasons experienced because of delay.

## 8-1.08-8-1.09 RESERVED

#### 8-1.10 LIQUIDATED DAMAGES

### 8-1.10A General

The Department specifies liquidated damages (Pub Cont Code § 10226). Liquidated damages, if any, accrue starting on the 1st day after the expiration of the working days through the day of Contract acceptance except as specified in sections 8-1.10B and 8-1.10C.

The Department withholds liquidated damages before the accrual date if the anticipated liquidated damages may exceed the value of the remaining work.

Liquidated damages are specified in section 8-1.04.

# 8-1.10B Failure to Complete Work Parts within Specified Times

The Department may deduct specified damages from payments for each day needed to complete a work part in excess of the time specified for completing the work part.

Damages for untimely completion of work parts may not be equal to the daily amount specified as liquidated damages for the project as a whole, but the Department does not simultaneously assess damages for untimely completion of work parts and for the whole work.

Damages accrue starting the 1st day after a work part exceeds the specified time through the day the specified work part is complete.

## 8-1.10C Failure to Complete Work Parts by Specified Dates

The Department may deduct specified damages from payments for each day needed to complete a work part in excess of the specified completion date for the work part.

Damages for untimely completion of a work part may not be equal to the daily amount specified as liquidated damages for the project as a whole, but the Department does not simultaneously assess damages for untimely completion of a work part and the whole work.

Damages accrue starting the 1st day after an unmet completion date through the day the work part is complete.

## 8-1.10D RESERVED

### 8-1.11-8-1.12 RESERVED

#### 8-1.13 CONTRACTOR'S CONTROL TERMINATION

The Department may terminate your control of the work for failure to do any of the following (Pub Cont Code § 10253):

- 1. Supply an adequate workforce
- 2. Supply material as described
- 3. Pay subcontractors (Pub Cont Code §10262)
- 4. Prosecute the work as described in the Contract

The Department may also terminate your control for failure to maintain insurance coverage.

For a federal-aid project, the Department may terminate your control of the work for failure to include "Required Contract Provisions, Federal-Aid Construction Contracts" in subcontracts.

The Department gives notice to you and your surety at least 5 business days before terminating control. The notice describes the failures and the time allowed to remedy the failures. If failures are not remedied within the time provided, the Department takes control of the work.

The Department may complete the work if the Department terminates the Contractor's control or you abandon the project (Pub Cont Code § 10255). The Department determines the unpaid balance under Pub Cont Code § 10258 and the Contract.

At any time before final payment of all claims, the Department may convert a Contractor's control termination to a Contract termination.

#### 8-1.14 CONTRACT TERMINATION

#### 8-1.14A General

The Director may terminate the Contract if it serves the State's best interest. The Department issues you a written notice, implements the termination, and pays you.

## 8-1.14B Relief from Responsibility for Work

Upon receiving a termination notice:

- 1. Stop work
- 2. Notify subcontractors and suppliers of the Contract termination and stop Contract-related work
- 3. Perform the Engineer-ordered work to secure the job site for termination
- 4. Remove equipment
- 5. Subject to the Engineer's authorization, settle termination-related claims and liabilities involving subcontractors and suppliers; assign to the Department the rights, titles, or interests held by you with respect to these parties

## 8-1.14C Responsibility for Materials

Upon receiving a termination notice, protect unused material until:

- 1. You submit an inventory of materials already produced, purchased, or ordered but not yet used; include the location of the material.
- The Engineer identifies materials that will be retained by the Department. Submit bills of sales or other records of material title.
- 3. The Engineer confirms that unused materials paid by progress payment and materials furnished by the State have been delivered and stored as ordered.
- 4. The titles are transferred for materials purchased by the Department.

Dispose of materials that will not be retained by the Department.

## 8-1.14D Contract Acceptance after Termination

The Engineer recommends Contract acceptance after determining the completion of:

- 1. Work ordered to be completed before termination
- 2. Other work ordered to secure the project before termination
- 3. Material delivery and title transfer

The Department pays you under section 9-1.17.

## 8-1.14E Payment Adjustment for Termination

If the Department issues a termination notice, the Engineer determines the payment for termination based on the following:

- 1. Direct cost for the work:
  - 1.1. Including:
    - 1.1.1. Mobilization.
    - 1.1.2. Demobilization.
    - 1.1.3. Securing the job site for termination.
    - 1.1.4. Losses from the sale of materials.
  - 1.2. Not including:
    - 1.2.1. Cost of materials you keep.
    - 1.2.2. Profit realized from the sale of materials.
    - 1.2.3. Cost of material damaged by:
      - 1.2.3.1. Act of God.
      - 1.2.3.2. Act of a public enemy.
      - 1.2.3.3. Fire.
      - 1.2.3.4. Flood.
      - 1.2.3.5. Governor-declared state of emergency.
      - 1.2.3.6. Landslide.
      - 1.2.3.7. Tsunami.
    - 1.2.4. Other credits.
- 2. Cost of remedial work, as estimated by the Engineer, is not reimbursed.
- 3. Allowance for profit not to exceed 4 percent of the cost of the work. Prove a likelihood of having made a profit had the Contract not been terminated.
- 4. Material handling costs for material returned to the vendor or disposed of as ordered.
- 5. Costs in determining the payment adjustment due to the termination, excluding attorney fees and litigation costs.

Termination of the Contract does not relieve the surety of its obligation for any just claims arising out of the work performed.

## 8-1.15-8-1.16 RESERVED

## 9 PAYMENT

# Add Section 9-1.01A:

# 9-1.01A COMPENSATION

The bid items shown in the bid proposal sheet represent full compensation for performing all work. Full compensation for any work for which there is no bid item shall be considered to be included in the various items of work.

## Replace Section 9-1.03 with:

## 9-1.03 PAYMENT SCOPE

The Department pays you for furnishing the resources and activities required to complete the work. The Department's payment is full compensation for furnishing the resources and activities, including:

- Risk, loss, damage repair, or cost of whatever character arising from or relating to the work and performance of the work
- 2. PLACs and taxes
- 3. Any royalties and costs arising from patents, trademarks, and copyrights involved in the work

The Department does not pay for your loss, damage, repair, or extra costs of whatever character arising from or relating to the work that is a direct or indirect result of your choice of construction methods, materials, equipment, or manpower, unless specifically mandated by the Contract.

## Payment is:

- Full compensation for all work involved in each bid item shown on the Bid Item List by the unit of measure shown for that bid item
- 2. For the price bid for each bid item shown on the Bid Item List or as changed by change order with a specified price adjustment

Full compensation for work specified in divisions I, II, and X is included in the payment for the bid items unless:

- 1. Bid item for the work is shown on the Bid Item List
- 2. Work is specified as change order work

Work paid for under one bid item is not paid for under any other bid item.

Payment for a bid item includes payment for work in sections referenced by the section set forth by that bid item.

Notwithstanding anything to the contrary in these special provisions, full compensation for performing all work as shown, as specified, and as directed by the Engineer is considered to be included in the various bid items, and no additional payment will be made, except pursuant to a contract change order to perform work not shown and/or specified.

If one or more bid item(s) is/are not included, perform the work as shown and as specified and payment therefor is considered to be included in the various items of work.

If an alternative is described in the Contract, the Department pays based on the bid items for the details and specifications not described as an alternative unless the bid item is described as an alternative, in which case, the Department pays based on the details and specifications for that alternative.

The Department pays for change order work based on one or a combination of the following:

- 1. Bid item prices
- 2. Force account
- 3. Agreed price
- 4. Specialist billing

If the Engineer chooses to pay for change order work based on an agreed price, but you and the Engineer cannot agree on the price, the Department pays by force account.

If a portion of extra work is covered by bid items, the Department pays for this work as changed quantities in those items. The Department pays for the remaining portion of the extra work by force account or agreed price.

If the amount of a deduction or withhold exceeds final payment, the Department invoices you for the difference, to be paid upon receipt.

Pay your subcontractors within 10 days of receipt of each progress payment under Pub Cont Code §§ 10262 and 10262.5.

## Replace Section 9-1.07 with:

# 9-1.07 PAYMENT ADJUSTMENTS FOR PRICE INDEX FLUCTUATIONS 9-1.07A General

Section 9-1.07 applies to asphalt contained in materials for pavement structures and pavement surface treatments such as HMA, tack coat, asphaltic emulsions, bituminous seals, asphalt binders, and modified asphalt binders placed in the work. Section 9-1.07 does not apply if you opted out of payment adjustments for price index fluctuations at the time of bid.

The Engineer adjusts payment whenever the California statewide crude oil price index for the month the material is placed is more than 5 percent higher or lower than the price index at the time of bid.

The California Department of Transportation determines the California statewide crude oil price index each month on or about the 1st business day of the month using the average of the posted prices in effect for the previous month as posted by Chevron, ExxonMobil, and ConocoPhillips for the Buena Vista and Midway Sunset fields.

If a company discontinues posting its prices for a field, the Department determines the index from the remaining posted prices. The Department may include additional fields to determine the index.

For the California statewide crude oil price index, go to the California Department of Transportation Division of Construction Web site.

If the adjustment is a decrease in payment, the Department deducts the amount from the monthly progress payment.

The Department makes payment adjustments due to price index fluctuations for changed quantities under section 9-1.06.

If you do not complete the work within the Contract time, payment adjustments during the overrun period are determined using the California statewide crude oil price index in effect for the month in which the overrun period began.

If the price index at the time of placement increases:

- 1. 50 percent or more over the price index at bid opening, notify the Engineer.
- 2. 100 percent or more over the price index at bid opening, do not furnish material containing asphalt until the Engineer authorizes you to proceed with that work. The Department may decrease bid item quantities, eliminate bid items, or terminate the Contract.

Before placing material containing asphalt, submit the current sales and use tax rate in effect in the tax jurisdiction where the material is to be placed.

Submit a public weighmaster's certificate for HMA, tack coat, asphaltic emulsions, and modified asphalt binders, including those materials not paid for by weight. For slurry seals, submit a separate public weighmaster's certificate for the asphaltic emulsion.

# Add to the end of section 9-1.16C:

The following items are eligible for progress payment even if they are not incorporated into the work:

- 1. Service Enclosures
- 2. Traffic Signal Controller Cabinets
- 3. Traffic Signal Communications Cabinets
- 4. Street Lighting Poles
- 5. Street Lighting Decorative Poles
- 6. Street Lighting Mast Arms
- 7. Street Lighting Luminaires
- 8. Street Lighting Decorative Luminaires
- 9. Vehicle Signal Mounting Equipment

- 10. Pedestrian Signal Mounting Equipment
- 11. Pole Anchor Bolts
- 12. Traffic Signal Standard Poles
- 13. Traffic Signal Mast Arm
- 14. Traffic Signal Luminaire Mast Arm

### Replace Section 9-1.16F with:

## 9-1.16F Retentions

The Department, once in each month, shall cause an estimate in writing to be made by the Engineer. The estimate shall include the total amount of work done and acceptable materials furnished, provided the acceptable materials are listed as eligible for partial payment as materials in the special provisions and are furnished and delivered by the Contractor on the ground and not used or are furnished and stored for use on the contract, if the storage is within the State of California and the Contractor furnishes evidence satisfactory to the Engineer that the materials are stored subject to or under the control of the Department, to the time of the estimate, and the value thereof. The estimate shall also include any amounts payable for mobilization. Daily extra work reports furnished by the Contractor less than 5 calendar days, not including Saturdays, Sundays and legal holidays, before the preparation of the monthly progress estimate shall not be eligible for payment until the following month's estimate.

The amount of any material to be considered in making an estimate will in no case exceed the amount thereof which has been reported by the Contractor to the Engineer on State-furnished forms properly filled out and executed, including accompanying documentation as therein required, less the amount of the material incorporated in the work to the time of the estimate. Only materials to be incorporated in the work will be considered. The estimated value of the material established by the Engineer will in no case exceed the contract price for the item of work for which the material is furnished.

The Department shall retain 5 percent of the estimated value of the work done and 5 percent of the value of materials so estimated to have been furnished and delivered and unused or furnished and stored as aforesaid as part security for the fulfillment of the contract by the Contractor. The Department will not hold retention for mobilization or demobilization.

The Department shall pay monthly to the Contractor, while carrying on the work, the balance not retained, as aforesaid, after deducting therefrom all previous payments and all sums to be kept or retained under the provisions of the contract. No monthly estimate or payment shall be required to be made when, in the judgment of the Engineer, the work is not proceeding in accordance with the provisions of the contract.

No monthly estimate or payment shall be construed to be an acceptance of any defective work or improper materials.

Attention is directed to the prohibitions and penalties pertaining to unlicensed contractors as provided in Business and Professions Code Sections 7028.15(a) and 7031.

#### Add Section 9-1.23:

## 9-1.23 RESOLUTION OF CONTRACT CLAIMS

Public works contract claims of three hundred seventy-five thousand dollars (\$375,000) or less which arise between a Contractor and a local public agency shall be resolved in accordance with the provisions of California Public Contract Code Sections 20104-20104.6, inclusive. In addition, California Public Contract Code Section 9204 requires that the procedure established therein shall apply to all claims (as therein defined) filed by a contractor in connection with a public works project. Accordingly, this contract expressly incorporates all of the terms and conditions of those statutory provisions, which are as follows:

## California Public Contract Code Section 9204

- (a) The Legislature finds and declares that it is in the best interests of the state and its citizens to ensure that all construction business performed on a public works project in the state that is complete and not in dispute is paid in full and in a timely manner.
- (b) Notwithstanding any other law, including, but not limited to, Article 7.1 (commencing with Section 10240) of Chapter 1 of Part 2, Chapter 10 (commencing with Section 19100) of Part 2, and Article 1.5 (commencing with Section 20104) of Chapter 1 of Part 3, this section shall apply to any claim by a contractor in connection with a public works project.
- (c) For purposes of this section:
  - (1) "Claim" means a separate demand by a contractor sent by registered mail or certified mail with return receipt requested, for one or more of the following:
    - (A) A time extension, including, without limitation, for relief from damages or penalties for delay assessed by a public entity under a contract for a public works project.
    - (B) Payment by the public entity of money or damages arising from work done by, or on behalf of, the contractor pursuant to the contract for a public works project and payment for which is not otherwise expressly provided or to which the claimant is not otherwise entitled.
    - (C) Payment of an amount that is disputed by the public entity.
  - (2) "Contractor" means any type of contractor within the meaning of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code who has entered into a direct contract with a public entity for a public works project.
  - (3)(A) "Public entity" means, without limitation, except as provided in subparagraph (B), a state agency, department, office, division, bureau, board, or commission, the California State University, the University of California, a city, including a charter city, county, including a charter county, city and county, including a charter city and county, district, special district, public authority, political subdivision, public corporation, or nonprofit transit corporation wholly owned by a public agency and formed to carry out the purposes of the public agency.
    - (B) "Public entity" shall not include the following:
      - (i) The Department of Water Resources as to any project under the jurisdiction of that department.
      - (ii) The Department of Transportation as to any project under the jurisdiction of that department.
      - (iii) The Department of Parks and Recreation as to any project under the jurisdiction of that department.
      - (iv) The Department of Corrections and Rehabilitation with respect to any project under its jurisdiction pursuant to Chapter 11 (commencing with Section 7000) of Title 7 of Part 3 of the Penal Code.
      - (v) The Military Department as to any project under the jurisdiction of that department.
      - (vi) The Department of General Services as to all other projects.
      - (vii) The High-Speed Rail Authority.
  - (4) "Public works project" means the erection, construction, alteration, repair, or improvement of any public structure, building, road, or other public improvement of any kind.
  - (5) "Subcontractor" means any type of contractor within the meaning of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code who either is in direct contract with a contractor or is a lower tier subcontractor.
- (d) (1) (A) Upon receipt of a claim pursuant to this section, the public entity to which the claim applies shall conduct a reasonable review of the claim and, within a period not to exceed 45 days, shall provide the claimant a written statement identifying what portion of the claim is disputed and what portion is

undisputed. Upon receipt of a claim, a public entity and a contractor may, by mutual agreement, extend the time period provided in this subdivision.

- (B) The claimant shall furnish reasonable documentation to support the claim.
- (C) If the public entity needs approval from its governing body to provide the claimant a written statement identifying the disputed portion and the undisputed portion of the claim, and the governing body does not meet within the 45 days or within the mutually agreed to extension of time following receipt of a claim sent by registered mail or certified mail, return receipt requested, the public entity shall have up to three days following the next duly publicly noticed meeting of the governing body after the 45-day period, or extension, expires to provide the claimant a written statement identifying the disputed portion and the undisputed portion.
- (D) Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the public entity issues its written statement. If the public entity fails to issue a written statement, paragraph (3) shall apply.
- (2) (A) If the claimant disputes the public entity's written response, or if the public entity fails to respond to a claim issued pursuant to this section within the time prescribed, the claimant may demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested, the public entity shall schedule a meet and confer conference within 30 days for settlement of the dispute.
  - (B) Within 10 business days following the conclusion of the meet and confer conference, if the claim or any portion of the claim remains in dispute, the public entity shall provide the claimant a written statement identifying the portion of the claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the public entity issues its written statement. Any disputed portion of the claim, as identified by the contractor in writing, shall be submitted to nonbinding mediation, with the public entity and the claimant sharing the associated costs equally. The public entity and claimant shall mutually agree to a mediator within 10 business days after the disputed portion of the claim has been identified in writing. If the parties cannot agree upon a mediator, each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator. If mediation is unsuccessful, the parts of the claim remaining in dispute shall be subject to applicable procedures outside this section.
  - (C) For purposes of this section, mediation includes any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the parties in dispute resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes in this section.
  - (D) Unless otherwise agreed to by the public entity and the contractor in writing, the mediation conducted pursuant to this section shall excuse any further obligation under Section 20104.4 to mediate after litigation has been commenced.
  - (E) This section does not preclude a public entity from requiring arbitration of disputes under private arbitration or the Public Works Contract Arbitration Program, if mediation under this section does not resolve the parties' dispute.
- (3) Failure by the public entity to respond to a claim from a contractor within the time periods described in this subdivision or to otherwise meet the time requirements of this section shall result in the claim being deemed rejected in its entirety. A claim that is denied by reason of the public entity's failure to have responded to a claim, or its failure to otherwise meet the time requirements of this section, shall not constitute an adverse finding with regard to the merits of the claim or the responsibility or qualifications of the claimant.

- (4) Amounts not paid in a timely manner as required by this section shall bear interest at 7 percent per annum.
- (5) If a subcontractor or a lower tier subcontractor lacks legal standing to assert a claim against a public entity because privity of contract does not exist, the contractor may present to the public entity a claim on behalf of a subcontractor or lower tier subcontractor. A subcontractor may request in writing, either on his or her own behalf or on behalf of a lower tier subcontractor, that the contractor present a claim for work which was performed by the subcontractor or by a lower tier subcontractor on behalf of the subcontractor. The subcontractor requesting that the claim be presented to the public entity shall furnish reasonable documentation to support the claim. Within 45 days of receipt of this written request, the contractor shall notify the subcontractor in writing as to whether the contractor presented the claim to the public entity and, if the original contractor did not present the claim, provide the subcontractor with a statement of the reasons for not having done so.
- (e) The text of this section or a summary of it shall be set forth in the plans or specifications for any public works project that may give rise to a claim under this section.
- (f) A waiver of the rights granted by this section is void and contrary to public policy, provided, however, that (1) upon receipt of a claim, the parties may mutually agree to waive, in writing, mediation and proceed directly to the commencement of a civil action or binding arbitration, as applicable; and (2) a public entity may prescribe reasonable change order, claim, and dispute resolution procedures and requirements in addition to the provisions of this section, so long as the contractual provisions do not conflict with or otherwise impair the timeframes and procedures set forth in this section.
- (g) This section applies to contracts entered into on or after January 1, 2017.
- (h) Nothing in this section shall impose liability upon a public entity that makes loans or grants available through a competitive application process, for the failure of an awardee to meet its contractual obligations.
- (i) This section shall remain in effect only until January 1, 2027, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2027, deletes or extends that date.

## California Public Contract Code Sections 20104 – 20104.6

## **Section 20104**

- (a)(1) This article applies to all public works claims of three hundred seventy-five thousand dollars (\$375,000) or less which arise between a contractor and a local agency.
  - (2) This article shall not apply to any claims resulting from a contract between a contractor and a public agency when the public agency has elected to resolve any disputes pursuant to Article 7.1 (commencing with Section 10240) of Chapter 1 of Part 2.
- **(b)(1)** "Public work" means "public works contract" as defined in Section 1101 but does not include any work or improvement contracted for by the state or the Regents of the University of California.
  - (2) "Claim" means a separate demand by the contractor for (A) a time extension, (B) payment of money or damages arising from work done by, or on behalf of, the contractor pursuant to the contract for a public work and payment of which is not otherwise expressly provided for or the claimant is not otherwise entitled to, or (C) an amount the payment of which is disputed by the local agency.

- **(c)** The provisions of this article or a summary thereof shall be set forth in the plans or specifications for any work which may give rise to a claim under this article.
- (d) This article applies only to contracts entered into on or after January 1, 1991.

## **Section 20104.2**

For any claim subject to this article, the following requirements apply:

- (a) The claim shall be in writing and include the documents necessary to substantiate the claim. Claims must be filed on or before the date of final payment. Nothing in this subdivision is intended to extend the time limit or supersede notice requirements otherwise provided by contract for the filing of claims.
- **(b) (1)** For claims of less than fifty thousand dollars (\$50,000), the local agency shall respond in writing to any written claim within 45 days of receipt of the claim, or may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses to the claim the local agency may have against the claimant.
  - (2) If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the local agency and the claimant.
  - (3) The local agency's written response to the claim, as further documented, shall be submitted to the claimant within 15 days after receipt of the further documentation or within a period of time no greater than that taken by the claimant in producing the additional information, whichever is greater.
- **(c) (1)** For claims of over fifty thousand dollars (\$50,000) and less than or equal to three hundred seventy-five thousand dollars (\$375,000), the local agency shall respond in writing to all written claims within 60 days of receipt of the claim, or may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses to the claim the local agency may have against the claimant.
  - (2) If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the local agency and the claimant.
  - (3) The local agency's written response to the claim, as further documented, shall be submitted to the claimant within 30 days after receipt of the further documentation, or within a period of time no greater than that taken by the claimant in producing the additional information or requested documentation, whichever is greater.
- (d) If the claimant disputes the local agency's written response, or the local agency fails to respond within the time prescribed, the claimant may so notify the local agency, in writing, either within 15 days of receipt of the local agency's response or within 15 days of the local agency's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon a demand, the local agency shall schedule a meet and confer conference within 30 days for settlement of the dispute.
- (e) Following the meet and confer conference, if the claim or any portion remains in dispute, the claimant may file a claim as provided in Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code. For purposes of those provisions, the running of the period of time within which a claim must be filed shall be tolled from the time the claimant submits his or her written claim pursuant to subdivision (a) until the time that claim is denied

as a result of the meet and confer process, including any period of time utilized by the meet and confer process.

(f) This article does not apply to tort claims and nothing in this article is intended nor shall be construed to change the time periods for filing tort claims or actions specified by Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code.

# **Section 20104.4**

The following procedures are established for all civil actions filed to resolve claims subject to this article:

- (a) Within 60 days, but no earlier than 30 days, following the filing or responsive pleadings, the court shall submit the matter to nonbinding mediation unless waived by mutual stipulation of both parties. The mediation process shall provide for the selection within 15 days by both parties of a disinterested third person as mediator, shall be commenced within 30 days of the submittal, and shall be concluded within 15 days from the commencement of the mediation unless a time requirement is extended upon a good cause showing to the court or by stipulation of both parties. If the parties fail to select a mediator within the 15-day period, any party may petition the court to appoint the mediator.
- **(b) (1)** If the matter remains in dispute, the case shall be submitted to judicial arbitration pursuant to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, notwithstanding Section 1141.11 of that code. The Civil Discovery Act (Title 4 (commencing with Section 2016.010) of Part 4 of the Code of Civil Procedure) shall apply to any proceeding brought under this subdivision consistent with the rules pertaining to judicial arbitration.
  - (2) Notwithstanding any other provision of law, upon stipulation of the parties, arbitrators appointed for purposes of this article shall be experienced in construction law, and, upon stipulation of the parties, mediators and arbitrators shall be paid necessary and reasonable hourly rates of pay not to exceed their customary rate, and such fees and expenses shall be paid equally by the parties, except in the case of arbitration where the arbitrator, for good cause, determines a different division. In no event shall these fees or expenses be paid by state or county funds.
  - (3) In addition to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, any party who after receiving an arbitration award requests a trial de novo but does not obtain a more favorable judgment shall, in addition to payment of costs and fees under that chapter, pay the attorney's fees of the other party arising out of the trial de novo.
- **(c)** The court may, upon request by any party, order any witnesses to participate in the mediation or arbitration process.

# **Section 20104.6**

- (a) No local agency shall fail to pay money as to any portion of a claim which is undisputed except as otherwise provided in the contract.
- **(b)** In any suit filed under Section 20104.4, the local agency shall pay interest at the legal rate on any arbitration award or judgment. The interest shall begin to accrue on the date the suit is filed in a court of law.

## Add Section 9-1.24:

9-1.24 SUPPLEMENTAL WORK (PAYMENT ADJUSTMENTS FOR PRICE INDEX FLUCTUATIONS)

This item is provided solely to provide funds necessary for adjustments to the prices of those oil-containing materials expressly specified as eligible for such adjustments in "Payment Adjustments for Price Index Fluctuations," elsewhere in these special provisions.

The amount included for this item is an estimate only, and is a predetermined amount included in the bid proposal sheet(s) for the project.

This item, "Supplemental Work (Payment Adjustments for Price Index Fluctuations" is purely administrative in nature, is not intended to limit such payment adjustments to the number provided in the bid proposal sheet(s), nor is it intended to modify or supplement the provisions in "Payment Adjustments for Price Index Fluctuations," in any manner whatsoever. Any and all such adjustments shall be made in strict conformance with the requirements in said section.

The provisions in Section 9-1.06, "Changed Quantity Pay Adjustments" of the Standard Specifications shall not apply to the item "Supplemental Work (Payment Adjustments for Price Index Fluctuations)."

#### Add Section 9-1.25:

## 9-1.25 SUPPLEMENTAL WORK

The Supplemental Work bid item is provided to compensate the Contractor for new and unforeseen work necessary to construct the project as designed and intended. Supplemental Work is not for design changes. Supplemental Work will be classed as extra work in accordance with the provisions of Section 4-1.05, "Changes and Extra Work," of the Standard Specifications. The dollar amount for supplemental work shown in the Proposal is an estimate only, and shall be included in each bidder's proposal.

Supplemental work shall be performed only upon direct written authorization from the Engineer and daily extra work reports shall be submitted to and approved by the Engineer. The contractor shall maintain separate records for extra work performed in accordance with the provisions of Section 5-1.27," Records," of the Standard Specifications and these special provisions.

Payment will be based on the total amount of authorized Supplemental Work actually performed. The provisions in Section 9-1.06, "Changed Quantity Pay Adjustments" of the Standard Specifications shall not apply to the item "Supplemental Work."

# **DIVISION II GENERAL CONSTRUCTION**

## 10 GENERAL

## Add to the end of the RSS for section 10-1.02B:

Install loop detectors in the uppermost layer of the new pavement.

## Add to the end of section 10-1.02C(2):

Protect any irrigation component to be relocated before performing any other construction activity in the area.

#### Add to the beginning of section 10-1.02E:

Construct the new pavement structure adjacent to the existing traveled way by successively excavating, preparing subgrade, placing base materials, and paving. Perform these activities concurrently after you start paving. Excavation within 8 feet of the existing traveled way must not precede the paving operation by more than 2 working days unless:

## 1. Authorized

2. Material is placed and compacted against the vertical cuts within 8 feet of the existing traveled way. During excavation, you may use native material for this purpose except you must use structural material once you start placing the pavement structure. 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 10-3 with:

#### 10-3 FURNISH FIELD OFFICE

## 10-3.01 GENERAL

## 10-3.01A Summary

Section 10-3 includes specifications for furnishing a field office and associated services for the exclusive use of the Engineer.

You must provide the office and testing trailer beginning 14 days before project work begins and ending 21 days after final acceptance. Facilities remain your property upon completion of the contract. You must perform all site work to set up and remove the office. Provide weatherproof buildings or trailers in good condition and meet all applicable ordinances, safety codes, and regulations. Facilities and their location are subject to approval.

You are responsible for providing a separate, private, professional working area for the Resident Engineer's Office. The field office must be safe, sanitary and include the appropriate electrical service, potable water supply, toilet accommodations and waste disposal services.

## You must pay

- 1. sanitary and utility bills (electricity, phone and water) promptly
- 2. the cost for all connection and disconnection fees for electricity, phone, water service, sanitary service, fax and high speed internet
- 3. rental of all of the office and furnishings
- 4. all costs associated with days of delay in closing the office including, but not limited to, weather and/or contractor schedule completions delays
- 5. and maintain insurance for such facility to cover any losses of equipment or material within this space. The field office shall be reasonably secure, and if determined necessary by the Engineer, shall be enclosed by a 6 foot high chain link fence with a gate around the building and parking area.

## 10-3.01B Definitions

Not Used

## 10-3.01C Submittals

Not Used

## 10-3.01D Quality Control and Assurance

Not Used

## **10-3.02 MATERIALS**

You must supply a field office with the minimum requirements:

- 1. 400 square feet floor space, with separate room for Resident Engineer's office
- 2. Locking outside doors, deadbolt with keys (minimum 2 doors)
- 3. Alarm system with 24 hour monitoring service, optional
- 4. Slip proof tread and handrails on steps as required
- 5. Windows with locks, provide adequate cross ventilation in all rooms
- 6. 7 foot (min) ceiling height
- 7. Electrical lighting
- 8. Heat and air conditioning able to maintain 72 degrees Fahrenheit
- 9. Adequate electrical outlets and surge protectors
- 10. Adequate electricity (120 volt, 60 cycle)

- 11. Adequate potable water supply
- 12. Adequate indoor sanitary facilities, including sink
- 13. Parking for 4 vehicles (min)
- 14. Janitorial services twice per week

## You must furnish the office at a minimum with:

- 1. 3 Table 30" wide 8' long x 30" high
- 2. 1 File cabinet, 4-drawer, fire resistant metal with lock and keys
- 3. 2 Desk, 30" x 60"
- 4. 2 Desk lamps
- 5. 3 Office chairs and 6 folding chairs
- 6. 1 5 shelf Bookcase, 3' wide x 1' deep x 6' high minimum
- 7. 3 3 shelf Bookcase, 3' wide x 1' deep x 4' high minimum
- 8. 1 48"x72" dry erase board
- 9. 1 Fire extinguisher
- 10. 1 Refrigerator, 10 cubic feet
- 11. 1 Microwave Oven
- 12. 1 Water cooler with hot/cold taps and water delivery service
- 13. 1 fully serviced commercial Copy Machine (with color, 11x17, and scanning capabilities), with necessary paper and cartridges
- 14. 1 commercial grade First Aid Kit (Contractor maintained)

#### 10-3.03 CONSTRUCTION

Not Used

## **10-3.04 PAYMENT**

The Department pays you for furnish field office as follows:

- 1. A total of 25 percent of the item total upon the Engineer determining the field office is complete and acceptable.
- 2. A total of 90 percent of the item total over the life of the contract
- 3. A total of 100 percent of the item total upon contract acceptance

## 12 TEMPORARY TRAFFIC CONTROL

# Replace section 12-1.04 with:

#### 12-1.04 FLAGGING COSTS

You pay the cost of furnishing all flaggers, including transporting flaggers and furnishing stands and towers for flaggers to provide for the passage of traffic through the work as specified in sections 7-1.03 and 7-1.04.

## Replace Section 12-2 with:

#### 12-2 CONSTRUCTION PROJECT FUNDING SIGNS

## 12-2.01 GENERAL

Details for construction project funding signs are in *Project Details*.

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

### **12-2.02 MATERIALS**

Provide Construction project funding signs, posts, and mounting hardware.

Construction project funding signs must be wood post signs complying with section 82-3.

Sign panels for construction project funding signs must be framed, single sheet aluminum panels complying with section 82-2.

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

# LOCAL PARTNERSHIP PROGRAM (LPP)

## FRESNO COUNTY MEASURE "C" TRANSPORTATION FUNDS

## 12-2.03 CONSTRUCTION

Provide and Install a total of 2 construction project funding signs at the locations designated by the Engineer before starting major work activities visible to highway users.

Upon completion and acceptance of the work, the signs shall be removed and become the property of the Contractor.

#### **12-2.04 PAYMENT**

The Department pays you for Construction Funding Signs as follows:

- 1. 75 percent of the item upon installation of each sign
- 2. 100 percent of the item upon removal of each sign

## Replace Section 12-3.01C with:

## 12-3.01C Construction

If channelizing devices are used on the project, perform all layout work necessary to place channelizing devices:

- 1. On the proper alignment
- 2. Uniformly at the location and spacing described
- 3. Straight on a tangent alignment
- 4. On a true arc in a curved alignment

If temporary traffic control devices are damaged, displaced, or stop operating or functioning as described from any cause during the progress of the work, immediately repair, repaint, or replace the components and restore them to their original locations and positions.

If ordered, furnish and place additional temporary traffic control devices. This work is not change order work if:

- 1. Required to conform with your traffic control plan
- 2. Required to conform with the MUTCD
- Necessary for public safety or convenience as determined by the Engineer
- 4. Required to perform staged construction shown on the plans

## Replace Section 12-3.03C with:

## 12-3.03C Construction

If plastic traffic drums are used on project, use 1 type of plastic traffic drum on the project.

Use the same type and brand of retroreflective sheeting for all plastic traffic drums used on the project.

Do not use sandbags or comparable ballast.

Moving plastic traffic drums from location to location if ordered after initial placement is not change order work if:

- 1. Required to conform with your traffic control plan
- 2. Required to conform with the MUTCD
- 3. Necessary for public safety or convenience as determined by the Engineer
- 4. Required to perform staged construction shown on the plans

# Replace Section 12-3.10C with:

## 12-3.10C Construction

If barricades are used on the project, place each barricade such that the stripes slope downward in the direction road users are to pass.

Place each sand-filled bag near the ground level on the lower parts of the frame or stays to serve as ballast for the barricades. Do not place ballast on top of barricades or over any retroreflective barricade rail face that is facing traffic.

Do not remove barricades that are shown to be left in place at the time of work completion.

Moving a barricade from location to location is change order work if ordered after initial placement of the barricade unless.

- 1. Required to conform with your traffic control plan
- 2. Required to conform with the MUTCD
- 3. Necessary for public safety or convenience as determined by the Engineer
- 4. Required to perform staged construction shown on the plans

## Replace Section 12-3.20C(1) with:

#### 12-3.20C1 General

If Type K temporary rail is used on the project, before placing Type K temporary railing on the job site, paint the exposed surfaces of the railing with white paint complying with the specifications for acrylic emulsion paint for exterior masonry.

Place Type K temporary railing on a firm, stable foundation. Grade the foundation to provide a uniform bearing surface throughout the entire length of the railing.

Structure excavation and backfill must comply with section 19-3 except compaction of earth fill placed behind Type K temporary railing in a curved layout is not required.

Place and maintain the abutting ends of PC concrete units in alignment without substantial offset from each other.

The drilling of holes and bonding of threaded rods or dowels must comply with the specifications for drilling and bonding dowels in section 51-1.

Install a reflector on the top or face of the rail of each rail unit placed within 10 feet of a traffic lane. Apply adhesive for mounting the reflector under the reflector manufacturer's instructions.

Install a Type P marker panel at each end of railing placed adjacent to a 2-lane, two-way highway and at the end facing traffic for railing installed adjacent to a one-way roadbed. If the railing is placed on a skew, install the marker at the end of the skew nearest the traveled way. Type P marker panels must comply with section 82 except you must furnish the marker panels.

After removing Type K temporary railing:

- 1. Restore the area to its previous condition or construct it to its planned condition if temporary excavation or embankment was used to accommodate the railing.
- 2. Remove all threaded rods or dowels to a depth of at least 1 inch below the surface of the concrete. Fill the resulting holes with mortar under section 51-1 except cure the mortar by the water method or by the curing compound method using curing compound no. 6.

If the Engineer orders a lateral move of Type K temporary railing and repositioning is not shown, the lateral move is change order work unless:

- 1. Required to conform with your traffic control plan
- 2. Required to conform with the MUTCD
- 3. Necessary for public safety or convenience as determined by the Engineer
- 4. Required to perform staged construction shown on the plans

## Replace Section 12-3.22C with:

# 12-3.22C Construction

If crash cushion modules are used on the project, use the same type of crash cushion module for a single grouping or array.

Temporary crash cushion arrays must not encroach on the traveled way.

Secure the sand-filled modules in place before starting an activity requiring a temporary crash cushion.

Maintain sand-filled temporary crash cushions in place at each location, including times when work is not actively in progress. You may remove the crash cushions during the work shift for access to the work if the exposed fixed obstacle is 15 feet or more from the nearest lane carrying traffic. Reset the crash cushion before the end of the work shift.

Immediately repair sand-filled temporary crash cushion modules damaged due to your activities. Remove and replace any module damaged beyond repair. Repair and replacement of temporary crash cushion modules damaged by traffic are change order work.

You may place sand-filled temporary crash cushion modules on movable pallets or frames complying with the dimensions shown. The pallets or frames must provide a full-bearing base beneath the modules. Do not move the modules and supporting pallets or frames by sliding or skidding along the pavement or bridge deck.

Attach a Type R or Type P marker panel to the front of the temporary crash cushion if the closest point of the crash cushion array is within 12 feet of the traveled way. Firmly fasten the marker panel to the crash cushion with commercial quality hardware or by other authorized methods. Attach the Type R marker panel such that the top of the panel is 1 inch below the module lid. Attach the Type P marker panel such that the bottom of the panel rests upon the pallet or roadway surface if pallets are not used.

A lateral move of a temporary crash cushion module is change order work if ordered and the repositioning is not shown, unless required for staged construction.

Remove sand-filled temporary crash cushion modules, including sand, pallets or frames, and marker panels, at Contract acceptance. Do not install sand-filled temporary crash cushion modules in the permanent work.

## Replace section 12-3.31C with:

## 12-3.31C Construction

If portable flashing beacons are used on the project, remove portable flashing beacons from the traveled way at the end of each night's work. You may store the flashing beacon at selected central locations within the highway where designated by the Engineer.

Moving portable flashing beacons from location to location if ordered after initial placement is change order work unless:

- 1. Required to conform with your traffic control plan
- 2. Required to conform with the MUTCD
- 3. Necessary for public safety or convenience as determined by the Engineer
- 4. Required to perform staged construction shown on the plans

#### Add to section 12-3.32C:

Start displaying the message ("ROADWORK START MONTH/DAY/YEAR" "EXPECT DELAYS") on the portable changeable message boards 7 days prior to the start of construction.

Start displaying the message on the portable changeable message sign 10 minutes before closing the lane.

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

- 1. Stationary lane closure
- 2. Connector closure
- 3. Shoulder closure
- 4. Speed reduction zone

## Replace Section 12-3.35B(6) with:

## 12-3.35B(6) User Interface

If the project includes an AWIS, the system must have a user interface to control the AWIS PCMS communications. The interface must be (1) software compatible with a Windows environment or (2) a web service accessed by a web browser.

Provide any software on a CD or other Engineer-authorized data-storage device.

The user interface must, at a minimum, provide the user with a list of AWIS PCMSs in the field, location information for each AWIS PCMS, and a real-time on-board display of the message in the field. Control options must, at a minimum, provide the user the ability to change the on-board messages and flash rate.

# Replace Section 12-3.37 with:

# 12-3.37 PORTABLE RADAR SPEED FEEDBACK SIGN SYSTEMS

## 12-3.37A General

Section 12-3.37 includes specifications for placing, maintaining, and removing portable radar speed feedback sign systems.

# 12-3.37B Materials

A portable radar speed feedback sign system must comply with the requirements for a temporary radar speed feedback sign system, except it must be trailer mounted.

## 12-3.37C Construction

Not Used

## 12-3.37D Payment

Payment for Portable radar speed feedback sign systems is included under Temporary Traffic Control.

# Replace Section 12-4 with: 12-4 MAINTAINING TRAFFIC

### 12-4.01 GENERAL

## 12-4.01A General

Section 12-4.01 includes general specifications for maintaining traffic through construction work zones.

If local authorities regulate traffic, notify them at least 5 business days before the start of job site activities. Cooperate with the local authorities to handle traffic through the work zone and to make arrangements to keep the work zone clear of parked vehicles.

#### 12-4.01B Materials

Not Used

#### 12-4.01C CONSTRUCTION

Furnishing and operating pilot cars is not change order work.

### 12-4.01D Payment

Not Used

## 12-4.02 TRAFFIC CONTROL SYSTEMS

#### 12-4.02A General

# 12-4.02A(1) Summary

Section 12-4.02 includes specifications for providing a traffic control system to close traffic lanes, shoulders, and roadways.

A traffic control system for a closure includes the temporary traffic control devices described as part of the traffic control system. Temporary traffic control devices must comply with section 12-3.

## 12-4.02A(2) Definitions

designated holidays: Designated holidays are shown as "holidays" in Section 1-1.07B.

## 12-4.02A(3) Submittals

## 12-4.02A(3)(a) General

The Contractor shall prepare and submit to the County Construction Engineer for approval, a separate traffic control system plan will need to be submitted for each jurisdiction indicating the means and methods he will employ to institute and maintain traffic control for all phases of the work within the project. Lane closures along Golden State Blvd within County areas will not be allowed to be closed for more than 1 mile at a time, and at least 1 mile must separate lane closure at any time in both, or as approved by the County Engineer. If lane closure is required in City limits, it must be between major signalized intersections and as approved by the City & County Engineers. The traffic control system plan shall be submitted to the County Construction Engineer as early as possible, preferably **ten (10) working days** prior to pre-construction meeting. The Engineer will require ten (10) working days to review the initial submittal of the traffic control system plan and an additional ten (10) working days for each successive review.

No work at the project site whatsoever, including preparatory work such as the installation of construction project funding signs, shall commence until the traffic control system plan has been approved in writing by the Engineer. In the event that the traffic control system plan is not submitted timely, the Engineer may issue a notice of commencement of contract time prior to approval of the traffic control system plan, and working days will begin to accrue against the allotted contract time.

Late submittal of the traffic control plan or revisions thereafter required, due to the inadequacy of the plan, shall not be accepted as justification for the delay in the start of the working days for the project.

It shall be the Contractor's responsibility to provide, install, maintain, and remove any and all detour signage and traffic control devices and to obtain all permits, including permits from Caltrans, as may be necessary to establish detours as part of the contractor's traffic control plan.

Traffic will not be allowed to be limited to one direction when construction activities are not actively in progress. Providing, installing, maintaining, and removing all traffic control, including portable changeable message signs if required, obtaining and complying with all permits, and providing all traffic control operations shall be the responsibility of the contractor, and no additional compensation will be allowed therefor.

## 12-4.02A(3)(b) Closure Schedules

One-way traffic shall be controlled through the project in accordance with the California Manual MUTCD and Caltrans Standard Plans T-11 and T-13 entitled "Traffic Control System for Lane Closure on Multilane Conventional Highways" and "Traffic Control System for Lane Closure on Two Lane Conventional Highways," and these special provisions. Night closure will not be permitted.

When traffic is under one way control on unpaved areas, the cones shown along the centerline on the plan need not be placed.

Every Monday by noon, submit a closure schedule request for planned closures for the next week.

The next week is defined as Sunday at noon through the following Sunday at noon.

Submit a closure schedule request 10 days before the anticipated start of any job site activity that reduces:

- 1. Horizontal clearances of traveled ways, including shoulders, to 2 lanes or fewer due to activities such as temporary barrier placement and paying
- 2. Vertical clearances of traveled ways, including shoulders, due to activities such as pavement overlays, overhead sign installation, or falsework girder erection

Submit closure schedule changes, including additional closures, by noon at least 3 business days before a planned closure.

Cancel closure requests at least 48 hours before the start time of the closure.

The Department notifies you of unauthorized closures or closures that require coordination with other parties as a condition for authorization.

## 12-4.02A(3)(c) Contingency Plans for Closures

Submit a contingency plan for an activity that could affect a closure 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 the job 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 the planned activities. For each activity, identify the critical event that will activate the contingency plan.

Submit revisions to a contingency plan at least 3 business days before starting the activity requiring the contingency plan. Allow 2 business days for review.

## 12-4.02A(4) Quality Assurance

Reserved

## 12-4.02B Materials

Not Used

#### 12-4.02C Construction

## 12-4.02C(1) General

Traffic will be controlled by flagmen by eyesight, radio (walkie talkie) or baton. In the event these methods do not work satisfactorily, as determined by the Engineer, a pilot car will be required.

The Engineer may require a pilot car to be used during earthwork operations in preparation of the grading plane or other operations when the Contractor's operations cover an area beyond the line of sight, or beyond the range of radios or when the baton method does not function satisfactorily.

Work that interferes with traffic is limited to the hours when closures are allowed.

## 12-4.02C(3) Closure Requirements and Charts

## 12-4.02C(3)(a) General

Where 2 or more lanes in the same direction, including the shoulders, are adjacent to the area where the work is being performed, close the adjacent lane under any of the following conditions:

- 1. Work is off the traveled way but within 6 feet of the edge of the traveled way, and the approach speed is greater than 45 mph
- 2. Work is off the traveled way but within 3 feet of the edge of the traveled way, and the approach speed is less than 45 mph

Closure of the adjacent traffic lane is not required during any of the following activities:

- 1. Work behind a barrier
- 2. Paving, grinding, or grooving
- 3. Installation, maintenance, or removal of traffic control devices except for temporary railing

## 12-4.02C(3)(b) - 12-4.02C(3)(n)

Reserved

#### 12-4.02C(3)(o) Closure of Conventional County Roads

The type and location of signs, lights, flags, flagmen, and other traffic control and safety devices shall be in accordance with the current edition of the California Manual on Uniform Traffic Control Devices (MUTCD) issued by the State of California, Department of Transportation (Caltrans).

Allow public traffic to pass through construction at all times unless otherwise specified herein.

Provide access to properties abutting the project site at all times.

When directed by the Engineer, traffic shall be routed through the work under one-way control.

Under one-way reversing traffic control operations, public traffic may be stopped in one direction for periods not to exceed 10 minutes.

Lane closure is defined as the closure of a traffic lane or lanes within a single traffic control system.

Provide a minimum of one paved traffic lane, not less than 11 feet wide, to be open for use by public traffic in each direction of travel at all times.

The full width of the traveled way shall be open for use by public traffic when construction operations are not actively in progress.

Keep driveways and access roads accessible at all times.

The seal coats shall not be applied to more than one-half of the width to be sealed at time, and the remaining half width to be kept free of obstructions and open for use by public traffic until the seal coat first applied is ready for use by traffic.

Asphaltic emulsion, asphalt concrete and asphalt rejuvenating agent shall not be applied to more than one-half of the width to be capped at a time, the remaining half-width to be kept free of obstructions and open for use by public traffic until the asphalt concrete cap, first applied, is ready for use by traffic.

Valley gutters shall be constructed in one-half widths and the remaining one-half width shall be kept free from obstructions to allow local traffic and through traffic to pass.

12-4.02C(3)(o)-12-4.02C(3)(s) Reserved

12-4.02C(4)-12.4.02C(6) Reserved

12-4.02C(7) Traffic Control System Requirements

12-4.02C(7)(a) General

Control traffic using stationary closures.

If components of the traffic control system are displaced or cease to operate or function as specified, immediately repair them to their original condition or replace them and place them back in their original locations.

Vehicles equipped with attenuators must comply with section 12-3.23.

Each vehicle used to place, maintain, and remove components of a traffic control system on a multilane highway must have a Type II flashing arrow sign that must operate whenever the vehicle is used for placing, maintaining, or removing the components. For a stationary closure, vehicles with a Type II flashing arrow sign not involved in placing, maintaining, or removing the components must display only the caution display mode. If a flashing arrow sign is required for a closure, activate the sign before the closure is in place.

#### 12-4.02C(7)(b) Stationary Closures

Except for channelizing devices placed along open trenches or excavations adjacent to the traveled way, remove the components of the traffic control system for a stationary closure from the traveled way and shoulders at the end of each work period. You may store the components at authorized locations within the limits of the highway.

If a traffic lane is closed with channelizing devices for excavation work, move the devices to the adjacent edge of the traveled way when not excavating. Space the devices as shown for the lane closure.

#### 12-4.02C(7)(c) Moving Closures

For a moving closure, use a PCMS that complies with section 12-3.32 except the sign must be truck mounted. The full operational height to the bottom of the sign may be less than 7 feet above the ground but must be as high as practicable.

If you use a flashing arrow sign in a moving closure, the sign must be truck mounted. Operate the flashing arrow sign in the caution display mode if it is being used on a 2-lane, two-way highway.

## 12-4.02C(8) Traffic Control System Signs

## 12-4.02C(8)(a) General

Traffic control system signs must comply with section 12-3.11.

## 12-4.02C(8)(b) Connector and Ramp Closure Signs

Inform motorists of a temporary closing of a (1) connector or a (2) freeway or expressway entrance or exit ramp using:

- 1. SC6-3(CA) (Ramp Closed) sign for closures of 1 day or less
- 2. SC6-4(CA) (Ramp Closed) sign for closures of more than 1 day

SC6-3(CA) and SC6-4(CA) signs must be stationary mounted at the locations shown and must remain in place and visible to motorists during the connector or ramp closure.

Notify the Engineer at least 2 business days before installing the sign and install the sign from 7 to 15 days before the closure.

## 12-4.02C(9)-12-4.02C(10) Reserved

## 12-4.02C(11) Failure to Provide Traffic Control.

If you do not provide the traffic control and it becomes necessary for the Engineer to notify you of your duties according to the Standard Specifications and these special provisions, you will pay \$200 per 15-minute period or portion thereof to the County for all the time required to acquire the traffic control, including pilot car.

Such payment shall commence at the time notice of the improper traffic control condition is given to you or your authorized representative by the Engineer and shall terminate when the condition is corrected. Such payment will be deducted from your payment.

In addition, when it is necessary for the Engineer to perform the work, you will pay the actual cost for the performance thereof. Such amount will be deducted from the your payment. This will be in addition to any penalties imposed in these special provisions.

The provisions in this section will not relieve you from your responsibility to provide such additional devices or take such measures as may be necessary to comply with the provisions in Section 7-1.04, "Public Safety," of the Standard Specifications.

#### Replace Reserved in section 12-4.02C(12):

## 12-4.02C(12) Construction Work Zone Speed Limit Reduction

#### 12-4.02C(12)(a) General

Section 12-4.02C(12) includes specifications for providing, installing, maintaining, and removing traffic control devices for reducing the speed limit for the construction work zones.

Speed limit reduction is limited to 10 mph from the posted speed limit in construction work zones unless a greater speed limit reduction is specified. Construction work zone speed limit reduction can either be required when construction activities are active in a closure as a temporary condition or 24 hours a day, 7 days a week based on the roadway conditions when specified.

Speed limit reduction for Golden State Boulevard is to be reduced in the areas per the Construction Work Zone Speed Limit table below.

Place traffic control devices as shown for multiple speed limit reduction steps within traffic control system. Speed limits can be stepped down in 5 or 10 mph increments.

Temporary construction work zone speed limit reduction is required for lane closures when construction activities require workers to be present within the lane closures. Construction work zone speed limit reduction is not required for short duration closures of 1 hour or less or when the length of lane closure is 1/2 mile or less.

Temporary construction work zone speed limit reduction is required when construction activities require lane closures within the construction zone.

Construction work zone speed limit reduction is required 24 hours a day, 7 days a week when construction activities affect the roadway around the clock 24 hours a day, 7 days a week as shown on the traffic handling plans.

Construction work zone speed limit reduction is required 24 hours a day 7 days a week at the following locations when the roadway conditions listed are in effect because of construction activities:

## Construction Work Zone Speed Limit Reduction 24 Hours A Day 7 Days A Week

Location no.	Route	Beg. STA	End STA	Roadway Condition
1	NB Golden State Blvd	10+00	705+00	Under Construction
2	SB Golden State Blvd	10+00	705+00	Under Construction

For divided highways, the construction speed limit reduction zone for 24 hours a day, 7 days a week applies only to the direction of travel where the roadway conditions require lower vehicle speeds.

#### 12-4.02C(12)(b) Materials

For construction work zone speed limit reduction for 24 hours a day, 7 days a week, construction area signs must comply with the requirements for stationary-mounted signs in section 12-3.11. When the duration of construction work zone speed limit reduction for 24 hours a day, 7 days a week is 7 days or less, you may use portable signs that comply with the requirements for portable signs in section 12-3.11.

For temporary construction work zone speed limit reduction, signs must comply with the requirements for portable signs in section 12-3.11.

The PCMS must comply with section 12-3.32.

Radar speed feedback sign LED displays must have LED:

- 1. Character of at least 18 inches in height for freeways and expressways
- 2. Character of at least 14 inches in height for conventional highways
- 3. Character's width-to-height ratio from 0.7 to 1.0
- 4. Character's stroke width-to-height ratio of 0.2

Portable radar speed feedback sign must comply with section 12-3.37.

Portable radar speed feedback sign trailers must have a minimum of 9 cones placed on a taper in advance of the device and along the edge of shoulder or edge of the traveled way at 25-foot intervals to a point not less than 25 feet past the device.

Temporary radar speed feedback sign system must comply with the specifications for:

- 1. Temporary electrical system in section 87-20
- 2. Radar speed feedback sign system in section 87-14 except the LED character display must remain blank when no vehicles are detected or when the detected vehicle speed is 10 miles or less than the preset speed

#### 12-4.02C(12)(c) Construction

Advise motorists of construction work zone speed limit reductions starting 14 days in advance of implementing the speed limit reduction using a PCMS displaying the alternating messages Reduced Speed and Starting XX/XX/XX (Date).

When construction work zone speed limit reduction is in effect, the PCMS message must be XX ZONE AHEAD and WILL BE ENFORCED. Mount a 48-by-48-inch W3-5 XX "SPEED LIMIT" ahead symbol sign on the PCMS trailer.

Cover all existing speed limit signs while the construction work zone speed limit reduction is in effect. Remove covers when construction work zone speed limit reduction is no longer in effect. For construction work zone speed limit reduction for 24 hours a day, 7 days a week, you may remove the existing speed limit signs and replace the signs when the construction activities that required the 24 hours a day, 7 days a week speed limit reduction are completed.

For construction work zone speed limit reduction for 24 hours a day, 7 days a week, install temporary radar speed feedback systems. In addition to the temporary radar speed feedback system shown, place a portable radar speed feedback system 400 feet upstream of active work areas. Portable radar speed feedback system must include a R2-1 sign with G20-5aP "WORK ZONE" plaque.

For temporary construction work zone speed limit reduction for lane closures, install portable radar speed feedback system as shown. In addition to the portable radar speed feedback system shown, place a portable radar speed feedback system 400 feet upstream of active work areas. The portable radar speed feedback system must include a R2-1 sign with G20-5aP "WORK ZONE" plaque.

For on-ramps within the limits of a construction work zone speed limit reduction, place R2-1 signs with G20-5aP "WORK ZONE" plaque within 500 feet of entrance ramps. You may use the strap and saddle method for mounting these sign panels on the entrance ramp lighting standard at the merge point.

For freeway to freeway connector ramps, install signs and devices as shown for construction work zone speed limit reduction.

For expressways, place a R2-1 sign with G20-5aP "WORK ZONE" plaque approximately 500 feet downstream from intersections within the limits of a construction work zone speed limit reduction.

For conventional highways, place a R2-1 sign with G20-5aP "WORK ZONE" plaque approximately 500 feet downstream from major intersections within the limits of a construction work zone speed limit reduction.

Within the limits of a construction work zone speed limit reduction, place intermediate R2-1 signs with G20-5aP "WORK ZONE" plaque at intervals not exceeding three miles.

For chip seal projects, place construction work zone speed limit reduction signs and devices as shown except place additional intermediate signs, W8-7 "LOOSE GRAVEL" sign, and a W13-1 (35) plaque every 2000 feet.

For construction work zone speed limit reduction for 24 hours a day, 7 days a week, install advisory warning signs 48-inch by 48-inch W3-5 as shown.

## 12-4.02D Payment

The Department pays for change order work for a traffic control system by force account for increased traffic control and uses a force account analysis for decreased traffic control.

Traffic control system for lane closure is paid for as traffic control system. Flagging costs are paid for as specified in section 12-1.04.

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.

Full compensation for furnishing and operating the pilot car, (including driver, radios, and any other equipment and labor required) shall be considered as included in the contract lump sum price paid for traffic control system and no further payment will be made.

#### 12-4.03 FALSEWORK OPENINGS

Reserved

#### 12-4.04 PEDESTRIAN FACILITIES

#### 12-4.04A General

Section 12-4.04 includes specifications for providing temporary pedestrian facilities.

Temporary pedestrian facilities must comply with section 16-2.02.

#### 12-4.04B Materials

Not Used

#### 12-4.04C Construction

If pedestrian traffic is allowed to pass through work areas, provide a temporary pedestrian facility through the construction areas within the highway. Include a protective overhead covering as necessary to ensure protection from falling objects and drippings from overhead structures.

If an activity requires a closure of a walkway, provide another walkway nearby, off of the traveled way.

Where pedestrian openings through falsework are required, provide a temporary pedestrian facility with a protective overhead covering during all bridge construction activities.

## 12-4.04D Payment

Not Used

#### 12-4.06-12-4.10 RESERVED

#### Replace the last sentence in the 1st paragraph of section 12-6.03A with:

On multilane roadways, freeways, expressways, and 2-lane roadways with shoulders 4 feet or more in width, the temporary pavement delineation must also include edge line delineation for traveled ways open to traffic.

## Replace the 1st sentence in the 3rd paragraph of section 12-6.03A with:

When the Engineer determines the temporary pavement delineation is no longer required for the direction of traffic, remove the temporary pavement delineation, including any underlying adhesive for temporary pavement markers, from the final layer of surfacing and from the pavement to remain in place.

#### Replace the introductory clause in the 1st paragraph of section 12-6.03C with:

On multilane roadways, freeways, expressways, and 2-lane roadways with shoulders 4 feet or more in width open to traffic where edge lines are obliterated and temporary pavement delineation to replace those edge lines is not shown, provide temporary pavement delineation for:

## 13 WATER POLLUTION CONTROL

#### Add to Section 13-1.01:

## STATE WATER RESOURCES CONTROL BOARD (SWRCB) NOTICE OF INTENT FILING (NOI) FEE

Complete the NOI filing process started by the County on the SWRCB website using information available in the contract, field and website. The Engineer will link your plan to the project on the SWRCB website.

The SWRCB NOI bid item is specifically provided to reimburse Contractor for payment of NOI filing fee charged by the SWRCB and paid by the Contractor after the Contractor has completed the NOI filing process started by the County.

The amount paid will be the amount of the fee only. No payment will be made for overhead or processing costs. Full compensation for any overhead and processing costs will be considered to be included in the various items of work, and no separate compensation will be made therefor.

The provisions of section 9-1.06 for increased or decreased quantities shall not apply to the "State Water Resources Control Board Notice of Intent" bid item.

The SWRCB website can be found at:

## https://smarts.waterboards.ca.gov/smarts/faces/SwSmartsLogin.xhtml

The dollar amount shown in the Proposal is an estimate only and shall be included in each bidder's proposal.

#### Replace 13-1.01A with:

## **13-1.01A Summary**

Section 13-1 includes general specifications for preventing, controlling, and abating water pollution within waters of the State.

Information on forms, reports, and other documents is in the following Caltrans manuals:

- 1. Field Guide to Construction Site Dewatering
- 2. Stormwater Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual
- 3. Construction Site Best Management Practices (BMPs) Manual
- 4. Construction Site Monitoring Program Guidance Manual

You may view these manuals at the Stormwater and Water Pollution Control Information link at the Caltrans Division of Construction website or purchase them at the Caltrans Publication Distribution Unit.

A WPCP and a SWPPP must comply with the Caltrans Stormwater Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual and must be prepared using the latest template posted on the Construction stormwater website.

#### Replace Section 13-1.01D(2) with

## 13-1.01D(2) Regulatory Requirements

Comply with the discharge requirements in the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities; Order No. 2009-000 9-DWQ, CAS000002 (Construction General Permit) and any amendments thereto issued by the SWRCB. The Construction General Permit may be found at:

http://www.waterboards.ca.gov/water\_issues/programs/stormwater/constpermits.shtml

Discharges from manufacturing facilities, such as batch plants and crushing plants, must comply with the discharge requirements in the NPDES General Permit for Storm Water Discharges Associated with Industrial Activities; Order No. 2014-0057-DWQ, CAS000001 (Industrial General Permit), issued by the SWRCB. For the Industrial General Permit, go to the SWRCB website.

For a batch plant and crushing plant outside a job site or within a job site that serves one or more contracts, obtain coverage under the Industrial General Permit before operating a batch plant to manufacture concrete, HMA, or other material or a crushing plant to produce rock or aggregate.

This Project disturbs 48.3 acres of soil.

### Replace Section 13-1.01D(4)(b) with:

#### 13-1.01D(4)(b) Qualifications

The WPC manager must:

- 1. Comply with the requirements provided in the Construction General Permit for:
  - 1.1. QSP if the project requires a WPCP
  - 1.2. QSD if the project requires a SWPPP
- 2. Complete the stormwater management training described at the Stormwater and Water Pollution Control Information link at the Caltrans Division of Construction website

## Add between the 4th and 5th paragraphs of section 13-2.01C:

The Central Valley Regional Water Quality Control Board will review the authorized WPCP.

#### Replace Section 13-2.04:

#### **13-2.04 PAYMENT**

The Department pays for prepare water pollution control program as follows:

- 1. Total of 50 percent of the item total upon authorization of the WPCP
- 2. Total of 90 percent of the item total upon work completion
- 3. Total of 100 percent of the item total upon Contract acceptance

#### Add to section 13-3.01A:

This project's risk level is 1

## Add between the 4th and 5th paragraphs of section 13-3.01C(2)(a):

The Central Valley Regional Water Quality Control Board will review the authorized SWPPP.

## Replace Section 13-3.01C(2)(b)(iv) with:

## 13-3.01C(2)(b)(iv) Sampling and Analysis Plan

If a sampling and analysis plan is required, submit a sampling and analysis plan that complies with the Caltrans *Construction Site Monitoring Program Guidance Manual*.

The sampling and analysis plan must describe:

- 1. Sampling equipment and sample containers.
- 2. Preparation of samples.
- 3. Collection and holding times.
- 4. Field measurement methods.
- 5. Analytical methods.
- 6. Quality assurance and quality control.
- 7. Sample preservation and labeling.
- 8. Collection documentation, including the names of personnel collecting samples and their training.
- 9. Shipment of samples.
- 10. Chain of custody.
- 11. Data management and reporting.
- 12. Precautions from the construction site health and safety plan, including procedures for collecting samples during precipitation. List the conditions under which you are not required to collect samples, such as:
  - 12.1. Dangerous weather
  - 12.2. Flooding or electrical storms
  - 12.3. Times outside of normal working hours
- 13. Procedures for collecting and analyzing at least 3 samples for each day of each qualifying rain event for a risk level 2 or risk level 3 project.
- 14. Procedures for collecting effluent samples at all locations where the stormwater is discharged off the job site.

The sampling and analysis plan must identify the State-certified laboratory that will perform the analyses. For a list of State-certified laboratories, go to the SWRCB's website.

Submit a revised plan if discharges or sampling locations change because of changed work activities or knowledge of site conditions.

#### Replace Section 13-3.01C(5) with:

#### 13-3.01C(5) Annual Certification

Submit an annual certification of compliance as described in the Caltrans *Stormwater Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual* before July 15th of each year.

## Replace Section 13-3.04:

#### 13-3.04 PAYMENT

For a project with 60 original working days or less, the Department pays for prepare stormwater pollution prevention plan as follows:

- 1. Total of 75 percent of the item total upon authorization of the SWPPP, and the completed N.O.I has been posted in the SMARTS public access database for the project.
- 2. Total of 100 percent of the item total upon Contract acceptance, and N.O.T has been closed in the SMARTS public access database for the project.

For a project with more than 60 original working days, the Department pays for prepare stormwater pollution prevention plan as follows:

- 1. Total of 50 percent of the item total upon authorization of the SWPPP, and the completed N.O.I has been listed in the SMARTS public access database for the project.
- 2. Total of 90 percent of the item total upon work completion
- 3. Total of 100 percent of the item total upon Contract acceptance, and N.O.T has been closed in the SMARTS public access database for the project.

The Department does not pay for the preparation, collection, laboratory analysis, and reporting of stormwater samples for nonvisible pollutants if WPC practices are not implemented before precipitation or if you fail to correct a WPC practice before precipitation.

#### The Department pays:

- 1. \$500 for each authorized rain event action plan
- 2. \$2,000 for each authorized stormwater annual report upon acceptance by RWQCB

The Department does not adjust the unit price for an increase or decrease in the quantity of:

- 1. Rain event action plan
- 2. Storm water sampling and analysis day
- 3. Storm water annual report

#### Replace Section 13-4.03G with:

## 13-4.03G Dewatering

Dewatering consists of discharging accumulated stormwater, groundwater, or surface water from excavations or temporary containment facilities.

If dewatering is required, perform dewatering work as specified for the work items involved, such as a temporary ATS or dewatering and discharge.

If dewatering and discharging activities are not specified for a work item and you perform dewatering activities:

1. Conduct dewatering activities under the Caltrans Field Guide for Construction Site Dewatering.

- 2. Ensure any dewatering discharge does not cause erosion, scour, or sedimentary deposits that could impact natural bedding materials.
- 3. Discharge the water within the project limits. Dispose of the water if it cannot be discharged within project limits due to site constraints or contamination.
- 4. Do not discharge stormwater or nonstormwater that has an odor, discoloration other than sediment, an oily sheen, or foam on the surface. Immediately notify the Engineer upon discovering any such condition.

## Replace Section 13-5.04 with:

#### 13-5.04 PAYMENT

The payment quantity for temporary soil stabilization bid items paid for by the area is the area measured parallel with the ground surface not including the additional quantity used for overlaps.

If there is no bid item for temporary soil stabilization measures, payment therefor is considered to be included in the bid item for prepare water pollution control program or in the bid item for prepare stormwater pollution prevention plan, as applicable.

## Replace Section 13-6.04 with:

#### **13-6.04 PAYMENT**

The payment quantity for temporary sediment control bid items paid for by the length is the length measured along the centerline of the installed material.

The payment quantity, if any, for temporary fiber roll does not include the additional quantity used for overlaps.

The Department does not pay for the relocation of temporary drainage inlet protection during work progress.

If there are no bid items for installing or maintaining temporary sediment control measures, payment therefor is considered to be included in the bid item for prepare water pollution control program or in the bid item for prepare stormwater pollution prevention plan, as applicable.

### Replace Section 13-7.03D with:

#### **13-7.03D Payment**

The Department does not pay for the relocation of temporary construction entrances or roadways during work progress.

If there are no bid items for installing or maintaining temporary construction entrances or roadways, payment therefor is considered to be included in the bid item for prepare water pollution control program or in the bid item for prepare stormwater pollution prevention plan, as applicable.

#### Replace Section 13-8.01C(2) with:

## 13-8.01C(2) Active Treatment System Plan

Within 20 days of Contract approval, submit 3 copies of the ATS plan if an ATS plan is required for the project.

The plan, if required, must include:

- 1. Title sheet.
- 2. Table of contents.
- 3. Certification and approval sheet described in the Caltrans Stormwater Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual.
- 4. Amendment log and format described in the Caltrans Stormwater Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual.
- 5. Description and schedule of the discharge activities.

- 6. Discharge alternatives, including:
  - 6.1. Reuse of treated water for job site activities, such as dust control, irrigation, fill compaction, or concrete batch plant activities
  - 6.2. Percolation
  - 6.3. Discharge into storm sewers
  - 6.4. Discharge into surface waters
- 7. Treatment system description and components.
- 8. Anticipated flow rates.
- 9. Operation and maintenance manual for the equipment.
- 10. Monitoring, sampling, and reporting plan, including QA and QC.
- 11. Health and safety plan.
- 12. Spill prevention plan.
- 13. Field-recorded data, visual inspection, calibration procedures, and examples of logs.
- 14. Descriptions of measuring equipment.
- 15. Shop drawings showing:
  - 15.1. Section and plan views of stormwater effluent treatment systems
  - 15.2. Location of sampling points for water quality measurements
  - 15.3. Flow path and placement of pipes, hoses, pumps, holding tanks, and other equipment used to convey water
  - 15.4. General position of treatment components relative to excavations or other areas requiring dewatering
  - 15.5. Point of stormwater discharge
- 16. Daily inspection report form.
- 17. Municipal batch discharge permit from a publicly owned treatment works if required.
- 18. Coagulant-handling work plan if you use chemical coagulants, in-line flocculants, or both in the treatment system. The coagulant-handling work plan must include:
  - 18.1. Description of WPC practices to prevent accidental spillage, overfeeding into the treatment system, or other mishandling of coagulant agents
  - 18.2. Monitoring plan for all coagulants, flocculants, or both
  - 18.3. Description of the coagulation and flocculating agents, including chemical and trade names
  - 18.4. Determination of acute or chronic toxicity for aquatic organisms conforming to EPA methods for the agents
  - 18.5. Monitoring plan to detect a residual agent at concentrations at or below the established acute toxicity levels for freshwater and marine conditions for that agent

Allow 20 days for review. If revisions are required, the Engineer notifies you of the date the review stopped and provides comments. Submit a revised ATS plan within 15 days of receiving the comments. The Department's review resumes when a complete plan has been resubmitted.

Submit an electronic copy on a read-only CD, DVD, or other Engineer-authorized data storage device and 4 printed copies of the authorized ATS plan. Allow 15 days for the Engineer to submit the plan to the SWRCB and the RWQCB. If the Engineer requests revisions based on comments from the SWRCB or RWQCB, submit a revised plan within 5 business days.

## 14 ENVIRONMENTAL STEWARDSHIP

Replace the 1st paragraph of section 14-1.02 with:

Before start of work, protect ESAs identified by the County-supplied Biologist during preconstruction surveys. The proposed quantity for Temporary Fence (Type ESA) is an estimate only. The quantity paid for will be based on the actual quantity required and installed. The provisions in section 4-1.05 for payment adjustment do not apply to ESA fence.

Replace paragraph 1 of section 14-2.03A with:

If archaeological or historical resources are discovered within or near construction limits, do not disturb the resources and immediately:

- 1. Stop all work within a 100-foot radius of an archaeological or historical discovery
- 2. Stop all work within a 50-foot radius of human remains
- 3. Secure the area
- 4. Notify the engineer

#### Add to the 1st paragraph of section 14-6.03A:

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

**Regulated Species** 

Western Mastiff and Pallid Bats
San Joaquin Kit Fox
Swainson's Hawk
Migratory Birds and Raptors
American Badger

## Replace item 1 in the 2nd paragraph of section 14-6.03A with:

1. Stop all work within a 100-foot radius of the discovery except as shown in the following table:

**Regulated Species and Protective Radius** 

Regulated species	Protective radius (feet)
San Joaquin Kit Fox / American Badger Potential/Atypical Den	50 feet
San Joaquin Kit Fox / American Badger Natal/Pupping Den (Occupied	TBD by County-supplied
and Unoccupied)	Biologist / USFWS
Nesting Migratory Raptors	500 feet
Nesting Migratory Birds	250 feet
Nesting Swainson's Hawk	600 feet

#### Add to section 14-6.03A:

Species protection areas within the project limits are as specified in the following table:

**Species Protection Areas** 

Identification name	Location	
Species Protection Area 1	Entire Project Limits	

The County-supplied Biologist will:

- 1. Provide biological resource training handout, sign-in sheet, and PowerPoint presentation
- 2. Identify ESAs
- 3. Perform all required preconstruction surveys and onsite species and habitat monitoring/agency coordination

Comply with the following biological resource information requirements:

- 1. Before start of work, all workers must watch the biological resource training provided to you on Digital Video Disk or by email. Workers include contractors, subcontractors, representatives, and other personnel who stay on the project site longer than 60 minutes.
- 2. Biological resource training is required for all workers that start after the initial training.
- 3. The workers must sign a form stating they attended the training. Submit this form to the Engineer within 2 business days following each training session as an information submittal.

Within Species Protection Area 1, implement the following protection measures:

## **General Protection Measures:**

- 1. Do not perform any work until pre-construction surveys have been performed, ESA fence has been installed, your workers have watched the biological resource training, and you are authorized to start by the Engineer.
- 2. Notify the Engineer immediately if you see a regulated species.
- 3. Notify the Engineer immediately if you see a dead, injured or entrapped San Joaquin kit fox.
- 4. Project-related vehicles should observe a daytime speed limit of 20-mph throughout the site, except on county roads and State and Federal highways; this is particularly important at night when San Joaquin kit foxes are most active. Night-time construction should be minimized to the extent possible. However, if it does occur, then the speed limit should be reduced to 10-mph. Off-road traffic outside of Species Protection Area 1 should be prohibited.
- 5. To prevent inadvertent entrapment of San Joaquin kit foxes or other animals during the construction phase of a project, all excavated, steep-walled holes or trenches more than 2-feet deep should be covered at the close of each working day by plywood or similar materials. If the trenches cannot be closed, one or more escape ramps constructed of earthen-fill or wooden planks shall be installed. Before such holes or trenches are filled, they should be thoroughly inspected for trapped animals. If at any time a trapped or injured San Joaquin kit fox is discovered, inform the Engineer.
- 6. In the case of trapped animals, escape ramps or structures must be installed immediately to allow the animal to escape.
- 7. San Joaquin Kit foxes are attracted to den-like structures such as pipes and may enter stored pipes and become trapped or injured. All construction pipes, culverts, or similar structures with a diameter of 4-inches or greater that are stored at a construction site for one or more overnight periods should be thoroughly inspected for San Joaquin kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a San Joaquin kit fox is discovered inside a pipe, that section of pipe should not be moved until the County-supplied Biologist has consulted with the Engineer. If necessary, and under the direct supervision of the County-supplied Biologist, the pipe may be moved only once to remove it from the path of construction activity, until the fox has escaped.
- 8. All food-related trash items such as wrappers, cans, bottles, and food scraps should be disposed of in securely closed containers and removed at least once a week from Species Protection Area 1.
- 9. Do not bring firearms or pets on site.
- 10. Be informed of and comply with PLACs and the Mitigation Monitoring and Reporting Program included in the Project Details.

## Replace paragraph 1 of section 14-7.03 with:

If unanticipated paleontological resources are discovered at the job site, do not disturb the resources and immediately:

- 1. Stop all work within a 100-foot radius of a paleontological discovery
- 2. Secure the area
- 3. Notify the engineer

#### Replace Section 14-8.02 with:

Limit construction activities to the hours of 7:00 a.m. to 7:00 p.m. on weekdays and the hours of 8:00 a.m. to 5:00 p.m. on weekends and federally recognized holidays except as required to alleviate traffic congestion or safety hazards.

Control and monitor noise resulting from work activities.

Comply with applicable local regulations regarding noise suppression and attenuation.

Engine-driven equipment shall be fitted with mufflers according to manufacturers' specifications.

Locate fixed construction equipment such as compressors and generators at distances no less than 250 feet from sensitive receptors (including occupied residential property boundaries).

Shroud or shield impact tools, and muffle or shield intake and exhaust ports on power construction equipment.

Construction equipment using internal combustion engines shall be in proper tune.

#### Add to Section 14-9.02:

Ensure construction equipment is properly maintained and sized for the work.

Unnecessary idling of internal combustion engines is prohibited.

## Add to the list in the 2nd paragraph of section 14-11.08A:

- 9. RWQCB, Region 5-Central Valley
- 10. San Joaquin Valley Air Pollution Control District

#### Add to the end of section 14-11.08A:

Hazardous waste concentrations of ADL are present within the project limits. Management of this material exposes workers to health hazards that must be addressed in a lead compliance plan. Include perimeter air monitoring under section 14-11.08F as part of your lead compliance plan.

The Department has received a variance from the DTSC regarding the use of material containing ADL. The variance applies if Type Y-1 or Type Y-2 material is shown. The variance is available for inspection at the Department of Transportation, District 6.

#### Add to section 14-11.08C:

Type Z-2 material exists between 2' and 38' feet, measured horizontally from the edges of the existing pavement, from 10+00 to 752+00 station, and from a depth of 0.5 to 1 feet below existing grade as shown. See Table below for specific locations:

Beg STA	End STA	Horizontal Distance
53+00	95+00	2' to 38'
136+50	250+00	5' to 30'
394+00	455+00	5' to 3512'
480+00	514+00	5' to 38'
625+00	690+00	5' to 20'

## Replace the 1st paragraph of section 14-11.08D(2) with:

Within 15 days of Contract approval, submit 3 copies of an excavation and transportation plan for material containing hazardous waste concentrations of ADL. Allow 10 days for review.

## Add after the 2nd paragraph of section 14-11.08D(2):

The excavation and transportation plan must include:

1. Procedures for excavating, stockpiling, transporting, placing and disposing of the material

- 2. Excavation schedule by location and date
- 3. Locations for temporary stockpiles if stockpiling is ordered
- 4. Sampling and analysis plans for areas after removal of a stockpile if sampling is ordered, including:
  - 4.1 Location and number of samples.
  - 4.2 Name and address of the laboratory that will perform the analysis. The laboratory must be certified under the SWRCB ELAP.
- 5. Survey methods for burial locations for Types Y-1 or Y-2 materials
- 6. Sampling and analysis plan for soil cover
- 7. Sampling and analysis plan for post excavation as shown from:

Beg STA	End STA
10+00	105+00
136+50	289+00
375+50	455+00
475+00	514+00
587+00	752+00

- 8. Dust control measures
- 9. Air monitoring procedures, including:
  - 9.1 Location and type of equipment
  - 9.2 Sampling frequency
  - 9.3 Name and address of the laboratory that will perform the analyses
- 10. Transportation equipment and routes
- 11. Method for preventing spills and tracked material onto public roads
- 12. Truck waiting and staging areas
- 13. Name and address of the hazardous waste disposal facility
- 14. Example of a bill of lading to be carried by trucks transporting Type Y-1 or Y-2 material from the job site to another project. The bill of lading must include:
  - 14.1. US Department of Transportation description, including shipping name
  - 14.2. Hazard class
  - 14.3. Identification number
  - 14.4. Handling codes
  - 14.5. Quantity of material
  - 14.6. Volume of material
- 15. Spill contingency plan for material containing ADL

## Replace Reserved in section 14-11.08D(3) with:

Within 5 business days of completing placement of Type Y-1 or Type Y-2 material, submit a report for each burial location that includes:

- 1. Burial Location of Soil Containing Aerially Deposited Lead form
- 2. Electronic geospatial vector data shapefiles of the top and bottom perimeters of the burial location

Submit the report to the Engineer and to:

#### ADL@dot.ca.gov.

The Engineer notifies you of acceptance or rejection of the burial location report within 5 business days of receipt. If the report is rejected, submit a corrected report within 5 business days of receiving notification.

#### Replace Reserved in section 14-11.08F with:

Conduct perimeter air monitoring at upwind and downwind locations as detailed in the authorized lead compliance plan. Monitor using personal air samplers by the National Institute of Safety and Health Method 7082. Your sampling procedures must achieve a detection limit of 0.05 µg/ m3 of air per day.

Under the direction of a CIH, monitor the air daily while clearing and grubbing and performing earthwork activities. Analyze a single representative daily sample for lead and provide results within 24 hours. Analyses must be performed by a laboratory accredited by the Environmental Lead Laboratory-Accreditation Program of the American Industrial Hygiene Association.

Average lead concentrations must not exceed 1.5  $\mu$ g/ m3 of air per day and 0.15  $\mu$ g/ m3 per day on a rolling 90-day basis. Calculate average daily concentrations based on accumulated monitoring data and projections based on monitoring trends for the next 90 days or to the end of work subject to the lead compliance plan if less than the specified averaging period. If concentrations exceed these levels, stop work and modify the work to prevent release of lead. The air monitoring data must be reviewed and signed by the CIH.

## 14-12.04 RELATIONS WITH SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT (SJVAPCD)

You are responsible for compliance with all applicable SJVAPCD regulations and requirements. This section is provided for your information, and nothing herein or elsewhere within these special provisions shall be construed as limiting your responsibility for complying with all applicable rules and regulations.

In accordance with SJVAPCD Regulation VIII – Fugitive PM10 Prohibitions: Rule 8021, implementation of an SJVAPCD-approved dust control plan is required prior to commencement of any dust generating activities. The County has filed a dust control plan with the SJVAPCD and has paid the application fee. A copy of the dust control plan filed by the County is included in "Project Details" of these special provisions.

Prepare and submit proposed modifications to the dust control plan to provide any information which is identified as "to be determined" on the dust control plan filed by the County and to modify the dust control plan to the extent necessary to accurately reflect your proposed operations. The Engineer completes the review within two working days after receipt thereof. In the event that the Engineer determines your submittal as incomplete or inadequate submit a corrected plan. The Engineer completes review of any resubmittal within two working days after receipt thereof.

Upon approval by the Engineer, submit the proposed modified dust control plan to the SJVAPCD. Pay to the SJVAPCD any fees which may be required for any modifications of the dust control plan. You are solely responsible for prompt preparation and submittal to the Engineer, and immediately upon approval by the Engineer, submittal to the SJVAPCD of all proposed modifications to the dust control plan.

Do not commence work until the SJVAPCD has approved or conditionally approved the dust control plan and the Engineer authorizes. When a modification to an approved dust control plan is under consideration do not perform work which is inconsistent with the approved dust control plan prior to receiving written approval.

Compensation for delays associated with review and approval of dust control plans is only considered in the event that: 1) the Engineer fails to review any modified dust control plan submitted by the Contractor within two working days after submittal thereof by the Contractor; or 2) the SJVAPCD fails to review and to either approve or disapprove a modified dust control plan within 30 calendar days after their receipt thereof. Disapproval of a proposed modification to the dust control plan by the Engineer or by the SJVAPCD shall not be considered as a basis for an extension of contract time nor as the basis for any additional compensation. Only in the event that it is determined by the Engineer that the Contractor was unreasonably delayed, through no fault of the Contractor, will compensation for delays be considered in conformance with the provisions in Section 8-1.07, "Delays," of the Standard Specifications.

It is your responsibility to be fully informed of the requirements of the Dust Control Plan and all rules, regulations, plans and conditions that may govern your operations and to conduct the work accordingly.

You must comply with the modifications to the Dust Control Plan approved by the SJVAPCD and accepted by the Engineer. Ensure the provisions of this section and SJVAPCD-approved modifications to the Dust Control Plan is made part of every subcontract executed pursuant to this contract.

## Replace Section 14-12.04- 14.12.08 with:

#### 14-12.05 - 14.12.08 RESERVED

## 15 Existing Facilities Insert into Section 15-1:

Installation of the utilities shown in the following table requires coordination with your activities. Make the necessary arrangements with the utility company through the Engineer and submit a schedule:

- 1. Verified by a representative of the utility company
- 2. Allowing at least the time shown for the utility owner to complete its work

## Utility Relocation and Contractor-Arranged Time for the Relocation/Adjustments

Utility	Contact Information	Location	Duration
AT&T	(559) 454-3725	Adjust Manholes to Grade	2 Day
Kevin Tate	Kt5861@att.com		Notification
City of Kingsburg	(559) 299-1544	Water Valve Adjustments	2 Day
Dave Peters	davidpeters@peters-	Adjust Storm Drain Manholes to	Notification
	engineering.com	Grade	
City of Fowler	(559) 299-1544	Water Valve Adjustments	2 Day
Dave Peters	davidpeters@peters-	Adjust Storm Drain Manholes to	Notification
	engineering.com	Grade	
		Relocate Fire Hydrants	
City of Selma	(559) 244-3123	Adjust Storm Drain Manholes to	2 Day
Philip Romero	Promero@yhmail.com	Grade	Notification
SKF	fhernandez@skfcsd.org	Adjust Sewer Manholes to Grade	2 Day
Frank Hernandez			Notification
Southern California	(559) 739-2308	Adjust Gas Manholes to Grade	2 Day
Gas	APena4@semprautilities.com	Adjust Gas Vault to Grade	Notification
Amy Pena			

#### 15-1.03C SALVAGING FACILITIES

#### Add to the end of section 15-1.03C:

At least 2 business days before hauling the material to the salvaged material stockpile location, notify the Engineer and inform the stockpile recipient. For County of Fresno traffic signal or street lighting equipment please contact the City of Fresno TSSL at telephone no. (559) 621 - 1312. For City of Fowler traffic signal or street lighting equipment please contact the City of Fowler Public Works Department at telephone no. (559) 834 - 3113. For City of Selma traffic signal or street lighting equipment please contact the City of Selma Public Works Department at telephone no. (559) 891 - 2215. For City of Kingsburg Street lighting equipment please contact the City of Kingsburg Public Works Department at telephone no. (559) 897 - 5328.

The stockpile locations are as shown in the following table:

#### **Stockpile Locations**

Material	Location
County of Fresno - Traffic Signal Cabinets, Poles and Mast Arms	3191 W. Belmont Avenue, Fresno, CA 93722
County of Fresno - Street Light Poles, Mast Arms, and Luminaires	3191 W. Belmont Avenue, Fresno, CA 93722
City of Kingsburg Steet Light Poles, Mast Arms and Luminaires	For location, please contact the City of Kingsburg Public Works Department at (559) 897 – 5328
City of Selma – Traffic Signal Cabinets, Poles, Mast Arms, and Luminaires	For location, please contact the City of Selma Public Works Department at (559) 891 – 2215.
City of Selma – Street Lighting Poles and Luminaires	For location, please contact the City of Selma Public Works Department at (559) 891 – 2215.
City of Fowler – Traffic Signal Cabinets, Service Pedestals, Poles, Mast Arms, and Luminaires	For location, please contact the City of Fowler Public Works Department at (559) 834 – 3113.
City of Fowler – Street Light Poles and Luminaires	For location, please contact the City of Fowler Public Works Department at (559) 834 – 3113.

## DIVISION III EARTHWORK AND LANDSCAPE

#### 17 GENERAL

#### Replace the 4th paragraph in section 17-2.03A with:

Clear and grub vegetation only within the excavation and embankment slope lines.

## Replace the 1st sentence in the 2nd paragraph in section 17-2.03B with:

Cut tree branches that extend over the roadway and hang within 20 feet of finished grade and as directed by the engineer.

### Add to end of 17-2.03C:

Any trees with a trunk diameter greater than or equal to 4" will constitute as a "tree removal" and will have separate bid item. Any tree or shrub less than 4" shall be considered in the bid item for "clearing and grubbing".

## 19 EARTHWORK

## Replace the first paragraph and list of Section 19-5.03B with:

Compact earthwork to a relative compaction of at least 95 percent for at least a depth of:

- 1. 0.5 foot below the grading plane for the width between the outer edges of shoulders on excavation and embankments smaller than 2.5 feet above original grade.
- 2. 2.5 feet below the finished grade for the width of the traveled way plus 3 feet on either side (6 feet wider) on embankments.

Replace Section 19-9.02 with:

Material for shoulder backing if possible must be native and generated from roadway excavation. Material shall be readily compactable, shall not contain deleterious materials, shall pass 100% through a 2-inch sieve, 20% to 40% passing the #200 sieve, a Plasticity Index less than 10, and shall provide a stable surface and uniform appearance as determined by the engineer.

## **20 LANDSCAPE**

## Add to section 20-2.02B(3):

The color of the backflow preventer blanket must be black.

#### Replace item 1 in the list in the 1st paragraph of section 20-2.02B(4) with:

1. Be hot-dipped galvanized steel

## Add to the list in the 1st paragraph of section 20-2.02B(4):

7. Be powder coated black by the manufacturer.

## Add between the 2nd and 3rd paragraphs of section 20-4.01A:

Minimum-bid plant establishment work is work (1) that is described as plant establishment work and (2) for which a minimum item total must be bid.

#### Add to section 20-4.01A:

This project has a Type 2 plant establishment period.

## 21 EROSION CONTROL

## Replace Section 21-2.01C(4) with:

#### 21-2.01C(4) Tackifier

Submit a certificate of compliance for tackifier and bonded fiber matrix at least 5 business days before application. Certificates of compliance must include:

- 1. SDS
- 2. Product label
- 3. List of applicable nonvisible pollutant indicators for soil amendment and stabilization materials as shown in the table titled "Pollutant Testing Guidance Table" in the Caltrans *Construction Site Monitoring Program Guidance Manual.* For the manual, go to the Caltrans Division of Construction website
- 4. Report of acute and chronic toxicity tests on aquatic organisms complying with EPA methods
- 5. List of ingredients, including chemical formulation
- 6. Properties of polyacrylamide in tackifier including:
  - 6.1. Percent purity by weight
  - 6.2. Percent active content
  - 6.3. Average molecular weight
  - 6.4. Charge density

## 22 FINISHING ROADWAY

# DIVISION IV SUBBASE AND BASE 24 STABILIZED SOILS

#### Replace Section 24-1.01C(1) with:

## 24-1.01C(1) General

At least 15 days before starting soil stabilization activities submit the name of the laboratory you will use for QC tests. The laboratory must be qualified under the Caltrans Independent Assurance Program.

Before performing QC sampling and testing, submit the time and location the sampling and testing will occur. Submit QC testing results within 24 hours of receiving the results.

Submit a certificate of compliance with the stabilizing agent samples that includes a statement certifying the stabilizing agent furnished is the same as on the Authorized Material Source List for the stabilizing agent specified.

Submit a weighmaster certificate for stabilizing agent remaining on hand after completion of the work.

Submit a stabilized soil quality control plan.

## **28 CONCRETE BASES**

#### 30 RECLAIMED PAVEMENT

Replace Section 30-1.01D(4)(b) with:

## 30-1.01D(4)(b) Sampling and Testing

Take samples under California Test 125.

Testing must be performed by an authorized laboratory. Testing personnel for QC must be qualified under the Caltrans Independent Assurance Program.

Measure and record the actual cut depth at both ends of the pulverizing drum at least once every 300 feet along the cut length. Take measurements in the Engineer's presence.

#### Add to Section 30-4.04:

The payment quantity for Full Depth Reclamation - Cement shall be measured in square feet.

# DIVISION V SURFACINGS AND PAVEMENTS 36 GENERAL

Replace Section 36-3 with: 36-3 PAVEMENT SMOOTHNESS

36-3.01 GENERAL 36-3.01A Summary

Section 36-3 includes specifications for measuring the smoothness of pavement surfaces.

36-3.01B Definitions

Reserved

36-3.01C Submittals

36-3.01C(1) General

Reserved

36-3.01C(2) Reserved

36-3.01C(3) Reserved

## 36-3.01C(4) Straightedge Measurements

Within 2 business days of measuring smoothness with a straightedge, submit a list of the areas requiring smoothness correction. Identify the areas 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 traffic lane:
  - 4.1. Lane direction, NB, SB, EB, or WB
  - 4.2. Lane number from left to right in the direction of travel
  - 4.3. Wheel path, *L* for left, *R* for right, or *B* for both
- 5. For correction areas not within a traffic lane:
  - 5.1. Identify the pavement area, such as shoulder, weigh station, or turnout
  - 5.2. Direction and distance from the centerline, *L* for left or *R* for right
- 6. Estimated size of correction area

## 36-3.01D Quality Assurance

36-3.01D(1) General

Reserved

36-3.01D(2) Reserved

36-3.01D(3) Quality Control

36-3.01D(3)(a) General

Reserved

36-3.01D(3)(b) Smoothness

36-3.01D(3)(b)(i) General

Test pavement smoothness using a 12-foot straightedge.

36-3.01D(3)(b)(ii) Reserved

36-3.01D(3)(b)(iii) Reserved

#### 36-3.01D(4) Department Acceptance

The Department accepts pavement surfaces for smoothness based on compliance with the smoothness specifications for the type of pavement surface specified.

For areas that require pavement smoothness determined using a 12-foot straightedge, 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

#### **36-3.02 MATERIALS**

Not Used

#### 36-3.03 CONSTRUCTION

Perform pavement smoothness testing in areas selected by the Engineer in the presence of the Engineer.

#### **36-3.04 PAYMENT**

Not Used

## Replace Section 37 with: 37 SEAL COATS 37-1 GENERAL

#### **37-1.01 GENERAL**

#### **37-1.01A Summary**

Section 37-1 includes general specifications for applying seal coats.

#### 37-1.01B Definitions

Reserved

#### 37-1.01C Submittals

At least 10 days before the preconstruction meeting submit a list of participants in the preconstruction meeting. Provide each participant's name, employer, title, and role in the production and placement of the seal coats.

At least 10 days before starting seal coat activities, submit the names of the authorized laboratories for quality control testing.

For each delivery of asphalt binder or asphaltic emulsion to the job site, submit a certificate of compliance and a copy of the specified test results.

For a seal coat that uses crumb rubber modifier, submit a Crumb Rubber Usage Report form monthly and at the end of project.

#### 37-1.01D Quality Assurance

### 37-1.01D(1) General

For aggregate testing, quality control laboratories must be in compliance with the Caltrans Independent Assurance Program to be an authorized laboratory. Quality control personnel must be qualified under the Caltrans Independent Assurance Program.

For emulsion testing, quality control laboratories must participate in the AASHTO Material's Reference Laboratory proficiency sample program. The lab must show evidence of a rating of three or greater on the two most recent samples.

#### 37-1.01D(2) Preconstruction Meeting

Hold a preconstruction meeting within 5 days before start of seal coat work at a mutually agreed time and place with the Engineer and your:

- 1. Project superintendent
- 2. Project foreman
- 3. Traffic control foreman

Make arrangements for the conference facility. Preconstruction meeting participants must sign an attendance sheet provided by the Engineer. Be prepared to discuss:

- 1. Quality control testing
- 2. Acceptance testing
- 3. Seal coat placement
- 4. Proposed application rates for asphaltic emulsion or asphalt binder and aggregate.
- 5. Training on placement methods
- 6. Checklist of items for proper placement

- 7. Unique issues specific to the project, including:
  - 7.1. Weather
  - 7.2. Alignment and geometrics
  - 7.3. Traffic control requirements
  - 7.4. Haul distances
  - 7.5. Presence and absence of shaded areas
  - 7.6. Any other local conditions
- 8. Contingency plan for material deliveries, equipment breakdowns, and traffic handling
- 9. Who in the field has authority to adjust application rates and how adjustments will be documented
- 10. Schedule of sweepings

## **37-1.02 MATERIALS**

Not Used

#### 37-1.03 CONSTRUCTION

## 37-1.03A General

If seal coat activities affect access to public parking, residential property, or commercial property, post signs at 100-foot intervals on the affected streets. Signs must display *No Parking – Tow Away*. Signs must state the dates and hours parking or access will be restricted. Notify residents, businesses, and local agencies at least 24 hours before starting activities. The notice must:

- 1. Describe the work to be performed
- 2. Detail streets and limits of activities
- 3. Indicate dates and work hours
- 4. Be authorized

Asphaltic emulsion or asphalt binder for seal coats may be reheated if necessary. After loading the asphaltic emulsion or asphalt binder into a truck for transport to the job site, do not heat asphaltic emulsion above 160 degrees F and asphalt rubber binder above 425 degrees F. During reheating, circulate or agitate the asphaltic emulsion or asphalt binder to prevent localized overheating.

Except for fog seals, apply quick setting Grade 1 asphaltic emulsions at a temperature from 75 to 130 degrees F and apply quick setting Grade 2 asphaltic emulsions at a temperature from 110 to 185 degrees F.

You determine the application rates for asphaltic emulsion or asphalt binder and aggregate and the Engineer authorizes the application rates.

## 37-1.03B Equipment

A self-propelled distributor truck for applying asphaltic emulsion or asphalt binder must be equipped with:

- 1. Pressure-type system with insulated tanks with circulating unit
- 2. Spray bars:
  - 2.1. With minimum length of 9 feet and full-circulating type
  - 2.2. With full-circulating-type extensions if needed to cover a greater width
  - 2.3. Adjustable to allow positioning at various heights above the surface to be treated
  - 2.4. Operated by levers such that 1 or all valves may be quickly opened or closed in one operation
- 3. Devices and charts to provide for accurate and rapid determination and control of asphaltic emulsion or asphalt binder quantities being applied. Include an auxiliary wheel type meter that registers:
  - 3.1. Speed in ft/min
  - 3.2. Trip by count
  - 3.3. Total distance in feet
- 4. Distribution system:
  - 4.1. Capable of producing a uniform application of asphaltic emulsion or asphalt binder in controlled quantities ranging from 0.02 to 1 gal/sq yd of surface and at a pressure ranging from 25 to 75 psi
  - 4.2. Pumps that spray asphaltic emulsion or asphalt binder within 0.02 gal/sq yd of the set rate

- 4.3. With a hose and nozzle for application of asphaltic emulsion to areas inaccessible to the spray
- 4.4. With pressure gauges and a thermometer for determining temperatures of the asphaltic emulsion or asphalt binder

You may use cab-controlled valves for the application of asphaltic emulsion or asphalt binder. The valves controlling the flow from nozzles must act positively to provide a uniform unbroken application of asphaltic emulsion or asphalt binder.

Maintain distributor and storage tanks at all times to prevent dripping.

#### **37-1.04 PAYMENT**

Not Used

#### 37-2 CHIP SEALS

#### 37-2.01 GENERAL

#### 37-2.01A General

## 37-2.01A(1) Summary

Section 37-2.01 includes general specifications for applying chip seals.

## 37-2.01A(2) Definitions

Reserved

## 37-2.01A(3) Submittals

At least 15 days before starting placement of chip seal, submit:

- Samples for:
  - 1.1. Asphaltic emulsion chip seal, six 1-quart wide mouth plastic containers with screw top lid of asphaltic emulsion
  - 1.2. Polymer modified asphaltic emulsion chip seal, six 1-quart wide mouth plastic containers with screw top lid of polymer modified asphaltic emulsion
  - Asphalt rubber binder chip seal, two 1-quart cans of base asphalt binder 1.3.
  - Asphalt rubber binder chip seal, five 1-quart cans of asphalt rubber binder
- 2. Asphaltic emulsion, polymer modified asphaltic emulsion, asphalt binder or asphalt rubber binder data as follows:
  - Supplier and Type/Grade of asphaltic emulsion or asphalt binder 2.1.
  - Type of modifier used including polymer or crumb rubber or both 2.2.
  - 2.3. Percent of crumb rubber, if used as modifier
  - 2.4. Copy of the specified test results for asphaltic emulsion or asphalt binder
- 3. 50 lb of uncoated aggregate
- 4. Aggregate test results for the following:
  - 4.1. Gradation
  - 4.2. Los Angeles Rattler
  - 4.3. Percent of crushed particles
  - 4.4. Flat and elongated particles
  - 4.5. Film stripping
  - 4.6. Cleanness value4.7. Durability
- 5. Vialit test results

Submit quality control test results for the quality characteristics within the reporting times allowance after sampling shown in the following table:

**Quality Control Test Result Reporting** 

Quality characteristic	Maximum reporting time allowance	
Los Angeles Rattler loss (max, %)	48 hours	
Percent of crushed particles (min, %)	48 hours	
Flat and elongated particles (max by weight at 3:1, %)	48 hours	
Film stripping (max, %)	48 hours	
Durability (min)	48 hours	
Gradation (percentage passing)	24 hours	
Cleanness value (min)	24 hours	
Asphaltic emulsion spread rate (gal/sq yd)	24 hours	

Within 3 days after taking asphaltic emulsion or asphalt binder quality control samples, submit the authorized laboratory's test results.

37-2.01A(4) Quality Assurance 37-2.01A(4)(a) General Reserved

37-2.01A(4)(b) Quality Control 37-2.01A(4)(b)(i) General

Reserved

## 37-2.01A(4)(b)(ii) Aggregate

All tests must be performed on uncoated aggregate except for film stripping which must be performed on precoated aggregate.

For aggregate, the authorized laboratory must perform sampling and testing at the specified frequency and location for the following quality characteristics:

## **Aggregate Quality Control Requirements**

Quality characteristic	Test method	Minimum sampling and testing frequency	Location of sampling
Los Angeles Rattler loss (max, %) At 100 revolutions At 500 revolutions	California Test 211	1st day of production	See California Test 125
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	AASHTO T 335	1st day of production	See California Test 125
Flat and elongated particles (max by weight at 3:1, %)	ASTM D4791	1st day of production	See California Test 125
Film stripping (max, %)	California Test 302	1st day of production	See California Test 125
Durability (min)	California Test 229	1st day of production	See California Test 125
Gradation (% passing)	California Test 202	2 per day	See California Test 125
Cleanness value (min)	California Test 227	2 per day	See California Test 125

## 37-2.01A(4)(b)(iii) Chip Seals

For a chip seal, the authorized laboratory must perform sampling and testing at the specified frequency and location for the following quality characteristics:

**Chip Seal Quality Control Requirements** 

ompocar quanty control requirements					
Quality characteristic	Test method	Minimum sampling	Location of		
		and testing frequency	sampling		
Asphaltic emulsion binder spread rate	California	1 per day per	Pavement surface		
(gal/sq yd)	Test 339	distributor truck	Pavement Sunace		

## 37-2.01A(4)(c) Department Acceptance

Department Acceptance shall not apply to identified areas where the existing surfacing before application of chip seal, contains defective areas as determined by the Engineer and Contractor. At least 7 days before starting placement of the chip seal, the Contractor shall submit a written list of existing defective areas, identifying the lane direction, lane number, starting and ending highway post mile locations, and defect type. The Engineer must agree on which of the identified areas are defective.

Defective areas are defined as one of the following:

- 1. Areas with wheel path rutting in excess of 3/8 inch when measured by placing a straightedge 12 feet long on the finished surface perpendicular to the center line and measuring the vertical distance between the finished surface and the lower edge of the straightedge
- 2. Areas exhibiting flushing

For a chip seal, acceptance is based on visual inspection for the following:

1. Uniform surface texture

- 2. Raveling, which consists of the separation of the aggregate from the asphaltic emulsion or asphalt binder
- 3. Flushing, which consists of the occurrence of a film of asphaltic material on the surface of the chip seal.
- 4. Streaking, which consists of alternating longitudinal bands of asphaltic emulsion or asphalt binder without uniform aggregate retention, approximately parallel with the lane line.

Areas of raveling, flushing or streaking that are greater than 0.5 sq ft shall be considered defective and must be repaired.

Raveling and streaking must be repaired by placing an additional layer of chip seal over the defective area.

For asphaltic emulsion or asphalt binder, acceptance is based on the Department's sampling and testing for compliance with the requirements for the quality characteristics specified.

For aggregate, acceptance is based on the Department's sampling and testing for compliance with the requirements shown in the following table:

**Chip Seal Aggregate Acceptance Criteria** 

Quality characteristic	Test method	Requirements
Los Angeles Rattler loss (max, %)		
At 100 revolutions	California Test 211	10
At 500 revolutions		40
Percent of crushed particles:	AASHTO T 335	
Coarse aggregate (min, %)		
One-fractured face		95
Two-fractured faces		90
Fine aggregate (min, %)		
(Passing No. 4 sieve and retained on No. 8 sieve)		
One fractured face		70
Flat and elongated particles (max by weight at 3:1, %)	ASTM D4791	10
Film stripping (max, %)	California Test 302	25
Durability (min)	California Test 229	52
Gradation (% passing by weight)	California Test 202	Aggregate Gradation
		table shown under
		Materials for the chip
		seal type specified.
Cleanness value (min)	California Test 227	80

If test results for the aggregate gradation do not comply with specifications, you may remove the chip seal represented by these tests or request that it remain in place with a payment deduction. The deduction is \$1.75 per ton for the aggregate represented by the test results.

If test results for aggregate cleanness value do not comply with the specifications, you may remove the chip seal represented by these tests or you may request that the chip seal remain in place with a pay deduction corresponding to the cleanness value shown in the following table:

**Chip Seal Cleanness Value Deductions** 

Cleanness value	Deduction
80 or over	None
79	\$2.00 /ton
77–78	\$4.00 /ton
75–76	\$6.00 /ton

If the aggregate cleanness value is less than 75, remove the chip seal.

37-2.01B Materials

37-2.01B(1) General

Reserved

## 37-2.01B(2) Asphaltic Emulsions and Asphalt Binders

Reserved

## 37-2.01B(3) Aggregate

## 37-2.01B(3)(a) General

Aggregate must be broken stone, crushed gravel, or both.

Aggregate must comply with the requirements shown in the following table:

**Chip Seal Aggregate Requirements** 

Quality characteristic	Test method	Requirements
Los Angeles Rattler loss (max, %)		
At 100 revolutions	California Test 211	10
At 500 revolutions		40
Percent of crushed particles	AASHTO T 335	
Coarse aggregate (min, %)		
One-fractured face		95
Two-fractured faces		90
Fine aggregate (min, %)		
(Passing No. 4 sieve and retained on No. 8 sieve)		
One fractured face		70
Flat and elongated particles (max by weight at 3:1, %)	ASTM D4791	10
Film stripping (max, %)	California Test 302	25
Durability (min)	California Test 229	52
Gradation (% passing by weight)	California Test 202	Aggregate Gradation
		table shown under
		Materials for the chip
		seal type specified.
Cleanness value (min)	California Test 227	80

The authorized laboratory must conduct the Vialit test using the proposed asphaltic emulsion or asphalt binder and aggregate for compliance with the requirements shown in the following table:

**Chip Retention Requirements** 

Quality characteristic Test method Requ		Requirement	
Chip retention (%)	Vialit test method for aggregate in chip seals, French chip (Modified) <sup>a</sup>	95	

<sup>&</sup>lt;sup>a</sup>The asphaltic emulsion or asphalt binder must be within the field placement temperature range and application rate during specimen preparation. For asphalt binder cure the specimen for first 2 hours at 100 °F.

#### 37-2.01B(3)(b) Precoated Aggregate

Precoating of aggregate must be performed at a central mixing plant. The plant must be authorized under the Caltrans *MPQP*.

When precoating aggregate, do not recombine fine materials collected in dust control systems.

Precoated aggregate 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. The asphalt must be from 0.5 to 1.0 percent by weight of dry aggregate. You determine the exact asphalt rate for precoating of aggregate.

Do not stockpile precoated aggregate.

#### 37-2.01C Construction

#### 37-2.01C(1) General

For chip seals on 2-lane, 2-way roadways, place a W8-7 (LOOSE GRAVEL) sign and a W13-1 (35 mph) plaque at 2,000-foot maximum intervals along each side of the traveled way where aggregate is spread on a traffic lane and at public roads or streets entering the chip seal area. Place the 1st W8-7 sign in each direction where traffic first encounters the loose aggregate, regardless of which lane the aggregate is spread on. A W13-1 (35 mph) plaque is not required where the posted speed limit is less than 40 mph.

For chip seals on freeways, expressways, and multilane conventional highways, place a W8-7, (LOOSE GRAVEL) sign and a W13-1 (35 mph) plaque at 2,000-foot maximum intervals along the outside edge of the traveled way nearest to the lane worked on, at on ramps, and at public roads or streets entering the chip seal area. Place the 1st W8-7 sign where the aggregate starts with respect to the direction of travel on that lane. A W13-1 (35 mph) plaque is not required where the posted speed limit is less than 40 mph.

Pilot cars must have cellular or radio contact with other pilot cars and personnel in the work zone. The maximum speed of the pilot cars convoying or controlling traffic through the traffic control zone must be 15 mph on 2-lane, two-way highways and 25 mph on multilane divided and undivided highways. Pilot cars must only use traffic lanes open to traffic.

On the days that closures are not allowed, you may use a moving closure to maintain the seal coat surface. The moving closure is only allowed during daylight hours when traffic will be the least inconvenienced and delayed. The Engineer determines the hours for the moving closure.

Maintain signs in place at each location until the final sweeping of the chip seal surface for that location is complete. Signs may be set on temporary portable supports with the W13-1 sign below the W8-7 sign or on barricades with the W13-1 sign alternating with the W8-7 sign.

Schedule chip seal activities so that the chip seals are placed on both lanes of the traveled way each work shift.

If traffic is routed over a surface where a chip seal application is intended, the chip seal must not be applied to more than half the width of the traveled way at a time, and the remaining width must be kept free of obstructions and open to traffic until the previously applied width is ready for traffic use.

Wherever maintenance sweeping of the chip seal 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 chip seal work completed that has not received permanent traffic stripes and pavement markings.

#### 37-2.01C(2) Equipment

Equipment for chip seals must include and comply with the following:

- 1. Aggregate haul trucks must have:
  - 1.1. Tailgate that discharges aggregate
  - 1.2. Device to lock onto the rear aggregate spreader hitch
  - 1.3. Dump bed that will not push down on the spreader when fully raised
  - 1.4. Dump bed that will not spill aggregate on the roadway when transferred to the spreader hopper
  - 1.5. Tarpaulin to cover precoated aggregate when haul distance exceeds 30 minutes or ambient temperature is less than 65 degrees F
- 2. Self-propelled aggregate spreaders must have:

- 2.1. Aggregate hopper in the rear
- 2.2. Belt conveyor that carries the aggregate to the front
- 2.3. Spreading hopper capable of providing a uniform aggregate spread rate over the entire width of the traffic lane in 1 application.
- 3. Self-propelled power brooms must:
  - 3.1. Not be steel-tined brooms on emulsion chip seals
  - 3.2. Be capable of removing loose aggregate adjacent to barriers that prevent aggregate from being swept off the roadway, including curbs, gutters, dikes, berms, and railings
- 4. Pneumatic or foam filled rubber tired rollers must:
  - 4.1. Be an oscillating type at least 4 feet wide
  - 4.2. Be self-propelled and reversible
  - 4.3. Have tires of equal size, diameter, type, and ply
  - 4.4. Carry at least 3,000 lbs of load on each wheel
  - 4.5 Have tires with an air pressure of  $100 \pm 5$  psi or be foam filled

## 37-2.01C(3) Surface Preparation

Before applying chip seals, 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 enough control points to relocate the facilities after the application of the chip seal.

Immediately before applying chip seals, clean the surface to receive a chip seal by removing any extraneous material affecting adhesion of the chip seal with the existing surface and drying. Use self-propelled power brooms to clean the existing pavement.

#### 37-2.01C(4) Placement

## 37-2.01C(4)(a) General

Schedule the operations so that chip seals are placed on both lanes of the traveled way each work shift. At the end of the work shift, the end of the chip seals on both lanes must generally match.

#### 37-2.01C(4)(b) Applying Asphaltic Emulsions or Asphalt Binders

Prevent spraying on existing pavement not intended for chip seals or on previously applied chip seals using a material such as building paper. Remove the material after use.

Align longitudinal joints between chip seal applications with designated traffic lanes.

For asphaltic emulsion or asphalt binder, 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:

- 1. Asphaltic emulsions by hand spraying
- 2. Asphalt binders with a squeegee or other authorized means

You may overlap the asphaltic emulsion or asphalt binder applications before the application of aggregate at longitudinal joints.

Do not apply the asphaltic emulsion or asphalt binder unless there is sufficient aggregate at the job site to cover the asphaltic emulsion or asphalt binder.

Discontinue application of asphaltic emulsion or asphalt binder early enough to comply with lane closure requirements. Apply to 1 lane at a time and cover the lane width entirely in 1 operation.

## 37-2.01C(4)(c) Spreading Aggregates

## 37-2.01C(4)(c)(i) General

Prevent vehicles from driving on asphaltic emulsion or asphalt binder before spreading aggregate.

Spread aggregate within 10 percent of your determined rate.

Spread aggregate at a uniform rate over the full lane width in 1 application. Apply to 1 lane at a time.

Sweep excess aggregate at joints before spreading adjacent aggregate.

Operate the spreader at speeds slow enough to prevent aggregate from rolling over after dropping.

If the spreader is not moving, aggregate must not drop. If you stop spreading and aggregate drops, remove the excess aggregate before resuming activities.

## 37-2.01C(4)(c)(ii) Precoated Aggregate Application

During transit, cover precoated aggregate with tarpaulins if the ambient air temperature is below 65 degrees F or the haul time exceeds 30 minutes.

When applied, precoated aggregate must be from 225 to 325 degrees F.

#### 37-2.01C(4)(d) Finishing

## 37-2.01C(4)(d)(i) General

Remove piles, ridges, or unevenly distributed aggregate. Repair permanent ridges, bumps, streaks or depressions in the finished surface. Spread additional aggregate and roll if aggregate is picked up by rollers or vehicles.

Chip seal joints between adjacent applications of a chip seal must be smooth, straight, uniform, and completely covered.

A coverage is 1 roller movement over the entire width of lane. A pass is 1 roller movement parallel to the chip seal 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 new coverage until completing the previous coverage.

Before opening to traffic, finish the chip seals in the following sequence:

- 1. Perform initial rolling consisting of 1 coverage with a pneumatic-tired roller
- 2. Perform final rolling consisting of 2 coverages with a pneumatic-tired roller
- 3. Sweep excess aggregate from the roadway and adjacent abutting areas
- 4. Apply a flush coat if specified
- 5. Remove covers from the facilities

## 37-2.01C(4)(d)(ii) Traffic Control With Pilot Car

For 2-lane 2-way roadways under 1-way traffic control, upon completion of final rolling, traffic must be controlled with pilot cars and routed over the new chip seal for a period of 2 to 4 hours before opening the lane to traffic not controlled with pilot cars.

For multilane roadways, when traffic is controlled with pilot cars, a maximum of 1 lane in the direction of travel must be open to traffic. Traffic must be controlled with pilot cars and be routed on the new chip seal surface of the lane for a minimum of 2 hours after completion of the initial sweeping and before opening the lane to traffic not controlled with pilot cars. Once traffic controlled with pilot cars is routed over the chip seal at a particular location, continuous control must be maintained at that location until the chip seal placement and sweeping on adjacent lanes to receive a chip seal is completed.

#### 37-2.01C(4)(d)(iii) Sweeping

Sweeping must be performed after the chip seal has set and there is no damage or dislodging of aggregate from the chip seal surface. As a minimum, sweeping is 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 chip seal
- 2. On multilane roadways, from 2 to 4 hours after aggregate have been placed
- 3. In addition to previous sweeping, perform final sweeping immediately before opening any lane to public traffic, not controlled with pilot cars

## 37-2.01C(4)(d)(iv) Excess Aggregate

Dispose of excess aggregate. If ordered, salvaging and stockpiling of excess aggregate is change order work.

## 37-2.01C(4)(e) Chip Seal Maintenance

Perform sweeping on the morning following the application of aggregate on any lane that has been open to traffic not controlled with pilot cars and before starting any other activities.

Chip seal surfaces must be maintained for 4 consecutive days from the day aggregate is applied. Maintenance must include sweeping to maintain a surface free of loose aggregate and to prevent formation of corrugations. Sweeping must not dislodge aggregate set in asphaltic emulsion or asphalt binder

After 4 consecutive days, excess aggregate must be removed from the paved areas.

## 37-2.01D Payment

If there is no bid item for traffic control system, furnishing and using a pilot car is included in the various items of the work involved in applying the chip seal.

The payment quantity for precoated aggregate is the weight measured after the aggregate is preheated and precoated with asphalt binder.

If recorded batch weights are printed automatically, the payment quantity for aggregate is the weight determined from the printed batch weights if:

- 1. Total weight for the precoated aggregate per batch is printed
- 2. Total asphalt binder weight per batch is printed
- Zero tolerance weight is printed before weighing the first batch and after weighing the last batch for each truckload
- 4. Time, date, mix number, load number, and truck identification are correlated with a load slip
- 5. Copy of the recorded batch weights is certified by a licensed weighmaster

#### 37-2.02 ASPHALTIC EMULSION CHIP SEALS

## 37-2.02A General

## 37-2.02A(1) Summary

Section 37-2.02 includes specifications for applying asphaltic emulsion chip seals. An asphaltic emulsion chip seal includes applying an asphaltic emulsion, followed by aggregate, and then a flush coat.

A double asphaltic emulsion chip seal is the application of an asphaltic emulsion followed by aggregate, applied twice in sequence and then a flush coat.

#### 37-2.02A(2) Definitions

Reserved

#### 37-2.02A(3) Submittals

Immediately after sampling, submit two 1-quart plastic containers of asphaltic emulsion taken in the presence of the Engineer. Samples must be submitted in insulated shipping container.

37-2.02A(4) Quality Assurance 37-2.02A(4)(a) General

Reserved

37-2.02A(4)(b) Quality Control 37-2.02A(4)(b)(i) General

Reserved

## 37-2.02A(4)(b)(ii) Asphaltic Emulsions

Circulate 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. In the presence of the Engineer, take two 1-quart samples in a plastic container with lined sealed lid for acceptance testing.

For asphaltic emulsion, the authorized laboratory must perform quality control sampling and testing at the specified frequency and location for the following quality characteristics:

**Asphaltic Emulsion** 

Quality characteristic	Test method	Minimum sampling and testing frequency	Sampling location
Saybolt Furol Viscosity, at 25 °C (Saybolt Furol seconds) Sieve Test (%) Storage stability, 1 day (%) Residue by distillation (%) Particle charge <sup>a</sup>	AASHTO T 59	Minimum 1 per day per delivery truck	Distributor truck
Tests on Residue from Distillation Test:			
Penetration, 25 °C	AASHTO T 49	Minimum 1 per dev per	
Ductility	AASHTO T 51	Minimum 1 per day per delivery truck	Distributor truck
Solubility in trichloroethylene	AASHTO T 44	delivery truck	

<sup>&</sup>lt;sup>a</sup>If the result of the particle charge is inconclusive, the asphaltic emulsion must be tested for pH under ASTM E70. Grade QS1h asphaltic emulsion must have a minimum pH of 7.3. Grade CQS1h asphaltic emulsion must have a maximum pH of 6.7.

## 37-2.02A(4)(c) Department Acceptance

Aggregate acceptance is based on the Department's sampling and testing for compliance with the requirements shown in the following table:

## **Aggregate Gradation Acceptance Criteria**

Quality characteristic	Test method	Requirement		
Gradation (% passing by weight) Sieve size:		3/8"	5/16"	1/4"
3/4"				
1/2"	California Test 202	100		
3/8"		85–100	100	100
No. 4		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

37-2.02B Materials

37-2.02B(1) General

Reserved

### 37-2.02B(2) Asphaltic Emulsions

Reserved

## 37-2.02B(3) Aggregate

Aggregate gradation for an asphaltic emulsion chip seal must comply with the requirements shown in the following table:

**Asphaltic Emulsion Chip Seal Aggregate Gradation** 

Quality characteristic	Test method		equirement	
Gradation (% passing by weight) Sieve size:		3/8"	5/16"	1/4"
3/4"				
1/2"		100	-	
3/8"	California Test	85–100	100	100
No. 4	202	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

37-2.02C Construction 37-2.02C(1) General

Reserved

## 37-2.02C(2) Asphaltic Emulsions

Asphaltic emulsions must be applied within the application rate ranges shown in the following table:

**Asphaltic Emulsion Application Rates** 

Aggregate gradation	Application rate range
	(gal/sq yd)
3/8"	0.30-0.45
5/16"	0.25-0.35
1/4"	0.20-0.30

For double asphaltic emulsion chip seals, the asphaltic emulsions must be applied within the application rates shown in the following table:

**Asphaltic Emulsion Application Rates** 

Double chip seals	Application rate range	
	(gal/sq yd)	
1st application	0.30-0.45	
2nd application	0.20-0.30	

When applied, the temperature of the asphaltic emulsions must be from 130 to 180 degrees F.

Apply asphaltic emulsions 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 emulsions when weather forecasts predict the ambient air temperature will fall below 39 degrees F within 24 hours after application.

## 37-2.02C(3) Spreading Aggregates

Aggregate must be spread within the spread rate ranges shown in the following table:

**Aggregate Spread Rates** 

Aggregate gradation	Spread rate range
	(lb/sq yd)
3/8"	20–30
5/16"	16–25
1/4"	12–20

For double asphaltic emulsion chip seals, aggregate must be spread within the spread rate ranges shown in the following table:

**Aggregate Spread Rates** 

Double chip seal	Spread rate range (lb/sq yd)
1st application 2nd application	23–30 12–20

Remove excess aggregate on the 1st application before the 2nd application of asphaltic emulsion.

You may stockpile aggregate for asphaltic emulsion chip seals if you prevent contamination. Aggregate must have a damp surface at spreading. If water visibly separates from the aggregate, do not spread. You may re-dampen aggregate in the delivery vehicle.

Spread aggregate before an asphaltic emulsion sets or breaks.

Do not spread aggregate more than 2,500 feet ahead of the completed initial rolling.

#### 37-2.02D Payment

Not Used

#### 37-2.03 POLYMER MODIFIED ASPHALTIC EMULSION CHIP SEALS

#### 37-2.03A General

## 37-2.03A(1) Summary

Section 37-2.03 includes specifications for applying polymer modified asphaltic emulsion chip seals. A polymer modified asphaltic emulsion chip seal includes applying a polymer modified asphaltic emulsion, followed by aggregate, and then a flush coat.

A double polymer modified asphaltic emulsion chip seal is the application of a polymer modified asphaltic emulsion followed by aggregate, applied twice in sequence and then a flush coat.

#### 37-2.03A(2) Definitions

Reserved

## 37-2.03A(3) Submittals

Immediately after sampling, submit two 1-quart cans of polymer modified asphaltic emulsion taken in the presence of the Engineer. A sample must be submitted in an insulated shipping container.

## 37-2.03A(4) Quality Assurance

37-2.03A(4)(a) General

Reserved

37-2.03A(4)(b) Quality Control

37-2.03A(4)(b)(i) General

Reserved

## 37-2.03A(4)(b)(ii) Polymer Modified Asphaltic Emulsions

Circulate polymer modified asphaltic emulsions 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. In the presence of the Engineer, take two 1-quart samples for acceptance testing.

For polymer modified asphaltic emulsions, the authorized laboratory must perform quality control sampling and testing at the specified frequency and location for the following quality characteristics:

**Polymer Modified Asphaltic Emulsion** 

Polymer Wodined Asphaluc Emulsion					
Quality characteristic	Test method	Minimum sampling and testing frequency	Sampling location		
Saybolt Furol Viscosity, at 50 °C (Saybolt Furol seconds)					
Settlement, 5 days (max, %)					
Storage stability test, 1 day (max, %)	AASHTO T 59	Minimum 1	Distributor		
Sieve test (max, %)		per day per	Distributor		
Demulsibility (min, %)		delivery truck	truck		
Particle charge					
Ash content (max, %)	ASTM D3723				
Residue by evaporation (min, %)	California Test 331				
Tests on residue from evaporation test:	Tests on residue from evaporation test:				
Penetration, 25 °C	AASHTO T 49				
Penetration, 4 °C, 200g for 60 seconds	AASHTO T 49	Minimum 1	Distributor		
Ductility, 25 °C (min, mm)	AASHTO T 51	per day per	truck		
Torsional recovery (min, %)	California Test 332	delivery truck	HUCK		
Ring and Ball Softening Point (min, °F)	AASHTO T 53				

## 37-2.03A(4)(c) Department Acceptance

Aggregate acceptance is based on the Department's sampling and testing for compliance with the requirements shown in the following table:

**Aggregate Gradation Acceptance Criteria** 

, (99.094)	riggiogato Gradation ricooptanoo Gritoria				
Quality characteristic	Test method	Requirement			
Gradation (% passing by weight) Sieve size:		3/8"	5/16"	1/4"	
3/4"					
1/2"		100			
3/8"	California Test	85–100	100	100	
No. 4	202	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	

37-2.03B Materials

37-2.03B(1) General

Reserved

#### 37-2.03B(2) Polymer Modified Asphaltic Emulsions

A polymer modified asphaltic emulsion must include elastomeric polymer.

A polymer modified asphaltic emulsion must be Grade PMRS2, PMRS2h, PMCRS2, or PMCRS2h. Polymer content in percent by weight does not apply.

A polymer modified asphaltic emulsion must comply with section 94 and the quality characteristic requirements in the following table:

**Polymeric Asphaltic Emulsion** 

Quality characteristic	Test method	Requirement
Penetration, 4 °C, 200g for 60 seconds (min)	AASHTO T 49	6
Ring and Ball Softening Point (min, °F)	AASHTO T 53	135

## 37-2.03B(3) Aggregate

The aggregate gradation for a polymer modified asphaltic emulsion chip seal must comply with the requirements shown in the following table:

**Asphaltic Emulsion Chip Seal Aggregate Gradation** 

Quality characteristic	Test method	Requirement		
Gradation (% passing by weight) Sieve Size		3/8"	5/16"	1/4"
3/4"				
1/2"	California Toot	100		
3/8"	California Test 202	85–100	100	100
No. 4	202	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

#### 37-2.03C Construction

Polymer modified asphaltic emulsions must be applied within the application rate ranges shown in the following table:

**Polymer Modified Asphaltic Emulsion Application Rates** 

Aggregate gradation	Application rate range (gal/sq yd)
3/8"	0.30-0.45
5/16"	0.25-0.35
1/4"	0.20-0.30

For double polymer modified asphaltic emulsion chip seals, polymer modified asphaltic emulsions must be applied within the application rates shown in the following table:

**Polymer Modified Asphaltic Emulsion Application Rates** 

Double application	Application rate range
	(gal/sq yd)
1st application	0.30-0.45
2nd application	0.20-0.30

Apply polymer modified asphaltic emulsions when the ambient air temperature is from 60 to 105 degrees F and the pavement surface temperature is at least 80 degrees F.

Do not apply polymer modified asphaltic emulsions when weather forecasts predict the ambient air temperature will fall below 39 degrees F within 24 hours after application.

Aggregate must be spread within the spread rate ranges shown in the following table:

**Aggregate Spread Rates** 

Chip seal type	Spread rate range (lb/sq yd)
3/8"	20–30
5/16"	16–25
1/4"	12–20

For double chip seals, aggregate must be spread within spread rate ranges shown in the following table:

**Aggregate Spread Rates** 

Double application	Spread rate range
	(lb/sq yd)
1st application	23–30
2nd application	12–20

Remove excess aggregate on the 1st application before the 2nd application of asphaltic emulsion.

You may stockpile aggregate for the polymer modified asphaltic emulsion chip seals if you prevent contamination. Aggregate must have damp surfaces at spreading. If water visibly separates from the aggregate, do not spread. You may redampen aggregate in the delivery vehicle.

Spread aggregate before the polymer modified asphaltic emulsion sets or breaks.

Do not spread aggregate more than 2,500 feet ahead of the completed initial rolling.

#### 37-2.03D Payment

Not Used

#### 37-2.04 ASPHALT RUBBER BINDER CHIP SEALS

#### 37-2.04A General

#### 37-2.04A(1) Summary

Section 37-2.04 includes specifications for applying asphalt rubber binder chip seals.

An asphalt rubber binder chip seal consists of applying asphalt rubber binder followed by heated aggregate precoated with asphalt binder followed by a flush coat.

#### 37-2.04A(2) Definitions

**crumb rubber modifier:** Combination of ground or granulated high natural scrap tire crumb rubber and scrap tire crumb rubber derived from waste tires described in Pub Res Code § 42703.

**descending viscosity reading:** Subsequent viscosity reading at least 5 percent lower than the previous viscosity reading.

high natural scrap tire crumb rubber: Material containing 40 to 48 percent natural rubber.

scrap tire crumb rubber: Any combination of vehicle tires or tire buffing.

## 37-2.04A(3) Submittals

At least 5 business days before use, submit the permit issued by the local air district for asphalt rubber binder field blending equipment and application equipment. If an air quality permit is not required by the local air district for producing asphalt rubber binder, submit verification from the local air district that an air quality permit is not required.

For each delivery of asphalt rubber binder ingredients to the job site, submit a certificate of compliance with a copy of the specified test results.

Submit a certified volume or weight slip for each delivery of asphalt rubber binder ingredients and asphalt rubber binder.

Submit a SDS for each asphalt rubber binder ingredient and the asphalt rubber binder.

At least 15 days before use, submit:

- 1. Samples of each asphalt rubber binder ingredient:
  - 1.1. 2 lbs of scrap tire crumb rubber
  - 1.2. 2 lbs of high natural scrap tire crumb rubber
  - 1.3. Two 1-quart cans of base asphalt binder
  - 1.4. Two 1-quart cans of asphalt modifier
- 2. Asphalt rubber binder formulation and data as follows:
  - 2.1. For asphalt modifier, include:
    - 2.1.1. Source of asphalt modifier
    - 2.1.2. Type of asphalt modifier
    - 2.1.3. Percentage of asphalt modifier by weight of asphalt binder
    - 2.1.4. Percentage of combined asphalt binder and asphalt modifier by weight of asphalt rubber binder
    - 2.1.5. Test results for the specified quality characteristics
  - 2.2. For crumb rubber modifier, include:
    - 2.2.1. Each source and type of scrap tire crumb rubber and high natural scrap tire crumb rubber
    - 2.2.2. Percentage of scrap tire crumb rubber and high natural scrap tire crumb rubber by total weight of asphalt rubber binder
    - 2.2.3. Test results for the specified quality characteristics
  - 2.3. For asphalt rubber binder, include minimum reaction time and temperature

Immediately after sampling, submit five 1-quart cans of asphalt rubber binder taken in the presence of the Engineer. Sample must be submitted in insulated shipping containers.

Submit notification 15 minutes before each viscosity test or submit a schedule of testing times.

Submit the log of asphalt rubber binder descending viscosity test results within 1 business day after sampling.

Submit asphalt rubber binder quality control viscosity test results within 1 business day after sampling.

## 37-2.04A(4) Quality Assurance

#### 37-2.04A(4)(a) General

The equipment used in producing asphalt rubber binder and the equipment used in spreading asphalt rubber binder must be permitted for use or exempted by the local air district.

## 37-2.04A(4)(b) Quality Control

## 37-2.04A(4)(b)(i) General

Reserved

## 37-2.04A(4)(b)(ii) Asphalt Modifiers

For asphalt modifiers, the authorized laboratory must perform quality control sampling and testing at the specified frequency for the following quality characteristics:

**Asphalt Modifier for Asphalt Rubber Binder** 

Quality characteristic	Test method	Frequency	
Viscosity	ASTM D445	1 per shipment	
Flash point	ASTM D92		
Molecular Analysis:			
Asphaltenes	ASTM D2007	1 per shipment	
Aromatics	ASTM D2007		

## 37-2.04A(4)(b)(iii) Crumb Rubber Modifiers

Sample and test scrap tire crumb rubber and high natural scrap tire crumb rubber separately.

Perform quality control sampling and testing at the specified frequency for the following quality characteristics:

#### **Crumb Rubber Modifier**

Quality characteristic	Test method	Frequency
Scrap tire crumb rubber gradation	California Test 385	1 per 10,000
High natural scrap tire crumb rubber gradation	California Test 385	1 per 3,400 lb
Wire in CRM	California Test 385	
Fabric in CRM	California Test 385	1 per 10,000 lb
CRM particle length		i pei 10,000 ib
CRM specific gravity	California Test 208	
Natural rubber content in high natural scrap tire crumb rubber	ASTM D297	1 per 3,400 lb

## 37-2.04A(4)(b)(iv) Asphalt Rubber Binders

For asphalt rubber binders, the authorized laboratory must perform quality control sampling and testing at the specified frequency and location for the following quality characteristics:

## **Asphalt Rubber Binder Quality Control Requirements**

Quality characteristic	Test method	Sampling location	Frequency
Descending viscosity <sup>a</sup> at 375 °F (Pa•s x 10 <sup>-3</sup> )	ASTM D7741	Reaction vessel	1 per lot <sup>b</sup>
Viscosity at 375 °F (Pa•s x 10 <sup>-3</sup> )	ASTM D7741	Distribution truck	15 minutes before use per lot <sup>b</sup>
Cone penetration at 25 °C (0.10 mm)	ASTM D217		
Resilience at 25 °C (% rebound)	ASTM D5329	Distribution truck	1 per lot <sup>b</sup>
Softening point (°C)	ASTM D36		

<sup>&</sup>lt;sup>a</sup>Start taking viscosity readings 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 complies with the specification requirement.

Retain samples from each lot. Test samples for cone penetration, resilience, and softening point for the first 3 lots and if all 3 lots pass, the testing frequency may be reduced to once for every 3 lots.

If QC test results indicate that the asphalt rubber binder does not comply with the specifications, take corrective action and notify the Engineer.

37-2.04A(4)(c) Department Acceptance 37-2.04A(4)(c)(i) General

Reserved

<sup>&</sup>lt;sup>b</sup>A lot is defined in the *MPQP*.

## 37-2.04A(4)(c)(ii) Asphalt Modifiers

The Department accepts asphalt modifier based on compliance with the requirements shown in the following table:

**Asphalt Modifier for Asphalt Rubber Binder** 

Quality characteristic	Test method	Requirement
Viscosity at 100 °C (m <sup>2</sup> /s x 10 <sup>-6</sup> )	ASTM D445	X ± 3 <sup>a</sup>
Flash point (min, °C)	ASTM D92	207
Molecular Analysis:		
Asphaltenes (max, % by mass)	ASTM D2007	0.1
Aromatics (min, % by mass)	ASTM D2007	55

<sup>&</sup>lt;sup>a</sup>The symbol "X" is the asphalt modifier viscosity.

## 37-2.04A(4)(c)(iii) Crumb Rubber Modifiers

Scrap tire CRM and high natural CRM are sampled and tested separately.

The Department accepts scrap tire CRM and high natural CRM based on compliance with the requirements shown in the following table:

**Crumb Rubber Modifier for Asphalt Rubber Binder** 

Quality characteristic	Test method	Requirement
Wire in CRM (max, %)	California Test 385	0.01
Fabric in CRM (max, %)	California Test 385	0.05
CRM particle length (max, in)		3/16
CRM specific gravity	California Test 208	1.1–1.2
Natural rubber content in high natural CRM (%)	ASTM D297	40.0-48.0

The Department accepts CRM gradation based on the requirements shown in the following table:

## **Crumb Rubber Modifier Gradation Requirements**

Quality characteristic	Test method	Requirement			
Gradation (% passing by weight)		Scrap tire crumb rubber			ral scrap tire o rubber
Sieve size:		Operating	Contract	Operating	Contract
		range	complianc	range	compliance
			е		
No. 8	California	100	100		
No. 10	Test 385	95–100	90–100	100	100
No. 16		35–85	32–88	92–100	85–100
No. 30		2–25	1–30	25–95	20–98
No. 50		0–10	0–15	6–35	2–40
No. 100		0–5	0–10	0–7	0–10
No. 200		0–2	0–5	0–3	0–5

If a test result for CRM gradation does not comply with the specifications, the Department deducts the corresponding amount for each gradation test as shown in the following table:

Material	Gradation test result <sup>a</sup>	Deduction
Scrap tire crumb rubber	Operating range < TR < Contract compliance	\$250
Scrap tire crumb rubber	TR > Contract compliance	\$1,100
High natural scrap tire crumb rubber	Operating range < TR < Contract compliance	\$250
High natural scrap tire crumb rubber	TR > Contract compliance	\$600

aTest Result = TR

Each gradation test for scrap tire crumb rubber represents 10,000 lb or the quantity used in that day's production, whichever is less.

Each gradation test for high natural scrap tire crumb rubber represents 3,400 lb or the quantity used in that day's production, whichever is less.

## 37-2.04A(4)(c)(iv) Asphalt Rubber Binders

For Department acceptance testing, take a sample of asphalt rubber binder in the Engineer's presence every 5 lots or once a day, whichever is greater. Each sample must be in five 1-quart cans with an open top and friction lid.

For an asphalt rubber binder, acceptance is based on the Department's sampling and testing for compliance with the requirements shown in the following table:

## **Asphalt Rubber Binder**

Quality characteristic	Test method	Requirement
Cone penetration at 25 °C (0.10 mm)	ASTM D217	25–60
Resilience at 25 °C (% rebound)	ASTM D5329	18–50
Softening point (°C)	ASTM D36	55–88
Viscosity at 375 °F (Pa•s x 10 <sup>-3</sup> ) <sup>a</sup>	ASTM D7741	1,500–2,500

<sup>&</sup>lt;sup>a</sup>Prepare sample for viscosity test under California Test 388.

## 37-2.04A(4)(c)(v) Precoated Aggregate

The Department accepts precoated aggregate based on compliance with the requirements shown in the following table:

**Precoated Aggregate Gradation Acceptance Criteria** 

Quality Characteristic	Test method	Requirement
1/2" gradation (% passing by weight)	California Test 202	
Sieve size:		
3/4"		100
1/2"		85–90
3/8"		0–30
No. 4		0–5
No. 8		
No. 200		0–1
3/8" gradation (% passing by weight)	California Test 202	
Sieve size:		
3/4"		100
1/2"		95–100
3/8"		70–85
No. 4		0–15
No. 8		0–5
No. 200		0–1

## 37-2.04B Materials

## 37-2.04B(1) General

Reserved

## 37-2.04B(2) Asphalt Binders

Asphalt binder used as the base binder for asphalt rubber binder must comply with the specifications for asphalt binder. Do not modify asphalt binder with polymer.

## 37-2.04B(3) Asphalt Modifiers

An asphalt modifier must be a resinous, high flash point, and aromatic hydrocarbon. An asphalt modifier must comply with the requirements shown in the following table:

**Asphalt Modifier for Asphalt Rubber Binder** 

Quality characteristic	Test method	Requirement
Viscosity at 100 °C (m <sup>2</sup> /s x 10 <sup>-6</sup> )	ASTM D445	X ± 3 <sup>a</sup>
Flash point (min, CL.O.C., °C)	ASTM D92	207
Molecular analysis:		
Asphaltenes by mass (max, %)	ASTM D2007	0.1
Aromatics by mass (min, %)	ASTM D2007	55

<sup>&</sup>lt;sup>a</sup>X denotes the proposed asphalt modifier viscosity from 19 to 36. A change in X requires a new asphalt rubber binder submittal.

## 37-2.04B(4) Crumb Rubber Modifiers

The CRM to be used must be on the Authorized Materials List for crumb rubber modifier.

The CRM must be ground or granulated at ambient temperature.

Scrap tire crumb rubber and high natural scrap tire 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 CRM particles must be large enough to be ground or granulated.

The CRM must be dry, free-flowing particles that do not stick together. A maximum of 3 percent calcium carbonate or talc by weight of CRM may be added. The CRM must not cause foaming when combined with the asphalt binder and asphalt modifier.

The CRM must comply with the requirements shown in the following table:

**Crumb Rubber Modifier for Asphalt Rubber Binder** 

Quality characteristic	Test method	Requirement
Wire in CRM (max, %)	California Test 385	0.01
Fabric in CRM (max, %)	California Test 385	0.05
CRM particle length (max, in)		3/16
CRM specific gravity	California Test 208	1.1–1.2

The CRM must comply with the requirements shown in the following table:

**Crumb Rubber Modifier Requirements** 

		Require	ement
Quality characteristic	Test method	Scrap tire crumb rubber	High natural scrap
			tire crumb rubber
Acetone extract (%)		6.0–16.0	4.0–16.0
Rubber hydrocarbon (min, %)		42.0–65.0	50.0
Natural rubber content (%)	ASTM D297	22.0–39.0	40.0–48.0
Carbon black content (%)		28.0–38.0	
Ash content (max, %)		8.0	

Scrap tire crumb rubber gradation must comply with the gradation requirements shown in the following table:

**Scrap Tire Crumb Rubber Gradation** 

Quality characteristic	Test method	Requirement		
Gradation (% passing by weight) Sieve size:		Gradation limit	Operating range	Contract compliance
No. 8		100	100	100
No. 10	California	98–100	95–100	90–100
No. 16	Test 385	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 scrap tire crumb rubber gradation must comply with the gradation requirements shown in the following table:

**High Natural Scrap Tire Crumb Rubber Gradation** 

Quality characteristic	Test		Requirement		
	method				
Gradation (% passing by weight) Sieve size:		Gradation limit	Operating range	Contract compliance	
No. 10	0-1:4	100	100	100	
No. 16	California Test 385	95–100	92–100	85–100	
No. 30	1681 303	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	

## 37-2.04B(5) Asphalt Rubber Binders

An 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 Caltrans MPQP.

The blending equipment must allow the determination of weight percentages of each asphalt rubber binder ingredient.

An asphalt rubber binder must be  $79 \pm 1$  percent by weight asphalt binder and  $21 \pm 1$  percent by weight of CRM. The minimum percentage of CRM must be 20.0 percent and lower values must not be rounded up.

The CRM must be  $75 \pm 2$  percent by weight scrap tire crumb rubber and  $25 \pm 2$  percent by weight high natural scrap tire crumb rubber.

An asphalt modifier and asphalt binder must be blended at the production site. An 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 before adding CRM, the asphalt binder must be from 375 to 440 degrees F when an asphalt modifier is added and the mixture must circulate for at least 20 minutes. An asphalt binder, asphalt modifier, and CRM may be proportioned and combined simultaneously.

The blend of an asphalt binder and an asphalt modifier must be combined with the CRM at the asphalt rubber binder production site. The asphalt binder and asphalt modifier blend must be from 375 to 440 degrees F when the CRM 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 comply with the requirements shown in the following table:

#### **Asphalt Rubber Binder**

Quality characteristic	Test method	Requirement
Cone penetration at 25 °C (0.10 mm)	ASTM D217	25–60
Resilience at 25 °C (% rebound)	ASTM D5329	18–50
Softening point (°C)	ASTM D36	55–88
Viscosity at 375 °F (Pa•s x 10 <sup>-3</sup> ) <sup>a</sup>	ASTM D7741	1,500-2,500

<sup>&</sup>lt;sup>a</sup>Prepare sample for viscosity test under California Test 388.

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, the asphalt rubber binder must be from 375 to 415 degrees F before use.

During reheating, you may add CRM. The CRM must not exceed 10 percent by weight of the asphalt rubber binder. Allow added CRM to react for at least 45 minutes. Reheated asphalt rubber binder must comply with the specifications for asphalt rubber binder.

## 37-2.04B(6) Precoated Aggregate

Before precoating with asphalt binder, aggregate for an asphalt rubber binder chip seal must comply with the gradation requirements shown in the following table:

## **Asphalt Rubber Binder Chip Seal Aggregate Gradation**

Quality characteristic	Test method	Requi	rement
Gradation (% passing by weight) Sieve size:		1/2"	3/8"
3/4"		100	100
1/2"	California Test	85–90	95–100
3/8"	202	0–30	70–85
No. 4		0–5	0–15
No. 8			0–5
No. 200		0–1	0–1

## 37-2.04C Construction

## 37-2.04C(1) General

Reserved

## 37-2.04C(2) Equipment

Distributor trucks must be equipped with:

- 1. Mixing and heating unit
- 2. Observation platform on the rear of the truck for an observer on the platform to see the nozzles and unplug them if needed

#### 37-2.04C(3) Asphalt Rubber Binder Application

Apply the asphalt rubber binder when the ambient temperature is from 60 to 105 degrees F and the pavement surface temperature is at least 55 degrees F.

Do not apply the asphalt rubber binder unless enough aggregate is available at the job site 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 pavement is damp or during high wind conditions. If authorized, you may adjust the distributor bar height and distribution speed and use shielding equipment during high wind conditions.

When applied, the temperature of the asphalt rubber binder must be from 385 to 415 degrees F.

Apply the asphalt rubber binder at a rate from 0.55 to 0.65 gal/sq yd. You may reduce the application rate by 0.050 gal/sq yd in the wheel paths.

## 37-2.04C(4) Precoated Aggregate Spreading

Spread aggregate at a rate from 28 to 40 lb/sq yd. Do not spread aggregate more than 200 feet ahead of the completed initial rolling.

#### 37-2.04C(5) Rolling and Sweeping

Perform initial rolling within 90 seconds of spreading aggregate. If authorized for final rolling, you may use a steel-wheeled roller weighing from 8 to 10 tons in static mode only.

Perform a final sweeping before Contract acceptance. The final sweeping must not dislodge aggregate.

#### 37-2.04D Payment

Asphalt rubber binder is measured as specified for asphalt binder.

#### 37-2.05 STRESS ABSORBING MEMBRANE INTERLAYERS

#### 37-2.05A General

Section 37-2.05 includes specifications for placing stress absorbing membrane interlayers (SAMI).

Comply with section 37-2.04 except a flush coat is not required.

Traffic must not be allowed on a SAMI.

#### 37-2.05B Materials

For a SAMI, aggregate must comply with the 3/8-inch gradation.

#### 37-2.05C Construction

If a SAMI is overlaid in the same work shift, section 37-2.01C(4)(e) does not apply.

Final sweeping is not required for a SAMI.

#### 37-2.05D Payment

Not Used

#### 37-2.06 MODIFIED ASPHALT BINDER CHIP SEALS

Reserved

#### **37-2.07 SCRUB SEALS**

Reserved

#### 37-3 SLURRY SEALS AND MICRO-SURFACINGS

#### 37-3.01 GENERAL

#### **37-3.01A General**

## 37-3.01A(1) Summary

Section 37-3.01 includes general specifications for applying slurry seals and micro-surfacings.

## 37-3.01A(2) Definitions

Reserved

#### 37-3.01A(3) Submittals

At least 15 days before starting placement of a slurry seal or micro-surfacing, submit:

- 1. Samples for:
  - 1.1. Asphaltic emulsion slurry seal, two 1-quart wide mouth plastic containers with screw top lid of asphaltic emulsion
  - 1.2 Polymer modified asphaltic emulsion slurry seal, two 1-quart wide mouth plastic containers with screw top lid of polymer modified asphaltic emulsion
  - 1.3. Micro-surfacing, two 1-quart wide mouth plastic containers with screw top lid of micro-surfacing emulsion
- Asphaltic emulsion, polymer modified asphaltic emulsion, or micro-surfacing emulsion data as follows:
  - 2.1. Supplier and Type/Grade of asphaltic emulsion
  - 2.2. Type of modifier polymer for polymer modified asphaltic emulsion or micro-surfacing emulsion
  - 2.3. Copy of the specified test results for asphaltic emulsion, polymer modified asphaltic emulsion, or micro-surfacing emulsion
- 3. 50 lb of aggregate
- 4. Aggregate test results for the followings:
  - 4.1. Gradation
  - 4.2. Los Angeles Rattler
  - 4.3. Percent of crushed particles
  - 4.4 Sand equivalent
  - 4.5 Durability

At least 10 days before starting placement of a slurry seal or micro-surfacing, submit a laboratory report of test results and the proposed mix design from an authorized laboratory. The authorized laboratory must sign the laboratory report and mix design.

The report must include:

- 1. Test results used in the mix design compared with specification requirements
- 2. Proportions based on the dry weight of aggregate, including ranges, for:
  - 2.1. Aggregate
  - 2.2. Water
  - 2.3. Additives
  - 2.4. Mineral filler
  - 2.5. Slurry seal emulsion or micro-surfacing emulsion residual asphalt content
- 3. Recommended changes to the proportions based on heating the mixture to 100 degrees F and mixing for 60 seconds, if atmospheric temperatures during application will be 90 degrees F or above, for:
  - 3.1. Water
  - 3.2. Additives
  - 3.3. Mineral filler
- 4. Quantitative moisture effects on the aggregate's unit weight determined under ASTM C29M

If the mix design consists of the same materials covered by a previous laboratory report, you may submit the previous laboratory report that must include material testing data performed within the previous 12 months for authorization.

If you change any of the materials in the mix design, submit a new mix design and laboratory report at least 10 days before starting slurry seal or micro-surfacing work.

Submit a certificate of compliance as specified for asphaltic emulsion in section 94-1.01C with each shipment of asphaltic emulsion, polymer modified asphaltic emulsion or micro-surfacing emulsion.

Submit quality control test results for the quality characteristics within the reporting times allowance after sampling shown in the following table:

**Quality Control Test Reporting Requirements** 

Quality Control rest Reporting Requirements			
Quality characteristic	Maximum reporting time allowance		
Las Assalas Dattlantas (see 0/)			
Los Angeles Rattler loss (max, %)	2 business days		
Percent of crushed particles (min, %)	2 business days		
Durability (min)	2 business days		
Resistance of fine aggregate to			
degradation by abrasion in the Micro-	2 business days		
Deval Apparatus (% loss by weight)	-		
Gradation (% passing by weight)	48 hours		
Sand equivalent (min)	48 hours		
Moisture content (%)	48 hours		

Within 3 days after taking asphaltic emulsion, polymer modified asphaltic emulsion or micro-surfacing emulsion quality control samples, submit the authorized laboratory's test results.

## 37-3.01A(4) Quality Assurance

## 37-3.01A(4)(a) General

Your authorized laboratory must be able to perform International Slurry Surfacing Association tests and mix design.

# 37-3.01A(4)(b) Quality Control 37-3.01A(4)(b)(i) General

Reserved

## 37-3.01A(4)(b)(ii) Aggregate

For aggregate, the authorized laboratory must perform sampling and testing at the specified frequency and location for the following quality characteristics:

## **Aggregate Quality Control**

Quality characteristic	Test method	Minimum sampling and testing frequency	Location of sampling
Los Angeles Rattler loss (max, %) At 500 revolutions	California Test 211	1st day of production	See California Test 125
Percent of crushed particles (min, %)	AASHTO T 335	1st day of production	See California Test 125
Sand equivalent (min)	California Test 217	1 per working stockpile per day	See California Test 125
Resistance of fine aggregate to degradation by abrasion in the Micro-Deval Apparatus (% loss by weight)	ASTM D7428	1 per working stockpile per day	See California Test 125
Gradation (% passing by weight)	California Test 202	1 per working stockpile per day	See California Test 125
Moisture content, from field stockpile (%)	AASHTO T 255 <sup>a</sup>	1 per working stockpile per day	See California Test 125

<sup>&</sup>lt;sup>a</sup>Test aggregate moisture at field stockpile every 2 hours if you are unable to maintain the moisture content to within a maximum daily variation of ±0.5 percent.

## 37-3.01A(4)(b)(iii) Slurry Seals and Micro-surfacings

Reserved

## 37-3.01A(4)(c) Department Acceptance

Slurry Seal and micro-surfacing acceptance is based on:

- 1. Visual inspection for the following:
  - 1.1. Uniform surface texture throughout the work limits.
  - 1.2. Marks in the surface:
    - 1.2.1. Up to 4 marks in the completed slurry seal or micro-surfacing surface that are up to 1 inch wide and up to 6 inches long per 1000 square feet of slurry seal or micro-surfacing placed.
    - 1.2.2. No marks in the completed slurry seal or micro-surfacing surface that are over 1 inch wide or 6 inches long.
  - 1.3. Excessive raveling consisting of the separation of the aggregate from the asphaltic emulsion, polymer modified asphaltic emulsion or micro-surfacing emulsion.
  - 1.4. Bleeding consists of the occurrence of a film of asphaltic material on the surface of the slurry seal or micro-surfacing.
  - 1.5. Delaminating of slurry seal or micro-surfacing from the existing pavement.
  - 1.6. Rutting or wash-boarding.
- 2. Department's sampling and testing for compliance with the requirements for aggregate shown in the following table:

### **Aggregate Gradation Acceptance Criteria**

Quality characteristic	Test method	R	equiremen	ts
Gradation (% passing by weight) Sieve Size:		Type I	Type II	Type III
3/8"			100	100
No. 4	California Test	100	94–100	70–90
No. 8	202	90–100	65–90	45–70
No. 16		60–90	40–70	28–50
No. 30		40–65	25-50	19–34
No. 200		10–20	5–15	5–15

An aggregate gradation test represents 300 tons or 1 day's production, whichever is less.

If test results for aggregate gradation do not comply with the specifications, you may remove the slurry seal or micro-surfacing represented by the test results or request it remain in place with a payment deduction. If your request is authorized, the Department deducts:

- 1. \$1.75 per ton of slurry seal for each noncompliant aggregate gradation
- 2. \$2.00 per ton of micro-surfacing for each noncompliant aggregate gradation

#### 37-3.01B Materials

## 37-3.01B(1) General

Additional water must not cause separation of the asphaltic emulsion, polymer modified asphaltic emulsion or micro-surfacing emulsion from the aggregate before placement.

You may use an additive that does not adversely affect the slurry seal or micro-surfacing.

### 37-3.01B(2) Aggregate

Aggregate must be rock dust. Aggregate must be free from vegetable matter, deleterious substances, caked or clay lumps, and oversized particles.

Aggregate for a slurry seal and micro-surfacing must comply with the gradations shown in the following table:

**Aggregate Gradation** 

Quality characteristic	Test method		Requirements	3
Gradation (% passing by weight)		Type I	Type II	Type III
Sieve size:				
3/8"			100	100
No. 4	California	100	94–100	70–90
No. 8	Test 202	90–100	65–90	45–70
No. 16		60–90	40–70	28–50
No. 30		40–65	25–50	19–34
No. 200		10–20	5–15	5–15

## 37-3.01C Construction

#### 37-3.01C(1) General

Before applying slurry seals or micro-surfacings, cover manholes, valve and monument covers, grates, and other exposed facilities located within the area of application using plastic or oil resistant construction paper secured by tape or adhesive to the facility being covered. Reference the covered facilities with enough control points to relocate the facilities after application of the slurry seals or micro-surfacings.

## 37-3.01C(2) Proportioning

Proportion slurry seal and micro-surfacing ingredients in compliance with the authorized mix design.

## 37-3.01C(3) Mixing and Spreading Equipment

## 37-3.01C(3)(a) General

Mixing and spreading equipment for slurry seals and micro-surfacings must proportion the asphaltic emulsions, water, aggregate, and any additives by volume and mix them in continuous pug mill mixers.

Introduce emulsions into the mixer with a positive displacement pump. If you use a variable-rate pump, the adjusting unit must be sealed in its calibrated position.

Introduce water into the mixer through a meter that measures gallons.

Choose a truck mounted mixer-spreader or continuous self-loading mixer spreader.

## 37-3.01C(3)(b) Truck Mounted Mixer Spreaders

Truck mounted mixer spreaders must comply with:

- 1. Rotating and reciprocating equipment must be covered with metal guards.
- 2. Proportion aggregate using a belt feeder with an adjustable cutoff gate. The Engineer verifies the height of the gate opening.
- 3. Belt feeder must have a depth monitor device. The depth monitor device must automatically shut down power to the belt feeder when the aggregate depth is less than 70 percent of the target depth.
- 4. Separate monitor device must detect the revolutions of the belt feeder. This device must automatically shut down power to the belt feeder if it detects no revolutions. If the belt feeder is an integral part of the equipment's drive chain, the monitor device is not required.
- 5. Aggregate belt feeder must be connected directly to the drive on the emulsion pump. The aggregate feeder drive shaft must have a revolution counter reading the nearest 0.10 revolution for microsurfacing, and nearest 1 revolution for slurry seal.
- 6. Emulsion storage must be equipped with a device that automatically shuts down power to the emulsion pump and aggregate belt feeder when the level of stored emulsion is lowered. To allow for normal fluctuations, there may be a delay of 3 seconds between detection of low emulsion storage levels or low aggregate depths and automatic power shut down.
- 7. Emulsion storage must be located immediately before the emulsion pump.
- 8. Emulsion storage tank must have a temperature indicator at the pump suction level. The indicator must be accurate to ±5 degrees F.
- 9. No-flow and revolution warning devices must be in working condition. Low-flow indicators must be visible while walking alongside the equipment.

#### 37-3.01C(3)(c) Continuous Self-Loading Mixer Spreaders

Continuous self-loading mixer spreaders must be automatically sequenced and self-propelled. The mixing machine must deliver each material to a double shafted mixer and discharge the mixed material on a continuous flow basis. The mixing machines must have sufficient storage capacity to maintain a continuous supply of material to the proportioning controls. The mixing machine operators must have full control of forward and reverse speeds during placement.

#### 37-3.01C(3)(d) Spreader Boxes

The spreader boxes used to spread slurry seals and micro-surfacings must be:

- 1. Capable of spreading the slurry seal or micro-surfacing a minimum of 12 feet wide and preventing the loss of slurry seal or micro-surfacing.
- 2. Equipped with flexible rubber belting on each side. The belting must contact the pavement to prevent the loss of slurry seal or micro-surfacing from the box.
- 3. Equipped to uniformly apply the slurry seal or micro-surfacing on superelevated sections and shoulder slopes. Micro-surfacing spreader box must be equipped with reversible motor driven augers.
- 4. Equipped with a series of strike-off devices at its rear.
  - 4.1. The leading strike off device must be:

- 4.1.1. Fabricated of a suitable material such as steel or stiff rubber
- 4.1.2. Designed to maintain close contact with the pavement during spreading
- 4.1.3. Capable of obtaining the specified thickness
- 4.1.4. Capable of being adjusted to the various pavement cross sections
- 4.2. The final strike-off device must be:
  - 4.2.1. Fabricated of flexible material that produces a uniform texture in the finished surface
  - 4.2.2. Cleaned daily and changed if longitudinal scouring occurs in the slurry seal of microsurfacing
- 5. Clean and free of slurry seal or micro-surfacing at the start of each work shift.

#### 37-3.01C(3)(e) Shoulder Equipment

Spread the slurry seal or micro-surfacing on shoulders with a device such as an edge box that forms clean and straight joints and edges.

## 37-3.01C(3)(f) Equipment Calibration

Equipment calibration must comply with the *MPQP*. Notify the Engineer at least 5 business days before calibrating.

If the Department authorizes a truck or continuous mixer spreader, its calibration is valid for 6 months provided you:

- 1. Use the same truck or continuous mixer spreader verified with a unique identifying number
- 2. Use the same materials in compliance with the authorized mix design
- 3. Do not perform any repair or alteration to the proportioning systems

Calibrate the adjustable cut-off gate settings of each truck or continuous mixer spreader on the project to achieve the correct delivery rate of aggregate and emulsion per revolution of the aggregate feeder under the MPQP.

Checks must be performed for each aggregate source using an authorized vehicle scale.

Individual checks of the aggregate belt feeder's delivery rate to the pug mill mixer must not vary more than 2 percent from the average of 3 runs of at least 3 tons each.

Before using a variable-rate emulsion pump, the pump must be calibrated and sealed in the calibrated condition under the *MPQP*.

Individual checks of the emulsion pump's delivery rate to the pug mill mixer must not vary more than 2 percent from the average of 3 runs of at least 500 gal each.

### 37-3.01C(4) Surface Preparation

Immediately before applying slurry seals or micro-surfacings, clean the surface to receive slurry seals or micro-surfacings by removing any extraneous material affecting adhesion of the slurry seal or micro-surfacing with the existing surface. Use self-propelled power brooms or other methods such as flushing to clean the existing pavement.

#### 37-3.01C(5) Placement

## 37-3.01C(5)(a) General

If truck-mounted mixer-spreaders are used, keep at least 2 operational spreaders at the job site during placement.

Spread slurry seals and micro-surfacings uniformly and do not spot, rehandle, or shift the mixture. However in areas inaccessible to spreading equipment, spread the slurry seal or micro-surfacing mixtures with hand tools or other authorized methods. If placing with hand tools, lightly dampen the area first.

You may fog the roadway surface with water ahead of the spreader box. The fog spray must be adjusted for pavement:

- 1. Temperature
- 2. Surface texture
- 3. Dryness

You determine the application rates for slurry seals or micro-surfacings and the Engineer authorizes the application rates. Spread within 10 percent of authorized rate.

The mixtures must be uniform and homogeneous after spreading, and there must not be separation of the emulsion and aggregate after setting.

## 37-3.01C(5)(b) Weather Conditions

Only place slurry seals or micro-surfacings if both the pavement and air temperatures are at least 50 degrees F and rising. The expected high temperature must be at least 65 degrees F within 24 hours after placement.

Do not place slurry seals or micro-surfacings if rain is imminent or the air temperature is expected to be below 36 degrees F within 24 hours after placement.

## 37-3.01C(5)(c) Joints

Transverse and longitudinal joints must be:

- 1. Uniform
- 2. Straight
- 3. Neat in appearance
- 4. Without material buildup
- 5. Without uncovered areas

Transverse joints must be butt-type joints.

Prevent double placement at transverse joints over previously placed slurry seals or micro-surfacings.

Place longitudinal joints:

- 1. On centerlines, lane lines, edge lines, or shoulder lines
- 2. With overlaps not more than 4 inches

You may request other longitudinal joint patterns if they do not adversely affect the slurry seals or microsurfacings.

The maximum difference between the pavement surface and the bottom edge of a 12-foot straightedge placed perpendicular to the longitudinal joint must be 0.04 foot.

#### 37-3.01C(5)(d) Finished Surfaces

Finished slurry seals or micro-surfacings must be smooth and free of irregularities such as scratch or tear marks. You may leave up to 4 marks that are up to 1 inch wide and 6 inches long per 75 linear feet of slurry seal or micro-surfacing placed. Do not leave any marks that are over 1 inch wide or 6 inches long.

## 37-3.01C(5)(e) Maintenance Sweeping

Sweep the slurry seals or micro-surfacings 24 hours after placement without damaging the slurry seals or micro-surfacings. For 4 days afterwards, sweep the slurry seals or micro-surfacings daily unless determined otherwise by the Engineer.

#### 37-3.01C(5)(f) Repair of Early Distress

The slurry seals or micro-surfacings must not show bleeding, raveling, separation, or other distresses for 15 days after placing. If bleeding, raveling, delaminating, rutting, or wash-boarding occurs after placing the slurry seals or micro-surfacings, make repairs using an authorized method.

## 37-3.01D Payment

Not Used

#### 37-3.02 SLURRY SEALS

## 37-3.02A General

#### 37-3.02A(1) Summary

Section 37-3.02 includes specifications for applying slurry seals.

Applying a slurry seal consists of spreading a mixture of asphaltic emulsion or polymer modified asphaltic emulsion, aggregate, additives, and water on a surface or pavement.

## 37-3.02A(2) Definitions

Reserved

#### 37-3.02A(3) Submittals

Immediately after sampling, submit two 1-quart wide mouth plastic containers of asphaltic emulsion or polymer modified asphaltic emulsion taken in the presence of the Engineer. Samples must be submitted in insulated shipping containers.

## 37-3.02A(4) Quality Assurance

## 37-3.02A(4)(a) General

Reserved

#### 37-3.02A(4)(b) Quality Control

## 37-3.02A(4)(b)(i) General

Take samples of asphaltic emulsion and polymer modified asphaltic emulsion from the tank truck at mid load or from a sampling tap or thief. Before taking samples, draw and dispose of 1 gallon. In the presence of the Engineer take two 1-quart samples in wide mouth plastic containers with lined, sealed lids for acceptance testing.

## 37-3.02A(4)(b)(ii) Asphaltic Emulsion

For asphaltic emulsions, the authorized laboratory must perform quality control sampling and testing at the specified frequency and location for the following quality characteristics:

**Asphaltic Emulsion** 

Quality characteristic	Test method	Minimum sampling and testing frequency	Sampling location
Saybolt Furol Viscosity, at 25 °C (Saybolt Furol seconds) Sieve Test (%)		Minimum 1 per day per	
Storage stability, 1 day (%)	AASHTO T 59	delivery truck	Delivery truck
Residue by distillation (%) Particle charge <sup>a</sup>			
Tests on Residue from Distillation Test:			
Penetration, 25 °C	AASHTO T 49	Minimum 1 per dev per	
Ductility	AASHTO T 51	Minimum 1 per day per delivery truck	Delivery truck
Solubility in tricloroethylene	AASHTO T 44	delivery truck	

<sup>&</sup>lt;sup>a</sup>If the result of the particle charge is inconclusive, the asphaltic emulsion must be tested for pH under ASTM E70. Grade QS1h asphaltic emulsion must have a minimum pH of 7.3. Grade CQS1h asphaltic emulsion must have a maximum pH of 6.7.

#### 37-3.02A(4)(b)(iii) Polymer Modified Asphaltic Emulsion

For polymer modified asphaltic emulsions, the authorized laboratory must perform quality control sampling and testing at the specified frequency and location for the following quality characteristics:

**Polymer Modified Asphaltic Emulsion** 

Quality characteristic	Test method	Minimum sampling and testing frequency	Sampling Location	
Tests on emulsion:				
Saybolt Furol Viscosity at 25 °C	AASHTO T 59			
(Saybolt Furol seconds)		Minimum 1 nor		
Sieve test (%)	AASHTO T 59	Minimum 1 per	Dolivon, truok	
Storage stability after 1 day (%)	AASHTO T 59	day per delivery truck	Delivery truck	
Residue by evaporation (min, %)	California Test 331	liuck		
Particle charge	AASHTO T 59			
Tests on residue by evaporation:	Tests on residue by evaporation:			
Penetration at 25 °C	AASHTO T 49			
Ductility at 25 °C (min, mm)	AASHTO T 51			
Torsional recovery (min, %)	California Test 332	Minimum 1 per		
Or		day per delivery truck	Delivery truck	
Polymer content based on residual asphalt (min, %)	California Test 401			

## 37-3.02A(4)(c) Department Acceptance

For a slurry seal asphaltic emulsion and polymer modified asphaltic emulsion, acceptance is based on the Department's sampling and testing for compliance with the requirements for the quality characteristics specified.

Aggregate acceptance is based on the Department's sampling and testing for compliance with the requirements shown in the following table:

**Aggregate Acceptance Criteria** 

Quality characteristic	Test method	Requirement
Los Angeles Rattler loss (max, %) At 500 revolutions	California Test 211a	35
Percent of crushed particles (min, %)	California Test 205	95
Durability (min)	California Test 229	55
Sand equivalent (min)		
Type I	California Test 217	45
Type II	California 168(217	55
Type III		60

<sup>&</sup>lt;sup>a</sup>California Test 211 must be performed on the source aggregate before crushing.

A sand equivalent test represents 300 tons or 1 day's production, whichever is less.

If test results for sand equivalent do not comply with the specifications, you may remove the slurry seal represented by the test results or request it remain in place with a payment deduction. If your request is authorized, the Department deducts \$1.75 per ton of slurry seal for each noncompliant sand equivalent test.

37-3.02B Materials 37-3.02B(1) General Reserved

## 37-3.02B(2) Asphaltic Emulsions

An asphaltic emulsion must comply with the requirements in Section 94. The asphaltic emulsion must be Grade CQS1h.

## 37-3.02B(3) Polymer Modified Asphaltic Emulsions

A polymer modified asphaltic emulsion must:

- 1. Consist of an elastomeric polymer mixed with an asphaltic material uniformly emulsified with water and an emulsifying or stabilization agent.
- 2. Use either neoprene polymer or butadiene and styrene copolymer. The polymer must be homogeneous and milled into the asphaltic emulsion at the colloid mill.
- 3. Be Grade PMCQS1h and must comply with the requirements shown in the following table:

**Polymer Modified Asphaltic Emulsion Requirements** 

1 Olymer Woulled Aspiratic Emuls	ion requirements	
Quality characteristic	Test method	Requirement
Tests on emulsion:		
Saybolt Furol Viscosity at 25 °C (Saybolt Furol	AASHTO T 59	15–90
seconds)		
Sieve test (%)	AASHTO T 59	0–0.3
Storage stability after 1 day (%)	AASHTO T 59	0–1
Residue by evaporation (min, %)	California Test 331	60
Particle charge	AASHTO T 59	Positive
Tests on residue by evaporation:		
Penetration at 25 °C	AASHTO T 49	40–90
Ductility at 25 °C (min, mm)	AASHTO T 51	400
Torsional recovery (min, %)	California Test 332	18
Or		
Polymer content based on residual asphalt (min, %)	California Test 401	2.5

#### 37-3.02B(4) Aggregate

Aggregate must comply with the quality characteristic requirements shown in the following table:

**Aggregate Requirements** 

Quality characteristic	Test method	Requirement
Los Angeles Rattler loss (max, %) At 500 revolutions	California Test 211 <sup>a</sup>	35
Percent of crushed particles (min, %)	California Test 205	95
Durability (min)	California Test 229	55
Sand equivalent (min)		
Type I	California Test 217	45
Type II	California 1650 217	55
Type III		60

<sup>&</sup>lt;sup>a</sup>California Test 211 must be performed on the source aggregate before crushing. The aggregate supplier must certify that the crushed aggregate being used on the project is manufactured from the source aggregate complying with the LA rattler requirements.

## 37-3.02B(5) Slurry Seal Mix Design

The slurry seal mix design, using project source aggregate, an asphaltic emulsion, and set-control agents if any, must comply with the requirements shown in the following table:

**Slurry Seal Mix Design Requirements** 

Quality characteristic	Test method <sup>a</sup>	Requirement
Consistency (max, mm)	Technical Bulletin 106	30
Wet stripping	Technical Bulletin 114	Pass
Compatibility	Technical Bulletin 115	Pass <sup>b</sup>
Cohesion test, within 1 hour (min, kg-mm)	Technical Bulletin 139	200
Wet track abrasion (max, g/m²)	Technical Bulletin 100	810

<sup>&</sup>lt;sup>a</sup>Test methods are by the International Slurry Surfacing Association.

The mix design must have the percent of asphaltic residue, based on percentage by weight of the dry aggregate, within the ranges shown in the following table:

Slurry seal type	Residue range
Type I	10–16
Type II	7.5–13.5
Type III	6.5-12.0

Determine the exact percentage based on the design asphalt binder content and the asphalt residual content of the asphaltic emulsion furnished.

## 37-3.02C Construction

#### 37-3.02C(1) General

Reserved

## 37-3.02C(2) Proportioning

After proportioning, slurry seal mixtures must be workable.

#### 37-3.02C(3) Mixing and Spreading Equipment

Reserved

#### 37-3.02C(4) Placement

The slurry seal spread rates must be within the ranges shown in the following table:

Slurry Seal Spread Rates

Slurry seal type	Application range (lb of dry aggregate/sq yd)
Type I	8–12
Type II	10–18
Type III	20–25

Within 4 hours after placement, slurry seals must be set enough to allow traffic without pilot cars. Protect slurry seals from damage until it has set and will not adhere or be picked up by vehicle tires. Slurry seals must not exhibit distress from traffic such as bleeding, raveling, separation or other distresses.

## 37-3.02D Payment

The payment quantity for slurry seal is the weight determined by combining the weights of the aggregate and asphaltic emulsion or polymeric asphaltic emulsion. The payment quantity for slurry seal does not include the weights of the added water and set-control additives.

<sup>&</sup>lt;sup>b</sup>Mixing test must pass at the maximum expected air temperature at the job site during placement.

#### 37-3.03 MICRO-SURFACINGS

#### 37-3.03A General

## 37-3.03A(1) Summary

Section 37-3.03 includes specifications for applying micro-surfacings.

Applying a micro-surfacing consists of spreading a mixture of a micro-surfacing emulsion, water, additives, mineral filler, and aggregate on the pavement.

#### 37-3.03A(2) Definitions

Reserved

## 37-3.03A(3) Submittals

Immediately after sampling, submit two 1-quart wide mouth plastic containers of micro-surfacing emulsion taken in the presence of the Engineer. Samples must be submitted in insulated shipping container.

## 37-3.03A(4) Quality Assurance

37-3.03A(4)(a) General

Reserved

## 37-3.03A(4)(b) Quality Control

#### 37-3.03A(4)(b)(i) General

Reserved

## 37-3.03A(4)(b)(ii) Micro-surfacing Emulsions

Take samples from the truck tank at mid load from a sampling tap or thief. Before taking samples, draw and dispose of 1 gallon. In the presence of the Engineer, take two 1-quart wide mouth plastic containers for acceptance testing.

For a micro-surfacing emulsion, the authorized laboratory must perform quality control sampling and testing at the specified frequency and location for the quality characteristics shown in the following table:

#### **Micro-Surfacing Emulsion**

Quality characteristic	Test method	Minimum sampling and testing frequency	Sampling location
Tests on emulsion:			
Saybolt Furol Viscosity, at 25°C (Saybolt Furol seconds)  Storage stability, 1 day (max, %) <sup>a</sup> Sieve test (max, %)	- AASHTO T 59	Minimum 1 per day per delivery truck	Delivery truck
Residue by evaporation (min, %)	California Test 331	Minimum 1 per day per delivery truck	Delivery truck
Tests on residue from evaporation test:			
Penetration at 25 °C	AASHTO T 49	Minimum 1 per day	Delivery
Softening point (min, °C)	AASHTO T 53	per delivery truck	truck

<sup>&</sup>lt;sup>a</sup>Storage stability test will be run if the storage exceeds 48 hours

## 37-3.03A(4)(c) Department Acceptance

For micro-surfacing emulsions, acceptance is based on the Department's sampling and testing for compliance with the requirements shown in the following table:

Micro-surfacing Emulsion Acceptance Criteria

Quality characteristic	Test method	Requirement	
Tests on emulsion:			
Saybolt Furol Viscosity at 25 °C	AASHTO T 59	15–90	
(Saybolt Furol seconds)			
Sieve test (%)	AASHTO T 59	0.30	
Storage stability, 1 day (max, %)	AASHTO T 59	0–1	
Settlement <sup>a</sup> , 5 days (max, %)	ASTM D244	5	
Residue by evaporation (min, %)	California Test 331	62	
Tests on residue by evaporation:			
Penetration at 25 °C	AASHTO T 49	40–90	
Softening point (min, °C)	AASHTO T 53	57	

<sup>&</sup>lt;sup>a</sup>Settlement test on emulsion is not required if used within 48 hours of shipment.

Acceptance of aggregate, except mineral filler, is based on the Department's sampling and testing for compliance with the requirements shown in the following table:

**Aggregate Acceptance Criteria** 

Quality characteristic	Test method	Requirement
Los Angeles Rattler loss (max, %) At 500 revolutions	California Test 211ª	35
Percent of crushed particles (min, %)	California Test 205	95
Durability (min)	California Test 229	65
Sand equivalent (min)	California Test 217	
Type II		65
Type III		65

<sup>&</sup>lt;sup>a</sup>California Test 211 must be performed on the aggregate before crushing. The aggregate supplier must certify that the crushed aggregate being used on the project is manufactured from the source aggregate complying with the LA rattler requirements.

An aggregate sand equivalent test represents 300 tons or 1 day's production, whichever is less.

If the test results for aggregate sand equivalent do not comply with the specifications, you may remove the micro-surfacing represented by the test results or request it remain in place with a payment deduction. If your request is authorized, the Department deducts \$2.00 per ton of micro-surfacing for each noncompliant aggregate sand equivalent test.

## 37-3.03B Materials 37-3.03B(1) General

Reserved

## 37-3.03B(2) Micro-surfacing Emulsions

A micro-surfacing emulsion must be a homogeneous mixture of asphalt, an elastomeric polymer and an emulsifier solution.

Add an elastomeric polymer modifier to asphalt or emulsifier solution before emulsification. An elastomeric polymer solid must be a minimum of 3 percent by weight of the micro-surfacing emulsion's residual asphalt.

A micro-surfacing emulsion must comply with the requirements shown in the following table:

## **Micro-surfacing Emulsion Requirements**

Quality characteristic	Test method	Requirement	
Tests on emulsion:			
Saybolt Furol Viscosity at 25 °C (Saybolt Furol seconds)	AASHTO T 59	15–90	
Sieve test (%)	AASHTO T 59	0.30	
Storage stability, 1 day (max, %)	AASHTO T 59	0–1	
Settlement <sup>a</sup> , 5 days (max, %)	ASTM D244	5	
Residue by evaporation (min, %)	California Test 331	62	
Tests on residue by evaporation:			
Penetration at 25 °C	AASHTO T 49	40–90	
Softening point (min, °C)	AASHTO T 53	57	

<sup>&</sup>lt;sup>a</sup>Settlement test on emulsion is not required if used within 48 hours of shipment.

## 37-3.03B(3) Aggregate

Aggregate must comply with the quality characteristic requirements shown in the following table:

## **Aggregate Requirements**

Quality characteristic	Test method	Requirement
Los Angeles Rattler loss (max, %) At 500 revolutions	California Test 211 <sup>a</sup>	35
Percent of crushed particles (min, %)	California Test 205	95
Durability (min)	California Test 229	65
Sand equivalent (min)	California Test 217	
Type II		65
Type III		65

<sup>&</sup>lt;sup>a</sup>California Test 211 must be performed on the source aggregate before crushing. The aggregate supplier must certify that the crushed aggregate being used on the project is manufactured from the source aggregate complying with the LA rattler requirements.

## 37-3.03B(4) Mineral Fillers

If a mineral filler is used, it must be type I or type II Portland cement. A mineral filler used during mix design must be used during production.

#### 37-3.03B(5) Micro-Surfacing Mix Designs

The micro-surfacing mix design must have the material proportion limits shown in the following table:

Micro-surfacing Mix Design Proportion Limits

	mioro ouridonig mix Doorgii i roportion Emitto			
Material	Proportion limits			
Micro-surfacing emulsion asphalt residual content (%	5.5–10.5			
of dry weight of aggregate)				
Water and additives	As Required			
Mineral filler (% of dry weight of aggregate)	0–3			

The micro-surfacing mix design must comply with the requirements shown in the following table:

Micro-surfacing Mix Design Requirements

Quality characteristics	Test method <sup>a</sup>	Requirement
Wet cohesion		
At 30 minutes (set) (min, kg-cm)	Technical Bulletin 139	12
At 60 minutes (traffic) (min, kg-cm)		20
Excess asphalt (max, g/m²)	Technical Bulletin 109	540
Wet stripping (min, %)	Technical Bulletin 114	90
Wet track abrasion loss 6-day soak (max, g/m²)	Technical Bulletin 100	810
Displacement Lateral (max, %) Specific gravity after 1000 cycles of 57 kg (max)	Technical Bulletin 147A	5 2.10
Classification compatibility (min, grade points)	Technical Bulletin 144	(AAA, BAA) 11
Mix time at 25 °C (min)	Technical Bulletin 113	Controllable to 120 seconds

<sup>&</sup>lt;sup>a</sup>Test methods are by the International Slurry Surfacing Association.

#### 37-3.03B(6) Tack Coats

If there is a bid item for tack coat, you must coat the pavement surface with an asphaltic emulsion mixed with additional water before applying a micro-surfacing. The maximum ratio of water to asphaltic emulsion must be 2 to 1. Apply the tack coat at a rate from 0.08 to 0.15 gal/sq yd. The exact rate must be authorized.

You determine the grade of slow-setting or quick setting asphaltic emulsion to be used.

#### 37-3.03C Construction

## 37-3.03C(1) General

Reserved

#### 37-3.03C(2) Proportioning

Field conditions may require adjustments to the proportions within the authorized mix design during construction.

## 37-3.03C(3) Mixing and Spreading Equipment

## 37-3.03C(3)(a) General

Reserved

### 37-3.03C(3)(b) Scratch Course Boxes

Spread the scratch courses with the same type of spreader box used to spread micro-surfacings except use an adjustable steel strike-off device instead of a final strike-off device.

## 37-3.03C(3)(c) Wheel Path Depression Boxes

Each wheel path depression box must have adjustable strike-off device between 5 and 6 feet wide to regulate depth. The wheel path depression box must also have devices such as hydraulic augers capable of:

- 1. Moving the mixed material from the rear to the front of the filling chamber
- 2. Guiding larger aggregate into the deeper section of the wheel path depression
- 3. Forcing the finer material towards the outer edges of the spreader box

## 37-3.03C(4) Test Strips

If micro-surfacing placement will require more than 1 day, you must construct a test strip. The test strip must be:

- 1. From 300 to 450 feet long
- 2. The same as the full production micro-surfacing
- 3. On 1 of the application courses specified at an authorized location
- 4. At the same time of day or night the full production micro-surfacing is to be applied

If multiple application courses are specified, you may construct test strips over 2 days or nights.

The Engineer evaluates the test strip after traffic has used it for 12 hours. If the Engineer determines the mix design or placement procedure is unacceptable, make modifications and construct a new test strip for the Engineer's evaluation.

## 37-3.03C(5) Placement 37-3.03C(5)(a) General

Reserved

## 37-3.03C(5)(b) Repair Wheel Path Depressions

If repairing wheel path depressions is shown in plans, fill wheel path depressions and irregularities with micro-surfacing material before spreading micro-surfacing. If the depressions are less than 0.04 foot deep, fill with a scratch course. If the depressions are 0.04 foot deep or more, fill the depressions using a wheel path depression box.

Spread scratch courses by adjusting the steel strike-off of a scratch course box until it is directly in contact with the pavement surface.

Spread micro-surfacings with a wheel path depression box leaving a slight crown at the surface. Use multiple applications to fill depressions more than 0.12 foot deep. Do not apply more than 0.12 foot in a single application.

Allow traffic to compact each filled wheel path depression for a minimum of 12 hours before placing additional micro-surfacings.

#### 37-3.03C(5)(c) Micro-surfacing Pavement Surfaces

The micro-surfacing spread rates must be within the ranges shown in the following table:

Micro-surfacing type	Application range (lb of dry aggregate/sq yd)
Type II	10–20
Type III <sup>a</sup>	20–32
Type III <sup>b</sup>	30–32

<sup>&</sup>lt;sup>a</sup>Over asphalt concrete pavement

Within 2 hours after placement, micro-surfacings must be set enough to allow traffic without pilot cars. Protect the micro-surfacings from damage until it has set and will not adhere or be picked up by vehicle tires. Micro-surfacings must not exhibit distress from traffic such as bleeding, raveling, separation or other distresses.

## 37-3.03D Payment

The payment quantity for micro-surfacing is the weight determined by combining the weights of the aggregate and micro-surfacing emulsion. The payment quantity for micro-surfacing does not include the weights of added water, mineral filler, and additives.

<sup>&</sup>lt;sup>b</sup>Over concrete pavement and concrete bridge decks

#### 37-3.04 RUBBERIZED AND MODIFIED SLURRY SEALS

Reserved

#### 37-4 FOG SEALS AND FLUSH COATS

## 37-4.01 GENERAL

#### 37-4.01A General

## 37-4.01A(1) Summary

Section 37-4.01 includes general specifications for applying fog seals and flush coats.

## 37-4.01A(2) Definitions

Reserved

#### 37-4.01A(3) Submittals

At least 15 days before use, submit:

- 1. Sample of asphaltic emulsion in two 1-quart plastic container with lined, sealed lid
- 2. Asphaltic emulsion information and test data as follows:
  - 2.1. Supplier
  - 2.2. Type/Grade of asphalt emulsion
  - 2.3. Copy of the specified test results for asphaltic emulsion

#### 37-4.01B Materials

Not Used

#### 37-4.01C Construction

## 37-4.01C(1) General

Reserved

#### 37-4.01C(2) Weather Conditions

Only place a fog seal or flush coat if both the pavement and ambient temperatures are at least 50 degrees F and rising. Do not place a fog seal or flush coat within 24 hours of rain or within 24 hours of forecast rain or freezing temperatures.

### **37-4.01D Payment**

Not Used

### **37-4.02 FOG SEALS**

#### 37-4.02A General

#### 37-4.02A(1) Summary

Section 37-4.02 includes specifications for applying fog seals.

Applying a fog seal includes applying a diluted slow-setting or quick setting asphaltic emulsion.

## 37-4.02A(2) Definitions

Reserved

## 37-4.02A(3) Submittals

Immediately after sampling, submit two 1-quart plastic container of asphaltic emulsion taken in the presence of the Engineer. Samples must be submitted in insulated shipping container.

#### 37-4.02A(4) Quality Assurance

## 37-4.02A(4)(a) General

Reserved

# 37-4.02A(4)(b) Quality Control 37-4.02A(4)(b)(i) General

Reserved

## 37-4.02A(4)(b)(ii) Asphaltic Emulsions

Circulate asphaltic emulsions 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. In the presence of the Engineer, take asphalt emulsion sample in two 1-quart plastic container with lined, sealed lid.

For asphaltic emulsions, the authorized laboratory must perform quality control sampling and testing at the specified frequency and location for the following quality characteristics:

**Asphaltic Emulsion** 

	/ tophattic Emulcion			
Quality characteristic	Test Method	Minimum sampling and testing frequency	Sampling location	
Saybolt Furol Viscosity, at 25 °C (Saybolt Furl seconds) Sieve Test (%) Storage stability, 1 day (%) Residue by distillation (%) Particle charge <sup>a</sup>	AASHTO T 59	Minimum 1 per day per delivery truck	Distributor truck	
Tests on Residue from Distillation Test:				
Penetration, 25 °C	AASHTO T 49	Minimum 4 may day may		
Ductility	AASHTO T 51	Minimum 1 per day per delivery truck	Distributor truck	
Solubility in tricloroethylene	AASHTO T 44	delivery truck		

<sup>&</sup>lt;sup>a</sup>If the result of the particle charge is inconclusive, the asphaltic emulsion must be tested for pH under ASTM E70. Grade QS1h asphaltic emulsion must have a minimum pH of 7.3. Grade CQS1h asphaltic emulsion must have a maximum pH of 6.7.

## 37-4.02A(4)(b)(iii) Asphaltic Emulsion Spread Rates

For fog seals, the authorized laboratory must perform sampling and testing at the specified frequency and location for the following quality characteristics:

#### Fog Seal Quality Control Requirements

Quality characteristic	Test method	Minimum sampling	Location of
		and testing frequency	sampling
Asphaltic emulsion spread rate (gal/sq yd)	California Test 339	2 per day	Pavement surface

#### 37-4.02A(4)(c) Department Acceptance

Fog seal acceptance is based on:

- 1. Visual inspection for the following:
  - 1.1. Uniform surface texture throughout the work limits
  - 1.2. Flushing consisting of the occurrence of a film of asphaltic material on the surface
  - 1.4 Streaking consisting of alternating longitudinal bands of asphaltic emulsion approximately parallel with the lane line
- 2. The Department's sampling and testing for compliance with the requirements for the quality characteristics specified in section 94 for asphaltic emulsion
- 3. Department's sampling and testing for compliance with the requirements for fog seal shown in the following table:

### Fog Seal Acceptance Criteria

Quality Characteristic	Test Method	Requirement
Asphaltic emulsion spread rate (gal/sq yd)	California Test 339	TV ± 10%

#### 37-4.02B Materials

You determine the grade of slow-setting or quick setting asphaltic emulsion to be used.

#### 37-4.02C Construction

Apply asphaltic emulsions for fog seals at a residual asphalt rate from 0.02 to 0.06 gal/sq yd.

If additional water is added to the asphaltic emulsions, the resultant mixture must not be more than 1 part asphaltic emulsion to 1 part water. You determine the dilution rate.

If the fog seals become tacky, sprinkle water as required.

If fog seals and chip seals are on the same project, the joint between the seal coats must be neat and uniform.

#### 37-4.02D Payment

The Department does not adjust the unit price for an increase or decrease in the asphaltic emulsion quantity.

#### 37-4.03 FLUSH COATS

#### 37-4.03A General

### 37-4.03A(1) Summary

Section 37-4.03 includes specifications for applying flush coats.

Applying a flush coat includes applying a fog seal coat followed by sand.

#### 37-4.03A(2) Definitions

Reserved

#### 37-4.03A(3) Submittals

At least 15 days before use, submit:

- 1. Proposed target X values for sand gradation.
- 2. Gradation test results for sand

Submit quality control test results for sand gradation within 2 business days of sampling.

## 37-4.03A(4) Quality Assurance

#### 37-4.03A(4)(a) General

Reserved

#### 37-4.03A(4)(b) Quality Control

For sand, the authorized laboratory must perform sampling and testing at the specified frequency and location for the following quality characteristics:

#### **Sand Quality Control**

	_		
Quality characteristic	Test method	Minimum sampling and testing frequency	Location of sampling
Gradation (% passing by weight)	California Test 202	1 per day	See California Test 125

## 37-4.03A(4)(c) Department Acceptance

Flush coat acceptance is based on fog seal acceptance and the following:

- 1. Visual inspection for uniform application of sand.
- 2. Sand acceptance is based on the Department's sampling and testing for compliance with the requirements shown in the following table:

## **Sand Gradation Acceptance Criteria**

Quality characteristic	Test method	Requirement
Gradation (% passing by weight) Sieve size: 3/8" No. 4 No. 8 No. 16 No. 30 No. 50 No.100	California Test 202	100 93–100 61–99 X ± 13 X ± 12 X ± 9 1–15
Sieve size:     3/8"     No. 4     No. 8     No. 16     No. 30     No. 50	California Test 202	93–100 61–99 X ± 13 X ± 12 X ± 9

NOTE: "X" is the gradation that you propose to furnish for the specific sieve size.

#### 37-4.03B Material

## 37-4.03B(1) General

Reserved

#### 37-4.03B(2) Sand

Sand must be free from deleterious coatings, clay balls, roots, bark, sticks, rags, and other extraneous material.

Sand for a flush coat must comply with the gradations shown in the following table:

### **Sand Gradation**

Quality characteristic	Test method	Requirement
Gradation (% passing by weight) Sieve size: 3/8" No. 4 No. 8 No. 16 No. 30 No. 50 No.100	California Test 202	100 93–100 61–99 X ± 13 X ± 12 X ± 9 1–15
No. 200		0–10

NOTE: "X" is the gradation that you propose to furnish for the specific sieve size.

Fine aggregate sizes must be distributed such that the difference between the total percentage passing the No. 16 and No. 30 sieves is from 10 to 40, and the difference between the percentage passing the No. 30 and No. 50 sieves is from 10 to 40.

## 37-4.03C Construction

#### 37-4.03C(1) General

During flush coat activities, close adjacent lanes to traffic. Do not track asphaltic emulsion on existing pavement surfaces.

Apply sand immediately after applying asphaltic emulsions.

Spread sand aggregate 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. You determine the application rates for sand and the Engineer authorizes the application rate.

#### 37-4.03C(2) Sweeping

Sweep loose sand material remaining on the surface 24 hours after application.

#### 37-4.03D Payment

The Department does not adjust the unit price for an increase or decrease in the sand cover (seal) quantity.

#### **37-5 PARKING AREA SEALS**

#### 37-5.01 GENERAL

## 37-5.01A Summary

Section 37-5 includes specifications for applying parking area seals. Sealing a parking area consists of spreading a mixture of asphaltic emulsion, aggregate, polymer, and water.

### 37-5.01B Definitions

Reserved

#### 37-5.01C Submittals

At least 15 days before starting placement, submit a 20 lb sample of the aggregate to be used.

At least 10 days before starting placement, submit:

- 1. Name of the authorized laboratory to perform testing and mix design.
- 2. Laboratory report of test results and a proposed mix design. The report and mix design must include the specific materials to be used and show a comparison of test results and specifications. The mix design report must include the quantity of water allowed to be added at the job site. The authorized laboratory performing the tests must sign the original laboratory report and mix design.
- 3. Manufacturer's data for oil seal primer and polymer.

If the mix design consists of the same materials covered by a previous laboratory report, you may submit the previous laboratory report that must include material testing data performed within the previous 12 months for authorization.

If you request substitute materials, submit a new laboratory report and mix design at least 10 days before starting placement.

Submit a certificate of compliance for the parking area seal material.

Immediately after sampling, submit two 1-quart plastic containers of parking area seal taken in the presence of the Engineer. Samples must be submitted in insulated shipping containers.

## 37-5.01D Quality Assurance

37-5.01D(1) General

Reserved

# 37-5.01D(2) Quality Control 37-5.01D(2)(a) General

Reserved

#### 37-5.01D(2)(b) Asphaltic Emulsions

For an asphaltic emulsion, the authorized laboratory must perform quality control sampling and testing at the specified frequency and location for the following quality characteristics:

**Asphaltic Emulsion** 

Quality characteristic	Test Method	Minimum sampling and testing frequency	Sampling location
Saybolt Furol Viscosity, at 25 °C (Saybolt Furol seconds) Sieve Test (%) Storage stability, 1 day (%) Residue by distillation (%) Particle charge <sup>a</sup>	AASHTO T 59	Minimum 1 per day per delivery truck	Distributor truck
Tests on Residue from Distillation Test			
Penetration, 25 °C	AASHTO T 49	Minimum 1 per day per delivery truck	
Ductility	AASHTO T 51		Distributor truck
Solubility in trichloroethylene	AASHTO T 44	per delivery truck	

<sup>&</sup>lt;sup>a</sup>If the result of the particle char is inconclusive, the asphaltic emulsion must be tested for pH under ASTM E70. Grade QS1h asphaltic emulsion must have a minimum pH of 7.3. Grade CQS1h asphaltic emulsion must have a maximum pH of 6.7.

## 37-5.01D(2)(c) Sand

For sand, the authorized laboratory must perform sampling and testing at the specified frequency and location for the following quality characteristics:

## **Sand Quality Control**

Quality characteristic	Test method	Minimum sampling and testing frequency	Location of sampling
Gradation (% passing by weight)	California Test 202	One per project	See California Test 125

## 37-5.01D(2)(d) Parking Area Seals

For a parking area seal, the authorized laboratory must perform quality control sampling and testing at the specified frequency for the following quality characteristics:

**Parking Area Seal Requirements** 

Quality characteristic	Test method	Frequency
Mass per liter (kg)	ASTM D244	
Cone penetration (mm)	California Test 413	
Nonvolatile (%)	ASTM D2042a	
Nonvolatile soluble in trichloroethylene (%)	ASTIVI D2042"	One per project
Wet track abrasion (g/m²)	ASTM D3910	
Dried film color		
Viscosity (KU) <sup>b</sup>	ASTM D562	

<sup>&</sup>lt;sup>a</sup>Weigh 10 g of homogenous material into a previously tarred, small can. Place in a constant temperature oven at  $165 \pm 5$  °C for  $90 \pm 3$  minutes. Cool, reweigh, and calculate nonvolatile components as a percent of the original weight.

#### 37-5.01D(3) Department Acceptance

Parking area seal acceptance is based on:

- 1. Visual inspection for:
  - 1.1. Uniform surface texture throughout the work limits

<sup>&</sup>lt;sup>b</sup>Krebs units

- 1.2 Marks in the surface:
  - 1.2.1. Up to 4 marks in the completed parking area seal that are up to 1 inch wide and up to 6 inches long per 1,000 square feet of parking area seal placed.
  - 1.2.2. No marks in the completed parking area seal surface that are over 1 inch wide or 6 inches long.
- 1.2. Raveling consisting of the separation of the aggregate from the asphaltic emulsion
- 1.3. Bleeding consisting of the occurrence of a film of asphaltic material on the surface of the parking area seal
- 1.4 Delaminating of the parking area seal from the existing pavement
- 1.5 Rutting or wash-boarding
- 2. The Department's sampling and testing of aggregate for compliance with 100 percent passing no. 16 sieve under California Test 202
- 3. The Department's sampling and testing for compliance with the requirements shown in the following table:

**Parking Area Seal Acceptance Criteria** 

Quality characteristic	Test method	Requirement
Mass per liter (min, kg)	ASTM D244	1.1
Cone penetration (mm)	California Test 413	340–700
Nonvolatile (min, %)	ASTM D2042a	50
Nonvolatile soluble in trichloroethylene (%)	A31W D2042"	10–35
Wet track abrasion (max, g/m²)	ASTM D3910	380
Dried film color		Black
Viscosity (min, KU) <sup>b</sup>	ASTM D562	75

 $<sup>^{</sup>a}$ Weigh 10 g of homogenous material into a previously tared, small ointment can. Place in a constant temperature oven at 165 ± 5  $^{\circ}$ C for 90 ± 3 minutes. Cool, reweigh, and calculate nonvolatile components as a percent of the original weight.

#### <sup>b</sup>Krebs units

#### **37-5.02 MATERIALS**

## 37-5.02A General

Aggregate must be clean, hard, durable, uncoated, and free from organic and deleterious substances. One hundred percent of the aggregate must pass the no. 16 sieve.

Asphaltic emulsion must be either Grade SS1h or CSS1h, except the values for penetration at 25 degrees C for tests on residue from distillation must be from 20 to 60.

Polymer must be either neoprene, ethylene vinyl acetate, or a blend of butadiene and styrene.

Oil seal primer must be a quick-drying emulsion with admixtures. Oil seal primer must be manufactured to isolate the parking area seal from pavement with residual oils, petroleum grease, and spilled gasoline.

Crack sealant must comply with section 37-6.

Water must be potable and not separate from the emulsion before the material is placed.

#### 37-5.02B Mix Design

The proposed mix design for a parking area seal must comply with the requirements shown in the following table:

## Parking Area Seal Mix Design Requirements

Quality characteristic	Test method	Requirement
Mass per liter (min, kg)	ASTM D244	1.1
Cone penetration (mm)	California Test 413	340–700
Nonvolatile (min, %)	ASTM D2042 <sup>a</sup>	50
Nonvolatile soluble in trichloroethylene (%)	A31W D2042"	10–35
Wet track abrasion (max, g/m²)	ASTM D3910	380
Dried film color		Black
Viscosity (min, KU) <sup>b</sup>	ASTM D562	75

<sup>&</sup>lt;sup>a</sup>Weigh 10 g of homogenous material into a previously tarred, small ointment can. Place in a constant temperature oven at  $165 \pm 5$  °C for  $90 \pm 3$  minutes. Cool, reweigh, and calculate nonvolatile components as a percent of the original weight.

A parking area seal must contain a minimum of 2 percent polymer by volume of undiluted asphaltic emulsion.

#### 37-5.02C Proportioning

Parking area seal ingredients must be mixed at a central plant. The plant must include mechanical or electronic controls that consistently proportion the ingredients. Mix an asphaltic emulsion with the other ingredients mechanically.

Store the parking area seal in a tank equipped with mixing or agitation devices. Keep stored materials thoroughly mixed. Protect stored materials from freezing conditions.

#### 37-5.03 CONSTRUCTION

#### 37-5.03A General

Request that the Engineer shut off the irrigation control system at least 5 days before placing the seal. Do not water plants adjacent to the seal at least 24 hours before and after the seal coat placement.

#### 37-5.03B Surface Preparations

If cracks in the existing pavement are from 1/4 to 1 inch wide, treat the cracks under section 37-6. Do not place the parking area seals until the Engineer determines that the crack treatments are cured.

If cracks in the existing pavement are greater than 1 inch wide, the Engineer orders the repair. This work is change order work.

After any crack treatment and before placing parking area seals, clean the pavement surface, including removal of oil and grease spots. Do not use solvents.

If cleaning the pavement with detergents, thoroughly rinse with water. Allow all water to dry before placing parking area seals.

You must seal oil and grease spots that remain after cleaning. Use an oil seal primer and comply with the manufacturer's instructions.

If the existing pavement has oil and grease spots that do not come clean and sealing is insufficient, the Engineer orders the repair of the pavement. This work is change order work.

Before placing the parking area seals, dampen the pavement surface using a distributor truck. Place the seal on the damp pavement but do not place it with standing water on the pavement.

## 37-5.03C Placement

If adding water at the job site based on the manufacturer's instructions for consistency and spreadability, do not exceed 15 percent by volume of undiluted asphaltic emulsion.

<sup>&</sup>lt;sup>b</sup>Krebs units

Place the parking area seals in 1 or more application. The seals must be uniform and smooth, free of ridges or uncoated areas.

If placing in multiple applications, allow the last application to thoroughly dry before the subsequent application.

Do not allow traffic on the parking area seals for at least 24 hours after placement.

Do not stripe over the parking area seals until it is dry.

#### **37-5.04 PAYMENT**

The payment quantity for parking area seal is the weight determined by combining the weights of the aggregate and asphaltic emulsion. The payment quantity for parking area seal does not include the added water and set-control additive.

#### **37-6 CRACK TREATMENTS**

#### **37-6.01 GENERAL**

#### 37-6.01A Summary

Section 37-6 includes specifications for treating cracks in asphalt concrete pavement.

#### 37-6.01B Definitions

Reserved

#### 37-6.01C Submittals

If your selected crack treatment material is on the Authorized Material List for flexible pavement crack treatment material, submit a certificate of compliance including:

- Manufacturer's name
- 2. Production location
- 3. Brand or trade name
- 4. Designation
- 5. Batch or lot number
- 6. Crack treatment material type
- 7. Contractor or subcontractor name
- 8. Contract number
- 9. Lot size
- 10. Shipment date
- 11. Manufacturer's signature

If your selected crack treatment material is not on the Authorized Material List for flexible pavement crack treatment material, submit a sample and test results from each batch or lot 20 days before use. Testing must be performed by an authorized laboratory and test results must show compliance with the specifications. Test reports must include the information specified for the certificate of compliance submittal. Each hot-applied crack treatment material sample must be a minimum of 3 lb and submitted in a silicone release container. Each cold-applied crack treatment material sample must be a minimum of 2 quarts and submitted in a plastic container.

At least 10 days before the start of work, submit sand gradation test results under California Test 202.

Submit the following with each delivery of crack treatment material to the job site:

- 1. Manufacturer's heating and application instructions
- 2. Manufacturer's SDS
- 3. Name of the manufacturer's recommended detackifying agent

# 37-6.01D Quality Assurance

#### 37-6.01D(1) General

Hot-applied crack treatment material must be sampled at least once per project in the Engineer's presence. Collect two 3-pounds-minimum samples of crack treatment material from the dispensing wand into silicone release boxes.

Cold-applied crack treatment material must be sampled at least once per project in the Engineer's presence. Collect 2 samples of crack treatment material from the dispensing wand into 1-quart containers.

# 37-6.01D(2) Quality Control

Reserved

# 37-6.01D(3) Department Acceptance

Crack treatment acceptance is based on:

- 1. Visual inspection for uniform filling of cracks throughout the work limits including:
  - 1.2. Crack treatment is not more than a 1/4 inch below the specified level
  - 1.3. Sealant failures
  - 1.4. Crack re-opening
  - 1.5. Crack overbanding is less than 3 inches wide
- 2. The Department's sampling and testing for compliance with the requirements shown in the following table:

**Crack Treatment Acceptance Criteria** 

Orack Treatment Acceptance Oriteria						
Quality characteristic <sup>a</sup>	Toot mothodb	Requirement				
Quality characteristic	Test method <sup>b</sup>	Type 1	Type 2	Type 3	Type 4	Type 5
Softening point (min, °C)	ASTM D36	102	96	90	84	84
Cone penetration at 77 °F (max)	ASTM					
	D5329	35	40	50	70	90
Resilience at 77 °F, unaged (%)	ASTM					
- ' '	D5329	20-60	25–65	30–70	35–75	40–80
Flexibility (°C) <sup>c</sup>	ASTM					
	D3111	0	0	0	-11	-28
Tensile adhesion (min, %)	ASTM					
	D5329	300	400	400	500	500
Specific gravity (max)	ASTM D70	1.25	1.25	1.25	1.25	1.25
Asphalt compatibility	ASTM					
	D5329	Pass	Pass	Pass	Pass	Pass
Sieve test (% passing)	See note d	100	100	100	100	100

<sup>&</sup>lt;sup>a</sup>Cold-applied crack treatment material residue collected under ASTM D6943, Method B and sampled under ASTM D140 must comply with the grade specified.

<sup>&</sup>lt;sup>b</sup>Except for viscosity, cure each specimen at a temperature of  $23 \pm 2$  °C and a relative humidity of 50  $\pm$  10 percent for  $24 \pm 2$  hours before testing.

<sup>°</sup>For the flexibility test, the specimen size must be  $6.4 \pm 0.2$  mm thick by  $25 \pm 0.2$  mm wide by  $150 \pm 0.5$  mm long. The test mandrel diameter must be  $6.4 \pm 0.2$  mm. The bend arc must be 180 degrees. The bend rate must be  $2 \pm 1$  seconds. At least 4 of 5 test specimens must pass at the specified test temperature without fracture, crazing, or cracking.

<sup>&</sup>lt;sup>d</sup>For hot-applied crack treatment, dilute with toluene and sieve through a no. 8 sieve. For coldapplied crack treatment, sieve the material as-received through a no. 8 sieve. If the manufacturer provides a statement that added components passed the no. 16 sieve before blending, this requirement is void.

#### **37-6.02 MATERIALS**

#### 37-6.02A General

Reserved

#### 37-6.02B Crack Treatment Material

A crack treatment material must comply with the requirements shown in the following table:

#### **Crack Treatment Material**

Quality characteristic <sup>a</sup>	Tost mothodb	Requirement				
Quality characteristic	Test method <sup>b</sup>	Type 1	Type 2	Type 3	Type 4	Type 5
Softening point (min, °C)	ASTM D36	102	96	90	84	84
Cone penetration at 77 °F (max)	ASTM					
	D5329	35	40	50	70	90
Resilience at 77 °F, unaged (%)	ASTM					
	D5329	20–60	25–65	30–70	35–75	40–80
Flexibility (°C) <sup>c</sup>	ASTM					
	D3111	0	0	0	-11	-28
Tensile adhesion (min, %)	ASTM					
	D5329	300	400	400	500	500
Specific gravity (max)	ASTM D70	1.25	1.25	1.25	1.25	1.25
Asphalt compatibility	ASTM					
-	D5329	Pass	Pass	Pass	Pass	Pass
Sieve test (% passing)	See note d	100	100	100	100	100

<sup>&</sup>lt;sup>a</sup>Cold-applied crack treatment material residue collected under ASTM D6943, Method B and sampled under ASTM D140 must comply with the grade specifications.

<sup>d</sup>For hot-applied crack treatment, dilute with toluene and sieve through a no. 8 sieve. For cold-applied crack treatment, sieve the material as-received through a no. 8 sieve. If the manufacturer provides a statement that added components passed the no. 16 sieve before blending, this requirement is void.

A crack treatment material must be delivered to the job site with the information listed below. If crack treatment material is delivered to the job site in containers, each container must be marked with the following information.

- 1. Manufacturer's name
- 2. Production location
- 3. Brand or trade name
- 4. Designation
- 5. Crack treatment trade name
- 6. Batch or lot number
- 7. Maximum heating temperature
- 8. Expiration date for cold application only

Hot-applied crack treatment must be delivered to the job site premixed in cardboard containers with meltable inclusion liners or in a fully meltable package.

Cold-applied crack treatment must have a minimum shelf life of 3 months from the date of manufacture.

<sup>&</sup>lt;sup>b</sup>Except for viscosity, cure each specimen at a temperature of  $23 \pm 2$  °C and a relative humidity of 50  $\pm$  10 percent for  $24 \pm 2$  hours before testing.

<sup>°</sup>For the flexibility test, the specimen size must be  $6.4 \pm 0.2$  mm thick by  $25 \pm 0.2$  mm wide by  $150 \pm 0.5$  mm long. The test mandrel diameter must be  $6.4 \pm 0.2$  mm. The bend arc must be 180 degrees. The bend rate must be  $2 \pm 1$  seconds. At least 4 of 5 test specimens must pass at the specified test temperature without fracture, crazing, or cracking.

#### 37-6.02C Sand

Sand applied to tacky crack treatment material must be clean, free of clay, and comply with the gradation shown in the following table:

#### Sand Gradation

Quality characteristic	Test method	Requirement
Gradation (% passing by weight)		
Sieve size:		
No. 4	California Test 202	100
No. 50		0–30
No. 200		0–5

#### 37-6.03 CONSTRUCTION

Treat cracks from 1/4 to 1 inch in width for the entire length of the crack. Fill or repair cracks wider than 1 inch as ordered. Filling cracks wider than 1 inch is change order work.

If treating cracks on a traffic lane adjacent to a shoulder, treat the cracks on the shoulder.

For hot-applied crack treatment material, rout cracks or saw cut to form a reservoir.

Cracks must be clean and dry before treating. Before treating, blast cracks with oil-free compressed air at a pressure of at least 90 psi.

If the pavement temperature is below 40 degrees F or if there is evidence of moisture in the crack, use a hot air lance immediately before applying crack treatment. The hot air lance must not apply flame directly on the pavement.

Heat and apply hot-applied crack treatment material under with the manufacturer's instructions.

Apply cold-applied crack treatment material with a distributor kettle, a piston, or a diaphragm barrel pump that can deliver from 50 to 75 psi. The application line must have a pressure gauge and a filter. The pressure in the application line must not exceed 20 psi. The pressure gauge must have a regulator. Use a high-pressure hose with a 1/2-inch NPT swivel connection and a dispensing wand.

Apply crack treatment with a nozzle inserted into the crack. Fill the crack flush. If after 2 days the crack treatment is more than 1/4 inch below the specified level, the sealant fails, or the crack re-opens, re-treat the crack.

Immediately remove crack treatment material that is spilled or deposited on the pavement surface.

Before opening to traffic, apply sand or the manufacturer's recommended detackifying agent to tacky crack treatment material on the traveled way.

Sweep up excess sand before opening to traffic.

# **37-6.04 PAYMENT**

The payment quantity for crack treatment is the length measured in lane miles along the edge of each paved lane parallel to the pavement's centerline. The payment for a lane includes crack treatment of the adjacent shoulder.

# 37-7-37-10 RESERVED

# Replace Section 39 with:

# 39 ASPHALT CONCRETE 39-1 GENERAL

#### 39-1.01 GENERAL

Section 39 includes specifications for performing asphalt concrete work.

#### **39-1.02 MATERIALS**

Not Used

# 39-1.03 CONSTRUCTION

Not Used

# **39-1.04 PAYMENT**

Not Used

#### 39-2 HOT MIX ASPHALT

#### 39-2.01 GENERAL

39-2.01A General

# 39-2.01A(1) Summary

Section 39-2.01 includes general specifications for producing and placing hot mix asphalt.

HMA includes one or more of the following types:

- 1. Type A HMA
- 2. RHMA-G
- 3. OGFC
- 4. BWC
- 5. Minor HMA

WMA technologies must be on the Authorized Material List for WMA authorized technologies.

For HMA that uses asphalt binder containing crumb rubber modifier, submit a Crumb Rubber Usage Report form monthly and at the end of the project.

Wherever reference is made to the following test methods, the year of publication for these test methods is as shown in the following table:

Test method	Year of publication
AASHTO M 17	2011 (2015)
AASHTO M 323	2013
AASHTO R 30	2002 (2015)
AASHTO R 35	2014
AASHTO T 27	2014
AASHTO T 49	2014
AASHTO T 59	2013
AASHTO T 96	2002 (2010)
AASHTO T 164	2014
AASHTO T 176	2008
AASHTO T 209	2012
AASHTO T 269	2014
AASHTO T 275	2007 (2012)
AASHTO T 283	2014
AASHTO T 304	2011
AASHTO T 305	2014
AASHTO T 308	2010
AASHTO T 312	2014
AASHTO T 324	2014
AASHTO T 329	2013
AASHTO T 335	2009
ASTM D36/D36M	2014 <sup>ε1</sup>
ASTM D92	2012b
ASTM D217	2010
ASTM D297	2013
ASTM D445	2014
ASTM D2007	2011
ASTM D2074	2007 (Reapproved 2013)
ASTM D2995	1999 (Reapproved 2009)
ASTM D4791	2010
ASTM D5329	2009
ASTM D7741/D7741M	2011 <sup>ε1</sup>
Asphalt Institute MS-2	7th edition (2015)

# 39-2.01A(2) Definitions

binder replacement: Binder from RAP expressed as a percent of the total binder in the mix.

coarse aggregate: Aggregate retained on a no. 4 sieve.

fine aggregate: Aggregate passing a no. 4 sieve.

**leveling course:** Thin layer of HMA used to correct minor variations in the longitudinal and transverse profile of the pavement before placement of other pavement layers.

miscellaneous areas: Areas outside the traveled way and shoulders such as:

- 1. Median areas not including inside shoulders
- 2. Island areas
- 3. Sidewalks
- 4. Gutters
- 5. Ditches
- 6. Overside drains
- 7. Aprons at ends of drainage structures

8. Driveways and driveway approaches

processed RAP: RAP that has been fractionated.

**supplemental fine aggregate:** Mineral filler consisting of rock dust, slag dust, hydrated lime, hydraulic cement, or any combination of these and complying with AASHTO M 17.

39-2.01A(3) Submittals 39-2.01A(3)(a) General

Reserved

# 39-2.01A(3)(b) Job Mix Formula

# 39-2.01A(3)(b)(i) General

Except for the HMA to be used in miscellaneous areas, dikes, and berms, submit your proposed JMF for each type of HMA to be used. The JMF must be submitted on the Contractor Job Mix Formula Proposal form along with:

- Mix design documentation on Contractor Hot Mix Asphalt Design Data form dated within 12 months of submittal
- 2. JMF verification on a Caltrans Hot Mix Asphalt Verification form, if applicable
- 3. JMF renewal on a Caltrans Job Mix Formula Renewal form, if applicable
- 4. SDS for:
  - 4.1. Asphalt binder
  - 4.2. Supplemental fine aggregate except fines from dust collectors
  - 4.3. Antistrip additives

The Contractor Hot Mix Asphalt Design Data form must show documentation on aggregate quality.

If you cannot submit a Department-verified JMF on a Caltrans Hot Mix Asphalt Verification form dated within 12 months before HMA production, the Engineer verifies the JMF.

Submit a new JMF if you change any of the following:

- 1. Target asphalt binder percentage greater than ±0.2 percent
- 2. Asphalt binder supplier
- 3. Combined aggregate gradation
- 4. Aggregate sources
- 5. Liquid antistrip producer or dosage
- 6. Average binder content in a new processed RAP stockpile by more than ±2.00 percent from the average RAP binder content reported on page 4 of your Contractor Hot Mix Asphalt Design Data form
- 7. Average maximum specific gravity in a new processed RAP stockpile by more than ±0.060 from the average maximum specific gravity value reported on page 4 of your Contractor Hot Mix Asphalt Design Data form
- 8. Any material in the JMF, except lime supplier and source

Allow the Engineer 5 business days from a complete JMF submittal for document review of the aggregate qualities, mix design, and JMF. The Engineer notifies you if the proposed JMF submittal is accepted.

If your JMF fails verification testing, submit an adjusted JMF based on your testing. The adjusted JMF must include a new Contractor Job Mix Formula Proposal form, Contractor Hot Mix Asphalt Design Data form, and the results of the failed verification testing.

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.

### 39-2.01A(3)(b)(ii) Job Mix Formula Renewal

You may request a JMF renewal by submitting:

- 1. Proposed JMF on a Contractor Job Mix Formula Proposal form
- Previously verified JMF documented on a Caltrans Hot Mix Asphalt Verification form dated within 12 months
- Mix design documentation on a Contractor Hot Mix Asphalt Design Data form used for the previously verified JMF

#### 39-2.01A(3)(b)(iii) Job Mix Formula Modification

For an authorized JMF, submit a modified JMF if you change any of the following:

- 1. Asphalt binder supplier
- 2. Liquid antistrip producer
- 3. Liquid antistrip dosage

You may change any of the above items only once during the Contract.

Submit your modified JMF request at least 15 days before production. Each modified JMF submittal must include:

- 1. Proposed modified JMF on Contractor Job Mix Formula Proposal form, marked *Modified*.
- Mix design records on Contractor Hot Mix Asphalt Design Data form for the authorized JMF to be modified.
- 3. JMF verification on Hot Mix Asphalt Verification form for the authorized JMF to be modified.
- 4. Test results for the modified JMF in compliance with the mix design specifications. Perform tests at the mix design OBC as shown on the Contractor Asphalt Mix Design Data form.

With an accepted modified JMF submittal, the Engineer verifies each modified JMF within 10 days of receiving all verification samples.

# 39-2.01A(3)(c) Quality Control Plan

With your proposed JMF submittal, submit a QC plan for HMA.

The QC plan must describe the organization and procedures for:

- 1. Controlling HMA quality characteristics
- 2. Taking samples, including sampling locations
- 3. Establishing, implementing, and maintaining QC
- 4. Determining when corrective actions are needed
- 5. Implementing corrective actions
- 6. Using methods and materials for backfilling core locations

The QC plan must address the elements affecting HMA quality, including:

- 1. Aggregates
- 2. Asphalt binder
- 3. Additives
- 4. Production
- 5. Paving

The QC plan must include aggregate QC sampling and testing during lime treatment.

The QC Plan must include action and suspension limits and details of corrective action to be taken if any process is outside of those limits. Suspension limits must not exceed specified acceptance criteria.

The QC plan must describe how test results will be submitted including times for sampling and testing for each quality characteristic.

Allow 5 business days for review of the QC plan.

If you change QC procedures, personnel, or sample testing locations, submit a QC plan supplement before implementing the proposed change. Allow 3 business days for review of the QC plan supplement.

# 39-2.01A(3)(d) Test Results

For mix design, JMF verification, production start-up, and each 10,000 tons, submit AASHTO T 283 and AASHTO T 324 (Modified) test results to the Engineer.

Submit all QC test results, except AASHTO T 283 and AASHTO T 324 (Modified), within 3 business days of a request. Submit AASHTO T 283 QC tests within 15 days of sampling.

For tests performed under AASHTO T 324 (Modified), submit test data and 1 tested sample set within 5 business days of sampling.

If coarse and fine durability index tests are required, submit test results within 2 business days of sampling.

If a tapered notched wedge is used, submit compaction test result values within 24 hours of testing.

# 39-2.01A(3)(e) Reserved

# 39-2.01A(3)(f) Liquid Antistrip Treatment

If liquid antistrip treatment is used, submit the following with your proposed JMF submittal:

- 1. One 1 pt sample
- 2. Infrared analysis, including copy of absorption spectra
- 3. Certified copy of test results
- 4. Certificate of compliance for each liquid antistrip shipment. On each certificate of compliance, include:
  - 4.1. Your signature and printed name
  - 4.2. Shipment number
  - 4.3. Material type
  - 4.4. Material specific gravity
  - 4.5. Refinery
  - 4.6. Consignee
  - 4.7. Destination
  - 4.8. Quantity
  - 4.9. Contact or purchase order number
  - 4.10. Shipment date
- 5. Proposed proportions for the liquid antistrip

For each delivery of liquid antistrip to the HMA production plant, submit a 1 pt sample to the Engineer. Submit shipping documents. Label each liquid antistrip sampling container with:

- 1. Liquid antistrip type
- 2. Application rate
- 3. Sample date
- 4. Contract number

At the end of each day's production shift, submit production data in electronic media. Present data on electronic media in a tab delimited format. Use line feed carriage return with 1 separate record per line for each production data set. Allow enough fields for the specified data. Include data titles at least once per report. For each HMA mixing plant type, submit the following information in the order specified:

- 1. For batch plant mixing:
  - 1.1. Production date
  - 1.2. Time of batch completion
  - 1.3. Mix size and type
  - 1.4. Each ingredient's weight
  - 1.5. Asphalt binder content as a percentage of the total weight of mix

- 1.6. Liquid antistrip content as a percentage of the asphalt binder weight
- 2. For continuous mixing plant:
  - 2.1. Production date
  - 2.2. Data capture time
  - 2.3. Mix size and type
  - 2.4. Flow rate of wet aggregate collected directly from the aggregate weigh belt
  - 2.5. Aggregate moisture content as a percentage of the dry aggregate weight
  - 2.6. Flow rate of asphalt binder collected from the asphalt binder meter
  - 2.7. Flow rate of liquid antistrip collected from the liquid antistrip meter
  - 2.8. Asphalt binder content as a percentage of the total weight of mix calculated from:
    - 2.8.1. Aggregate weigh belt output
    - 2.8.2. Aggregate moisture input
    - 2.8.3. Asphalt binder meter output
  - 2.9. Liquid antistrip content as a percentage of the asphalt binder weight calculated from:
    - 2.9.1. Asphalt binder meter output
    - 2.9.2. Liquid antistrip meter output

# 39-2.01A(3)(g) Lime Treatment

If aggregate lime treatment is used, submit the following with your proposed JMF submittal and each time you produce lime-treated aggregate:

- 1. Exact lime proportions for fine and coarse virgin aggregates
- 2. If marination is required, the averaged aggregate quality test results within 24 hours of sampling
- 3. For dry lime aggregate treatment, a treatment data log from the dry lime and aggregate proportioning device in the following order:
  - 3.1. Treatment date
  - 3.2. Time of day the data is captured
  - 3.3. Aggregate size being treated
  - 3.4. HMA type and mix aggregate size
  - 3.5. Wet aggregate flow rate collected directly from the aggregate weigh belt
  - 3.6. Aggregate moisture content, expressed as a percentage of the dry aggregate weight
  - 3.7. Flow rate of dry aggregate calculated from the flow rate of wet aggregate
  - 3.8. Dry lime flow rate
  - 3.9. Lime ratio from the authorized JMF for each aggregate size being treated
  - 3.10. Lime ratio from the authorized JMF for the combined aggregates
  - 3.11. Actual lime ratio calculated from the aggregate weigh belt output, aggregate moisture input, and dry lime meter output, expressed as a percentage of the dry aggregate weight
  - 3.12. Calculated difference between the authorized lime ratio and the actual lime ratio
- 4. For lime slurry aggregate treatment, a treatment data log from the slurry proportioning device in the following order:
  - 4.1. Treatment date
  - 4.2. Time of day the data is captured
  - 4.3. Aggregate size being treated
  - 4.4. Wet aggregate flow rate collected directly from the aggregate weigh belt
  - 4.5. Moisture content of the aggregate just before treatment, expressed as a percentage of the dry aggregate weight
  - 4.6. Dry aggregate flow rate calculated from the wet aggregate flow rate
  - 4.7. Lime slurry flow rate measured by the slurry meter
  - 4.8. Dry lime flow rate calculated from the slurry meter output
  - 4.9. Authorized lime ratio for each aggregate size being treated
  - 4.10. Actual lime ratio calculated from the aggregate weigh belt and slurry meter output, expressed as a percentage of the dry aggregate weight
  - 4.11. Calculated difference between the authorized lime ratio and actual lime ratio
  - 4.12. Dry lime and water proportions at the slurry treatment time

Each day during lime treatment, submit the treatment data log on electronic media in tab delimited format. Each continuous treatment data set must be a separate record using a line feed carriage return to present the specified data on 1 line. The reported data must include data titles at least once per report.

# 39-2.01A(3)(h) Warm Mix Asphalt Technology

If a WMA technology is used, submit the following with your proposed JMF submittal:

- 1. SDS for the WMA technology
- 2. For water injection foam technology:
  - 2.1. Name of technology
  - 2.2. Proposed foaming water content
  - 2.3. Proposed HMA production temperature range
  - 2.4. Certification from binder supplier stating no antifoaming agent is used
- 3. For additive technology:
  - 3.1. Name of technology
  - 3.2. Percent admixture by weight of binder and percent admixture by total weight of HMA as recommended by the manufacturer
  - 3.3. Methodology for inclusion of admixture in laboratory-produced HMA
  - 3.4. Proposed HMA production temperature range

Collect and hold data for the duration of the Contract and submit the electronic media daily. The snapshot of production data must include the following:

- 1. Production date
- 2. Production location
- 3. Time of day the data is captured
- 4. HMA mix type being produced and target binder rate
- 5. HMA additive type, brand, and target rate
- 6. Temperature of the binder and HMA mixture
- 7. For a continuous mixing plant, the rate of flow of the dry aggregate calculated from the wet aggregate flow rate as determined by the conveyor scale
- 8. For a continuous mixing plant, the rate of flow of the asphalt meter
- 9. For a continuous mixing plant, the rate of flow of HMA additive meter
- 10. For batch plant mixing, actual batch weights of all ingredients
- 11. Dry aggregate to binder ratio calculated from metered ingredient output
- 12. Dry aggregate to HMA additive ratio calculated from metered output

At the end of each day's production shift, submit electronic media from the HMA plant process controller. Present data on electronic media in comma-separated values or tab-separated values format. The captured data for the ingredients represented by the production snapshot must have allowances for sufficient fields to satisfy the amount of data required by these specifications and include data titles at least once per report.

# 39-2.01A(3)(i) Reserved

# 39-2.01A(3)(m)–39-2.01A(3)(o) Reserved 39-2.01A(4) Quality Assurance 39-2.01A(4)(a) General

AASHTO T 324 (Modified) is AASHTO T 324 with the following parameters:

- 1. Target air voids must equal 7.0 ± 1.0 percent
- 2. Specimen height must be 60 ± 1 mm
- 3. Number of test specimens must be 4 to run 2 tests
- 4. Do not average the 2 test results
- 5. Test specimen must be a 150 mm gyratory compacted specimen
- 6. Test temperature must be set at:

- 6.1.  $113 \pm 2$  degrees F for PG 58
- 6.2. 122 ± 2 degrees F for PG 64
- 6.3.  $131 \pm 2$  degrees F for PG 70 and above
- 7. Measurements for impression must be taken at every 100 passes along the total length of the sample
- 8. Inflection point is the number of wheel passes at the intersection of the creep slope and the stripping slope at maximum rut depth
- 9. Testing shut off must be set at 25,000 passes
- 10. Submersion time for samples must not exceed 4 hours

Take samples under California Test 125.

If a WMA technology is used, a technical representative for the WMA technology must attend the preconstruction meeting.

# 39-2.01A(4)(b) Job Mix Formula Verification

The Engineer verifies the JMF from samples taken from HMA produced by the plant to be used. The production set point at the plant must be within ±0.2 from the asphalt binder percentage TV shown in your Contractor Job Mix Formula Proposal form. Notify the Engineer at least 2 business days before sampling materials. Samples may be taken from a different project including a non-Department project if you make arrangements for the Engineer to be present during sampling.

In the Engineer's presence and from the same production run, take samples of:

- 1. Aggregates. Coarse, fine, and supplemental fine aggregates must be taken from the combined cold-feed belt or the hot bins. If lime treatment is required, samples must be taken from individual stockpiles before lime treatment. Samples must be at least 120 lb for each coarse aggregate, 80 lb for each fine aggregate, and 10 lb for each type of supplemental fine aggregate. For hot-bin samples, the Department combines these aggregate samples to verify the TV submitted on a Contractor Job Mix Formula Proposal form.
- 2. Asphalt binder. Take at least four 1 qt samples. Each sample must be in a cylindrical-shaped can with an open top and friction lid. If the asphalt binder is modified or rubberized, the asphalt binder must be sampled with the components blended in the proportions to be used.
- 3. RAP. Samples must be at least 50 lb from each fractionated stockpile used or 100 lb from the belt.
- 4. Plant-produced HMA. The HMA samples must be at least 250 lb.

For aggregate, RAP, and HMA, split the samples into at least 4 parts and label their containers.

Submit 3 parts and keep 1 part.

After acceptance of the JMF submittal, the Engineer verifies each proposed JMF within 20 days of receiving all verification samples.

For JMF verification, the Engineer tests the following for compliance with the specifications:

- 1. Aggregate quality
- 2. Aggregate gradation
- 3. Voids in mineral aggregate on laboratory-produced HMA
- 4. HMA quality characteristics for Department acceptance

To verify the HMA for air voids, voids in mineral aggregate, and dust proportion, the Engineer uses an average of 3 briquettes. The Engineer tests plant-produced material.

If the Engineer verifies the JMF, the Engineer furnishes you a Hot Mix Asphalt Verification form.

If the Engineer's test results on plant-produced samples do not show compliance with the specifications, the Engineer notifies you. Adjust your JMF based on your testing unless the Engineer authorizes reverification without adjustments. JMF adjustments may include a change in:

- Asphalt binder content TV up to ±0.20 percent from the OBC value submitted on the Contractor Hot Mix Asphalt Design Data form
- 2. Aggregate gradation TV within the TV limits specified in the aggregate gradation table

You may adjust the JMF only once due to a failed verification test.

For each HMA type and aggregate size specified, the Engineer verifies up to 2 proposed JMF submittals including a JMF adjusted after verification failure. If you submit more than 2 JMFs for each type of HMA and aggregate size, the Engineer deducts \$3,000 from payments for each verification exceeding this limit. This deduction does not apply to verifications initiated by the Engineer or if a JMF expires while HMA production is stopped longer than 30 days.

A verified JMF is valid for 12 months.

# 39-2.01A(4)(c) Job Mix Formula Authorization

You may start HMA production if:

- 1. Engineer's review of the JMF shows compliance with the specifications
- 2. Department has verified the JMF within 12 months before HMA production
- 3. Engineer authorizes the verified JMF

#### 39-2.01A(4)(d) Job Mix Formula Renewal

For a JMF renewal and upon request, in the Engineer's presence and from the same production run, take samples of:

- Aggregates. Coarse, fine, and supplemental fine aggregates must be taken from the combined cold-feed belt or the hot bins. If lime treatment is required, samples must be taken from individual stockpiles before lime treatment. Samples must be at least 120 lb for each coarse aggregate, 80 lb for each fine aggregate, and 10 lb for each type of supplemental fines. For hot-bin samples, the Department combines these aggregate samples to verify the TV submitted on a Contractor Job Mix Formula Proposal form.
- 2. Asphalt binder. Take at least four 1 qt samples. Each sample must be in a cylindrical-shaped can with an open top and friction lid. If the asphalt binder is modified or rubberized, the asphalt binder must be sampled with the components blended in the proportions to be used.
- 3. RAP. Samples must be at least 50 lb from each fractionated stockpile.
- 4. Plant-produced HMA. The HMA samples must be at least 250 lb.

Notify the Engineer at least 2 business days before sampling materials. For aggregate, RAP, and HMA, split samples into at least 4 parts. Submit 3 parts and use 1 part for your testing.

Allow the Engineer 5 business days from a complete JMF reverification submittal for document review of the aggregate qualities, mix design, and JMF.

The most recent aggregate quality test results within the past 12 months may be used for verification of JMF renewal or upon request, the Engineer may perform aggregate quality tests for verification of JMF renewal.

The Engineer verifies the JMF for renewal under section 39-2.01A(4)(b) except:

- 1. Engineer keeps the samples until you provide test results for your part on a Contractor Job Mix Formula Renewal form.
- 2. Department tests samples of materials obtained from the HMA production unit after you submit test results that comply with the mix design specifications.
- 3. After completion of the JMF verification renewal document review, the Engineer verifies each proposed JMF within 20 days of receiving the verification renewal samples and the complete Contractor Job Mix Formula Renewal form.
- 4. You may not adjust the JMF due to a failed verification.

5. For each HMA type and aggregate gradation specified, the Engineer verifies at no cost to you 1 proposed JMF renewal within a 12-month period.

If the Engineer verifies the JMF renewal, the Engineer furnishes you a Hot Mix Asphalt Verification form. The Hot Mix Asphalt Verification form is valid for 12 months.

# 39-2.01A(4)(e) Job Mix Formula Modification

The Engineer verifies the modified JMF after the modified JMF HMA is placed and verification samples are taken within the first 750 tons. The Engineer tests verification samples for compliance with:

- 1. Hamburg wheel track mix design specifications
- 2. Air void content
- 3. Voids in mineral aggregate on plant-produced HMA mix design specifications
- 4. Dust proportion mix design specifications

The Engineer may test for moisture susceptibility for compliance with the mix design specifications.

If the modified JMF is verified, the Engineer revises your Hot Mix Asphalt Verification form to include the new asphalt binder source, new liquid antistrip producer, or new liquid antistrip dosage. 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 JMF modification.

# 39-2.01A(4)(f) Certifications

# 39-2.01A(4)(f)(i) General

Laboratories testing aggregate and HMA qualities used to prepare the mix design and JMF must be qualified under AASHTO Re:Source program and the Caltrans Independent Assurance Program.

# 39-2.01A(4)(f)(ii) Hot Mix Asphalt Plants

Before production, the HMA plant must have a current qualification under the Caltrans Material Plant Quality Program.

#### 39-2.01A(4)(f)(iii)-39-2.01A(4)(f)(v) Reserved

39-2.01A(4)(g) Reserved

39-2.01A(4)(h) Quality Control

# 39-2.01A(4)(h)(i) General

QC test results must comply with the specifications for Department acceptance.

Prepare 3 briquettes for air voids content and voids in mineral aggregate determination. Report the average of 3 tests.

Except for smoothness, if 2 consecutive QC test results or any 3 QC test results for 1 day's production do not comply with the materials specifications:

- 1. Stop HMA production
- 2. Notify the Engineer
- 3. Take corrective action
- 4. Demonstrate compliance with the specifications before resuming production and placement

For QC tests performed under AASHTO T 27, results are considered 1 QC test regardless of number of sieves out of compliance.

Do not resume production and placement until the Engineer authorizes your corrective action proposal.

You are not entitled to compensation for the suspension of work resulting from noncompliance with quality control requirements, including those identified in the QC Plan.

39-2.01A(4)(h)(ii) Reserved 39-2.01A(4)(h)(iii) Aggregates 39-2.01A(4)(h)(iii)(A) General

Reserved

# 39-2.01A(4)(h)(iii)(B) Aggregate Lime Treatments

If lime treatment is required, sample coarse and fine aggregates from individual stockpiles before lime treatment. Combine aggregate in the JMF proportions. Test the aggregates under the test methods and frequencies shown in the following table:

**Aggregate Quality Control During Lime Treatment** 

Quality characteristic	Test method	Minimum sampling and testing frequency
Sand equivalent <sup>a, b</sup>	A A CLITO T 47C	- 1 7
	AASHTO T 176	1 per 750 tons of untreated aggregate
Percent of crushed particles	AASHTO T 335	1
Los Angeles Rattler	AASHTO T 96	1 per 10 000 tana ar 2 per project
Fine aggregate angularity	AASHTO T 304, Method A	1 per 10,000 tons or 2 per project whichever is greater
Flat and elongated particles	ASTM D4791	willchever is greater
Fine durability index	AASHTO T 210	

<sup>&</sup>lt;sup>a</sup>Report test results as the average of 3 tests from a single sample.

For lime slurry aggregate treatment, determine the aggregate moisture content at least once every 2 hours of treatment. Calculate moisture content under AASHTO T 255 and report it as a percent of dry aggregate weight. Use the moisture content calculations as a set point for the proportioning process controller.

The device controlling lime and aggregate proportioning must produce a treatment data log. The log must consist of a series of data sets captured at 10-minute intervals throughout daily treatment. The data must be a treatment activity register and not a summation. The material represented by a data set is the quantity produced 5 minutes before and 5 minutes after the capture time. Collected data must be stored by the controller for the duration of the Contract.

If 3 consecutive sets of recorded treatment data indicate a deviation of more than 0.2 percent above or below the lime ratio in the authorized JMF, stop treatment and take corrective action.

If a set of recorded treatment data indicates a deviation of more than 0.4 percent above or below the lime ratio in the authorized JMF, stop treatment and do not use the material represented by that set of data in HMA.

If 20 percent or more of the total daily treatment indicates a deviation of more than 0.2 percent above or below the lime ratio in the authorized JMF, stop treatment and do not use that day's treated aggregate in HMA.

The Engineer may order you to stop aggregate treatment activities for any of following:

- 1. You fail to submit treatment data log.
- 2. You fail to submit aggregate QC data for marinated aggregate.

<sup>&</sup>lt;sup>b</sup>Use of a sand reading indicator is required as shown in AASHTO T 176, Figure 1. Sections 4.7, "Manual Shaker," 7.1.2, "Alternate Method No. 2," 8.4.2, "Manual Shaker Method, and 8.4.3, "Hand Method," do not apply. Prepare the stock solution as specified in section 4.8.1, "Stock solution with formaldehyde," except omit the addition of formaldehyde.

- 3. You submit incomplete, untimely, or incorrectly formatted data.
- 4. You do not take corrective actions.
- 5. You take late or unsuccessful corrective actions.
- 6. You do not stop treatment when proportioning tolerances are exceeded.
- 7. You use malfunctioning or failed proportioning devices.

If you stop treatment for noncompliance, notify the Engineer of any corrective actions taken and conduct a successful 20-minute test run before resuming treatment.

# 39-2.01A(4)(h)(iv) Liquid Antistrip Treatment

For continuous mixing or batch-plant mixing, sample asphalt binder before adding liquid antistrip. For continuous mixing, sample the combined asphalt binder and liquid antistrip after the static mixer.

#### 39-2.01A(4)(h)(v) Production Start-up Evaluation

You and the Engineer evaluate HMA production and placement at production start-up.

Within the first 750 tons produced on the 1st day of HMA production, in the Engineer's presence, and from the same production run, take samples of:

- 1. Aggregates. Samples must be at least 120 lb for each coarse aggregate, 80 lb for each fine aggregate, and 10 lb for each type of supplemental fines. For hot-bin samples, the Department combines these aggregate samples.
- 2. Asphalt binder. Take at least four 1 qt samples. Each sample must be in a cylindrical-shaped can with an open top and friction lid. If the asphalt binder is modified or rubberized, the asphalt binder must be sampled with the components blended in the proportions to be used.
- 3. RAP. Samples must be at least 50 lb..
- 4. HMA. The HMA samples must be at least 250 lb.

Sample aggregates from the combined cold-feed belt or hot bin. Take RAP samples from the RAP system.

For aggregates, RAP, and HMA, split the samples into at least 4 parts and label their containers. Submit 3 parts and keep 1 part.

You and the Engineer must test the samples and report test results, except for AASHTO T 324 (Modified) and AASHTO T 283 test results, within 5 business days of sampling. For AASHTO T 324 (Modified) and AASHTO T 283 test results, report test results within 15 days of sampling. If you proceed before receipt of the test results, the Engineer may consider the HMA placed to be represented by these test results.

# 39-2.01A(4)(h)(vi) Hot Mix Asphalt Density

During HMA placement determine HMA density using a nuclear gauge. On the 1st day of production, develop a correlation factor between cores and nuclear gauge under California Test 375.

Test for in-place density using cores and a nuclear gauge. Test at random locations you select and include the test results in your QC production tests reports.

#### 39-2.01A(4)(h)(vii) RESERVED

# 39-2.01A(4)(h)(viii) Density Cores

Except for HMA pavement placed using method compaction, take 4- or 6-inch diameter density cores at least once every 5 business days. Take 1 density core for every 250 tons of HMA from random locations the Engineer selects. Take density cores in the Engineer's presence, and backfill and compact holes with authorized material. Before submitting a density core, mark it with the density core's location and place it in a protective container.

If a density core is damaged, replace it with a density core taken within 1 foot longitudinally from the original density core location. Relocate any density core located within 1 foot of a rumble strip to 1 foot transversely away from the rumble strip.

For a tapered notched wedge joint, take 4- or 6-inch diameter density cores 6 inches from the upper vertical notch of the completed longitudinal joint for every 3,000 feet at locations selected by the Engineer. Take cores after the adjacent lane is placed and before opening the pavement to traffic. Take cores in the presence of the Engineer, and backfill and compact holes with authorized material. Before submitting a density core, mark it with the core's location, and place it in a protective container.

# 39-2.01A(4)(h)(ix) Pavement Smoothness

For HMA pavement within 3 feet from and parallel to the construction joint formed between curbs, gutters, or existing pavement, test pavement smoothness using a 12-foot straightedge.

# 39-2.01A(4)(h)(x) Reserved

# 39-2.01A(4)(i) Department Acceptance

# 39-2.01A(4)(i)(i) General

The Department tests treated aggregate for acceptance before lime treatment except for gradation.

The Engineer takes HMA samples for AASHTO T 283 and AASHTO T 324 (Modified) from any of the following locations:

- 1. Plant
- 2. Truck
- 3. Windrow

The Engineer takes HMA samples for all other tests from any of the following locations:

- 1. Plant
- 2. Truck
- 3. Windrow
- 4. Mat behind the paver

To obtain workability of the HMA sample for splitting, the Engineer reheats each sample of HMA mixture not more than 2 cycles. Each reheat cycle is performed by placing the loose mixture in a mechanical forced-draft oven for 2 hours or less after the sample reaches 140 degrees F.

The Engineer splits samples and provides you with a part if you request this.

No single aggregate or HMA test result may represent more than 750 tons or one day's production, whichever is less, except AASHTO T 283 and AASHTO T 324 (Modified).

Except for smoothness, if 2 consecutive Department acceptance test results or any 3 Department acceptance test results for 1 day's production do not comply with the specifications:

- 1. Stop HMA production
- 2. Take corrective action
- 3. Demonstrate compliance with the specifications before resuming production and placement

For Department acceptance tests performed under AASHTO T 27, results are considered 1 Department acceptance test regardless of the number of sieves out of compliance.

The Engineer accepts HMA based on:

- 1. Authorized JMF
- 2. Authorized QC plan
- 3. Asphalt binder compliance
- 4. Asphalt emulsion compliance

- 5. Visual inspection
- 6. Pavement smoothness

# 39-2.01A(4)(i)(ii) In-Place Density

Except for HMA pavement placed using method compaction, the Engineer tests the density core you take from each 250 tons of HMA. The Engineer determines the percent of theoretical maximum density for each density core by determining the density core's density and dividing by the theoretical maximum density.

Density cores must be taken from the final layer, cored through the entire pavement thickness shown. Where OGFC is required, take the density cores before placing OGFC.

If the percent of theoretical maximum density does not comply with the specifications, the Engineer may accept the HMA and take a payment deduction as shown in the following table:

**Reduced Payment Factors for Percent of Maximum Theoretical Density** 

HMA percent of	Reduced payment	HMA percent of	Reduced payment
maximum theoretical	factor	maximum theoretical	factor
density		density	
91.0	0.0000	97.0	0.0000
90.9	0.0125	97.1	0.0125
90.8	0.0250	97.2	0.0250
90.7	0.0375	97.3	0.0375
90.6	0.0500	97.4	0.0500
90.5	0.0625	97.5	0.0625
90.4	0.0750	97.6	0.0750
90.3	0.0875	97.7	0.0875
90.2	0.1000	97.8	0.1000
90.1	0.1125	97.9	0.1125
90.0	0.1250	98.0	0.1250
89.9	0.1375	98.1	0.1375
89.8	0.1500	98.2	0.1500
89.7	0.1625	98.3	0.1625
89.6	0.1750	98.4	0.1750
89.5	0.1875	98.5	0.1875
89.4	0.2000	98.6	0.2000
89.3	0.2125	98.7	0.2125
89.2	0.2250	98.8	0.2250
89.1	0.2375	98.9	0.2375
89.0	0.2500	99.0	0.2500
<89.0	Remove and replace	>99.0	Remove and replace

For acceptance of a completed tapered notched wedge joint, the Engineer determines density from cores you take every 3,000 feet.

# 39-2.01A(4)(i)(iii) RESERVED

# 39-2.01A(4)(i)(iv) Dispute Resolution

You and the Engineer must work together to avoid potential conflicts and to resolve disputes regarding test result discrepancies. Notify the Engineer within 5 business days of receiving a test result if you dispute the test result.

If you or the Engineer dispute the other's test results, submit your test results and copies of paperwork including worksheets used to determine the disputed test results. An independent third party performs referee testing. Before the third party participates in a dispute resolution, it must be qualified under AASHTO Materials Reference Laboratory program, and the Caltrans' Independent Assurance Program.

The independent third party must have no prior direct involvement with this Contract. By mutual agreement, the independent third party is chosen from:

- 1. Caltrans laboratory in a district or region not in the district or region the project is located
- 2. Caltrans Transportation Laboratory
- 3. Laboratory not currently employed by you or your HMA producer

If the Department's portion of the split QC samples or acceptance samples are not available, the independent third party uses any available material representing the disputed HMA for evaluation.

For a dispute involving JMF verification, the independent third party performs referee testing as specified in the 5th paragraph of section 39-2.01A(4)(b).

If the independent third party determines the Department's test results are valid, the Engineer deducts the independent third party's testing costs from payments. If the independent third party determines your test results are valid, the Department pays the independent third party's testing costs.

39-2.01B Materials 39-2.01B(1) General Reserved

39-2.01B(2) Mix Design 39-2.01B(2)(a) General

The HMA mix design must comply with the Superpave HMA mix design as described in MS-2 Asphalt Mix Design Methods by the Asphalt Institute.

The Contractor Hot Mix Asphalt Design Data form must show documentation on aggregate quality.

#### 39-2.01B(2)(b) Hot Mix Asphalt Treatments

If the proposed JMF indicates that the aggregate is being treated with dry lime or lime slurry with marination, or the HMA with liquid antistrip, then testing the untreated aggregate under AASHTO T 283 and AASHTO T 324 is not required.

If HMA treatment is required or being used by the Contractor, determine the plasticity index of the aggregate blend under California Test 204.

Do not use an aggregate blend with a plasticity index greater than 10.

If the plasticity index is from 4 to 10, treat the aggregate blend with dry lime with marination or lime slurry with marination.

If the plasticity index is less than 4, treat the aggregate blend with dry lime or lime slurry with marination, or treat the HMA with liquid antistrip.

#### 39-2.01B(2)(c) Warm Mix Asphalt Technology

For HMA with WMA additive technology, produce HMA mix samples for your mix design using your methodology for inclusion of WMA admixture in laboratory-produced HMA. Cure the samples in a forcedair draft oven at 275 degrees F for 4 hours  $\pm$  10 minutes.

For WMA water injection foam technology, the use of foamed asphalt for mix design is not required.

#### 39-2.01B(3) Asphalt Binder

Asphalt binder must comply with section 92.

For a leveling course, the grade of asphalt binder for the HMA must be PG 64-10 or PG 64-16.

#### 39-2.01B(4) Aggregates

# 39-2.01B(4)(a) General

Aggregates must be clean and free from deleterious substances.

The aggregates for a leveling course must comply with the grading specifications for Type A HMA in section 39-2.02B(4)(b).

#### 39-2.01B(4)(b) Aggregate Gradations

Aggregate gradation must be determined before the addition of asphalt binder and must include supplemental fine aggregates. Test for aggregate gradation under AASHTO T 27. Do not wash the coarse aggregate. Wash the fine aggregate only. Use a mechanical sieve shaker. Aggregate shaking time must not exceed 10 minutes for each coarse and fine aggregate portion.

Choose a TV within the TV limits shown in the tables titles "Aggregate Gradation for Type A HMA (Percentage Passing)".

Gradations are based on nominal maximum aggregate size.

# 39-2.01B(4)(c) Aggregate Lime Treatments

#### 39-2.01B(4)(c)(i) General

If aggregate lime treatment is required as specified in section 39-2.01B(2)(b), the virgin aggregate must comply with the aggregate quality specifications.

Lime for treating aggregate must comply with section 24-2.02.

Water for lime treatment of aggregate with lime slurry must comply with section 24-1.02B.

Notify the Engineer at least 24 hours before the start of aggregate treatment.

Do not treat RAP.

The lime ratio is the pounds of dry lime per 100 lb of dry virgin aggregate expressed as a percentage. Water content of slurry or untreated aggregate must not affect the lime ratio.

Coarse and fine aggregate fractions must have the lime ratio ranges shown in the following table:

Aggregate fractions	Lime ratio percent
Coarse	0.4–1.0
Fine	1.5–2.0
Combined	0.8–1.5

The lime ratio for fine and coarse aggregate must be within ±0.2 percent of the lime ratio in the accepted JMF. The lime ratio must be within ±0.2 percent of the authorized lime ratio when you combine the individual aggregate sizes in the JMF proportions. The lime ratio must be determined before the addition of RAP.

If marination is required, marinate treated aggregate in stockpiles from 24 hours to 60 days before using in HMA. Do not use aggregate marinated longer than 60 days.

Treated aggregate must not have lime balls or clods.

#### 39-2.01B(4)(c)(ii) Dry Lime

If marination is required:

- 1. Treat and marinate coarse and fine aggregates separately
- 2. Treat the aggregate and stockpile for marination only once
- 3. Treat the aggregate separately from HMA production

Proportion dry lime by weight with an automatic continuous proportioning system.

If you use a batch-type proportioning system for HMA production, control proportioning in compliance with the specifications for continuous mixing plants. Use a separate dry lime aggregate treatment system for HMA batch mixing including:

- 1. Pugmill mixer
- 2. Controller
- 3. Weigh belt for the lime
- 4. Weigh belt for the aggregate

If a continuous mixing plant for HMA production without lime-marinated aggregates is used, use a controller that measures the blended aggregate weight after any additional water is added to the mixture. The controller must determine the quantity of lime added to the aggregate from the aggregate weigh belt input in connection with the manually input total aggregate moisture, the manually input target lime content, and the lime proportioning system output. Use a continuous aggregate weigh belt and pugmill mixer for lime treatment in addition to the weigh belt for the aggregate proportioning to asphalt binder in the HMA plant. If you use a water meter for moisture control for lime treatment, the meter must comply with Caltrans' MPQP manual.

When mixing dry lime with aggregate, the aggregate moisture content must ensure complete lime coating. The aggregate moisture content must not cause aggregate to be lost between the point of weighing the combined aggregate continuous stream and the dryer. Add water to the aggregate for mixing and coating before dry lime addition. Immediately before mixing lime with aggregate, water must not visibly separate from the aggregate.

Mix aggregate, water, and dry lime with a continuous pugmill mixer with twin shafts. Immediately before mixing lime with aggregate, water must not visibly separate from the aggregate. Store dry lime in a uniform and free-flowing condition. Introduce dry lime to the pugmill in a continuous process. The introduction must occur after the aggregate cold feed and before the point of proportioning across a weigh belt and the aggregate dryer. Prevent loss of dry lime.

The pugmill must be equipped with paddles arranged to provide sufficient mixing action and mixture movement. The pugmill must produce a homogeneous mixture of uniformly coated aggregates at mixer discharge.

If the aggregate treatment process is stopped longer than 1 hour, clean the equipment of partially treated aggregate and lime.

Aggregate must be completely treated before introduction into the mixing drum.

# 39-2.01B(4)(c)(iii) Lime Slurry

For lime slurry aggregate treatment, treat aggregate separate from HMA production. Stockpile and marinate the aggregate.

Proportion lime and water with a continuous or batch mixing system.

Add lime to the aggregate as slurry consisting of mixed dry lime and water at a ratio of 1 part lime to from 2 to 3 parts water by weight. The slurry must completely coat the aggregate.

Immediately before mixing lime slurry with the aggregate, water must not visibly separate from the aggregate.

Proportion lime slurry and aggregate by weight in a continuous process.

#### 39-2.01B(5) Liquid Antistrip Treatment

Liquid antistrip must be from 0.25 to 1.0 percent by weight of asphalt binder. Do not use liquid antistrip as a substitute for asphalt binder.

Liquid antistrip total amine value must be 325 minimum when tested under ASTM D2074.

Use only 1 liquid antistrip type or brand at a time. Do not mix liquid antistrip types or brands.

Store and mix liquid antistrip under the manufacturer's instructions.

# 39-2.01B(6)-39-2.01B(7) Reserved

# 39-2.01B(8) Hot Mix Asphalt Production

#### 39-2.01B(8)(a) General

Do not start HMA production before verification and authorization of JMF.

The HMA plant must have a current qualification under Caltrans' Material Plant Quality Program.

Weighing and metering devices used for the production of HMA modified with additives must comply with Caltrans' *MPQP*. If a loss-in-weight meter is used for dry HMA additive, the meter must have an automatic and integral material delivery control system for the refill cycle.

Calibrate the loss-in-weight meter by:

- 1. Including at least 1 complete system refill cycle during each calibration test run
- 2. Operating the device in a normal run mode for 10 minutes immediately before starting the calibration process
- 3. Isolating the scale system within the loss-in-weight feeder from surrounding vibration
- 4. Checking the scale system within the loss-in-weight feeder for accuracy before and after the calibration process and daily during mix production
- 5. Using a minimum 15 minute or minimum 250 lb test run size for a dry ingredient delivery rate of less than 1 ton per hour.
- 6. Complying with the limits of Table B, "Conveyor Scale Testing Extremes," in Caltrans' MPQP

Proportion aggregate by hot or cold-feed control.

Aggregate temperature must not be more than 375 degrees F when mixed with the asphalt binder.

Asphalt binder temperature must be from 275 to 375 degrees F when mixed with aggregate.

Mix HMA ingredients into a homogeneous mixture of coated aggregates.

HMA must be produced at the temperatures shown in the following table:

**HMA Production Temperatures** 

HMA compaction	Temperature (°F)
HMA	
Density based	≤ 325
Method	305–325
HMA with WMA technology	
Density based	240–325
Method	260–325

If you stop production for longer than 30 days, a production start-up evaluation is required.

# 39-2.01B(8)(b) Liquid Antistrip

If 3 consecutive sets of recorded production data show that the actual delivered liquid antistrip weight is more than ±1 percent of the authorized mix design liquid antistrip weight, stop production and take corrective action.

If a set of recorded production data shows that the actual delivered liquid antistrip weight is more than ±2 percent of the authorized mix design liquid antistrip weight, stop production. If the liquid antistrip weight exceeds 1.2 percent of the asphalt binder weight, do not use the HMA represented by that data.

The continuous mixing plant controller proportioning the HMA must produce a production data log. The log must consist of a series of data sets captured at 10-minute intervals throughout daily production. The data must be a production activity register and not a summation. The material represented by the data is

the quantity produced 5 minutes before and 5 minutes after the capture time. For the duration of the Contract, the collected data must be stored by the plant controller or a computer's memory at the plant.

The Engineer orders proportioning activities stopped for any of the following reasons:

- 1. You fail to submit data
- 2. You submit incomplete, untimely, or incorrectly formatted data
- 3. You fail to take corrective actions
- 4. You take late or unsuccessful corrective actions
- 5. You fail to stop production when proportioning tolerances are exceeded
- 6. You use malfunctioning or failed proportioning devices

If you stop production, notify the Engineer of any corrective actions taken before resuming.

# 39-2.01B(8)(c) Warm Mix Asphalt Technology

Proportion all ingredients by weight. The HMA plant process controller must be the sole source of ingredient proportioning control and be fully interfaced with all scales and meters used in the production process. The addition of the HMA additive must be controlled by the plant process controller.

Liquid ingredient additive, including a normally dry ingredient made liquid, must be proportioned with a mass flow meter at continuous mixing plants. Use a mass flow meter or a container scale to proportion liquid additives at batch mixing plants.

Continuous mixing plants using HMA additives must comply with the following:

- 1. Dry ingredient additives for continuous production must be proportioned with a conveyor scale or a loss-in-weight meter.
- 2. HMA plant process controller and ingredient measuring systems must be capable of varying all ingredient-feed rates proportionate with the dry aggregate delivery at all production rates and rate changes.
- 3. Liquid HMA additive must enter the production stream with the binder. Dry HMA additive must enter the production stream at or before the mixing area.
- 4. If dry HMA additives are used at continuous mixing HMA plants, bag-house dust systems must return all captured material to the mix. This requirement is waived for lime-treated aggregates.
- 5. HMA additive must be proportioned to within ±0.3 percent of the target additive rate.

Batch mixing plants using HMA additives must comply with the following:

- 1. Metered HMA additive must be placed in an intermediate holding vessel before being added to the stream of asphalt binder as it enters the pugmill.
- 2. If a container scale is used, weigh additive before combining with asphalt binder. Keep the container scale separate from other ingredient proportioning. The container scale capacity must be no more than twice the volume of the maximum additive batch size. The container scale's graduations must be smaller than the proportioning tolerance or 0.001 times the container scale capacity.
- 3. Dry HMA additive proportioning devices must be separate from metering devices for the aggregates and asphalt binder. Proportion dry HMA additive directly into the pugmill, or place in an intermediate holding vessel to be added to the pugmill at the appropriate time in the batch cycle. Dry ingredients for batch production must be proportioned with a hopper scale.
- 4. Zero tolerance for the HMA additive batch scale is ±0.5 percent of the target additive weight. The indicated HMA additive batch scale weight may vary from the preselected weight setting by up to ±1.0 percent of the target additive weight.

# 39-2.01B(9) Geosynthetic Pavement Interlayer

Geosynthetic pavement interlayer must comply with the specifications for pavement fabric, paving mat, paving grid, paving geocomposite grid, or geocomposite strip membrane as shown.

The asphalt binder for geosynthetic pavement interlayer must be PG 64-10, PG 64-16, or PG 70-10.

# 39-2.01B(10) Tack Coat

Tack coat must comply with the specifications for asphaltic emulsion or asphalt binder. Choose the type and grade of emulsion or binder.

#### 39-2.01B(11) Miscellaneous Areas, Dikes, & Berms

For miscellaneous areas, dikes, and berms:

- 1. 1. Use Minor HMA.
- 2. Choose the aggregate gradation from:
  - 2.1. 3/8-inch Type A HMA aggregate gradation
  - 2.2. 1/2-inch Type A HMA aggregate gradation
  - 2.3. dike mix aggregate gradation
- 3. Choose asphalt binder Grade PG 64-10, PG 64-16 or PG 70-10.
- 4. Minimum asphalt binder content must be:
  - 4.1. 6.40 percent for 3/8-inch Type A HMA aggregate gradation
  - 4.2. 5.70 percent for 1/2-inch Type A HMA aggregate gradation
  - 4.3. 6.00 percent for dike mix aggregate gradation

If you request and the Engineer authorizes, you may reduce the minimum asphalt binder content.

Aggregate gradation for dike mix must be within the TV limits for the specified sieve size shown in the following table:

Dike Mix Aggregate Gradation (Percentage Passing)

	(1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
Sieve size	Target value limit	Allowable tolerance
1/2"	100	
3/8"		95 - 100
No. 4	73–77	TV ± 10
No. 8	58–63	TV ± 10
No. 30	29–34	TV ± 10
No. 200		0 - 14

For HMA used in miscellaneous areas, dikes, and berms, sections 39-2.01A(3), 39-2.01A(4), 39-2.01B(2), 39-2.01B(4)(c), and 39-2.01B(5)–(10) do not apply.

# 39-2.01C Construction

# 39-2.01C(1) General

Do not place HMA on wet pavement or 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 depositing, pickup, loading, and paving are continuous
- 4. For method compaction:
  - 4.1. The temperature of the HMA and the HMA produced with WMA water injection technology in the windrow does not fall below 260 degrees F
  - 4.2. The temperature of the HMA produced using WMA additive technology in the windrow does not fall below 250 degrees F

HMA placed in a windrow on the roadway surface must not extend more than 250 feet in front of the loading equipment or material transfer vehicle.

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
- 4. Marks
- 5. Tearing
- 6. Irregular Texture

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

# 39-2.01C(2) Spreading and Compacting Equipment 39-2.01C(2)(a) General

Paving equipment for spreading must be:

- 1. Self-propelled
- 2. Mechanical
- 3. Equipped with a screed or strike-off assembly that can distribute HMA the full width of a traffic lane
- 4. Equipped with a full-width compacting device
- 5. Equipped with automatic screed controls and sensing devices that control the thickness, longitudinal grade, and transverse screed slope

Install and maintain grade and slope references.

The screed must be heated and produce a uniform HMA surface texture without tearing, shoving, or gouging.

The paver must not leave marks such as ridges and indentations unless you can eliminate them by rolling.

Rollers must be equipped with a system that prevents HMA from sticking to the wheels. You may use a parting agent that does not damage the HMA or impede the bonding of layers.

In areas inaccessible to spreading and compacting equipment:

- 1. Spread the HMA by any means to obtain the specified lines, grades, and cross sections
- 2. Use a pneumatic tamper, plate compactor, or equivalent to achieve thorough compaction

# 39-2.01C(2)(b) Material Transfer Vehicle

If a material transfer vehicle is specified, the material transfer vehicle must have sufficient capacity to prevent stopping the paver and must be capable of:

- 1. Either receiving HMA directly from trucks or using a windrow pickup head to load it from a windrow deposited on the roadway surface
- 2. Remixing the HMA with augers before transferring into the paver's receiving hopper or feed system
- 3. Transferring HMA directly into the paver's receiving hopper or feed system

#### 39-2.01C(2)(c) Method Compaction Equipment

For method compaction, each paver spreading HMA must be followed by at least one of each of the following 3 types of rollers:

- 1. Breakdown roller must be a vibratory roller specifically designed to compact HMA. The roller must be capable of at least 2,500 vibrations per minute and must be equipped with amplitude and frequency controls. The roller's gross static weight must be at least 7.5 tons.
- 2. Intermediate roller must be an oscillating-type pneumatic-tired roller at least 4 feet wide. Pneumatic tires must be of equal size, diameter, type, and ply. The tires must be inflated to 60 psi minimum and maintained so that the air pressure does not vary more than 5 psi.
- 3. Finishing roller must be a steel-tired, 2-axle tandem roller. The roller's gross static weight must be at least 7.5 tons.

Each roller must have a separate operator. Rollers must be self-propelled and reversible.

39-2.01C(2)(d)-39-2.01C(2)(f) Reserved 39-2.01C(3) Surface Preparation

Before placing HMA, remove loose paving particles, dirt, and other extraneous material by any means including flushing and sweeping.

# 39-2.01C(3)(b) Subgrade

39-2.01C(3)(a) General

Prepare subgrade to receive HMA under the sections for the material involved. Subgrade must be free of loose and extraneous material.

39-2.01C(3)(c) Reserved 39-2.01C(3)(d) Reserved 39-2.01C(3)(e) Reserved 39-2.01C(3)(f) Tack Coat

Apply a tack coat:

- 1. To existing pavement including planed surfaces
- 2. Between HMA layers
- 3. To vertical surfaces of:
  - 3.1. Curbs
  - 3.2. Gutters
  - 3.3. Construction joints

Equipment for the application of tack coat must comply with section 37-1.03B.

Before placing HMA, apply a tack coat in 1 application at the minimum residual rate shown in the following table for the condition of the underlying surface:

**Tack Coat Application Rates for HMA** 

	ruok Gout Apphoution Rutto for Think			
	Minin	num residual rates (gal/s	sq yd)	
HMA over:	CSS1/CSS1h, SS1/SS1h and QS1h/CQS1h asphaltic emulsion	CRS1/CRS2, RS1/RS2 and QS1/CQS1 asphaltic emulsion	Asphalt binder and PMRS2/PMCRS2 and PMRS2h/PMCRS2h asphaltic emulsion	
New HMA (between layers)	0.02	0.03	0.02	
Concrete pavement and existing asphalt concrete surfacing	0.03	0.04	0.03	
Planed pavement	0.05	0.06	0.04	

If a stress absorbing membrane interlayer as specified in section 37-2.05 is applied, the tack coat application rates for new HMA apply.

Notify the Engineer if you dilute asphaltic emulsion with water. The weight ratio of added water to asphaltic emulsion must not exceed 1 to 1.

Measure added water either by weight or volume under section 9-1.02 or use water meters from water districts, cities, or counties. If you measure water by volume, apply a conversion factor to determine the correct weight.

With each dilution, submit:

- 1. Weight ratio of water to bituminous material in the original asphaltic emulsion
- 2. Weight of asphaltic emulsion before diluting
- 3. Weight of added water
- 4. Final dilution weight ratio of water to asphaltic emulsion

Apply a tack coat to vertical surfaces with a residual rate that will thoroughly coat the vertical face without running off.

If authorized, you may:

- 1. Change tack coat rates
- 2. Omit tack coat between layers of new HMA during the same work shift if:
  - 2.1. No dust, dirt, or extraneous material is present
  - 2.2. Surface is at least 140 degrees F

Immediately in advance of placing HMA, apply additional tack coat to damaged areas or where loose or extraneous material is removed.

Close areas receiving tack coat to traffic. Do not allow the tracking of tack coat onto pavement surfaces beyond the job site.

If you use an asphalt binder for tack coat, the asphalt binder temperature must be from 285 to 350 degrees F when applied.

# 39-2.01C(3)(g) Geosynthetic Pavement Interlayer

Where shown, place geosynthetic pavement interlayer over a coat of asphalt binder and in compliance with the manufacturer's instructions. Do not place the interlayer on a wet or frozen surface. If the interlayer, in compliance with the manufacturer's instructions, does not require asphalt binder, do not apply asphalt binder before placing the interlayer.

Before placing the interlayer or asphalt binder:

1. Clean the pavement of loose and extraneous material.

If the interlayer requires asphalt binder, immediately before placing the interlayer, apply asphalt binder at a rate specified by the interlayer manufacturer; at 0.25±0.03 gal per square yard of interlayer; or at a rate that just saturates the interlayer; whichever is greater. Apply asphalt binder the width of the interlayer plus 3 inches on each side. At an interlayer overlap, apply asphalt binder on the lower interlayer the same overlap distance as the upper interlayer.

If asphalt binder tracked onto the interlayer or brought to the surface by construction equipment causes interlayer displacement, cover it with a small quantity of HMA.

If the interlayer placement does not require asphalt binder, apply tack coat prior to placing HMA at the application rates specified under section 39-2.01C(3)(f) based on the condition of the underlying surface on which the interlayer was placed.

Align and place the interlayer with no overlapping wrinkles, except a wrinkle that overlaps may remain if it is less than 1/2 inch thick. If the overlapping wrinkle is more than 1/2 inch thick, cut the wrinkle out and overlap the interlayer no more than 2 inches.

Overlap the interlayer borders between 2 to 4 inches. In the direction of paving, overlap the following roll with the preceding roll at any break.

You may use rolling equipment to correct distortions or wrinkles in the interlayer.

Before placing HMA on the interlayer, do not expose the interlayer to:

- 1. Traffic, except for crossings under traffic control and only after you place a small HMA quantity
- 2. Sharp turns from construction equipment
- 3. Damaging elements

Pave HMA on the interlayer during the same work shift. The minimum HMA thickness over the interlayer must be 0.12 foot including at conform tapers.

# 39-2.01C(4) Longitudinal Joints

# 39-2.01C(4)(a) General

Longitudinal joints in the top layer must match lane lines. Alternate the longitudinal joint offsets in the lower layers at least 0.5 foot from each side of the lane line. Other longitudinal joint placement patterns are allowed if authorized.

A vertical longitudinal joint of more than 0.15 foot is not allowed at any time between adjacent lanes open to traffic.

For an HMA thickness of 0.15 foot 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 an HMA thickness greater than 0.15 foot, you must place HMA on adjacent traveled way lanes or shoulder such 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 other authorized release agent under the conform tapers to facilitate the taper removal when paving activities resume.

If placing HMA against the edge of existing pavement, saw cut or grind the pavement straight and vertical along the joint and remove extraneous material.

# 39-2.01C(4)(b) Tapered Notched Wedge

Not used

# 39-2.01C(5) Pavement Edge Treatments

Construct edge treatment on the HMA pavement as shown.

Where a tapered edge is required, use the same type of HMA used for the adjacent lane or shoulder.

The edge of roadway where the tapered edge is to be placed must have a solid base, free of debris such as loose material, grass, weeds, or mud. Grade the areas to receive the tapered edge as required.

The tapered edge must be placed monolithic with the adjacent lane or shoulder and must be shaped and compacted with a device attached to the paver.

The device must be capable of shaping and compacting HMA to the required cross section as shown. Compaction must be accomplished by constraining the HMA to reduce the cross sectional area by 10 to 15 percent. The device must produce a uniform surface texture without tearing, shoving, or gouging and must not leave marks such as ridges and indentations. The device must be capable of transitioning to cross roads, driveways, and obstructions.

For the tapered edge, 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.

If paving is done in multiple lifts, the tapered edge must be placed with each lift.

Short sections of hand work are allowed to construct tapered edge transitions.

#### The test section:

- 1. Must not be less than 0.1 mile in length.
- 2. Must have a width equal to the width of the pavement and tapered edge to be paved in one pass during production.
- 3. Locations shall be proposed by the Contractor and approved by the Engineer.

The test section must be constructed with asphalt paver fitted with one of the following FHWA-approved tapered edge devices:

- 1. **"Shoulder Wedge Maker"** manufactured by Transtech Systems, Inc.,1594 State Street, Schenectady, NY 12304, Telephone 1-800-724-6306 or 518-370-5558
- 2. "Advant-Edger" manufactured by Advant-Edge Paving Equipment LLC, 33 Old Niskayuna Road, Loudonville, NY 12211, Telephone 814-422-3343
- 3. "Ramp Champ" manufactured by Advant-Edge Paving Equipment LLC, 33 Old Niskayuna Road, Loudonville, NY 12211, Telephone 814-422-3343
- 4. **"SafeTSlope"** manufactured by Troxler Electronic Laboratories, Inc., 3008 E. Cornwallis Rd. Research Triangle Park, NC 27709, Telephone 877-876-9537

Comply with manufacturer's instructions for attaching the device(s) to the paver. The Engineer accepts the use of selected tapered edge device when edge shape and compaction of the test section are in compliance with plans and specifications. No further paving operations which include the construction of the tapered edge shall commence unless means and methods for constructing the tapered edge are approved by the Engineer.

# 39-2.01C(6) 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.

#### 39-2.01C(7) 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. Tapers3. Transitions
- 4. Road connections
- 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.

If shoulders or median borders are shown, pave shoulders and median borders adjacent to the lane before opening a lane to traffic.

If shoulder conform tapers are shown, place conform tapers concurrently with the adjacent lane's paving.

If a driveway or a road connection is shown, place additional HMA along the pavement's edge to conform to road connections and driveways. Hand rake, if necessary, and compact the additional HMA to form a smooth conform taper.

New paving shall tie smoothly into previously resurfaced mats, existing pavement and to private drives. Place additional HMA along the pavement's edge to conform to private drives and private road connections as shown in the Project Plans.

Hand rake, if necessary, and compact the additional HMA to form a smooth conform taper.

Feather down the HMA to zero thickness at the approximate rate of 20 feet per 0.08-foot thickness at all match lines across the travel lanes including the beginning and end of construction and at all intersections unless otherwise shown or described in the Project Details and as directed by the Engineer.

#### 39-2.01C(8) Leveling

Section 39-2.01C(8) applies if a bid item for hot mix asphalt (leveling) is shown on the Bid Item List.

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 hot mix asphalt (leveling).

### 39-2.01C(9) Miscellaneous Areas, Dikes, & Berms

Prepare the area to receive HMA for miscellaneous areas, dikes, and berms, including excavation and backfill as needed.

Spread the HMA in miscellaneous areas in 1 layer and compact to the specified lines and grades.

In median areas adjacent to slotted median drains, each layer of HMA must not exceed 0.20 foot maximum compacted thickness.

The finished surface must be:

- 1. Textured uniformly
- 2. Compacted firmly
- 3. Without depressions, humps, and irregularities

# 39-2.01C(10)-39-2.01C(14) Reserved

# 39-2.01C(15) Compaction

# 39-2.01C(15)(a) General

Rolling must leave the completed surface compacted and smooth without tearing, cracking, or shoving.

If a vibratory roller is used as a finish roller, turn the vibrator off.

Do not open new HMA pavement to traffic until its mid depth temperature is below 160 degrees F.

If the surface to be paved is both in sunlight and shade, pavement surface temperatures are taken in the shade.

#### 39-2.01C(15)(b) Method Compaction

Use method compaction for all conditions.

HMA compaction coverage is the number of passes needed to cover the paving width. A pass is 1 roller's movement parallel to the paving in either direction. Overlapping passes are part of the coverage being made and are not a subsequent coverage. Do not start a coverage until completing the prior coverage.

Method compaction must consist of performing:

- 1. Breakdown compaction of each layer with 3 coverages using a vibratory roller. The speed of the vibratory roller in miles per hour must not exceed the vibrations per minute divided by 1,000. If the HMA layer thickness is less than 0.08 foot, turn the vibrator off.
- 2. Intermediate compaction of each layer of HMA with 3 coverages using a pneumatic-tired roller at a speed not to exceed 5 mph.
- 3. Finish compaction of HMA with 1 coverage using a steel-tired roller.

Start rolling at the lower edge and progress toward the highest part.

The Engineer may order fewer coverages if the layer thickness of HMA is less than 0.15 foot.

The compacted lift thickness must not exceed 0.25 foot.

# 39-2.01C(15)(c)-39-2.01C(15)(e) Reserved 39-2.01C(16) Smoothness Corrections

If the pavement surface does not comply with section 39-2.01A(4)(i)(iii), grind the pavement to within specified tolerances, remove and replace the pavement, or place an overlay of HMA. Do not start corrective work until your method is authorized.

Do not use equipment with carbide cutting teeth to grind the pavement unless authorized.

Smoothness corrections must leave at least 75 percent of the specified HMA thickness. If ordered, core the pavement at the locations selected by the Engineer. Coring, including traffic control, is change order work. Remove and replace deficient pavement areas where the overlay thickness is less than 75 percent of the thickness specified.

Corrected HMA pavement areas must be uniform rectangles, half the lane width, with edges:

- 1. Parallel to and along the nearest HMA pavement edge or lane line
- 2. Perpendicular to the pavement centerline

On ground areas not to be overlaid with OGFC, apply a fog seal under section 37-4.02.

Where corrections are made within areas requiring testing with inertial profiler, reprofile the entire lane length with the inertial profiler.

Where corrections are made within areas requiring testing with a 12-foot straightedge, retest the corrected area with the straightedge.

# 39-2.01C(17) Data Cores

Not Used.

#### 39-2.01D Payment

The payment quantity for geosynthetic pavement interlayer is the area measured from the actual pavement covered.

Except for tack coat used in minor HMA, payment for tack coat is not included in the payment for hot mix asphalt.

The Department does not adjust the unit price for an increase or decrease in the tack coat quantity.

The payment quantity for HMA of the type shown on the Bid Item List is measured based on the combined mixture weight. If recorded batch weights are printed automatically, the bid item for HMA is measured by using the printed batch weights, provided:

- 1. Total aggregate and supplemental fine aggregate weight per batch is printed. If supplemental fine aggregate is weighed cumulatively with the aggregate, the total aggregate batch weight must include the supplemental fine aggregate weight.
- 2. Total virgin asphalt binder weight per batch is printed.
- 3. Each truckload's zero tolerance weight is printed before weighing the first batch and after weighing the last batch.
- 4. Time, date, mix number, load number and truck identification is correlated with a load slip.
- 5. Copy of the recorded batch weights is certified by a licensed weigh master and submitted.

The payment quantity for place hot mix asphalt dike or berm of the type shown on the Bid Item List is the length measured from end to end. Payment for the HMA used to construct the dike or berm is not included in the payment for place hot mix asphalt dike or berm.

The payment quantity for place hot mix asphalt (miscellaneous areas) is the area measured for the inplace compacted area. Payment for the HMA used for miscellaneous areas is not included in the payment for place hot mix asphalt (miscellaneous areas).

The Engineer does not adjust the unit price for an increase or decrease in the prepaving grinding day quantity.

# 39-2.02 TYPE A HOT MIX ASPHALT

39-2.02A General

39-2.02A(1) Summary

Section 39-2.02 includes specifications for producing and placing Type A hot mix asphalt.

You may produce Type A HMA using an authorized WMA technology.

# 39-2.02A(2) Definitions

Reserved

**39-2.02A(3) Submittals** 

39-2.02A(3)(a) General

Reserved

#### 39-2.02A(3)(b) Job Mix Formula

The JMF must be based on the superpave HMA mix design as described in MS-2 Asphalt Mix Design Methods by the Asphalt Institute.

#### 39-2.02A(3)(c) Reclaimed Asphalt Pavement

Submit QC test results for RAP gradation with the combined aggregate gradation within 2 business days of taking RAP samples during Type A HMA production.

39-2.02A(3)(d)-39-2.02A(3)(f) Reserved

39-2.02A(4) Quality Assurance

39-2.02A(4)(a) General

Reserved

39-2.02A(4)(b) Quality Control 39-2.02A(4)(b)(i) General

Reserved

#### 39-2.02A(4)(b)(ii) Aggregates

Test the quality characteristics of aggregates under the test methods and frequencies shown in the following table:

**Aggregate Testing Frequencies** 

	, - <u>J</u>	
Quality characteristic	Test method	Minimum testing frequency
Gradation <sup>a</sup>	AASHTO T 27	
Sand equivalent <sup>b, c</sup>	AASHTO T 176	1 per 750 tons and any remaining part
Moisture content <sup>d</sup>	AASHTO T 255	
Crushed particles	AASHTO T 335	
Los Angeles Rattler	AASHTO T 96	1 per 10,000 tons or 2 per project
Flat and elongated particles	ASTM D4791	whichever is greater
Fine aggregate angularity	AASHTO T 304	willchever is greater
	Method A	
Coarse durability index	AASHTO T 210	1 per 3,000 or 1 per paving day,
Fine durability index	AASHTO T 210	whichever is greater

alf RAP is used, test the combined aggregate gradation under California Test 384.

For lime treated aggregate, test aggregate before treatment and test for gradation and moisture content during HMA production.

#### 39-2.02A(4)(b)(iii) Reclaimed Asphalt Pavement

Sample and test processed RAP at a minimum frequency of 1 sample per 1,000 tons with a minimum of 6 samples per fractionated stockpile. If the fractionated stockpile has not been augmented, the 3 RAP samples taken and tested for mix design can be part of this minimum sample requirement. 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.

The combined RAP sample when tested under AASHTO T 164 must be within ±2.00 percent of the average asphalt binder content reported on page 4 of your Contractor Hot Mix Asphalt Design Data form. If a new processed RAP stockpile is required, the average binder content of the new processed RAP stockpile must be within ±2.00 percent of the average binder reported on page 4 of your Contractor Hot Mix Asphalt Design Data form.

<sup>&</sup>lt;sup>b</sup>Reported value must be the average of 3 tests from a single sample.

<sup>&</sup>lt;sup>c</sup>Use of a sand reading indicator is required as shown in AASHTO T 176, Figure 1. Sections 4.7,

<sup>&</sup>quot;Manual Shaker," 7.1.2, "Alternate Method No. 2," and 8.4.3, "Hand Method," do not apply. Prepare the stock solution as specified in section 4.8.1, "Stock solution with formaldehyde," except omit the addition of formaldehyde.

<sup>&</sup>lt;sup>d</sup>Test at continuous mixing plants only. If RAP is used, test the RAP moisture content at continuous mixing plant and batch mixing plant.

The combined RAP sample when tested under AASHTO T 209 must be within ±0.06 of the average maximum specific gravity reported on page 4 of your Contractor Hot Mix Asphalt Design Data form.

During Type A HMA production, sample RAP twice daily and perform QC testing for:

- 1. Aggregate gradation at least once a day under California Test 384
- 2. Moisture content at least twice a day

# 39-2.02A(4)(b)(iv)-39-2.02A(4)(b)(viii) Reserved 39-2.02A(4)(b)(ix) Type A Hot Mix Asphalt Production

Test the quality characteristics of Type A HMA under the test methods and frequencies shown in the following table:

**Type A HMA Production Testing Frequencies** 

	<u>, , , ,                                </u>	
Quality characteristic	Test method	Minimum testing frequency
Asphalt binder content	AASHTO T 308, Method A	1 per 750 tons and any remaining part
HMA moisture content	AASHTO T 329	1 per 2,500 tons but not less than 1
		per paving day
Air voids content	AASHTO T 269	1 per 4,000 tons or 2 every 5 paving
		days, whichever is greater
Voids in mineral	MS-2MS-2 Asphalt Mixture	
aggregate	Volumetrics	1 per 10,000 tons or 2 per project
Dust proportion	MS-2MS-2 Asphalt Mixture	whichever is greater
	Volumetrics	
Density of core	California Test 375	2 per paving day
Nuclear gauge density	California Test 375	3 per 250 tons or 3 per paving day,
		whichever is greater
Hamburg wheel track	AASHTO T 324 (Modified)	1 per 10,000 tons or 1 per project,
Moisture susceptibility	AASHTO T 283	whichever is greater

# 39-2.02A(4)(c)-39-2.02A(4)(d) Reserved 39-2.02A(4)(e) Department Acceptance

The Department accepts Type A HMA based on compliance with:

1. Aggregate quality requirements shown in the following table:

**Aggregate Quality** 

Quality characteristic	Test method	Doguiroment
,		Requirement
Aggregate gradation <sup>a</sup>	AASHTO T 27	JMF ± Tolerance
Percent of crushed particles		
Coarse aggregate (min, %)		
One-fractured face		95
Two-fractured faces		90
Fine aggregate (min, %)	AASHTO T 335	
(Passing No. 4 sieve		
and retained on No. 8 sieve.)		
One-fractured face		70
Los Angeles Rattler (max, %)		
Loss at 100 Rev.	AASHTO T 96	12
Loss at 500 Rev.		40
Sand equivalent (min.) <sup>b, c</sup>	AASHTO T 176	47
Flat and elongated particles (max, % by	ASTM D4791	10
weight at 5:1)	AOTIVI D4731	10
Fine aggregate angularity (min, %)d	AASHTO T 304, Method A	45
Coarse durability index (Dc, min)	AASHTO T 210	65
Fine durability index (D <sub>f</sub> , min)	AASHTO T 210	50

<sup>&</sup>lt;sup>a</sup>The Engineer determines combined aggregate gradations containing RAP under California Test 384.

#### 2. If RAP is used, RAP quality requirements shown in the following table:

**Reclaimed Asphalt Pavement Quality** 

Quality characteristic	Test method	Requirement
Binder content (% within the average value reported)	AASHTO T 164	±2.00
Specific gravity (within the average value reported)	AASHTO T 209	±0.06

3. In place Type A HMA quality requirements shown in the following table:

<sup>&</sup>lt;sup>b</sup>Reported value must be the average of 3 tests from a single sample.

<sup>&</sup>lt;sup>c</sup>Use of a sand reading indicator is required as shown in AASHTO T 176, Figure 1. Sections 4.7,

<sup>&</sup>quot;Manual Shaker," 7.1.2, "Alternate Method No. 2," 8.4.2 Manual Shaker Method, and 8.4.3, "Hand Method," do not apply. Prepare the stock solution as specified in section 4.8.1, "Stock solution with formaldehyde," except omit the addition of formaldehyde.

<sup>&</sup>lt;sup>d</sup>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.

Type A HMA Acceptance In Place

Quality characteristic	Test method	Requirement
Asphalt binder content (%)	AASHTO T 308	JMF -0.30, +0.50
	Method A	·
HMA moisture content (max, %)	AASHTO T 329	1.00
Air voids content at N <sub>design</sub> (%) <sup>a, b</sup>	AASHTO T 269	4.0 ± 1.5
		(5.0 ± 1.5 for 1-inch aggregate)
Voids in mineral aggregate on laboratory-	MS-2MS-2	
produced HMA (min, %) <sup>d</sup>	Asphalt Mixture	
Gradation:	Volumetrics	
No. 4		16.5–19.5
3/8-inch		15.5–18.5
1/2-inch		14.5–17.5
3/4-inch		13.5–16.5
1-inch		40 - 40 -
with NMAS = 1-inch		13.5–16.5
with NMAS = 3/4-inch		14.5–17.5
Voids in mineral aggregate on plant-produced	MS-2MS-2	
HMA (min, %) <sup>a</sup>	Asphalt Mixture	
Gradation:	Volumetrics <sup>c</sup>	440-
No. 4		15.5–18.5
3/8-inch		14.5–17.5
1/2-inch		13.5–16.5
3/4-inch		12.5–15.5
1-inch		40.5.45.5
with NMAS = 1-inch		12.5–15.5
with NMAS = 3/4-inch	MC OMC O	13.5–16.5
Dust proportion	MS-2MS-2	0.0.4.20
	Asphalt Mixture	0.6–1.3 <sup>9</sup>
Denoity of ears (0) of may theoretical denoity)e f	Volumetrics California Test	
Density of core (% of max theoretical density) <sup>e, f</sup>	375	91.0–97.0
Hamburg wheel track (min number of passes at	AASHTO T 324	
0.5-inch rut depth)	(Modified)	
Binder grade:	(Modified)	
PG 58		10,000
PG 64		15,000
PG 70		20,000
PG 76 or higher		25,000
Hamburg wheel track (min number of passes at	AASHTO T 324	25,000
inflection point)	(Modified)	
Binder grade:	(iviounicu)	
PG 58		10,000
PG 64		10,000
PG 70		12,500
PG 76 or higher		15,000
Moisture susceptibility (min, psi, dry strength)	AASHTO T 283	100
Moisture susceptibility (min, psi, wet strength)	AASHTO T 283	70
motoristic odocoptionity (min, poi, wot otrongth)	7.0.0.1.0 1 200	, ,

<sup>a</sup>Prepare 3 briquettes. Report the average of 3 tests.

°Determine bulk specific gravity under AASHTO T 275, Method A.

- 1. AASHTO T 275 to determine in-place density of each density core
- 2. AASHTO T 209, Method A to determine theoretical maximum density instead of calculating test maximum density

The Engineer determines theoretical maximum density under AASHTO T 209, Method A, at the frequency specified in California Test 375, part 5, section D.

<sup>9</sup>For lime-treated aggregates, the dust proportion requirement is 0.6–1.5.

39-2.02B Materials 39-2.02B(1) General

Reserved

<sup>&</sup>lt;sup>b</sup>The Engineer determines the bulk specific gravity of each lab-compacted briquette under AASHTO T 275, Method A, and theoretical maximum specific gravity under AASHTO T 209, Method A.

<sup>&</sup>lt;sup>d</sup>The Engineer determines the laboratory-prepared Type A HMA value for only mix design verification. <sup>e</sup>The Engineer determines percent of theoretical maximum density under California Test 375 except the Engineer uses:

# 39-2.02B(2) Type A Hot Mix Asphalt Mix Design

The mix design for Type A HMA must comply with the requirements shown in the following table:

Type A HMA Mix Design Requirements

	ix Design Requireme	
Quality characteristic	Test method	Requirement
Air voids content (%)	AASHTO T 269 <sup>a</sup>	$N_{initial} > 8.0$
		$N_{\text{design}} = 4.0$
		$(N_{design} = 5.0 \text{ for } 1\text{-inch}$
		aggregate)
		$N_{\text{max}} > 2.0$
Gyration compaction (no. of gyrations)	AASHTO T 312	$N_{initial} = 8$
		$N_{\text{design}} = 85.0$
		$N_{\text{max}} = 130$
Voids in mineral aggregate (min, %) <sup>b</sup>	MS-2	
Gradation:	Asphalt Mixture	
No. 4	Volumetrics	16.5–19.5
3/8-inch		15.5–18.5
1/2-inch		14.5–17.5
3/4-inch		13.5–16.5
1-inch		
with NMAS = 1-inch		13.5–16.5
with NMAS = 3/4-inch		14.5–17.5
Dust proportion	MS-2	
	Asphalt Mixture	0.6–1.3
	Volumetrics	
Hamburg wheel track (min number of passes	AASHTO T 324	
at 0.5-inch rut depth)	(Modified) <sup>c</sup>	
Binder grade:		
PG 58		10,000
PG 64		15,000
PG 70		20,000
PG 76 or higher		25,000
Hamburg wheel track (min number of passes	AASHTO T 324	
at the inflection point)	(Modified) <sup>c</sup>	
Binder grade:		
PG 58		10,000
PG 64		10,000
PG 70		12,500
PG 76 or higher		15,000
Moisture susceptibility, dry strength (min, psi)	AASHTO T 283°	100
Moisture susceptibility, wet strength (min,	AASHTO T 283 <sup>c, d</sup>	70
psi)		

<sup>&</sup>lt;sup>a</sup>Calculate the air voids content of each specimen using AASHTO T 275, Method A, to determine bulk specific gravity. Use AASHTO T 209, Method A, to determine theoretical maximum specific gravity. Use a digital manometer and pycnometer when performing AASHTO T 209.

For Type A HMA mixtures using RAP, the maximum allowed binder replacement is 25.0 percent in the upper 0.2 foot exclusive of OGFC and 40.0 percent below. The binder replacement is calculated as a percentage of the approved JMF target asphalt binder content.

<sup>&</sup>lt;sup>b</sup>Measure bulk specific gravity using AASHTO T 275, Method A.

<sup>&</sup>lt;sup>c</sup>Test plant-produced Type A HMA.

<sup>&</sup>lt;sup>d</sup>Freeze thaw required.

For Type A HMA with a binder replacement percent less than or equal to 25 percent of your specified OBC, you may request that the performance graded asphalt binder grade with upper and lower temperature classifications be reduced by 6 degrees C from the specified grade.

For Type A HMA with a binder replacement greater than 25 percent of your specified OBC and less than or equal to 40 percent of OBC, you must use a performance graded asphalt binder grade with upper and lower temperature classifications reduced by 6 degrees C from the specified grade.

# 39-2.02B(3) Asphalt Binder

The grade of asphalt binder for Type A HMA must be PG 64-10.

# 39-2.02B(4) Aggregates

# 39-2.02B(4)(a) General

Before the addition of asphalt binder and lime treatment, the aggregates must comply with the requirements shown in the following table:

**Aggregate Quality** 

Aggregate wanty			
Quality characteristic	Test method	Requirement	
Percent of crushed particles:			
Coarse aggregate (min, %)			
One-fractured face		95	
Two-fractured faces	AASHTO T 335	90	
Fine aggregate (min, %)	AASHTO 1 333		
(Passing No. 4 sieve			
and retained on No. 8 sieve.)			
One-fractured face		70	
Los Angeles Rattler (max, %)			
Loss at 100 Rev.	AASHTO T 96	12	
Loss at 500 Rev.		40	
Sand equivalent (min) <sup>a</sup>	AASHTO T 176	47	
Flat and elongated particles (max, % by weight at 5:1)	ASTM D4791	10	
Fine aggregate angularity (min, %) <sup>b</sup>	AASHTO T 304, Method A	45	
Coarse durability index (Dc, min)	AASHTO T 210	65	
Fine durability index (Df, min)	AASHTO T 210	50	

<sup>&</sup>lt;sup>a</sup>The reported value must be the average of 3 tests from a single sample. Use of a sand reading indicator is required as shown in AASHTO T 176, Figure 1. Sections 4.7, "Manual Shaker," 7.1.2, "Alternate Method No. 2," 8.4.2 Manual Shaker Method, and 8.4.3, "Hand Method," do not apply. Prepare the stock solution as specified in section 4.8.1, "Stock solution with formaldehyde," except omit the addition of formaldehyde.

#### 39-2.02B(4)(b) Aggregate Gradations

The aggregate gradations for Type A HMA must comply with the requirements shown in the following table:

**Aggregate Gradation Requirements** 

Type A HMA pavement thickness shown	Gradation
0.10 foot	3/8 inch
Greater than 0.10 to less than 0.20 foot	1/2 inch
0.20 to less than 0.25 foot	3/4 inch
0.25 foot or greater	3/4 inch or 1 inch

<sup>&</sup>lt;sup>b</sup>The Engineer waives this specification if the Type A 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.

Aggregate gradation must be within the TV limits for the specified sieve size shown in the following tables:	

# Aggregate Gradations for Type A HMA (Percentage Passing)

# 1 inch

Sieve size	Target value limit	Allowable tolerance
1"	100	
3/4"	88–93	TV ± 5
1/2"	72–85	TV ± 6
3/8"	55–70	TV ± 6
No. 4	35–52	TV ± 7
No. 8	22–40	TV ± 5
No. 30	8–24	TV ± 4
No. 50	5–18	TV ± 4
No. 200	3.0–7.0	TV ± 2.0

# 3/4 inch

Sieve size	Target value limit	Allowable tolerance
1"	100	
3/4"	90–98	TV ± 5
1/2"	70–90	TV ± 6
No. 4	42–58	TV ± 5
No. 8	29–43	TV ± 5
No. 30	10–23	TV ± 4
No. 200	2.0–7.0	TV ± 2.0

# 1/2 inch

Sieve size	Target value limit	Allowable tolerance
3/4"	100	
1/2"	95–98	TV ± 5
3/8"	72–95	TV ± 5
No. 4	52–69	TV ± 5
No. 8	35–55	TV ± 5
No. 30	15–30	TV ± 4
No. 200	2.0-8.0	TV ± 2.0

# 3/8 inch

Sieve size	Target value limit	Allowable tolerance
1/2"	100	
3/8"	95–98	TV ± 5
No. 4	55–75	TV ± 5
No. 8	30–50	TV ± 5
No. 30	15–35	TV ± 5
No. 200	2.0-9.0	TV ± 2.0

# No. 4

Sieve size	Target value limit	Allowable tolerance
3/8"	100	
No. 4	95–98	TV ± 5
No. 8	70–80	TV ± 6
No. 30	34–45	TV ± 5
No. 200	2.0-12.0	TV ± 4.0

### 39-2.02B(5) Reclaimed Asphalt Pavement

You may substitute RAP for part of the virgin aggregate in a quantity up to 15 percent of the aggregate blend.

Provide enough space at your plant for complying with all RAP handling requirements. Provide a clean, graded base, well drained area for stockpiles.

If RAP is from multiple sources, blend the RAP thoroughly and completely before fractionating.

For RAP substitution of 15 percent of the aggregate blend or less, fractionation is not required.

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.

# 39-2.02B(6)-39-2.02B(10) Reserved

## 39-2.02B(11) Type A Hot Mix Asphalt Production

If RAP is used, the asphalt plant must automatically adjust the virgin asphalt binder to account for RAP percentage and RAP binder.

During production, you may adjust hot- or cold-feed proportion controls for virgin aggregate and RAP. RAP must be within ±3 of RAP percentage described in your Contractor Job Mix Formula Proposal form without exceeding 15 percent.

#### 39-2.02C Construction

Place Type A HMA in lifts as shown in the Project Plans.

Where the pavement thickness shown is greater than 0.30 foot, you may place Type A HMA in multiple lifts not less than 0.15 foot each. If placing Type A HMA in multiple lifts:

1. Aggregate gradation must comply with the requirements shown in the following table:

**Aggregate Gradation Requirements** 

Type A HMA lift thickness	Gradation
0.15 to less than 0.20 foot	1/2 inch
0.20 foot to less than 0.25 foot	3/4 inch
0.25 foot or greater	3/4 inch or 1 inch

- 2. Apply a tack coat before placing a subsequent lift
- 3. The Engineer evaluates each HMA lift individually for compliance

If the ambient air temperature is below 60 degrees F, cover the loads in trucks with tarpaulins. If the time for HMA discharge to truck at the HMA plant until transfer to paver's hopper is 90 minutes or greater and if the ambient air temperature is below 70 degrees F, cover the loads in trucks with tarpaulins, unless the time from discharging to the truck until transfer to the paver's hopper or the pavement surface is less than 30 minutes. The tarpaulins must completely cover the exposed load until you transfer the mixture to the paver's hopper or the pavement surface.

Spread Type A HMA at the ambient air and surface temperatures shown in the following table:

**Minimum Ambient Air and Surface Temperatures** 

Lift thickness	Ambient air (°F)		Surface (°F)	
(feet)	Unmodified	Modified asphalt	Unmodified	Modified asphalt
	asphalt binder	binder	asphalt binder	binder
Type A HMA and T	ype A HMA produced	d with WMA water inje	ction technology	
<0.15	55	50	60	55
≥0.15	45	45	50	50
Type A HMA produced with WMA additive technology				
<0.15	45	45	50	45
≥0.15	40	40	40	40

For Type A HMA and Type A HMA produced with WMA water injection technology placed under method compaction, if the asphalt binder is:

- 1. Unmodified, complete:
  - 1.1. 1st coverage of breakdown compaction before the surface temperature drops below 250 degrees F
  - Breakdown and intermediate compaction before the surface temperature drops below 190 degrees F
  - 1.3. Finish compaction before the surface temperature drops below 150 degrees F
- 2. Modified, complete:
  - 1st coverage of breakdown compaction before the surface temperature drops below 240 degrees F
  - Breakdown and intermediate compaction before the surface temperature drops below 180 degrees F
  - 2.3. Finish compaction before the surface temperature drops below 140 degrees F

For Type A HMA produced with WMA additive technology placed under method compaction, if the asphalt binder is:

- 1. Unmodified, complete:
  - 1.1 1st coverage of breakdown compaction before the surface temperature drops below 240 degrees F
  - 1.2. Breakdown and intermediate compaction before the surface temperature drops below 190 degrees F
  - 1.3. Finish compaction before the surface temperature drops below 140 degrees F
  - 1.4 You may continue static rolling below 140 degrees F to remove roller marks.
- 2. Modified, complete:
  - 1st coverage of breakdown compaction before the surface temperature drops below 230 degrees F
  - Breakdown and intermediate compaction before the surface temperature drops below 170 degrees F
  - 2.3. Finish compaction before the surface temperature drops below 130 degrees F
  - 2.4. You may continue static rolling below 130 degrees F to remove roller marks.

You may cool Type A HMA with water when rolling activities are complete if authorized.

# 39-2.02D Payment

Not Used

#### 39-2.03 RUBBERIZED HOT MIX ASPHALT-GAP GRADED

#### 39-2.03A General

#### 39-2.03A(1) Summary

Section 39-2.03 includes specifications for producing and placing rubberized hot mix asphalt–gap graded.

You may produce RHMA-G using a WMA technology.

# 39-2.03A(2) Definitions

Reserved

# 39-2.03A(3) Submittals

#### 39-2.03A(3)(a) General

At least 5 business days before use, submit the permit issued by the local air district for asphalt rubber binder blending equipment. If an air quality permit is not required by the local air district for producing asphalt rubber binder, submit verification from the local air district that an air quality permit is not required.

At least 10 days before RHMA-G production, submit the name of an authorized laboratory to perform QC testing for asphalt rubber binder. The authorized laboratory must comply with the Caltrans Independent Assurance Program.

### 39-2.03A(3)(b) Job Mix Formula

With your proposed JMF, include the SDS for:

- 1. Base asphalt binder
- 2. CRM and asphalt modifier
- 3. Blended asphalt rubber binder components

The JMF must be based on the superpave HMA mix design as described in MS-2 Asphalt Mix Design Methods by the Asphalt Institute.

# 39-2.03A(3)(c) Asphalt Rubber Binder

Submit a proposal for asphalt rubber binder design and profile. In the design, include the asphalt binder, asphalt modifier, and CRM and their proportions.

If you change asphalt rubber binder supplier or any component material used in asphalt rubber binder or its percentage, submit a new JMF.

For the asphalt rubber binder used, submit:

- 1. Log of production daily.
- 2. Certificate of compliance with test results for CRM and asphalt modifier with each truckload delivered to the HMA plant. The certificate of compliance for asphalt modifier must represent no more than 5,000 lb.
- 3. Certified weight slips for the CRM and asphalt modifier furnished.
- 4. QC test results on viscosity within 2 business days after sampling.
- 5. QC test results on cone penetration, resilience, and softening point within 3 business days after sampling.

Submit a certificate of compliance for the CRM and asphalt modifier. With the certificate of compliance, submit test results for CRM and asphalt modifier with each truckload delivered to the HMA plant.

# 39-2.03A(4) Quality Assurance

39-2.03A(4)(a) General

Reserved

### 39-2.03A(4)(b) Job Mix Formula Verification

If you request, the Engineer verifies RHMA-G quality requirements within 7 days of receiving all verification samples and after the JMF document submittal has been accepted.

### 39-2.03A(4)(c) Quality Control

# 39-2.03A(4)(c)(i) General

Reserved

# 39-2.03A(4)(c)(ii) Asphalt Rubber Binder

# 39-2.03A(4)(c)(ii)(A) General

The asphalt rubber binder blending plant must be authorized under the Department's Material Plant Quality Program.

Take asphalt rubber binder samples from the feed line connecting the asphalt rubber binder tank to the HMA plant.

# 39-2.03A(4)(c)(ii)(B) Asphalt Modifier

Test asphalt modifier under the test methods and frequencies shown in the following table:

**Asphalt Modifier for Asphalt Rubber Binder** 

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Quality characteristic	Test method	Frequency	
Viscosity	ASTM D445	1 per chipment	
Flash point	ASTM D92	1 per shipment	
Molecular analysis: Asphaltenes Aromatics	ASTM D2007	1 per shipment	

# 39-2.03A(4)(c)(ii)(C) Crumb Rubber Modifier

Sample and test scrap tire crumb rubber and high natural crumb rubber separately. Test CRM under the test methods and frequencies shown in the following table:

**Crumb Rubber Modifier for Asphalt Rubber Binder** 

Quality characteristic	Test method	Frequency	
Scrap tire crumb rubber gradation	California Test 385	1 per 10,000 lb	
High natural crumb rubber gradation	California Test 385	1 per 3,400 lb	
Wire in CRM	California Test 385		
Fabric in CRM	California Test 385	1 per 10,000 lb	
CRM particle length		T per 10,000 ib	
CRM specific gravity	California Test 208		
Natural rubber content in high natural crumb rubber	ASTM D297	1 per 3,400 lb	

# 39-2.03A(4)(c)(ii)(D) Asphalt Rubber Binder

Test asphalt rubber binder under the test methods and frequencies shown in the following table:

Quality characteristic	Test method	Frequency
Cone penetration	ASTM D217	
Resilience	ASTM D5329	1 per lot <sup>a</sup>
Softening point	ASTM D36/D36M	
Viscosity	ASTM D7741/D7741M	15 minutes before use per lot <sup>a</sup>

<sup>&</sup>lt;sup>a</sup>The lot is defined in the Department's MPQP.

Retain the sample from each lot. Test for cone penetration, resilience, and softening point for the first 3 lots and, if all 3 lots pass, the testing frequency may be reduced to once for every 3 lots.

If QC test results indicate that the asphalt rubber binder does not comply with the specifications, take corrective action and notify the Engineer.

# 39-2.03A(4)(c)(iii) Aggregates

Test the quality characteristics of aggregates under the test methods and frequencies shown in the following table:

**Aggregate Testing Frequencies** 

Quality characteristic	Test method	Minimum testing frequency
Gradation	AASHTO T 27	1 per 750 tens and any remaining
Sand equivalent <sup>a, b</sup>	AASHTO T 176	1 per 750 tons and any remaining
Moisture content <sup>c</sup>	AASHTO T 255	part
Crushed particles	AASHTO T 335	
Los Angeles Rattler	AASHTO T 96	1 per 10,000 tons or 2 per project,
Flat and elongated particles	ASTM D4791	whichever is greater
Fine aggregate angularity	AASHTO T 304, Method A	

<sup>&</sup>lt;sup>a</sup>Reported value must be the average of 3 tests from a single sample.

For lime treated aggregate, test aggregate before treatment and test for gradation and moisture content during RHMA-G production.

#### 39-2.03A(4)(c)(iv)-39-2.03A(4)(c)(viii) Reserved

# 39-2.03A(4)(c)(ix) Rubberized Hot Mix Asphalt-Gap Graded Production

Test the quality characteristics of RHMA-G under the test methods and frequencies shown in the following table:

**RHMA-G Production Testing Frequencies** 

Quality characteristic	Test method	Minimum testing frequency
Asphalt binder content	AASHTO T 308, Method A	1 per 750 tons and any remaining
		part
HMA moisture content	AASHTO T 329	1 per 2,500 tons but not less than 1
		per paving day
Air voids content	AASHTO T 269	1 per 4,000 tons or 2 every 5 paving
		days, whichever is greater
Voids in mineral	MS-2 Asphalt Mixture Volumetrics	1 per 10,000 tons or 2 per project
aggregate		whichever is greater
Dust proportion	MS-2 Asphalt Mixture Volumetrics	
Density of core	California Test 375	2 per paving day
Nuclear gauge density	California Test 375	3 per 250 tons or 3 per paving day,
		whichever is greater
Hamburg wheel track	AASHTO T 324 (Modified)	1 per 10,000 tons or 1 per project,
Moisture susceptibility	AASHTO T 283	whichever is greater

<sup>&</sup>lt;sup>b</sup>Use of a sand reading indicator is required as shown in AASHTO T 176, Figure 1. Sections 4.7,

<sup>&</sup>quot;Manual Shaker," 7.1.2, "Alternate Method No. 2," and 8.4.3, "Hand Method," do not apply. Prepare the stock solution as specified in section 4.8.1, "Stock solution with formaldehyde," except omit the addition of formaldehyde.

<sup>&</sup>lt;sup>c</sup>Test at continuous mixing plants only.

# 39-2.03A(4)(d) Reserved 39-2.03A(4)(e) Department Acceptance 39-2.03A(4)(e)(i) General

The Department accepts RHMA-G based on compliance with:

1. Aggregate quality requirements shown in the following table:

**Aggregate Quality** 

7.199.094.004.0011			
Quality characteristic	Test method	Requirement	
Aggregate gradation	AASHTO T 27	JMF ± Tolerance	
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.)	AASHTO T 335	 90	
One-fractured face		70	
Los Angeles Rattler (max, %) Loss at 100 Rev. Loss at 500 Rev.	AASHTO T 96	12 40	
Sand equivalent (min) <sup>a, b</sup>	AASHTO T 176	47	
Flat and elongated particles (max, % by weight at 5:1)	ASTM D4791	Report only	
Fine aggregate angularity (min, %) <sup>c</sup>	AASHTO T 304, Method A	45	

<sup>&</sup>lt;sup>a</sup>Reported value must be the average of 3 tests from a single sample.

2. In-place RHMA-G quality requirements shown in the following table:

<sup>&</sup>lt;sup>b</sup>Use of a sand reading Indicator is required as shown in AASHTO T 176, Figure 1. Sections 4.7, "Manual Shaker," 7.1.2, "Alternate Method No. 2," and 8.4.3, "Hand Method," do not apply. Prepare the stock solution as specified in section 4.8.1, "Stock solution with formaldehyde," except omit the addition of formaldehyde.

<sup>&</sup>lt;sup>c</sup>The Engineer waives this specification if RHMA-G contains 10 percent or less of nonmanufactured sand by weight of total aggregate. Manufactured sand is fine aggregate produced by crushing rock or gravel.

**RHMA-G Acceptance In Place** 

Quality characteristic	Test method	Requirement
Asphalt binder content (%)	AASHTO T 308 Method A	JMF -0.40, +0.50
HMA moisture content (max, %)	AASHTO T 329	1.00
Air voids content @ N <sub>design</sub> (%) <sup>a, b</sup>	AASHTO T 269	4.0 ± 1.5
Voids in mineral aggregate on laboratory-	MS-2 Asphalt	
produced HMA <sup>d</sup> (min, %)	Mixture	
Gradation:	Volumetrics <sup>c</sup>	
1/2-inch and 3/4-inch		18.0–23.0
Voids in mineral aggregate on plant-produced	MS-2 Asphalt	
HMA (min, %) <sup>a</sup>	Mixture	
Gradation:	Volumetrics <sup>c</sup>	
1/2-inch and 3/4-inch		18.0–23.0
Dust proportion <sup>a</sup>	MS-2 Asphalt	Papart only
	Mixture Volumetrics	Report only
Density of core (% of max theoretical density) <sup>e, f</sup>	California Test 375	91.0–97.0
Hamburg wheel track (min number of passes at	AASHTO T 324	
0.5-inch rut depth)	(Modified)	
Binder grade:		
PG 58		15,000
PG 64		20,000
PG 70		25,000
Hamburg wheel track (min number of passes at	AASHTO T 324	
inflection point)	(Modified)	
Binder grade:		
PG 58		10,000
PG 64		12,500
PG 70		15,000
Moisture susceptibility (min, psi, dry strength)	AASHTO T 283	100
Moisture susceptibility (min, psi, wet strength)	AASHTO T 283	70

<sup>&</sup>lt;sup>a</sup>Prepare 3 briquettes. Report the average of 3 tests.

- 1. AASHTO T 275, Method A, to determine in-place density of each density core instead of using the nuclear gauge
- 2. AASHTO T 209, Method A to determine theoretical maximum density instead of calculating test maximum density

<sup>f</sup>The Engineer determines theoretical maximum density under AASHTO T 209, Method A, at the frequency specified in California Test 375, part 5, section D.

# 39-2.03A(4)(e)(ii) Asphalt Rubber Binder

# 39-2.03A(4)(e)(ii)(A) General

The Department does not use asphalt rubber binder design profile for production acceptance.

# 39-2.03A(4)(e)(ii)(B) Asphalt Modifier

The Department accepts asphalt modifier based on compliance with the requirements shown in the following table:

<sup>&</sup>lt;sup>b</sup>The Engineer determines the bulk specific gravity of each lab-compacted briquette under AASHTO T 275, Method A, and theoretical maximum specific gravity under AASHTO T 209, Method A.

<sup>&</sup>lt;sup>c</sup>Determine bulk specific gravity under AASHTO T 275, Method A.

<sup>&</sup>lt;sup>d</sup>The Engineer determines the laboratory-prepared RHMA-G value for only mix design verification.

<sup>&</sup>lt;sup>e</sup>The Engineer determines percent of theoretical maximum density under California Test 375 except the Engineer uses:

### **Asphalt Modifier for Asphalt Rubber Binder**

Quality characteristic	Test method	Requirement
Viscosity at 100 °C (m <sup>2</sup> /s x 10 <sup>-6</sup> )	ASTM D445	X ± 3 <sup>a</sup>
Flash point (min, °C)	ASTM D92	207
Molecular analysis: Asphaltenes (max, % by mass) Aromatics (min, % by mass)	ASTM D2007	0.1 55

<sup>&</sup>lt;sup>a</sup>The symbol *X* is the asphalt modifier viscosity.

# 39-2.03A(4)(e)(ii)(C) Crumb Rubber Modifier

CRM used must be on the Authorized Materials List for Crumb Rubber Modifier.

CRM must be a ground or granulated combination of scrap tire crumb rubber and high natural scrap tire crumb rubber, CRM must be  $75.0 \pm 2.0$  percent scrap tire crumb rubber and  $25.0 \pm 2.0$  percent high natural scrap tire crumb rubber by total weight of CRM. Scrap tire crumb rubber and high natural scrap tire crumb rubber must be derived from waste tires described in Pub Res Code § 42703.

The Department accepts CRM, scrap tire crumb rubber, and high natural crumb rubber based on compliance with the requirements shown in the following table:

**Crumb Rubber Modifier for Asphalt Rubber Binder** 

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Quality characteristic	Test method	Requirement	
Scrap tire crumb rubber gradation (% passing No. 8	California Test 385	100	
sieve)			
High natural crumb rubber gradation (% passing No. 10	California Test 385	100	
sieve)			
Wire in CRM (max, %)	California Test 385	0.01	
Fabric in CRM (max, %)	California Test 385	0.05	
CRM particle length (max, in)		3/16	
CRM specific gravity	California Test 208	1.1–1.2	
Natural rubber content in high natural crumb rubber (%)	ASTM D297	40.0-48.0	

Scrap tire crumb rubber and high natural crumb rubber are sampled and tested separately.

# 39-2.03A(4)(e)(ii)(D) Asphalt Rubber Binder

For Department acceptance testing, take samples of asphalt rubber binder in the Engineer's presence every 5 lots or once a day, whichever is greater. Each sample must be in a 6 qt can with open top and friction lid.

The Department accepts asphalt rubber binder based on compliance with the requirements shown in the following table:

Quality characteristic	Test method	Requirement
Cone penetration at 25 °C (0.10 mm)	ASTM D217	25–70
Resilience at 25 °C (min, % rebound)	ASTM D5329	18
Softening point (°C)	ASTM D36/D36M	52–74
Viscosity at 190 °C (centipoises) <sup>a</sup>	ASTM D7741/D7741M	1,500-4,000

<sup>&</sup>lt;sup>a</sup>Prepare sample for viscosity test under California Test 388.

39-2.03A(4)(e)(iii)-39-2.03A(4)(e)(v) Reserved 39-2.03B Materials 39-2.03B(1) General Reserved

# 39-2.03B(2) Rubberized Hot Mix Asphalt-Gap Graded Mix Design

For RHMA-G, the mix design must comply with the requirements shown in the following table:

**RHMA-G Mix Design Requirements** 

Quality characteristic	Test method	Requirement
Air voids content (%)	AASHTO T 269 <sup>a</sup>	$N_{\text{design}} = 4.0$
Gyration compaction (no. of gyrations)	AASHTO T 312	N <sub>design</sub> = 50– 150 <sup>b</sup>
Voids in mineral aggregate (min, %)	MS-2 Asphalt Mixture Volumetrics <sup>c</sup>	18.0–23.0
Dust proportion	MS-2 Asphalt Mixture Volumetrics	Report only
Hamburg wheel track (min, number of passes at 0.5-inch rut depth)  Binder grade:	AASHTO T 324 (Modified) <sup>d</sup>	15,000
PG 58 PG 64 PG 70		20,000 25,000
Hamburg wheel track (min, number of passes at the inflection point) Binder grade:	AASHTO T 324 (Modified) <sup>d</sup>	
PG 58 PG 64 PG 70		10,000 12,500 15,000
Moisture susceptibility, dry strength (min, psi)	AASHTO T 283 <sup>d</sup>	100
Moisture susceptibility, wet strength (min, psi)	AASHTO T 283 <sup>d, e</sup>	70

<sup>&</sup>lt;sup>a</sup>Calculate the air voids content of each specimen using AASHTO T 275, Method A, to determine bulk specific gravity and AASHTO T 209, Method A, to determine theoretical maximum specific gravity. Under AASHTO T 209, use a digital manometer and pycnometer when performing AASHTO T 209. <sup>b</sup>Superpave gyratory compactor ram pressure may be increased to a maximum of 825kPa, and specimens may be held at a constant height for a maximum of 90 minutes.

Determine the quantity of asphalt rubber binder to be mixed with the aggregate for RHMA-G as follows:

- 1. Base the calculations on the average of 3 briquettes produced at each asphalt rubber binder content.
- 2. Plot asphalt rubber binder content versus average air voids content for each set of 3 specimens and connect adjacent points with a best-fit curve.
- 3. Calculate voids in mineral aggregate for each specimen, average each set, and plot the average versus asphalt rubber binder content.
- 4. Calculate the dust proportion and plot versus asphalt rubber binder content.
- 5. From the curve plotted, select the theoretical asphalt rubber binder content at 4 percent air voids.
- 6. At the selected asphalt rubber binder content, calculate dust proportion.
- 7. Record the asphalt rubber binder content in the Contractor Hot Mix Asphalt Design Data Form as the OBC.

The OBC must not fall below 7.5 percent by total weight of the mix.

Laboratory mixing and compaction must comply with AASHTO R 35, except the mixing temperature of the aggregate must be from 300 to 325 degrees F. The mixing temperature of the asphalt rubber binder must

<sup>&</sup>lt;sup>c</sup>Measure bulk specific gravity using AASHTO T 275, Method A.

dTest plant produced RHMA.

eFreeze thaw required.

be from 375 to 425 degrees F. The compaction temperature of the combined mixture must be from 290 to 320 degrees F.

# 39-2.03B(3) Asphalt Rubber Binder

# 39-2.03B(3)(a) General

Asphalt rubber binder must be a combination of:

- 1. Asphalt binder
- 2. Asphalt modifier
- 3. CRM

The combined asphalt binder and asphalt modifier must be  $80.0 \pm 2.0$  percent by weight of the asphalt rubber binder.

#### 39-2.03B(3)(b) Asphalt Modifier

Asphalt modifier must be a resinous, high-flash-point, aromatic hydrocarbon and must comply with the requirements shown in the following table:

**Asphalt Modifier for Asphalt Rubber Binder** 

Quality characteristic	Test method	Requirement
Viscosity at 100 °C (m <sup>2</sup> /s x 10 <sup>-6</sup> )	ASTM D445	X ± 3 <sup>a</sup>
Flash point (min, °C)	ASTM D92	207
Molecular analysis:		
Asphaltenes (max, % by mass)	ASTM D2007	0.1
Aromatics (min, % by mass)		55

<sup>&</sup>lt;sup>a</sup>The symbol *X* is the proposed asphalt modifier viscosity. *X* must be between 19 and 36. A change in *X* requires a new asphalt rubber binder design.

Asphalt modifier must be from 2.0 to 6.0 percent by weight of the asphalt binder in the asphalt rubber binder.

# 39-2.03B(3)(c) Crumb Rubber Modifier

CRM must be a ground or granulated combination of scrap tire crumb rubber and high natural scrap tire crumb rubber. CRM must be  $75.0 \pm 2.0$  percent scrap tire crumb rubber and  $25.0 \pm 2.0$  percent high natural scrap tire crumb rubber by total weight of CRM. Scrap tire crumb rubber and high natural scrap tire crumb rubber must be derived from waste tires described in Pub Res Code § 42703.

The CRM must comply with the requirements shown in the following table:

**Crumb Rubber Modifier for Asphalt Rubber Binder** 

Quality characteristic	Test method	Requirement
Scrap tire crumb rubber gradation (% passing No. 8 sieve)	California Test 385	100
High natural crumb rubber gradation (% passing No. 10 sieve)	California Test 385	100
Wire in CRM (max, %)	California Test 385	0.01
Fabric in CRM (max, %)	California Test 385	0.05
CRM particle length (max, in) <sup>a</sup>		3/16
CRM specific gravity	California Test 208	1.1–1.2
Natural rubber content in high natural crumb rubber (%)	ASTM D297	40.0–48.0

<sup>&</sup>lt;sup>a</sup>Test at mix design and for certificate of compliance.

CRM must be ground or granulated at ambient temperature. If steel and fiber are cryogenically separated, separation must occur before grinding or granulating. Cryogenically produced CRM particles must be ground or granulated and not pass through the grinder or granulator.

CRM must be dry, free-flowing particles that do not stick together. CRM must not cause foaming when combined with the asphalt binder and asphalt modifier. You may add calcium carbonate or talc up to 3 percent by weight of CRM.

# 39-2.03B(3)(d) Design and Profile

Design the asphalt rubber binder from testing you perform for each quality characteristic and for the reaction temperatures expected during production. The profile must include the same component sources for the asphalt rubber binder used. The 24-hour (1,440-minute) interaction period determines the design profile. At a minimum, mix asphalt rubber binder components, take samples, and perform and record the tests shown in the following table:

**Asphalt Rubber Binder Reaction Design Profile** 

Quality characteristic Test method	Minutes of reaction <sup>a</sup>					Limit			
Quality characteristic	rest method	45	60	90	120	240	360	1440	LIMIL
Cone penetration at 25 °C (0.10 mm)	ASTM D217	Χb	-			Х	1	Х	25–70
Resilience at 25 °C (min, % rebound)	ASTM D5329	Χ	ŀ	-	-	Χ	ı	X	18
Field softening point (°C)	ASTM D36/D36M	Χ	1			Х	1	X	52–74
Viscosity (centipoises)	ASTM D7741/D774 1M	Х	Х	Х	Х	Х	Х	X	1,500– 4,000

<sup>&</sup>lt;sup>a</sup>Six hours (360 minutes) after CRM addition, reduce the oven temperature to 275 °F for 16 hours. After the 16-hour (960 minutes) cool down after CRM addition, reheat the binder to the reaction temperature expected during production for sampling and testing at 24 hours (1,440 minutes). <sup>b</sup>X denotes required testing.

# 39-2.03B(3)(e) Asphalt Rubber Binder Production

#### 39-2.03B(3)(e)(i) General

Deliver scrap tire crumb rubber and high natural crumb rubber in separate bags.

#### 39-2.03B(3)(e)(ii) Mixing

Proportion and mix asphalt binder, asphalt modifier, and CRM simultaneously or premix the asphalt binder and asphalt modifier before adding CRM. If you premix asphalt binder and asphalt modifier, mix them for at least 20 minutes. When you add CRM, the temperature of the asphalt binder and asphalt modifier must be from 375 to 440 degrees F.

After interacting for at least 45 minutes, the asphalt rubber binder must comply with the requirements shown in the following table:

Quality characteristic	Test method	Requirement
Cone penetration at 25 °C (0.10 mm)	ASTM D217	25–70
Resilience at 25 °C (min, % rebound)	ASTM D5329	18
Softening point (°C)	ASTM D36/36M	52–74
Viscosity at 190 °C (centipoises) <sup>a</sup>	ASTM D7741/D7741M	1,500-4,000

<sup>&</sup>lt;sup>a</sup>Prepare sample for viscosity test under California Test 388.

Do not use the asphalt rubber binder during the first 45 minutes of the reaction period. During this period, the asphalt rubber binder mixture must be between 375 degrees F and the lower of 425 or 25 degrees F below the asphalt binder's flash point shown in the SDS.

If any asphalt rubber binder is not used within 4 hours after the reaction period, discontinue heating. If the asphalt rubber binder drops below 375 degrees F, reheat before use. If you add more scrap tire crumb

rubber to the reheated asphalt rubber binder, the binder must undergo a 45-minute reaction period. The added scrap tire crumb rubber must not exceed 10 percent of the total asphalt rubber binder weight. Reheated and reacted asphalt rubber binder must comply with the viscosity specifications. Do not reheat asphalt rubber binder more than twice.

# 39-2.03B(4) Aggregates

# 39-2.03B(4)(a) General

For RHMA-G, before the addition of asphalt binder and lime treatment, the aggregates must comply with the requirements shown in the following table:

**Aggregate Quality** 

Quality characteristic	Test method	Requirement
Percent of crushed particles		
Coarse aggregate (min, %)		
One-fractured face		
Two-fractured faces	AASHTO T 335	90
Fine aggregate (min, %)	AASITIO I 333	
(Passing No. 4 sieve		
and retained on No. 8 sieve.)		
One-fractured face		70
Los Angeles Rattler (max, %)		
Loss at 100 Rev.	AASHTO T 96	12
Loss at 500 Rev.		40
Sand equivalent (min) <sup>a</sup>	AASHTO T 176	47
Flat and elongated particles (max, % by weight at 5:1)	ASTM D4791	Report only
Fine aggregate angularity (min, %) <sup>b</sup>	AASHTO T 304, Method A	45

<sup>&</sup>lt;sup>a</sup>Reported value must be the average of 3 tests from a single sample. The use of a sand reading indicator is required as shown in AASHTO T 176, Figure 1. Sections 4.7, "Manual Shaker," 7.1.2, "Alternate Method No. 2," and 8.4.3, "Hand Method," do not apply. Prepare the stock solution as specified in section 4.8.1, "Stock solution with formaldehyde," except omit the addition of formaldehyde.

# 39-2.03B(4)(b) Aggregate Gradations

The aggregate gradations for RHMA-G must comply with the requirements shown in the following table:

**Aggregate Gradation Requirements** 

7 tgg: oguto oradation reoquiromento		
RHMA-G pavement thickness shown	Gradation	
0.10 to less than 0.20 foot	1/2 inch	
0.20 foot or greater	3/4 inch	

For RHMA-G, the aggregate gradations must be within the TV limits for the specified sieve size shown in the following tables:

<sup>&</sup>lt;sup>b</sup>The Engineer waives this specification if the HMA contains 10 percent or less of nonmanufactured sand by weight of total aggregate unless your JMF fails verification. Manufactured sand is fine aggregate produced by crushing rock or gravel.

# Aggregate Gradations for RHMA-G (Percentage Passing)

#### 3/4 inch

Sieve size	Target value limit	Allowable tolerance
1"	100	
3/4"	95–98	TV ± 5
1/2"	83–87	TV ± 6
3/8"	65–70	TV ± 5
No. 4	28–42	TV ± 6
No. 8	14–22	TV ± 5
No. 200	0.0–6.0	TV ± 2.0

#### 1/2 inch

Sieve size	Target value limit	Allowable tolerance
3/4"	100	
1/2"	90–98	TV ± 6
3/8"	83–87	TV ± 5
No. 4	28–42	TV ± 6
No. 8	14–22	TV ± 5
No. 200	0.0–6.0	TV ± 2.0

# 39-2.03B(5) Rubberized Hot Mix Asphalt-Gap Graded Production

Asphalt rubber binder must be from 375 to 425 degrees F when mixed with aggregate.

If the dry and wet moisture susceptibility test result for treated plant-produced RHMA-G is less than the RHMA-G mix design requirement for dry and wet moisture susceptibility strength, the minimum dry and wet strength requirement is waived, but you must use one of the following treatments:

- 1. Aggregate lime treatment using the slurry method
- 2. Aggregate lime treatment using the dry lime method
- 3. Liquid antistrip treatment of RHMA-G

### 39-2.03C Construction

Use a material transfer vehicle when placing RHMA-G.

Do not use a pneumatic tired roller to compact RHMA-G.

Spread and compact

RHMA-G and RHMA-G produced with WMA water injection technology

at an ambient air temperature of at least 55 degrees F and a surface temperature of at least 60 degrees F.

If the ambient air temperature is below 70 degrees F, cover loads in trucks with tarps. The tarps must completely cover the exposed load until you transfer the mixture to the paver's hopper or to the pavement surface. Tarps are not required if the time from discharge to truck until transfer to the paver's hopper or the pavement surface is less than 30 minutes.

For

RHMA-G and RHMA-G produced with WMA water injection technology

placed under method compaction:

- Complete the 1st coverage of breakdown compaction before the surface temperature drops below 285 degrees F.
- Complete breakdown and intermediate compaction before the surface temperature drops below 250 degrees F. Use a static steel-tired roller instead of the pneumatic-tired roller for intermediate compaction.
- 3. Complete finish compaction before the surface temperature drops below 200 degrees F.

For RHMA-G produced with WMA additive technology placed under method compaction:

- Complete the 1st coverage of breakdown compaction before the surface temperature drops below 260 degrees F
- Complete breakdown and intermediate compaction before the surface temperature drops below 230 degrees F
- 3. Complete finish compaction before the surface temperature drops below 180 degrees F
- 4. You may continue static rolling below 140 degrees F to remove roller marks

Spread sand at a rate between 1 and 2 lb/sq yd on new RHMA-G pavement when finish rolling is complete. Sand must be free of clay or organic matter. Sand must comply with section 90-1.02C(3). Keep traffic off the pavement until spreading of the sand is complete.

# 39-2.03D Payment

Not Used

#### 39-2.04 OPEN GRADED FRICTION COURSES

39-2.04A General

# 39-2.04A(1) Summary

Section 39-2.04 includes specifications for producing and placing open graded friction courses. Open graded friction courses include HMA-O, RHMA-O, and RHMA-O-HB.

You may produce OGFC using a WMA technology.

#### 39-2.04A(2) Definitions

Reserved

#### 39-2.04A(3) Submittals

Submit a complete JMF, except do not specify an asphalt binder content.

For RHMA-O and RHMA-O-HB, the JMF submittal must comply with section 39-2.03A(3)(c).

### 39-2.04A(4) Quality Assurance

# 39-2.04A(4)(a) General

Reserved

#### 39-2.04A(4)(b) Quality Control

# 39-2.04A(4)(b)(i) General

Reserved

# 39-2.04A(4)(b)(ii) Asphalt Rubber Binder

For RHMA-O and RHMA-O-HB, the asphalt rubber binder must comply with the specifications in 39-2.03A(4)(b)(ii).

### 39-2.04A(4)(b)(iii) Aggregates

Test the quality characteristics of aggregates under the test methods and frequencies shown in the following table:

**Aggregate Testing Frequencies** 

Quality characteristic	Test method	Minimum testing frequency
Gradation	AASHTO T 27	1 per 750 tons and any remaining part
Moisture content <sup>a</sup>	AASHTO T 255	1 per 1500 tons and any remaining part
Crushed particles	AASHTO T 335	1 per 10,000 tons or 2 per project,
Los Angeles Rattler	AASHTO T 96	whichever is greater
Flat and elongated particles	ASTM D4791	

<sup>&</sup>lt;sup>a</sup>Test at continuous mixing plants only.

For lime treated aggregate, test aggregate before treatment and test for gradation and moisture content during OGFC production.

# 39-2.04A(4)(b)(iv) Open Graded Friction Course Production

Test the quality characteristics of OGFC under the test methods and frequencies shown in the following table:

**OGFC Testing Frequencies** 

Quality characteristic	Test method	Minimum testing frequency
Asphalt binder content	AASHTO T 308, Method A	1 per 750 tons and any remaining part
HMA moisture content	AASHTO T 329	1 per 2,500 tons but not less than 1 per paving day

# 39-2.04A(4)(c) Department Acceptance 39-2.04A(4)(c)(i) General

The Department accepts OGFC based on compliance with:

1. Aggregate quality requirements shown in the following table:

**Aggregate Quality** 

riggrogate dataily			
Quality characteristic	Test method	Requirement	
Aggregate gradation	AASHTO T 27	JMF ± Tolerance	
Percent of crushed particles:			
Coarse aggregate (min, %)			
One-fractured face		90	
Two-fractured faces	AASHTO T 335	90	
Fine aggregate (min, %)	AA31110 1 333		
(Passing No. 4 sieve and retained on No. 8			
sieve.)		90	
One-fractured face			
Los Angeles Rattler (max, %)			
Loss at 100 Rev.	AASHTO T 96	12	
Loss at 500 Rev.		40	
Flat and elongated particles (max, % by weight @	ASTM D4791	Report only	
5:1)	A31101 D4791	ixeport only	

2. In-place OGFC quality requirements shown in the following table:

**OGFC Acceptance In Place** 

Quality characteristic	Test method	Requirement		
Asphalt binder content (%)	AASHTO T 308, Method A	JMF -0.40, +0.50		
HMA moisture content (max, %)	AASHTO T 329	1.00		

### 39-2.04A(4)(c)(ii) Asphalt Rubber Binder

The Department accepts asphalt rubber binder in RHMA-O and RHMA-O-HB under 39-2.03A(4)(e)(ii).

# 39-2.04A(4)(c)(iii) Pavement Smoothness

Pavement smoothness of OGFC must comply with the requirements shown in the following table for a 0.1 mile section:

**OGFC Pavement Smoothness Acceptance Criteria** 

OGFC placement on	Mean Roughness Index requirement
New construction or HMA overlay	60 in/mi or less
Existing pavement	75 in/mi or less
Milled surface	75 in/mi or less

# 39-2.04A(4)(c)(iv)-39-2.04A(4)(c)(v) Reserved

### 39-2.04B Materials

#### 39-2.04B(1) General

When mixed with asphalt binder, aggregate must not be more than 325 degrees F except aggregate for OGFC with unmodified asphalt binder must be not more than 275 degrees F.

# 39-2.04B(2) Open Graded Friction Course Mix Design

The Department determines the asphalt binder content under California Test 368 within 20 days of your complete JMF submittal and provides you a Caltrans Hot Mix Asphalt Verification form.

For OGFC, the 1st paragraph of section 39-2.01B(2)(a) does not apply.

#### 39-2.04B(3) Asphalt Binder

Asphalt rubber binder in RHMA-O and RHMA-O-HB must comply with section 39-2.03B(3).

# 39-2.04B(4) Aggregates

# 39-2.04B(4)(a) General

Aggregates must comply with the requirements shown in the following table:

**Aggregate Quality** 

Quality characteristic	Test method	Requirement
Percent of crushed particles		
Coarse aggregate (min, %)		
One-fractured face		
Two-fractured faces	AASHTO T 335	90
Fine aggregate (min, %)	AASITIO I 333	
(Passing No. 4 sieve and retained on No. 8		
sieve.)		90
One-fractured face		
Los Angeles Rattler (max, %)		
Loss at 100 Rev.	AASHTO T 96	12
Loss at 500 Rev.		40
Flat and elongated particles (max, % by weight at 5:1)	ASTM D4791	Report only

#### 39-2.04B(4)(b) Aggregate Gradations

The aggregate gradations for HMA-O must comply with the requirements shown in the following table:

**Aggregate Gradation Requirements** 

HMA-O pavement thickness shown	Gradation
0.10 foot or greater to less than 0.15 foot	1/2 inch
0.15 foot or greater	1 inch

The aggregate gradations for RHMA-O and RHMA-O-HB must comply with the requirements shown in the following table:

**Aggregate Gradation Requirements** 

RHMA-O and RHMA-O-HB pavement thickness	Gradation
shown	
0.10 foot or greater	1/2 inch

For RHMA-O and RHMA-O-HB, the 1-inch aggregate gradation is not allowed.

For OGFC, the aggregate gradations must be within the TV limits for the specified sieve size shown in the following tables:

# Aggregate Gradations for OGFC (Percentage Passing)

#### 1 inch

Sieve size	Target value limit	Allowable tolerance
1 1/2"	100	
1"	99–100	TV ± 5
3/4"	85–96	TV ± 5
1/2"	55–71	TV ± 6
No. 4	10–25	TV ± 7
No. 8	6–16	TV ± 5
No. 200	0.0–6.0	TV ± 2.0

#### 1/2 inch

Sieve size	Target value limit	Allowable tolerance
3/4"	100	
1/2"	95–100	TV ± 6
3/8"	78–89	TV ± 6
No. 4	28–37	TV ± 7
No. 8	7–18	TV ± 5
No. 30	0–10	TV ± 4
No. 200	0.0–3.0	TV ± 2.0

If lime treatment is required, you may reduce the lime ratio for the combined aggregates from 1.0 to 0.5 percent for OGFC.

# 39-2.04B(5) Sand

Sand for spreading over RHMA-O and RHMA-O-HB pavement must be free of clay or organic matter. Sand must comply with section 90-1.02C(3).

# 39-2.04C Construction

Use a material transfer vehicle when placing OGFC.

If the ambient air temperature is below 70 degrees F, cover loads in trucks with tarps. The tarps must completely cover the exposed load until you transfer the mixture to the paver's hopper or to the pavement

surface. Tarps are not required if the time from discharge to truck until transfer to the paver's hopper or the pavement surface is less than 30 minutes.

Apply a tack coat before placing OGFC. The tack coat application rate must comply with the requirements of the following table:

**Tack Coat Application Rates for OGFC** 

	rack coat Application i	10.100 101 0 0 1 0	
	Minimum residual rates (gal/sq yd)		
OGFC over:	CSS1/CSS1h, SS1/SS1h, and QS1h/CQS1h asphaltic emulsion	CRS1/CRS2, RS1/RS2, and QS1/CQS1 asphaltic emulsion	Asphalt binder and PMRS2/PMCRS2 and PMRS2h/PMCRS2h asphaltic emulsion
New HMA	0.03	0.04	0.03
Concrete pavement and existing asphalt concrete surfacing	0.05	0.06	0.04
Planed pavement	0.06	0.07	0.05

Compact OGFC with steel-tired, 2-axle tandem rollers. If placing over 300 tons of OGFC per hour, use at least 3 rollers for each paver. If placing less than 300 tons of OGFC per hour, use at least 2 rollers for each paver. Each roller must weigh from 126 to 172 lb per linear inch of drum width. Turn the vibrator off.

Compact OGFC with 2 coverages. The Engineer may order fewer coverages if the layer thickness of OGFC is less than 0.20 foot.

For HMA-O and HMA-O produced with WMA water injection technology:

- 1. With unmodified asphalt binder:
  - 1.1. Spread and compact only if the atmospheric temperature is at least 55 degrees F and the surface temperature is at least 60 degrees F.
  - 1.2. Complete the 1st coverage using 2 rollers before the surface temperature drops below 240 degrees F.
  - 1.3. Complete all compaction before the surface temperature drops below 200 degrees F.
- 2. With modified asphalt binder, except asphalt rubber binder:
  - 2.1. Spread and compact only if the atmospheric temperature is at least 50 degrees F and the surface temperature is at least 50 degrees F.
  - 2.2. Complete the 1st coverage using 2 rollers before the surface temperature drops below 240 degrees F.
  - 2.3. Complete all compaction before the surface temperature drops below 180 degrees F.

For HMA-O produced with WMA additive technology:

- 1. With unmodified asphalt binder:
  - 1.1. Spread and compact only if the atmospheric temperature is at least 45 degrees F and the surface temperature is at least 50 degrees F.
  - 1.2. Complete the 1st coverage using 2 rollers before the surface temperature drops below 230 degrees F.
  - 1.3. Complete all compaction before the surface temperature drops below 190 degrees F.
- 2. With modified asphalt binder, except asphalt rubber binder:
  - 2.1. Spread and compact only if the atmospheric temperature is at least 40 degrees F and the surface temperature is at least 40 degrees F.
  - 2.2. Complete the 1st coverage using 2 rollers before the surface temperature drops below 230 degrees F.
  - 2.3. Complete all compaction before the surface temperature drops below 170 degrees F.

For

RHMA-O and RHMA-O produced with WMA water injection technology, and RHMA-O-HB and RHMA-O-HB produced with WMA water injection technology

:

- 1. Spread and compact only if the ambient air temperature is at least 55 degrees F and surface temperature is at least 60 degrees F.
- 2 Complete the 1st coverage using 2 rollers before the surface temperature drops below 280 degrees F
- 3. Complete compaction before the surface temperature drops below 250 degrees F.

For RHMA-O produced with WMA additive technology and RHMA-O-HB produced with WMA additives technology:

- Spread and compact if the ambient air temperature is at least 45 degrees F and the surface temperature is at least 50 degrees F
- 2. Complete the 1st coverage using 2 rollers before the surface temperature drops below 270 degrees F
- 3. Complete all compaction before the surface temperature drops below 240 degrees F

Spread sand at a rate between 1 and 2 lb/sq yd on new RHMA-O and RHMA-O-HB pavement after finish rolling activities are complete. Keep traffic off the pavement until spreading of the sand is complete.

If you choose to correct OGFC for smoothness, the Engineer determines if the corrective method causes raveling. OGFC that is raveling must be removed and replaced.

#### 39-2.04D Payment

Not Used

#### 39-2.05 BONDED WEARING COURSES

39-2.05A General

39-2.05A(1) General

#### 39-2.05A(1)(a) Summary

Section 39-2.05 includes specifications for producing and placing bonded wearing courses.

Placing a BWC consists of applying a polymer-modified asphaltic emulsion and placing the specified HMA in a single pass with an integrated paving machine.

BWC using RHMA-G, RHMA-O, or HMA-O must comply with the specifications for RHMA-G, RHMA-O, or HMA-O.

# 39-2.05A(1)(b) Definitions

Reserved

#### 39-2.05A(1)(c) Submittals

With your JMF submittal, include:

- 1. Asphaltic emulsion target residual rate
- 2. Weight ratio of water to bituminous material in the original asphaltic emulsion

Within 3 business days following the 1st job site delivery, submit test results for asphaltic emulsion properties performed on a sample taken from the asphaltic emulsion delivered.

Within 1 business day of each job site delivery of asphaltic emulsion, submit to METS a 2-quart sample and a certificate of compliance. Ship each sample so that it is received at METS within 48 hours of sampling.

Each day BWC is placed, submit the residual and application rate for the asphaltic emulsion.

During production, submit certified volume or weight slips for the materials supplied.

# 39-2.05A(1)(d) Quality Assurance

# 39-2.05A(1)(d)(i) General

For each job site delivery of asphaltic emulsion, take a 2 qt sample in the presence of the Engineer. Take samples from the delivery truck at mid load from a sampling tap or thief. If the sample is taken from the tap, draw and discard 4 qt before sampling.

If you unload asphalt binder or asphaltic emulsion into a bulk storage tank, do not use material from the tank until you submit test results for a sample taken from the bulk storage tank. Testing must be performed by an AASHTO-accredited laboratory.

# 39-2.05A(1)(d)(ii) Quality Control

Take two 1 gal samples of BWC in metal containers.

Test the asphaltic emulsion under ASTM D2995 at least once per paving day at the job site.

#### 39-2.05A(1)(d)(iii) Department Acceptance

The Department accepts asphaltic emulsion based on compliance with the requirements shown in the following table:

**Asphaltic Emulsion** 

Quality characteristic	Test method	Requiremen t
Saybolt Furol viscosity at 25 °C (Saybolt Furol seconds)	AASHTO T 59	20–100
Sieve test on original emulsion at time of delivery (max, %)	AASHTO T 59	0.05
24-hour storage stability (max, %)	AASHTO T 59	1
Residue by evaporation (min, %)	California Test	63
	331	
Tests on residue from evaporation test:		
Torsional recovery, measure entire arc of recovery at 25 °C (min,	California Test	40
(%)	332	
Penetration at 25 °C (0.01 mm)	AASHTO T 49	70–150

The Department accepts the BWC based on the submitted asphaltic emulsion target residual rate  $\pm 0.02$  gal/sq yd when tested under ASTM D2995.

#### 39-2.05A(2) Materials

39-2.05A(2)(a) General

Reserved

# 39-2.05A(2)(b) Asphaltic Emulsion

The asphaltic emulsion must comply with the requirements shown in the following table:

**Asphaltic Emulsion** 

Quality characteristic	Test method	Requiremen t
Saybolt Furol viscosity at 25 °C (Saybolt Furol seconds)	AASHTO T 59	20–100
Sieve test on original emulsion at time of delivery (max, %)	AASHTO T 59	0.05
24-hour storage stability (max, %)	AASHTO T 59	1
Residue by evaporation (min, %)	California Test	63
	331	
Tests on residue from evaporation test:		
Torsional recovery, measure entire arc of recovery at 25 °C (min,	California Test	40
(%)	332	
Penetration at 25 °C (0.01 mm)	AASHTO T 49	70–150

39-2.05A(2)(c) Reserved 39-2.05A(3) Construction

39-2.05A(3)(a) General

Do not dilute the asphaltic emulsion.

Do not place BWC if rain is forecast for the project area within 24 hours by the National Weather Service.

# 39-2.05A(3)(b) Spreading and Compacting Equipment

Use method compaction for placing the BWC.

Use a material transfer vehicle when placing BWC. The material transfer vehicle must receive HMA directly from the truck.

Use an integrated distributor paver capable of spraying the asphaltic emulsion, spreading the HMA, and leveling the mat surface in 1 pass.

Apply asphaltic emulsion at a uniform rate for the full paving width. The asphaltic emulsion must not be touched by any part of the paver including wheels or tracks.

If the spray bar is adjusted for changing pavement widths, the paver must prevent excess spraying of asphaltic emulsion beyond 2 inches of the HMA edge.

#### 39-2.05A(3)(c) Applying Asphaltic Emulsion

Before spreading HMA, apply asphaltic emulsion on dry or damp pavement with no free water.

Apply emulsion at a temperature from 120 to 180 degrees F and in a single application at the residual rate specified for the condition of the underlying surface. Asphaltic emulsion must have a target residual rate for the surfaces to receive the emulsion as shown in the following table:

**Asphaltic Emulsion Target Residual Rate** 

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Surface to receive asphaltic emulsion	Target residual rates	
Concrete pavement (gal/sq yd)	0.09–0.11	
Dense, compacted, new HMA pavement (gal/sq yd)	0.11-0.14	
Open textured, dry, aged or oxidized existing asphalt concrete pavement (gal/sq yd)	0.13–0.17	

If you request and your request is authorized, you may change the asphaltic emulsion application rates.

# 39-2.05A(3)(d) Placing and Compacting Hot Mix Asphalt

Construct a transverse joint if the HMA remains in the paver for more than 30 minutes.

Do not reintroduce HMA spread over asphaltic emulsion into the paving process.

Do not overlap or hot lap HMA. Pave through lanes after paving adjacent:

1.	Shoulders	6.	Curve widenings
2.	Tapers	7.	Chain control lanes
3.	Transitions	8.	Turnouts
4.	Road connections	9.	Turn pockets
5.	Driveways	10.	Ramps

For BWC placed on areas adjacent to through lanes that extend into the through lanes, cut the BWC to a neat, straight vertical line at the lane line.

If you spill asphaltic emulsion into the paver hopper, stop paving and remove the contaminated material.

# 39-2.05A(4) Payment

Payment for asphaltic emulsion is not included in the payment for the type of HMA used in a bonded wearing course.

# 39-2.05B Bonded Wearing Courses-Gap Graded

39-2.05B(1) General

# 39-2.05B(1)(a) Summary

Section 39-2.05B includes specifications for producing bonded wearing course-gap graded.

# 39-2.05B(1)(b) Definitions

Reserved

# 39-2.05B(1)(c) Submittals

Include film thickness and calculations and AASHTO T 305 results with your JMF submittal.

# 39-2.05B(1)(d) Quality Assurance

39-2.05B(1)(d)(i) General

Reserved

# 39-2.05B(1)(d)(ii) Quality Control

39-2.05B(1)(d)(ii)(A) General

Reserved

# 39-2.05B(1)(d)(ii)(B) Aggregates

Test the quality characteristics of the aggregates under the test methods and frequencies shown in the following table:

**Aggregate Testing Frequencies** 

Quality characteristic	Test method	Minimum testing frequency
Gradation	AASHTO T 27	1 per 750 tape and any remaining part
Sand equivalent <sup>a</sup>	AASHTO T 176	1 per 750 tons and any remaining part
Moisture content <sup>b</sup>	AASHTO T 255	1 per 1500 tons and any remaining
		part
Crushed particles	AASHTO T 335	
Los Angeles Rattler	AASHTO T 96	1 per 10,000 tons or 2 per project,
Flat and elongated particles	ASTM D4791	whichever is greater
Fine aggregate angularity	AASHTO T 304, Method A	

<sup>&</sup>lt;sup>a</sup>Reported value must be the average of 3 tests from a single sample. The use of a sand reading indicator is required as shown in AASHTO T 176, Figure 1. Sections 4.7, "Manual Shaker," 7.1.2, "Alternate Method No. 2," and 8.4.3, "Hand Method," do not apply. Prepare the stock solution as specified in section 4.8.1, "Stock solution with formaldehyde," except omit the addition of formaldehyde.

For lime treated aggregate, test the aggregate before treatment and test for gradation and moisture content during BWC-G production.

# 39-2.05B(1)(d)(ii)(C) Bonded Wearing Course-Gap Graded Production

Take two 1 gal samples of BWC-G in metal containers.

Test the quality characteristics of BWC-G under the test methods and frequencies shown in the following table:

**BWC-G Testing Frequencies** 

Quality characteristic	Test method	Minimum testing frequency
Asphalt binder content	AASHTO T 308, Method A	1 per 750 tons and any remaining part
HMA moisture content	AASHTO T 329	1 per 2,500 tons but not less than 1 per paving day

# 39-2.05B(1)(d)(ii)(D)-39-2.05B(1)(d)(ii)(G) Reserved 39-2.05B(1)(d)(iii) Department Acceptance

The Department accepts BWC-G based on compliance with:

- 1. Asphalt binder content at JMF -0.40, +0.50 percent when tested under AASHTO T 308, Method A.
- 2. Aggregate quality requirements shown in the following table:

<sup>&</sup>lt;sup>b</sup>Test at continuous mixing plants only.

**Aggregate Quality** 

Aggregate quanty			
Quality characteristic	Test method	Requirement	
Aggregate gradation	AASHTO T 27	JMF ± Tolerance	
Percent of crushed particles			
Coarse aggregate (min, %)			
One-fractured face			
Two-fractured faces	AASHTO T 335	90	
Fine aggregate (min, %)	AASI110 1 333		
(Passing no. 4 sieve and retained on no. 8			
sieve.)		85	
One fractured face			
Los Angeles Rattler (max, %)			
Loss at 100 Rev.	AASHTO T 96	12	
Loss at 500 Rev.		35	
Sand equivalent (min) <sup>a</sup>	AASHTO T 176	47	
Flat and elongated particles (max, % by weight at	ASTM D4791	25	
5:1)	A31W D4791	20	
Fine aggregate angularity (min, %)	AASHTO T 304, Method A	45	

<sup>a</sup>Reported value must be the average of 3 tests from a single sample. The use of a sand reading indicator is required as shown in AASHTO T 176, Figure 1. Sections 4.7, "Manual Shaker," 7.1.2, "Alternate Method No. 2," and 8.4.3, "Hand Method," do not apply. Prepare the stock solution as specified in section 4.8.1, "Stock solution with formaldehyde," except omit the addition of formaldehyde.

# 39-2.05B(2) Materials 39-2.05B(2)(a) General

Reserved

# 39-2.05B(2)(b) Bonded Wearing Course-Gap Graded Mix Design

For BWC-G, the 1st paragraph of section 39-2.01B(2)(a) does not apply.

Determine the proposed OBC from a mix design that complies with the requirements shown in the following table:

**Hot Mix Asphalt Mix Design Requirements** 

Quality characteristic	Test method	Requirement
Film thickness (min, μm)	Asphalt Institute MS-2	12
, , ,	Table 8.1 a	
Drain down (max, %)	AASHTO T 305 b	0.1

<sup>&</sup>lt;sup>a</sup>Film thickness is calculated based on the effective asphalt content and determined as follows:

$$FT = \left( \frac{P_{be}}{SA \times G_b \times 1000} \right) 10^6$$

where:

FT = Film thickness in µm

P<sub>be</sub> = Effective asphalt content by total weight of mix using *MS-2*Asphalt Mix Design Methods

SA = Estimated surface area of the aggregate blend in m<sup>2</sup>/kg from Table 8.1 in the Asphalt Institute *MS-2 Asphalt Mix Design Methods* 

G<sub>b</sub> = Specific gravity of asphalt binder

<sup>b</sup>Combine aggregate and asphalt at the asphalt binder supplier's instructed mixing temperature. Coated aggregates that fall through the wire basket during loading must be returned to the basket before conditioning at 350 °F for 1 hour.

The OBC must be greater than 4.9 percent by total weight of mix.

## 39-2.05B(2)(c) Asphalt Binder

Reserved

# 39-2.05B(2)(d) Aggregates

The aggregates must comply with the requirements shown in the following table:

**Aggregate Quality** 

7.199.094.0 4.44			
Quality characteristic	Test method	Requirement	
Percent of crushed particles			
Coarse aggregate (min, %)			
One-fractured face			
Two-fractured faces	AASHTO T 335	90	
Fine aggregate (min, %)			
(Passing No. 4 sieve and retained on No. 8 sieve.)			
One-fractured face		85	
Los Angeles Rattler (max, %)			
Loss at 100 Rev.	AASHTO T 96	12	
Loss at 500 Rev.		35	
Sand equivalent (min) <sup>a</sup>	AASHTO T 176	47	
Flat and elongated particles (max, % by weight @ 5:1)	ASTM D4791	25	
Fine aggregate angularity (min, %)	AASHTO T 304, Method	45	
	Α	45	

<sup>&</sup>lt;sup>a</sup>Reported value must be the average of 3 tests from a single sample. The use of a sand reading indicator is required as shown in AASHTO T 176, Figure 1. Sections 4.7, "Manual Shaker," 7.1.2, "Alternate Method No. 2," and 8.4.3, "Hand Method," do not apply. Prepare the stock solution as specified in section 4.8.1, "Stock solution with formaldehyde," except omit the addition of formaldehyde.

The aggregate gradations for BWC-G must comply with the requirements shown in the following table:

Aggregate Gradation Requirements

BWC-G pavement thickness shown	Gradation
less than 0.08 foot	No. 4 or 3/8 inch
0.08 foot or greater	1/2 inch

The proposed aggregate gradation must be within the TV limits for the specified sieve sizes shown in the following tables:

# Aggregate Gradations for BWC-G (Percentage Passing)

# 1/2 inch

Sieve size	Target value limit	Allowable tolerance
3/4"	100	
1/2"	80–100	TV ± 6
3/8"	55–80	TV ± 6
No. 4	25–40	TV ± 7
No. 8	19–32	TV ± 5
No. 16	16–22	TV ± 5
No. 30	10–18	TV ± 4
No. 50	8–13	TV ± 4
No. 100	6–10	TV ± 2
No. 200	4.0–7.0	TV ± 2.0

# 3/8 inch

Sieve size	Target value limit	Allowable tolerance
1/2"	100	
3/8"	80–100	TV ± 6
No. 4	25–40	TV ± 7
No. 8	19–32	TV ± 5
No. 16	16–22	TV ± 5
No. 30	10–18	TV ± 4
No. 50	8–13	TV ± 4
No. 100	7–11	TV ± 2
No. 200	6.0–10.0	TV ± 2.0

#### No. 4

Sieve size	Target value limit	Allowable tolerance
1/2"	100	
3/8"	95–100	TV ± 2
No. 4	42–55	TV ± 7
No. 8	19–32	TV ± 5
No. 16	16–22	TV ± 5
No. 30	10–18	TV ± 4
No. 50	8–13	TV ± 4
No. 100	7–11	TV ± 2
No. 200	6.0–10.0	TV ± 2.0

# 39-2.05B(3) Construction

Apply asphaltic emulsion when the ambient air and pavement temperatures are above 50 degrees F.

# 39-2.05B(4) Payment

Not Used

# 39-2.06 HOT MIX ASPHALT ON BRIDGE DECKS

# 39-2.06A General

Section 39-2.06 includes specifications for producing and placing hot mix asphalt on bridge decks.

HMA used for bridge decks must comply with the specifications for Type A HMA in section 39-2.02.

#### 39-2.06B Materials

Do not use the 1-inch or 3/4-inch aggregate gradation for HMA on bridge decks.

The grade of asphalt binder for HMA must be PG 64-10 or PG 64-16.

#### 39-2.06C Construction

Spread and compact HMA on bridge decks using method compaction.

If a concrete expansion dam is to be placed at a bridge deck expansion joint, tape oil-resistant construction paper to the deck over the area to be covered by the dam before placing the tack coat and HMA across the joint.

Apply a tack coat at the minimum residual rate specified in section 39-2.01C(3)(f). For HMA placed on a deck seal, use the minimum residual rate specified for concrete pavement.

For HMA placed on a deck seal:

- 1. Place the HMA within 7 days after installing the deck seal.
- 2. If a paper mask is placed on the deck under section 54-5.03, place the HMA continuously across the paper mask.
- 3. Place HMA in at least 2 approximately equal layers.
- 4. For placement of the 1st HMA layer:
  - 4.1. Comply with the HMA application temperature recommended by the deck seal manufacturer.
  - 4.2. Deliver and place HMA using equipment with pneumatic tires or rubber-faced wheels. Do not operate other vehicles or equipment on the bare deck seal.
  - 4.3. Deposit HMA on the deck seal in such a way that the deck seal is not damaged. Do not use a windrow.
  - 4.4. Place HMA in a downhill direction on bridge decks with grades over 2 percent.
  - 4.5. Self-propelled spreading equipment is not required.

#### 39-2.06D Payment

Not Used

#### 39-2.07 MINOR HOT MIX ASPHALT

#### **39-2.07A General**

# 39-2.07A(1) Summary

Section 39-2.07 includes specifications for producing and placing minor hot mix asphalt.

Minor HMA must comply with section 39-2.02 except as specified in this section 39-2.07.

The inertial profiler requirements in section 36-3 do not apply.

#### 39-2.07A(2) Definitions

Reserved

#### 39-2.07A(3) Submittals

The QC plan and test results in sections 39-2.01A(3)(c) and 39-2.01A(3)(d) do not apply.

#### 39-2.07A(4) Quality Assurance

#### 39-2.07A(4)(a) General

The JMF renewal requirements in section 39-2.01A(4)(d) do not apply.

Test pavement smoothness with a 12 foot straightedge.

#### 39-2.07A(4)(b) Quality Control

Testing for compliance with the following quality characteristics is not required:

- 1. Flat and elongated particles
- 2. Fine aggregate angularity
- 3. Hamburg wheel track
- 4. Moisture susceptibility

# 39-2.07A(4)(c) Department Acceptance

The Department accepts minor HMA under section 39-2.02A(4)(e) except for compliance with requirements for the following quality characteristics:

- 1. Flat and elongated particles
- 2. Fine aggregate angularity
- 3. Hamburg wheel track
- 4. Moisture susceptibility

#### 39-2.07B Materials

# 39-2.07B(1) General

Reserved

#### 39-2.07B(2) Minor Hot Mix Asphalt Mix Design

The Hamburg wheel track and moisture susceptibility requirements do not apply to the mix design for minor HMA.

# 39-2.07B(3) Asphalt Binder

The grade of asphalt binder for minor HMA must be PG-64-10 or PG-64-16.

#### 39-2.07B(4) Liquid Antistrip Treatment

Treat minor HMA with liquid antistrip unless you submit AASHTO T 283 and AASHTO T 324 (Modified) test results showing compliance with section 39-2.02B and dated within 12 months of the submittal.

#### 39-2.07C Construction

Not Used

#### 39-2.07D Payment

Not Used

#### 39-2.08-39-2.10 RESERVED

# **39-3 EXISTING ASPHALT CONCRETE**

#### 39-3.01 GENERAL

#### 39-3.01A General

Section 39-3.01 includes general specifications for performing work on existing asphalt concrete facilities.

Work performed on existing asphalt concrete facilities must comply with section 15.

#### 39-3.01B Materials

Not Used

#### 39-3.01C Construction

Before removing a portion of an asphalt concrete facility, make a 2-inch deep saw cut to a true line along the limits of the removal area.

#### **39-3.01D Payment**

Not Used

#### 39-3.02 REPLACE ASPHALT CONCRETE SURFACING

#### 39-3.02A General

Section 39-3.02 includes specifications for replacing asphalt concrete surfacing.

#### 39-3.02B Materials

HMA to be used for replacing asphalt concrete surfacing must comply with Type A HMA as specified in section 39-2.02.

The grade of asphalt binder must be PG 64-10 or PG 64-16.

Tack coat must comply with section 39-2.01B(10).

#### 39-3.02C Construction

Where replace asphalt concrete surfacing is shown, remove the asphalt concrete surfacing and, if necessary, base to a depth of 6 inches below the grade of the existing surfacing and replace with HMA. The Engineer determines the exact limits of asphalt concrete surfacing to be replaced.

The width of each removal shall be a minimum of four feet wide or as determined by the Engineer

Use cold planned material for shoulder backing inside the project limits, as per these specifications and as directed by the Engineer.

Replace asphalt concrete in a lane before the lane is specified to be opened to traffic.

Before removing asphalt concrete, outline the replacement area and cut neat lines with a saw or grind to a depth of 6 inches below the grade of the existing surfacing. Do not damage any asphalt concrete and base remaining in place.

If you excavate the base beyond the specified plane, replace it with HMA.

Do not use a material transfer vehicle for replacing asphalt concrete surfacing.

Before placing HMA, apply a tack coat as specified in section 39-2.01C(3)(f).

Place HMA using method compaction as specified in section 39-2.01C(2)(c).

The contract price paid per square feet for Remove Asphalt Concrete Pavement shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in repairing pavement, complete in place, including disposal of removed material, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The quantity of Remove Asphalt Concrete Pavement to be paid for will be the actual area repaired.

#### **39-3.02D Payment**

The payment quantity for replace asphalt concrete surfacing is the volume determined from the dimensions shown.

#### 39-3.03 REMOVE ASPHALT CONCRETE DIKES & BERMS

#### 39-3.03A General

Section 39-3.03 applies to removing asphalt concrete dikes and berms outside the limits of excavation.

#### 39-3.03B Materials

Not Used

#### 39-3.03C Construction

Reserved

#### **39-3.03D** Payment

Not Used

#### 39-3.04 COLD PLANING ASPHALT CONCRETE PAVEMENT

#### 39-3.04A General

Section 39-3.04 includes specifications for cold planning asphalt concrete pavement.

Cold planning asphalt concrete pavement includes the removal of pavement markers, traffic stripes, and pavement markings within the area of cold planning.

Schedule cold planing activities such that the pavement is cold planed, the HMA is placed, and the area is opened to traffic during the same work shift.

#### 39-3.04B Materials

HMA for temporary tapers must be of the same quality that is used for the HMA overlay or comply with the specifications for minor HMA in section 39-2.07.

#### 39-3.04C Construction

#### 39-3.04C(1) 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 unless a wider cutter head is authorized.
- 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 such that no fumes or smoke is produced.

Replace broken, missing, or worn machine teeth.

If you do not complete placing the HMA surfacing before opening the area to traffic, you must:

- 1. Construct a temporary HMA taper to the level of the existing pavement.
- 2. Place HMA during the next work shift.
- 3. Submit a corrective action plan that shows you will complete cold planing and placement of HMA in the same work shift. Do not restart cold planing activities until the corrective action plan is authorized.

#### 39-3.04C(2) Grade Control and Surface Smoothness

Install and maintain grade and transverse slope references.

The final cut must result in a neat and uniform surface.

The completed surface of the planed pavement must not vary more than 0.02 foot when measured with a 12-foot straightedge parallel with the centerline. With the straightedge at right angles to the centerline, the transverse slope of the planed surface must not vary more than 0.03 foot.

Where lanes are open to traffic, the drop-off of between adjacent lanes must not be more than 0.15 foot.

# 39-3.04C(3) Planed Material

Remove cold planed material concurrently with planing activities such that the removal does not lag more than 50 feet behind the planer.

# 39-3.04C(4) Temporary HMA Tapers

If a drop-off between the existing pavement and the planed area at transverse joints cannot be avoided before opening to traffic, construct a temporary HMA taper.

Compact by any method that will produce a smooth riding surface

Completely remove temporary tapers before placing permanent surfacing.

#### 39-3.04D Payment

Not Used

#### 39-3.05 REMOVE BASE AND SURFACING

#### 39-3.05A General

Section 39-3.05 includes specifications for removing base and asphalt concrete surfacing.

#### 39-3.05B Materials

Not Used

#### 39-3.05C Construction

Where base and surfacing are described to be removed, remove base and surfacing to a depth of at least 6 inches below the grade of the existing surfacing. Backfill resulting holes and depressions with embankment material under section 19.

# **39-3.05D Payment**

The payment quantity for remove base and surfacing is the volume determined from the dimensions shown.

#### Replace Section 39-3.06 with:

# 39-3.06 COLD IN-PLACE RECYCLING-FOAMED ASPHALT

# **39-3.06A GENERAL**

# 39-3.06A(1) Submittals

The Contractor shall furnish the following information regarding the Cold In-Place Recycling (CIPR) to the Engineer. Approval of the Contractor or Subcontractor performing the CIPR is at the discretion of the Engineer.

- 1) Description and specification of the proposed CIR recycling unit and support equipment, construction method, expected production rates, and planned sequence of construction.
- 2) The Contractor (or Subcontractor) shall have completed a minimum of three (3) CIR projects in the last three (3) years. Submit project name, agency/owner, project engineer, and construction dates.
- 3) The CIR recycling unit shall demonstrate the ability to crush, size and screen the RAP used in the CIR process.
- 4) Verification the CIR recycling unit meets the proportioning requirements of California Department of Transportation Material and Plant Quality Program (MPQP) and the applicable Air Quality Control district permits.

#### 39-3.06A(2) Contractor Responsibility

The Contractor shall be responsible for the final product and shall make any quality control, adjustments and corrections necessary to obtain the final product accepted by the Engineer. The Contractor shall perform process and quality control sampling and testing and exercise management and control the work of his/her subcontractors, technicians and workers to ensure that the milling, transporting, recycling, spreading, compaction, and finishing processes conform to these Specifications. The proficiency of testing laboratories and sampling and testing personnel shall be reviewed and approved by the Engineer prior to providing services to the project. The Engineer shall have unrestricted access to the laboratory,

sampling, testing sites, and all information resulting from mix design and quality control activities. All Quality Control testing results shall be submitted to the Engineer on a daily basis.

# 39-3.06A(3) Scope

This work shall consist of milling the existing asphalt concrete pavement to the length, depth and width as shown on the plans, crushing, screening, and sizing the Reclaimed Asphalt Pavement (RAP) material to an aggregate blend with a maximum size. The properly sized RAP to be recycled shall then be blended with a bituminous recycling agent (asphalt foam), and other additives, such as cement, as required by the Contractor's Mix Design, to produce a recycled asphalt concrete. This material shall then be placed and compacted in accordance with the Plans and Specifications, and as directed by the Engineer.

The Contractor shall be responsible for providing Quality Control of the cold in-place recycling process and provide documentation to the Engineer demonstrating conformance to the Contractor's Quality Control Program. A Contractor's Quality Control Plan shall be submitted to the Engineer. The Quality Control Plan shall address: 1) equipment conformance with the specifications and calibration to required tolerances, 2) Quality control parameters for recycling agent and other CIR additives, 3) Conformance to Mix Design. The Agency shall provide Geotechnical Engineering testers for Quality Assurance.

# 39-3.06A(4) Just In Time Training

Attending a 2-hour minimum Just-In-Time Training (JITT) shall be mandatory, and consist of a formal joint training class on cold recycled asphalt materials, required special equipment, placement and compaction methods, and quality control. Construction operations for cold recycling shall not begin until the Contractor's and the Engineer's personnel have completed the JITT. The JITT training class shall be conducted at a project field location convenient for both the Contractor and the Engineer. The JITT class shall be completed not more than 7 days prior to the start of cold recycling operations. The class shall be held during normal working hours. The Contractor shall provide the JITT instructor. The instructor shall be experienced in the construction methods, materials, and test methods associated with construction of cold recycle asphalt projects. A copy of the course syllabus, handouts, and presentation material shall be submitted to the Engineer at least 7 days before the day of the training. The Contractor and the Engineer shall mutually agree to the course instructor, course content, and training site. Just-In-Time Training shall not relieve the Contractor of responsibility under the contract for the successful completion of the work in conformance with the requirements of the plans and specifications.

### 39-3.06A(5) Mix Design

A mix design shall be submitted by the Contractor using representative samples of the asphalt concrete to be recycled obtained directly from the Project site. The mix design shall be certified by a licensed Civil Engineer or AASHTO Approved Laboratory experienced in cold recycled pavements. Asphalt foam recycling agent mix design shall be conducted in accordance with the Appendix A. The job mix formula shall meet the criteria of Table 1 for Foamed Asphalt Recycling Agent and be approved by the Engineer.

Table 1 – Foamed Asphalt Recycling Agent

CIR Mixture Design Requirements	Requirement
Gradation of Reclaimed Asphalt Pavement (RAP): CT 202	1-inch maximum
Asphalt Content of RAP: ASTM D 2172 Method B	Report
Bulk Specific Gravity of Compacted Samples <sup>a, b</sup> : AASHTO T245	Report
Maximum Theoretical Specific Gravity <sup>b</sup> : AASHTO T209	Report
Air Voids of Compacted and Cured Specimens <sup>b</sup> : AASHTO T269	Report
Indirect Wet Tensile Strength, Cured Specimen <sup>c</sup> : CT 371, Section J	31.5 psi
Indirect Dry Tensile Strength, Cured Specimen <sup>c</sup> : CT 371, Section J	Report
Tensile Strength Ratio (%): CT 371	Report
Ratio of Bituminous Residue to Cement (min)	2.5

#### Notes:

- <sup>a</sup> 4-inch diameter mold compaction based on either 75 blow Marshall on each side or gyratory compactor at 30 gyrations.
- <sup>b</sup> Test specimens after 140°F curing to constant weight between 16 hours and 48 hours.
- <sup>c</sup> Fabricate 6 indirect tensile strength specimens under AASHTO T245. Fabrication of indirect tensile strength specimens must be completed within 30 minutes after materials have been mixed. Cure the specimens at 100 degrees F for 72 hours and allow the specimens to cool to room temperature. Test 3 specimens for dry tensile strength under California Test 371. Test 3 specimens for wet tensile strength under California Test 371 after moisture conditioning.

The mix design reports for a foamed asphalt recycling agent shall include the following:

- a. Percent by weight of foamed asphalt cement to be added to the mix.
- b. Optimum percent by weight of water to be added to the asphalt cement for the foaming process.
- c. Minimum Foamed Asphalt Expansion Characteristics required.
- d. Temperature of asphalt cement at the time of injection.
- e. Percent by weight of Portland cement, if any, to be added to the mix.
- f. Gradation of the RAP
- g. Optimum compaction moisture content
- h. Design wet indirect splitting tensile strength
- i. Maximum dry density

For the recycling agent and any cement if used include the designation, company name, location, residue content, and Certificates of Compliance.

#### **39-3.06 B MATERIALS**

# 39-3.06B(1) Foamed Asphalt Recycling Agent

Asphalt used in the cold foam in-place recycling process shall conform to the provisions in the Standard Specifications. The grade of asphalt shall be determined by the mix design and approved by the Engineer. The asphalt shall not be heated above a temperature of 375 deg F. Asphalt provided to the job shall have no additives or properties which will inhibit the ability to produce asphalt foam with a minimum expansion ratio (volume of foamed asphalt to residual, un-foamed asphalt) of 8 and a half-life (time for the foamed asphalt to lose half its expanded volume) of not less than 6 seconds.

A Certificate of Compliance from the asphalt manufacturer shall accompany each shipment to the Project. The Contractor shall perform an expansion ratio and half-life test for each load utilized in the recycle unit. A one-quart sample of Asphalt shall be obtained from each delivery vehicle to the job and turned over to the Engineer at the end of the day, or retained by the Contractor at the direction of the Engineer. The sample shall be sealed and the container clean and dry when the sample is taken. The sample bottle shall be marked with the date and time the sample was taken, the name of the supplier, and the bill of lading number from the load delivery ticket. The asphalt shall be handled with care.

#### 39-3.06B(2) Reclaimed Asphalt

Reclaimed asphalt pavement from the existing pavement surface shall be processed and graded material with the resultant blend consisting of 100% of the crushed RAP passing a 1-inch sieve and shall be clean, free of contamination of dirt, base, concrete or other deleterious materials.

Rubberized crack filler, pavement markers, loop wires, thermoplastic markers, fabric (if encountered) and other like materials that may be incorporated into the RAP as it is removed from the roadway shall be removed by the screening process. A minor amount of these residual materials that cannot be completely removed from the processed RAP may be incorporated into the recycled mix if the Contractor can demonstrate that those added materials will not adversely affect the performance of the recycled asphalt

pavement. Any such materials retained in the mix shall be appropriately sized and blended so as not to adversely affect the appearance or strength of the recycled pavement.

# 39-3.06B(3) Cement

Cement may be added at the Contractor's option to the recycled pavement mixture to aid in curing and early strength gain. Cement shall be a Type II Portland Cement and shall conform to the Standard Specifications. The cement source and percentage used shall be described in the job mix formula submittal. Include the process for incorporating cement into the CIR mixture in the job mix formula submittal.

A Certificate of Compliance from the cement manufacturer shall accompany each shipment to the Project.

#### 39-3.06B(4) Water

Water may be added to facilitate the uniform mixing of the recycling agent and the processed RAP. Water added to the recycled asphalt concrete shall be potable, clean and free from deleterious concentrations of acids, alkalis, salts, sugar and other organic or chemical substances. The water shall not contain an amount of impurities that will cause a reduction in the strength of the recycled asphalt concrete. If the water is of questionable quality, it shall be tested in accordance with AASHTO T26.

Water used specifically in the COLD FOAM apparatus for foaming the asphalt shall be purified so that upon evaporation no deposits or residue are left behind that might clog or impede water flow to the foaming nozzles of the recycle unit.

#### 39-3.06C CONSTRUCTION

# 39-3.06C(1) Surface Preparation

Before any recycling work begins, the Contractor shall prepare the existing roadway by:

- 1) Removing from the roadway dirt, vegetation, standing water, combustible materials, oils, raised roadway markings, and other objectionable materials by sweeping, blading, or another approved method.
- 2) Adjusting affected utilities down or prior to recycling.
- 3) Accurately referencing the profile and cross slope as shown on the plans for the finished surface of the recycled pavement material.

#### 39-3.06C(2) Contractor Responsibility

The Contractor may make adjustments in the field to the actual application rate of recycling agent or any cement as needed and as provided by these Special Provisions. Any changes made by the Contractor shall be documented in conformance with these Special Provisions and the Contractor's Quality Control Plan.

The Contractor shall perform process and quality control sampling and testing, and exercise management control to ensure that cold in-place recycling and placement conforms to these Specifications. The Contractor shall provide a Qualified Technician, testing laboratory and personnel to perform process and quality control sampling and testing during the cold in-place recycling, spreading, compaction, and finishing. The proficiency of testing laboratories and sampling and testing personnel shall be reviewed and approved by the Engineer prior to providing services to the project.

Sampling and testing shall be performed at a rate sufficient to ensure that cold in-place recycling, placement, compaction, and finishing conforms to these specifications. The Engineer shall have unrestricted access to the laboratory, sampling, testing sites, and all information resulting from mix design and quality control activities. All Quality Control testing results shall be submitted to the Engineer on a daily basis.

The project shall be divided into lots of not greater than 3,000 square yards. The contractor shall control the CIR operation as follows:

- 1. The Contractor shall measure and record the actual recycle depth at each end of the milling drum at least once every 350 feet along the cut length.
- 2. The amount of recycling agent shall be within 0.5 percent of the job mix formula percentage established in the mix design for the cold in-place recycled asphalt concrete mixture. Recycling agent usage shall be recorded for each lot. The percent of recycling agent shall be determined based on the ratio of recycling agent used to the theoretical dry weight of the millings processed.
- 3. The amount of cement, if used, shall be within 2.5 percent of the job mix formula percentage established in the mix design for the cold in-place recycled asphalt concrete mixture. Cement usage shall be recorded for each lot. The percent of cement shall be determined based on the ratio of recycling agent used to the theoretical dry weight of the millings processed.
- 4. The Contractor shall measure and report in-place density, and relative compaction for the lot, and shall rework or reprocess any lot not meeting the requirements of these specifications.
- 5. Sample the recycled material behind the recycling equipment or the sized reclaimed asphalt pavement prior to the addition of the emulsified recycling agent for each lot. If the reclaimed asphalt pavement does not meet the allowable maximum particle size, the test results shall be reported immediately to the Engineer. The Contractor shall reprocess the material or take other corrective actions to attain conformance.
- 6. On the first sample and every fourth sample thereafter, the Contractor shall perform a wet field gradation for material passing the 1-inch to No. 4 sieves. The Contractor shall compare the sieved sample to the gradation band determined from the mix design and adjust the recycling agent as needed.

Some sections of the pavement being recycled may require field adjustment for optimum results. For any changes made by the Contractor from one lot to the next, the Contractor shall document the reason for the change and identify each lot where such changes were made.

# 39-3.06C(3) Test Strip and Start up Procedures

The first day of operations, the Contractor shall construct within the limits to be cold in-place recycled a test strip of a single lane width and no more than 1000 feet in length. The test strip section shall:

- A. Demonstrate that the equipment, materials, and processes proposed can produce a recycled pavement material layer that conforms to the requirements of these special provisions:
- B. Determine the optimal rates for recycling agent, any cement, and water recommended for the reclaimed asphalt pavement; and
- C. Determine the sequence and manner of rolling necessary to obtain the density requirements of these special provisions.

The Contractor shall provide a sequence and manner of rolling which will define maximum compaction by establishing a rolling vs. density chart that shows the progress of densification from initial lay down through maximum obtainable density at the "break over point". The Contractor shall determine relative compaction on the quantity within the test strip by measurement with a properly calibrated nuclear density gauge. If the relative compaction of quantity within the test strip or any lot does not meet the density requirements of these special provisions, the Contractor shall construct additional test strips to determine the maximum density obtainable for the recycled material being produced and site conditions.

CIR operations may continue through the first day, unless the Contractor's equipment and process fail to meet the requirements for successful completion of CIR operations in conformance with these special provisions. Recycling operations shall not continue beyond the first day unless a test strip conforming to

the special provisions has been constructed and approved by the Engineer. Test strips that do not conform to the special provisions shall be reworked, re- compacted, or removed and replaced at the Contractor's expense.

Upon acceptance of the test strip by the Engineer, the Contractor shall use the same equipment, materials, and construction methods for the remainder of recycling operations, unless adjustments made by the Contractor are approved by the Engineer. If adjustments are made, the Contractor will produce a new test strip to define the maximum density.

#### 39-3.06C(4) Weather Limitations

Cold In-place Recycling operations shall not be performed during wet conditions or if rain is imminent or predicted to exist. "Imminent or predicted" is defined as being forecasted within a 48-hour period on the National Weather Service Web Site http://www.wrh.noaa.gov for the most representative and nearest location listed where recycling is to begin and end.

When using Foamed Asphalt Recycling Agent, recycling and placement operations shall not be performed unless the ambient temperature is a minimum of 45°F and unless the National Weather Service Web Site forecasts the ambient temperature will remain above 45°F throughout the recycling operation until all initial compaction and protection efforts have been completed for that day's run.

In the event CIR operations are initiated and weather conditions deteriorate soon after, it is then a requirement that all traffic stay off the recycled mat until weather conditions improve (temperature rises and humidity drops) and the recycled section has "cured" sufficiently for secondary compaction to take place in accordance with the Cure and Maintenance requirements of this specification. The Contractor will be responsible for maintaining and protecting the recycled surface. Any recycled asphalt surfacing damaged by inclement weather shall be replaced by the Contractor at the Contractor's expense as directed by the Engineer.

All CIR mixing and placement operations shall be completed a minimum of 2 hours before sunset to allow for compaction and protection operations.

#### 39-3.06C(5) Milling, Sizing and Mixing

The recycling train shall be capable of milling, crushing, and screening the existing asphalt pavement. The equipment used for mixing the RAP with the recycling agent and any cement shall be capable of producing a homogeneous and uniformly coated recycled pavement mixture. The equipment used for placement of the recycled pavement mixture shall be capable of placement to the lines, grades, and requirements specified in these special provisions and shown on the plans. The Contractor shall have available on the site of the work all equipment and materials to be used for recycling operations.

The pavement milling machine shall be self-propelled. The primary milling equipment shall have a minimum 12.5-feet cutter capable of removing the existing pavement to the depths shown in the plans. Milling equipment shall be equipped with automatic depth controls capable of maintaining the cutting depth to within ¼-inch of the desired depth, and shall have a positive means for controlling cross slope. The milling operation shall not disturb or damage the underlying material. The use of a heating device to soften the pavement will not be permitted. A smaller milling machine may be used to mill the shoulders and miscellaneous areas.

The RAP shall be sized using crushing and screening equipment capable of producing reclaimed asphalt pavement to the size required. After the crushing and sizing, the recycled material shall be processed in a mixing unit capable of processing the sized RAP, recycling agent, water and any cement to a homogeneous mixture to produce recycled asphalt concrete. The mixing unit shall be equipped with a belt

scale for the continuous weighing of the RAP and a coupled/interlocked computer-controlled liquid metering device. The mixing unit shall be an on-board completely self-contained counter rotating twin shaft pugmill appropriately rated by the manufacturer for the production levels used by the Contractor. The liquid metering device shall be capable of automatically adjusting the flow of recycling agent to compensate for any variation in the weight of the RAP introduced into the pugmill. Recycling agent shall be metered by weight of RAP using a mass flow, coriolis effect, type meter that will accurately measure the amount of recycling agent to within 0.5 percent of the amount required by the mix design or as adjusted in the field and approved by the Engineer. The recycle train shall have an independent source of water to properly disperse the recycling agent. Automatic digital readings shall be displayed for both the flow rate and total amount of RAP, recycling agent, and cements in appropriate units of weight and time.

If an asphalt foam recycling agent is used, the system shall be equipped with a heating system capable of maintaining the temperature of asphalt flow components above 300 degrees F. The RAP belt scale shall be coupled/interlocked with two microprocessor controlled systems, complete with two independent pumping systems and spray bars, to regulate the application of foamed asphalt separate from water that is used to increase the moisture content for compaction. The two spray bars shall be fitted with self-cleaning nozzles at a maximum spacing of one nozzle for each 6-inch width of the mixing chamber. The foamed asphalt shall be produced at the spray bar in individual expansion chambers into which hot asphalt, water, and air are injected under pressure through individual and small orifices that promote atomization. The rate of addition of water into the hot asphalt shall be kept at a constant percent by mass of asphalt by the same microprocessor. An inspection or test nozzle shall be fitted at one end of the spray bar to produce a representative sample of foamed asphalt.

The recycling agent, any cement and water shall be incorporated into the graded RAP at the initial rate determined by the mix design and approved by the Engineer. Adjustments in the rate of recycling agent, cement and water shall be determined by the Qualified Technician and made as necessary based on the coating and compaction properties of the recycling agent. Sampling variations and mix design may determine the necessity of different levels of recycling agent and/or cement in various sections of the project.

When a paving fabric is encountered during the cold milling operation, the CIR Contractor shall make the necessary changes in equipment or operations so that incorporation of the shredded fabric in the recycled material does not affect the performance parameters of the recycled asphalt concrete, or inhibit placing or compaction of the CIR pavement. No fabric piece incorporated into the recycled section shall have any dimension exceeding a length of 2-inches. The Contractor shall be required to remove and properly dispose of oversized pieces of paving fabric as directed by the Engineer. Similarly, loop wires, pavement markers, rubberized crack fill materials, thermoplastic marking materials, milled concrete, and other materials that may be incorporated into the RAP through the milling process shall be removed from the recycled material unless the Contractor can demonstrate that minor amounts of residual materials that remain will not compromise the integrity of the recycled asphalt.

# 39-3.06C(6) Mixing and Spreading of Cement

Cement slurry shall be produced at the jobsite as required by these specifications. The Contractor shall provide the Engineer with batch logs daily. Cement slurry may be added directly to the pugmill or sprayed over the cutting teeth of the milling machine.

Portland cement slurry storage and supply equipment shall have agitators or similar equipment to keep the cement or lime slurry in suspension when held in the slurry feed tank. Cement slurry shall be kept in suspension during transport using agitator equipment.

Dry cement shall be spread upon the existing asphalt concrete surface no more than 100 feet ahead of the recycling train. If cement is spread ahead of the milling operation, the distance between the spreader

and the recycling train shall be reduced appropriately during windy days. In no case shall cement be allowed to remain exposed at the end of the workday. Dust control measures shall be employed to minimize fugitive dust. No traffic other than the recycling equipment shall be allowed to pass over the spread cement until the recycling operation is complete

#### 39-3.06C(7) Placement

Recycled pavement shall be spread using a self-propelled track-paver having electronic grade and cross slope control for the screed. The equipment shall be of sufficient size and power (minimum 170 hp) to spread the recycled material in one continuous pass, without segregation, to the lines and grades established by the Engineer and according to Plans. Heating of the paver screed is not permitted. A pick-up machine shall be used for transferring the recycled material from a windrow to the receiving hopper of the paver, the pick-up machine shall be capable of removing and transferring the entire windrow of recycled mix in a single pass.

Handwork of CIR pavement shall be minimized and care shall be taken to prevent segregation. The wings of the paver shall be emptied regularly to prevent buildup and to minimize segregation.

# 39-3.06C(8) Compaction

Compacting the recycled mix shall be completed using self-propelled rollers, complete with properly operating scrapers and water spray systems. Rollers of the vibratory-steel drum and pneumatic tired type shall be used. They shall be in good condition, capable of operating at slow speeds to avoid displacement of the mixture.

Compaction operations shall start no more than 15 minutes behind the paver, or at the direction of the Qualified Technician and/or Engineer. The number, weight and types of rollers shall be as necessary to obtain the required compaction. At a minimum the following rollers shall be used:

At least one pneumatic roller with a minimum gross operating weight of not less than 25 tons. Tires on the pneumatic rollers shall be evenly inflated and matched in size and profile so as to maximize compactive effort.

At least one double drum steel vibratory roller with a gross operating weight of not less than 10 tons with a minimum drum diameter of at least 60-inches.

Rolling patterns shall be established in the field by the Contractor and verified by the Engineer to achieve a maximum density determined by nuclear density testing. A rolling pattern for compaction shall be determined such that no increase in density is shown on successive nuclear density tests (per ASTM D 2950) for any additional passes of the compaction equipment once the maximum density pattern has been identified ("break over point"). Nuclear density testing shall be repeated throughout the time compaction is being completed to continuously verify the compaction is within 5% of the maximum density established via a rolling vs. density chart that shows the progress of densification from initial breakdown compaction through maximum obtainable density at the break over point.

Care shall be taken not to over compact the mat. A Qualified Technician shall be on site and observing all compaction efforts, monitoring density gauge readings, and approving areas as they reach maximum density. The minimum rolling pattern shall be as follows:

Two complete coverages with the double drum steel vibratory roller immediately after the recycled mix is placed. The first coverage shall be made without the vibratory unit turned on and the second with the vibratory unit operating.

Two complete coverages with the pneumatic-tired roller shall be made after the initial passes of the steel roller.

Final rolling, before cure, to eliminate pneumatic tire marks and to achieve maximum density shall be done by the double drum steel roller, either operating in a static or vibratory mode.

The recycled mat shall be continuously observed during compaction efforts. If moisture cracking occurs under the vibratory compaction mode, the vibrators shall be turned off and static rolling only applied. If moisture cracking of the mat continues under static steel rolling, steel drum compaction shall cease, the mat shall be allowed to cure for a time in order for some moisture to escape, and pneumatic rolling commenced, followed by steel rolling to iron out irregularities from the rubber-tired roller(s). This procedure shall be followed until there is no longer any displacement of the mat observed by roller action on the recycled surface.

The selected rolling pattern shall be followed unless changes in the recycled mix or placement conditions occur and a new rolling pattern is established at that time. Any type of rolling that causes cracking, major displacement and/or any other type of pavement distress shall be discontinued until such time as the problem can be resolved. Discontinuation and commencement of rolling operations shall be at the discretion of the Engineer.

Extra care shall be taken to ensure that aggregate from the recycled mixture does not stick to the drums or wheels of the rollers. Water shall be uniformly applied to the wheels and drums, along with mechanical means to keep aggregate from sticking. Sufficient water shall be applied to keep rollers and tires clean, but not so much that water pools or ponds on the recycled surface.

Rollers shall not be started or stopped on uncompacted recycled material. Rolling patterns shall be established so that starting and stopping shall be on previously compacted material or the adjacent, existing surfacing.

#### 39-3.06C(9) Cure and Maintenance

After the completion of compaction of the recycled material, no traffic, including that of the Contractor, shall be permitted on the recycled material for at least two hours. This may be reduced if sufficient care is established for traffic that will not initiate raveling. A fog seal of dilute (1:1) SS-1h emulsion, emulsified recycling agent or equivalent (0.08 to 0.12 gallon per square yard) shall be applied after initial compaction or after the secondary compaction, as outlined below, to all areas opened to significant traffic depending on curing of the CIR pavement. If necessary to prevent pickup of the fog seal, the recycled pavement surface shall be covered with sand at a rate of 1.0 to 2.0 pounds per square yard. Excess sand shall be removed from the pavement surface by careful sweeping. Sand shall be free from clay or organic material. Fog sealing and/or sanding shall be initiated at the Engineer's direction.

After opening to traffic, the surface of the recycled pavement shall be maintained in a condition suitable for the safe movement of traffic. Before placing the final surfacing, the recycled surface shall remain in-place:

- For a minimum of 2 days and until there is less than 2.0 percent moisture remaining in the recycled pavement mixture; or
- · A minimum of 10 days without rainfall.

The Contractor shall protect and maintain the recycled surface from nuisance water, other deleterious substances, and/or any other damage. Any damage to the completed recycled material shall be repaired by the Contractor prior to the placement of new asphalt concrete or final surface sealing. Areas damaged shall be excavated to the depth directed by the Engineer and/or filled and compacted with new asphalt

concrete. All loose particles that may develop on the pavement surface shall be removed prior to the final surface course. No direct payment will be made and costs shall be included elsewhere for protection and maintenance of the recycled asphalt concrete pavement.

Prior to any overlay with asphalt concrete, the recycled pavement should be carefully swept of all loose material to create a dry clean surface. A tack coat of SS-1h emulsion, emulsified recycling agent or equivalent (0.05 gallon per square yard minimum) shall be applied to all surface areas.

# 39-3.06C(10) Smoothness

The finished surface and grade of the recycled material shall be checked regularly during placement using a level. The smoothness shall not vary more than ¼ inch from a 10-foot straight edge placed on the surface. The Contractor shall correct humps or depressions exceeding this tolerance. High points may be trimmed if approved by the Engineer in the field.

#### **39-3.06D PAYMENT**

# 39-3.06D(1) Method of Measurement

Quantities of the produced CIR pavement shall be measured by the square yards completed and accepted by the Engineer for the depths specified. Recycling agent and cement weight shall be based upon Certified delivery weight tickets, less any unused portion. Water used in this operation will not be paid for directly and shall be considered subsidiary to the bid item.

#### 39-3.06D(2) Basis of Payment

Full compensation for furnishing all labor, materials, tools, equipment, and incidentals; for doing all the work involved in cold in-place recycling, complete in-place; for milling, screening, crushing, mixing, blending, placing, and compacting the recycled pavement mixture; for protection and maintenance of the recycled layer; for performing all QC testing including mix design; for fog sealing, sanding and sweeping if necessary; for obtaining measurements and recording results of all tests as shown on the plans and as directed by the Engineer shall be considered as included in the contract unit price paid for Cold In Place Recycling and no additional compensation will be allowed.

Recycling agent will be paid for under the Cold In-Place Recycling bid item. No adjustment of compensation will be made for any increase or decrease in the quantities of emulsified recycling agent required, regardless of the reason for the increase or decrease.

Cement, if necessary, will be paid for under the Cold In-Place Recycling bid item. No adjustment of compensation will be made for any increase or decrease in the quantities of cement required, regardless of the reason for the increase or decrease.

#### **39-3.06E APPENDIX A**

# 39-3.06E(1) Method of Test for Determining the Percent of Foamed Asphalt Recycling Agent to Use for Cold Recycling of Asphalt Concrete

# 39-3.06E(1)(a) Scope

This method is used to determine the optimum foamed asphalt application rates for cold recycling (CR) using foamed asphalt.

#### 39-3.06E(1)(b) References

` '` '	
AASHTO T 209	Method of Test for Theoretical Maximum Specific Gravity and Density of Hot Mix
	Asphalt (Method A)
AASHTO T 269	Method of Test for Determining Air Voids
AASHTO T 283	Standard Method of Test for Resistance of Compacted Asphalt Mixtures to
	Moisture-Induced Damage

#### 39-3.06E(1)(c) Apparatus

- 1. The laboratory material production method should closely simulate full-scale foamed asphalt production. Laboratory equipment should be capable of producing foamed asphalt at a rate from 50 grams to 500 grams per second. The laboratory equipment should have a thermostatically controlled chamber or vessel capable of holding at least 22 lbs. of asphalt at a temperature from 285°F to 340°F. The laboratory equipment should have a compressed air supply capable of delivering from 0 to 100 psi. The laboratory equipment should have a system for adding from 0 % to 4 % cold water by weight of asphalt. All metering devices shall be calibrated annually in accordance with the manufacturers manual, laboratory accreditation standards, and/or Caltrans Independent Assurance Standards.
- 2. An air cabinet capable of maintaining a temperature of  $104^{\circ}F \pm 5^{\circ}F$ .
- 3. Water Bath: A water bath of sufficient size for immersing samples in accordance with AASHTO T 209 (Methods A). The water bath must be maintained at 77° F ± 2° F by suitable methods, and have an overflow system for maintaining a constant water level during sample emersion.
- 4. A pugmill style mixer capable of mixing up to 55 lbs. of aggregate, sand, and fines as included in the sample of reclaimed asphalt pavement (RAP) collected from the job site. The mixer shall be able to mix the material in a suspended state, and allow for the foamed asphalt to be injected into the pugmill apparatus during mixing. The mixer shall also be able to provide an evenly distributed foamed asphalt material after 2 minutes of mixing.
- 5. Calipers to measure the length and diameter of test specimens to the nearest 0.02 inch.
- 6. A thermometer capable of measuring temperatures from 32°F to 120°F.
- 7. Gyratory Compactor OR Marshall Compactor
- 8. A mechanical or hydraulic testing machine as specified in AASHTO T 283 to provide a range of accurately controllable rates of vertical deformation, including 2.0 inches per minute.
- 9. Lottman Breaking Head.
- 10. Air tight containers capable of holding 1,500-grams and 50 lbs of asphalt pavement materials.

# 39-3.06E(1)(d) Asphalt Binder Selection and Foamed Asphalt Parameters

Laboratory production of the foamed asphalt must use the same asphalt binder that will be used during construction, including grade as specified in the project's special provisions and asphalt supplier as chosen by the contractor.

- 1. Calibrate laboratory asphalt foaming equipment in compliance with the manufacturer's instructions and laboratory accreditation requirements.
- Select 3 asphalt temperatures at 18°F increments bracketing the expected optimum temperature. The expected optimum temperature can be determined based on previous experience or a temperature of 320°F can be used. If 320°F is selected, the 3 asphalt temperatures tested would be 302°F, 320°F, and 338°F.

- 3. For each asphalt temperature, use at least 3 foamed asphalt water percentages of 2.0 %, 3.0 %, and 4.0 % in the foamed asphalt laboratory equipment to determine:
  - 3.1 Expansion ratio: The ratio of maximum volume of foamed asphalt relative to original volume of asphalt.
  - 3.2 Half-life: The time measured in seconds for foamed asphalt to subside to half of the maximum volume from the time the foam nozzle shuts off.
- 4. Calculate the product of expansion ratio and half-life (expansion ratio x half-life) for each water percentage. The water percentage with the highest product of expansion ratio and half-life is the optimum foamed asphalt water percentage at the selected temperature. If there is not at least one test performed at foamed asphalt water percentages above and below the determined optimum, repeat steps 3 and 4 increasing or decreasing the foamed asphalt water percentages in 0.5 % increments.
- 5. The temperature with the highest product of expansion ratio and half-life at the optimum foamed asphalt water percentage is the optimum temperature.
- 6. The required minimum half-life and expansion ratio will depend on the recycled material temperature during construction. If the recycled material temperature is between 50°F and 60°F, select the asphalt temperature and water percentage with a minimum expansion ratio of 10:1 and half-life of at least 8 seconds. If the material temperature is above 60°F, select a water percentage with a minimum expansion ration of 8:1 and a half-life of at least 6 seconds. If the expansion and half-life at the optimum foamed asphalt water percentage at the optimum temperature do not meet these requirements, select the temperature and foamed asphalt water percentage with the highest product of expansion ratio and half-life that does meet the requirements.

#### 39-3.06E(1)(e) Preparation of Recycled Materials

- Dry each sample of RAP to a constant weight in accordance with AASHTO T 329. Samples will be dried to a constant weight at 104±4°F
- 2. Perform a sieve analysis on the course portion of the milled samples and a washed sieve analysis on fine portion of the samples in accordance with AASHTO T 27.
- 3. Prepare RAP samples for both fine gradation and coarse gradation by recombining the RAP material in the laboratory to meet the following gradation requirements:

Sieve Size	% Passing - Fine	% Passing - Coarse
1"	100	100
3/4"	100	85
1/2"	90	55
No. 4	62	35
No. 30	28	13

# **39-3.06E(1)(f)** Optimum Foamed Asphalt Content Determination

Using four 30-pound portions from the fine gradation from section E above, prepare approximately 120 lbs. of recycled material for the determination of the optimum foamed asphalt content.

- 1. Quarter the material into four 30-pound bulk samples, and place in air tight containers.
   Containers represent material to be tested at foamed asphalt contents of 2.00%, 2.25%, 2.50%, and 2.75%.
- 2. Determine the active filler content to maintain a 2.5:1 asphalt to cement ratio for each sample. Weigh the required amount of cement for each sample.
- 3. Place one 30-pound bulk sample into the pug mill mixer. Add the required active filler content and thoroughly mix a sufficient amount of water to achieve 75 percent of OMC as determined in Section H for material with the target active filler content.
- 4. Move pugmill to proper location to receive foamed asphalt through opening in pugmill lid. Start mixer, and blend 2.0 percent foamed asphalt. Allow mixer to blend material for 60 seconds.
- 5. Remove the material from the pug mill, and split the processed material down to 6, 1,000g 1,250g specimens. Typically, between 1,000g-1,250g of material is sufficient, when compacting asphalt-stabilized materials using the foamed asphalt method. The target final specimen height should be 2.5 ± 0.1 inch. Place the 1,000 to 1,250g samples into air tight containers.
- 6. Add the remaining 25 percent water required to bring the material to the OMC determined earlier in this test method. Water must be equally distributed to each of the six samples by stirring vigorously for 15 to 20 seconds.
- 7. Place 1,100 grams of material in a 150mm (4-inch) diameter Marshall or Gyratory mold and rod the material 10-15 times with a 1/8" rod in a circular motion, making sure to evenly distribute the rodding across the entire sample.
- 8. Compact the specimen using the Marshall compactor and applying 75 blows on each side of the specimen or using the gyratory compactor at 30 gyrations.
- 9. Gently extrude the specimen from the Marshall or Gyratory mold and record the height, diameter and weight of the specimen.
- 10. Repeat steps 3 through 9, three additional times, using the remaining 3 bulk samples to fabricate specimens at 2.25%, 2.50%, and 2.75% foamed asphalt with the appropriate amount of active filler to maintain a 2.5:1 ration of foamed asphalt to active filler.
- 11. Repeat steps 1 through 10 using the coarse gradation samples from section E above, using the 4 bulk samples to fabricate specimens at 2.00%, 2.25%, 2.50%, and 2.75% foamed asphalt with the appropriate amount of active filler to maintain a 2.5:1 ratio of foamed asphalt to active filler.
- 12. Cure the compacted specimens in a forced draft oven at 104°F for 72 hours. If after the 72-hour cure, the specimens have not reached constant mass, allow the samples to continue to cure until constant mass is reached checking each additional hour. Note the additional time required for cure.
- 13. Remove specimens from oven, and allow the specimens to cool to ambient temperature 77°F±5°F. Once they have cooled, record weight and height for each specimen.

- 14. Select 3 specimens from each asphalt content and determine the Indirect Tensile Strength (ITS) under AASHTO T 283. Record the peak breaking loads. Do not discard sample material.
- 15. Place the 3 remaining specimens from each asphalt content in a water bath with a temperature of 77 ±3°F for 24 hours. Water level must be a minimum of 4.0 inches above the specimens' surface and specimens must not be stacked. Water level must be a minimum of 4.0 inches above the specimens' surface. Specimens must not be stacked or touching and should allow for water penetration from every angle.
- 16. After the 24-hour soaking period, remove the specimens from the water and let stand for 15 minutes.
- 17. Cover specimens with damp cloth or a plastic sheet to prevent excessive evaporation.
- 18. Determine the Indirect Tensile Strength (ITS) of the soaked specimens under AASHTO T 283. Record the peak breaking loads. Do not discard the material.
- 19. Calculate average wet (ITSwet), and dry (ITSdry) of each subset and record the results.
- 20. Determine Tensile Strength Ratio (TSR) of each subset and record the results:

# TSR = ITSwet / ITSdry

- 21. Select the asphalt content with test results of minimum ITSwet ≥ 30 psi.
- 22. When one or more asphalt content complies with the minimum test results, select the lower asphalt content.

39-3.06E(1)(g) Theoretical Maximum Specific Gravity and Density of CR Foamed Asphalt Material

- 1. Take the 3 soaked specimens of material selected for optimum foamed asphalt content.
- 2. Use California Test 309, Section H, Supplemental Dry Back Procedure, to determine the Theoretical Maximum Specific Gravity and Density of the CR Foamed Asphalt Material.
- 3. Report test results of the 3 specimens as an average.

## 39-3.06E(1)(h) Reporting of Results

Each mix design submittal must consist of:

- Proposed Mix Design on Contractor Cold In-place Recycling Using Foamed Asphalt Mix Design form
- Safety Data Sheets (SDS) for:
  - 2.1 Asphalt Binder
  - 2.2 Cement or other active fillers
- 3. Manufacture's Certificate of Compliance for (COC) for:
  - 3.1 Asphalt Binder
  - 3.2 Cement or other active fillers

# **40 CONCRETE PAVEMENT**

# Replace Section 40-1.01D(4) with:

#### 40-1.01D(4) Qualifications

Testing laboratories and their test equipment must be qualified under the Caltrans Independent Assurance Program.

Use a laboratory that complies with ASTM C1077 to determine the mix proportions for concrete pavement. The laboratory must have a current AASHTO accreditation for:

- 1. AASHTO T 97 or ASTM C78
- 2. ASTM C192/C192M

Use an ACI-certified concrete laboratory technician, Grade I, to perform field qualification tests and calculations.

#### 41 EXISTING CONCRETE PAVEMENT

# **DIVISION VI STRUCUTURES**

# 49 PILING

#### 51 CONCRETE STRUCTURES

Add to Section 51-7.01A:

#### **51-7.01A General**

This item consists of the construction of drainage inlets, outlets, and junction boxes complete and in place in conformance with the plans, specifications, the Standard specifications and Section 51 of the Standard specifications of the State of California.

# Replace Section 51-7.01B Paragraph 1, 2 & 4 with:

#### 51-7.01B Materials

Concrete shall have a compressive strength of 3000 psi at 28 days. All metal parts shall be A36 structural grade steel.

Deformed steel bars of size called for in the plans and, specifications shall meet requirements of A.S.T.M. A615.

PC inlets may be used if approved by the City Engineer.

# Add to Section 51-7.01C Paragraph 2 Sentence 1:

#### 51-7.01C Construction

"and if it has been approved by the City Engineer."

### Add to Section 51-7.01C Paragraph 3 Sentence 1:

#### 51-7.01C Construction

"if it has been approved by the City Engineer."

# Replace Section 51-7.01C Paragraph 1, 4 & 5 with:

#### 51-7.01C Construction

The forms shall be smooth, mortar tight, true to the required lines and grade, and of sufficient strength to resist springing out of shape during the placing of the concrete. All dirt, chips, sawdust, nails, and other foreign matter shall be completely removed from forms before any concrete is deposited therein. Forms previously used shall be thoroughly cleaned of all dirt, mortar and foreign matter before being reused. Before concrete is placed in forms all inside surfaces of the forms shall be thoroughly coated with form oil.

All concrete shall be used while fresh and before it has taken an initial set. Retempering any partially hardened concrete with additional water shall not be permitted.

All concrete shall be compacted by means of high frequency internal vibrators.

Mixed concrete, after being deposited, shall be consolidated until all voids are filled and free mortar appears on the surface.

#### Replace Section 51-7.01D Paragraph 2 with:

# **51-7.01D Payment**

Cost of frame and grate and throat frame shall be included in price of inlet or outlet.

#### Replace Section 51-8 with:

# **51-8 MANHOLE**

#### 51-8.01 GENERAL

Section 70-8 includes specifications related to performing work on City of Kingsburg manholes.

City of Kingsburg manholes shall be constructed in accordance with the City of Kingsburg Standard Drawings D-4 and D-5, the plans, and as specified herein or as directed by the Engineer.

#### **51-8.02 MATERIALS**

Elliptical single-line reinforcement will not be permitted. Single-line circular reinforcement will be permitted and the minimum steel area shall equal the minimum steel area required for the inner-cage reinforcement.

Tapered sections shall conform to the requirements for pipe of the size equal to the largest internal diameter of the tapered sections.

Concrete for the base section shall have a 28-day compressive strength of 3000 psi.

"Jiffy rings" for raising manholes will be allowed.

#### 51-8.03 CONSTRUCTION

Cast-in-place manhole bases shall be constructed by the use of a slip form. Hand forming of bases is forbidden.

The inside of the manhole shall be formed to the flow line of the storm drain.

#### 51-8.04 MEASUREMENT AND PAYMENT

Payment for the manholes shall include full compensation for furnishing all labor, material and equipment required to complete the manhole including the cover and ring and thimbles if required by the plans.

# 56 OVERHEAD SIGN STRUCTURES, STANDARDS, AND POLES

# Add to section 56-3.01C(1):

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.

# DIVISION VII DRAINAGE FACILITIES 65 CONCRETE PIPE

Replace Section 65-2 with:
65-2 REINFORCED CONCRETE PIPE

#### **65-2.01 GENERAL**

#### 65-2.01A Summary

Storm drain pipe shall be furnished in accordance with the requirements established in these specifications.

#### 65-2.01B Materials

Reinforced concrete pipe shall be manufactured in accordance with the requirements of A.S.T.M. Designation C 76, and shall be the Class and Type shown on the plans

Rubber gaskets joints shall conform to the requirements of A.S.T.M. Designation C 442 and shall be flexible and able to withstand expansion, contraction and settlement.

#### 65-2.01C Excavation

All excavations shall be made in accordance with the trench construction safety orders issued by the State of California Division of Industrial Safety.

The width of trenches at approximately the level of the top of the pipe to be installed shall be not more than the outside diameter of the barrel of the pipe plus sixteen (16") inches, maximum. The above clearances shall be increased to accommodate shoring and also provide space for banding at points required.

If the Contractor is unable to maintain the trench width allowed, the Engineer shall specify the bedding requirement to compensate for the additional loading of the pipe. Such additional bedding may require crushed rock or other suitable granular bedding material or concrete encasement as necessary to obtain satisfactory pipe support.

The bottom of the trench shall be excavated or backfilled so that the barrel of the pipe shall have uniform bearing along its entire length, except for the area necessary for bell holes. All adjustment of pipe to line and grade shall be made by scraping away or filling and tamping. The use of blocks as support is forbidden. An additional depth and width shall be hand dug at joint or bell location of sufficient depth to relieve the bell of any load and to allow ample space for making the joint.

Where hardpan is encountered, it shall be removed to a depth of 4 inches below the grade of the bottom of the pipe and the space refilled with earth containing sufficient moisture to produce maximum compaction and free from lumps or unsuitable material. The imported earth shall be compacted by means of mechanical tampers to the grade of the pipe. Where a firm foundation is not encountered due to soggy, spongy or other unsuitable material, such unsuitable material under the pipe and for a width of at least ½ diameter on each side of the pipe shall be removed to a depth as directed by the Engineer and replaced with a suitable material. No additional payment will be made for such excavation and/ or backfill.

Where the pipe is to be laid on sand having less than optimum moisture, as determined by the Engineer, the Contractor shall apply sufficient water and compact the sand prior to placing the pipe.

All existing gas pipes, water pipes, conduits, sewers, drains, fire hydrants, and other structures which are not in the opinion of the Engineer required to be changed in location shall be carefully supported and protected from injury by the Contractor. In case of injury, such structures shall be restored by the Contractor without additional compensation, to as good a condition as that in which they were found.

If all excavated material cannot be stored on the roadway in such a manner as to maintain access to property adjacent to the work, the surplus material shall be removed from the work and stored until needed for backfill, at which time it shall be returned. If the surplus material is to be stored, prior approval must be obtained from the Engineer for the site to be used. The cost of removing material shall be at the Contractor's expense.

# 65-2.01D Installation of Pipe

Proper facilities shall be provided for stringing and lowering section of pipe into the trench. The pipe shall be laid carefully to lines and grades given.

The grade line shown on the plans indicates the flow line or invert of the pipe. Unless otherwise indicated, refer to this line.

The pipe sections shall be laid commencing at the downstream or outlet end with the spigot or tongue end in direction of flow. Pipe with elliptical reinforcement shall be placed with the minor axis in a vertical position.

Contractor shall provide a laser device for setting grades. Alternative methods must be approved by the Engineer in advance of starting construction.

Each joint of pipe shall be fully pressed into place so that a uniform profile will be maintained throughout the length of the pipe. The interior of the pipe shall be kept free from dirt and other foreign material as the laying progresses.

Any pipe, which shows undue settlement or is damaged shall be taken up and replaced or relied at the Contractor's expense.

All pipe shall be laid to true line and grade. Occasional variations as follows will be permitted above grade 1/4 inch, below grade, not to exceed 1/4 inch; alignment not to exceed 2 inches if gradual and regular over a distance of 20 feet.

The Engineer, at his sole discretion, may require the inspection of a sewer line by means of a television camera prior to acceptance. If such inspection reveals faults such as broken pipe, misalignment, or improper grades, such faulty areas will be promptly removed and replaced and both the cost of the inspection and the repair of the faulty line will be at Contractor's expense. If the inspection reveals no faults in the line, then the cost of the inspection will be paid by the City.

#### 65-2.01E Backfill

After the pipe has been laid to line and grade the trench shall be backfilled to the spring line with select native material placed by hand and compacted around the Pipe. From the spring line to one foot above the top of pipe select native material shall be placed by hand. Compaction around the pipe and to within two feet of the finished grade shall be ninety percent (90%). Select excavated material at optimum moisture and free from all rocks, hardpan, and any other lumps over 2 inches in diameter shall be used as backfill.

The method of obtaining the density requirements shall be such that the backfill material is completely compacted around the lower haunches of the pipe and the pipe's line and grade is not disturbed.

That portion of the backfill within two feet of the finish grade shall have a relative compaction of ninety-five percent (95%).

No free water will be allowed in the top 24 inches of backfill.

#### 65-2.01F Alternate Density Test Method

At the Engineer's sole discretion, the Contractor may be allowed to use California Test Method NO.231 to determine relative compaction, with the following restriction.

Under the Engineer's supervision, a density test shall be made using both California Test Method Nos. 216 and 231. The results of these tests, which shall be immediately adjacent, shall be compared, and the appropriate correction shall be applied to all further testing utilizing Method No.231.

Example: Adjacent tests yield results of 93% relative compaction by method 231 and 91% by method 216. The results of all further k tests by method 231 shall then be decreased by 2%.

At the discretion of the Engineer, further comparison tests may be required.

#### 65-2.01G Measurement and Payment

Payment for laying pipe shall be per lineal foot, in place, and shall include all material, labor and equipment to trench, lay, pipe, backfill and compact the trench. Pipe will be measured from the center of manholes.

#### **68 SUBSURFACE DRAINS**

Replace Section 68-3.03 with:

#### 68-3.03 CONSTRUCTION

The locations shown for horizontal drains are approximate. The Engineer determines the exact locations and placement sequence. Any ordered exploratory work is change order work.

Complete the installation of horizontal drains at a bench in an excavation slope before excavating more than 40 feet below the bench.

Furnish water required for drilling.

Drill horizontal holes to the designated lines and grades with rotary equipment capable of drilling 3 to 6-inch-diameter holes 600 feet long through soil and rock formations.

Install plastic pipe with pipe slots or perforations on top by pushing it into the hole or inserting it inside the drill rod then retracting the drill rod so that the drilled hole is cased for the full depth. Tightly plug the entrance end with a rounded or pointed extension that does not extend more than 0.5 foot beyond the end of the pipe.

During casing activity, cement plastic pipe together to form a continuous tube. Prevent telescoping and damage to plastic pipe during installation.

Identify each drain by securely attaching a permanent brass plate with a number assigned by the Engineer to the outlet end of the nonperforated pipe drain or by other permanent marking designated by the Engineer.

Tightly plug the annular space between the hole and the pipe with earth for a length of at least 2 feet at the outlet end of the drilled hole.

Connect the outlet end of the drain to the collector system by installing a pipe tee, pipe plug, street ell, and galvanized steel pipe or plastic pipe. The Engineer determines the length of the pipe.

Furnishing and installing a collector system is change order work.

During drilling activities, determine the drilled hole elevation at 100-foot intervals and the elevation at the upper end of the completed drain hole. You may take measurements by inserting tubes or pipes and measuring liquid levels or by other authorized methods.

Dispose of water used for drilling and water developed during drilling activities under section 13. Comply with the requirements of the RWQCB for nonstormwater discharges and the Caltrans *Construction Site Best Management Practices (BMP) Manual* for dewatering.

# DIVISION VIII MISCELLANEOUS CONSTRUCTION

# 71 EXISTING DRAINAGE FACILITIES 71-4 MODIFY DRAINAGE STRUCTURES

#### Add to Section 71-4.03C:

#### 71-4.03C Construction

The removing, reconstruction, adjusting, remodeling and salvaging of the various street facilities shall conform to the provisions in Section 15 of the State Standard Specifications revised as follows:

All manholes that are to be lowered shall be removed as directed by the Engineer, to an approximate depth of two (2) feet below finished grade and shall then be reconstructed with the proper taper to finish grade.

#### Replace Section 71-4.03D with:

#### **71-4.03D Payment**

The bid price for adjusting manholes to a new street elevation shall include surface restoration.

#### 78 INCIDENTAL CONSTRUCTION

#### Add the Following to Section 78-2

Damaged or destroyed survey monuments shall be replaced with new survey monuments.

Survey monuments shall be constructed or adjusted, as applicable, in accordance with Standard Drawing A-74 Type D.

Survey control for the reestablishment of survey monuments will be provided by the Department.

#### **80 FENCES**

#### Replace Section 80-4 with:

# 82-4.01A Summary

3/8" Grade 30 Zinc Plated Chain - Chain will be measured by linear foot and shall conform to these specifications and as shown on the plans. chain

Chain shall be 3/8" Grade 30 zinc plated. At each end of chain, use 3/8" zinc plated double end bolt snap to connect to 3/8" eye bolt on bollard.

The contract price paid per linear foot of chain shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the Ornamental Fence and no additional payment will be made.

Bollard - Bollards shall be manufactured, installed, cleaned and painted as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

Bollards will be measured by each bollard installed and shall conform to these specifications and as shown on the Plans. Bollards will be 4" O.D. Steel Post (10.79 lb/ft).

Individual bollards shall be constructed of a single length of pipe. Welding together of individual lengths of pipe to construct bollards shall not be allowed.

All bollards shall be placed in portland cement concrete footings as shown on the Plans. The steel pipe shall be filled with portland cement concrete.

Portland cement concrete for "Bollard" shall conform to the provisions in Section 90-10, "MINOR CONCRETE," of the Standard Specifications and these special provisions.

The finish color is to be "CAT YELLOW" or approved equivalent.

All exposed metal surfaces of bollards shall be cleaned and powder coated in conformance with these special provisions.

The Contractor shall remove heavy oil or grease with a scraper from surfaces to be painted with solvent vapor, alkali, emulsion (detergent), or steam. Only solvents that do not leave a residue may be used. The Contractor shall then remove any remaining foreign matter by brushing with stiff fiber or wire brushes, abrading, or cleaning with solutions of appropriate cleaners. The use of any cleaning solutions shall be followed by a fresh water rinse the pipe shall then be wiped dry.

After cleaning, the steel pipe shall be blast-cleaned to remove all dirt, dust mill scale, rust, corrosion products, oxides, paint, and other foreign matter.

The Contractor shall remove all sharp corners prior to powder coating by creating a small chamfer with a grinder.

Blast-cleaned surfaces shall be protected from high humidity, rainfall, or surface moisture. No surface shall be allowed to flash rust before coating. If cleaned surfaces rust or are contaminated with foreign material before coating is accomplished, the surfaces shall be re-cleaned and, if required by the Engineer, re-blasted at the Contractor's expense.

The Contractor shall submit proposed powder coating product data and manufacturer's recommended application procedures for the Engineer's approval prior to ordering said materials. All coatings shall be applied in conformance with the coating manufacturer's recommended procedures.

3/8"x4" zinc plated eye bolt shall be installed 4" from the top prior to filling the steel post with concrete.

The contract unit price paid for each bollard shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all the work involved in installing each bollard and no additional payment will be made.

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# **DIVISION IX TRAFFIC CONTROL DEVICES**

#### **82 SIGNS AND MARKERS**

# Replace Section 82-1.01A with:

#### 82-1.01A Summary

Section 82-1 includes general specifications for fabricating and installing sign panels and markers and constructing roadside signs.

Signs and markers must comply with the *California MUTCD*, *California Sign Specifications*, and the FHWA publication *Standard Highway Signs and Markings*. For the *California Sign Specifications*, go to the Caltrans Traffic Operations website.

#### Replace Item 1 of the 2nd paragraph of section 82-2.02A with:

1. Phrase Property of The County of Fresno

#### Add to section 82-2.02B:

Signs must be 0.080 inch thick aluminum alloy and street name signs must be 0.125 inch thick alloy faced on both sides.

#### Add to section 82-2.02C:

Reflective sheeting on all signs shall be 3M Diamond Grade DG3 Series 4000 or equal, and must meet ASTM Type XI specifications.

## Add to section 82-2.02D:

All signs must have the 3M 1160 graffiti resistant clear overlay film or equal.

#### Replace Section 82-2.04 with:

#### 82-2.04 PAYMENTNot Used

#### Add to section 82-3.02A:

All new roadside signs must be square post 14 gauge steel.

#### Add to section 82-3.02B:

All post for traffic signs must be 2"X2"X10' square by 14 gauge steel, with 7/16 inch holes punched one inch on center on all four sides for the entire length of the post.

Welded Anchor (2 ¼"X2 ¼"X30") and sleeve (2 ½"X2 ½"X18") shell be used as a base to anchor post in the ground. Hole size and placement must be the same as the metal post.

All mounting hardware shall be either galvanized or stainless steel. Banding shall be 3/4 inch wide stainless steel with flare leg sign brackets. Hose clamps are not permitted. All signs shall be mounted using 3/8" aluminum drive rivets. Nuts and bolts are not permitted.

### Replace Section 82-3.02D with:

#### 82-3.02D Laminated Wood Box Posts

Furnish a laminated wood box post with an attached metal cap at the top of each post.

#### Replace the last line of section 82-3.04 with:

Full compensation for furnishing sign panels is included in the bid item price per each Roadside Sign - One Post and Roadside Sign - Two Post. One or more sign panels furnished and installed on a single post will be counted as (1) one Roadside Sign - One Post. One or more sign panels furnished and installed on two posts will be counted as (1) one Roadside Sign - Two Post.

#### 83 RAILINGS AND BARRIERS

#### **84 MARKINGS**

#### Add to Section 84-1.03

Before obliterating any pavement delineation (traffic stripes, pavement markings) that is to be replaced on the same alignment and location, as determined by the Engineer, the pavement delineation shall be referenced by the Contractor, with a sufficient number of control points to reestablish the alignment and location of the new pavement delineation. The references shall include the limits or changes in striping pattern, including one- and 2-way barrier lines, limit lines, crosswalks and other pavement markings. Full compensation for referencing existing pavement delineation shall be considered as included in the contract prices paid for various items of work and no additional compensation will be allowed.

The Contractor shall protect pedestrian crosswalks, stop bars, rumble bars, and rumble Botts' dots from damage or displacement, unless otherwise directed by the Engineer.

Replace or repair facilities, which are damaged with your operation, at your expense.

#### Add between the 1st and 2nd paragraphs of section 84-2.01C:

For each lot or batch of thermoplastic, submit a manufacturer's certificate of compliance with test results for the tests specified in section 84-2.01D. The date of test must be within 1 year of use.

#### Add to the end of section 84-2.01D:

Each lot or batch of thermoplastic must be tested under California Test 423 for:

- 1. Brookfield Thermosel viscosity
- 2. Hardness

- 3. Yellowness index, white only
- 4. Daytime luminance factor
- 5. Yellow color, yellow only
- 6. Glass bead content
- 7. Binder content

During the installation of thermoplastic traffic stripes or markings at the job site, apply a test stripe of the thermoplastic on suitable material in the presence of the Engineer. The test stripe must be at least 1 foot in length. The test stripe will be tested for yellow color, daytime luminance factor, and yellowness index requirements.

# Delete the 1st paragraph of Section 84-2.03C(2)(a)

# Replace the 2nd paragraph of section 84-2.03C(2)(b) with:

Apply extruded thermoplastic for a traffic stripe at a rate of at least 0.37 lb of thermoplastic per foot of 4-inch-wide solid stripe. The applied thermoplastic traffic stripe must be at least 0.100 inch thick.

# Replace Section 84-2.03C(2)(c) with:

Apply sprayable thermoplastic under State Specification PTH-02SPRAY at a temperature from 350 to 400 degrees F.

Apply sprayable thermoplastic at a rate of at least 0.22 lb of thermoplastic per foot of 4-inch-wide solid stripe.

The applied sprayable thermoplastic material must be 0.08 inch (80 mil) thick.

# **DIVISION X Electrical Work**

#### 86-1.02 MATERIAL AND CONSTRUCTION

The Special Provisions for Traffic Signals and street lighting for this project are the City of Fresno Standard Specifications and Drawings and are incorporated in Project Details for reference only. Contractor is responsible for obtaining the most current version of the City of Fresno's specifications from their website.

They can be found on the City website, Department of Public Works, Developer Doorway, Technical Library.

https://www.fresno.gov/publicworks/developer-doorway/#tab-8

Section 23 of the City of Fresno Standard Specifications shall apply, except as modified below.

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 Fresno County Department of Public Works and Planning, Maintenance and Operations Division.

Conduit shall conform to the City of Fresno Standard Specifications, except that trenching shall be allowed as described on the plans and slurry backfill shall be required or deleted as described on the plans.

Potholing: Foundation locations shall be potholed (excavated) to determine if underground utilities or structures exist prior to ordering the poles. The pothole locations shall be approved by the Engineer prior to excavation. If underground utilities or structures are encountered, the Contractor shall notify the Engineer immediately and an alternate foundation location shall be determined.

Existing overhead utility lines exist on this project. High voltage contractor may be required for the installation of the traffic signal poles. All costs associated with PG&E overhead line coordination and permits shall be the responsibility of the contractor. Contractor shall contact PG&E regarding permits, requirements and associated costs well in advance of need. Payment for such work described above shall be included in the lump sum price bid for the traffic signal, and no additional compensation will be allowed therefor.

#### **86-1.04 PAYMENT**

Full compensation for potholing, installation of the poles including foundation, installation of the Controller assembly, inductive loop detector, installation of the communication cabinet (where applicable), furnishing and installing any other material as specified in the construction drawings and special provisions, coordination with City of Fresno, PG&E, testing and any other appurtenant work to provide a complete and fully functional traffic signal shall be considered to be included in Bid Item Signal Modification as a lump sum of work, and no further compensation shall be paid therefor.

#### Add to the end of section 86-1.02Q(3) of the RSS:

The cabinet components include:

- 1. Multiple AC outlet strip
- 2. RJ-11 modular jack
- 3. RJ-45 modular jack
- 4. DC terminal block

# 86-1.02Q(3)(a) Multiple AC Outlet Strip

The multiple AC outlet strip must:

- 1. Be 19 inch, rack mountable
- 2. Have a minimum of 6 receptacle outlets
- 3. Be rated for 15 A, 125 V(ac)
- 4. Have internal 12 A, 125 V(ac) circuit breaker
- 5. Rated for 36,000 A surge current protection Hot to Neutral
- 6. UL 1449 rating for 400 V minimum
- 7. Cord 6 feet minimum

#### 86-1.02Q(3)(c) RJ-45 Modular Jack

The RJ-45 modular jack must:

- 1. Be DIN rail mounting
- 2. Have 8 interface positions
- 3. Be rated for 120 V and 1 A

- 4. Have dimensions of 2 inches (D) by 1.5 inches (W) by 3.25 inches (H)
- 5. Have a screw clamp connection

# 86-1.02Q(3)(d) DC Terminal Block

The DC terminal block must:

- 1. Be rated for 250 V(ac)/DC voltage and 30 A current
- 2. Have an operating temperature from -13 to 122 degrees F
- 3. Have a maximum size of 3.9 inches (D) by 2.7 inches (W) by 2.7 inches (H)
- 4. Have a wire size for the input terminals of 26-10 AWG solid/strand
- 5. Have a wire size for the output terminals of 26-12 AWG solid/strand
- 6. Have a torque of at least 4.4 in-lb

# Replace Reserved in section 86-1.02Q(4)(d) of the RSS with:

#### Add to the list in the 2nd paragraph of section 86-1.02R(4) of the RSS:

4. Be made of Metal.

# Replace the 1st sentence in the 9th paragraph of the RSS for section 87-1.03A with:

The shutdown of traffic signal systems is allowed only between the hours of 9:30 a.m. and 3:30 p.m.

# Add to the beginning of the RSS for section 87-1.03B(3)(a):

Use Type 3 conduit for underground installation.

#### Replace the paragraphs of the RSS for section 87-1.03D with:

Install the assembled Model 332L cabinet with battery backup system cabinet on the foundation.

#### Replace the 1st paragraph of the RSS for section 87-1.03F(2)(c)(ii) with:

Install a Type B loop detector lead-in cable in conduit.

# Replace the 1st paragraph of the RSS for section 87-1.03F(3)(c)(ii) with:

Use a Type 2 loop wire. Use only Type 2 loop wire for Type E loop detectors.

Delete the 3rd paragraph of the RSS for section 87-1.03G.

#### Replace the 2nd paragraph of the RSS for section 87-1.03H(2) with:

Use Method B to insulate a splice.

# Add to the end of the RSS for section 87-1.03L(2)(b):

Install a Type III service equipment enclosure for irrigation controllers A, B and D.

Install a metered 120/240 V(ac), single-phase service with service disconnects in a NEMA 3R enclosure and surface mounted on a pole for irrigation controllers A, B and D. You may locate the service disconnects and metering equipment in a common enclosure if authorized by the service utility.

For irrigation controller C, install a single-pole, 15 A circuit breaker in the existing service equipment enclosure for the Whitson Street and Thompson Avenue Traffic Signal. The circuit breaker must be of the same manufacturer, model, and interrupting capacity as the existing circuit breakers.

#### Add to the end of the RSS for section 87-1.03T:

A manufacturer's representative must program the accessible pedestrian signals at the following intersections:

- 1. Intersection of Whitson Street and Floral Avenue
- 2. Intersection of Golden State Boulevard and San Antonio Drive
- 3. Intersection of Golden State Boulevard and Clovis Avenue

When the extended pushbutton press is used, program the signals with messages for each street as follows:

- 1. During the pedestrian clearance interval, the message heard must be *Wait to Cross* Whitson Street. *Wait*.
- 2. During the pedestrian clearance interval, the message heard must be *Wait to Cross* Floral Avenue. *Wait.*
- 3. During the pedestrian clearance interval, the message heard must be *Wait to Cross* San Antonio Drive. *Wait*.
- 4. During the pedestrian clearance interval, the message heard must be *Wait to Cross* Clovis Avenue. *Wait.*

#### Add between the 1st and 2nd sentences in the 2nd paragraph of the RSS for section 87-1.03V(2):

Saw the slots to allow a minimum of 2 inches of sealant above the top of the uppermost loop wire in the slot.

# Add between the 11th and 12th paragraphs of the RSS for section 87-1.03V(2):

Use hot-melt asphalt rubberized sealant to fill slots.

# Replace RSS section 87-14 with:

#### 87-14 RADAR SPEED FEEDBACK SIGN SYSTEMS

# 87-14.01 GENERAL

87-14.01A Summary

Section 87-14 includes specifications for installing radar speed feedback sign systems.

Radar speed feedback sign system includes:

- 1. Foundations
- 2. Pull boxes
- 3. Conduit
- 4. Conductors and cables
- 5. Standards or wood posts
- 6 Vehicle speed feedback sign

#### 7. Service equipment enclosure

The components of a radar speed feedback sign system are shown on the project plans.

#### 87-14.01B Definitions

Not Used

#### 87-14.01C Submittals

Submit 2 copies of:

- 1. Test data report complying with NEMA-TS-2 for the vehicle speed feedback sign
- 2. Shop drawings or installation manuals for the sign support, electrical connections, attachments, and mounting configurations

# 87-14.01D Quality Assurance 87-14.01D(1) General

Not Used

# 87-14.01D(2) Quality Control

Equipment setup must comply with the sign manufacturer's instructions.

Notify the Engineer at least 5 business days before performing the system test. Test the system in the presence of the Engineer.

Radar speed feedback sign system test consists of:

- 1. Turning on the radar speed feedback sign system
- 2. Driving a vehicle and recording the speeds displayed:
  - 2.1. By the vehicle speedometer
  - 2.2. On the vehicle speed feedback sign for the vehicles
- 3. Performing the test 5 times per lane detected
- 4. Ensuring that the 5 recorded speeds of the vehicle speed feedback sign are within ± 1 mph of the vehicle speeds recorded from the vehicle speedometer

After successful testing, present the recorded results to the Engineer.

# 87-14.01D(3) Training

Provide training to a maximum of 4 Department employees on the operation of the vehicle speedfeedback sign. Training must be a minimum of 1 hour and include how to program, adjust, troubleshoot, and repair the sign.

# 87-14.02 MATERIALS 87-14.02A General

Not Used

# 87-14.02B Vehicle Speed Feedback Signs

Vehicle speed feedback sign consists of a housing, display window, and radar unit. Sign must:

- 1. Comply with the California MUTCD, Chapter 2B
- 2. Have an operating voltage of 120 V(ac) for permanent installations

- 3. Have a maximum weight of 45 lb
- 4. Have a wind load rating of 90 mph
- 5. Have an operating temperature range from -34 to 165 degrees F
- 6. Have a retroreflective white sheeting background

#### 87-14.02B(1) Housings

Housing must:

- 1. Be weather proof (NEMA 3R or better) and vandal resistant
- 2. Be made of 0.09-inch-gauge welded aluminum with the outer surfaces being UV resistant
- 3. Have the manufacturer's name, model number, serial number, date of manufacture, rated voltage and rated current marked inside
- 4. Have the internal components easily accessible for field repair without removal of the sign

# 87-14.02B(2) Display Windows

Display window consists of a cover, LED character display, and dimming control. Character display and cover must deflect together without damage to the internal electronics and speed detection components.

# 87-14.02B(2)(a) Covers

Cover must be:

- 1. Vandal resistant and shock absorbent
- 2. Field replaceable with the removal of external stainless-steel, tamper proof fasteners

Cover must be made of a minimum .25-inch-thick, shatter-resistant polycarbonate.

# 87-14.02B(2)(b) LED Character Displays

LED character display must:

- 1. Consist of two 7-segment, solid-state, numeric characters
- 2. Be capable of displaying the detected vehicle speed within 1 second
- 3. Remain blank when no vehicles are detected within the radar detection zone
- 4. Have the option to flash the pre-set speed limit when the detected vehicle speed is 5 miles higher than the pre-set speed
- 5. Be viewable only by the approaching traffic

#### Characters must:

- 1. Be a minimum 15 inches in height
- 2. Be visible and legible from a minimum distance of 1500 feet and legible from a minimum distance of 750 feet
- 3. Consist of a minimum 16 LEDs

# LEDs must:

- 1. Be amber and have a wavelength from 590 to 600 nm andrated for minimum 100,000 hours
- 2. Must maintain a minimum 85 percent of the initial light output after 48 months of continuous use over the temperature range

#### 87-14.02B(2)(c) Dimming Controls

Dimming control must:

- 1. Automatically adjust the character light intensity to provide optimum character visibility and legibility under all ambient lighting conditions
- 2. Have minimum 3 manual dimming modes of different intensities

# 87-14.02B(3) Radar Units

Radar unit must:

- 1. Be able to detect up to 3 lanes of approaching traffic
- 2. Operate with an internal, low power, 24.159 GHz (K-band)
- 3. Be FCC approved Part 15 certified
- 4. Have a speed accuracy of ±1 mph
- 5. Have a maximum 15W power consumption

#### 87-14.03 CONSTRUCTION

Install the vehicle speed feedback sign under the manufacturer's instructions.

Perform the conductor test.

Configure the radar speed feedback sign system to detect only traffic in the approach direction of travel.

Perform the radar speed feedback sign system test.

Perform the operational test for the system.

#### **87-14.04 PAYMENT**

Not Used

#### Add to the end of section 87-21.03C of the RSS for section 87:

Modifying a lighting system includes removing, adjusting, or adding:

- 1. Foundations
- 2. Pull boxes
- 3. Conduit
- 4. Conductors
- 5. Standards
- 6. Luminaires
- 7. Service equipment enclosure
- 8. Photoelectric control
- 9. Fuse splice connectors

Modifying a sign illumination system includes removing, adjusting, or adding:

- 1. Foundations
- 2. Pull boxes
- 3. Conduit
- 4. Conductors
- 5. Sign lighting fixtures
- 6. Enclosure for the disconnect circuit breaker
- 7. Service equipment enclosure
- 8. Photoelectric control

Modifying a signal and lighting system includes removing, adjusting, or adding:

- 1. Foundations
- 2. Pull boxes
- 3. Conduit
- 4. Conductors
- 5. Cables
- 6. Standards
- 7. Signal heads
- 9. Service equipment enclosure
- 11. Detectors
- 13. Accessible pedestrian signals
- 14. Push button assemblies
- 15. Pedestrian signal heads
- 16. Luminaires
- 17. Photoelectric control
- 18. Fuse splice connectors
- 19. Battery backup system
- 20. Flashing beacons
- 21. Flashing beacon control assembly

Modifying a flashing beacon system includes removing, adjusting, or adding:

- 1. Foundations
- 2. Pull boxes
- 3. Conduit
- 4. Conductors
- 5. Standards
- 6. Service equipment enclosure
- 8. Flashing beacon control assembly

Modifying interconnection conduit and cable includes removing, adjusting, or adding:

- 1. Pull boxes
- 2. Conduit
- 3. Signal interconnect cables

# Add to the end of section 87-21.03D of the RSS for section 87:

Removing a lighting system includes removing:

- 1. Foundations
- 2. Pull boxes
- 3. Conduit
- 4. Conductors
- 5. Standards
- 6. Luminaires
- 7. Service equipment enclosure
- 8. Photoelectric control
- 9. High mast lighting assemblies

Removing a signal and lighting system includes removing:

- 1. Foundations
- 2. Pull boxes
- 3. Conduit
- 4. Conductors
- Cables
- Standards
- 7. Signal heads
- 9. Service equipment enclosure
- 10. Department-furnished controller assembly
- 12. Accessible pedestrian signals
- 13. Push button assemblies
- 14. Pedestrian signal heads
- 15. Luminaires
- 16. Photoelectric control
- 17. Battery backup system
- 18. Flashing beacons

Removing a flashing beacon system includes removing:

- 1. Foundations
- 2. Pull boxes
- 3. Conduit
- 4. Conductors
- 5. Standards
- 6. Service equipment enclosure
- 7. Signal heads
- 8. Flashing beacon control assembly

# **DIVISION XI MATERIALS**

# 90 CONCRETE

Replace Section 90-1.01D(3) with:

#### 90-1.01D(3) Shrinkage

If shrinkage limitations are specified, test the concrete under AASHTO T 160, modified as follows:

- 1. Prepare specimens that have a 4 by 4-inch cross section.
- 2. Remove each specimen from the mold  $23 \pm 1$  hours after mixing the concrete and place the specimen in lime water at  $73 \pm 3$  degrees F until 7 days age.
- 3. Take a comparator reading at 7 days age and record it as the initial reading.
- 4. Store the specimens in a humidity-controlled room maintained at  $73 \pm 3$  degrees F and  $50 \pm 4$  percent relative humidity for the remainder of the test.
- 5. Take subsequent readings at 7, 14, 21, and 28 days drying.

Perform AASHTO T 160 testing at a laboratory that is accredited to perform AASHTO T 160 or that maintains a current rating of 3 or better for the Cement and Concrete Reference Laboratory concrete proficiency sample program.

Shrinkage test data authorized by Caltrans no more than 3 years before the 1st day of the Contract is authorized for the entire Contract. The test data must be for concrete with similar proportions and using the same materials and material sources to be used on the Contract. Concrete is considered to have

similar proportions if no more than 2 mix design elements are varied and the variation is within the tolerances shown in the following table:

Mix design element	Tolerance (±)		
Water to cementitious material ratio	0.03		
Total water content (%)	5		
Coarse aggregate content (%)	10		
Fine aggregate content (%)	10		
SCM content (%)	5		
Admixture as originally dosed <sup>a</sup> (%)	25		

<sup>&</sup>lt;sup>a</sup>Admixtures must be the same brand.

#### Replace Section 90-2.02E With:

#### 90-2.02E Production

Sections 90-1.02F, 90-1.02G(1), 90-1.02G(2), 90-1.02G(3), and 90-1.02G(4) do not apply to minor concrete.

Store, proportion, mix, transport, and discharge the cementitious material, water, aggregate, and admixtures in compliance with recognized standards of good practice that result in thoroughly and uniformly mixed concrete suitable for the intended use. Recognized standards of good practice are outlined in various industry publications, such as those issued by ACI, AASHTO, or by Caltrans.

Use a quantity of water that produces concrete with a consistency that complies with section 90-1.02G(6). Do not add water during hauling or after arrival at the delivery point unless allowed by the Engineer.

Discharge ready-mixed concrete from the transport vehicle while the concrete is still plastic and before stiffening occurs. Take whatever action is necessary to eliminate quick stiffening, except do not add water.

Conditions contributing to quick stiffening are:

- 1. Elapsed time of 1.5 hours in agitating hauling equipment or 1 hour in nonagitating hauling equipment
- 2. More than 250 revolutions of the drum or blades after introduction of the cementitious material to the aggregates
- 3. Concrete temperature over 90 degrees F

The mixing time in a stationary mixer must be at least 50 seconds and no more than 5 minutes.

The minimum required revolutions at mixing speed for transit-mixed concrete must be at least that recommended by the mixer manufacturer and must be increased as needed to produce thoroughly and uniformly mixed concrete.

If you add a high-range water-reducing admixture to the concrete at the job site, the total revolutions must not exceed 300.

#### Replace Section 90-4.02 With:

#### **90-4.02 MATERIALS**

You may use Type III portland cement in PC concrete.

The specifications for SCM content in section 90-1.02B(3) do not apply to PC concrete.

For PC concrete, the SCM content must comply with one of the following:

1. Any combination of portland cement and SCM satisfying the following equation:

Equation 1:

$$[(25 \times UF) + (12 \times FA) + (10 \times FB) + (6 \times SL)]/TC \ge X$$

#### where:

UF = silica fume, metakaolin, or UFFA, including the quantity in blended cement, lb/cu yd

FA = natural pozzolan or fly ash complying with AASHTO M 295, Class F or N, with a CaO content of up to 10 percent, including the quantity in blended cement, lb/cu yd

FB = natural pozzolan or fly ash complying with AASHTO M 295, Class F or N, with a CaO content of greater than 10 percent and up to 15 percent, including the quantity in blended cement, lb/cu vd

SL = GGBFS, including the quantity in blended cement, lb/cu yd

TC = total quantity of cementitious material, lb/cu yd

X = 0.0 for innocuous aggregate, 3.0 for all other aggregate

- 2. 15 percent Class F fly ash with at least 48 oz of LiNO<sub>3</sub> solution added per 100 lb of portland cement. The CaO content of the fly ash must not exceed 15 percent.
- 3. Any combination of SCM and portland cement for which the expansion of cementitious material and aggregate does not exceed 0.10 percent when tested under ASTM C1567. Submit test data with each mix design. Test data authorized by Caltranst no more than 3 years before the 1st day of the Contract is authorized for the entire Contract. The test data must be for the same concrete mix and must use the same materials and material sources to be used on the Contract.

If municipally supplied potable water is used for PC concrete, the testing specified in section 90-1.02D is waived unless requested.

Portland cement based repair material must be on the Authorized Material List for precast Portland cement based repair material.

#### 92 ASPHALT BINDERS

#### Replace 92-1.01D(2) With:

# 92-1.01D(2) Certification

Asphalt binder suppliers must comply with the Caltrans Certification Program for Suppliers of Asphalt. For a copy of the certification program, go to the METS website.

#### Replace Section 92-1.02B With

# 92-1.02B Performance Grade Asphalt Binders

PG asphalt binder must comply with the requirements shown in the following table:

**PG Asphalt Binders** 

	Requirement					
Quality characteristic	Test	PG	PG	PG	PG	PG
	method	58-22 <sup>a</sup>	64-10	64-16	64-28	70-10
Original Binder						
Flash point (min, °C)	AASHTO	230	230	230	230	230
	T 48					
Solubility <sup>b</sup> (min, %)	AASHTO	99	99	99	99	99
	T 44					
Viscosity at 135 °C°	AASHTO					
(max, Pa•s)	T 316	3.0	3.0	3.0	3.0	3.0
Dynamic shear						
Test temperature at 10	AASHTO					
rad/s (°C)	T 315	58	64	64	64	70
G*/sin(delta) (min, kPa)	1 010	1.00	1.00	1.00	1.00	1.00
G*/sin(delta) (max, kPa)		2.00	2.00	2.00	2.00	2.00
RTFOf teste	AASHTO					
mass loss (max, %)	T 240	1.00	1.00	1.00	1.00	1.00
RTFO <sup>f</sup> Test Aged Binder						
Dynamic shear						
Test temperature at 10	AASHTO					
rad/s (°C)	T 315	58	64	64	64	70
G*/sin(delta) (min, kPa)		2.20	2.20	2.20	2.20	2.20
Ductility at 25 °C (min, cm)	AASHTO					
	T 51	75	75	75	75	75
PAV <sup>9</sup>	AASHTO					
Test temperature (°C)	R 28	100	100	100	100	110
	RTFOf Test	and PAV9	Aged Binder	r		T
Dynamic shear,						
Test temperature at 10	AASHTO					
rad/s (°C)	T 315	22 <sup>d</sup>	31 <sup>d</sup>	28 <sup>d</sup>	22 <sup>d</sup>	34 <sup>d</sup>
G*sin(delta) (max, kPa)		5000	5000	5000	5000	5000
Creep stiffness,						
Test temperature, °C	AASHTO	-12	0	-6	-18	0
S-value (max, MPa)	T 313	300	300	300	300	300
M-value (min)		0.300	0.300	0.300	0.300	0.300

<sup>&</sup>lt;sup>a</sup>Use as asphalt rubber base stock for high mountain and high desert area.

PG modified asphalt binder must comply with the requirements shown in the following table:

<sup>&</sup>lt;sup>b</sup>The Engineer waives solubility requirements if the supplier is an authorized material source as defined by the Caltrans *Certification Program for Suppliers of Asphalt*.

<sup>&</sup>lt;sup>c</sup>The Engineer waives this specification if the supplier provides written certification the asphalt binder can be adequately pumped and mixed at temperatures meeting applicable safety standards. <sup>d</sup>Test the sample at 3 °C higher if it fails at the specified test temperature. G\*sin(delta) remains 5000 kPa maximum.

eThe residue from mass change determination may be used for other tests.

fRTFO means rolling thin film oven.

<sup>&</sup>lt;sup>g</sup>PAV means Pressure Aging Vessel.

**PG Modified Asphalt Binders** 

rg mounteu Asphait binders							
			Requirement				
Quality characteristic	Test method	PG	PG	PG			
		58-34 M	64-28 M	76-22 M			
Original Binder							
Flash point (min, °C)	AASHTO T 48	230	230	230			
Solubility (min, %)	AASHTO T 44 <sup>a</sup>	97.5	97.5	97.5 <sup>b</sup>			
Viscosity at 135 °C°	A A SUTO T 246						
(max, Pa•s)	AASHTO T 316	3.0	3.0	3.0			
Dynamic shear,							
Test temperature at 10	AASHTO T 315						
rad/s (°C)	AASHIO I 315	58	64	76			
G*/sin(delta) (min, kPa)		1.00	1.00	1.00			
RTFO <sup>g</sup> test <sup>d</sup> ,	AASHTO T 240						
Mass loss (max, %)	AASHTO 1 240	1.00	1.00	1.00			
	RTFOg Test Aged Bin	der					
Dynamic shear,							
Test temperature at 10	AASHTO T 315						
rad/s (°C)	AASITIO I 315	58	64	76			
G*/sin(delta) (min, kPa)		2.20	2.20	2.20			
Dynamic shear,							
Test temperature at 10	AASHTO T 315						
rad/s, °C	AASHIO I 315						
Delta (max, degree)		80 <sup>e</sup>	80 <sup>e</sup>	80 <sup>e</sup>			
Elastic recoveryf,							
Test temperature (°C)	AASHTO T 301	25	25	25			
Recovery (min, %)		75	75	65			
PAV <sup>h</sup> ,	AASHTO R 28		_				
Temperature (°C)	AASHTOR 26	100	100	110			
	RTFO <sup>g</sup> Test and PAV <sup>h</sup> Age	d Binder					
Dynamic shear,							
Test temperature at 10	AASHTO T 315						
rad/s (°C)	AASHIUTSIS	16	22	31			
G*sin(delta) (max, kPa)		5000	5000	5000			
Creep stiffness,							
Test temperature (°C)	A A CLUTO T 242	-24	-18	-12			
S-value (max, Mpa)	AASHTO T 313	300	300	300			
M-value (min)		0.300	0.300	0.300			
· · · · · · · · · · · · · · · · · ·				•			

<sup>&</sup>lt;sup>a</sup>The Department allows ASTM D5546 or ASTM D7553 instead of AASHTO T 44. Particles recovered from ASTM D5546 or ASTM D7553 or AASHTO T 44 must be less than 250 μm.

<sup>&</sup>lt;sup>b</sup>Report only for spray application.

<sup>&</sup>lt;sup>c</sup>The Engineer waives the viscosity requirements if the supplier provides written certification the asphalt binder can be adequately pumped and mixed at temperatures meeting applicable safety standards.

<sup>&</sup>lt;sup>d</sup>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 2 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.

<sup>&</sup>lt;sup>f</sup>Tests without a force ductility clamp may be performed.

<sup>&</sup>lt;sup>9</sup>RTFO means rolling thin film oven.

<sup>&</sup>lt;sup>h</sup>PAV means Pressure Aging Vessel.

Do not modify PG modified asphalt binder using polyphosphoric acid.

Crumb rubber must be from automobile and truck tires and must be free from contaminants including fabric, metal, minerals, and other nonrubber substances.

PG modified asphalt binder modified with crumb rubber must be homogeneous and must not contain visible particles of crumb rubber.

The supplier of PG modified asphalt binder modified with crumb rubber must:

- 1. Report the quantity of crumb rubber by weight of asphalt binder
- 2. Certify a minimum of 10 percent of crumb rubber by weight of asphalt binder

# **Project Details**

## **Soil Testing**



July 20, 2022

Project No.: 20171121.002a

Mark Thomas, Inc. 7571 North Remington Avenue Suite 102 Fresno, CA 93711

Attention: Mr. Edward Noriega

SUBJECT: Soil Screening of Golden State Boulevard from Fresno to Kingsburg, California

Mr. Noriega:

Kleinfelder is pleased to present this cover letter to Mark Thomas Inc. (Mark Thomas/client) for laboratory data collected during a screening level characterization of in-place soil located along Golden State Boulevard in Fresno County, California (Site).

This letter provides a table summarizing the data, sample location maps, the laboratory reports and a brief summary of the data. In general, ten of fourteen shallow samples are considered California Hazardous Waste because the total lead concentrations exceed 10 times the soluble limit (5 milligrams per kilogram  $[mg/kg] \times 10 = 50 \text{ mg/kg}$ ) and testing for soluble lead by the California Waste Extraction Test showed results greater than 5 milligrams per liter (mg/L). In addition, eight of the samples had total lead concentrations which exceeded the soluble limit for lead by 20 times (5  $mg/kg \times 20 = 100 \text{ mg/kg}$ ) and were tested by Toxicity Characteristic Leaching Procedure (TCLP) to determine if the soil should be classified as a Federal Hazardous Waste for lead. None of the TCLP samples exceeded its limit of 5 mg/L.

We appreciate the opportunity to present this information to aid your planning efforts. If you have questions regarding this proposal or require additional information, please contact the undersign at your earliest convenience.

Respectfully submitted,

KLEINFELDER, INC.

James Helge

Principal Environmental Scientist

Robert Horwath, PG Principal Geologist

#### **TABLES**

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# Table 1 Summary of Data Golden State Bouldevard Screening Level Aerially Deposited Lead Survey Fresno to Selma, California

		рН	<b>Total Lead</b>	CA WET Lead	TCLP Lead
Sample ID	Date	SU	mg/kg	mg/L	mg/L
HA-1A 6-12 Inches	7/1/2022	6.9	99	7.7	
HA-1B 6-12 Inches	7/1/2022	7.0	98	3.5	
HA-1 18-24 Inches	7/1/2022	7.5	2.3		
HA-2 6-12 Inches	7/1/2022	6.6	65	4.2	
HA-2 18-24 Inches	7/1/2022	6.7	58	4.3	
HA-3 6-12 Inches	7/1/2022	7.3	130	7.3	<0.3
HA-3 18-24 Inches	7/1/2022	8.0	30		
HA-4 6-12 Inches	7/1/2022	6.7	110	7.6	<0.3
HA-4 18-24 Inches	7/1/2022	7.4	9.1		
HA-5 6-12 Inches	7/1/2022	7.8	100	8.2	0.4
HA-5 18-24 Inches	7/1/2022	7.0	23		
HA-6 6-12 Inches	7/1/2022	6.3	180	14	<0.3
HA-6 18-24 Inches	7/1/2022	6.9	44		
HA-7 6-12 Inches	7/1/2022	7.5	34	2.4	
HA-7 18-24 Inches	7/1/2022	8.5	28		
HA-8 6-12 Inches	7/1/2022	6.4	250	20	0.4
HA-8 18-24 Inches	7/1/2022	7.0	5.7		
HA-9 6-12 Inches	7/1/2022	6.6	240	16	1.0
HA-9 18-24 Inches	7/1/2022	6.7	2.0		
HA-10 6-12 Inches	7/1/2022	7.0	5.6	1.2	
HA-10 18-24 Inches	7/1/2022	7.4	9.4		
HA-11 6-12 Inches	7/1/2022	6.6	95	7.4	
HA-11 18-24 Inches	7/1/2022	6.6	7.5		
HA-12 6-12 Inches	7/1/2022	7.0	35	2.2	
HA-12 18-24 Inches	7/1/2022	7.1	5.2		
HA-13 6-12 Inches	7/1/2022	4.9	130	12	<0.3
HA-13 18-24 Inches	7/1/2022	5.5	11		
HA-14A 6-12 Inches	7/1/2022	6.8	140	10	<0.3
HA-14B 6-12 Inches	7/1/2022	6.9	140	13	
HA-14 18-24 Inches	7/1/2022	7.2	20		

XX

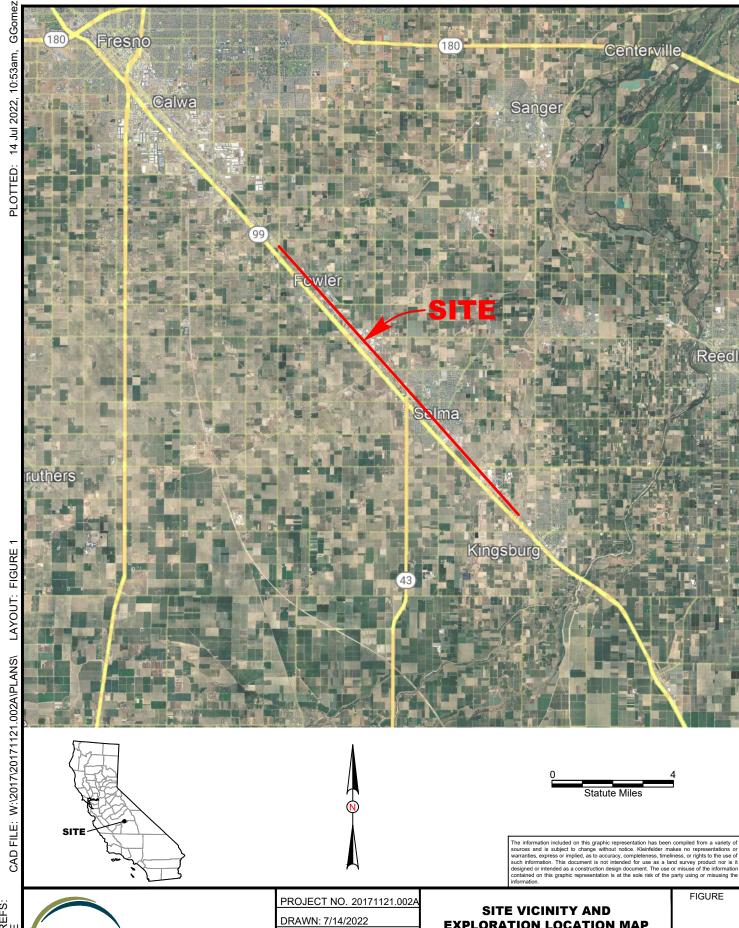
= 10X the soluble limit (50 mg/kg)

= 20X the Soluble limit (100 mg/kg)

= CA Hazardous Wste

#### **FIGURES**

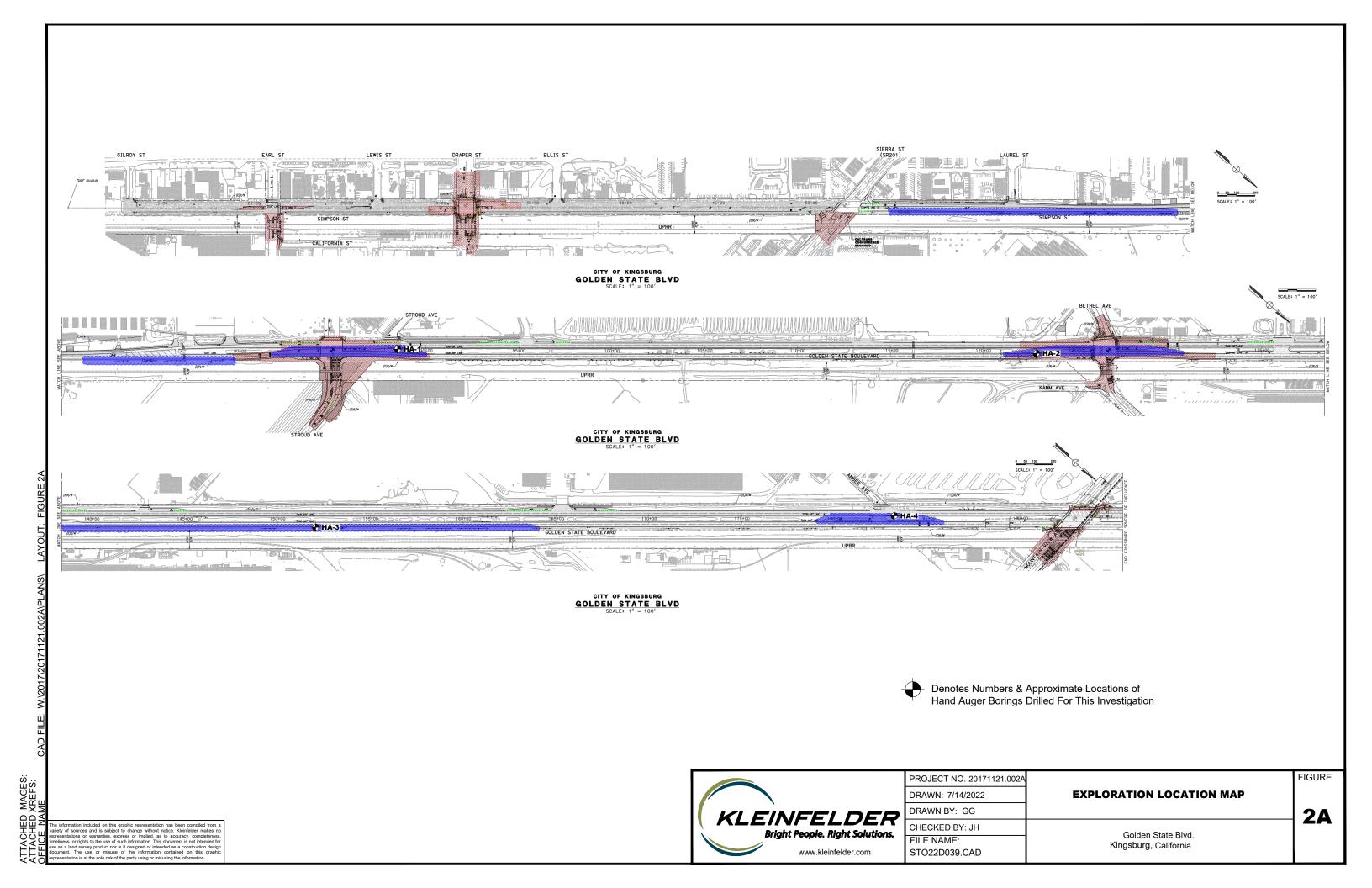
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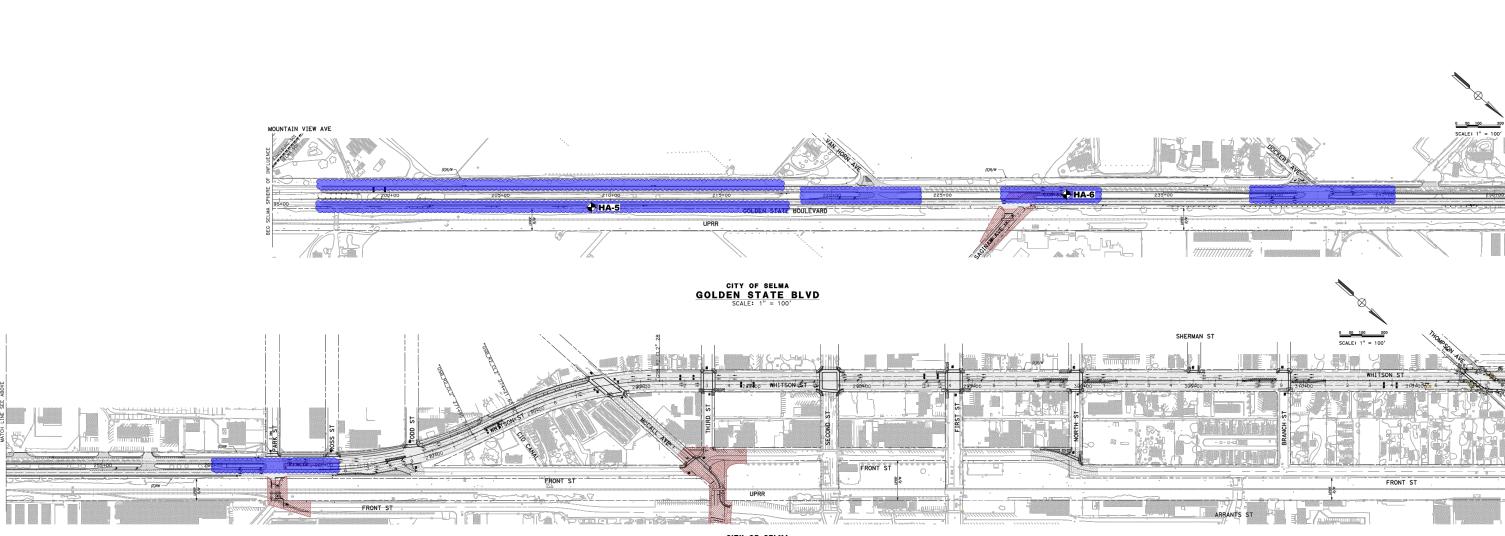
KLEINFELDER Bright People. Right Solutions. www.kleinfelder.com

DRAWN BY: GG CHECKED BY: JH FILE NAME: STO22D039.CAD **EXPLORATION LOCATION MAP** 

Golden State Blvd. Fresno County, California







CITY OF SELMA

GOLDEN STATE BLVD

SCALE: 1" = 100'



Denotes Numbers & Approximate Locations of Hand Auger Borings Drilled For This Investigation



PROJECT NO. 20171121.002A	
DRAWN: 7/14/2022	EXPLORATION LOCATION MAP
DRAWN BY: GG	

FIGURE

**2B** 

Selma, California

Golden State Blvd.

CITY OF SELMA

GOLDEN STATE BLVD

SCALE: 1" = 100'



Denotes Numbers & Approximate Locations of Hand Auger Borings Drilled For This Investigation



PROJECT NO. 20171121.002A

DRAWN: 7/14/2022

DRAWN BY: GG

CHECKED BY: JH

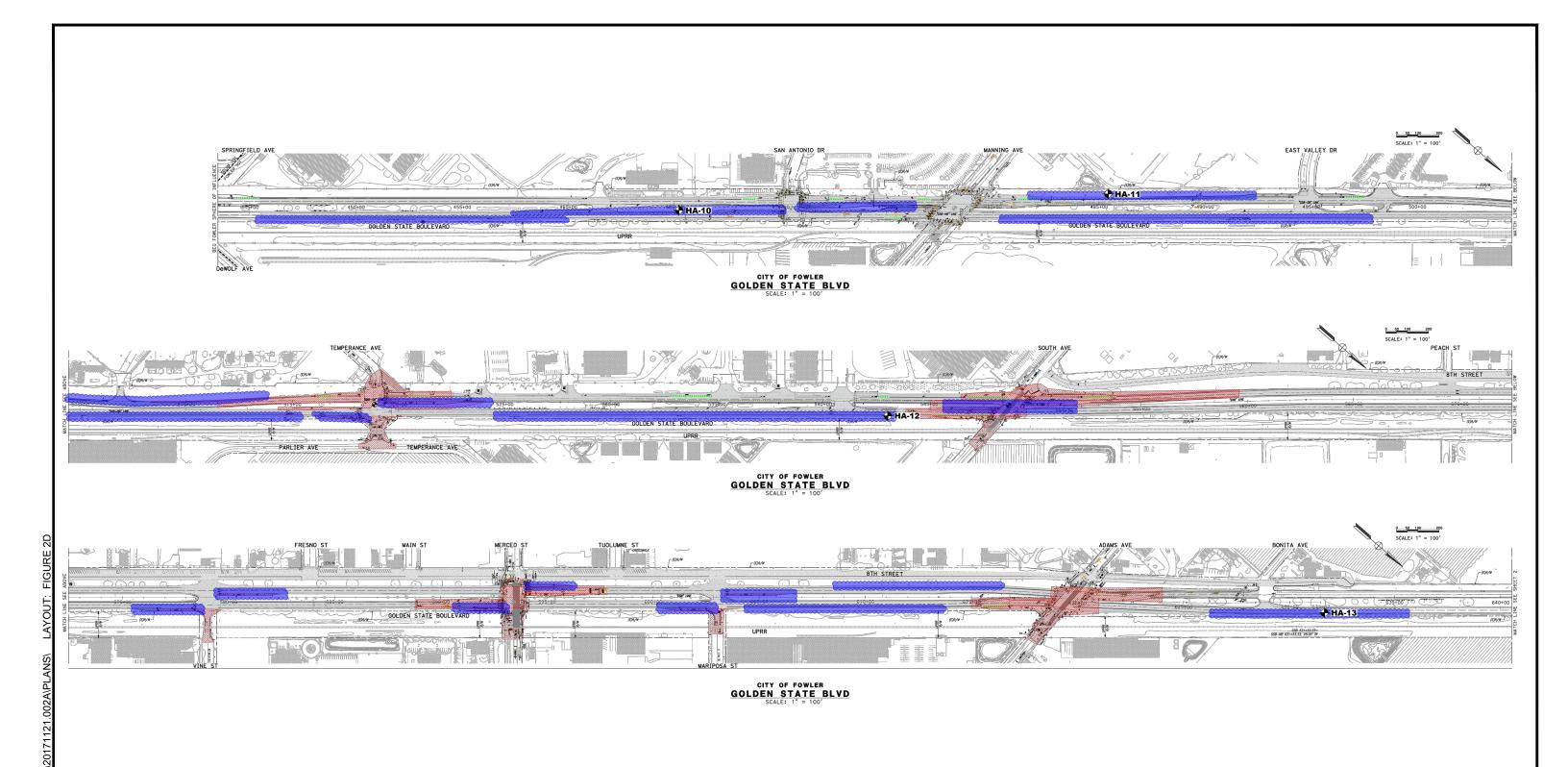
Golden State Blvd. Selma, California

ATTACHED IMAGES:
ATTACHED XREFS:
OFFICE NAME
OFFICE NAME

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**2C** 

FIGURE





Denotes Numbers & Approximate Locations of Hand Auger Borings Drilled For This Investigation

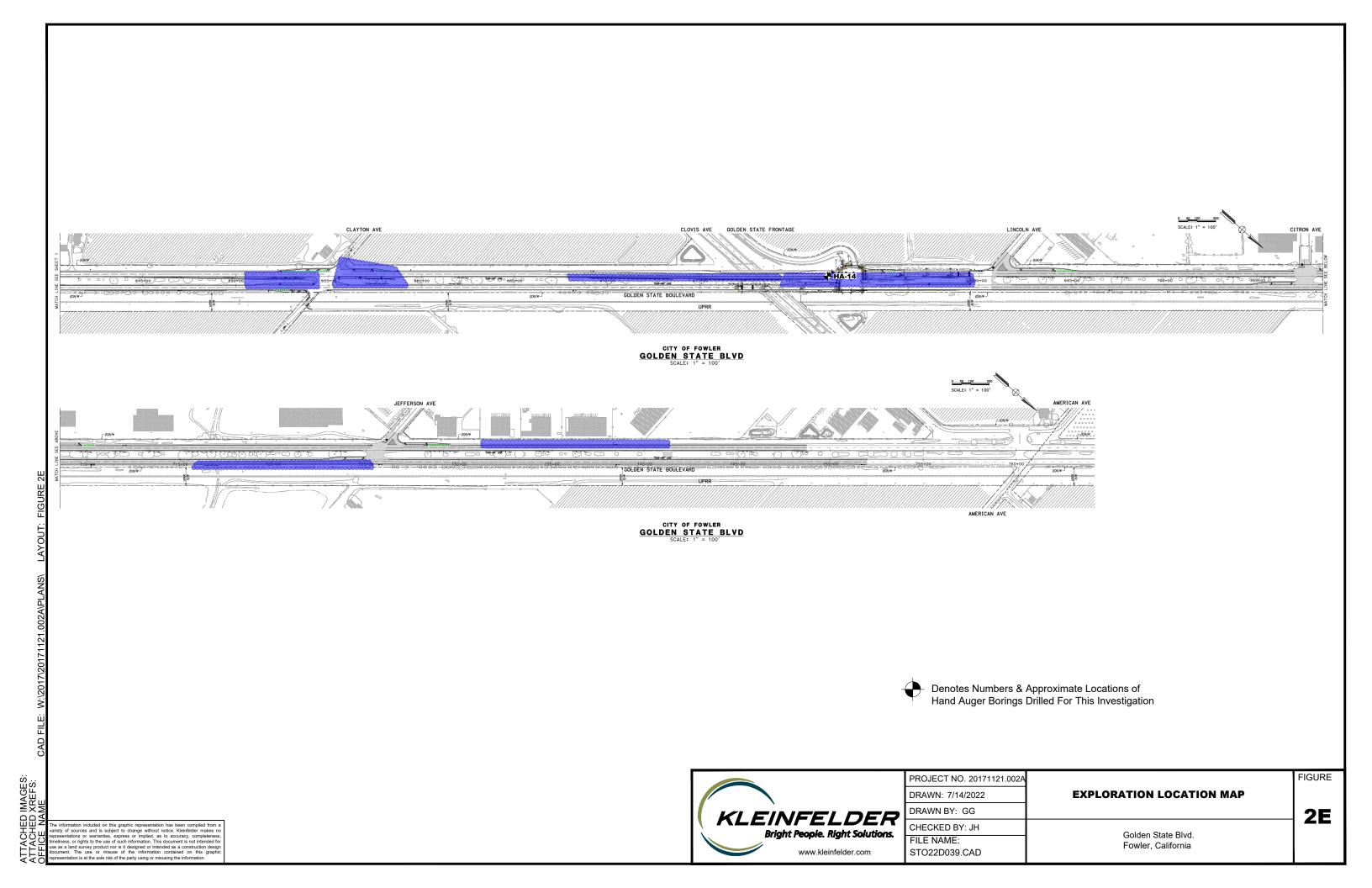


JECT NO. 20171121.002A	
WN: 7/14/2022	EXPLORATION LOCATION MAP
WN BY: GG	

Golden State Blvd. Fowler, California

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FIGURE



#### ATTACHMENT 1 LABORATORY REPORT

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2527 Fresno Street Fresno, CA 93721 (559) 268-7021 Phone (559) 268-0740 Fax

July 19, 2022

Work Order #: IG01024

James Helge Kleinfelder 1410 F St Fresno, CA 93706

RE: Golden State Blvd. ADL Screening

Enclosed are the analytical results for samples received by our laboratory on **07/01/22**. For your reference, these analyses have been assigned laboratory work order number **IG01024**.

All analyses have been performed according to our laboratory's quality assurance program. All results are intended to be considered in their entirety, Moore Twining Associates, Inc. (MTA) is not responsible for use of less than complete reports. Results apply only to samples analyzed.

If you have any questions, please feel free to contact us at the number listed above.

Sincerely,

Moore Twining Associates, Inc.

Julio Morales

Client Services Supervisor





1410 F St Project Number: 20171121.002A Fresno CA, 93706 Project Manager: James Helge

Reported: 07/19/2022

#### **Analytical Report for the Following Samples**

HA-1-A (6-12 INCHES) HA-1-B (6-12 INCHES) HA-1-B (6-12 INCHES) HA-1-B (6-12 INCHES) HA-1 (B-24 INCHES) HA-1 (B-24 INCHES) HA-1 (B-24 INCHES) HA-1 (B-24 INCHES) HA-2 (B-12 INCHES) HA-3 (B-12 INCHES) HA-4 (B-12 INCHES) HA-4 (B-12 INCHES) HA-5 (B-12 INCHES) HA-6 (B-12 INCHES) HA-7 (B-12 INCHES) HA-7 (B-12 INCHES) HA-7 (B-12 INCHES) HA-8 (B-12 INCHES) HA-8 (B-12 INCHES) HA-7 (B-12 INCHES) HA-8 (B-12 INCHES) HA-8 (B-12 INCHES) HA-9 (B-12 INCHES) HA-10 (B-12 INCHES) HA-11 (B	Sample ID	Notes	Laboratory ID	Matrix	Date Sampled	Date Received
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HA-9 (6-12 INCHES)  HA-9 (18-24 INCHES)  HA-10 (6-12 INCHES)  HA-10 (18-24 INCHES)  HA-10 (18-24 INCHES)  HA-10 (18-24 INCHES)  HA-10 (18-24 INCHES)  HA-11 (6-12 INCHES)  HA-11 (18-24 INCHES)  HA-11 (18-24 INCHES)  HA-11 (18-24 INCHES)  HA-11 (18-24 INCHES)  HA-12 (6-12 INCHES)  HA-13 (18-24 INCHES)  HA-14-14 (6-12 INCHES)  HA-15 (6-12 INCHES)  HA-16 (6-12 INCHES)  HA-17 (18-24 INCHES)  HA-18 (6-12 INCHES)  HA-19 (18-24 INCHES)  HA-19 (18-2	HA-8 (6-12 INCHES)		IG01024-16	Soil	07/01/22 10:30	07/01/22 15:00
HA-9 (18-24 INCHES)  HA-10 (6-12 INCHES)  IG01024-19  Soil  07/01/22 11:30  07/01/22 15:00  HA-10 (18-24 INCHES)  IG01024-20  Soil  07/01/22 12:00  07/01/22 15:00  HA-10 (18-24 INCHES)  IG01024-21  Soil  07/01/22 12:00  07/01/22 15:00  HA-11 (6-12 INCHES)  IG01024-22  Soil  07/01/22 13:00  07/01/22 15:00  HA-11 (18-24 INCHES)  IG01024-23  Soil  07/01/22 13:00  07/01/22 15:00  HA-12 (6-12 INCHES)  IG01024-24  Soil  07/01/22 08:00  07/01/22 15:00  HA-12 (18-24 INCHES)  IG01024-25  Soil  07/01/22 08:00  07/01/22 15:00  HA-13 (6-12 INCHES)  IG01024-26  Soil  07/01/22 13:30  07/01/22 15:00  HA-13 (18-24 INCHES)  IG01024-27  Soil  07/01/22 13:30  07/01/22 15:00  HA-14-A (6-12 INCHES)  IG01024-27  Soil  07/01/22 13:30  07/01/22 15:00  HA-14-B (6-12 INCHES)  IG01024-29  Soil  07/01/22 14:00  07/01/22 15:00	HA-8 (18-24 INCHES)		IG01024-17	Soil	07/01/22 10:30	07/01/22 15:00
HA-10 (6-12 INCHES)  HA-10 (18-24 INCHES)  IG01024-21  Soil  07/01/22 12:00  07/01/22 15:00  HA-11 (6-12 INCHES)  IG01024-22  Soil  07/01/22 13:00  07/01/22 15:00  HA-11 (18-24 INCHES)  IG01024-22  Soil  07/01/22 13:00  07/01/22 15:00  HA-11 (18-24 INCHES)  IG01024-23  Soil  07/01/22 13:00  07/01/22 15:00  HA-12 (6-12 INCHES)  IG01024-24  Soil  07/01/22 08:00  07/01/22 15:00  HA-12 (18-24 INCHES)  IG01024-25  Soil  07/01/22 08:00  07/01/22 15:00  HA-13 (6-12 INCHES)  IG01024-26  Soil  07/01/22 13:30  07/01/22 15:00  HA-13 (18-24 INCHES)  IG01024-27  Soil  07/01/22 13:30  07/01/22 15:00  HA-14-A (6-12 INCHES)  IG01024-27  Soil  07/01/22 13:30  07/01/22 15:00  HA-14-B (6-12 INCHES)  IG01024-29  Soil  07/01/22 14:00  07/01/22 15:00	HA-9 (6-12 INCHES)		IG01024-18	Soil	07/01/22 11:30	07/01/22 15:00
HA-10 (18-24 INCHES) IG01024-21 Soil 07/01/22 12:00 07/01/22 15:00 HA-11 (6-12 INCHES) IG01024-22 Soil 07/01/22 13:00 07/01/22 15:00 HA-11 (18-24 INCHES) IG01024-23 Soil 07/01/22 13:00 07/01/22 15:00 HA-12 (6-12 INCHES) IG01024-24 Soil 07/01/22 08:00 07/01/22 15:00 HA-12 (18-24 INCHES) IG01024-25 Soil 07/01/22 08:00 07/01/22 15:00 HA-13 (6-12 INCHES) IG01024-26 Soil 07/01/22 13:30 07/01/22 15:00 HA-13 (18-24 INCHES) IG01024-27 Soil 07/01/22 13:30 07/01/22 15:00 HA-14-A (6-12 INCHES) IG01024-28 Soil 07/01/22 14:00 07/01/22 15:00 HA-14-B (6-12 INCHES) IG01024-29 Soil 07/01/22 14:00 07/01/22 15:00	HA-9 (18-24 INCHES)		IG01024-19	Soil	07/01/22 11:30	07/01/22 15:00
HA-11 (6-12 INCHES)  IG01024-22  Soil  07/01/22 13:00  07/01/22 15:00  HA-11 (18-24 INCHES)  IG01024-23  Soil  07/01/22 13:00  07/01/22 15:00  07/01/22 15:00  HA-12 (6-12 INCHES)  IG01024-24  Soil  07/01/22 08:00  07/01/22 15:00  HA-12 (18-24 INCHES)  IG01024-25  Soil  07/01/22 08:00  07/01/22 15:00  HA-13 (6-12 INCHES)  IG01024-26  Soil  07/01/22 13:30  07/01/22 15:00  HA-13 (18-24 INCHES)  IG01024-27  Soil  07/01/22 13:30  07/01/22 15:00  HA-14-A (6-12 INCHES)  IG01024-28  Soil  07/01/22 14:00  07/01/22 15:00  HA-14-B (6-12 INCHES)  IG01024-29  Soil  07/01/22 14:00  07/01/22 15:00	HA-10 (6-12 INCHES)		IG01024-20	Soil	07/01/22 12:00	07/01/22 15:00
HA-11 (18-24 INCHES) IG01024-23 Soil 07/01/22 13:00 07/01/22 15:00 HA-12 (6-12 INCHES) IG01024-24 Soil 07/01/22 08:00 07/01/22 15:00 HA-12 (18-24 INCHES) IG01024-25 Soil 07/01/22 08:00 07/01/22 15:00 HA-13 (6-12 INCHES) IG01024-26 Soil 07/01/22 13:30 07/01/22 15:00 HA-13 (18-24 INCHES) IG01024-27 Soil 07/01/22 13:30 07/01/22 15:00 HA-14-A (6-12 INCHES) IG01024-28 Soil 07/01/22 14:00 07/01/22 15:00 HA-14-B (6-12 INCHES) IG01024-29 Soil 07/01/22 14:00 07/01/22 15:00	HA-10 (18-24 INCHES)		IG01024-21	Soil	07/01/22 12:00	07/01/22 15:00
HA-12 (6-12 INCHES)  IG01024-24  Soil  07/01/22 08:00  07/01/22 15:00  HA-12 (18-24 INCHES)  IG01024-25  Soil  07/01/22 08:00  07/01/22 15:00  07/01/22 15:00  1G01024-26  Soil  07/01/22 13:30  07/01/22 15:00  HA-13 (18-24 INCHES)  IG01024-27  Soil  07/01/22 13:30  07/01/22 15:00  HA-14-A (6-12 INCHES)  IG01024-28  Soil  07/01/22 14:00  07/01/22 15:00  HA-14-B (6-12 INCHES)  IG01024-29  Soil  07/01/22 14:00  07/01/22 15:00	HA-11 (6-12 INCHES)		IG01024-22	Soil	07/01/22 13:00	07/01/22 15:00
HA-12 (18-24 INCHES)  IG01024-25  Soil  07/01/22 08:00  07/01/22 15:00  HA-13 (6-12 INCHES)  IG01024-26  Soil  07/01/22 13:30  07/01/22 15:00  HA-13 (18-24 INCHES)  IG01024-27  Soil  07/01/22 13:30  07/01/22 15:00  HA-14-A (6-12 INCHES)  IG01024-28  Soil  07/01/22 14:00  07/01/22 15:00  HA-14-B (6-12 INCHES)  IG01024-29  Soil  07/01/22 14:00  07/01/22 15:00	HA-11 (18-24 INCHES)		IG01024-23	Soil	07/01/22 13:00	07/01/22 15:00
HA-13 (6-12 INCHES)  IG01024-26  Soil  07/01/22 13:30  07/01/22 15:00  HA-13 (18-24 INCHES)  IG01024-27  Soil  07/01/22 13:30  07/01/22 15:00  07/01/22 15:00  HA-14-A (6-12 INCHES)  IG01024-28  Soil  07/01/22 14:00  07/01/22 15:00  HA-14-B (6-12 INCHES)  Soil  07/01/22 14:00  07/01/22 15:00	HA-12 (6-12 INCHES)		IG01024-24	Soil	07/01/22 08:00	07/01/22 15:00
HA-13 (18-24 INCHES)  IG01024-27  Soil  07/01/22 13:30  07/01/22 15:00  HA-14-A (6-12 INCHES)  IG01024-28  Soil  07/01/22 14:00  07/01/22 15:00  HA-14-B (6-12 INCHES)  Soil  07/01/22 14:00  07/01/22 15:00	HA-12 (18-24 INCHES)		IG01024-25	Soil	07/01/22 08:00	07/01/22 15:00
HA-14-A (6-12 INCHES)  IG01024-28  Soil  07/01/22 14:00  07/01/22 15:00  HA-14-B (6-12 INCHES)  Soil  07/01/22 14:00  07/01/22 15:00	HA-13 (6-12 INCHES)		IG01024-26	Soil	07/01/22 13:30	07/01/22 15:00
HA-14-B (6-12 INCHES) IG01024-29 Soil 07/01/22 14:00 07/01/22 15:00	HA-13 (18-24 INCHES)		IG01024-27	Soil	07/01/22 13:30	07/01/22 15:00
	HA-14-A (6-12 INCHES)		IG01024-28	Soil	07/01/22 14:00	07/01/22 15:00
HA-14 (18-24 INCHES) IG01024-30 Soil 07/01/22 14:00 07/01/22 15:00	HA-14-B (6-12 INCHES)		IG01024-29	Soil	07/01/22 14:00	07/01/22 15:00
	HA-14 (18-24 INCHES)		IG01024-30	Soil	07/01/22 14:00	07/01/22 15:00



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Kleinfelder Project: Golden State Blvd. ADL Screening

1410 F St Project Number: 20171121.002A

Fresno CA, 93706 Project Manager: James Helge

Reported: 07/19/2022

#### AMENDED REPORT:

Added TCLP Lead to all samples:

HA-3 6-12 Inches

HA-4 6-12 Inches

HA-5 6-12 Inches

HA-6 6-12 Inches

HA-8 6-12 Inches

HA-9 6-12 Inches

HA-13 6-12 inches

HA-14A 6-12 Inches

Added STLC Lead to the following sample:

HA-2 18-24 Inches





Analyte

Inorganics pH

Lead

Metals (Total) Lead

Metals (STLC/Citrate Buffer)

Kleinfelder Project: Golden State Blvd. ADL Screening

1410 F StProject Number:20171121.002AFresno CA, 93706Project Manager:James Helge

Flag

Reported: 07/19/2022

EPA 6010B

#### **HA-1-A (6-12 INCHES)**

IG01024-01 (Soil) Sampled: 07/01/22 06:00

	- ( /		•				
Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
6.9	0.10	pH Units	1	B2G0705	07/11/22	07/11/22	EPA 9045C
99	2.0	mg/kg	1	B2F3005	07/06/22	07/08/22	EPA 6010B

B2G0514

07/08/22

07/08/22

#### **HA-1-B (6-12 INCHES)**

mg/L

IG01024-02 (Soil)

0.50

7.7

Sampled: 07/01/22 06:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
рН		7.0	0.10	pH Units	1	B2G0705	07/11/22	07/11/22	EPA 9045C
Metals (Total)									
Lead		98	2.0	mg/kg	1	B2F3005	07/06/22	07/08/22	EPA 6010B
Metals (STLC/Citrate Buffer)									
Lead		3.5	0.50	mg/L	1	B2G0514	07/08/22	07/08/22	EPA 6010B

#### HA-1 (18-24 INCHES)

IG01024-03 (Soil)

Sampled: 07/01/22 06:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									_
pH		7.5	0.10	pH Units	1	B2G0705	07/11/22	07/11/22	EPA 9045C
Metals (Total)									
Lead		2.3	2.0	mg/kg	1	B2F3005	07/06/22	07/08/22	EPA 6010B

#### **HA-2 (6-12 INCHES)**

IG01024-04 (Soil)

Sampled: 07/01/22 06:30

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
рН		6.6	0.10	pH Units	1	B2G0705	07/11/22	07/11/22	EPA 9045C
Metals (Total)									
Lead		65	2.0	mg/kg	1	B2F3005	07/06/22	07/08/22	EPA 6010B
Metals (STLC/Citrate Buffer)									
Lead		4.2	0.50	mg/L	1	B2G0514	07/08/22	07/08/22	EPA 6010B





1410 F StProject Number:20171121.002AFresno CA, 93706Project Manager:James Helge

Reported: 07/19/2022

#### **HA-2 (18-24 INCHES)**

IG01024-05 (Soil) Sampled: 07/01/22 06:30

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
рН		6.7	0.10	pH Units	1	B2G0705	07/11/22	07/11/22	EPA 9045C
Metals (Total)									
Lead		58	2.0	mg/kg	1	B2F3005	07/06/22	07/08/22	EPA 6010B
Metals (STLC/Citrate Buffer)									
Lead		4.3	0.50	mg/L	1	B2G1409	07/18/22	07/18/22	EPA 6010B

#### **HA-3 (6-12 INCHES)**

IG01024-06 (Soil)

Sampled: 07/01/22 07:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
рН		7.3	0.10	pH Units	1	B2G0705	07/11/22	07/11/22	EPA 9045C
Metals (Total)									
Lead		130	2.0	mg/kg	1	B2F3005	07/06/22	07/08/22	EPA 6010B
Metals (STLC/Citrate Buffer)									
Lead		7.3	0.50	mg/L	1	B2G0514	07/08/22	07/08/22	EPA 6010B

#### HA-3 (18-24 INCHES)

IG01024-07 (Soil)

Sampled: 07/01/22 07:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									_
рН		8.0	0.10	pH Units	1	B2G0705	07/11/22	07/11/22	EPA 9045C
Metals (Total)									
Lead		30	2.0	mg/kg	1	B2F3005	07/06/22	07/08/22	EPA 6010B

#### **HA-4 (6-12 INCHES)**

IG01024-08 (Soil)

Sampled: 07/01/22 07:30

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
рН		6.7	0.10	pH Units	1	B2G0705	07/11/22	07/11/22	EPA 9045C
Metals (Total)									
Lead		110	2.0	mg/kg	1	B2F3005	07/06/22	07/08/22	EPA 6010B
Metals (STLC/Citrate Buffer)									<u> </u>
Lead		7.6	0.50	mg/L	1	B2G0514	07/08/22	07/08/22	EPA 6010B





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1410 F StProject Number:20171121.002AFresno CA, 93706Project Manager:James Helge

Reported: 07/19/2022

#### **HA-4 (18-24 INCHES)**

IG01024-09 (Soil)

Sampled: 07/01/22 07:30

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
рН		7.4	0.10	pH Units	1	B2G0705	07/11/22	07/11/22	EPA 9045C
Metals (Total)									
Lead		9.1	2.0	mg/kg	1	B2F3005	07/06/22	07/08/22	EPA 6010B

#### **HA-5 (6-12 INCHES)**

IG01024-10 (Soil)

Sampled: 07/01/22 08:30

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
рН		7.8	0.10	pH Units	1	B2G0705	07/11/22	07/11/22	EPA 9045C
Metals (Total)									
Lead		100	2.0	mg/kg	1	B2F3005	07/06/22	07/08/22	EPA 6010B
Metals (STLC/Citrate Buffer)		-							
Lead		8.2	0.50	mg/L	1	B2G0514	07/08/22	07/08/22	EPA 6010B

#### **HA-5 (18-24 INCHES)**

IG01024-11 (Soil)

Sampled: 07/01/22 08:30

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
pH		7.0	0.10	pH Units	1	B2G0705	07/11/22	07/11/22	EPA 9045C
Metals (Total)									
Lead		23	2.0	mg/kg	1	B2G0502	07/07/22	07/09/22	EPA 6010B

#### HA-6 (6-12 INCHES)

IG01024-12 (Soil)

Sampled: 07/01/22 09:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
рН		6.3	0.10	pH Units	1	B2G0705	07/11/22	07/11/22	EPA 9045C
Metals (Total)									
Lead		180	2.0	mg/kg	1	B2G0502	07/07/22	07/09/22	EPA 6010B
Metals (STLC/Citrate Buffer)									
Lead		14	0.50	mg/L	1	B2G0514	07/08/22	07/08/22	EPA 6010B

#### **HA-6 (18-24 INCHES)**

IG01024-13 (Soil)

Sampled: 07/01/22 09:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									





1410 F StProject Number:20171121.002AFresno CA, 93706Project Manager:James Helge

Reported: 07/19/2022

#### **HA-6 (18-24 INCHES)**

IG01024-13 (Soil)

Sampled: 07/01/22 09:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
рН		6.9	0.10	pH Units	1	B2G0705	07/11/22	07/11/22	EPA 9045C
Metals (Total)									
Lead		44	2.0	mg/kg	1	B2G0502	07/07/22	07/09/22	EPA 6010B

#### **HA-7 (6-12 INCHES)**

IG01024-14 (Soil)

Sampled: 07/01/22 10:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
рН		7.5	0.10	pH Units	1	B2G0705	07/11/22	07/11/22	EPA 9045C
Metals (Total)									
Lead		34	2.0	mg/kg	1	B2G0502	07/07/22	07/09/22	EPA 6010B
Metals (STLC/Citrate Buffer)									
Lead		2.4	0.50	mg/L	1	B2G0514	07/08/22	07/08/22	EPA 6010B

#### **HA-7 (18-24 INCHES)**

IG01024-15 (Soil)

Sampled: 07/01/22 10:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
pH		8.5	0.10	pH Units	1	B2G0705	07/11/22	07/11/22	EPA 9045C
Metals (Total)									
Lead		28	2.0	mg/kg	1	B2G0502	07/07/22	07/09/22	EPA 6010B

#### **HA-8 (6-12 INCHES)**

IG01024-16 (Soil)

Sampled: 07/01/22 10:30

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
рН		6.4	0.10	pH Units	1	B2G0705	07/11/22	07/11/22	EPA 9045C
Metals (Total)									
Lead		250	2.0	mg/kg	1	B2G0502	07/07/22	07/09/22	EPA 6010B
Metals (STLC/Citrate Buffer)									
Lead		20	0.50	mg/L	1	B2G0514	07/08/22	07/08/22	EPA 6010B

#### HA-8 (18-24 INCHES)

IG01024-17 (Soil)

Sampled: 07/01/22 10:30

	Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
ī	Inorganics		•			•			•	





1410 F St **Project Number:** 20171121.002A Fresno CA, 93706 **Project Manager:** James Helge

Reported: 07/19/2022

#### **HA-8 (18-24 INCHES)**

IG01024-17 (Soil)

Sampled: 07/01/22 10:30

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
рН		7.0	0.10	pH Units	1	B2G0705	07/11/22	07/11/22	EPA 9045C
Metals (Total)									
Lead		5.7	2.0	mg/kg	1	B2G0502	07/07/22	07/09/22	EPA 6010B

#### **HA-9 (6-12 INCHES)**

IG01024-18 (Soil)

Sampled: 07/01/22 11:30

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
рН		6.6	0.10	pH Units	1	B2G0705	07/11/22	07/11/22	EPA 9045C
Metals (Total)									
Lead		240	2.0	mg/kg	1	B2G0502	07/07/22	07/09/22	EPA 6010B
Metals (STLC/Citrate Buffer)									
Lead		16	0.50	mg/L	1	B2G0514	07/08/22	07/08/22	EPA 6010B

#### **HA-9 (18-24 INCHES)**

IG01024-19 (Soil)

Sampled: 07/01/22 11:30

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
pH		6.7	0.10	pH Units	1	B2G0705	07/11/22	07/11/22	EPA 9045C
Metals (Total)									
Lead		2.0	2.0	mg/kg	1	B2G0502	07/07/22	07/09/22	EPA 6010B

#### **HA-10 (6-12 INCHES)**

IG01024-20 (Soil)

Sampled: 07/01/22 12:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
рН		7.0	0.10	pH Units	1	B2G0705	07/11/22	07/11/22	EPA 9045C
Metals (Total)									
Lead		5.6	2.0	mg/kg	1	B2G0502	07/07/22	07/09/22	EPA 6010B
Metals (STLC/Citrate Buffer)									
Lead		1.2	0.50	mg/L	1	B2G0713	07/11/22	07/11/22	EPA 6010B

#### **HA-10 (18-24 INCHES)**

IG01024-21 (Soil)

Sampled: 07/01/22 12:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									





1410 F StProject Number:20171121.002AFresno CA, 93706Project Manager:James Helge

**Reported:** 07/19/2022

#### HA-10 (18-24 INCHES)

IG01024-21 (Soil)

Sampled: 07/01/22 12:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
pH		7.4	0.10	pH Units	1	B2G0706	07/11/22	07/11/22	EPA 9045C
Metals (Total)									
Lead		9.4	2.0	mg/kg	1	B2G0502	07/07/22	07/09/22	EPA 6010B

#### **HA-11 (6-12 INCHES)**

IG01024-22 (Soil)

Sampled: 07/01/22 13:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
рН		6.6	0.10	pH Units	1	B2G0706	07/11/22	07/11/22	EPA 9045C
Metals (Total)									
Lead		95	2.0	mg/kg	1	B2G0502	07/07/22	07/09/22	EPA 6010B
Metals (STLC/Citrate Buffer)									
Lead		7.4	0.50	mg/L	1	B2G0713	07/11/22	07/11/22	EPA 6010B

#### **HA-11 (18-24 INCHES)**

IG01024-23 (Soil)

Sampled: 07/01/22 13:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
pH		6.6	0.10	pH Units	1	B2G0706	07/11/22	07/11/22	EPA 9045C
Metals (Total)									
Lead		7.5	2.0	mg/kg	1	B2G0502	07/07/22	07/09/22	EPA 6010B

#### **HA-12 (6-12 INCHES)**

IG01024-24 (Soil)

Sampled: 07/01/22 08:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
рН		7.0	0.10	pH Units	1	B2G0706	07/11/22	07/11/22	EPA 9045C
Metals (Total)									
Lead		35	2.0	mg/kg	1	B2G0502	07/07/22	07/09/22	EPA 6010B
Metals (STLC/Citrate Buffer)									
Lead		2.2	0.50	mg/L	1	B2G0713	07/11/22	07/11/22	EPA 6010B

#### **HA-12 (18-24 INCHES)**

IG01024-25 (Soil)

Sampled: 07/01/22 08:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									



2527 Fresno Street Fresno, CA 93721 (559) 268-7021 Phone (559) 268-0740 Fax

Kleinfelder Project: Golden State Blvd. ADL Screening

1410 F StProject Number:20171121.002AFresno CA, 93706Project Manager:James Helge

Reported: 07/19/2022

#### **HA-12 (18-24 INCHES)**

IG01024-25 (Soil)

Sampled: 07/01/22 08:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
рН		7.1	0.10	pH Units	1	B2G0706	07/11/22	07/11/22	EPA 9045C
Metals (Total)									
Lead		5.2	2.0	mg/kg	1	B2G0502	07/07/22	07/09/22	EPA 6010B

#### HA-13 (6-12 INCHES)

IG01024-26 (Soil)

Sampled: 07/01/22 13:30

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
рН		4.9	0.10	pH Units	1	B2G0706	07/11/22	07/11/22	EPA 9045C
Metals (Total)									
Lead		130	2.0	mg/kg	1	B2G0502	07/07/22	07/09/22	EPA 6010B
Metals (STLC/Citrate Buffer)									
Lead		12	0.50	mg/L	1	B2G0713	07/11/22	07/11/22	EPA 6010B

#### HA-13 (18-24 INCHES)

IG01024-27 (Soil)

Sampled: 07/01/22 13:30

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
рН		5.5	0.10	pH Units	1	B2G0706	07/11/22	07/11/22	EPA 9045C
Metals (Total)									
Lead		11	2.0	mg/kg	1	B2G0502	07/07/22	07/09/22	EPA 6010B

#### **HA-14-A (6-12 INCHES)**

IG01024-28 (Soil)

Sampled: 07/01/22 14:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
рН		6.8	0.10	pH Units	1	B2G0706	07/11/22	07/11/22	EPA 9045C
Metals (Total)									
Lead		140	2.0	mg/kg	1	B2G0502	07/07/22	07/09/22	EPA 6010B
Metals (STLC/Citrate Buffer)									
Lead		10	0.50	mg/L	1	B2G0713	07/11/22	07/11/22	EPA 6010B

#### **HA-14-B (6-12 INCHES)**

IG01024-29 (Soil)

Sampled: 07/01/22 14:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									





1410 F StProject Number:20171121.002AFresno CA, 93706Project Manager:James Helge

Reported: 07/19/2022

#### HA-14-B (6-12 INCHES)

IG01024-29 (Soil) Sampled: 07/01/22 14:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
рН		6.9	0.10	pH Units	1	B2G0706	07/11/22	07/11/22	EPA 9045C
Metals (Total)									
Lead		140	2.0	mg/kg	1	B2G0502	07/07/22	07/09/22	EPA 6010B
Metals (STLC/Citrate Buffer)									
Lead		13	0.50	mg/L	1	B2G0713	07/11/22	07/11/22	EPA 6010B

#### HA-14 (18-24 INCHES)

IG01024-30 (Soil) Sampled: 07/01/22 14:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
рН		7.2	0.10	pH Units	1	B2G0706	07/11/22	07/11/22	EPA 9045C
Metals (Total)									
Lead		20	2.0	mg/kg	1	B2G0502	07/07/22	07/09/22	EPA 6010B





1410 F StProject Number:20171121.002AFresno CA, 93706Project Manager:James Helge

Reported: 07/19/2022

#### **Quality Control Sample Results - Inorganics**

Analyte	Flag	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limits
Batch - B2G0705										
LCS (B2G0705-BS1)	Prepared 8	k Analyzed: 0	7/11/22							
EPA 9045C										
рН		7.00	0.10	pH Units	7.00		100	80-120		
LCS Dup (B2G0705-BSD1)		Prepared 8	k Analyzed: 0	7/11/22						
EPA 9045C										
pH		7.01	0.10	pH Units	7.00		100	80-120	0.143	20
Duplicate (B2G0705-DUP1)		Prepared 8	k Analyzed: 0	7/11/22		Source: IG0	1024-01			
EPA 9045C										
pH		6.85	0.10	pH Units		6.94			1.31	20
Duplicate (B2G0705-DUP2)		Prepared 8	k Analyzed: 0	7/11/22		Source: IG0	1024-11			
EPA 9045C										
pH		6.94	0.10	pH Units		6.95			0.144	20
Batch - B2G0706										
LCS (B2G0706-BS1)		Prepared 8	Analyzed: 0	7/11/22						
EPA 9045C										
рН		7.01	0.10	pH Units	7.00		100	80-120		
LCS Dup (B2G0706-BSD1)		Prepared 8	k Analyzed: 0	7/11/22						
EPA 9045C										
рН		7.00	0.10	pH Units	7.00		100	80-120	0.143	20
Duplicate (B2G0706-DUP1)		Prepared 8	k Analyzed: 0	7/11/22		Source: IG0	1024-21			
EPA 9045C										
рН		7.40	0.10	pH Units		7.41			0.135	20





Kleinfelder Project: Golden State Blvd. ADL Screening

1410 F St Project Number: 20171121.002A

Reported: 07/19/2022

Fresno CA, 93706 Project Manager: James Helge

#### **Quality Control Sample Results - Metals (Total)**

Analyte	Flag	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limits
Batch - B2F3005										
Blank (B2F3005-BLK1)		Prepared:	07/06/22 A	nalyzed: 07/0	08/22					
EPA 6010B										
Lead		ND	2.0	mg/kg						
LCS (B2F3005-BS1)		Prepared:	07/06/22 A	nalyzed: 07/0	08/22					
EPA 6010B										
Lead		20.7	2.0	mg/kg	20.0		103	75-125		
LCS Dup (B2F3005-BSD1)		Prepared:	07/06/22 A	nalyzed: 07/0	08/22					
EPA 6010B										
Lead		20.4	2.0	mg/kg	20.0		102	75-125	1.32	20
Matrix Spike (B2F3005-MS1)		Prepared:	07/06/22 A	nalyzed: 07/0	08/22	Source: IF2	4016-01			
EPA 6010B										
Lead		25.7	2.0	mg/kg	19.9	6.54	95.9	75-125		
Matrix Spike Dup (B2F3005-MSD1)		Prepared:	07/06/22 A	nalyzed: 07/0	08/22	Source: IF2	4016-01			
EPA 6010B		_				_				
Lead		25.8	2.0	mg/kg	19.9	6.54	96.5	75-125	0.356	20
Matrix Spike (B2F3005-MS2)		Prepared:	07/06/22 A	nalyzed: 07/0	08/22	Source: IG0	1024-10			
EPA 6010B				_						
Lead	MS2	143	2.0	mg/kg	20.1	102	203	75-125		
Matrix Spike Dup (B2F3005-MSD2)		Prepared:	07/06/22 A	nalyzed: 07/0	08/22	Source: IG0	1024-10			
EPA 6010B		.=-								
Lead	MS2	150	2.0	mg/kg	20.1	102	235	75-125	4.42	20
Batch - B2G0502										
Blank (B2G0502-BLK1)		Prepared:	07/07/22 A	nalyzed: 07/0	09/22					
EPA 6010B										
Lead		ND	2.0	mg/kg						
LCS (B2G0502-BS1)		Prepared:	07/07/22 A	nalyzed: 07/0	09/22					
EPA 6010B										
Lead		20.2	2.0	mg/kg	20.0		101	75-125		
LCS Dup (B2G0502-BSD1)		Prepared:	07/07/22 A	nalyzed: 07/0	09/22					
EPA 6010B										
Lead		20.3	2.0	mg/kg	20.0		101	75-125	0.442	20
Matrix Spike (B2G0502-MS1)		Prepared:	07/07/22 A	nalyzed: 07/0	09/22	Source: IG0	1024-11			
EPA 6010B										
Lead		40.1	2.0	mg/kg	19.9	22.5	88.2	75-125		
Matrix Spike Dup (B2G0502-MSD1)		Prepared:	07/07/22 A	nalyzed: 07/0	09/22	Source: IG0	1024-11			
EPA 6010B										
Lead	MS3	33.5	2.0	mg/kg	20.2	22.5	54.3	75-125	18.0	20
Matrix Spike (B2G0502-MS2)		Prepared:	07/07/22 A	nalyzed: 07/0	09/22	Source: IG0	1024-30			
EPA 6010B										
Lead		39.4	2.0	mg/kg	19.9	20.4	95.6	75-125		
Matrix Spike Dup (B2G0502-MSD2)		Prepared:	07/07/22 A	nalyzed: 07/0	09/22	Source: IG0	1024-30			



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Reported:

07/19/2022

Kleinfelder Project: Golden State Blvd. ADL Screening

1410 F St Project Number: 20171121.002A
Fresno CA, 93706 Project Manager: James Helge

#### **Quality Control Sample Results - Metals (Total)**

Analyte	Flag	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limits
Batch - B2G0502										
Matrix Spike Dup (B2G0502-MSD2)	Prepared: 07/07/22 Analyzed: 07/09/22			Source: IG0	1024-30					
EPA 6010B										
Lead		36.1	2.0	mg/kg	19.9	20.4	79.1	75-125	8.88	20



Reported:

07/19/2022



Kleinfelder Project: Golden State Blvd. ADL Screening

1410 F St Project Number: 20171121.002A
Fresno CA, 93706 Project Manager: James Helge

Quality Control Sample Results - Metals (STLC/Citrate Buffer)

Analyte	Flag	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limits
Batch - B2G0514										
Blank (B2G0514-BLK1)		Prepared &	Analyzed: 0	7/08/22						
EPA 6010B										
Lead		ND	0.50	mg/L						
LCS (B2G0514-BS1)		Prepared &	Analyzed: 0	7/08/22						
EPA 6010B										
Lead		1.89	0.50	mg/L	2.00		94.5	75-125		
LCS Dup (B2G0514-BSD1)		Prepared &	Analyzed: 0	7/08/22						
EPA 6010B										
Lead		1.98	0.50	mg/L	2.00		98.9	75-125	4.63	20
Duplicate (B2G0514-DUP1)		Prepared &	Analyzed: 0	7/08/22		Source: IG	01024-01			
EPA 6010B										
Lead	DUP1	9.94	0.50	mg/L		7.65			26.0	20
Matrix Spike (B2G0514-MS1)		Prepared &	Analyzed: 0	7/08/22		Source: IG	01024-01			
EPA 6010B										
Lead	MS2	10.6	0.50	mg/L	2.00	7.65	147	75-125		
Matrix Spike Dup (B2G0514-MSD1)		Prepared 8	Analyzed: 0	7/08/22		Source: IG	01024-01			
EPA 6010B										
Lead	MS2	10.5	0.50	mg/L	2.00	7.65	143	75-125	0.829	20
Batch - B2G0713										
Blank (B2G0713-BLK1)		Prepared &	Analyzed: 0	7/11/22						
EPA 6010B										
Lead		ND	0.50	mg/L						
LCS (B2G0713-BS1)		Prepared 8	Analyzed: 0	7/11/22						
EPA 6010B										
Lead		1.98	0.50	mg/L	2.00		99.1	75-125		
LCS Dup (B2G0713-BSD1)		Prepared &	Analyzed: 0	7/11/22						
EPA 6010B										
Lead		2.03	0.50	mg/L	2.00		102	75-125	2.49	20
Duplicate (B2G0713-DUP1)		Prepared &	Analyzed: 0	7/11/22		Source: IG	01024-20			
EPA 6010B									95.5	
Lead	DUP1	1.55	0.50	mg/L		1.24			22.3	20
Matrix Spike (B2G0713-MS1)		Prepared &	Analyzed: 0	7/11/22		Source: IG	01024-20			
EPA 6010B										
Lead		3.23	0.50	mg/L	2.00	1.24	99.8	75-125		
Matrix Spike Dup (B2G0713-MSD1)		Prepared &	Analyzed: 0	7/11/22		Source: IG	01024-20			
EPA 6010B							4			
Lead		3.31	0.50	mg/L	2.00	1.24	104	75-125	2.29	20
Batch - B2G1409										
Blank (B2G1409-BLK1)		Prepared &	Analyzed: 0	7/18/22						
EPA 6010B		ND	0.50	ma e: //						
Lead		ND	0.50	mg/L						





1410 F StProject Number:20171121.002AFresno CA, 93706Project Manager:James Helge

**Reported:** 07/19/2022

#### **Quality Control Sample Results - Metals (STLC/Citrate Buffer)**

Analyte	Flag	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limits
Batch - B2G1409										
LCS (B2G1409-BS1)		Prepared 8	k Analyzed: 07	7/18/22						
EPA 6010B										
Lead		1.88	0.50	mg/L	2.00		93.9	75-125		
LCS Dup (B2G1409-BSD1)		Prepared 8	k Analyzed: 07	7/18/22						
EPA 6010B										
Lead		1.85	0.50	mg/L	2.00		92.6	75-125	1.41	20
Duplicate (B2G1409-DUP1)		Prepared 8	k Analyzed: 0	7/18/22		Source: IG0	1024-05			
EPA 6010B										
Lead		4.11	0.50	mg/L		4.27			3.93	20
Matrix Spike (B2G1409-MS1)		Prepared 8	k Analyzed: 0	7/18/22		Source: IG0	1024-05			
EPA 6010B										
Lead		6.33	0.50	mg/L	2.00	4.27	103	75-125		
Matrix Spike Dup (B2G1409-MSD1)		Prepared 8	k Analyzed: 07	7/18/22		Source: IG0	1024-05			
EPA 6010B										
Lead		6.39	0.50	mg/L	2.00	4.27	106	75-125	0.931	20

#### **Notes and Definitions**

MS2	Recovery for this analyte was biased high; associated blank spike recoveries are within range.
MS3	Recovery for this analyte was biased low; associated blank spike recoveries are within range.
μg/L	micrograms per liter (parts per billion concentration units)
mg/L	milligrams per liter (parts per million concentration units)
mg/kg	milligrams per kilogram (parts per million concentration units)
ND	Analyte NOT DETECTED at or above the reporting limit

A high RPD was observed between a sample and this sample's duplicate.

RPD Relative Percent Difference

DUP1

Analysis of pH, filtration, and residual chlorine is to take place immediately after sampling in the field. If the test was performed in the laboratory, the hold time was exceeded. (for aqueous matrices only)



### Metals Analysis of TCLP Extract

Moore Twining Associates, Inc 2444 **Client ID:** 

Julio Morales **Report Number:** M243493 2527 Fresno St **Date Received:** 07/13/22 **Date Analyzed:** 07/18/22

Fresno, CA 93721 **Date Printed:** 07/19/22 07/18/22 **First Reported:** 

Job ID / Site: 37135; IG01024 2444 **SGSFL Job ID:** 

Date(s) Collected: 7/1/22 **Total Samples Submitted:** 8 **Total Samples Analyzed:** 8

					1 otal Samples linary 2 car			
Sample Number	Lab Number	Analyte	Result	Result Units	Reporting Limit*	Method Reference		
HA-3 (6-12 INCHES)	LM224727	Pb	< 0.3	mg/l	0.3	TCLP EPA1311/6010B		
HA-4 (6-12 INCHES)	LM224728	Pb	< 0.3	mg/l	0.3	TCLP EPA1311/6010B		
HA-5 (6-12 INCHES)	LM224729	Pb	0.4	mg/l	0.3	TCLP EPA1311/6010B		
HA-6 (6-12 INCHES)	LM224730	Pb	< 0.3	mg/l	0.3	TCLP EPA1311/6010B		
HA-8 (6-12 INCHES)	LM224731	Pb	0.4	mg/l	0.3	TCLP EPA1311/6010B		
HA-9 (6-12 INCHES)	LM224732	Pb	1.0	mg/l	0.3	TCLP EPA1311/6010B		
HA-13 (6-12 INCHES)	LM224733	Pb	< 0.3	mg/l	0.3	TCLP EPA1311/6010B		
HA-14 (6-12 INCHES)	LM224734	Pb	< 0.3	mg/l	0.3	TCLP EPA1311/6010B		

Beatriz Hinojosa, Laboratory Supervisor, Carson Laboratory

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<sup>\*</sup> The Reporting Limit represents the lowest amount of analyte that the laboratory can confidently detect in the sample, and is not a regulatory level. The Units for the Reporting Limit are the same as the Units for the Final Results.



## Quality Control ICP

**Date Analyzed:** 07/18/22

**Report Number(s):** \_\_M243493

Sample Name	Analyte	Matrix	Recovery	RPD	Pass/Fail C	onc Read	Dil	Expected	Units	Run ID#
CCB	Pb	TCLP				0.00	1	0.03	mg/l	88179
CCB	Pb	TCLP				-0.01	1	0.03	mg/l	88179
CCB	Pb	TCLP				-0.01	1	0.03	mg/l	88179
CCV	Pb	TCLP	100.0			1.00	1	1.00	mg/l	88179
CCV	Pb	TCLP	102.8			1.03	1	1.00	mg/l	88179
CCV	Pb	TCLP	103.2			1.03	1	1.00	mg/l	88179
ICV	Pb	TCLP	103.4			1.03	1	1.00	mg/l	88179
INTERF	Pb	TCLP	94.2			0.94	1	1.00	mg/l	88179
INTERF	Pb	TCLP	95.0			0.95	1	1.00	mg/l	88179
LCS 66738	Pb	TCLP	107.8			1.08	1	1.00	mg/l	88179
LCSD 66738	Pb	TCLP	111.9	3.8		1.12	1	1.00	mg/l	88179
MS LM224728	Pb	TCLP	84.7			1.03	1	1.21	mg/l	88179
MSD LM224728	Pb	TCLP	82.2	3.0		1.00	1	1.21	mg/l	88179
PB 66738	Pb	TCLP				0.00	1	0.05	mg/l	88179



#### Page 1 of 2 SUBCONTRACT ORDER

Purchase Order # 3712

MTA Project #

IG01024

**RUSH 2 Days** 

Analytical Chemistry Division California ELAP Certification # 1371

Please reference these numbers on all reports and invoices. We also request QC data be provided with final report.

SENDING LABORATORY:

Moore Twining Associates, Inc.

2527 Fresno Street Fresno, CA 93721

Phone: (559) 268-7021 Fax: (559) 268-0740

PROJECT MANAGER / REPORT TO:

Julio Morales

JulioM@MooreTwining.com

INVOICE TO:

Denise Willis

AccountsPayable@MooreTwining.com

RECEIVING LABORATORY:

SGS Forensic Laboratories 20535 South Belshaw Ave.

Carson, CA 90746 Phone: (310) 763-2374

Fax: -

COMMENTS / SOURCE ID

SAMPLE INFORMATION

Client Sample ID: MTA Sample ID:

HA-3 (6-12 INCHES) /atrix:

Sampled Date/Time: 07/01/22 07:00

Holding Time Expires: 12/28/22 07:00

Holding Time Expires: 12/28/22 07:00

Requested Analysis: Requested Analysis: Containers Supplied:

HA-4 (6-12 INCHES) Client Sample ID:

MTA Sample ID:

latrix:

Aatrix:

Sampled Date/Time: 07/01/22 07:30

Requested Analysis:

Lead TCLP EPA 6010B TCLP - Extraction Only

Lead TCLP EPA 6010B

TCLP - Extraction Only

Holding Time Expires: 12/28/22 07:30 Holding Time Expires: 12/28/22 07:30

Requested Analysis:

Containers Supplied:

Client Sample ID:

HA-5 (6-12 INCHES)

MTA Sample ID: IG01024-10 Requested Analysis:

Lead TCLP EPA 6010B

TCLP - Extraction Only

Sampled Date/Time: 07/01/22 08:30 Holding Time Expires: 12/28/22 08:30

Holding Time Expires: 12/28/22 08:30

Requested Analysis: Containers Supplied:

Client Sample ID:

HA-6 (6-12 INCHES)

MTA Sample ID: Requested Analysis:

IG01024-12 Lead TCLP EPA 6010B

**Aatrix**:

Soil

Soil

Sampled Date/Time: 07/01/22 09:00

Holding Time Expires: 12/28/22 09:00

Requested Analysis:

TCLP - Extraction Only

Holding Time Expires: 12/28/22 09:00

Containers Supplied:

Please include QC Data Report.

Released By

Date / Time

Received By

Date / Time

Please email copy of receipt with your assigned Sample ID Number to <u>JulioM@MooreTwining.com</u>



## Page 2 of 2 SUBCONTRACT ORDER

Purchase Order # 37135 MTA Project # IG01024

Analytical Chemistry Division California ELAP Certification # 1371

Please reference these numbers on all reports and invoices. We also request QC data be provided with final report. RUSH 2 Days

COMMENTS / SOURCE ID SAMPLE INFORMATION HA-8 (6-12 INCHES) Client Sample ID: latrix: Sampled Date/Time: 07/01/22 10:30 MTA Sample ID: IG01024-16 Lead TCLP EPA 6010B Holding Time Expires: 12/28/22 10:30 Requested Analysis: Holding Time Expires: 12/28/22 10:30 Requested Analysis: TCLP - Extraction Only Containers Supplied: Client Sample ID: HA-9 (6-12 INCHES) MTA Sample ID: 1atrix: Sampled Date/Time: 07/01/22 11:30 IG01024-18 Holding Time Expires: 12/28/22 11:30 Requested Analysis: Lead TCLP EPA 6010B TCLP - Extraction Only Holding Time Expires: 12/28/22 11:30 Requested Analysis: **Containers Supplied:** HA-13 (6-12 INCHES) Client Sample ID: MTA Sample ID: IG01024-26 1atrix: Soil Sampled Date/Time: 07/01/22 13:30 Lead TCLP EPA 6010B Holding Time Expires: 12/28/22 13:30 Requested Analysis: Holding Time Expires: 12/28/22 13:30 Requested Analysis: TCLP - Extraction Only Containers Supplied: HA-14-A (6-12 INCHES) Client Sample ID: MTA Sample ID: latrix: Sampled Date/Time: 07/01/22 14:00 **Requested Analysis:** Lead TCLP EPA 6010B Holding Time Expires: 12/28/22 14:00 Holding Time Expires: 12/28/22 14:00 Requested Analysis: TCLP - Extraction Only Containers Supplied:

Please include QC Data Report.

Date / Time

Released By

Mry Bett	7-12-22/1630	allman	7-13-20 13:00	) (oun'u
Released By	Date //Time	Received By	Date / Time	

Received By

Please email copy of receipt with your assigned Sample ID Number to <u>JulioM@MooreTwining.com</u>

Date / Time

#### **Julio Morales**

From: Jim Helge <JHelge@Kleinfelder.com>
Sent: Tuesday, July 12, 2022 9:23 AM

To: Julio Morales
Cc: Enrique Mendoza

**Subject:** Request for additional testing IGO1024

Follow Up Flag: Follow up Flag Status: Flagged

Julio:

We would like you to do TCLP extraction for lead on samples:

HA-3 6-12 Inches

HA-4 6-12 Inches

HA-5 6-12 Inches

HA-6 6-12 Inches

HA-8 6-12 Inches

HA-9 6-12 Inches

HA-13 6-12 inches

HA-14A 6-12 Inches

Please also do CA WET lead on

HA-2 18-24 Inches

When can you have this completed? What is the additional fee?

-Jim

## James Helge, CEM Principal Environmental Scientist

2882 Prospect Park Drive, Suite 200 Rancho Cordova, CA 95670 o| 916.366.1701 d| 916.366.2308 m| 610.608.9647





## IG01024

Page	1	2	

	Project No.		***************************************	Project	Name			1	Т														
			1 -		N Screening			<u> </u>		<del>,                                     </del>	<del></del>	Ar	nalysis	3		,		Receiving Lab:					
	20171121.002A Golden State Blvd ADL Scree					L ocieering													Moore Twining Associates Lab				
	L.P. N	lo Isa	mnlere:	/Signature/	Mumborl				.														
L.P. No. Samplers: (Signature/Number) (PO No.)									6010						ı								
(PO No.)  Anthony Aguino									Method										Instructions/Remarks				
			No. of Containers	Type of Containers	S e										"Total dollors in Certains"								
							o o mamero	Containers	EPA	49	_			l		1							
	5.1								S	7045	cţio			- 1									
		Sample I.D. HH-MM-		Samp	ple I.D.	Matrix			à	pH by USEPA	CA WET Extraction												
	WWW.DD/11 FIH-WW-55		33						Lead by	IS	ET												
									Total	Į p	8				1								
1	07/01/22	6:00 Af	и	HA-1-A	(6"-12")	s	1		X	<del></del>	Х	-	$\vdash$	$\dashv$	$\dashv$	+	$\vdash$						
2	07/01/22	6:00 Al	u		3 (6"-12")	s	1		<del> </del>	<del> </del>	-					<b>-</b>							
3	07/01/22	6:00 AI			18"-24")	<del> </del>			X	X	X												
4	07/01/22				· · · · · · · · · · · · · · · · · · ·	S	1		X	X													
		6:30 AI			(6"-12")	S	1		X	Х	Х												
5	07/01/22	6:30 Af		······································	18"-24")	S	1		Х	Х													
6	07/01/22	7:00 A	И	HA-3 (	(6"-12")	S	1		Х	Х	Х												
7	07/01/22	7:00 AM	И	HA-3 (	18"-24")	S	1		X	Х					$\top$				Marie Carlos Car				
8	07/01/22	7:30 AM	И	HA-4 (	(6"-12")	S	1		Х	Х	Х							$\exists$					
9	07/01/22	7:30 AM	Л	HA-4 (	18"-24")	S	1		X	Х			7	一十	$\top$		$\neg \dagger$	$\dashv$					
10	07/01/22	8:30 AM	Л	HA-5 (	(6"-12")	S	1		X	Х	х		$\dashv$	十	+	T	$\dashv$	ᅱ					
11	07/01/22	8:30 AN	Л	HA-5 (*	18"-24")	S	1		Х	х			7	十	+	T	$\dashv$	$\dashv$					
12	07/01/22	9:00 AN	Л	HA-6 (	(6"-12")	S	1		х	Х	х		$\neg +$	$\dashv$	+			$\dashv$					
13	07/01/22	9:00 AN	Л	HA-6 (*	18"-24")	S	1		х	Х			$\dashv$	十	十	+-	$\dashv$	$\dashv$					
14	07/01/22	10:00 A	М	HA-7 (	(6"-12")	s	1		х	Х	х		+	$\neg \vdash$	1	+	$\dashv$	-					
15	07/01/22	10:00 AI	М	HA-7 (1	18"-24")	S	1	· · · · · · · · · · · · · · · · · · ·	Х	Х		$\dashv$	+	$\dashv$	+	+	$\dashv$	$\dashv$					
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	Anthony	Aquino		07/01/22	3:00 PM	Mry	/Old	As	5 da										ihelge@kleinfelder.com				
Relin	quished By:			Date/	/Time	Received By:													aaguino@kleinfelder.com				
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## IG01024

Page	2	of	2

1	Project No.				T				Anal	ysis				Receiving Lab:				
	20171121.00	2A		Golden St	ate Blvd AD	L Screening								T	Π			Moore Twining Associates Lab
	L.P. No. Samplers (PO No.)		Samplers:	(Signature/Ni	umber) Aquin	0	No. of Containers	Type of Containers	Method 6010									Instructions/Remarks
	MM/DD/YY	Sample I HH-M	M-SS	Sample	∋ I.D.	Matrix			Total Lead by US EPA Method 6010	pH by USEPA 7045	CA WET Extraction							
1	07/01/22	10:30	MAC	HA-8 (6	"-12")	S	1		X	Х	Х						1	
2	07/01/22	10:30	MAC	HA-8 (18	3"-24")	S	1		Х	Х					11	$\neg \uparrow$	$\top$	
3	07/01/22	11:30	MAC	HA-9 (6	"-12")	S	1		Х	Х	Х			T	$\Box$	1	T	
4	07/01/22	11:30	MAC	HA-9 (18	3"-24")	S	1		Х	Х						$\neg$	$\top$	
5	07/01/22	12:00		HA-10 (6	5"-12")	S	1		Х	Х	Х					寸	$\top$	
6	07/01/22	12:00	PM	HA-10 (1	8"-24")	S	1		Х	Х			$\top$	1			1	
7	07/01/22	1:00		HA-11 (6"-12")		S	1		Х	Х	х			1		十	1	
8	07/01/22	1:00	PM	HA-11 (1	8"-24")	S	1		Х	Х			T	T			$\top$	
9	07/01/22	8:00	AM	HA-12 (6	5"-12")	S	1		Х	Х	Х							
10	07/01/22	8:00	AM	HA-12 (1	8"-24")	S	1		Х	х					$\Box$	$\top$	+	
11	07/01/22	1:30	PM	HA-13 (6	5"-12")	S	1		Х	Х	Х					十		
12	07/01/22	1:30	РМ	HA-13 (1	8"-24")	S	1		Х	Х				1		寸	$\top$	
13	07/01/22	2:00	PM	HA-14-A (	6"-12")	S	1		Х	х	Х					寸	$\top$	
14	07/01/22	2:00	PM	HA-14-B (	6"-12")	S	1		х	X	Х					十		
15	07/01/22	2:00	PM	HA-14 (1		S	1		Х	Х			1			1		
Relin	nquished By:		<u> </u> _	Date/T		Received By:	6/6	11/1				emark	s		L1_			Send Results To:
lelin	Anthony nquished By:	Aquino		07/01/22 3:00 PM 9/// Date/Time Received B			y Uk	HA-	5 da	y IA	.1							jhelge@kleinfelder.com aaquino@kleinfelder.com
elin	quished By:	<del></del>		Date/T	ime													

No	Yes No-N/A	Yes No NYA																												Date/Time/Initials							FL-SC-0003-07
les: Yes or	les in VOA	of																	,										l	Date/Tir							æ
MTA Bottles:	Were there bubbles in VOA vials? (Volatiles Only)	Was PM notified of discrepancies?	PM: By/Time:																					• •	·					Preservative						~	
(	No N/A	NO N/A	Ares No N/A p																											Container						M KW	0 1 C   @
iates 4			<b>)</b>																											1	il <b>q</b>	S P F		S P	ш		Labels checked by: $\frac{M}{M}$
Moore Twining Associates wo $\# /GD/U$ $\mathcal{F}$	Did all bottle labels agree with COC? Was a sufficient amount of sample	received? Were correct containers and	preservatives received for the tests requested?						- - -																					 		_					Labels
Moore	K.	<u> </u>	$\neg$																												٠					`\(	
	Yes No (N/A	(2)	Yes/No N/A	1-35				- !				-													i j	-											Labeled by:
Page.	Temp °C	nere evidence C°	nd intact? hours?	1Liter (C) 40ml VOA (V)					Suffer																	j											Lab
Sample Integrity	13:	taken today, is the	rive unbroken ar a hold time <72	250ml (B) 1Liter (C					rate Carbonate E	1 3001111 (F)								3rown P) 549					tals Double Bag		ات,	/ Steel / Plastic											
Sample	Was temperature within range? Chemistry ≤6°C Micro <10°C	If samples were taken today, is there evidence that chilling has begun? Recvd C°	Did all bottles arrive unbroken and intact?  Do samples have a hold time <72 hours?	125ml (A) 25	.S <sub>2</sub> O <sub>3</sub>	None (P)	None (AG)	None (CG) 500ml	Cr6 Buffer (P) Borate Carbonate Buffer	HNO, (P)	HCI (AG)	H <sub>2</sub> SO <sub>4</sub> (P)	H₃PO₄ (AG)	NaOH (P)	NaOH + ZnAc (P)	Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> (AG)	Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> (CG)	Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> 250ml (Brown P) 549	Thio/K Citrate	NH4CI (AG) 552	Other:	Client Own	Low Level Hg/Metals Double Bag	oos,		Soil Tube: Brass	5g Encore	1G Cubitaner									
		ini 200									•			_	viə				_					-1		~'!	1				sţu	ıa	Pa	age	24	4 of 2	24

# Air Impact Assessment Information & Dust Control Plan Dummy Permit





August 19, 2022

Pankaj Joshi Fresno Council of Government 2035 Tulare St #201 Fresno, CA 93721

Re: Air Impact Assessment (AIA) Application Approval

ISR Project Number: C-20220249

Land Use Agency: Fresno Council of Government

Land Use Agency ID Number: N/A

Dear Mr. Joshi:

The San Joaquin Valley Air Pollution Control District (District) has approved your Air Impact Assessment (AIA) for the Golden State Blvd Corridor project, located on Golden State Blvd, crossing through Kingsburg, Selma and Fowler, California. The project consists of the construction of a combined total of 3.2 miles of additional turn lanes at various intersections. The District has determined that the mitigated baseline emissions for construction and operation will be less than two tons NOx per year and two tons PM10 per year. Pursuant to District Rule 9510 Section 4.3, this project is exempt from the requirements of Section 6.0 (General Mitigation Requirements) and Section 7.0 (Off-site Emission Reduction Fee Calculations and Fee Schedules) of the rule. As such, the District has determined that this project complies with the emission reduction requirements of District Rule 9510 and is not subject to payment of off-site fees. The determination is based on the project construction details provided with the application. Changes in the construction details may result in increased project related emissions and loss of this exemption.

Pursuant to District Rule 9510, Section 8.4, the District is providing you with the following information:

- A notification of AIA approval (this letter)
- A statement of tentative rule compliance (this letter)
- A summary of project emissions and emission reductions
- An approved Monitoring and Reporting Schedule

#### **Change in Developer Form**

If all or a portion of the project changes ownership, a completed Change in Developer form must be submitted to the District within thirty (30) days following the date of transfer.

> Samir Sheikh Executive Director/Air Pollution Control Officer

Northern Region 4800 Enterprise Way Modesto, CA 95356-8718 Tel: (209) 557-6400 FAX: (209) 557-6475

Central Region (Main Office) 1990 E. Gettysburg Avenue Fresno, CA 93726-0244 Tel: (559) 230-6000 FAX: (559) 230-6061

Southern Region 34946 Flyover Court Bakersfield, CA 93308-9725 Tel: (661) 392-5500 FAX: (661) 392-5585

#### **Additional Requirements**

- <u>Dust Control Plan</u>. Please be aware that you may be required to submit a Construction Notification Form or submit and receive approval of a Dust Control Plan prior to commencing any earthmoving activities as described in District Rule 8021 *Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities.*
- Asbestos Requirements for Demolitions. If demolition is involved, a Certified Asbestos Consultant will need to perform an asbestos survey prior to the demolition of a regulated facility. Following the completion of an asbestos survey; the asbestos survey, Asbestos Notification, Demolition Permit Release, and the proper fees are to be submitted to the District 10 working days prior to the removal of the Regulated Asbestos Containing Material and/or the demolition when no asbestos is present.
- <u>Permits</u>. Per District Rule 2010 (Permits Required), you may be required to obtain a
  District Authority to Construct prior to installation of equipment that controls or may
  emit air contaminants, including but not limited to emergency internal combustion
  engines, boilers, and baghouses.

To identify other District rules or regulations that apply to this project or to obtain information about District rules and permit requirements, the applicant is strongly encouraged to visit www.valleyair.org or contact the District's Small Business Assistance office nearest you:

Fresno office: (559) 230-5888 Modesto office: (209) 557-6446 Bakersfield office: (661) 392-5665 Mr. Joshi Page 3

Thank you for your cooperation in this matter. If you have any questions, please contact Cherie A Clark by telephone at (559) 230-5940 or by email at cherie.clark@valleyair.org.

Sincerely,

Brian Clements
Director of Permit Services

For: Mark Montelongo Program Manager

**Enclosures** 

cc: Ed Noriega Mark Thomas

Via email at enoriega@markthomas.com

# Indirect Source Review Complete Project Summary Sheet & Monitoring and Reporting Schedule

Project Name:	GOLDEN STATE BLVD CORRIDOR
Applicant Name:	PANKAJ JOSHI/FRESNO COUNCIL OF GOVERNMEN
Project Location:	GOLDEN STATE BLVD
	GOLDEN STATE BLVD FROM MISSION ST TO AMERICAN AVE
	APN(s): 000-00-000
Project Description:	LAND USE:
	Transportation - 3 Miles - Road Expansion
	Transportation - 3 Miles - Road Expansion
	ACREAGE: 40
ISR Project ID Number:	C-20220249
Applicant ID Number:	C-303675
Permitting Public Agency:	
Public Agency Permit No.	

#### **Existing Emission Reduction Measures**

Enforcing Agency Measure	Quantification	Notes	
--------------------------	----------------	-------	--

There are no Existing Measures for this project.

#### **Non-District Enforced Emission Reduction Measures**

E	inforcing Agency	Measure	Specific Implementation	Source Of Requirements

There are no Non-District Enforced Measures for this project.

#### **District Enforced Emission Reduction Measures**

Enforcing Agency	Measure	Specific Implementation	Measure For Compliance	District Review
SJVAPCD	Construction and Operation - Exempt from Off-site Fee	For each project phase, within 30-days of issuance of the first certificate of occupancy, if applicable, submit to the District a summary report of the construction start, and end dates, and the date of issuance of the first certificate of occupancy. Otherwise, submit to the District a summary report of the construction start and end dates within 30-days of the end of each phase of construction.	(Compliance Dept. Review)	

**SJVUAPCD** 

# Indirect Source Review Complete Project Summary Sheet & Monitoring and Reporting Schedule

8/15/22 10:51 am

(District Enforced Emission Reduction Measures Continued)

Enforcing Agency	Measure	Specific Implementation	Measure For Compliance	District Review
SJVAPCD	Construction and Operation - Recordkeeping	For each project phase, all records shall be maintained on site during construction and for a period of ten years following either the end of construction or the issuance of the first certificate of occupancy, whichever is later. Records shall be made available for District inspection upon request.	(Compliance Dept. Review)	
SJVAPCD	Construction and Operational Dates	For each project phase, maintain records of (1) the construction start and end dates and (2) the date of issuance of the first certificate of occupancy, if applicable.	(Compliance Dept. Review)	

Number of District Enforced Measures: 3





#### San Joaquin Valley Air Pollution Control District Regulation VIII – Fugitive PM10 Prohibitions

#### **Construction Notification**

Pursuant to section 6.4 of **District Rule 8021 – Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities**, the owner or operator of a construction project of at least 1.0 acre in size shall provide written notification to the District at least 48 hours prior to his/her intent to commence any earthmoving activities. Use the first two pages of this form to submit a written Construction Notification. There are no fees for filing a construction notification.

Larger construction projects, as outlined below, may be required to submit a full Dust Control Plan. If a Dust Control Plan is required the owner/operator does not need to submit a separate construction notification.

#### **Dust Control Plan**

Pursuant to section 6.3 of Rule 8021 – Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities, the owner or operator shall submit a Dust Control Plan to the District for a construction project that will involve any of the following:

- Residential developments that will include ten acres or more of disturbed surface area, or
- Non-residential developments that will include five acres or more of disturbed surface area, or
- Will include moving, depositing, or relocating more than 2,500 cubic yards per day of bulk materials on at least three days of the project.

A Dust Control Plan identifies the fugitive dust sources at the construction site and describes all of the dust control measures to be implemented before, during, and after any dust generating activity for the duration of the project. The District will review and approve, conditionally approve, or disapprove the Dust Control Plan within 30 days of submittal. Construction activities shall not commence until the Dust Control Plan has been approved or conditionally approved by the District. A copy of the approved Dust Control Plan must be retained at the project site and made available upon request by a District inspector.

At least one key individual representing the owner or operator, or any person who prepares a Dust Control Plan must complete a Dust Control Training Course presented by the District. Please contact the District to find out when courses are being offered.

Pursuant to **District Rule 3135 – Dust Control Plan Fee**, payment must accompany each Dust Control Plan submitted to the District. A separate fee is charged for any major modification made to an approved plan, such as modifying the size and scope of the project or making significant changes to the types of control or preventative measures. No fees are charged for administrative changes to an approved plan.

Regardless of whether a Construction Notification or Dust Control Plan is required, the owner or operator of any construction project shall comply with all other applicable requirements of Regulation VIII, and other District Rules.

Construction Notifications and Dust Control Plans should be submitted to the District's Compliance Division via mail or email to the applicable District Office:

San Joaquin, Stanislaus, Merced Counties	Madera, Fresno, Kings Counties	Tulare, Kern Counties
Northern Region Office	Central Region Office	Southern Region Office
4800 Enterprise Way	1990 East Gettysburg Avenue	34946 Flyover Court
Modesto, CA 95356	Fresno, CA 93726	Bakersfield, CA 93308
(209) 557-6400 Fax: (209) 557-6475	(559) 230-5950 Fax: (559) 230-6062	(661) 392-5500 Fax: (661) 392-5585
DCP.North@valleyair.org	DCP.Central@valleyair.org	DCP.South@valleyair.org
		• -

# Section 1 – General Information – Page 1

<ul> <li>☐ Construction Notification (Complete section 1)</li> <li>☑ Dust Control Plan (Complete sections 1-7)</li> </ul>	Date Received: (For District Use)
1-A Project Name and Location	
Project Name: Golden State Blvd Corridor	
Project Address: Golden State Blvd	
Major X-Streets: Mission St to American Ave	
City: Kingsburg/Selma/Fowler C	ounty: Fresno
GPS Coordinate(s):	
Expected Construction Start Date: October 1, 2022	End Date: October 1, 2025
1-B Project Details	
This project is: ☐ Residential ☐ Non-Residential (	commercial, industrial, institutional, public, etc.)
	project site area: Acres
Total disturb	ed surface area: 40 Acres
Total disturbed areas that will be left inactive for more t	· ———
	of earthmoving: Cubic Yards
Average daily volume	of earthmoving: Cubic Yards
4.0. But the bit here in the section	
1-C Provide a brief description of the project's	operations.
Rehabiliate approximately 14.1 miles of pavement along intersections.	g Golden State Blvd and cross-street
4 D. Judina et Course Bouissus (ICB)	
1-D Indirect Source Review (ISR) (Rule 9510)	
Air impact Assessment (AIA) application submitted to the I	District? Xes No
If yes, ISR Project ID #: 20220249	
For more information regarding ISR, please visit <a href="www.valleg">www.valleg</a> District's Technical Services team at (559) 230-6000.	eyair.org/ISR/ISRHome.htm or contact the

# Section 1 – General Information – Page 2

Project Name: (	Golden State Blvd Corridor		
1-E Contacts			
Property Owne	er:		
	s:		
Cit	y:	State:	Zip:
Phone	e:	Fax:	
Mobile	e:	Email:	
Develope	er:		
	s:		
	y:		Zip:
Contact Person	n:		
	e:		
Mobile	e:	Email:	_
General Contracto	or:		
	s:		
	y:		Zip:
Contact Person	n:		
	e:		
Mobile	e:		
Other Contac	ot:		
	y:		
Address	s:		
Cit	y:	State:	Zip:
	e:		
	e:		

# **STOP HERE FOR CONSTRUCTION NOTIFICATION ONLY**

# Section 2 – Dust Control Plan Implementation – Page 1

Project Name: Golden	State Blvd Corridor		
2-A This Dust Control	l Plan was prepared	by:	
Name:		Title:	
City:		State:	Zip:
Mobile:		Email:	
Date training completed:		Copy of course certificate	e attached.
2-B Contractors			
· · · · · · · · · · · · · · · · · · ·			d in dust generating activities
performing dust control as par	T Of this project (Rule 802)	1 Sec. 6.3.6.1). A suppleme	ntai iist may be attached.
1			
2			
3			
4			
2-C Who will have the (Rule 8021 Sec 6.3.6.1)	primary responsibi	lity for implementing	this Dust Control Plan?
Property Owner	☐ Developer	☐ General / Prime	Contractor
Sub-Contractor(s)	☐ Other:		
Primary Project Contact:			
Citv:		State:	∠ip:
On-Site Phone:		Fax:	Zip:

# Section 2 – Dust Control Plan Implementation – Page 2

Project Name:	Golden State Blvd Co	orridor		
2-D Dust Gen	erating Activity Da	tes		
•	For phased projects,	_	_	d soil disturbance activities to be pected start and completion dates
Expected start date:	October 1, 2022	2	Completion Date:	October 1, 2025
Phase Project Start	– A:		Completion – A:	
Phase Project Start	– B:		Completion – B:	
Phase Project Start	– C:		Completion – C:	
2-E Other Loc	cations			
example may includ		e bulk materials	will be imported t	are involved with this project. An from or exported to. This does not
☐ No other location	ns are included with th	is project.		
Location 1:				
☐ No Dust Cor	ntrol Plan Required		with this plan	☐ Included with another plan
Location 2:				
	ntrol Plan Required		with this plan	☐ Included with another plan
Location 3:				
☐ No Dust Cor	ntrol Plan Required	☐ Included	with this plan	☐ Included with another plan

# Section 3 – Fugitive PM10 Sources – Page 1

Project N	ame: Golden State Blvd Corridor
3-A S	ources of Fugitive Dust
	n describes the minimum requirements for limiting visible dust emissions from activities that cause at emissions. (Rule 8021 Sec. 6.3.6.5) <b>Check at least one box under each category</b> .
Structural	<b>Demolition.</b> (Rule 8021 Sec. 5.1, 6.3.3, & 6.3.6.5)
	No demolitions are planned for this project.
	Asbestos NESHAP notification and fees will be submitted to the District. (Rule 3050 and Rule 4002) Water will be applied to the following areas for the duration of the demolition activities:  Building exterior surfaces;  Unpaved surface areas where equipment will operate;  Razed building materials; and  Water or dust suppressants will be applied to unpaved surface areas within 100 feet of structure during demolition.
Pre-Activit	<b>ty</b> (Rule 8021 Sec. 5.2)
	Not applicable for this project (Please explain why in Section 3-C). The site will be pre-watered and work will be phased to reduce the amount of disturbed surface area at any one time (Complete Section 4-A).
Active Ope	erations (Rule 8021 Sec. 5.2)
	Water will be applied to dry areas during leveling, grading, trenching, and earthmoving activities (Complete Section 4-A).
	Wind barriers will be constructed and maintained, and water or dust suppressants will be applied to the disturbed surface areas (Complete Sections 4-A or 4-B, and 4-C).
Inactive O	perations, Including After Work Hours, Weekends, and Holidays (Rule 8021 Sec. 5.2)
	Not applicable for this project (Please explain why in Section 3-C).
	Water or dust suppressants will be applied on disturbed surface areas to form a visible crust, and vehicle access will be restricted to maintain the visible crust. (Complete Section 4-A or 4-B, and 4-C)
Temporary	y stabilization of areas that remain unused for seven or more days (Rule 8021 Sec. 5.2)
	Not applicable for this project (Please explain why in Section 3-C)
	Vehicular access will be restricted and water or dust suppressants will be applied and maintained
	at all un-vegetated areas (Complete Section 4-A or 4-B, and 4-C).
	Vegetation will be established on all previously disturbed areas (Complete Section 4-C).  Gravel will be applied and maintained at all previously disturbed areas (Complete Section 4-C).
	Previously disturbed areas will be paved (Complete Section 4-C).
Unnaved 4	Access and Haul Roads, Traffic and Equipment Storage Areas (Rule 8021 Sec. 5.2 and 5.3)
	Not applicable for this project (Please explain why in Section 3-C)
	Apply water or dust suppressants to unpaved haul and access roads (Complete Section 4-A or 4-
	B) Post speed limit signs of not more than 15 miles per hour at each entrance, and again every 500
	feet. (Complete Section 4-C)
	Water or dust suppressants will be applied to vehicle traffic and equipment storage areas (Complete Section 4-A or 4-B).
Wind Ever	nts (Rule 8021 Sec. 5.4)
	Water application equipment will apply water to control fugitive dust during wind events, unless unsafe to do so. Outdoor construction activities that disturb the soil will cease whenever visible dust emissions cannot be effectively controlled.

# Section 3 – Fugitive PM10 Sources – Page 2

Project Name:	Golden State Blvd Corridor
3-B Bulk Mat	<b>erials</b> (Rule 8021 Sec. 6.3.6.6 and Rule 8031)
☐ No bulk☐ Water o	of Bulk Materials (Rule 8031 Sec. 5.0 A)  materials will be handled during this project.  or dust suppressants will be applied when handling bulk materials.  arriers with less than 50 percent porosity will be installed and maintained, and water or ppressants will be applied.
	of Bulk Materials (Rule 8031 Sec. 5.0 B)
☐ Water of Storage manner ☐ Wind be storage	materials will be stored during this project. or dust suppressants will be applied to storage piles. e piles will be covered with tarps, plastic, or other suitable material and anchored in such a that prevents the cover from being removed by wind action. arriers with less than 50 percent porosity will be installed and maintained around the piles, and water or dust suppressants will be appliedsided structure (< 50% porosity) will be used that is at least as high as the storage piles.
On-Site Transport	ing of Bulk Materials (Rule 8031 Sec. 5.0 C)
☐ Vehicle ☐ All haul across ☐ A suffic	s materials will be transported on the project site.  speed will be limited on the work site.  trucks will be loaded such that the freeboard is not less than six inches when transported any paved public access road.  ient amount of water will be applied to the top of the load to limit visible dust emissions.  acks will be covered with a tarp or other suitable cover.
<del></del>	ing of Bulk Materials (Rule 8031 Sec. 5.0 D)
Measur	materials will be transported to or from the project site. res in section 5-B will be implemented to prevent haul trucks from becoming a source of remissions or carryout onto public roads. (complete Section 5-B)
	t using a Chute or Conveyor (Rule 8031 Sec. 5.0 E)
☐ Chute o	tes or conveyors will be used. or conveyor will be fully enclosed. spray equipment will be used to sufficiently wet the materials. orted materials will be washed or screened to remove fines (PM10 or smaller).
3-C Commen	ts

# Section 4 – Dust Control Methods – Page 1

Project Name: Golden State Blvd Corridor					
4-A Water Application					
Complete this section if water application will be used as a control method for limiting visible dust emissions and stabilizing surface areas. Check and answer everything that applies to this project. (Rule 8021 Sec. 6.3.6.6)					
Water Application Equipment:					
Sprinklers: Describe the activities that will utilize sprinklers:					
Minimum treated area: Square Feet Acres  Maximum treated area: Square Feet Acres  Minimum water flow rate: Gallons/minute Duration:  Water Truck, Water Trailer, Water Wagon, Other:  Describe the activities that will utilize this equipment:					
Number of application equipment available:  Application equipment capacity:  Application frequency (on a typical dry day):  Application rate:					
Water application equipment is available to operate after normal working hours, on weekends, and holidays.					
After-hours contact: Phone No.:					
After-hours contact: Phone No.:					
Water Supply: Include the relative locations of these sources on the plot plan in Section 6.    Fire hydrants					
Approval granted by the owner or public agency to use their water source for this project.  Owner or Agency:					
Contact: Phone No.:					

# Section 4 – Dust Control Methods – Page 2

Project Name:	Golden State Blvd Corridor				
4-B Dust Sup	opressant Products				
Complete this section if a dust suppressant product will be used. These materials include, but are not limited to: hygroscopic suppressants (road salts), adhesives, petroleum emulsions, polymer emulsions, and bituminous materials (road oils). (Rule 8021 Sec. 6.3.6.6)					
Copy this page if I	more than one dust suppressant product will be used.				
☐ Not Applicable	. No dust suppressant products will be used. Skip to 4-C.				
Application	Area:				
	Name:				
Contractor's I	Name: Phone No:				
Application	Rate: Gallons of undiluted material per 🗌 mile or 🗌 acre treated.				
Application Frequ	uency: Applications per 🗌 week, 🗌 month, 🗌 year				
Application Equip	oment:				
Number of Application Equipment Available:					
Application Equipment Capacity:					
Attach each of the following information that fully describes this product. Use the checklist below to make sure all information is submitted with this plan.					
	pecifications (MSDS, Product Safety Data Sheet, etc.)				
Manufactu	urer's Usage Instructions (method, frequency, and intensity of application)				
☐ Environme ground ap	ental impacts and approvals or certifications related to the appropriate and safe use for oplication.				

# Section 4 – Dust Control Methods – Page 3

Project Name: Golden State Blvd Corridor				
4-C Other Dust Control Methods				
Check below the other types of dust control methods that will be employed at the construction site. (Rule 8021 Sec. 5.2)				
☐ Restricting unauthorized vehicle access:         ☐ Fences       ☐ Gates       ☐ Posts       ☐ Berms       ☐ Concrete Barriers       ☐ Signs         ☐ Other:				
<ul> <li>Wind barriers Describe:</li> <li>□ Posted speed limit signs that meet State and Federal Department of Transportation standards. (Rule 8021 Sec. 5.3)</li> <li>□ Posted at 15 miles per hour □ Posted at miles per hour (less than 15 MPH)</li> <li>□ Re-establish vegetation for temporarily stabilizing previously disturbed surfaces.</li> <li>□ Explain:</li> <li>□ Apply and maintain gravel:</li> <li>□ On haul roads □ On access roads □ At equipment storage yards</li> <li>□ At vehicle traffic areas □ For temporarily stabilizing previously disturbed areas.</li> </ul>				
Explain:  Apply pavement:  Explain:  Other:				
4-D Contingencies				
Contingencies to be implemented should the listed control measures fail to meet the stability and visible emission requirements. Examples include, but are not limited to: replacement equipment, additional equipment, increased water application, additional water resources, adding chemical/organic dust suppressants, restricting access, and additional staffing. Attach any additional information if needed. (Rule 4102 and Rule 8021 Sec. 5.2)				
4-E Record Keeping (Rule 8011 Sec. 6.2)				
Records and any other supporting documents for demonstrating compliance must be maintained, but only for those days when a control measure is implemented. The District has developed record keeping forms that may be used for complying with this requirement. Check one or both below:				
Records will be maintained using the forms developed by the District.  Records will be maintained using documents or forms developed by the owner or operator.  Explain and include copies:				

# **Section 5 – Carryout and Trackout – Page 1**

Pro	ject Name: <u>(</u>	Golden State Blvd C	Corridor			
5-/	A Treatments	s for Preventing 1	Frackout Frackout			
Trac	ckout is any materi	rices that will be user ial that adheres to v oublic road. Check o	ehicle tires and is	deposited onto	a paved public	road or the paved
	from the intersec	oipes, or grates used ction with the paved least 25 feet. (Rule 80	public road surfa			
	Width:	Feet	Length:	Feet		
	and extends from	ayer of washed grav m the intersection wi a distance of at least	ith the public pav	ed road surface		•
		Feet				
	Gravel Size:	Inches	Clean-up Fred	luency:		
		Extends from the incess road for at leas 1 Sec. 5.9.3)		•		
	Width:	Feet	Length:	Feet		
	Mud and dirt deposits accumulating on paved interior roads used for trackout control will be removed with sufficient frequency, but not less frequently than once per workday. Cleanup will commence within ½ hour of generating any carryout and trackout onto public roads. (Rule 8041 Sec. 5.8.2 and 5.9.3)					
	Clean-up Freque	ency:				
	Wheel Washer:	Uses water to dislo	dge debris from t	ires and vehicle	undercarriage.	(Rule 8011 Sec. 3.73)
	Describe:					
	Other: (Rule 8041 S	Sec. 5.8.1.2)				
5-l	B Treatments	s for Preventing (	Carryout			
Report the required treatments that will be used for preventing carryout from occurring on paved public roads. Carryout occurs when materials from emptied or loaded haul trucks, vehicles, or trailers falls onto a paved public road or paved shoulder of a paved public road. (Rule 8031 Sec 5.0)						
	No haul trucks w	vill be routinely enter	ring or leaving the	project site.		
		of bulk materials from				
Emp	otied Haul Trucks	s:				
	☐ Interior carg	go compartments wil	ll be cleaned befo	ore leaving the p	roject site.	
	☐ Cargo comp	partment will be cove	ered with a tarp o	r suitable cover	before leaving	the project site.
Loa	ded Haul Trucks:	:				
	the top of th	will be loaded such ne load before leavin	ng the project site			
	project site.	partment and load w	ıll be covered wit	n a tarp or suita	ble cover befor	e leaving the
	Other:					

# **Section 5 – Carryout and Trackout – Page 2**

Project	t Name:	Golden State Blvd Corridor
5-C	Cleaning	up Carryout and Trackout
	•	elow the methods and frequency for cleaning up carryout and trackout from the surface rs of paved public roads.
		devices, or dry rotary brushers or brooms, for removal of carryout and trackout roads is prohibited. (Rule 8041 Sec. 5.0)
		a dust control plan are required to prevent and mitigate carryout and trackout beyond the equirements. (Rule 8041 Sec. 5.3)
☐ Ir	arryout and	the control device becomes insufficient to prevent carryout and trackout, removal of any trackout must be accomplished within one-half hour of the generation of such carryout. (Rule 8041 Sec. 5.8.2.)
	-	Check the method below that will be used for cleaning carryout and trackout.
	lanually sw	eeping and picking up. (Rule 8041 Sec. 5.7.1)
	Mechanical s Rule 8041 Sec. 8	sweeping with a rotary brush or broom accompanied or preceded by water. 5.7.2)
D	escribe the	types of equipment that will used:
	perating a	PM10-efficient street sweeper. (Rule 8041 Sec. 5.7.3)
M	Make and M	odel:
	•	n water: allowed if: (Rule 8041 Sec. 5.7.4) or gutters are present.
	<ul><li>Using wa</li></ul>	ter will not result as a source of trackout and carryout.
•	•	ter will not result in adverse impacts on storm water drainage systems.
•	Using wa	ter will not violate any National Pollutant Discharge Elimination System permit program.
5-D	Record k	keeping for Cleanup of Carryout and Trackout (Rule 8011 Sec. 6.2)
District I	has develop	other supporting documents for demonstrating compliance must be maintained. The ped a record keeping form specific for cleaning carryout and trackout from paved public used for complying with this requirement. Check one or both below:
☐ F	Records will	be maintained using the form developed by the District.
F	Records will	be maintained using documents or forms developed by the owner or operator.
E	Explain and	include copies:

## Section 6 - Plot Plan

Project Name:	Golden State Blvd Corridor				
6-A Plot Plan					
A plot plan identifies the type and location of each project. Attach appropriately sized maps with the project boundaries outlined or use the space in section 6-B to draw a plot plan. Attached maps may include tract maps, site maps, and topographic maps. Use the checklist below to make sure all areas have been identified on the plot plan. (Rule 8021 Sec. 6.3.6.2 & 6.3.6.5)					
Identify the relative locations of actual and potential sources of fugitive dust emissions.  Bulk material handling and storage areas.  Paved and unpaved access roads, haul roads, traffic areas, and equipment storage yards.  Exit points where carryout and trackout onto paved public roads may occur.  Water supply locations if water application will be used for controlling visible dust emissions.					
Identify the relative locations of sensitive receptors within ¼ mile of the project. (Rule 4102 Sec. 4.1)  No sensitive receptors within ¼ mile of the project.  Residential areas, schools, day care, churches, hospitals, nursing facilities, commercial, retail, etc.  Freeways, roads, or traffic areas that may be affected by the dust generating activities.  Other:					
6-B Draw Plo	ot Plan (if one is not attached)	May use the back of this form Include a North Arrow			
☐ Plot plan is attac	ched (Skip to Section 7).				

## **Section 7 – Certification**

Project I	Name:	Golden State Blvd Corri	idor			
7-A	Certification					
The owner, principle operator, or the individual implementing must certify the plan. (Rule 8021 Sec 6.3). For Title V sources, the responsible official must provide the certification. (Rule 2520 Sec. 3.28 and 10.0).						
I certify that all information contained herein and information submitted in the attachments to this documents are true and correct.						
Print	Name		Title			
Signa	ture		Date			
Phon	e Number	Fax Number	Cell Number			
E-Ma	il Address					

# **Caltrans Traffic Encroachment Permit**

## STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION ENCROACHMENT PERMIT

	20 (REV. 6/201		Permit No.			
111-0	20 (IVL V. 0/20)	2)		0 NILEO 000E		
				2-NMC-0605		
		,		Co/Rte/PM		
In com	oliance with (Check	one):	06/1	FRE/201/0.141		
	Your application of	May 18, 2022				
	Hallar Nation No.	-4	Date			
Ш	Utility Notice No.	of		gust 12, 2022	I 5 "	
	Agreement No.	of		Paid c <b>empt</b>	Deposit \$Exempt	
		<del></del>	Perf	ormance Bond Amount	Payment Bond Amount	
$\boxtimes$	Applicant's Reference	Golden State Blvd Corridor Infrastructure			(2)	
		Improvements	Bono	d Company		
			Rone	d Number (1)	Bond Number (2)	
TO:			ВОП	a Number (1)	Bond Number (2)	
	Fresno Council of 2035 Tulare St #2 Fresno, CA 93721 Attention: Pankai	01				
	Phone: (559)233-					
				DEDMITTEE		
And su	biect to the follow	ring, PERMISSION IS HEREBY GRAN	ITED to:	, PERMITTEE		
control install	signs, to grind and signs. All work with	Right of Way on State Route 201 at overlay existing asphalt roadway, repla nin the State Right of Way shall be d Il General, Utility, Special Provisions, A	ice portion of curb and gutter, road one in accordance with most cur	way striping, pavement i rent 2018 State Standa	markings, loop detectors, and ard Plans and Specifications,	
The Di	EDMITTEE'S prime	contractor shall apply for and obtain	a double permit to work within t	the State's Right of Wa	w All work shall be done in	
accorda	ance with the mos	t current 2018 State Standard Plans ust 12, 2022, and Closure Charts No. I	and Specifications, California MI			
NOTIF	CATIONS: Call at	la ant annum (7) marking davis priests at				
		least seven (7) working days prior to st ans Inspector. The Permittee shall notif		nis permit, a pre-constru	ction meeting is <b>mandatory</b>	
<ul> <li>Notify Ramiro Hernandez, Permit Inspector at (559) 445-6497 (office) or (559) 288-8553 (cell).</li> </ul>						
		Call at least seven working days before reconstruction meeting is mandator		of Way. Unless waived	by the Caltrans Inspector, a	
<ul> <li>Contact Caltrans Electrical Supervisor Randy Pearce at (559) 250-2209 a minimum 7 days prior to any excavation in the</li> </ul>						
permitted work area to mark Caltrans facilities					·	
Also contact Melquiades Gonzalez Sanchez, Stormwater Coordinator at (559) 445-6503						
THIS P		<b>ISA</b> [Underground Service Alert] at <b>811</b> ROPERTY RIGHT AND DOES NOT T				
		ments are also included as part of this F			ee, the PERMITTEE will be	
	v 🗖	applicable):		billed	actual costs for:	
	=	No General Provisions			T.N.: Daview	
$\square$	=	No Utility Maintenance Provisions No As-Built Plans Submittal Route S	Slip for Locally Advertised Projects	☐ Yes ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	] No Review ] No Inspection	
	_	No Special Provisions	sip for Locally Advertised Projects	Yes	] No Inspection Field work	
		No A Cal-OSHA Permit, if required:	Permit No	⊠ res	i ielu work	
$\Box$		No Storm Water Pollution Protection		(If any Caltra	ans effort expended)	
			ental documentation has been revi	<u> </u>	· · · · · · · · · · · · · · · · · · ·	
	Yes 🛛 I	No				
This P	ermit is void unless	the work is complete before Febru	ıary 12, 2023			
This Pe	ermit is to be strictly	construed and no other work other than	n specifically mentioned is hereby	authorized.		
		ommenced until all other necessary Per	mits and environmental clearances	s have been obtained.		
CC: DO,	RH, Randy Pearce, a	nd Maintenance.	APPROVED:			
Attachm		dated August 12, 2022, Closure Dated 5/31/2022, TR-0045, TR-				
	0408, TR-0153	TR-0157, TR-0163, TR-045,	Diana Comoz Diatriat Direct	or Dietriet & Control D	logion	
	CRF and NOC.		Diana Gomez, District Director BY:	יוס וווטוסיט, וע, וויסוט, ויס, וויסוט, ויס	kegi011	
				ellQuanLe, fo	or	
Permit Engineer:Bill Le, PE (559) 974-4988 Melquiades Gonzalez (559) 445-6305			For Joe O. Espinosa, District Permits Engineer –District 6			

Permit No.: 0622-NMC-0605 Date: August 12, 2022

#### **Permit Condition:**

The applicant shall submit a Post Construction Certification of Compliance with Americans with Disabilities Act (ADA) form (TR-0405) with the Design Engineer's signature and stamp at the project's completion to certify that the project compliance with all ADA requirements.

#### **GENERAL PROVISIONS**

The work included in this Permit shall be accomplished in strict accordance with all items of the attached "Department of Transportation Encroachment Permit General Provisions TR-0045.

#### REFERENCE TO STANDARD PLANS AND SPECIFICATIONS

The use of the wording "Standard Plans" and "Standard Specifications" in this permit refers to the most current editions of the following two publications: "State of California, Department of Transportation, Standard Plans 2018 and Standard 2018". Access to these documents can be obtained by linking onto the Department's World Wide Web page: (www.dot.ca.gov).

#### **EXCEPTION:**

All reference to the "State of California, Department of transportation, Standard Specifications 2018 within this permit excludes all sections pertaining to Measurement and Payment.

#### **AERIALLY DEPOSITED LEAD MANAGEMENT PROVISION:**

Permittee must reuse the soil within the work limits in the immediate area from which it was excavated. If any excess soil is generated, it becomes the property of the permittee. Permittee must transport all excess soil outside of Caltrans' right-of-way, and dispose of it in accordance with all applicable environmental laws and regulations.

#### **AUTHORIZED CONTRACTOR(S)/SUBCONTRACTOR(S)**

PERMITTEE'S prime contractor shall apply for and obtain a permit to work within the State's Right of Way. The Permittee's contractor(s) will be issued a Double Permit providing authorization to work under this Permit upon receipt and acceptance of the following numbered items by the Caltrans Permits Office located at 1352 W Olive Avenue, Fresno, CA 93728:

- A completed original current Standard Encroachment Permit Application Form TR-0100 (2018) with an "original" signature and a fee deposit of \$280.00 if application is submitted before December 31, 2022.
   After this date the fee deposit require will be \$324.00. Out of date Permit Application forms will not be accepted. The latest version of this form is available on the Internet at: dot.ca.gov.
- 2) The Business names of all subcontractors that will be working in the State Right of Way, together with names and phone numbers of contact people. A subcontractor not listed on the Contractor's Double Permit must apply for his own Double Permit. A traffic control company possessing a current Caltrans District 06 Biennial Traffic Control Permit may place traffic control devices in conventional highway Right of Way without additional Permits or fees.
- 3) The Prime Contractor shall submit a Project Specific Traffic Control Plan for review and acceptance with the Double Permit Application package to be consider a complete application, if no Project Specific Traffic Control Plan is submitted with the Double Permit application package, the application will not be accepted for review.
- 4) The Permittee's prime contractor will submit a complete Stormwater Pollution Prevention Plan (SW PPP) for review and approval with the submittal of the Double Permit Application. The application for a double permit will not be accepted if the SW PPP is not submitted with the application, it will be considered as incomplete.

Permit No.: 0622-NMC-0605 Date: August 12, 2022

The Permittee's prime contractor shall maintain a copy of this Permit, and attachments on site while work is being performed in the State Right of Way. <u>Failure to present these documents to authorized State representatives is grounds for suspension of this Permit.</u>

#### TRAFFIC CONTROL AND LANE/SHOULDER CLOSURE

- 1) Except for installing, maintaining and removing traffic control devices, any work encroaching within three feet of the edge of a traveled way for areas with a posted speed limit below 45 mph, or six feet of the edge of a traveled way, for areas with a speed limit posted at 45 mph or higher, shall require closing of that lane. Any work encroaching within six feet of the edge of the shoulder, shall require closing of that shoulder. At no time will the width of an existing lane be reduced to less than 10 feet. All traffic control, signing and striping shall comply with California MUTCD 2014, 2018 Standard Plans and 2018 Standard Specifications Section 12: Temporary Traffic Control. The Permittee shall notify the Department's Representative, and obtain approval of, all traffic control, lane closures or detours, at least seven WORKING DAYS prior to setting up of any traffic control. Permit Working Hours for night work are between 10:00 p.m. to 6 a.m., Sunday night to Friday morning, or as authorized by Caltrans inspector.
- 2) Night Work requiring traffic control shall be conducted between 10:00 p.m. to 6 a.m., Sunday night to Friday morning per Closure Chart No. K1 dated 5/31/2022 and in accordance with MUTCD 2014, 2018 Standard Plans and 2018 Standard Specifications Section 12: Temporary Traffic Control or as otherwise authorized by the Caltrans Inspector. The full width of the traveled way shall be opened for use by public traffic on designated legal holidays, after 3:00 P.M. on the day preceding designated legal holidays, and when construction operations are not actively in progress. Designated legal holidays are: January 1st, the third Monday in January, the third Monday in February, March 31st, the last Monday in May, July 4th, the first Monday in September, November 11th, Thanksgiving Day and the day after, and December 25th. When a designated holiday falls on a Sunday, the following Monday shall be a designated legal holiday. When November 11th falls on a Saturday, the preceding Friday shall be a designated legal holiday.
- 3) Notification of temporary lane/shoulder closures or traffic detours shall be faxed at (559) 445-5100 or e-mailed to <u>D6Permit.LCS@dot.ca.gov</u> <u>WEEKLY</u> to the District-6 Encroachment Permits Office. Notification shall be submitted for consideration, using the attached Closure Reporting Form (CRF) with Permit No.<u>0622-NMC-0605</u> referenced.
- 4) Notification shall be made by Monday, 5:00 PM, the week prior to the proposed closure.

  If the request is approved, you will receive the required Closure ID Numbers to be called in, on the date(s) of the closure, to the District TMC @ (559)445-6166. The following Codes shall be used when reporting the intended closure status to the TMC:
  - 5) Use "1097" code: At the START of a lane, shoulder, or ramp CLOSURE (i.e., dropping off the first cone).
  - 6) Use "1098" code: AFTER the lane, shoulder, or ramp closure is OPEN to traffic (i.e., picking up the last cone).
  - 7) Use "1022" code: to CANCEL an Approved Closure.

If the request is rejected, you may revise and resubmit your request by consulting Caltrans Permit Inspector.

The Permittee shall furnish all necessary safety devices and measures including Portable Changeable Message Signs (PCMS), flagmen and flashing Arrow Boards as required in item 14 of the attached General Provisions (TR-0045).

NO WORK SHALL BE UNDERTAKEN ON, OVER OR NEAR THE HIGHWAY TRAVELED WAYS OR SHOULDERS DURING INCLEMENT WEATHER CONDITIONS (i.e., Fog, Rain, etc.)

Permit No.: 0622-NMC-0605 Date: August 12, 2022

#### **SIGNS**

Installation of signs within the State Right of Way shall be consistent with 2018 Standard Specifications Section 82 SIGNS AND MARKERS and 2018 Standard Plans RS1 and RS2, ROADSIDE SIGNS. Signs shall be placed so that they do not obstruct and are not obstructed by other highway signs or driveways.

#### **RESTART NOTIFICATION**

When work has been interrupted for more than 5 working days, an additional notification is requires to resume work unless waived by the Caltrans Permit Inspector.

#### **SAFETY CLOTHING**

All personnel working within the State Right of Way shall wear protective safety clothing approved by the American National Standard Institute (ANSI) guidelines.

#### PEDESTRIAN SAFETY

Unobstructed access shall be provided continuously to pedestrian traffic. When the work area encroaches upon a sidewalk, walkway, or crosswalk area, special consideration must be given to pedestrian safety. Pedestrian detours, protective barricades, fencing, handrails and/or bridges, together with warning and guidance devices and signs shall be used as necessary to provide a safe and well defined passageway for pedestrians, especially blind and other physically handicapped.

#### **ACCESS - RESIDENTIAL AND BUSINESS**

Unobstructed access shall be provided continuously to local residential and commercial driveways and other residential and commercial access points. Whenever necessary, trenches and excavations shall be bridged to permit an unobstructed flow of traffic. Steel plate bridging shall conform to the attached Steel Plate Provisions

#### **SURVEY MONUMENTS**

In addition to the requirements of Section 5-1.36, Property and Facility Preservation of the 2018 Standard Specifications and Section 8771 of the Business and Professions Code, the PERMITTEE shall physically inspect the work site and locate survey monuments prior to commencement of work. Monuments shall be referenced or reset in accordance with the requirements of the Business and Professions Code. If feasible, monuments should not be set within the traveled way.

All monuments that must be set or perpetuated in paved surfaces shall be constructed in accordance with Section 78-2, SURVEY MONUMENTS, of the Standard Specification and Caltrans 2018 Standard Plan A74, type to be determined by the District Surveys Engineer or equal with prior approval of the District Surveys Engineer. Copies of Corners Record filed or Record of Surveys recorded in compliance with the Business and Professions Code shall be forwarded to the District Surveys Engineer Bridge Overlay: No Work shall be done on Bridges

#### **CONFLICT WITH STATE CONTRACTS**

If this work comes in conflict with work in progress under State Construction contract and both operations cannot be accomplished at the same time, the State Construction Contract work shall take precedence. The State Contractor shall have access to the work site at all times.

Permit No.: 0622-NMC-0605 Date: August 12, 2022

#### **UTILITY CONFLICTS**

It shall be the Permittee's responsibility to fully investigate the proposed work area for possible conflicts with existing utilities and facilities, including but not limited to sewers, electrical conductors, gas lines, water pipes and traffic signal facilities. The Permittee agrees to accept all liability for damages done to existing facilities caused by the work authorized by this Permit.

#### PIPES, CONDUIT AND UNDERGROUND FACILITIES

Pipes, conduit & under-ground facilities within the State right-of-way shall be installed in accordance with applicable portions of the Standard Specifications and attached Caltrans Encroachment Permit Underground Utility Provisions, **TR-0163**.

#### **EXCAVATIONS**

Excavations made within the limits of the right of way shall be backfield and resurfaced to original condition before leaving the work area unless otherwise authorized by the department's Representative. Any open Trenches or holes must be kept covered when not in use to prevent accidental trapping of wildlife. Ensure no wildlife is trapped inside the excavated area prior to covering/backfilling.

#### **EARTHWORK**

Earthwork within the State right-of-way shall comply with Sections 19-1 GENERAL, 19-2 ROADWAY EXCAVATION, 19-3 STRUCTURE EXCAVATION AND BACKFILL, 19-5 COMPACTION and 19-6 EMBANKMENT CONSTRUCTION of Section 19 in 2018 Standard Specifications. At the end of each work day any excavation that leaves a drop off of more than 0.15 feet in depth within 6 feet of the edge of pavement, shall be sloped at a maximum 4:1 (horizontal:vertical); backfilled or covered with a steel plate, with sufficient thickness to support legal truck traffic. Excavated materials shall be placed at locations to cause the least amount of obstruction to traffic. Excavated material, not to be used for backfill, shall be removed from the State's right of way at the end of each working period or as directed by the Caltrans Field Representative.

#### TRENCHING AND BACKFILLING

Trenching and backfilling for installation of pipe, fittings and appurtenances and electrical facilities, including removing and replacing improvements, shall conform to the details shown on plans, attached Encroachment Permit Trench Detail Provisions, **TR-0153** and provisions in section 86 of the Standard Specifications.

#### **COMPACTION**

Compaction shall be in accordance with Section 19 of the Standard Specifications and shall have a relative compaction of 95%. Compaction Test Method shall be used as per Section 6 of the Standard Specifications. Test results shall be supplied to the Caltrans Field Representative before paving is started an/or a requested by the Caltrans Field Representative.

#### STORM WATER AND NON-STORM WATER POLLUTION

The Permittee shall control the movement of sediments and pollutants within or leaving the State Right of Way. Water pollution control shall conform to Standard Specification Section 13 "Water Pollution Control", the Caltrans "Construction Site Best Management Practices (BMPs) Manual", and the Caltrans "Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual". The Manuals are available on the Internet at:

#### www.dot.ca.gov/hg/construc/stormwater/manuals.htm

The Permittee shall be responsible for the costs and any liability imposed by law as a result of the Permittee's failure to comply with the requirements set forth in this section, including, but not limited to, compliance with the Applicable Provisions of the referenced Manuals and Federal, State and local regulations. For the purposes of this paragraph, costs and liabilities include, but are not limited, to fines, penalties and damages whether assessed against the State or Permittee, including those levied under the Federal Clean Water Act and the State Porter Cologne Water Quality Act.

#### **HIGH & LOW RISK UNDERGROUND FACILITIES**

No machine excavation may be made within 4 feet of High and Low Risk Underground facilities unless those have been located to within 6 inches both vertically and horizontally by hand digging. Location of underground facilities may only be

Permit No.: 0622-NMC-0605 Date: August 12, 2022

accomplished by hand excavation after obtaining written permission from the underground facility owner. The Permittee shall provide the Caltrans Resident Engineer with copies of such permission. The owner of a high or low risk underground facility shall be responsible for determining the adequacy of the field location of the underground facility by the Permittee and the required clearances for machine excavation, or other requirement to expose, protect or relocate. The costs of such field location, exposure, protection or relocation shall be borne by Permittee. Special attention is directed to Section 5-1.36, PROPERTY AND FACILITY PRESERVATION, of the 2018 Standard Specifications. It shall be the Contractor's responsibility, pursuant thereto, to ascertain the location of those underground improvements or facilities which may be subject to damage by reason of the Contractor's operations.

#### **FUTURE MOVING OF INSTALLATIONS:**

Permittee understands and agrees to relocate a permitted installation upon notice by the Department. Unless under prior property right or agreement, the permittee shall comply with said notice at his sole expense.

#### UTILITY RELOCATIONS REQUIRED BY PERMITTEE'S INSTALLATION

If existing public or private utilities conflict with the permitted work, Permittee will make necessary arrangements with the owners of such utilities for their protection, relocation or removal. The Permittee shall inspect the protection, relocation or removal of such facilities. Total costs of such protection, relocation or removal which State or Permittee must legally pay, shall be borne by Permittee. If any protection, relocation, or removal of utilities is required, including determination of liability for cost, such work shall be performed in accordance with State policy and procedure. The Permittee shall require any utility company performing relocation work in the State Right of Way to obtain a State Encroachment Permit prior to the performance of said relocation work. Any relocated utilities shall be correctly located and identified on the As-Built plans.

#### **PAVEMENT RESTORATION:**

Existing highway pavement edge being tied into shall be first saw cut or ground to achieve a smooth, straight, and square edge with no raveling or cracking. All edges of existing Hot Mix Asphalt (HMA) shall be cleaned and a coat of Asphaltic Emulsion (Paint Binder) shall be applied prior to the placement of permanent Asphalt Concrete (AC) pavement. The new pavement shall consist of HMA Type A with ¾-inch aggregate size, and meet the requirements of 2018 Standard Specifications Section 39 ASPHALT CONCRETE. The Caltrans Inspector, at his discretion, may require additional pavement removal or grinding to achieve smooth transition.

#### **CONCRETE**:

All concrete within the State right of way shall conform to 2018 Standard Specification Section 90, CONCRETE.

#### **CONCRETE CURBS, GUTTERS & SIDEWALK:**

Construction of curbs, gutters and sidewalks shall conform to 2018 Standard Specification Section 73, CONCRETE CURBS AND SIDEWALKS. Existing Portland cement concrete curb, gutter driveway and sidewalk to be removed shall be sawed cut full depth at nearest score line and removed to a neat line. If the saw line is within 8 feet of an expansion joint, the concrete shall be removed to the expansion joint.

Reconstruction of existing sidewalks, curb and gutter shall conform to existing dimensions, configurations, alignments and grades.

Streets and Highway Code, Section 5610, requires owners of property fronting a public street to maintain any sidewalk in front of their property.

#### **STEEL PLATE BRIDGING**:

Steel plates shall conform to the Encroachment Permit Steel Plate Bridging Provisions (TR-0157), and meet Caltrans minimum requirements such as thickness, dowels and coefficient of friction that equals or exceeds 0.35 if used within

Permit No.: 0622-NMC-0605 Date: August 12, 2022

**state right-of-way**. Permittee shall provide a certificate of compliance for all material used in the state right-of-way. The Caltrans inspector/representative shall have final discretion on whether plate requirements are being met by the Permittee.

#### **DRAINAGE**:

Any change in existing drainage patterns, whether occasioned by increase or diversion, and the cost of any damage, repair or restoration of the State highway right of way shall be the responsibility of the Permittee. Existing State Highway drainage shall be maintained.

#### **DUST CONTROL**

The Permittee shall comply with 2018 Standard Specification Section 14-11.04, Dust Control.

#### **ELECTRICAL DAMAGE:**

Any damage to Caltrans traffic signal, traffic detection, or lighting circuits shall be replaced in-kind within 24 hours of damage, or as otherwise authorized by the Caltrans Inspector. Splicing damaged signal and detection circuits is not permitted.

#### **DAMAGES:**

Any damages to private or public facilities shall be immediately reported to the Caltrans Inspector, and repaired or replaced to Caltrans Standards and/or as requested by the facility owner, at the expense of the PERMITTEE. The PERMITTEE shall be responsible for locating and protecting all underground [UG] facilities that may be in the work areas. Before any excavation, the PERMITTEE shall call **USA [UNDERGROUND SERVICE ALERT]** at **811**.

Caltrans does not subscribe to USA, and USA does not locate Caltrans underground circuits. PERMITTEE must request location and marking of Caltrans underground facilities by Caltrans prior to start of any excavation in State Right of Way. Refer to notification requirements on the first page of this permit for information on how to contact the Caltrans underground locater.

#### SPECIAL NOTICES

Any work performed beyond the conditions listed herein, even if performed in conjunction with work authorized by this Permit, will require a separate Permit to cover the additional work, unless specifically authorized by the Caltrans Inspector or Engineer.

Hazardous Materials and Hazardous Waste Management Special Provision, TR-0408 is required. Any open trenches or holes must be covered when not in use.

Permittee or a contractor failing to comply with the provision herein shall be subject to removal from the Right of Way and shall be grounds for revocation of this Permit and/or suspension from performing future work in the State Highway Right of Way.

#### **TIME EXTENSION**

If time extension is necessary, a request for time extension and the accompanying attachments must be made a minimum of two (2) weeks prior to completion date stated on the face of permit. If work has not been started before completion date, the permit will be voided. Failure to comply with rules and regulations stated on the permit will jeopardize future permit privileges.

#### INDEMNIFICATION OF STATE

Permit No.: 0622-NMC-0605 Date: August 12, 2022

The Permittee is responsible for any and all incidents arising out of the exercise of this Permit, and will defend, indemnify and protect Caltrans against any and all claims of every type and description alleged to have resulted from the permitted activity.

#### **ACCEPTANCE OF CONDITIONS**

Beginning work on this Permit constitutes full agreement and acceptance of all conditions, terms and provisions contained herein, attached hereto, or incorporated by reference.

#### **AS-BUILT PLANS**

PERMITTEE shall submit AS-BUILT Plans. AS-BUILT Plans shall conform to the requirements as outlined under Item 22 of the attached "State of California – Department of Transportation, Encroachment Permit General Provisions TR-0045."

#### **NOTICE OF COMPLETION**

Immediately upon completion of the permitted work described herein, the Permittee shall fill out and mail the attached Notice of Completion card to:

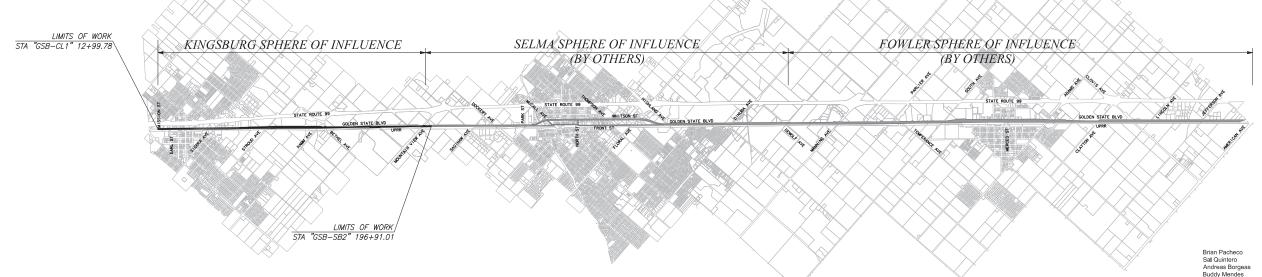
Fresno Permits Office, 1352 W. Olive Avenue, Fresno, CA 93728

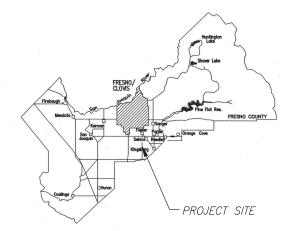
The attached Notice of Completion card can also be submitted digitally by e-mail to:

District6EncroachmentPermits@dot.ca.gov

# **PLANS FOR CONSTRUCTION**

# GOLDEN STATE BOULEVARD - KINGSBURG REGION 1 1 1-1 17-1 1711LE SHEET GENERAL NOTES 1 17 10





0 3000 ft 6000 ft



DEPARTMENT OF PUBLIC WORKS AND PLANNING

 Brian Pacheco
 Chairman
 1st
 Di

 Sal Quintero
 Vice Chairman
 3rd
 Di

 Andreas Borgeas
 2nd
 Di

 Buddy Mendes
 4th
 Di

 Nathan Massia
 5th
 Di

APPROVED

INDEX OF SHEETS

Steven E. White, Director Department of Public Works, County of Fresno

APPROVED\_

Darren Hays, Director Department of Public Works, City of Kingsburg

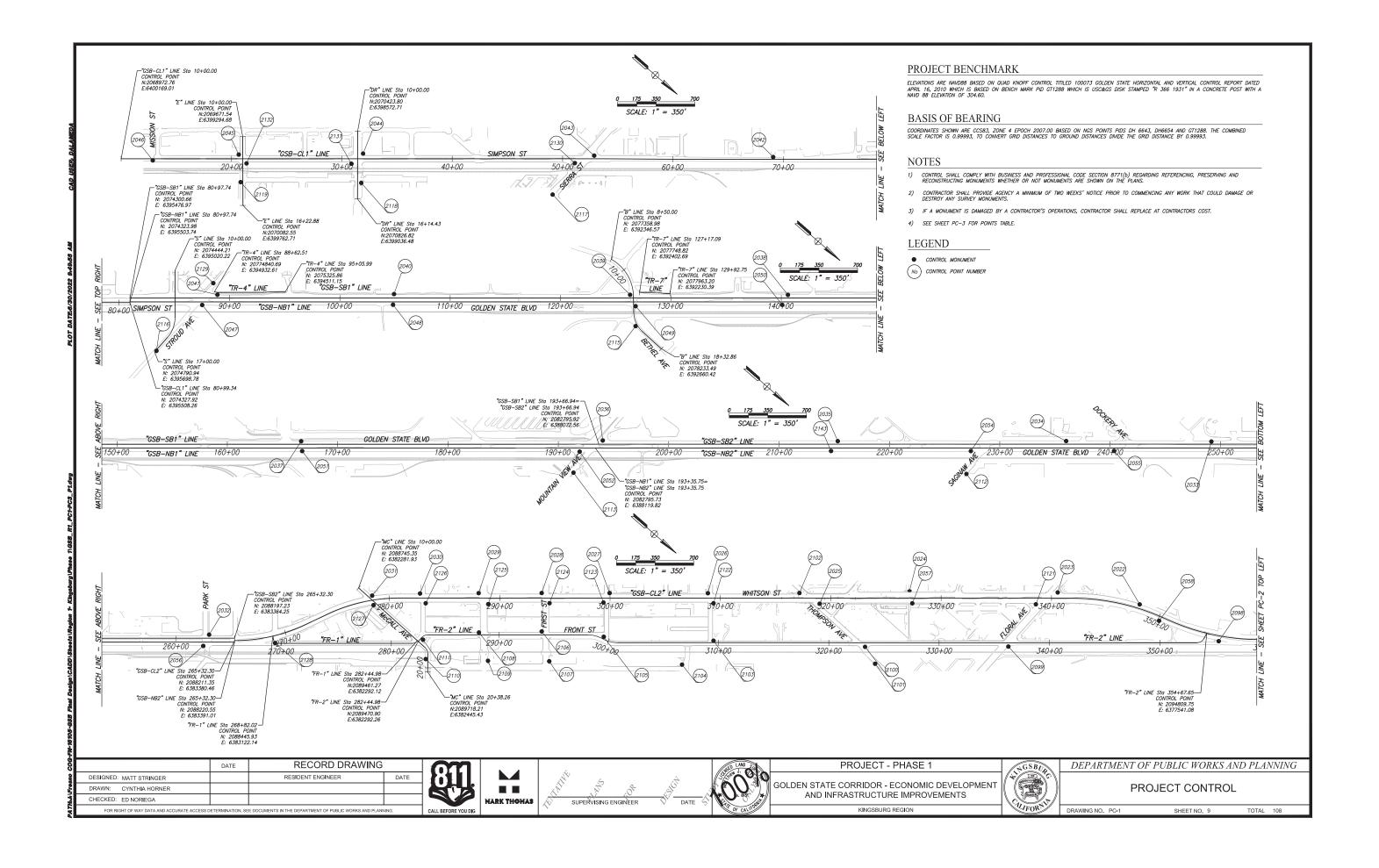
APPROVED\_

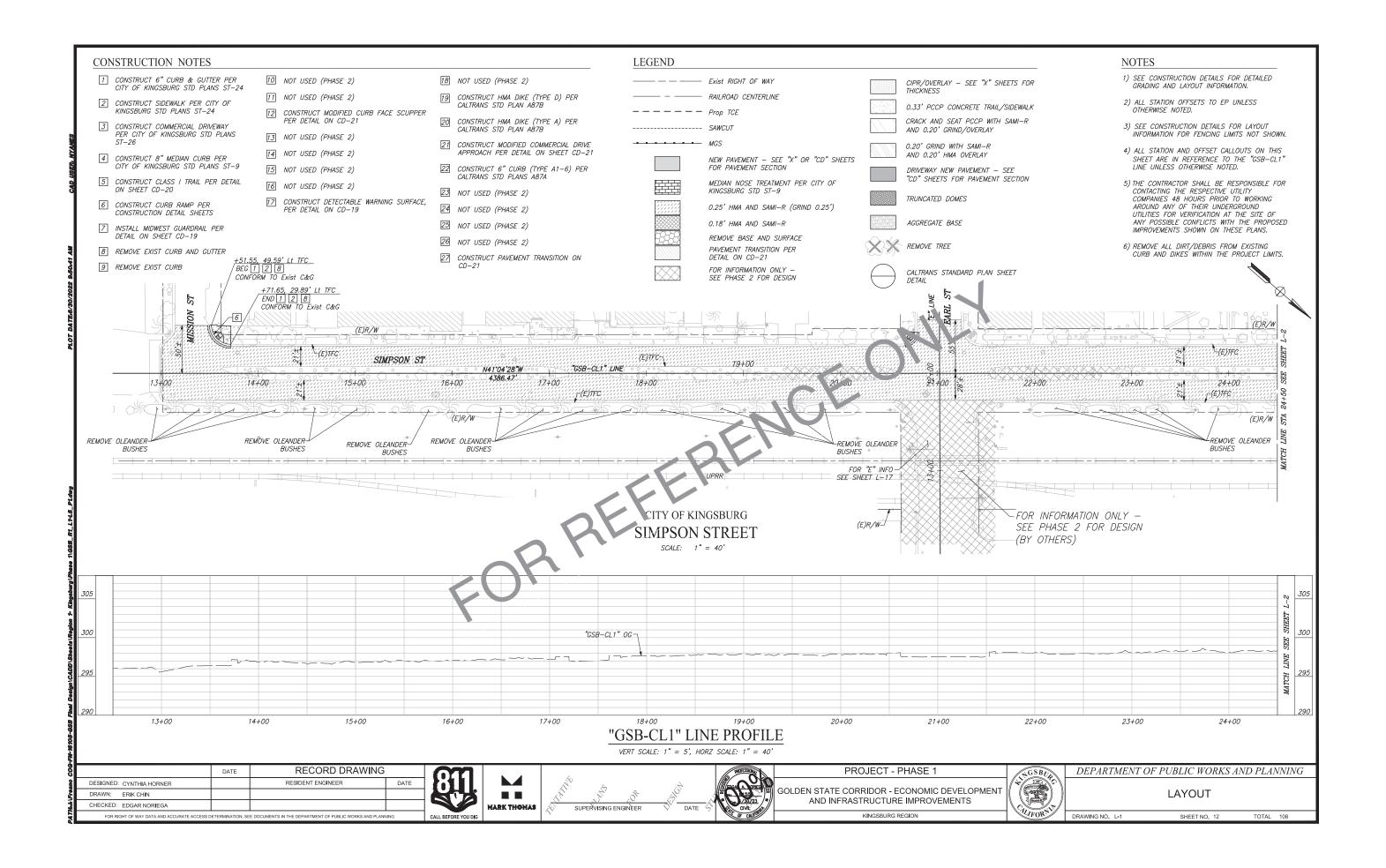
Certified Access Specialist

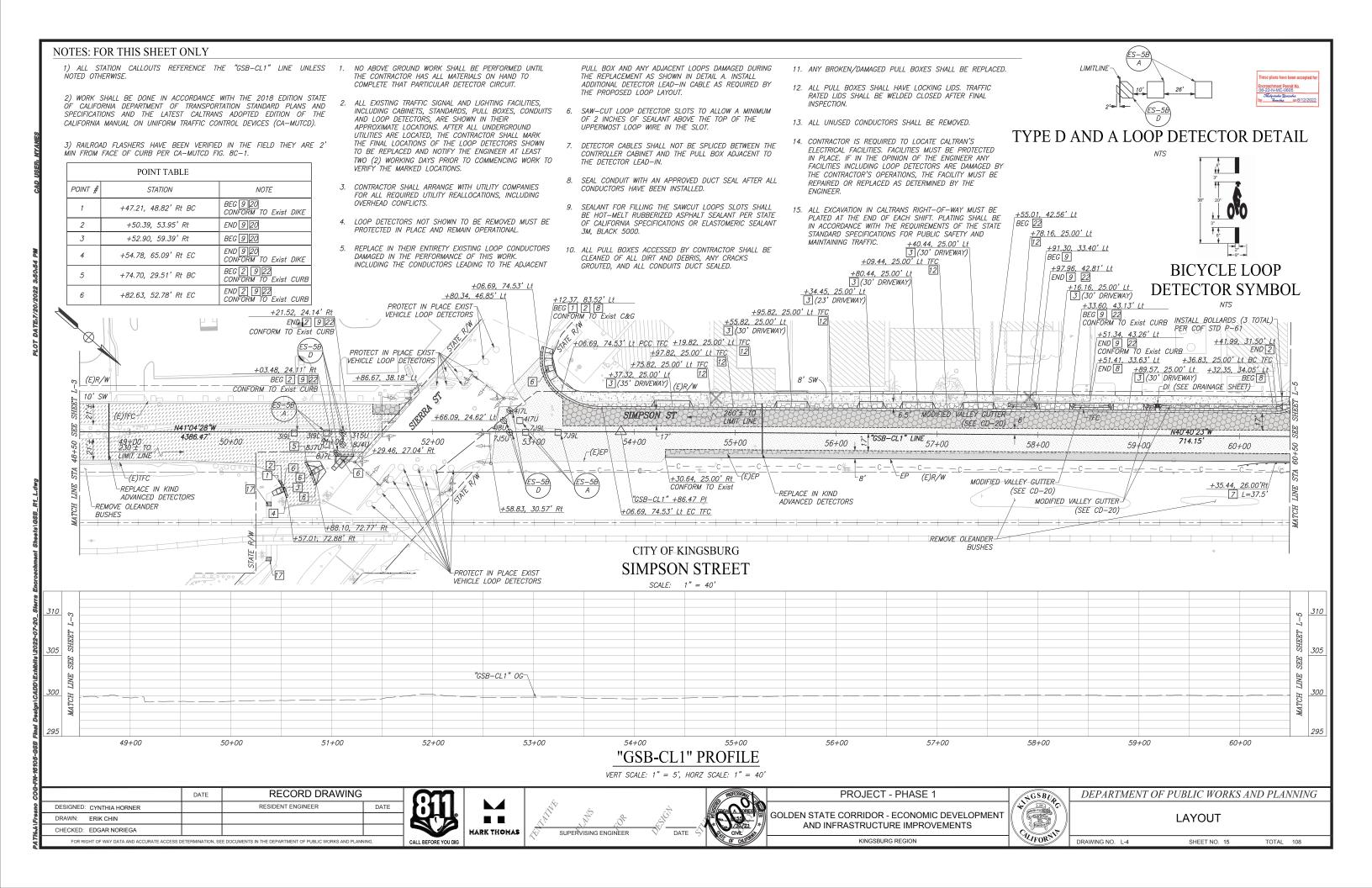
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PHONE							
DATE AWARDED							
DATE STARTED							
DATE COMPLETED							
		RESIDENT	ENGINEER				
		CICA	IATURE				
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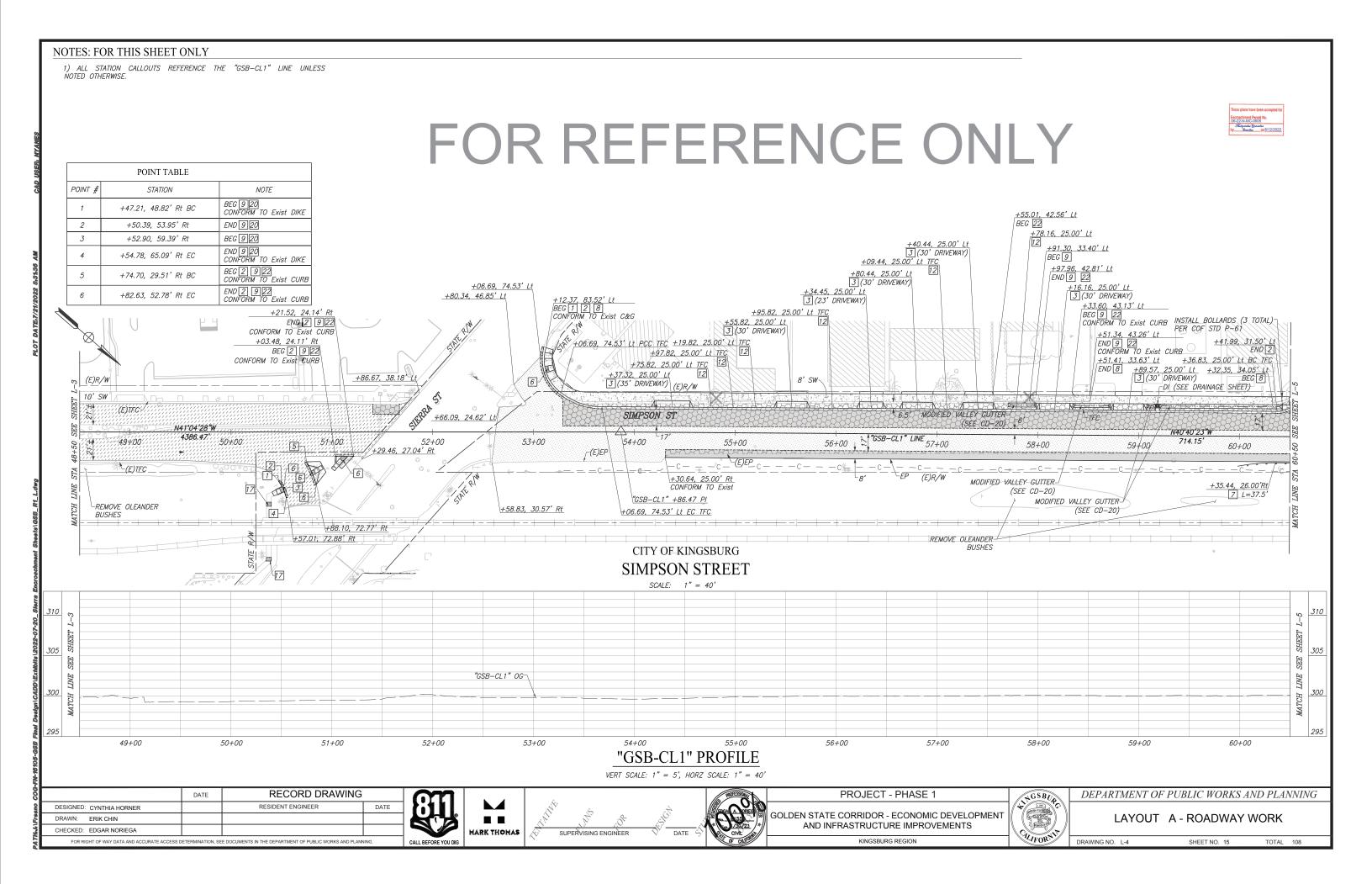
100% SUBMITTAL









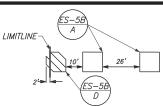


#### NOTES: FOR THIS SHEET ONLY

- 1) ALL STATION CALLOUTS REFERENCE THE "GSB-CL1" LINE UNLESS NOTED OTHERWISE.
- 2) WORK SHALL BE DONE IN ACCORDANCE WITH THE 2018 EDITION STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION STANDARD PLANS AND SPECIFICATIONS AND THE LATEST CALTRANS ADOPTED EDITION OF THE CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (CA-MUTCD).
- 3) RAILROAD FLASHERS HAVE BEEN VERIFIED IN THE FIELD THEY ARE 2' MIN FROM FACE OF CURB PER CA-MUTCD FIG. 8C-1.
- NO ABOVE GROUND WORK SHALL BE PERFORMED UNTIL THE CONTRACTOR HAS ALL MATERIALS ON HAND TO COMPLETE THAT PARTICULAR DETECTOR CIRCUIT.
- 2. ALL EXISTING TRAFFIC SIGNAL AND LIGHTING FACILITIES, INCLUDING CABINETS, STANDARDS, PULL BOXES, CONDUITS AND LOOP DETECTORS, ARE SHOWN IN THEIR APPROXIMATE LOCATIONS. AFTER ALL UNDERGROUND UTILITIES ARE LOCATED, THE CONTRACTOR SHALL MARK THE FINAL LOCATIONS OF THE LOOP DETECTORS SHOWN TO BE REPLACED AND NOTIFY THE ENGINEER AT LEAST TWO (2) WORKING DAYS PRIOR TO COMMENCING WORK TO VERIFY THE MARKED LOCATIONS.
- 3. CONTRACTOR SHALL ARRANGE WITH UTILITY COMPANIES FOR ALL REQUIRED UTILITY REALLOCATIONS, INCLUDING OVERHEAD CONFLICTS.
- 4. LOOP DETECTORS NOT SHOWN TO BE REMOVED MUST BE PROTECTED IN PLACE AND REMAIN OPERATIONAL.
- FEPLACE IN THEIR ENTIRETY EXISTING LOOP CONDUCTORS DAMAGED IN THE PERFORMANCE OF THIS WORK. INCLUDING THE CONDUCTORS LEADING TO THE ADJACENT

- PULL BOX AND ANY ADJACENT LOOPS DAMAGED DURING THE REPLACEMENT AS SHOWN IN DETAIL A. INSTALL ADDITIONAL DETECTOR LEAD—IN CABLE AS REQUIRED BY THE PROPOSED LOOP LAYOUT.
- 6. SAW-CUT LOOP DETECTOR SLOTS TO ALLOW A MINIMUM OF 2 INCHES OF SEALANT ABOVE THE TOP OF THE UPPERMOST LOOP WIRE IN THE SLOT.
- 7. DETECTOR CABLES SHALL NOT BE SPLICED BETWEEN THE CONTROLLER CABINET AND THE PULL BOX ADJACENT TO THE DETECTOR LEAD—IN.
- 8. SEAL CONDUIT WITH AN APPROVED DUCT SEAL AFTER ALL CONDUCTORS HAVE BEEN INSTALLED.
- SEALANT FOR FILLING THE SAWCUT LOOPS SLOTS SHALL BE HOT-MELT RUBBERIZED ASPHALT SEALANT PER STATE OF CALIFORNIA SPECIFICATIONS OR ELASTOMERIC SEALANT 3M, BLACK 5000.
- 10. ALL PULL BOXES ACCESSED BY CONTRACTOR SHALL BE CLEANED OF ALL DIRT AND DEBRIS, ANY CRACKS GROUTED, AND ALL CONDUITS DUCT SEALED.

- 11. ANY BROKEN/DAMAGED PULL BOXES SHALL BE REPLACED.
- 12. ALL PULL BOXES SHALL HAVE LOCKING LIDS. TRAFFIC RATED LIDS SHALL BE WELDED CLOSED AFTER FINAL INSPECTION.
- 13. ALL UNUSED CONDUCTORS SHALL BE REMOVED.
- 14. CONTRACTOR IS REQUIRED TO LOCATE CALTRAN'S ELECTRICAL FACILITIES. FACILITIES MUST BE PROTECTED IN PLACE. IF IN THE OPINION OF THE ENGINEER ANY FACILITIES INCLUDING LOOP DETECTORS ARE DAMAGED BY THE CONTRACTOR'S OPERATIONS, THE FACILITY MUST BE REPAIRED OR REPLACED AS DETERMINED BY THE FNGINFFR.
- 15. ALL EXCAVATION IN CALTRANS RIGHT—OF—WAY MUST BE PLATED AT THE END OF EACH SHIFT. PLATING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE STATE STANDARD SPECIFICATIONS FOR PUBLIC SAFETY AND MAINTAINING TRAFFIC.

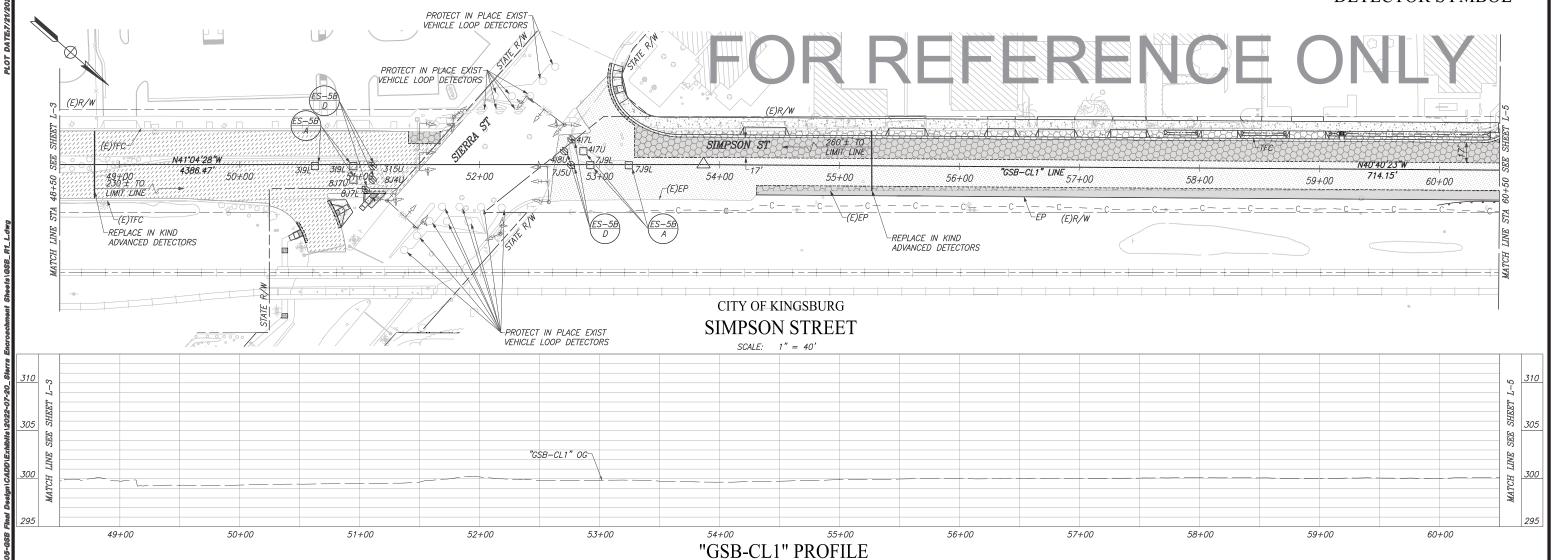




#### TYPE D AND A LOOP DETECTOR DETAIL

7S

BICYCLE LOOP DETECTOR SYMBOL



VERT SCALE: 1" = 5', HORZ SCALE: 1" = 40

DATE RECORD DRAWING

DESIGNED: CYNTHIA HORNER RESIDENT ENGINEER DATE

DRAWN: ERIK CHIN

CHECKED: FORAR NORIEGA

FOR RIGHT OF WAY DATA AND ACCURATE ACCESS DETERMINATION, SEE DOCUMENTS IN THE DEPARTMENT OF PUBLIC WORKS AND PLANNIN









PROJECT - PHASE 1

GOLDEN STATE CORRIDOR - ECONOMIC DEVELOPMENT AND INFRASTRUCTURE IMPROVEMENTS

KINGSBURG REGION



DEPARTMENT OF PUBLIC WORKS AND PLANNING

LAYOUT B - ELECTRICAL WORK

DRAWING NO. L-4 SHEET NO. 15 TOTAL 108

#### CONSTRUCTION NOTES

- 7 CONSTRUCT MEDIAN CURB TRANSITION PER DETAIL SHEET CD-19
- 2 CONSTRUCT COMMERCIAL DRIVEWAY CULVERT PER DETAIL ON SHEET CD-20
- CONSTRUCT TRANSITION PER %" CURB LIP PER DETAIL ON SHEET CD-19
- 4 UTILITY TO BE PROTECTED IN PLACE
- 5 CONSTRUCT MODIFIED VALLEY GUTTER PER DETAIL ON SHEET CD-20
- 6 CONSTRUCT DRIVEWAY FLARE & CULVERT TRANSITION PER DETAIL ON SHEET CD-20
- CONSTRUCT VALLEY GUTTER TRANSITION PER DETAIL ON SHEET CD—20
- BEG HMA DIKE TO CURB & GUTTER TRANSITION PER DETAIL ON SHEET CD-19
- CONSTRUCT 6" WIDE RETAINING CURB PER CITY
  OF KINGSBURG STD PLANS ST—33 TO ST—43
- CONSTRUCT TRANSITION PER 3" CURB DETAIL ON SHEET CD-21

+56.55, 50.13' Lt AP BOW 295.83

FL 295.30

FL 295.24 +56.01, 37.40' L

+58,81,/34.54' Lt

+64.41, 31.24', L

+51.55, 49.59' Lt TC 295.80

+47.56, 49.18' Lt

0.45' HMA=

0.95' AB

+52.71, 43.18' Lt GB

+58.12, 48.87' Lt AP |BOW 295.80

+61.05, 42.33' Lt CONC 295.67

+63.85, 39.47' Lt |CONC 295.61

CONFORM

+71.72, 48.83' Lt BOW 295.7±

+71.69, 40.00' Lt CONC 295.7± CONFORM

+71.65, 29.89 Lt TC 295.5± FL 295.0±

SIMPSON STREET /

T 3 14+00

CONFORM

"GSB-CL1" LINE

SIMPSON STREET

SCALE: 1" = 10'

- 11 INTERSECTION PAVEMENT TRANSITION CONFORM PER DETAIL ON SHEET CD-21
- 12 CURB AND GUTTER TRANSITION TO EDGE OF PAVEMENT SHEET CD-21
- [3] CONSTRUCT 3" CURB AND GUTTER TYPE B4 PER CALTRANS A87A

 $\triangle (E)R/W$ 

#### **LEGEND**

ROADWAY NEW PAVEMENT - SEE "X" OR "CD" SHEETS FOR PAVEMENT SECTION

DRIVEWAY NEW PAVEMENT - SEE "CD" SHEETS

MEDIAN NOSE TREATMENT PER CITY OF KINGSBURG STD ST-9

0.25' HMA AND SAMI-R (GRIND 0.25')

REMOVE BASE AND SURFACE

CIPR/OVERLAY — SEE "X" SHEETS FOR THICKNESS

CRACK AND SEAT PCCP WITH SAMI-R AND 0.20' GRIND/OVERLAY

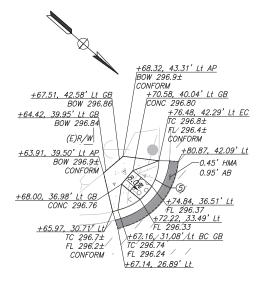
0.18' HMA AND SAMI-R

0.20' GRIND WITH SAMI-R AND 0.20' HMA OVERLAY

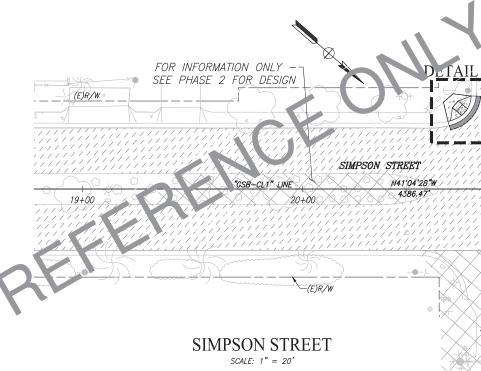
0.33' SIDEWALK 0.5' COMMERCIAL DRIVEWAY 0.66' VALLEY GUTTER

#### NOTES

1. ALL STATION AND OFFSET CALLOUTS ON THIS SHEET ARE IN REFERENCE TO THE "GSB-CL1" LINE UNLESS OTHERWISE NOTED



DETAIL "A" SCALE: 1" = 10'



└-FOR INFORMATION ONLY -SEE PHASE 2 FOR DESIGN

CURVE TABLE

DELTA

84°14'36"

72\*18'32

16°41'26"

**TANGENT** 

18.09

8.40'

7.33'

I FNGTH

29.41' 14.51

14.57

CURVE # RADIUS

20.00'

11.50

50.00'

	DATE	RECORD DRAWING		
DESIGNED: CYNTHIA HORNER		RESIDENT ENGINEER	DATE	
DRAWN: ERIK CHIN				
CHECKED: EDGAR NORIEGA				'
				1











GOLDEN STATE CORRIDOR - ECONOMIC DEVELOPMENT AND INFRASTRUCTURE IMPROVEMENTS

KINGSBURG REGION

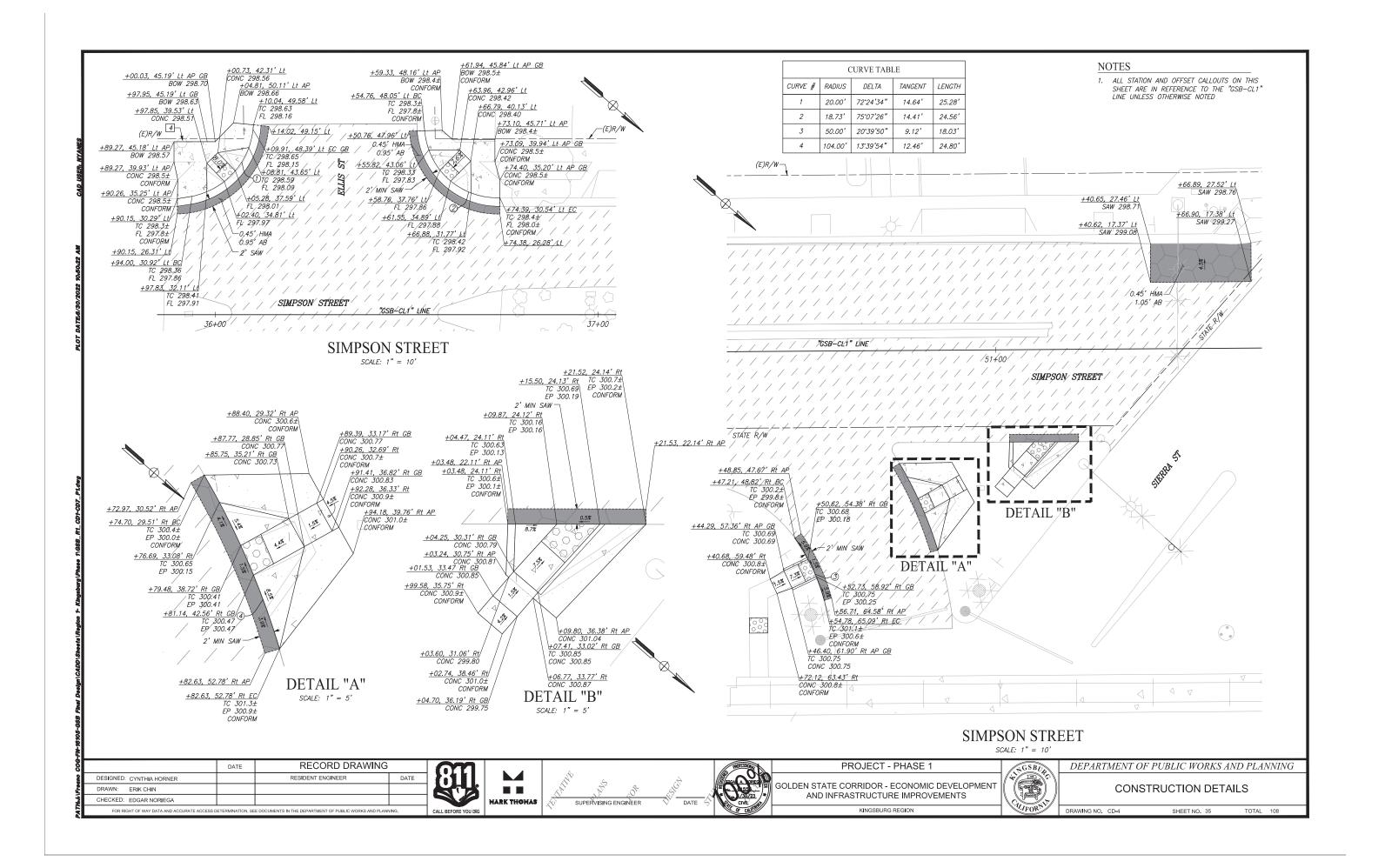


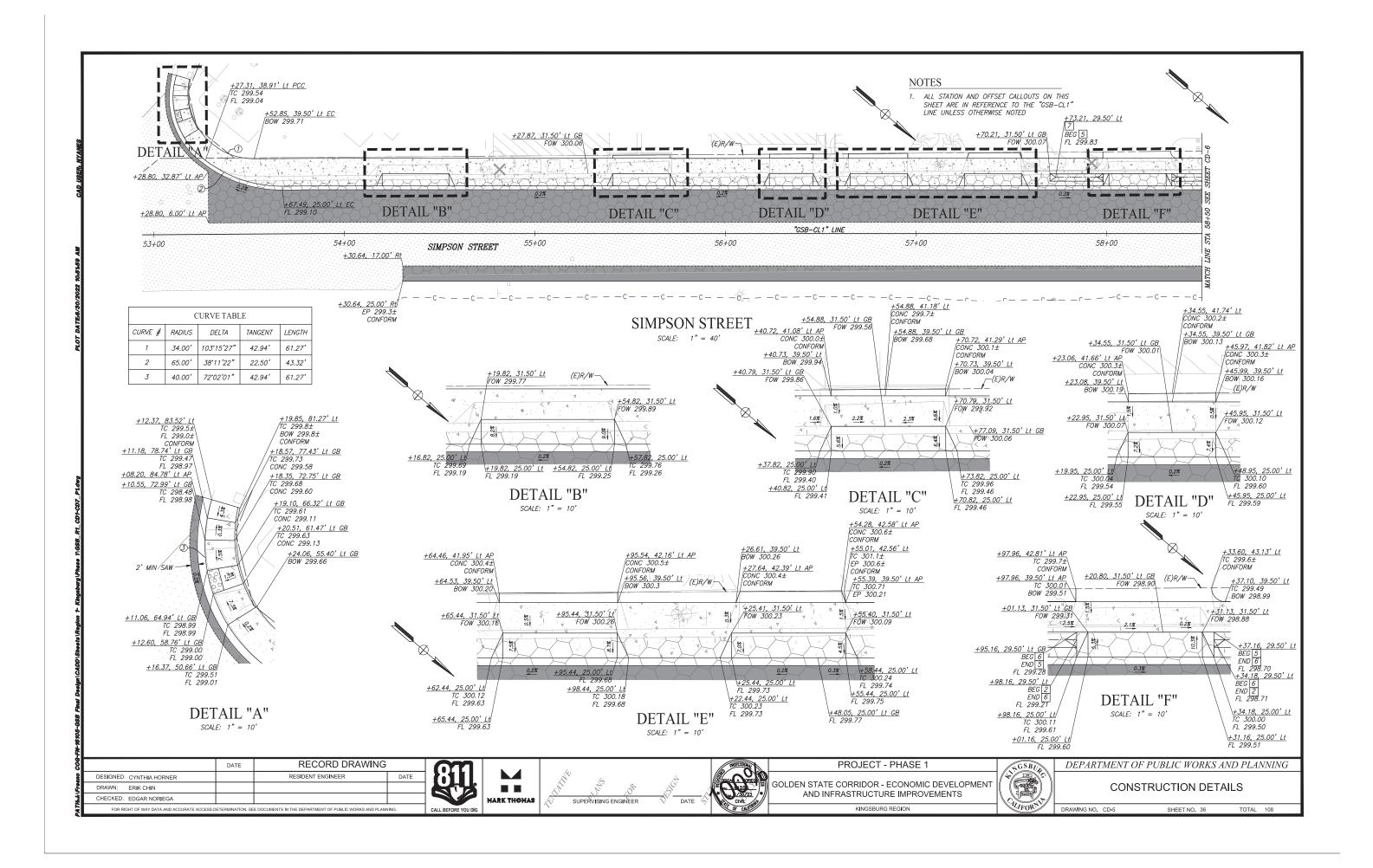
DEPARTMENT OF PUBLIC WORKS AND PLANNING

CONSTRUCTION DETAILS

DRAWING NO. CD-1

SHEET NO. 32





### TRAFFIC STAGE 1 LEGEND CONSTRUCTION STAGE 1 MAINTAIN 1-11' LANE IN EACH DIRECTION BETWEEN MISSION STREET TO SIERRA STREET ALONG SIMPSON STREET. CONSTRUCTION THIS STAGE CONSTRUCT LEFT TURN LANE. COMPLETE GRIND, SAMI-R, AND OVERLAY AND CURB RAMPS BETWEEN MISSION STREET AND SIERRA STREET. 2. WORK NOT NECESSARY FOR STAGING OPERATION CAN BE DONE AT ANY TIME AND IS NOT SHOWN. CONSTRUCTION ITEM THIS STAGE 3 CONSTRUCT WIDENING AREAS. FOR INFORMATION ONLY — SEE PHASE 2 FOR DESIGN (4) RE-STRIPING AT SIERRA STREET AREA. 3. CONTRACTOR TO PROVIDE A MINIMUM OF ONE-11' LANE OF ACCESS IN EACH DIRECTION ALONG GOLDEN STATE BOULEVARD DURING CONSTRUCTION AT ALL TIMES. 4. CONTRACTOR TO PROVIDE REASONABLE MEANS FOR PROPERTY OWNERS THAT ARE ADJACENT TO CONSTRUCTION TO ACCESS PROPERTIES AT ALL TIMES. 5. CONTRACTOR TO COORDINATE ANY DRIVEWAY CLOSURES WITH PROPERTY OWNERS BEFORE IMPACTING ACCESS. 6. CONTRACTOR SHALL COORDINATE WITH UPRR DURING ALL STAGES OF CONSTRUCTION. FOR INFORMATION ONLY -FOR INFORMATION ONLY -SEE PHASE 2 FOR DESIGN SEE PHASE 2 FOR DESIGN CITY OF KINGSBURG GOLDEN STATE BLVD SCALE: 1" = 200' GOLDEN STATE BOULEVARD FOR INFORMATION ONLY -SEE PHASE 2 FOR DESIGN PROJECT - PHASE 1

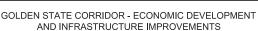
RECORD DRAWING RESIDENT ENGINEER DESIGNED: CYNTHIA HORNER CHECKED: EDGAR NORIEGA











KINGSBURG REGION

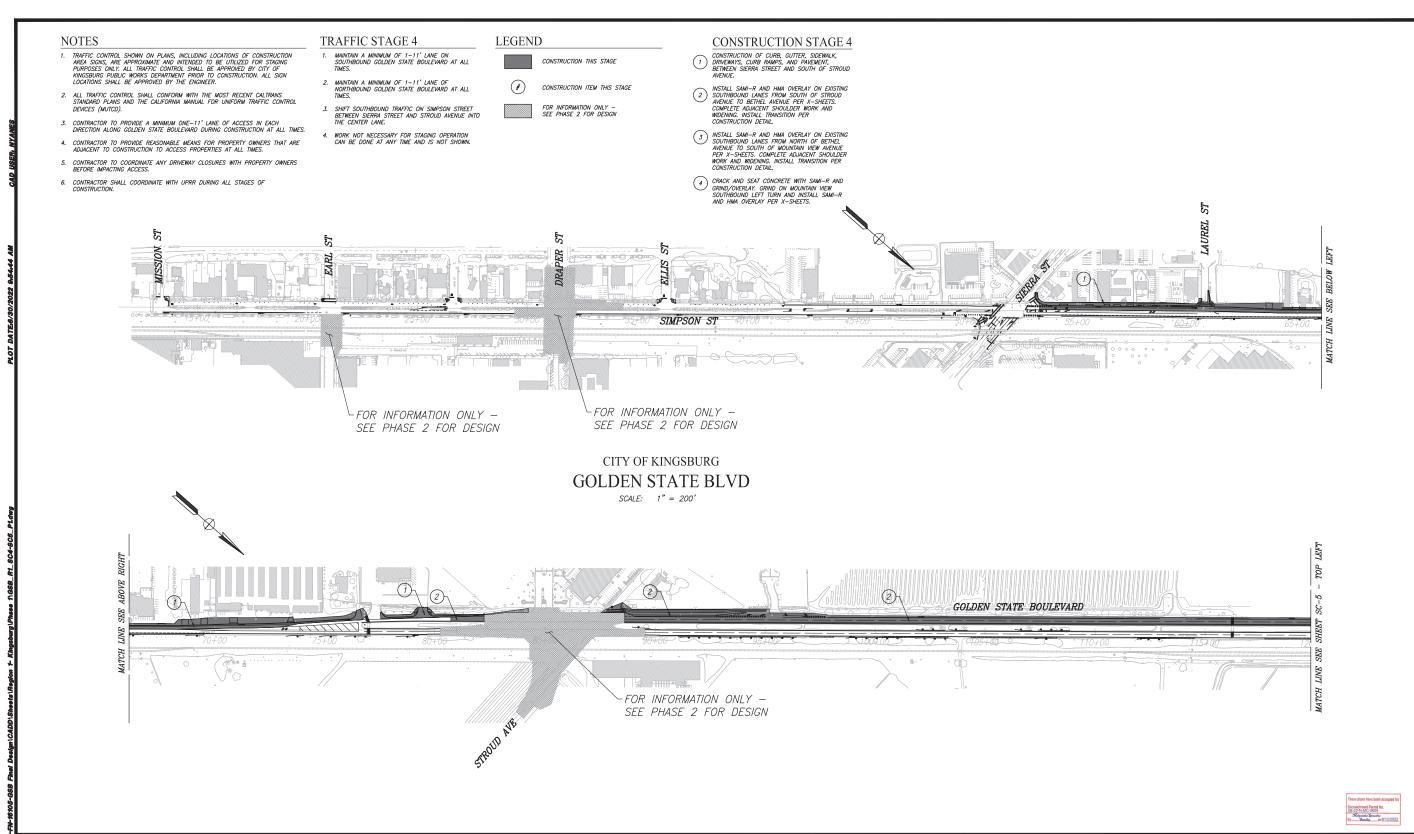


DEPARTMENT OF PUBLIC WORKS AND PLANNING

STAGE CONSTRUCTION - STAGE 1

DRAWING NO. SC-1

SHEET NO. 73



	DATE	RECORD DRAWING				
DESIGNED: CYNTHIA HORNER		RESIDENT ENGINEER	DATE	] :		
DRAWN: ERIK CHIN				1		
CHECKED: EDGAR NORIEGA				] •		
FOR RIGHT OF WAY DATA AND ACCURATE ACCESS DETERMINATION, SEE DOCUMENTS IN THE DEPARTMENT OF PUBLIC WORKS AND PLANNING.						











GOLDEN STATE CORRIDOR - ECONOMIC DEVELOPMENT AND INFRASTRUCTURE IMPROVEMENTS

KINGSBURG REGION



DEPARTMENT OF PUBLIC WORKS AND PLANNING

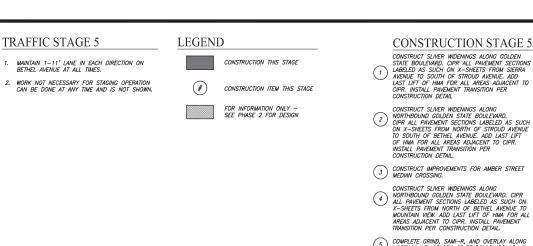
STAGE CONSTRUCTION - STAGE 4

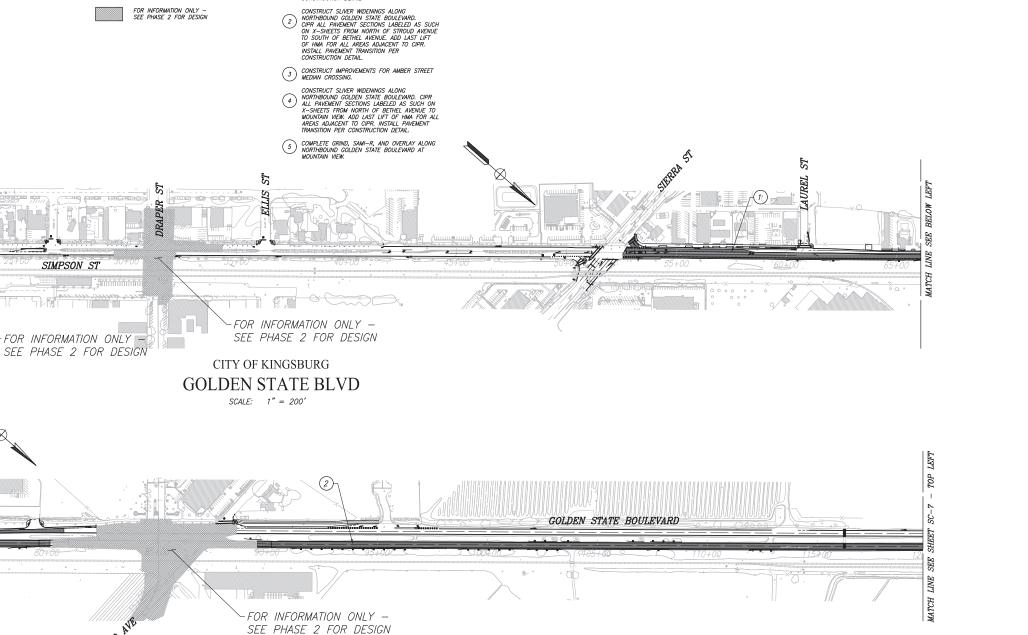
DRAWING NO. SC-4

SHEET NO. 76

TOTAL 108

## NOTES TRAFFIC CONTROL SHOWN ON PLANS, INCLUDING LOCATIONS OF CONSTRUCTION AREA SIGNS, ARE APPROXIMATE AND INTENDED TO BE UTILIZED FOR STAGING PURPOSES ONLY ALL TRAFFIC CONTROL SHALL BE APPROVED BY CITY OF KINGSBURG PUBLIC WORKS DEPARTMENT PRIOR TO CONSTRUCTION. ALL SIGN LOCATIONS SHALL BE APPROVED BY THE ENGINEER. ALL TRAFFIC CONTROL SHALL CONFORM WITH THE MOST RECENT CALTRANS STANDARD PLANS AND THE CALIFORNIA MANUAL FOR UNIFORM TRAFFIC CONTROL DEVICES (MUTCD). CONTRACTOR TO PROVIDE A MINIMUM OF ONE-11' LANE OF ACCESS IN EACH DIRECTION ALONG GOLDEN STATE BOULEVARD DURING CONSTRUCTION AT ALL TIMES. 4. CONTRACTOR TO PROVIDE REASONABLE MEANS FOR PROPERTY OWNERS THAT ARE ADJACENT TO CONSTRUCTION TO ACCESS PROPERTIES AT ALL TIMES. 5. CONTRACTOR TO COORDINATE ANY DRIVEWAY CLOSURES WITH PROPERTY OWNERS BEFORE IMPACTING ACCESS. CONTRACTOR SHALL COORDINATE WITH UPRR DURING ALL STAGES OF CONSTRUCTION. ST





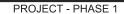
	DATE	RECORD DRAWING			
DESIGNED: CYNTHIA HORNER		RESIDENT ENGINEER	DATE		
DRAWN: ERIK CHIN					
CHECKED: EDGAR NORIEGA					











GOLDEN STATE CORRIDOR - ECONOMIC DEVELOPMENT AND INFRASTRUCTURE IMPROVEMENTS

KINGSBURG REGION



DEPARTMENT OF PUBLIC WORKS AND PLANNING

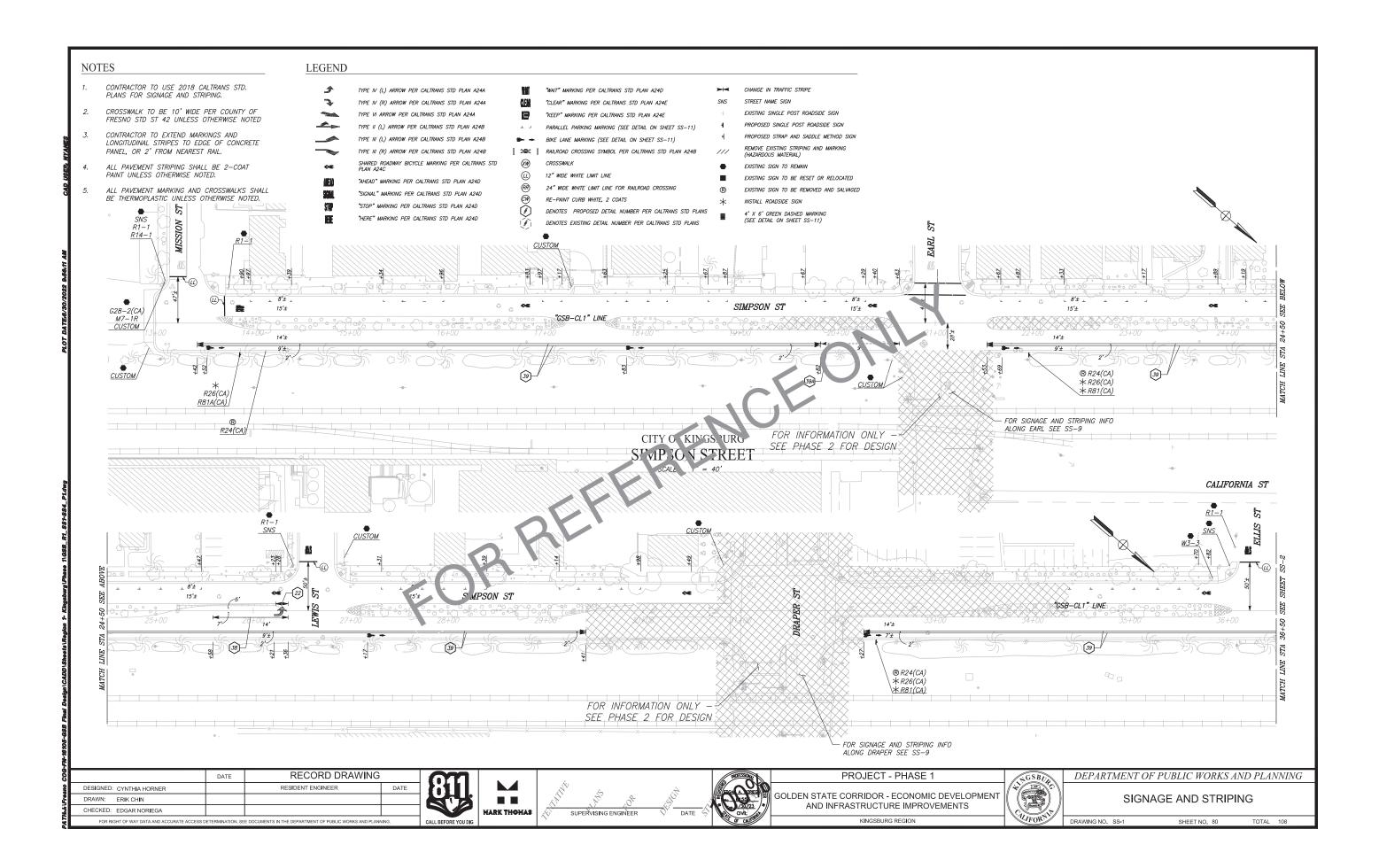
STAGE CONSTRUCTION - STAGE 5

DRAWING NO. SC-6

SHEET NO. 78

TOTAL 108

hese plans have been accented to



#### Replace Reserved in section 12-4.02C(3)(k) with:

Comply with the requirements for the conventional highway lane closures shown in the following chart:

Chart No. K1 Conventional Highway Lane Requirements Permit Number: 0622-NMC-0605 Date Issued: 05-31-2022																											
County: MAD						Route/Direction: 201 Eastbound/Westbound					Post Mile: 0.141																
Closure	limit	s: J	unct	ion	of Si	mps	on :	Stree	et																		
Hour 0	0 0	1 0	2 0	3 0	4 0	5 0	6 (	)7 C	8 (	09	10	1	1 1	12	13	14	1 1	5 1	6 1	7	18	19	20	21	2	2 2	3 24
Mon- Thu	1	1	1	1	1	1																				1	1
Fri	1	1	1	1	1	1																					
Sat																											
Sun																										1	1
Legend:																											
1	1 Provide at least 1 through traffic lane open in the direction of travel.																										
REMAR																											
A.				h of rogr			eled	l wa	y m	ust	be	ор	en t	o tr	affi	C W	/hei	n cc	nstr	ucti	on	acti	ivitie	es a	re n	ot	
							a si	ngle	sta	tior	nary	/ la	ne o	clos	sure	sh	nall	be	ว.2 เ	mile	s.						

#### **ENCROACHMENT PERMIT GENERAL PROVISIONS**

TR – 0045 (REV. 04/2021)

- AUTHORITY: The California Department of Transportation ("Department") has authority to issue encroachment permits under Division 1, Chapter 3, Article 1, Sections 660 through 734 of the Streets and Highways Code.
- **REVOCATION:** Encroachment permits are revocable on five (5) business days' notice unless otherwise stated on the permit and except as provided by law for public corporations, franchise holders, and Notwithstanding the foregoing, in an emergency situation as determined by the Department, an encroachment permit may be revoked immediately. These General Provisions and any applicable Special Provisions are subject to modification or abrogation by the Department at any time. Permittees' joint use agreements, franchise rights, reserved rights or any other agreements for operating purposes in State of California ("State") highway right-of-way may be exceptions to this revocation.
- DENIAL FOR NONPAYMENT OF FEES: Failure to pay encroachment permit fees when due may result in rejection of future applications and denial of encroachment permits.
- 4. ASSIGNMENT: This encroachment permit allows only the Permittee or Permittee's authorized agent to work within or encroach upon the State highway right-of-way, and the Permittee may not assign or transfer this encroachment permit. Any attempt to assign or transfer this encroachment permit shall be null and void.
- **ACCEPTANCE** OF **PROVISIONS:** Permittee understands and agrees to accept and comply with these General Provisions, the Special Provisions, any and all terms and/or conditions contained in or incorporated into the encroachment permit, and all attachments to the encroachment permit (collectively "the Conditions"), for any encroachment, work, and/or activity to be performed under this encroachment permit and/or under color of authority of this encroachment permit. Permittee understands and agrees the Permit Conditions are applicable to and enforceable against Permittee as long as the encroachment remains in, under, or over any part of the State highway right-of-way.
- 6. **BEGINNING OF WORK:** When traffic is not impacted (see General Provision Number 35), the Permittee must notify the Department's representative two (2) business days before starting permitted work. Permittee must notify the Department's representative if the work is to be interrupted for a period of five (5) business days or more, unless otherwise agreed upon. All work must be performed on weekdays during regular work hours, excluding holidays, unless otherwise specified in this encroachment permit.
- STANDARDS OF CONSTRUCTION: All work performed within State highway right-of-way must conform to all

applicable Departmental construction standards including but not limited to: Standard Specifications, Standard Plans, Project Development Procedures Manual, Highway Design Manual and Special Provisions.

Other than as expressly provided by these General Provisions, the Special Provisions, the Standard Specifications, Standard Plans, and other applicable Departmental standards, nothing in these General Provisions is intended to give any third party any legal or equitable right, remedy, or claim with respect to the encroachment permit and/or to these General Provisions or any provision herein. These General Provisions are for the sole and exclusive benefit of the Permittee and the Department.

Where reference is made in such standards to "Contractor" and "Engineer," these are amended to be read as "Permittee" and "Department's representative," respectively, for purposes of this encroachment permit.

- 8. **PLAN CHANGES:** Deviations from plans, specifications, and/or the Permit Conditions as defined in General Provision Number 5 are not allowed without prior approval from the Department's representative and the Federal Highway Administration ("FHWA") representative if applicable.
- 9. RIGHT OF ENTRY, INSPECTION AND APPROVAL: All work is subject to monitoring and inspection. The United States, the State, the Department, and the Directors, officers, employees, agents, and/or contractors of the State and/or of the Department, and other state, and federal agencies, and the FHWA, through their agents or representatives, must have full access to highway facilities/encroachment area, at any and all times for the purpose of inspection, maintenance, activities needed for construction/reconstruction, and operation of the State highway right-of-way.

Upon completion of work, Permittee must request a final inspection for acceptance and approval by the Department. The local public agency Permittee must not give final construction approval to its contractor until final acceptance and approval by the Department is obtained.

- 10. PERMIT AT WORKSITE: Permittee must keep the permit package or a copy thereof at the work site at all times and must show it upon request to any Department representative or law enforcement officer. If the permit package, or a copy thereof, is not kept and made available at the work site at all times, the work must be suspended.
- 11. **CONFLICTING ENCROACHMENTS:** Permittee must yield start of work to ongoing, prior authorized work adjacent to or within the limits of the Permittee's project site. When existing encroachments conflict with Permittee's work, the Permittee must bear all cost for rearrangements (e.g., relocation, alteration, removal, etc.).

- 12. PERMITS AND APPROVALS FROM OTHER PUBLIC AGENCIES AND/OR ENTITIES: This encroachment permit is invalidated if the Permittee has not obtained all permits and approvals necessary and required by law, including but not limited to permits from the California Utilities Commission ("CPUC"), California Occupational Safety and Health Administration ("Cal-OSHA"), and any other public agency and/or entity having jurisdiction. Permittee warrants all such permits and approvals have been obtained before beginning work under this encroachment permit. The Department may, at the Department's discretion, require the Permittee to demonstrate that Permittee has obtained all such permits/approvals, and Permittee shall demonstrate this at the time and in the manner specified by the Department.
- 13. **PEDESTRIAN AND BICYCLIST SAFETY:** A safe continuous passageway must be maintained through the work area at existing pedestrian or bicycle facilities. At no time must pedestrians be diverted onto a portion of the street used for vehicular traffic. At locations where safe alternate passageways cannot be provided, appropriate signs and barricades must be installed at the limits of construction and in advance of the limits of construction at the nearest crosswalk or intersection to detour pedestrians to facilities across the street. Attention is directed to Section 7-1.04 "Public Safety," and to Section 12-4.04 "Temporary Pedestrian Access Routes," and to Section 16-2.02 "Temporary Pedestrian Facility," of the Department's Standard Specifications, and to California Vehicle Code section 21760, subdivision (c).
- 14. **PUBLIC TRAFFIC CONTROL:** The Permittee must provide traffic control protection, warning signs, lights, safety devices, etc., and take all other measures necessary for the traveling public's safety as required by law and/or the Department. While providing traffic control, the needs of all road users, including but not limited to motorists, bicyclists and pedestrians, including persons with disabilities in accordance with the Americans with Disabilities Act, must be an essential part of the work activity.
  - Lane, Bike Lane, Sidewalk, Crosswalk, and/or shoulder closures must comply with the Department's Standard Specifications and Standard Plans for Temporary Traffic Control Systems & Temporary Pedestrian Access Routes, and with the applicable Special Provisions. Where issues are not addressed in the Standard Specifications, Standard Plans, and/or Special Provisions, the California Manual on Uniform Traffic Control Devices (Part 6, Temporary Traffic Control) must be followed.
- 15. **MINIMUM INTERFERENCE WITH TRAFFIC:** Permittee must plan and conduct work so as to create the least possible inconvenience to the traveling public (motorized vehicles, unmotorized vehicles such as bicycles, pedestrians, person(s) with disabilities, etc.), such that traffic is not unreasonably delayed.
- 16. STORAGE OF EQUIPMENT AND MATERIALS: The storage of equipment or materials is not allowed within

- State highway right-of-way, unless specified within the Special Provisions of this encroachment permit. If encroachment permit Special Provisions allow for the storage of equipment or materials within the State highway right-of-way, the equipment and material storage must also comply with Section 7-1.04, Public Safety, of the Department's Standard Specifications.
- 17. **CARE OF DRAINAGE:** Permittee must provide alternate drainage for any work interfering with an existing drainage facility in compliance with the Department's Standard Specifications, Standard Plans, and/or as directed by the Department's representative.
- 18. **RESTORATION AND REPAIRS IN STATE HIGHWAY RIGHT-OF-WAY:** Permittee is responsible for restoration and repair of State highway right-of-way resulting from permitted work (Streets and Highways Code, section 670 et seq.).
- 19. **STATE HIGHWAY RIGHT-OF-WAY CLEAN UP:** Upon completion of work, Permittee must remove and dispose of all scraps, refuse, brush, timber, materials, etc. off the State highway right-of-way. The aesthetics of the highway must be as it was before work started or better.
- 20. COST OF WORK: Unless stated otherwise in the encroachment permit or a separate written agreement with the Department, the Permittee must bear all costs incurred for work within the State highway right-of-way and waives all claims for indemnification or contribution from the United States, the State, the Department, and from the Directors, officers, and employees of the State and/or the Department. Removal of Permittee's personal property and improvements shall be at no cost to the United States, the State, and the Department.
- 21. **ACTUAL COST BILLING:** When specified in the permit, the Department will bill the Permittee actual costs at the currently set Standard Hourly Rate for encroachment permits.
- 22. **AS-BUILT PLANS:** When required, Permittee must submit one (1) set of folded as-built plans within thirty (30) calendar days after completion and acceptance of work in compliance with requirements listed as follows:
  - a) Upon completion of the work provided herein, the Permittee must submit a paper set of As-Built plans to the Department's representative.
  - b) All changes in the work will be shown on the plans, as issued with the permit, including changes approved by Encroachment Permit Rider.
  - c) The plans are to be prominently stamped or otherwise noted "AS-BUILT" by the Permittee's representative who was responsible for overseeing the work. Any original plan that was approved with a Department stamp, or by signature of the Department's representative, must be used for producing the As-Built plans.
  - d) If construction plans include signing or striping, the dates of signing or striping removal, relocation, or installation must be shown on the As-Built plans when required as a condition of the encroachment permit. When the construction plans show signing and striping for staged construction on separate sheets,

#### **ENCROACHMENT PERMIT GENERAL PROVISIONS**

- the sheet for each stage must show the removal, relocation, and installation dates of the appropriate staged striping and signing.
- e) As-Built plans must contain the Encroachment Permit Number, County, Route, and Post Mile on each sheet.
- f) The As-Built Plans must not include a disclaimer statement of any kind that differs from the obligations and protections provided by sections 6735 through 6735.6 of the California Business and Professions Code. Such statements constitute non-compliance with Encroachment Permit requirements and may result in the Department retaining Performance Bonds or deposits until proper plans are submitted. Failure to comply may also result in denial of future encroachment permits or a provision requiring a public agency to supply additional bonding.
- 23. PERMITS FOR RECORD PURPOSES ONLY: When work in the State highway right-of-way is within an area under a Joint Use Agreement (JUA) or a Consent to Common Use Agreement (CCUA), a fee exempt encroachment permit is issued to the Permittee for the purpose of providing a notice and record of work. The Permittee's prior rights must be preserved without the intention of creating new or different rights or obligations. "Notice and Record Purposes Only" must be stamped across the face of the encroachment permit.
- 24. **BONDING:** The Permittee must file bond(s), in advance, in the amount(s) set by the Department and using forms acceptable to the Department. The bonds must name the Department as obligee. Failure to maintain bond(s) in full force and effect will result in the Department stopping all work under this encroachment permit and possibly revoking other encroachment permit(s). Bonds are not required of public corporations or privately-owned utilities unless Permittee failed to comply with the provisions and/or conditions of a prior encroachment permit. The surety company is responsible for any latent defects as provided in California Code of Civil Procedure section 337.15. A local public agency Permittee also must comply with the following requirements:
  - a) In recognition that project construction work done on State property will not be directly funded and paid by State, for the purpose of protecting stop notice claimants and the interests of State relative to successful project completion, the local public agency Permittee agrees to require the construction contractor to furnish both a payment and performance bond in the local public agency's name with both bonds complying with the requirements set forth in Section 3-1.05 Contract Bonds of the Department's Standard Specifications before performing any project construction work.
  - b) The local public agency Permittee must defend, indemnify, and hold harmless the United States, the State and the Department, and the Directors, officers, and employees of the State and/or Department, from all project construction related claims by contractors, subcontractors, and suppliers, and from all stop

- notice and/or mechanic's lien claimants. The local public agency also agrees to remedy, in a timely manner and to the Department's satisfaction, any latent defects occurring as a result of the project construction work.
- 25. **FUTURE MOVING OF INSTALLATIONS:** Permittee understands and agrees to relocate a permitted installation upon notice by the Department. Unless under prior property right or agreement, the Permittee must comply with said notice at the Permittee's sole expense.

#### 26. ENVIRONMENTAL:

- a) ARCHAEOLOGICAL/HISTORICAL: If any archaeological or historical resources are identified or encountered in the work vicinity, the Permittee must immediately stop work, notify the Department's representative, retain a qualified archaeologist who must evaluate the site at Permittee's sole expense, and make recommendations to the Department's representative regarding the continuance of work.
- b) HAZARDOUS MATERIALS: If any hazardous waste or materials (such as underground storage tanks, asbestos pipes, contaminated soil, etc.) are identified or encountered in the work vicinity, the Permittee must immediately stop work, notify the Department's representative, retain a qualified hazardous waste/material specialist who must evaluate the site at the Permittee's sole expense, and make recommendations to the Department's representative regarding the continuance of work.
  - Attention is directed to potential aerially deposited lead (ADL) presence in unpaved areas along highways. It is the Permittee's responsibility to take all appropriate measures to protect workers in conformance with California Code of Regulations Title 8, Section 1532.1, "Lead," and with Cal-OSHA Construction Safety Orders, and to ensure roadway soil management is in compliance with Department of Toxic Substances Control (DTSC) requirements.
- c) Biological: If any regional, state, or federally listed biological resource is identified or encountered in the work vicinity, the Permittee must immediately stop work, notify the Department's representative, retain a qualified biologist who must evaluate the site at Permittee's sole expense, and make recommendations to the Department's representative regarding the continuance of work.
- 27. **PREVAILING WAGES:** Work performed by or under an encroachment permit may require Permittee's contractors and subcontractors to pay appropriate prevailing wages as set by the California Department of Industrial Relations. Inquiries or requests for interpretations relative to enforcement of prevailing wage requirements must be directed to the California Department of Industrial Relations.
- 28. LIABILITY, DEFENSE, AND INDEMNITY: The Permittee agrees to indemnify and save harmless the United States, the State, the Department, and the Directors, officers, employees, agents and/or contractors of the State and/or of the Department, including but not limited to the Director

of Transportation and the Deputy Directors, from any and all claims, demands, damages, costs, liability, suits, or actions of every name, kind, and description, including but not limited to those brought for or on account of property damage, invasion of privacy, violation or deprivation of a right under a state or federal law, environmental damage or penalty, or injury to or death of any person including but not limited to members of the public, the Permittee. persons employed by the Permittee, and/or persons acting on behalf of the Permittee, arising out of or in connection with: (a) the issuance and/or use of this encroachment permit; and/or (b) the encroachment, work, and/or activity conducted pursuant to this encroachment permit, or under color of authority of this encroachment permit but not in full compliance with the Permit Conditions as defined in General Provision Number 5 ("Unauthorized Work or Activity"); and/or (c) the installation, placement, design, existence, operation, and/or maintenance of the encroachment, work, and/or activity; and/or (d) the failure by the Permittee or anyone acting on behalf of the Permittee to perform the Permittee's obligations under any part of the Permit Conditions as defined in General Provision Number 5, in respect to maintenance or any other obligation; and/or (e) any change to the Department's property or adjacent property, including but not limited to the features or conditions of either of them, made by the Permittee or anyone acting on behalf of the Permittee; and/or (f) a defect or obstruction related to or caused by the encroachment, work, and/or activity whether conducted in compliance with the Permit Conditions as defined in General Provision Number 5 or constituting Unauthorized Work or Activity, or from any cause whatsoever. The duty of the Permittee to indemnify and save harmless includes the duties to defend as set forth in Section 2778 of the Civil Code.

It is the intent of the parties that except as prohibited by law, the Permittee will defend, indemnify, and hold harmless as set forth in this General Provision Number 28 regardless of the existence or degree of fault or negligence, whether active or passive, primary or secondary, on the part of: the United States, the State; the Department; the Directors, officers, employees, agents and/or contractors of the State and/or of the Department, including but not limited to the Director of Transportation and the Deputy Directors; the Permittee; persons employed by the Permittee; and/or persons acting on behalf of the Permittee.

The Permittee waives any and all rights to any type of expressed or implied indemnity from or against the United States, the State, the Department, and the Directors, officers, employees, agents, and/or contractors of the State and/or of the Department, including but not limited to the Director of Transportation and the Deputy Directors.

The Permittee understands and agrees to comply with the obligations of Titles II and III of the Americans with Disabilities Act in the conduct of the encroachment, work, and/or activity whether conducted pursuant to this encroachment permit or constituting Unauthorized Work

or Activity, and further agrees to defend, indemnify, and save harmless the United States, the State, the Department, and the Directors, officers, employees, agents, and/or contractors of the State and/or of the Department, including but not limited to the Director of Transportation and the Deputy Directors, from any and all claims, demands, damages, costs, penalties, liability, suits, or actions of every name, kind, and description arising out of or by virtue of the Americans with Disabilities Act

The Permittee understands and agrees the Directors, officers, employees, agents, and/or contractors of the State and/or of the Department, including but not limited to the Director of Transportation and the Deputy Directors, are not personally responsible for any liability arising from or by virtue of this encroachment permit.

For the purpose of this General Provision Number 28 and all paragraphs herein, "contractors of the State and/or of the Department" includes contractors, and their subcontractors, under contract to the State and/or the Department.

This General Provision Number 28 and all paragraphs herein take effect immediately upon issuance of this encroachment permit, and apply before, during, and after the encroachment, work, and/or activity contemplated under this encroachment permit, whether such work is in compliance with the Permit Conditions as defined in General Provision Number 5 or constitutes Unauthorized Work or Activity, except as otherwise provided by California law. The Permittee's obligations to defend, indemnify, and save harmless under this General Provision Number 28 take effect immediately upon issuance of this encroachment permit and have no expiration date, including but not limited to situations in which this encroachment permit expires or is revoked, the work or activity performed under this encroachment permit is accepted or not accepted by the Department, the encroachment, work, and/or activity is conducted in compliance with the Permit Conditions as defined in General Provision Number 5 or constitutes Unauthorized Work or Activity, and/or no work or activity is undertaken by the Permittee or by others on the Permittee's behalf.

If the United States or an agency, department, or board of the United States is the Permittee, the first two paragraphs of this General Provision Number 28 (beginning "The Permittee agrees to indemnify..." and "It is the intent of the parties...") are replaced by the following paragraph:

Claims for personal injury, death, or property damage allegedly caused by the negligent or wrongful act or omission of any employee of the United States acting within the scope of their official duties are subject to the Federal Tort Claims Act, as amended, 28 U.S.C. § 1346 and § 2671 et seq. (Chapter 171).

- 29. **NO PRECEDENT ESTABLISHED:** This encroachment permit is issued with the understanding that it does not establish a precedent.
- 30. FEDERAL CIVIL RIGHTS REQUIREMENTS FOR PUBLIC ACCOMMODATION:

- a) As part of the consideration for being issued this encroachment permit, the Permittee, on behalf of Permittee and on behalf of Permittee's personal representatives, successors in interest, and assigns, does hereby covenant and agree that:
  - No person on the grounds of race, color, or national origin may be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities.
  - ii) That in connection with the construction of any improvements on said lands and the furnishings of services thereon, no discrimination must be practiced in the selection and retention of first-tier subcontractors in the selection of second-tier subcontractors.
  - iii) That such discrimination must not be practiced against the public in their access to and use of the facilities and services provided for public accommodations (such as eating, sleeping, rest, recreation), and operation on, over, or under the space of the State highway right-of-way.
  - iv) That the Permittee must use the premises in compliance with all other requirements imposed pursuant to Title 15, Code of Federal Regulations, Commerce and Foreign Trade, Subtitle A. Office of the Secretary of Commerce, Part 8 (15 C.F.R. Part 8) and as said Regulations may be amended.
- b) That in the event of breach of any of the above nondiscrimination covenants, the State and the Department have the right to terminate this encroachment permit and to re-enter and repossess said land and the facilities thereon and hold the same as if said permit had never been made or issued.
- 31. **MAINTENANCE:** The Permittee is responsible at Permittee's sole expense for the encroachment, and the inspection, maintenance, repair, and condition thereof, so that it does not negatively impact State highway safety, maintenance, operations, construction, activities needed for construction/reconstruction, State facilities, or other encroachments. Additional permits or approval documents may be required authorizing additional work related to inspection, repair, and/or maintenance activities.
- 32. **SPECIAL EVENTS:** In accordance with subdivision (a) of Streets and Highways Code section 682.5 and 682.7, the Department is not responsible for the conduct or operation of the permitted activity, and the applicant agrees to defend, indemnify, and hold harmless the United States, the State, the Department, and the Directors, officers, employees, agents, and contractors of the State and/or of the Department, including but not limited to the Director of Transportation and the Deputy Directors, from any and all claims, demands, damages, costs, liability, suits, or actions of every name, kind and description arising out of any activity for which this encroachment permit is issued.

The Permittee is required, as a condition of this encroachment permit, for any event that awards prize compensation to competitors in gendered categories, for any participant level that receives prize compensation, to ensure the prize compensation for each gendered category is identical at each participant level. (Streets and Highways Code, section 682.7.)

The Permittee understands and agrees to comply with the obligations of Titles II and III of the Americans with Disabilities Act in the conduct of the event, and further agrees to defend, indemnify, and save harmless the United State, the State and the Department, and the Directors, officers, and employees of the State and/or Department, including but not limited to the Director of the Department and the Deputy Directors, from any and all claims, demands, damages, costs, liability, suits, or actions of every name, kind and description arising out of or by virtue of the Americans with Disabilities Act.

- 33. **PRIVATE USE OF STATE HIGHWAY RIGHT-OF-WAY:**State highway right-of-way must not be used for private purposes without compensation to the State. The gifting of public property uses and therefore public funds is prohibited under the California Constitution, Article XVI, Section 6.
- 34. **FIELD WORK REIMBURSEMENT:** Permittee must reimburse the Department for field work performed on Permittee's behalf to correct or remedy hazards or damaged facilities, or to clear refuse, debris, etc. not attended to by the Permittee.
- 35. LANE CLOSURE REQUEST SUBMITTALS AND NOTIFICATION OF **CLOSURES** TO THE **DEPARTMENT:** Lane closure request submittals and notifications must be in accordance with Section 12-4.02, and Section 12.4-04, of the Department's Standard Specifications or as directed by the Department's representative. The Permittee must notify Department's representative and the Traffic Management Center ("TMC") before initiating a lane closure or conducting an activity that may cause a traffic impact. In emergency situations when the corrective work or the emergency itself may affect traffic, the Department's representative and the TMC must be notified as soon as possible.
- 36. SUSPENSION OF TRAFFIC CONTROL OPERATION: The Permittee, upon notification by the Department's representative, must immediately suspend all traffic lane, bike lane, sidewalk, crosswalk, and/or shoulder closure operations and any operation that impedes the flow of traffic. All costs associated with this suspension must be borne by the Permittee.
- 37. UNDERGROUND SERVICE ALERT (USA) NOTIFICATION: Any excavation requires compliance with the provisions of Government Code section 4216 et seq., including but not limited to notice to a regional notification center, such as Underground Service Alert (USA). The Permittee must provide notification to the Department representative at least five (5) business days before, and the regional notification center at least forty-

#### **ENCROACHMENT PERMIT GENERAL PROVISIONS**

- eight (48) hours before, performing any excavation work within the State highway right-of-way.
- 38. **COMPLIANCE** WITH THE **AMERICANS** DISABILITIES ACT (ADA): All work within the State highway right-of-way to construct and/or maintain any public facility must be designed, maintained, and constructed strictly in accordance with all applicable Federal Access laws and regulations (including but not limited to Section 504 of the Rehabilitation Act of 1973, codified at 29 U.S.C. § 794), California Access laws and regulations relating to ADA, along with its implementing regulations, Title 28 of the Code of Federal Regulations Parts 35 and 36 (28 C.F.R., Ch. I, Part 35, § 35.101 et seq., and Part 36, § 36.101 et seq.), Title 36 of the Code of Federal Regulations Part 1191 (36 C.F.R., Ch. XI, Part 1191, § 1119.1 et seq.), Title 49 of the Code of Federal Regulations Part 37 (49 C.F.R., Ch. A, Part 37, § 37.1 et seq.), the United States Department of Justice Title II and Title III for the ADA, and California Government Code section 4450 et seq., which require public facilities be made accessible to persons with disabilities.

Notwithstanding the requirements of the previous paragraph, all construction, design, and maintenance of public facilities must also comply with the Department's

- Design Information Bulletin 82, "Pedestrian Accessibility Guidelines for Highway Projects" and Standard Plans & Specifications on "Temporary Pedestrian Access Routes."
- 39. **STORMWATER:** The Permittee is responsible for full compliance with the following:
  - a) For all projects, the Department's Storm Water Program and the Department's National Pollutant Discharge Elimination System (NPDES) Permit requirements under Order No. 2012-0011-DWQ, NPDES No CAS000003; and
  - b) In addition, for projects disturbing one acre or more of soil, with the California Construction General Permit Order No. 2009-0009-DWQ, NPDES No CAS000002; and
  - c) In addition, for projects disturbing one acre or more of soil in the Lahontan Region with Order No. R6T-2016-0010, NPDES No CAG616002.
  - d) For all projects, it is the Permittee's responsibility to install, inspect, repair, and maintain all facilities and devices used for water pollution control practices (Best Management Practices/BMPs) before performing daily work activities.

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

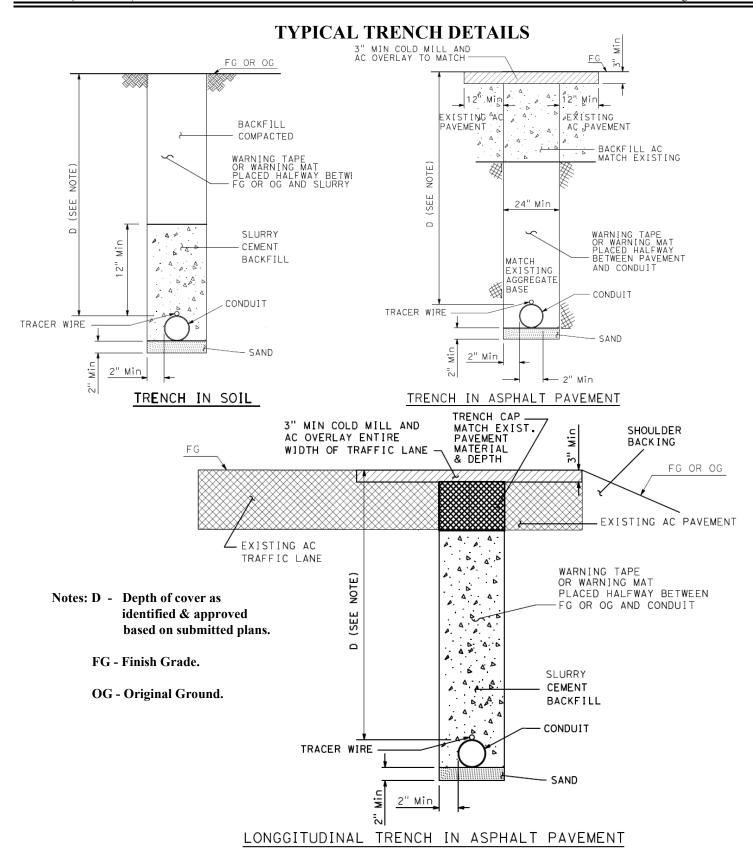
#### HAZARDOUS MATERIALS AND HAZARDOUS WASTE MANAGEMENT SPECIAL PROVISIONS

TR-0408 (New 09/2017)

By acceptance of this encroachment permit, Permittee hereby agrees that:

- 1. All construction debris/materials/water/excess soil must become the property of the Permittee, and must be transported and disposed of, outside of Caltrans' right-of-way, in accordance with all applicable environmental laws and regulations. The Permittee must be identified as the generator for all construction debris/materials/water/excess soil and must be responsible for proper identification (including sampling and analysis) and management of all construction and contaminated debris/materials/water/excess soil that are removed, and/or excavated, from the work site. If hazardous waste is generated, the Permittee must obtain an Environmental Protection Agency (EPA) Identification Number issued in their name. State Permit Inspector does not sign any manifests or shipping papers. The Permittee must be named as the generator on all Uniform Hazardous Waste Manifests and shipping papers. Caltrans must not be identified or written anywhere on the manifests or shipping papers. Prior to waste disposal, the Permittee should submit the waste generator form(s) to State Permit Inspector for verification. The Permittee must submit to the State Permit Inspector, a copy of all manifests and/or shipping papers generated for materials removed, transported and/or excavated from the state right-of-way.
- 2. If contaminated material is encountered, Permittee is to stop work and contact the State Permit Inspector immediately. The Permittee must submit a Sampling and Analysis Plan (SAP), and a Health and Safety Plan (HaSP) prepared by a Certified Industrial Hygienist (CIH) and in conformance with California Code of Regulations title 8, section 5192, "Hazardous Waste Operations and Emergency Response" for sampling activity through a separate permit application. Upon the permit review, additional environmental documents may be required prior to resumption of construction activity.
- 3. Permittee is responsible for any violation, penalty, enforcement action, corrective action, remedial action, and any other type of consequences resulting from cross contamination of groundwater (including perched groundwater), improper handling/managing of hazardous materials and/or placement of contaminated materials inside Caltrans right-of-way.
- 4. It is the Permittee's responsibility to comply with the Department of Toxic Substances Control (DTSC) ADL requirements for roadway soil management. Reuse of soils containing greater than 80 mg/kg total lead is not allowed without written approval of the DTSC and Caltrans. The Soil Management Agreement for Aerially Deposited Lead-Contaminated Soils between Caltrans and the DTSC does not constitute written approval for the Permittee to reuse soils containing greater than 80 mg/kg total lead.
- 5. The Permittee must implement the emergency notification requirements established in the California Office of Emergency Management Hazardous Materials, Spill / Release Notification Guidance (http://www.caloes.ca.gov/).
- 6. Any imported material used for backfill must be free of contamination, and a certificate of the material as "clean" with the source area of the material must be provided to Permit Inspector upon request. Importing soils containing greater than 80 mg/kg total lead for use in state right-of-way is not allowed.
- 7. Stockpiles of material containing aerially deposited lead shall not be placed where affected by surface run-on or run-off. Stockpiles shall be covered with plastic sheeting 13 mils minimum thickness or with one foot of nonhazardous material. Stockpiles shall not be placed in environmentally sensitive areas. Stockpiled material shall not enter storm drains, inlets, or waters of the State.

TR - 0153 (Rev. 07/2021) Page 1 of 2



• All work must be authorized by the encroachment permit, and/or as directed by the State's representative. (Notes continue on page 2)

#### ENCROACHMENT PERMIT TRENCH DETAIL

TR - 0153 (Rev. 07/2021) Page 2 of 2

- Must include tracer wire or other continuous measure to provide positive subsurface detection for the life of the facility (Project Development Procedures Manual (PDPM) Chapter 17).
- Open trench installation of underground utility facilities must include warning tape or warning mats complying with the American Public Works Association (APWA) Uniform Color Code for identifying the type of underground utility. Where mechanical protection is installed, warning tape must be placed above the mechanical protection and below the roadbed subgrade as shown on the details. (PDPM Chapter 17).
- Clearance between the trench wall and conduit of less than 6 inches in width shall be a minimum of 2 inches. Clearance between the trench wall and conduit of greater than 6 inches in width shall be a minimum of 6 inches.
- When the trench width is less than 24 inches the backfill for subgrade must consist of slurry cement. Controlled Low-Strength Material (CLSM) can be substituted at the discretion of the State's representative.
- When trench width is greater than 24 inches compacted aggregate base may be used for backfilling.
- Structure backfill and compaction must conform to Section 19-3.02C and 3.03 of the Standard Specifications.
- For trench located under unimproved surface, structure backfill can use the original soil. Soil must be compacted by
  mechanical means. Ponding, jetting or flooding are not allowed. Slurry cement backfill is not optional unless
  approved by the Caltrans District.
- Slurry cement backfill must conform to Section 19-3.02E of the Standard Specifications.
- Aggregate base and its compaction shall conform to Section 26 of the Standard Specifications.
- CLSM if used must conform to Section 19-3.02G of the Standard Specifications. When CLSM is utilized the mix
  design and test results must be submitted to the State's representative. See Appendix H of the Encroachment Permits
  Manual for additional information.
- Cold planed surface and overlay shall be to the nearest lane line for the entire length of the trench/disturbed areas, and/or as directed by the State's representative.
- When Hot mix asphalt (HMA) is used to backfill Asphalt Concrete (AC) Section of the road, HMA must conform to Section 39 of the Standard Specifications.
- A paving notch ("T" Cut) shall be cold planed in exist asphalt concrete to a minimum width of 12 inches beyond each side of the trench and to a depth of 3 inches for the final layer of HMA.
- AC used to replace pavement section shall match existing pavement depth, unless directed otherwise by the State's representative.
- A tack coat of asphaltic emulsion conforming to Section 39-2.01C (3) (f) shall be applied.
- When the trench is within 4 feet of curb and gutter, additional cold planning may be required at the discretion of the State's representative. Potholes or trenches separated / adjoined by 10 feet or less to be overlaid together at the discretion of the State's representative.
- Pavement markings and/or striping removed or damaged during construction must be replaced in kind as directed by the State's representative.
- Other trench related details are shown in Chapter 6 of the Encroachment Permits Manual as well as the Trenching and Shoring Manual. Both publications can be found on the State of California, Department of Transportation's website.
- If trench is located in the roadway where Portland Cement Concrete (PCC) exist, remove the concrete to a depth of at least 3 feet below finished grade as per standard Specification 15-1.03B. Replace entire concrete slab from joint to joint as directed by State's representative.
- Electrical systems installations that are part of State Highway System must be installed in compliance with Caltrans Standard Specifications, Section 87.

#### STEEL PLATE BRIDGING UTILITY

TR -0157 (Rev. 04/2018)

To accommodate excavation work, steel plate bridging may be necessary. All conditions for use of steel plate bridging should be set forth in the special provisions.

Consideration of steel plate bridging should take into account the following factors:

- Traffic speed.
- 2. Traffic Volume and Composition.
- Duration and dimensions (width & daily estimated lengths) of the proposed excavation.
- Weather conditions.

When backfilling operations of an excavation in the traveled way, whether transverse or longitudinal, cannot be properly completed within a work day, steel plate bridging with a non-skid surface and shoring (see Trenching & Shoring) may be required to preserve unobstructed traffic flow. In such cases, the following conditions shall apply:

- 1. Steel plate bridging on freeways is not allowed.
- Steel plates used for bridging must extend a minimum of 12" beyond the edges of the trench.
- Steel plate bridging shall be installed to operate with minimum noise.
- The trench shall be adequately shored, (as mentioned in Section 603.6B-2 of the Encroachment Permits Manual) to support the bridging and traffic loads.
- Temporary paving with cold asphalt concrete shall be used to feather the edges of the plates, if plate installation by Method (2) described below, is used.
- Bridging shall be secured against displacement by using adjustable cleats, shims, or other devices.

As required by the district, steel plate bridging and shoring shall be installed using either Method (1) or (2):

#### Method 1 For speeds of 45 MPH or greater:

The pavement shall be cold planed to a depth equal to the thickness of the plate and to a width and length equal to the dimensions of the plate.

Approach plate(s) and ending plate (if longitudinal placement) shall be attached to the roadway by a minimum of 2 dowels pre-drilled into the corners of the plate and drilled 2" into the pavement. Subsequent plates are to be butted and tack welded to each other.

#### Method 2 For Speeds less than 45 mph:

Approach plate(s) and ending plate (if longitudinal placement) shall be attached to the roadway by a minimum of 2 dowels pre-drilled into the corners of the plate and drilled 2" into the pavement. Subsequent plates are to be butted and tack welded to each other. Fine graded asphalt concrete shall be compacted to form ramps, maximum slope 8.5 % with a minimum 12" taper to cover all edges of the steel plates. When steel plates are removed, the dowel holes in the pavement shall be backfilled with either graded fines of

asphalt concrete mix, concrete slurry, epoxy or an equivalent that is satisfactory to the Caltrans' representative.

The permittee is responsible for maintenance of the steel plates, shoring, asphalt concrete ramps, and ensuring that they meet minimum specifications. Unless specifically noted or granted in the special provisions, or approved by the State representative, steel plate bridging shall not exceed 4 consecutive working days in any given week. Backfilling of excavations shall be covered with a minimum 3" temporary layer of cold asphalt concrete.

The following table shows the advisory minimal thickness of steel plate bridging required for a given trench width (A-36 grade steel, designed for HS20-44 truck loading per Caltrans Bridge Design Specifications Manual).

Trench Width	Minimum Plate Thickness
10"	1/2"
1'-11"	3/4"
2'-7"	7/8"
3'-5"	1"
5'-3"	1 3/4"

NOTE: For spans greater than 5'-3", a structural design shall be prepared by a California registered civil engineer.

All steel plates within the right of way whether used in or out of the traveled way shall be without deformation. Inspectors can determine the trueness of steel plates by using a straight edge and should reject any plate that is permanently deformed.

Steel plates used in the traveled portion of the highway shall have a surface that was manufactured with a nominal Coefficient Of Friction (COF) of 0.35 as determined by California Test Method 342 (See Appendix H, Encroachment Permits Manual). If a different test method is used, the permittee may utilize standard test plates with known coefficients of friction available from each Caltrans District Materials Engineer to correlate skid resistance results to California Test Method 342. Based on the test data, the permittee shall determine what amount of surface wear is acceptable, and independently ascertain when to remove, test, or resurface an individual plate.

Caltrans Inspectors should not enforce plate removal unless it is permanently deformed or delivered without the required surfacing. However, an inspector should document in a diary all contacts with the contractor.

A "Rough Road" (W8-8) sign and a "Steel Plate Ahead" (W8-24) sign with black lettering on an orange background must be used in advance of steel plate bridging along with the required construction area signs. These signs must be used along with any other construction area signs.

Surfacing requirements are not necessary for steel plates used in parking strips, on shoulders not used for turning movements, or on connecting driveways, etc., not open to the public.

#### **UTILITY UNDERGROUND PROVISIONS (UG)**

TR - 0163 (Rev. 04/2018)

In addition to the attached General Provisions (TR-0045), the following special provisions are also applicable:

High priority utilities, pressurized facilities, pipes or ducts 6" or larger in diameter, or placement of multiple pipes or ducts, regardless of diameters are required to be encased on both conventional and access-controlled highway rights-of-way.

A "High Priority Utility" is defined as: 1) a natural gas pipeline greater than 6" in diameter, or with normal operating pressures greater than 60 psig, 2) petroleum pipelines, 3) pressurized sanitary sewer pipelines, 4) high-voltage electric supply lines, conductors, or cables that have a potential to ground of greater than or equal to 60 kV, or 5) hazardous materials pipelines that are potentially harmful to workers or the public if damaged.

An exception to this policy may be allowed on a case by case basis for the installation of Uncased High-Pressure Natural Gas Pipelines when in compliance with the TR-0158 Special Provisions.

The pavement or roadway must not be open-cut unless specifically allowed under a separate "UT" permit. Utility installations must not be installed inside of culverts or drainage structures.

For additional details regarding longitudinal utility encroachments on both conventional and access-controlled highway rights-of-way, see Chapter 600.

UG 1. CASINGS: Casings must be steel conduit with a minimum inside diameter sufficiently larger than the outside diameter of the pipe or ducts to accommodate placement and removal. The casing can be either new or used steel pipe, or an approved connector system. Used pipe must be pre-approved by the Department's engineer or representative before installation.

When the method of Horizontal Directional Drilling (HDD) is used to place casing, the use of High Density Polyethylene Pipe (HDPE) as casing is acceptable.

Reinforced Concrete Pipe (RCP) in compliance of State Standard Specifications is an acceptable carrier for storm drain gravity flow or non-pressure flow. RCP when installed by Bore &Jack must have rubber gaskets at the joints, and holes for grouting of voids left by jacking operations, see "E" below.

A. Minimum wall thickness for steel pipe casing for different lengths and diameters of pipes are as follows:

#### **Minimum Wall Thickness**

Casing Pipe (Diameter)	Up to 150 ft (Length)	Over 150 ft (Length)
6" to 28"	1/4"	1/4"
30" to 38"	3/8"	1/2"
40" to 60"	1/2"	3/4"
62" to 72"	3/4"	3/4"

B. Spiral welded casing is authorized provided the casing is new and the weld is smooth.

- C. The ends of the casing must be plugged with ungrouted bricks or other suitable material approved by the Department's representative.
- D. When required by the Department's representative, the permittee must at his expense, pressure grout the area between the pavement and the casing from within the casing in order to fill any voids caused by the work covered under this permit. The increments for grout holes inside the pipe must be 8' staggered and located 22-1/2 degrees from vertical axis of the casing. Pressure must not exceed 5 psig for a duration sufficient to fill all voids.
- E. There is a spacing requirement when placement of multiple encasements is requested. The distance between multiple encasements must be the greater of either 24" or twice that of the diameter of the larger pipe being installed.
- F. Casings placed within access controlled highway rights-of-way must extend to the right-of-way lines.
- G. Wing cutters, if used, must be a maximum of 1" larger than the casing. Voids caused by the use of wing cutters must be grouted in accordance with "E" above.
- H. A band welded to the leading edge of the casing must be placed square to the alignment. The band must not be placed on the bottom edge. Flaring the lead section on bores over 100' must not be permitted.

- I. All casing lengths must equal to the auger length.
- J. The casings within conventional highways must extend 5' beyond the back of curb or edge of pavement, or to the right of way line if less. Where PCC cross-gutter exists, the casing must extend at least 5' beyond the back of the cross-gutter, or to the right of way line if less.

#### Bore and receiving pits must:

- A. be located at least 10' or more from the edge of pavement on conventional highways in rural areas.
- B. be located 5' behind the concrete curb or AC dike on conventional highways in urban areas.
- C. be located 5' outside the toe of slope of embankment areas.
- D. be located outside access controlled highway rightsof-way.
- E. be adequately fenced and/or have a Type-K barrier placed around them.
- F. be adequately shored in accordance with Cal-OSHA requirements. Shoring for jacking and receiving pits located within 15' of traffic lanes on a State highway must not extend more than 36" above the pavement grade unless otherwise authorized by Department's representative. Reflectors must be affixed to the shoring on the sides facing traffic. A 6' chain link fence must be installed around the perimeter of the pits during non-working hours.
- G. have crushed-rock and sump areas to clear groundwater and water used to clean the casing. Where ground water is found and pumping is required, the pits must be lined with filter fabric.

### UG 2. HORIZONTAL DIRECTIONAL DRILLING: Bore and receiving pits

When HDD is the approved method for pipe installation, drilling plans must contain information listed as follows:

- Location of: entry and exit point, access pit, equipment, and pipe staging area.
- Proposed drill path alignment (horizontal and vertical).
- Location and clearances of all other facilities.
- 4. Depth of cover.
- 5. Soil analysis.\*
- Carrier pipe length, diameter, thickness, and material (HDPE/steel) and ream pipe diameter.

- Detailed carrier pipe calculations confirming ability to withstand installation loads and long-term operational loads including H20.
- Proposed drilling fluid composition, viscosity, and density (based on soils analysis).
- 9. Drilling fluid pumping capacity, pressures, and flow rates
- State right-of-way lines, property, and utility right of way or easement lines.
- 11. Elevations.
- Type of tracking method/system and accuracy used.
- 13. A detailed plan for monitoring ground surface movement (settlement or heave) resulting from the drilling operation.
- \* May be waived by the District Permit Engineer for HDD jobs less than 6" in diameter and a traverse crossing less than 150'.
- UG 3. LIMIT OF EXCAVATION: No excavation is allowed within 10' from the edge of pavement except in curbed urban areas or as specified in the permit. Where no curb exists and excavations within 10' of the traveled way are to remain open, a temporary Type-K railing must be placed at a 10:1 taper or as otherwise directed by the Department.
- **UG 4. TUNNELING:** Review, requirements of Section 603.6A-6 of the Encroachment Permits Manual, if applicable. In addition to the requirements of "UG1" the following requirements apply:
  - A. For the purpose of this provision, a tunnel is defined as any pipe, 30" or larger in diameter placed.
  - B. When tunneling is authorized, the permittee must provide full-time inspection of tunneling operations. The Department's representative must monitor projects.
  - C. A survey grid must be set and appropriately checked over the centerline of the pipe jacking or tunneling operation. Copies of the survey notes must be submitted to the Department's representative.
  - Sand shields may be required as ground conditions change.
  - E. The method used to check the grade and alignment must be approved by the Department's representative.
  - F. Pressure grouting for liner plates, rib and spiling, or rib and lagging tunnels must be at every 8' section or at the end of work shift before the next section is excavated. All grouting must be completed at the end of each workday.
  - G. A method for securing the headway at the end of each workday is required. Breastplates must be

installed during working hours for running sand or super-saturated soil.

UG 5. CLEARANCE AND OFFSET
REQUIREMENTS: All installations must comply with
Chapter 17, Article 4 of the Project Delivery Procedures
Manual (PDPM) for utility clearance and offset
requirements.

# UG 6. FACILITIES EXEMPT FROM THE HIGH PRIORITY UTILITY REQUIREMENTS: The following utilities (not including State owned utilities) are exempt from these policies and do not need to be plotted

exempt from these policies and do not need to be plotted on the plans unless the depiction of the utility is needed for interconnectivity with the proposed work:

- Natural gas service lines less than 2 inches in pipe diameter that have normal operating pressures of 60 psig or less
- Subsurface electrical service connections with a potential to ground of 50 volts or less
- Service connections (laterals) for water, sewer, telephone, telecommunication, and cable service

All State owned utilities must be plotted on the plans.

- **UG 7. DETECTOR STRIP:** A continuous metallic detector strip must be provided with non-metallic main installations. Service connections must be installed at right angles to the centerline of the State highway where possible.
- **UG 8. BACKFILLING:** All backfilling must conform to the applicable sections of the Department's Standard Specifications. Ponding or jetting methods of backfilling are prohibited.

Any required compaction tests must be performed by a certified laboratory at no cost to the Department and the laboratory report furnished to the Department's representative.

UG 9. ROADWAY SURFACING AND BASE MATERIALS: When the permit authorizes installation by the open cut method, surfacing and base materials and thickness thereof must be as specified in the permit.

Temporary repairs to pavements must be made and maintained upon completion of backfill until permanent repairs are made. Permanent repairs to pavements must be made within thirty (30) days of completion of backfill unless otherwise specified by the Department. Temporary pavement patches must be placed and maintained in a smooth riding plane free of humps and/or depressions.

**UG 10. DAMAGE TO TREE ROOTS:** Tree roots 3" or larger in diameter will not be cut within the tree drip

line when trenching or other underground work is necessary adjacent to roadside trees. If such roots are encountered, they must be tunneled under, wrapped in burlap and kept moist until the trench is backfilled. Trenching machines may not be used under trees if the trunk or limbs will be damaged by their use.

If the trees involved are close together and of such size that it is impractical to protect all roots over 3" in diameter, or when roots are less than 4" in diameter, outside tree drip line, special arrangements may be made whereby pruning of the tree tops to balance the root loss can be done by the permittee under the close supervision of the District Landscape Specialist or District Tree Maintenance Supervisor. Manholes must not be installed within 20' of any trunk.

- **UG 11. PIPES ALONG ROADWAY:** Pipes and conduits paralleling the pavement must be located as shown on the plans or located outside of pavement as close as possible to the right-of-way line.
- **UG 12. BORROW AND WASTE:** Borrow and waste will be allowed within the work limits only as specified in the permit.
- **UG 13. MARKERS:** The permittee must not place any markers that create a safety hazard for the traveling public or departmental employees.
- UG 14. CATHODIC PROTECTION: The permittee must perform stray current interference tests on underground utilities under cathodic protection. The permittee must notify the Department prior to the tests. The permittee must perform any necessary corrective measures and advise the Department.
- UG 15. DELETED. Provision left blank intentionally
- **UG 16. INSTALLATION BY OPEN CUT METHOD:** When the permit authorizes installation by the open cut method no more than one lane of the highway pavement must be open-cut at any one time. Any exceptions must be in writing by the Department's representative. After the pipe is placed in the open section, the trench is to be backfilled in accordance with specifications, temporary repairs made to the surfacing and that portion opened to traffic before the pavement is cut for the next section.

If, at the end of the working day, backfilling operations have not been properly completed, steel plate bridging must be required to make the entire highway facility available to the traveling public in accordance with the "Steel Plate Bridging Special Provisions" (TR-0157)

**UG 17. PAVEMENT REMOVAL:** PCC pavement to be removed must be saw cut at a minimum depth of 4" to provide a neat and straight pavement break along both sides of the trench. AC pavement must be saw cut to the full depth.

Where the edge of the trench is within 2' of existing curb and gutter or pavement edge, the asphalt concrete pavement between the trench and the curb or pavement edge must be removed.

UG 18. DELETED. Provision left blank intentionally.\*

**UG 19. SIDES OF OPEN-CUT TRENCHES:** Sides of open cut trenches in paved areas must be kept as nearly vertical as possible. Trenches must not be more the 2' wider than the outside diameter of the pipe to be laid therein, plus the necessary width to accommodate shoring.

#### **UG 20. EXCAVATION UNDER FACILITIES:**

Where it is necessary to excavate under existing curb and gutter, or underground facilities, the void must be backfilled with two (2) sack cement-sand slurry.

#### UG 21. PERMANENT REPAIRS TO PCC

**PAVEMENT:** Repairs to PCC pavement must be made of Portland Cement Concrete containing a minimum of 658 lbs. or 7 sack of cement per cubic yard. Replaced PCC

pavement must equal existing pavement thickness. The concrete must be satisfactorily cured and protected from disturbance for not less than forty-eight (48) hours. Where necessary to open the area to traffic, no more than two (2%) percent by weight of calcium chloride may be added to the mix and the road opened to traffic after six (6) hours.

#### UG 22. REMOVAL OF PCC SIDEWALKS OR

CURBS: Concrete sidewalks or curbs must be saw cut to the nearest score marks and replaced equal in dimension to that removed with score marks matching existing sidewalk or curb.

UG 23. SPOILS: No earth or construction materials are to be dragged or scraped across the highway pavement, and no excavated earth placed or allowed to remain at a location where it may be tracked onto the highway traveled way, or any public or private approach by the permittee's construction equipment, or by traffic entering or leaving the highway traveled way. Any excavated earth or mud so tracked onto the highway pavement or public or private approach must be immediately removed by the permittee.

\*NOTE: Special Provision was deleted since it is already part of the EP General Provisions (TR-0045)

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

#### CERTIFICATION OF COMPLIANCE WITH AMERICANS WITH DISABILITIES ACT (ADA)

TR-0405 (REV 03/2015)

Permit No. 06-22-N-MC-0605
Dist/Co/Rte/PM 06/FRE/201/0.141

Encroachment permit projects that create, alter, or affect pedestrian facilities are required to be designed and constructed in accordance with the policies and standards in the current Design Information Bulletin 82 (DIB 82). Certification of compliance must be submitted by the permittee or permittee's authorized representative <u>prior to</u> the issuance of an encroachment permit or rider <u>AND</u> after construction is completed. DIB 82 can be found at:

#### http://www.dot.ca.gov/hq/oppd/dib/dibprg.htm

A separate TR-0405 form must be used for the Design and Post Construction Certifications. A California Licensed Professional Engineer, Licensed Architect or Licensed Landscape Architect's Stamp\* is required except when (1) an authorized utility company representative or (2) an authorized Caltrans representative signs the form (at the discretion of the District Permit Engineer).

Design Certification (prior to issuance of encroachment permit)								
☑ IEdgar Noriega		_ a California Licensed Professional Engineer, Licensed Architect or Licensed Landscape Architect do hereby certify that:						
	an auth	an authorized Caltrans representative, do hereby certify that:						
□ I		norized representative ofify that:	(utility company only)					
This project has been designed in acc	ordance v	vith DIB 82.						
An approved Exception to Accessibili	An approved Exception to Accessibility Design Standards is attached.							
SIGNATURE -		TITLE	DATE					
- Jul		Division Manager	05/17/2022					
,								
	Post	Construction Certification						
□ I		ornia Licensed Professional Engineer, Licensed Architect or Licenseby certify that:	sed Landscape Architect,					
□ ı	an auth	norized Caltrans representative, do hereby certify that:						
□ I		norized representative of	(utility company only)					
	do cert	ify that:						
This project has been constructed in accordance with DIB 82.								
An approved Exception to Accessibilit	y Design S	Standards is attached.						
SIGNATURE		TITLE	DATE					

ARCHITECT OR LICENSED LANDSCAPE ARCHITECT'S STAMP

Edgar A. Noriega
No. 61555
Exp. 06/30/23
CIVIL
OF CALIFORNIA

I attest to the technical information contained herein and have judged the qualifications of all technical specialists providing engineering data upon which recommendations, conclusions, and decisions were based

CA. LICENSED PROFESSIONAL ENGINEER, LICENSED

\*A Licensed Architect or Licensed Landscape Architect may prepare this document and sign and seal it in lieu of a Registered Civil Engineer, provided the same Licensed Architect or Licensed Landscape Architect designed the on-site improvements. Use the seal of the appropriate licensed person in responsible charge.



## District 6 Lane Closure Manager Email: D6Permit\_LCS@dot.ca.gov

FAX (559) 445-5100

## All requests are due by Monday, 5PM for work starting the following week.

Caltrans District 6 Closure Request Form for Encroachment Permits
Permit # (06XX-XXXX-XXXX)  Permit Inspector
Contact Name and Company Office Phone Cell Phone Fax
Route Direction
Begin County Begin Location Begin PM Begin Date Begin Time (HH:MM)
End County End Location End PM End Date End Time (HH:MM) : 24 Hr
Facility (Check one)  Type of Closure (Check one)  Connector  Conventional  Mainline  Lane / Shldr  Alternate lanes  Stndrd  Long-term  Direction  Direction  Direction
Lane(s) to be Closed (Check All that Apply)  Description of Work  Lane 1 Lane 2 Lane 3 Lane 4
Aux Ln Rt Shldr Lt Shldr Rt Turn Ln Lt Turn Ln
Additional Remarks
1

<sup>\*</sup> Standard is lasting less than 24 hours // Long-Term is lasting at least 24 hours // Intermittent is lasting no more than 10 minutes at a time Updated: May 2, 2012

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION NOTICE OF COMPLETION TR-0128 (REV 06/01) CT #7541-5529-1	STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION  NOTICE OF COMPLETION  TR-0128 (REV 06/01) CT #7541-5529-1
PERMIT NO.	PERMIT NO.
Dear Sir or Madam: All work authorized by the above-numbered permit was completed on  DATE	Dear Sir or Madam: All work authorized by the above-numbered permit was completed on  DATE
SIGNATURE OF PERMITTEE	SIGNATURE OF PERMITTEE
ADA Notice FM 92 1546 M  ADA Notice For individuals with sensory disabilities, this document is available in alternate formats. For information call (916) 654-6410 or TDD (916) 654-3880 or write Records and Forms Management, 1120 N Street, MS-89, Sacramento, CA 95814.	ADA Notice  For individuals with sensory disabilities, this document is available in alternate formats. For information call (916) 654-6410 or TDD (916) 654-3880 or write Records and Forms Management, 1120 N Street, MS-89, Sacramento, CA 95814.
STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION  NOTICE OF COMPLETION  TR-0128 (REV 06/01) CT #7541-5529-1	STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION  NOTICE OF COMPLETION  TR-0128 (REV 06/01) CT #7541-5529-1
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TR-0100 (REV 12/2018)	MII APPLI	CATION	FOR CALTRANS USE TRACKING NO.
Complete <u>ALL</u> fields, write "N/A" if not applicable. This application is not complete until all requirement			06-22-N-MC-0605 DIST/CO/RTE/PM 06/FRE/201/0.141
Permission is requested to encroach on the State I	Highway right-o	of-way as follows:	SIMPLEX STAMP
1. COUNTY	2. ROUTE	3. POST MILE	- CINII LEX CTAINII
Fresno	201	0.141	
4. ADDRESS OR STREET NAME	5. CITY		
Simpson Street	Kingsburg		
6. CROSS STREET (Distance and direction from p	roject site)		DATE OF SIMPLEX STAMP
At the intersection of Simpson Street and Route 20			5/24/2022
7. WORK TO BE PERFORMED BY			ONTRACTOR'S (DOUBLE) PERMIT?
□ APPLICANT ⊠ CONTRACTOR	⊠ NO		de the Parent Permit Number
9. ESTIMATE START DATE		ED COMPLETION DATE	
11/01/2022	12/01/2022	THE WAY DIGHT OF W	/AV
11. ESTIMATED NUMBER OF WORKING DAYS V	WITHIN STATE	E HIGHWAY RIGHT-OF-W	AY
12. ESTIMATED CONSTRUCTION COSTS WITH	IN STATE HIG	HWAY RIGHT-OF-WAY	
\$15,000	III O I / (I E I III O	111/1/11 1110111-01-1//11	
13. HAS THE PROJECT BEEN REVIEWED BY A	NOTHER CAL	TRANS BRANCH?	
14. FUNDING SOURCE(S)			
☐ FEDERAL ☐ STATE ☒ LOCAL ☐ PRIV	VATE ☐ SB	1 (ROAD REPAIR AND A	CCOUNTABILITY ACT OF 2017)
15. CALTRANS PROJECT CODE (ID)			REFERENCE / UTILITY WORK ORDER NUMBER
N/A		Golden State Blvd	Corridor Infrastructure Improvements
17. DESCRIBE WORK TO BE DONE WITHIN STA			
Attach 6 complete sets of plans (folded to 8.5")	x 11") and any	applicable specifications,	calculations, maps, traffic control plans, etc.
Grind and overlay existing asphalt roadway. R	Replace portion	of curb and gutter, Roady	vay striping, pavement markings, loop detectors, and 🛱
install signs.			× × × × × × × × × × × × × × × × × × ×
SWPPP and Project Specific Traffic Control to	be deferred to	the Double Permit Applic	eation /submittal to be submitted by the Contractor.
18 (a). PORTION OF STATE HIGHWAY RIGHT-O		DE MODK IS BEING DDO	
☐ Traffic lane ☐ Shoulder ☐ Sidewalk ☐		RE WORK IS BEING PROP	
I I Iraπic lane   I Shoilider   I Sidewalk   I	N A 1.	A	
	_	At or near an intersection	☐ Mobile work
	Median ⊠ e of pavement		☐ Mobile work
	e of pavement	Other	☐ Mobile work
Outside of the shoulder, feet from edg	e of pavement  AND METHOD	☐ Other	☐ Mobile work
<ul> <li>☐ Outside of the shoulder, feet from edg</li> <li>18 (b). PROPOSED TRAFFIC CONTROL PLANS</li> <li>☐ No traffic control needed  State Standard Plant</li> </ul>	e of pavement AND METHOD lans (T-Sheets	☐ Other ) ) # <u>T</u> 9, T11, T11A	☐ Mobile work
<ul> <li>☐ Outside of the shoulder, feet from edg</li> <li>18 (b). PROPOSED TRAFFIC CONTROL PLANS</li> <li>☐ No traffic control needed   State Standard Pl</li> <li>☐ Project specific Traffic Control Plans included</li> </ul>	e of pavement AND METHOD lans (T-Sheets  To be subm	Other  T9, T11, T11A  nitted by contractor	
□ Outside of the shoulder, feet from edg 18 (b). PROPOSED TRAFFIC CONTROL PLANS □ No traffic control needed ☑ State Standard Pl □ Project specific Traffic Control Plans included  19. MAX. DEPTH (in) MIN. DEPTH	e of pavement AND METHOD lans (T-Sheets To be subm (in) AVG. WID	Other  ) # T9, T11, T11A  nitted by contractor  OTH (in) LENGTH (ft)	SURFACE TYPE (e.g. Asphalt, concrete, soil, etc.)
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Management Unit at (916) 445-1233, TTY 711, or write to Records and Forms Management, 1120 N Street, MS-89, Sacramento, CA 95814.

#### STANDARD ENCROACHMENT PERMIT APPLICATION

TR-0100 (REV 12/2018)

TRACKING NO. 06-22-N-MC-0605

#### The following questions must be answered when a City, County or other public agency IS NOT involved in the approval of this project.

Your answers to these questions will assist Caltrans staff in identifying any physical, biological, social or economic resources that may be affected by your proposed project within State Highway right-of-way and to determine which type of environmental studies may be required to approve your application for an encroachment permit. It is the applicant's responsibility for the production of all required environmental documentation and supporting studies and in some cases this may be costly and time consuming. If possible, attach photographs of the location of the proposed project. Answer these questions to the best of your ability. Provide a description of any "YES" answers (type, name, number, etc.).

	A. Will any existing vegetation and/or landscaping within State Highway right-of-way	be disturbe	d?		
	B. Are there waterways (e.g. river, creek, pond, natural pool or dry streambed) adjacent to	o or within the	e limits o	of the proposed project?	
	C. Is the proposed project located within five miles of the coast line?				_
	D. Will the proposed project generate construction noise levels greater than 86 decib	bels (dBA) (e	e.g. Ja	ck-hammering, pile driving)?	_
	E. Will the proposed project incorporate land from a public park, recreation area or w	vildlife refuge	e open	to the public?	_
	F. Are there any recreational trails or paths within the limits of the proposed project?				_
	G. Will the proposed project impact any structures, buildings, rail lines or bridges with	thin State Hi	ghway	right-of-way?	_
	H. Will the proposed project impact access to any businesses or residences?				
	I. Will the proposed project impact any existing public utilities or public services?				_
	J. Will the proposed project impact any existing pedestrian facilities, such as sidewal	lks, crosswa	alks or o	overcrossings?	_
	K. Will new lighting be constructed within or adjacent to State Highway right-of-way?	?			
22.	2. Will the proposed project cause a substantial change in the significance of a historical or cultural resource?			ars or older), (if "YES", provide a description)	
23.	<ol> <li>Will the proposed project be on an existing State Highway or street where the activity significant tree or stand of trees, a rock outcropping or a historic building)</li> </ol>	•		of a scenic resource? (e.g. A (if "YES", provide a description)	_
24.	I. Is work being done on the applicant's property in addition to State Highway right-of-way?		] NO tach 6	complete sets of site and grading plan	ıs
25.	5. Will the proposed project require the disturbance of soil?  If "YES", estimate the area of disturbed soil within State Highway right-of-way in acres: and estimate the area of disturbed soil outside State Highway right-of-way in acres:	-	NO		
26.	6. Will the proposed project require dewatering?  If "YES", estimate Total gallons AND gallons/month (Total gallons) AN SOURCE*:  STORMWATER  NON-STORMWATER  **See Caltrans SWMP for definition of non-storm water discharge:  STORMWATER   NON-STORMWATER   N		(	(gallons/month)	
27.	7. How will any storm water or ground water be disposed?  ☑ Storm Drain System ☐ Combined Sewer / Stormwater System ☐ Stormwater  ☐ Other (explain)	r Retention E	Basin	□ N/A	_

#### STANDARD ENCROACHMENT PERMIT APPLICATION

TR-0100 (REV 12/2018)

33. TITLE

**ADA Notice** 

**Division Manager** 

TRACKING NO. 06-22-N-MC-0605

#### READ THE FOLLOWING CLAUSES PRIOR TO SIGNING THIS ENCROACHMENT PERMIT APPLICATION.

The applicant's submission of this application to the California Department of Transportation constitutes the applicant's agreement and representation that the work or other activity contemplated by the encroachment permit application shall comply with all applicable standards, specifications, policies, requirements, conditions, and regulations of the California Department of Transportation, and the applicant understands the application may be denied if there is non-compliance with any of the above. An exception process exists and may result in approval of a non-compliant encroachment, in the discretion of the California Department of Transportation, but the exception process may require additional time to complete. The applicant understands and agrees all work or other activity contemplated by the encroachment permit application is subject to inspection and oversight by the California Department of Transportation. The applicant understands and agrees encroachment permit fees must still be paid if an application is withdrawn or denied. The applicant understands a denial may be appealed, in accordance with California Streets and Highways Code, Section 671.5, and the related regulations found in California Code of Regulations, Title 21, Division 2, Chapter 8, Article 2.

The applicant understands and agrees that immediately upon issuance of the encroachment permit the applicant is bound by, subject to, and must comply with the "Encroachment Permit General Provisions" (TR-0045), "Stormwater Special Provisions" (TR-0400) and any other applicable Special Provisions and Conditions of the encroachment permit. The "Encroachment Permit General Provisions" (TR-0045), and the Stormwater Special Provisions (TR-0400) are available at: <a href="http://www.dot.ca.gov/trafficops/ep/docs/Appendix\_K\_(WEB).pdf">http://www.dot.ca.gov/trafficops/ep/docs/Appendix\_K\_(WEB).pdf</a>. If a paper copy is needed of the "Encroachment Permit General Provisions" (TR-0045) and/or "Stormwater Special Provisions" (TR-0400), please contact the District Office of Encroachment Permits. Their contact information is available at: <a href="http://www.dot.ca.gov/trafficops/ep/docs/Appendix\_G\_(WEB).pdf">http://www.dot.ca.gov/trafficops/ep/docs/Appendix\_G\_(WEB).pdf</a>. The "Encroachment Permit General Provisions" (TR-0045) and any other applicable Special Provisions and Conditions will be provided as part of the encroachment permit. Information about Stormwater requirements is available at the Internet address: <a href="http://www.dot.ca.gov/hq/construc/stormwater/">http://www.dot.ca.gov/hq/construc/stormwater/</a>.

The applicant understands an encroachment permit may be denied, revoked, and/or a bond may be required, for non-payment of prior or present encroachment permit fees. An encroachment permit is not a property right and does not transfer with the property to a new owner. Each of the persons purporting to execute this application on behalf of the applicant and/or on behalf of the applicant's authorized agent or engineer represents and warrants such person has full and complete legal authority to do so and to thereby bind applicant to the terms and conditions herein and to the terms and/or conditions of the encroachment permit. Applicant understands and agrees this application may be executed in one or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. Executed copies of this application and/or its counterparts may be reproduced and/or exchanged by copy machine, mailing, facsimile, or electronic means (such as e-mail), and such copies shall be deemed to be effective as originals.

28. NAME OF APPLICANT (Project or Property Owner or Organization	)	
Fresno Council of Governments		
ADDRESS OF APPLICANT (Include City, State and Zip Code)		
2035 Tulare St #201 Fresno, CA 93721		
E-MAIL ADDRESS	PHONE NUMBER	FAX NUMBER
joshi@fresnocog.org	559-233-4148	
29. NAME OF AUTHORIZED AGENT / ENGINEER (A "Letter of Authorization" is required if different from #28)		IS A LETTER OF AUTHORIZATION ATTACHED?
Ed Noriega P.E., Mark Thomas		
ADDRESS OF AUTHORIZED AGENT / ENGINEER (Include City,	State and Zip Code)	
7571 N. Remington Ave #102 Fresno, CA 93711		
E-MAIL ADDRESS	PHONE NUMBER	FAX NUMBER
enoriega@markthomas.com	(530) 848-1222	
30. NAME OF BILLING CONTACT (Same as #28 ⊠ Same as #29 [	<u> </u>	
Pankaj Joshi		
BILLING ADDRESS WHERE INVOICE(S) IS / ARE TO BE MAILEI	O (Include City, State and Zip Code)	
2035 Tulare St #201 Fresno, CA 93721	_	
E-MAIL ADDRESS	PHONE NUMBER	FAX NUMBER
joshi@fresnocog.org	559-233-4148	
* I hereby certify under penalty of perjury under the laws of the State of submitted with or in support of this application are true and correct to submitted with or in support of this application are true and correct copprovided information that is false, intentionally incomplete, or misleading or both fine and imprisonment. (Penal Code Section 72)	the best of my knowledge and belief, pies of unaltered original documents.	and that copies of any documents I further understand that if I have
31. SIGNATURE OF APPLICANT OR AUTHORIZED AGENT*	32. PRINT OR TYPE NAME	
	Ed Noriega	

For individuals with sensory disabilities, this document is available in alternate formats. For alternate format information, contact the Forms Management Unit at (916) 445-1233, TTY 711, or write to Records and Forms Management, 1120 N Street, MS-89, Sacramento, CA 95814.

34. DATE 05/17/2022

#### STANDARD ENCROACHMENT PERMIT APPLICATION

TR-0100 (REV 12/2018)

#### **INSTRUCTIONS**

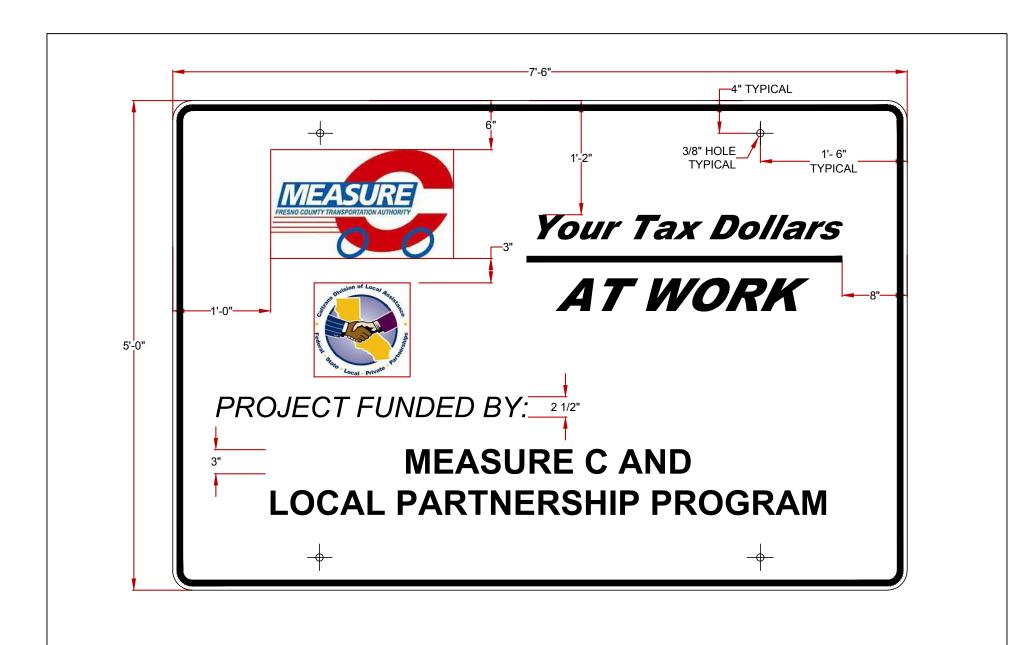
Complete ALL fields, write "N/A" if not applicable. Type or print clearly. All dimensions must be in U.S. Customary (English) units.

Print your application single sided and submit all of the required attachments (See Section VII A&B of the "Encroachment Permit Application Guide Booklet" found at: http://www.dot.ca.gov/trafficops/ep/docs/EP Application Guide Booklet.pdf).

- 1. County (e.g. Fresno, San Francisco, Los Angeles, etc.)
- 2. State Highway Route Number (e.g. I-5, SR-99, etc.)
- Highway Postmile: (location of work, see <a href="https://postmile.dot.ca.gov/">https://postmile.dot.ca.gov/</a>)
   If unable to determine, contact the appropriate District Encroachment
   Permits Office for assistance at: <a href="http://www.dot.ca.gov/trafficops/ep/docs/Appendix G">http://www.dot.ca.gov/trafficops/ep/docs/Appendix G</a> (WEB).pdf
- Address of project site (if the property has a physical address with a Number and Street/Road Name)
- 5. City (e.g. Sacramento, Redding, Irvine, etc.)
- Distance and the direction from the nearest cross street to the project site (e.g. 500 ft. north of "C" Street).
- Indicate whether the work will be performed by the applicant (your own forces) or by a contractor.
- 8. Indicate if you are applying for a "Contractor's (Double) Permit" and provide the "Parent Permit Number".
- 9. Estimated start date for the proposed work. (Allow a minimum of 60 calendar days from the submittal date of your application for processing)
- 10. Estimated completion date for the proposed work.
- 11. Estimated number of working days within State Highway right-of-way.
- Estimated construction costs for all work to be done within State Highway right-of-way.
- Has another Caltrans' branch seen or reviewed your project? Which branch? (e.g. Design, Project Management, Right-of-Way, Environmental, etc.)
- 14. Identify funding source(s) for the proposed work.
- Caltrans' Project Code (ID) if this is a State project, capital project, or joint venture project.
- Your company's reference number or utility work order number for this project.
- 17. Describe the proposed work to be done entirely. If applicable, attach six (6) complete sets of FOLDED plans (folded 8-½" X 11") and any applicable specifications, calculations, maps, etc.
- 18. (a) Identify portion(s) of State right-of-way where work will occur and (b) proposed traffic control plans to be used if any.
- 19. Maximum and minimum depth, average width, and length of the excavation area. Existing surface type (e.g. Asphalt, concrete, soil, etc.)
- 20. Product being transported (e.g. water, natural gas, etc.) Carrier pipe, diameter (inches) and material (e.g. Steel, HDPE, etc.) Casing pipe (if any), diameter and material Proposed installation method, Voltage of electrical current or pressure of liquid or gas.

- Replacement and/or abandonment of an existing facility (e.g. Abandoning pipe and filling it with two-sack slurry cement)
- 21. Check "YES", if you are getting a permit or approval from another agency (City, County, etc.), and an environmental determination has been made. Then check the Categorically Exempt, Negative Declaration, Environmental Impact Report box or Other if one has been prepared. Attach a copy of the approved document and a copy of the Notice of Determination. Skip questions A-K on page 2 of the application.
  - If you checked "NO", check the box of the appropriate type of work to be done, or check "other" and fill in the type of work to be done. <u>Also answer questions A-K on page 2 of the application.</u>
- 22. A Historical Resource includes, but is not limited to, any object, building, structure, site, area, place, record, or manuscript that has historical or archaeological significance, or significance in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California.
- 23. In this context a Scenic Resource includes, but is not limited to, trees that display outstanding features of form or age; unique, massive rock formations; historic buildings that are rare examples of their period, style, design, or which have special architectural features and details of importance.
- 24. Is there any work being done on the applicant's property?
- 25. Indicate if the proposed project will require the disturbance of soil. If "YES," estimate the area within AND outside of State Highway right-of-way in acres.
- 26. Indicate if the proposed project will require dewatering. If "YES," estimate volume in total gallons AND gallons per month. Also indicate the source: Stormwater or Non-Stormwater (see Caltrans Stormwater Management Plan for definitions of non-stormwater discharge at: <a href="http://www.dot.ca.gov/hq/env/stormwater">http://www.dot.ca.gov/hq/env/stormwater</a>).
- 27. Indicate how any stormwater or ground water will be disposed of from or near the limits of the proposed project.
- 28. Name of the applicant or organization applying for the permit. List the mailing address, e-mail address, phone and fax numbers.
- 29. Name of the authorized agent or engineer acting on behalf of the applicant or organization. Attach a letter of authorization signed by the applicant or organization. List the mailing address, e-mail address, phone and fax numbers.
- 30. Name of the billing contact. List the mailing address where invoices are to be mailed, email address, phone and fax numbers.
- 31. Signature of the applicant or applicant's authorized agent.
- 32. Name of the applicant or applicant's authorized agent.
- 33. Title (owner, president, etc.) of the applicant or applicant's authorized agent.
- 34. Date of the signature.

## **Construction Funding Sign**



		DATE:	
DESIGNED:	ERIK CHIN	08/10/2022	:
DRAWN:	ERIK CHIN	08/10/2022	ı
CHECKED:	ED NORIEGA	08/10/2022	

SCALE NONE
DRAWING NO. 01



#### DEPARTMENT OF PUBLIC WORKS AND PLANNING

CONSTRUCTION PROJECT FUNDING SIGN
GOLDEN STATE BLVD IMPROVEMENT PROJECT

## Mitigation Monitoring and Reporting Program

#### SECTION FIVE - MITIGATION MONITORING AND REPORTING PROGRAM

Section 21081.6 of the California Environmental Quality Act (CEQA) requires a public agency to adopt a reporting or monitoring program in those cases where the public agency finds that changes or alterations have been required in, or incorporated into, a project, and that those changes mitigate or avoid a significant effect on the environment. A public agency may delegate the monitoring or reporting responsibilities to another public agency or private entity that accepts the delegation, but the lead agency remains responsible for ensuring that the mitigation measures have been implemented (CEQA Guidelines § 15097).

The following table lists each mitigation measure identified in the Draft Initial Study and Mitigated Negative Declaration (IS/MND) and Final IS/MND and identifies the monitoring or reporting program, and timing for such efforts.

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Table 5-1
Mitigation Monitoring and Reporting Program

Impact Number	Mitigation Measure	Implementing Agency	Monitoring Agency	Implementation Plan and Timing
3.1 Aesthetic	l CS	Agency	Agency	and Timing
3.1-1	Prior to issuance of construction permits for the project, the project proponent shall provide a lighting plan to the lead agency or designee for review and approval. The plan shall include provisions to ensure that outdoor lighting is designed so that potential glare or light spillover to surrounding land uses is minimized through appropriate site design and shielding of light fixtures. Exterior lighting shall not create glare for neighboring properties but shall provide adequate onsite lighting for safety and security purposes. The lead agency or designee will review the final design plans to ensure that all lighting is directed downward and away from neighboring properties. This mitigation measure does not preclude the use of small-scale decorative lighting does not spill over onto adjacent property. Each jurisdiction's improvement standards will remain in effect.	Project Proponent	Lead Agency or Designee	Prior to issuance of construction permits
3.4 Biologica 3.4-1	To reduce potential impacts to western mastiff bats and/or pallid bats that could occur during construction activities, the following measures shall be implemented prior to and during construction activities to reduce impacts to a level that is less than significant. The Lead Agency or Designee shall determine the applicability of the following measures depending on specific construction activities and shall implement such measures when required.  Prior to the removal of trees, or construction activities within 100 feet of the Corridor, the project applicant will conduct a survey to determine the presence of roosting bats. The survey should be conducted 14 days prior to the start of the proposed activity. A Survey shall be conducted during the day to determine potential signs of bats (e.g., white wash, guano) and	Project Proponent	CDFG, Lead Agency or Designee	Prior to removal of trees

Impact Number	Mitigation Measure	Implementing Agency	Monitoring Agency	Implementation Plan and Timing
	at dusk, when bats would be expected to be emerging from roost sites. A Survey will be conducted by a wildlife biologist qualified to identify the species of bats using these roosts. If the survey determines that no bats are roosting on or in structures, bridges or trees, then no further mitigation is required.	228		
	If roosting bats are present, the biologist will determine if the roost is a day roost or is a maternal roost. If the roost is determined to be a maternal roost, construction activities that cause the abandonment of the maternal roost or cause harm to bats (e.g., diesel fumes being trapped under the bridges) will be prohibited until the biologist determines that the bat pups have left the roost and are able to fend for themselves. The biologist will consult with the California Department of Fish and Game (CDFG) for further guidance on avoiding and minimizing impacts on a maternal colony.			
	If bats are determined to be roosting within the proposed project area, the above measures will be implemented before demolition or construction occurs. If it is determined that the roost is a day roost, the wildlife biologist who conducted the preconstruction survey will recommend appropriate measures to exclude the bats from roosting. These include installing exclusion devices (i.e., lightweight polypropylene netting [<1/6-inch mesh], plastic sheeting, tube-type excluders, etc.) to prevent roosting bats from being in the project area when construction occurs. The biologist will also recommend, through consultation with the CDFG and other bat experts, appropriate replacement roosting habitat for the displaced bats.			
3.4-2	Because there is the potential for San Joaquin kit foxes to occur on site, the United States Fish and Wildlife Service's (USFW)	Project Proponent	CDFG, Lead Agency or	Prior to and during ground disturbance

Impact Number	Mitigation Measure	Implementing Agency	Monitoring Agency	Implementation Plan and Timing
Trumoer .	Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance shall be followed. The measures that are listed below have been excerpted from those guidelines and will protect San Joaquin kit foxes from direct mortality and from destruction of active dens and natal or pupping dens. The Lead Agency or Designee shall determine the applicability of the following measures depending on specific construction activities and shall implement such measures when required.  • Pre-construction surveys shall be conducted no fewer than 14 days and no more than 30 days prior to the beginning of ground disturbance and/or construction activities, or any project activity likely to impact the San Joaquin kit fox or American badger. Exclusion zones shall be placed in accordance with USFWS Recommendations using the following:    Potential Den   50 foot radius   Natal/Pupping Den   Contact U.S. Fish and   (Occupied and   Wildlife Service for   Unoccupied)   guidance   Atypical Den   50 foot radius   So fo	rigoney	Designee	
	If dens must be removed, they must be appropriately monitored and excavated by a trained wildlife biologist. Replacement dens will be required. Destruction of natal dens and other "known" kit fox dens must not occur until authorized by USFWS.  Project-related vehicles shall observe a 20-mph speed limit in all project areas, except on county roads and State and Federal highways; this is particularly important at night when kit foxes are most active. Nighttime construction shall be avoided, unless			

Impact Number	Mitigation Measure	Implementing Agency	Monitoring Agency	Implementation Plan and Timing
7 (87.1007	the construction area is appropriately fenced to exclude kit foxes. The area within any such fence must be determined to be uninhabited by San Joaquin Kit foxes prior to initiation of construction. Off-road traffic outside of designated project areas shall be prohibited.			
	To prevent inadvertent entrapment of kit foxes or other animals during the construction phase of the project, all excavated, steep-walled holes or trenches more than 2 feet deep should be covered at the close of each working day by plywood or similar materials, or provided with one or more escape ramps constructed of earth fill or wooden planks. Before such holes or trenches are filled, they should be thoroughly inspected for trapped animals. If at any time a trapped or injured kit fox is discovered, the procedures under numbers 8 and 9 of this section must be followed.			
	** Kit foxes are attracted to den-like structures such as pipes and may enter stored pipe, becoming trapped or injured. All construction pipes, culverts, or similar structures with a diameter of 4-inches or greater that are stored at a construction site for one or more overnight periods shall be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in anyway. If a kit fox is discovered inside a pipe, that section of pipe should not be moved until the USFWS has been consulted. If necessary, and under the direct supervision of the biologist, the pipe may be moved once to remove it from the path of construction activity, until the fox has escaped.			
	<ul> <li>All food-related trash items such as wrappers, cans, bottles, and food scraps shall be disposed of in closed containers and</li> </ul>			

Impact Number	Mitigation Measure	Implementing Agency	Monitoring Agency	Implementation Plan and Timing
	removed at least once a week from a construction or Project Site.	<u> </u>	<u> </u>	
	<ul> <li>No firearms shall be allowed on the project site.</li> </ul>			
	<ul> <li>To prevent harassment, mortality of kit foxes or destruction of dens by dogs or cats, no pets shall be permitted on Project Sites.</li> </ul>			
	• A representative shall be appointed by the project proponent who will be the contact source for any employee or contractor who might inadvertently kill or injure a kit fox, or who finds a dead, injured or entrapped individual. The representative's name and telephone number shall be provided to the USFWS and CDFG.			
	■ In the case of trapped animals, escape ramps or structures shall be installed immediately to allow the animal(s) to escape, or the USFWS and CDFG should be contacted for advice.			
	Any contractor, employee(s), or military or agency personnel who inadvertently kills or injures a San Joaquin kit fox shall immediately report the incident to their representative. This representative shall contact the CDFG immediately in the case of a dead, injured or entrapped kit fox. The CDFG contact for immediate assistance is State Dispatch at (916) 445 0045. They will contact the local warden or biologist.			
	The Sacramento Fish and Wildlife Office and CDFG will be notified in writing within three working days of the accidental death or injury to a San Joaquin kit fox during project related activities. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal and any other pertinent information. The USFWS contact is the			

Impact Number	Mitigation Measure	Implementing Agency	Monitoring Agency	Implementation Plan and Timing
	Chief of the Division of Endangered Species, 2800 Cottage Way, Suite W2605, Sacramento, CA 95825-1846, and (916) 414-6620. The CDFG contact is Mr. Ron Schlorff at 1416 9th Street, Sacramento, CA 95814, (916) 654-4262.			
3.4-3	To reduce project related impacts to active bird nests and to reduce the potential for construction activities to interrupt breeding and rearing behaviors of birds, the following measures shall be implemented prior to and during construction activities to reduce impacts to a level that is less than significant. The Lead Agency or Designee shall determine the applicability of the following measures depending on specific construction activities and shall implement such measures when required.	Project Proponent	CDFG, Lead Agency or Designee	Prior to construction (14 to 30 days prior)
	A pre-construction survey shall be conducted to determine the presence of nesting birds if ground clearing or construction activities will be initiated during the breeding season (February 15 through September 15). The project site and potential nesting areas within 500 feet of the site shall be surveyed 14 to 30 days prior to the initiation of construction. Surveys will be performed by a qualified biologist or ornithologist to verify the presence or absence of nesting birds. Construction shall not occur within a 500 foot buffer surrounding nests of raptors or a 250 foot buffer surrounding nests of migratory birds. If construction within these buffer areas is required or if nests must be removed to allow continuation of construction, then approval will be obtained from CDFG.			
	All trees which are suitable for Swainson's hawk nesting that are within 2,640 feet of construction activities shall be inspected for nests by a qualified biologist.			
	If potential Swainson's hawk nests are located, surveys to determine whether Swainson's hawks use those nests will be			

Impact	Mitigation Measure	Implementing	Monitoring	Implementation Plan
Number		Agency	Agency	and Timing
	determined by conducting surveys at the following intensities, depending upon dates of initiation of construction.			

Construction start	Survey period	Number of surveys	Timing
1 January to 20 March	1 January to 20 March	1	All day
21 March to 24 March	1 January to 20 March	1	All day
	21 March to 24 March	Up to 3	Sunrise to 1000 and 1600 to sunset
24 March to 5 April	1 January to 20 March	1	All day
	21 March to 5 April	3	Sunrise to 1000 and 1600 to sunset
6 April to 9 April	21 March to 5 April	3	Sunrise to 1000 and 1600 to sunset
	6 April to 9 April	Up to 3	Sunrise to 1000 and 1600 to sunset
	1 January to 20 March	1 (if all 3 surveys are performed between 6 and 9 April, then this survey not needed	All day
10 April to 30 July	21 March to 5 April	3	Sunrise to 1000 and 1600 to sunset
	6 April to 20 April	3	Sunrise to 1200 and 1630 to sunset
31 July to 15 September	6 to 20 April	3	Sunrise to 1200 and 1630 to sunset
	10 to 30 July	3	Sunrise to 1200 and 1600 to sunset

Impact Number	Mitigation Measure	Implementing Agency	Monitoring Agency	Implementation Plan
Number	A nest can be eliminated as a potential Swainson's hawk nest if another species of raptor is using the nest;  If Swainson's hawks are detected to be nesting in trees within 600 feet of the construction area, construction will not occur within this zone until after young Swainson's hawks have fledged (this usually occurs by early June). The nest will be monitored by a qualified biologist to determine fledging date. If Swainson's hawks are found within the project area, the project site would be considered foraging habitat and compensation for foraging habitat would be required by CDFG at a ratio of 0.75 to 1 (0.75 acre for every 1.0 acre adversely affected).  If other raptors are found nesting within 250 feet of the construction area, construction will be postponed until after young have fledged. The date of fledging will be determined by a qualified biologist. If construction cannot be delayed within this zone, the CDFG will be consulted and alternative protection measures required by the CDFG will be followed.	Agency	Agency	and Timing
	• The removal of trees shall not occur during the breeding season (February 1st to September 15th). Trees slated for removal during the breeding season shall be surveyed by a qualified biologist prior to removal to ensure that there are no nesting birds occupying the tree.			
3.4-4	Prior to construction the project proponent shall ensure that buffer areas of up to 100 feet are provided for work occurring near all canals and ditches. The buffer area shall be shown on the applicable construction design maps. The implementing agency/local jurisdiction shall be responsible for reviewing and approving the construction maps with the required buffer area. If a	Project Proponent	CDFG, Lead Agency or Designee	Prior to and during construction

Impact Number	Mitigation Measure	Implementing Agency	Monitoring Agency	Implementation Plan and Timing
	100 foot avoidance area cannot be maintained during construction, a discharge permit and SWPPP shall be prepared for the specific project component.			
	The Fresno COG shall be provided with documentation to show that this mitigation measure has been implemented.			
3.5 Cultural	Resources		ı	
3.5-1	Although there is no recorded evidence of historic or archaeological sites on the project site, there is the potential during project-related excavation and construction for the discovery of cultural resources. The project proponent shall incorporate into the construction contract(s) for the project a provision that includes the following measures:	Project Proponent	Lead Agency or Designee	Prior to and during construction
	<ul> <li>Before initiation of construction or ground-disturbing activities associated with the project, the project proponent for all project phases shall require all construction personnel to be alerted to the possibility of buried cultural resources, including historic, archeological and paleontological resources;</li> </ul>			
	■ The general contractor and its supervisory staff shall be responsible for monitoring the construction project for disturbance of cultural resources; and			
	■ If a potentially significant historical, archaeological, or paleontological resource, such as structural features, unusual amounts of bone or shell, artifacts, human remains, or architectural remains or trash deposits are encountered during subsurface construction activities (i.e., trenching, grading), all construction activities within a 100-foot radius of the identified potential resource shall cease until a qualified archaeologist			

Impact	Mitigation Measure	Implementing	Monitoring	Implementation Plan
Number		Agency	Agency	and Timing
	evaluates the item for its significance and records the item on the appropriate State Department of Parks and Recreation (DPR) forms. The archaeologist shall determine whether the item requires further study. If, after the qualified archaeologist conducts appropriate technical analyses, the item is determined to be significant under California Environmental Quality Act, the archaeologist shall recommend feasible mitigation measures, which may include avoidance, preservation in place or other appropriate measure, as outlined in Public Resources Code section 21083.2. The lead agency or designee shall implement said measures.			
3.5-2	The project proponent shall incorporate into the construction contract(s) for the project a provision that includes the following measure:  If ground-disturbing activities uncover previously unknown human remains, Section 7050.5 of the California Health and Safety Code applies, and the following procedures shall be followed:  There shall be no further excavation or disturbance of the area where the human remains were found or within 50 feet of the find until the Fresno County or local agency Coroner is contacted. Duly authorized representatives of the Coroner shall be permitted onto the project site and shall take all actions consistent with Health and Safety Code Section 7050.5 and Government Code Section 27460, et seq. Excavation or disturbance of the area where the human remains were found or within 50 feet of the find shall not be permitted to re-commence until the Coroner determines that the remains are not subject to the provisions of law concerning investigation of the circumstances, manner, and cause of any death. If the Coroner determines the remains are Native American, the Coroner shall contact the NAHC within 24 hours, and the NAHC	Project Proponent	Lead Agency or Designee	Prior to and during construction

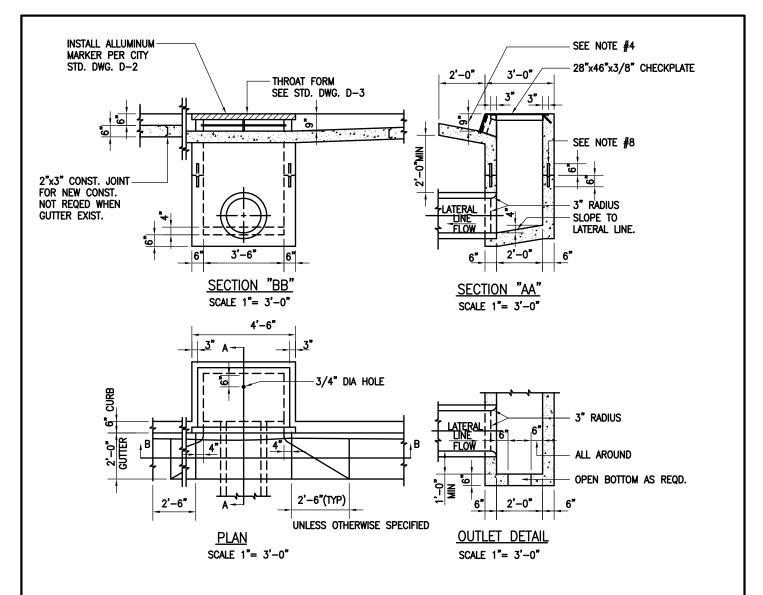
Impact	Mitigation Measure	Implementing	Monitoring	Implementation Plan
Number	shall identify the person or persons it believes to be the "most likely descendant" (MLD) of the deceased Native American. The MLD may make recommendations to the landowner or the person responsible for the excavation work, for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in PRC Section 5097.98.	Agency	Agency	and Timing
3.7 Greenhou	use Gas Emissions		l	
3.7-1	<ul> <li>Prior to issuance of construction and/or encroachment permits, the project proponent shall incorporate the GHG reduction measures outlined below. The lead agency or designee shall be responsible for reviewing and approving the final design plans.</li> <li>Ensure that construction equipment is properly sized for the task.</li> <li>Properly maintain construction equipment.</li> <li>Strictly prohibit unnecessary idling of internal combustion engines.</li> <li>Provide landscaping along the corridor that will reduce surface warming, and through photosynthesis, decrease CO<sub>2</sub>.</li> <li>Incorporate the use of energy efficient lighting, such as LED traffic signals. While LED bulbs (or balls) are more costly than incandescent bulbs, the LEDs last five to six years, compared to the one year average lifespan of the incandescent bulbs previously used. The LED bulbs themselves consume 10</li> </ul>	Project Proponent	Lead Agency or Designee	Prior to issuance of construction and/or encroachment permits
	percent of the electricity of traditional lights, which will also help reduce CO <sub>2</sub> emissions.			

Impact Number	Mitigation Measure	Implementing Agency	Monitoring Agency	Implementation Plan and Timing
	Hazardous Materials	rigency	rigency	und Timing
3.8-1	Prior to issuance of grading permits by the implementing agency, the project proponent shall provide the implementing agency with proof of consultation with the Chevron Environmental Management Company (CEMC) in instances where subsurface construction (depths up to 10 feet) are likely to encounter the TAOC pipeline. The project proponent shall prepare a management plan in consultation with the CEMC to address the potential hazards and ensure that crude oil impacted soil and pipelines are properly remediated and/or abandoned in accordance with state and federal regulations The implementing agency shall review and approve the management plan. The CEMC may be contacted at (800) 338-5334 or via email at contact@hppinfo.com. The Fresno COG and/or lead agency or designee shall be provided with documentation that this mitigation measure has been implemented.	Project Proponent	Lead Agency or Designee	Prior to issuance of grading permits
3.9 Hydrolog	gy/Water Quality			
3.9-1	Prior to issuance of construction and encroachment permits for landscaping, the project proponent shall submit landscaping plans to the lead agency or designee for review and approval demonstrating that landscaping will comply with the requirements in the State of California Updated Model Water Efficient Landscape Ordinance (AB 1881). The landscaping plans shall identify outdoor irrigation water conservation measures, such as but not limited to:  Drought-resistant vegetation;  Irrigation systems employing the following features:	Project Proponent	Lead Agency or Designee	Prior to issuance of construction and encroachment permits for landscaping
	Drip irrigation;			

Impact	Mitigation Measure	Implementing	Monitoring	Implementation Plan
Number		Agency	Agency	and Timing
	<ul> <li>Low-precipitation-rate sprinklers;</li> <li>Bubbler/soaker systems;</li> <li>Programmable irrigation controllers with automatic rain shutoff sensors and flow sensing capabilities;</li> <li>Matched precipitation rate nozzles that maximize the uniformity of the water distribution characteristics of the irrigation system; and</li> <li>Conservative sprinkler spacings that minimize overspray onto paved surfaces.</li> <li>Hydrozones that keep plants with similar water needs in the same irrigation zone;</li> <li>Minimally or gently sloped landscaped areas to minimize runoff and maximize infiltration; and</li> <li>Organic topdressing mulch in non-turf areas to decrease evaporation and increase water retention.</li> </ul>			
3.9-2	Prior to issuance of construction and encroachment permits, the project proponent shall incorporate into the their final design plan the low impact design features detailed in the Golden State Corridor Design Guidelines Manual to the maximum extent feasible. Additionally, the project proponent shall consider the implementation of the "Recycled Water Usage Final Technical Report" recommendations as applicable and to the extent feasible. The implementing agency and/or local jurisdiction shall be responsible for reviewing and approving the final design plans.	Project Proponent	Lead Agency or Designee	Prior to issuance of construction and encroachment permits
3.9-3	Prior to issuance of construction and encroachment permits for landscaping, the project proponent shall submit design-level drainage plans demonstrating the provision of adequate stormwater	Project Proponent	Lead Agency or Designee	Prior to issuance of construction and encroachment permits

Impact Number	Mitigation Measure	Implementing Agency	Monitoring Agency	Implementation Plan and Timing
	drainage facilities to the lead agency or designee for review and approval.			for landscaping
3.12 Noise				
3.12-1	The lead agency or designee shall require that construction contractors comply with all applicable local regulations regarding noise suppression and attenuation and shall require that enginedriven equipment be fitted with mufflers according to manufacturers' specifications. The following requirements shall be included in the construction specifications:  Limit construction activities to the hours of 7:00 a.m. to 7:00 p.m. on weekdays and the hours of 8:00 a.m. to 5:00 p.m. on weekends and federally recognized holidays except as required to alleviate traffic congestion or safety hazards;  Locate fixed construction equipment such as compressors and generators at distances no less than 250 feet from sensitive receptors (including occupied residential property boundaries);  Shroud or shield impact tools, and muffle or shield intake and exhaust ports on power construction equipment;  Construction equipment using internal combustion engines shall be in proper tune; and  Comply with Caltrans Standard Special Provisions Section 5.1.	Project Proponent	Lead Agency or Designee	Prior to issuance of grading permits and/or construction permits

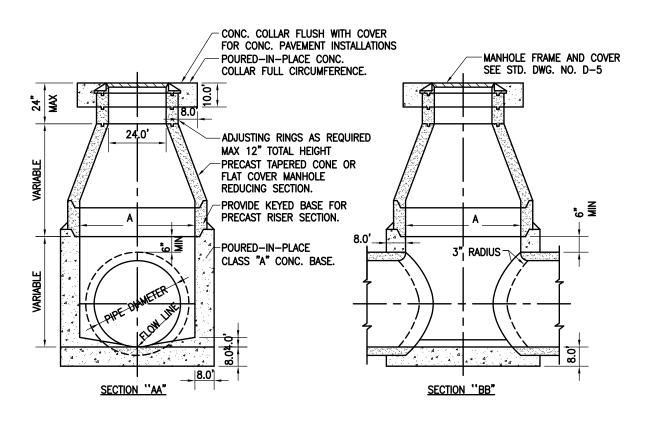
# CITY OF KINGSBURG STANDARD DRAWINGS AND SPECIFICATIONS

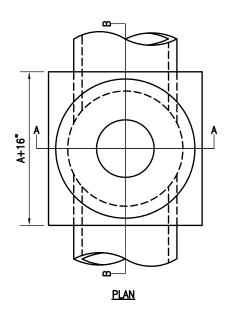


#### NOTES:

- 1. THE INLET MAY BE MODIFIED SLIGHTLY TO MATCH EXISTING IMPROVEMENTS, AS DIRECTED BY THE CITY ENGINEER.
- 2. STRUCTURE SHALL BE CLASS "A" CONCRETE. EXPOSED SURFACES SHALL BE FINISHED AS PER CURB SPECIFICATIONS.
- 3. COST OF FRAME AND GRATE AND THROAT FRAME SHALL BE INCLUDED IN PRICE OF INLET OR OUTLET.
- 4. WHEN EMPLOYED AS OUTLET, PLACE GUTTER 6" BELOW TOP OF CURB GRADE AND ELIMINATE ½" IRON ROD FROM THROAT FORM.
- 5. CURB AND GUTTER SHALL BE CONSTRUCTED OR RECONSTRUCTED ON EACH SIDE OF BOX AS INDICATED ON THE PLANS AND COST THEREOF SHALL BE INCLUDED IN PRICE OF INLET OR OUTLET.
- 6. FLOOR OF THE INLET SHALL SLOPE FROM ALL WAYS TO THE LATERAL LINE AND SHALL BE GIVEN A STEEL TROWELED FINISH.
- 7. AT THE CONTACT POINT BETWEEN THE LATERAL LINE AND THE INLET WALL A SMOOTH 3" RADIUS CURVE SHALL BE CONSTRUCTED.
- 8. IF INLET IS CONSTRUCTED IN A TWO STAGE POUR, PROVIDED A ROUGHENED CONSTRUCTION JOINT AND PLACED ONE NO.4 BAR 12" LONG IN EACH OF THE FOUR WALLS, AS SHOWN.

REVISIONS		CITY OF KINGSBURG	CTD
FEB 09		CITT OF KINGSDONG	טוכ
			No.
		CURB INLET	D_1





## MANHOLE DIMENSIONS

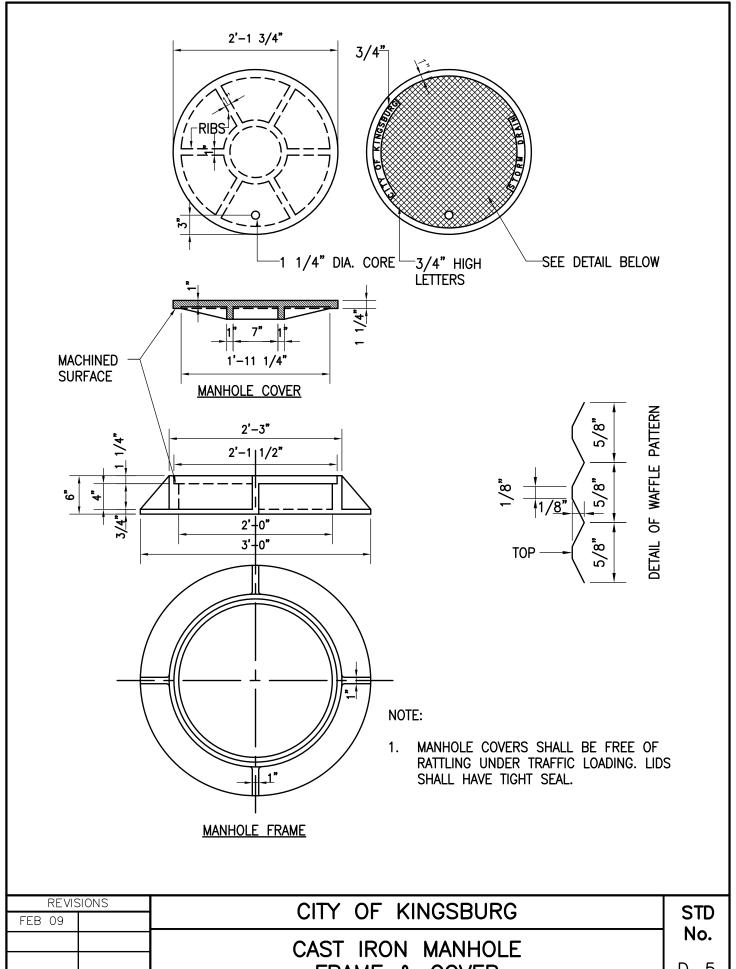
PIPE DIAMETER	Α
12"-36"	48"
42"-48"	60"
54"-60"	70 <b>"</b>
_	

- 1. PRECAST PIPE ADJUSTING RINGS AND TAPERED SECTIONS SHALL BE CONSTRUCTED IN ACCORDANCE WITH A.S.T.M. C-478, USING TYPE II CEMENT.

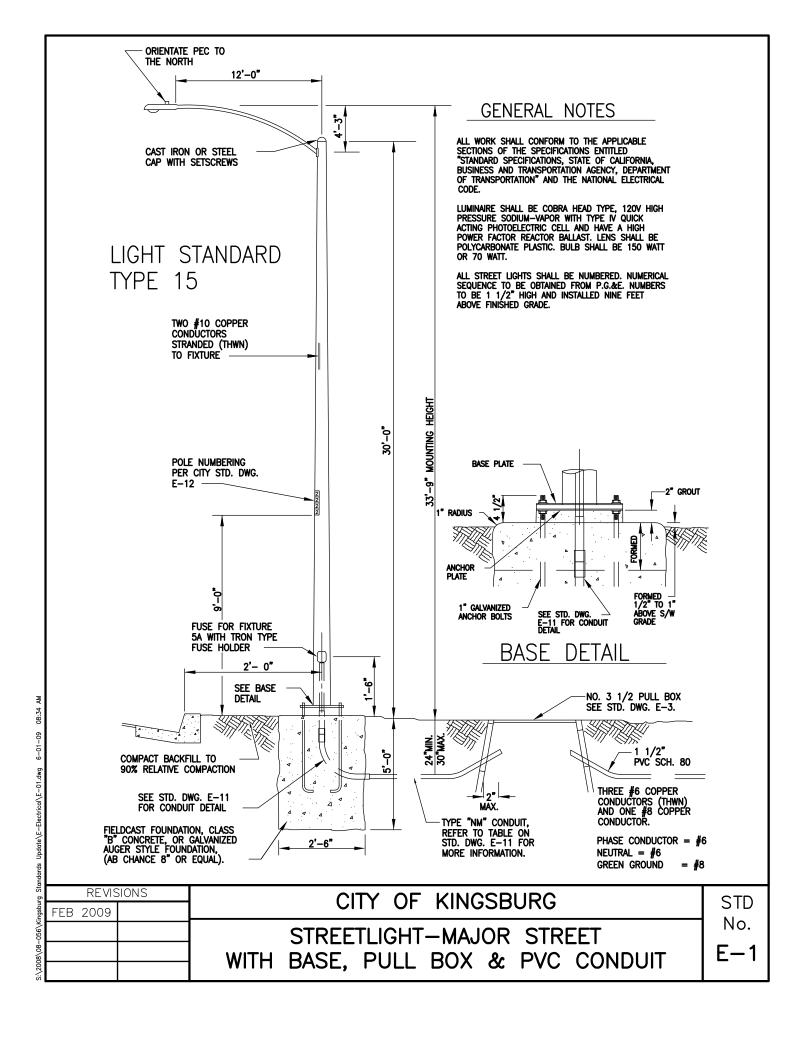
  2. ALL JOINTS BETWEEN PRECAST SECTIONS SHALL BE
- MORTARED.

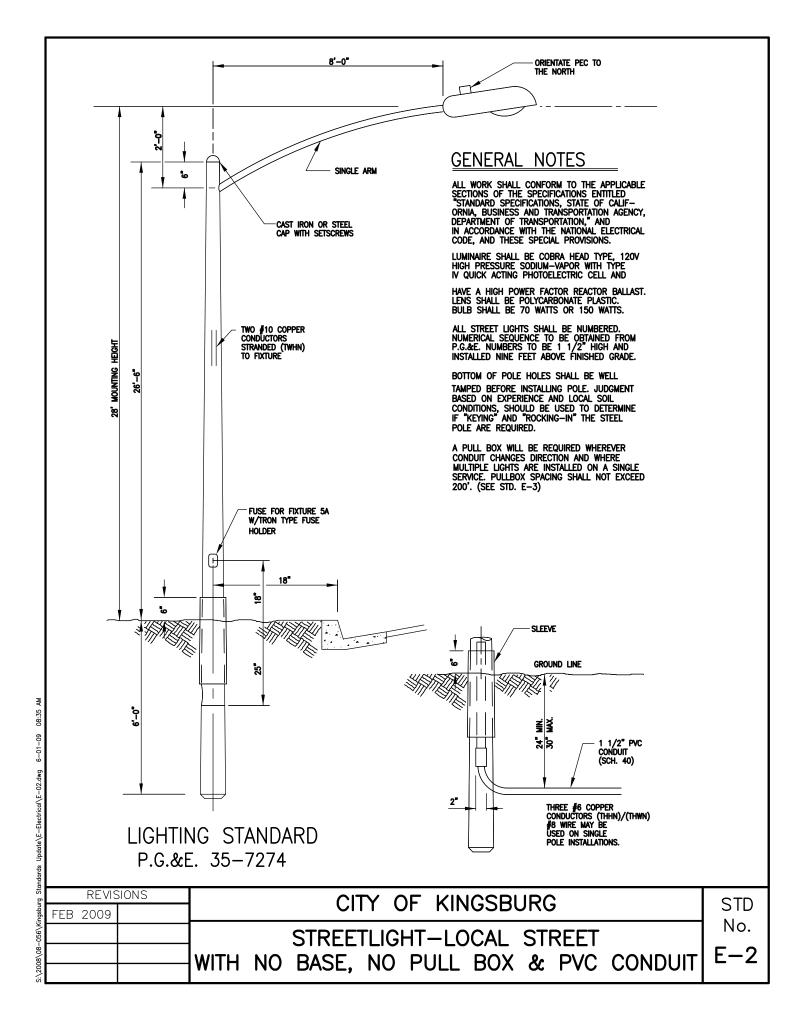
  3. INTERIOR OF THE MANHOLE SHALL HAVE A SMOOTH TROWELED SURFACE.

REVISIONS		CITY OF KINGSBURG	CTD
FEB 09		CITT OF KINGSBORG	STD
		TYPE 'A'	No.
		—	D-4
		MANHOLE	



CITE OF KINGSBURG	ן טוכ ן
CAST IRON MANHOLE	No.
	D-5
FRAME & COVER	



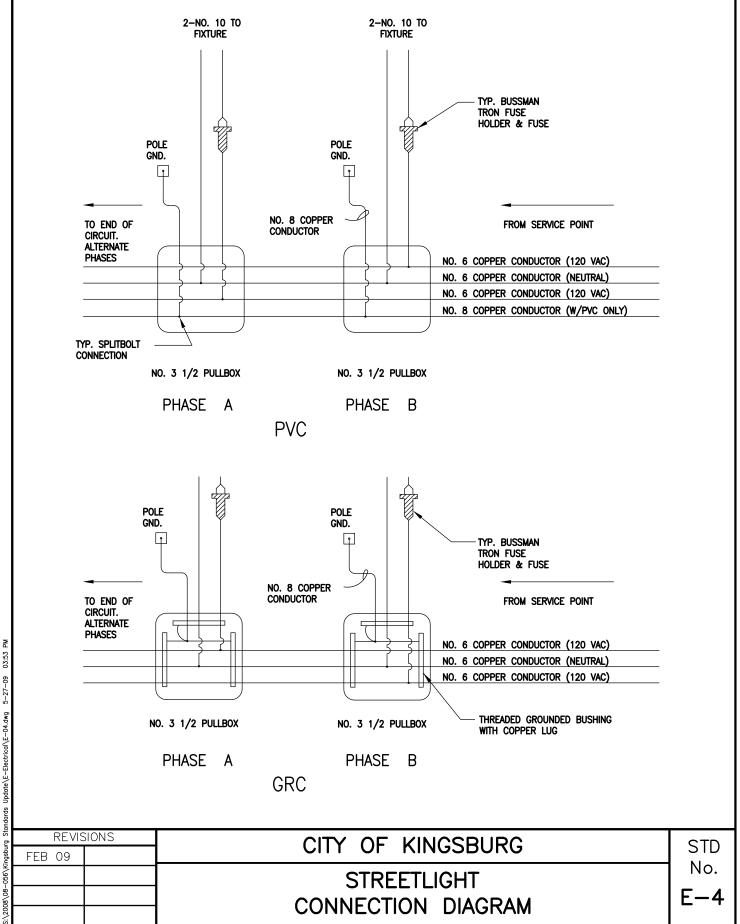


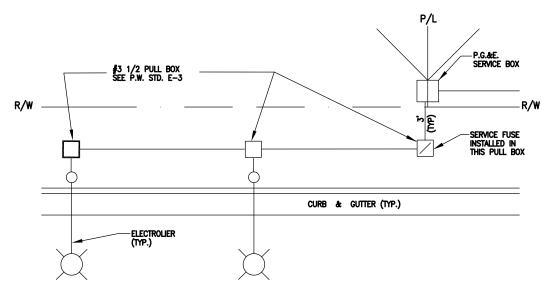
#### **GENERAL NOTES:**

- PULL BOXES SHALL BE #3 1/2 AS PER CAL TRANS STANDARD SPECIFICATIONS OR CHRISTY N-9 OR APPROVED EQUAL.
- PULL BOXES SHALL GROUTED PRIOR TO INSTALLATION OF CONDUCTORS, SLOPED TOWARD THE DRAIN HOLE. PLACE A LAYER OF ROOFING PAPER BETWEEN THE CRUSHED ROCK AND THE GROUT.
- 3. PULL LIDS BEFORE POURING CONCRETE AROUND PULL BOXES.
- 4. WRAP PULL BOX WITH ROOFING PAPER BEFORE BACKFILLING.
- 5. FUSE AT POINT OF SERVICE SHALL BE 60A IF #6 CONDUCTOR AND 40A IF #8 CONDUCTOR AND SHALL HAVE A TRON TYPE FUSE HOLDER. (SINGLE POLE)
- INSTALL A ONE-FOOT RING OF CONCRETE, FOUR INCHES DEEP, AROUND THE WRAPPED PULL BOXES INSTALLED IN DIRT AREAS. SLOPED TO DRAIN AWAY FROM THE PULL BOX.

andc				
rg St	REVIS	SIONS	CITY OF KINGSBURG	CTD
ndsbu	FEB 2009		CITI OF KINGSBUKG	טוט
056\Ki			STREETLIGHTS	No.
-80\8				E-3
:\200			CONCRETE PULL BOXES	

356\Kingsburg Standards Update\E-Electrical\E-03.dwg 5-27-09 03:52

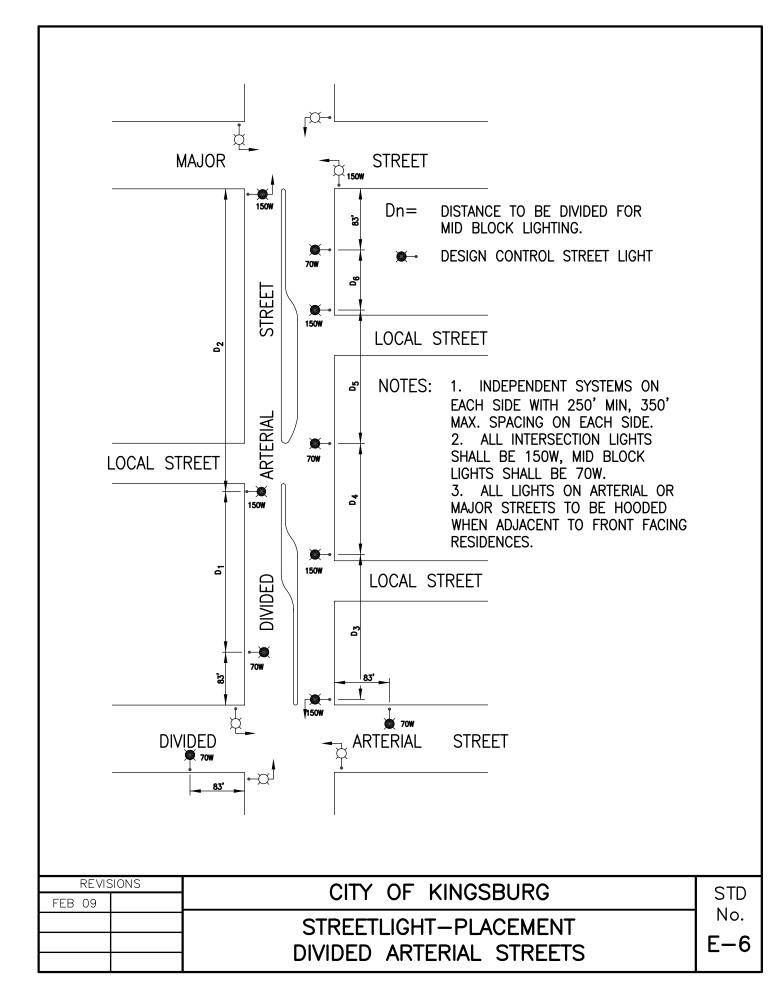


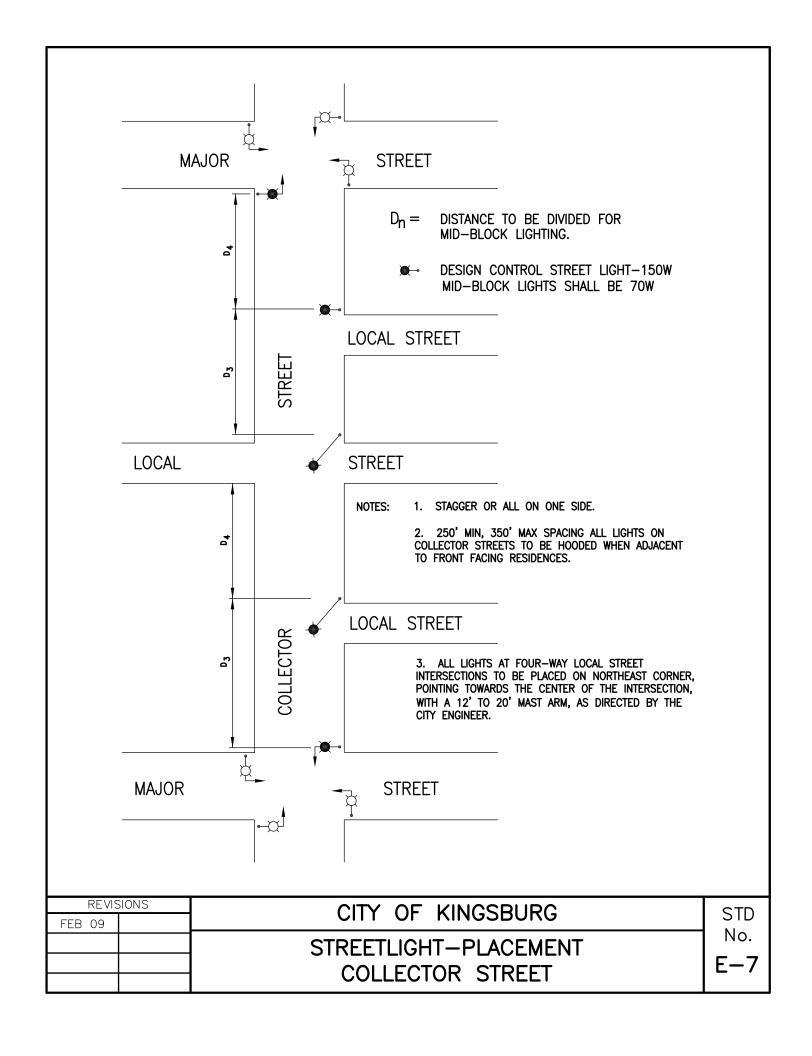


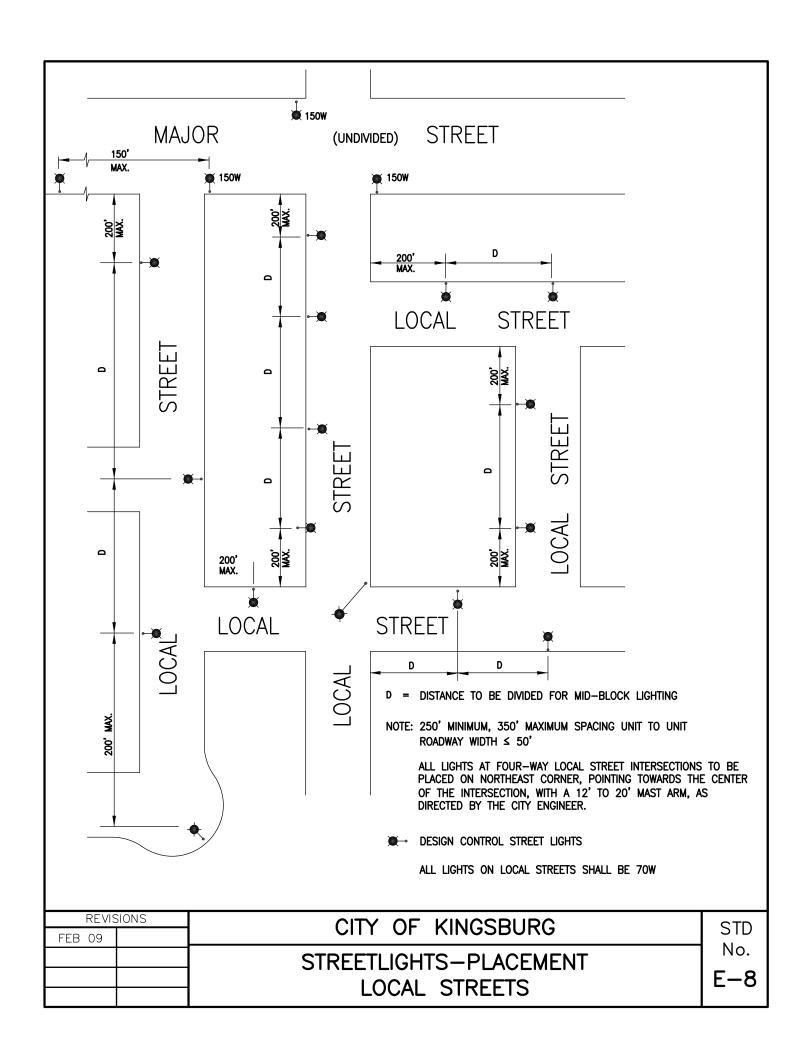
## MULTIPLE LIGHT INSTALLATION

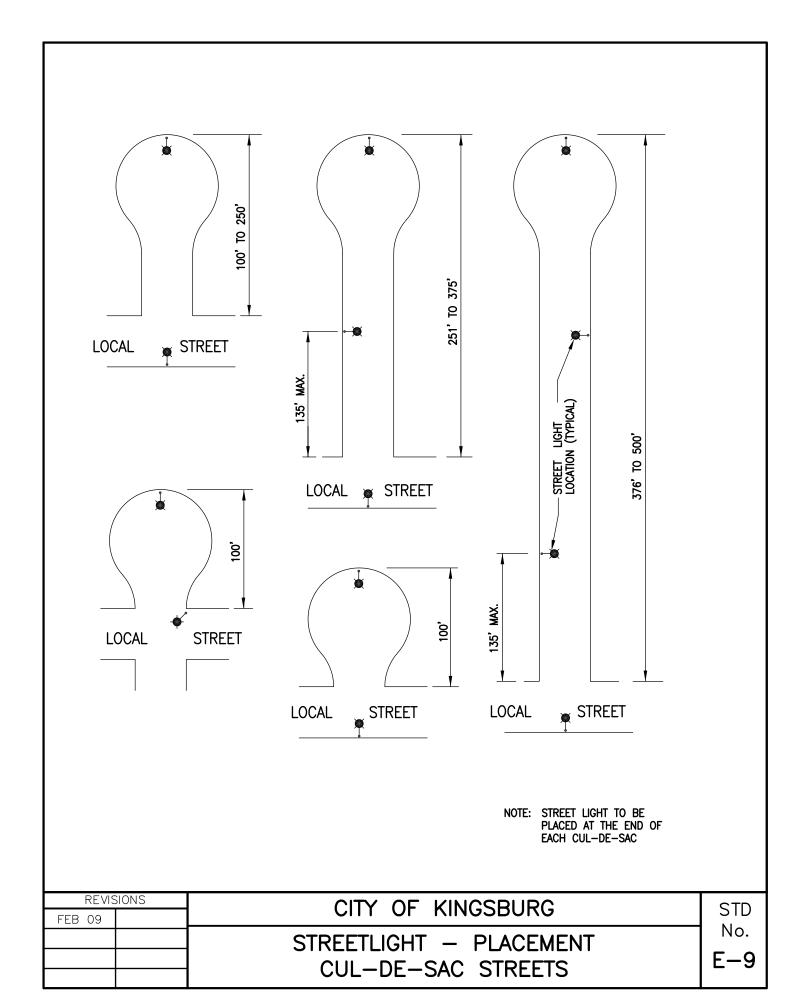
- CONDUIT SHALL BE SCHEDULE 40 PVC ON LOCAL STREETS AND SCHEDULE 80 PVC ON MAJOR STREETS. LOCAL STREET CROSSINGS SHALL BE SCHEDULE 80 PVC, AND MAJOR STREETS CROSSINGS SHALL BE GALVANIZED RIGID CONDUIT.
- 2. LOCATE STREET LIGHTS ON THE SAME SIDE OF THE STREET AS THE P.G.&E. SERVICE WHEN POSSIBLE.
- 3. DO NOT LOCATE THE PULL BOXES ABOVE THE JOINT TRENCH.
- PULL BOX SPACING SHALL NOT EXCEED 200' AND SHALL BE REQUIRED IN ALL CONDUIT CHANGE OF DIRECTION.

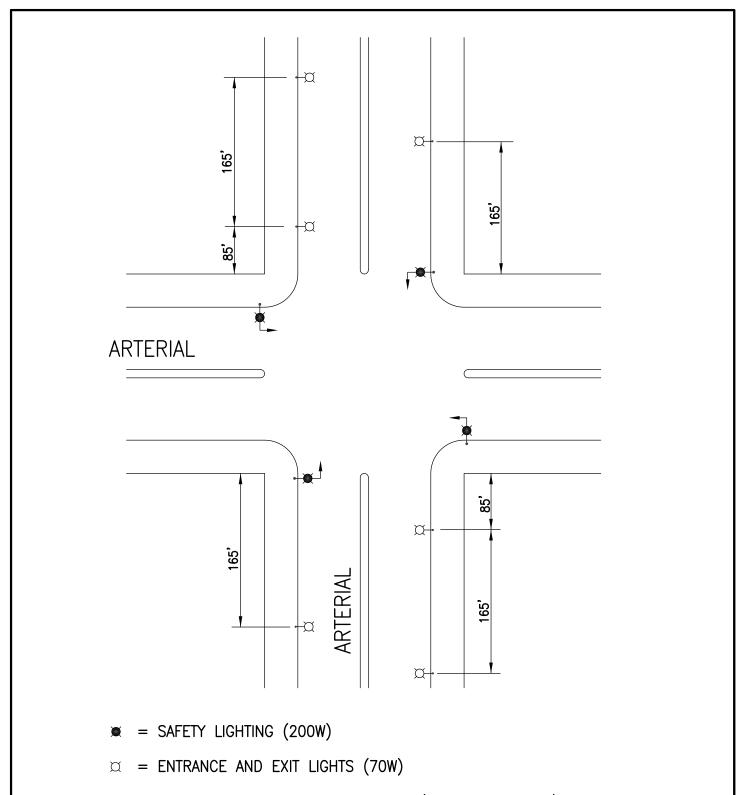
urg St	REVIS	SIONS	CITY OF KINGSBURG	STD
Kingsb	FEB 09		OTT OF KINGOBONG	No.
-056\k			STREETLIGHT LAYOUT	110.
80\80				E-5
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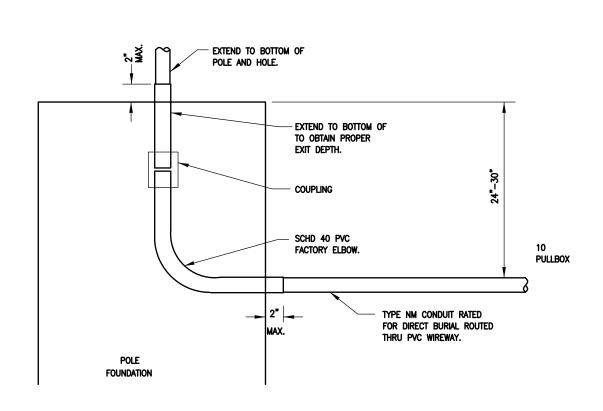






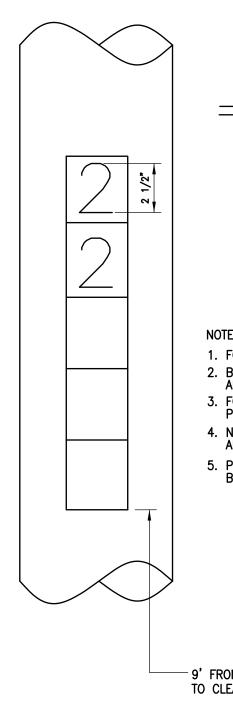
NOTE: SAFETY LIGHTS & APPROACH LIGHTS (ENTRANCE & EXIT) TO BE ON SEPARATE BREAKERS OF SAME CONTACTOR.

REVIS	SIONS	CITY OF KINGSBURG	QTD
FEB 09		OTT OF KINOSDONO	N <sub>2</sub>
		STREETLIGHTS-PLACEMENT	INO.
			E-10
		ARTERIAL INTERSECTION	



POLE TYPE	PVC	NM
PPBP	2"	1"
POLE TYPE	2.5"	1.5"
POLE TYPE	2.5"	1.5"
POLE TYPE	3"	2"

ırg Sto	REVIS	SIONS	CITY OF KINGSBURG	QTD
Kingsbur	FEB 09		CITT OF KINGSDONG	טוט
.056\K			STREETLIGHTS	No.
-80\80				E-11
S:\200			FOUNDATION WIRE—WAY DETAIL	



**NUMBERING** ORIENTATION TOWARD CENTER OF INTERSECTION TOWARD STREET

#### NOTES:

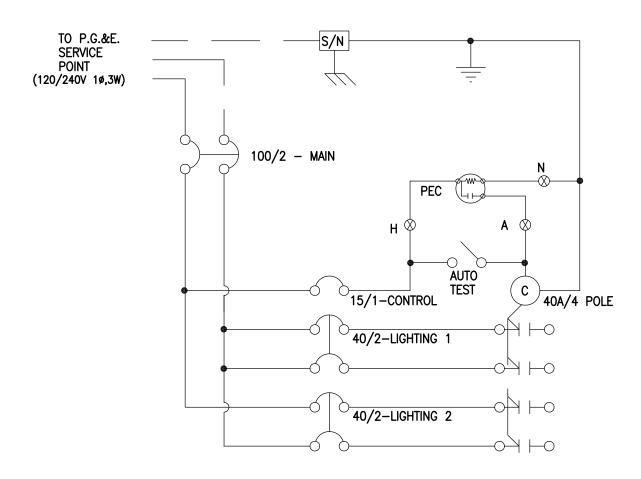
- 1. FOR METAL POLES APPLY TO CLEAN SURFACE.
- 2. BACKING PLATE SHALL BE ALMETEK EMP-2.5V5 OR APPROVED EQUAL.
- 3. FOR WOOD POLES USE EMBOSSED ALUMINUM BACKING PLATE SECURED W/  $1\!-\!1/2$  ALUMINUM ROOFING NAILS
- 4. NUMBERALS SHALL BE ALMETEK PS-2.5 SERIES OR APPROVED EQUAL.
- 5. PRESSURE SENSITIVE MARKERS OF REFLECTIVE SCOTCHLITE BLACK ON WHITE.

9' FROM GRADE/SIDEWALK ELEVATION, ADJUST AS NEEDED TO CLEAR HARDWARE OR APPURTENANCES.

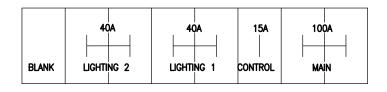
REVISIONS CITY OF KINGSBURG STD FEB 09 No. **STREETLIGHT** E - 12POLE NUMBERING

5-27-09 03:58 PM

NOTE: SERVICE CABINET SHALL BE TESCO 23-000 LBS UNMETERED OR APPROVED EQUIVALENT.



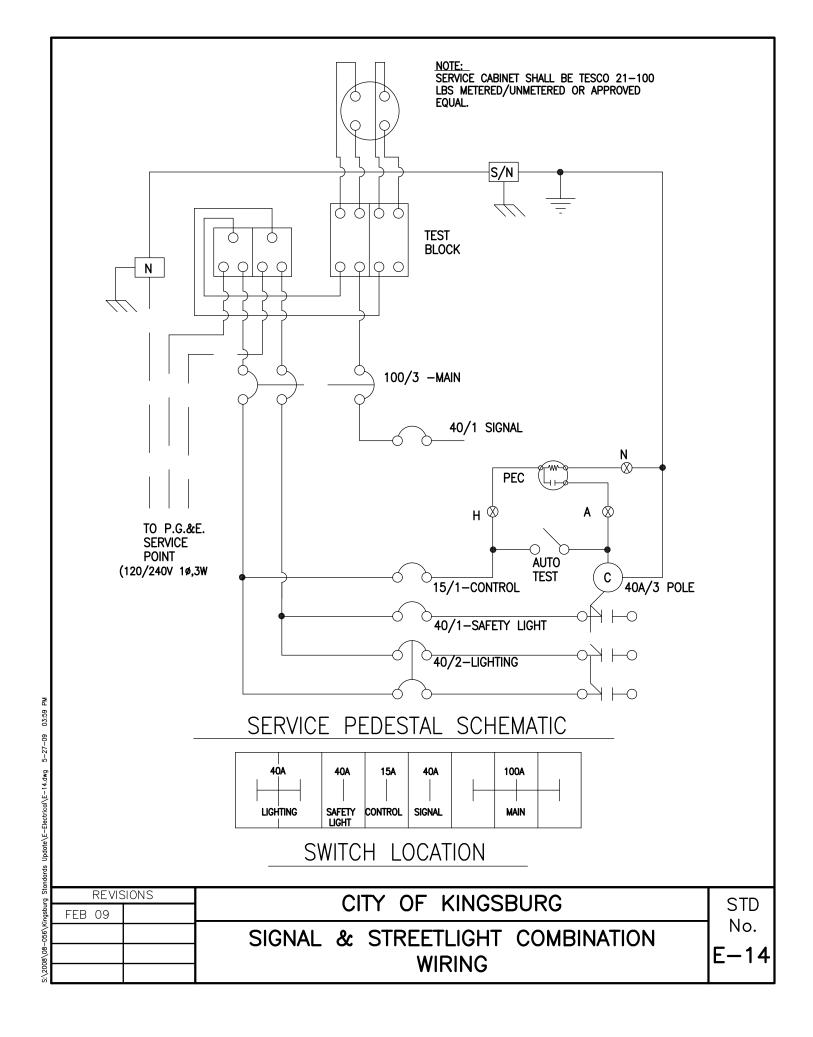
## SERVICE PEDESTAL SCHEMATIC

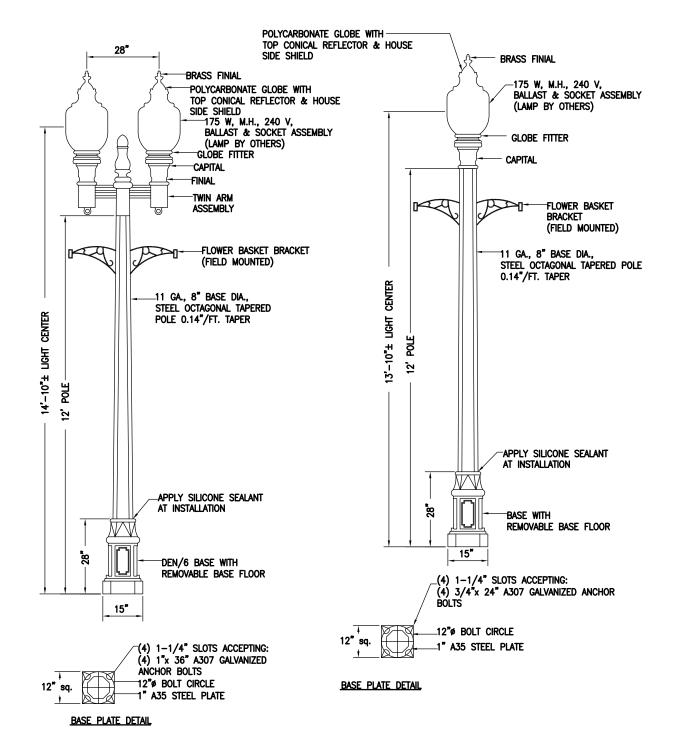


SWITCH LOCATION

rg Stano	PI NEVISIONS I CITY OF VINCEDITOR		CTD	
ndsbu	FEB 09		CITT OF KINGSDONG	310
.056\Kingsbur			STREETLIGHT	No.
-80\8			WIRING	E-13
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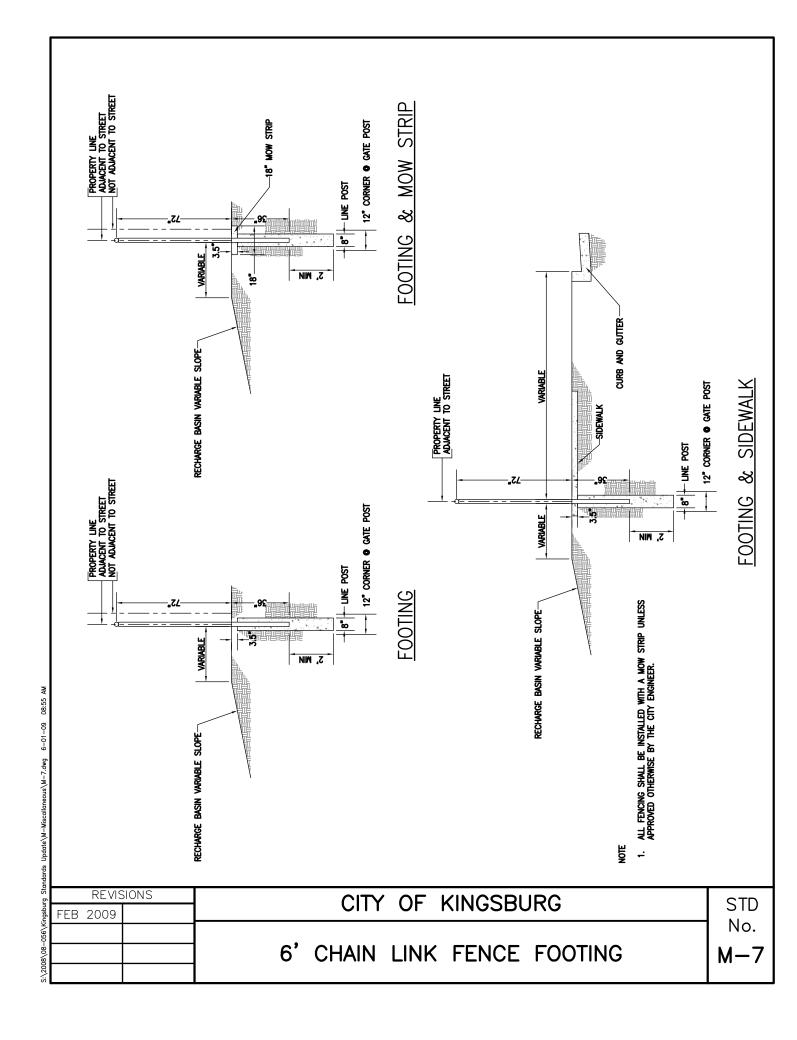


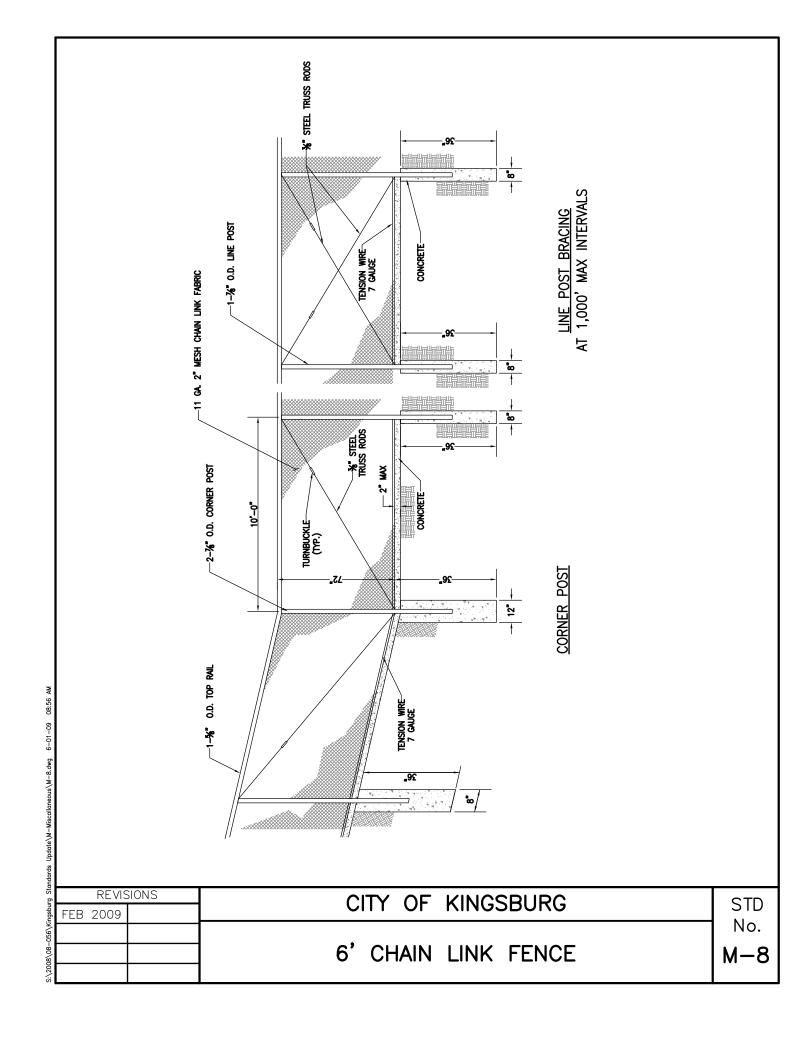


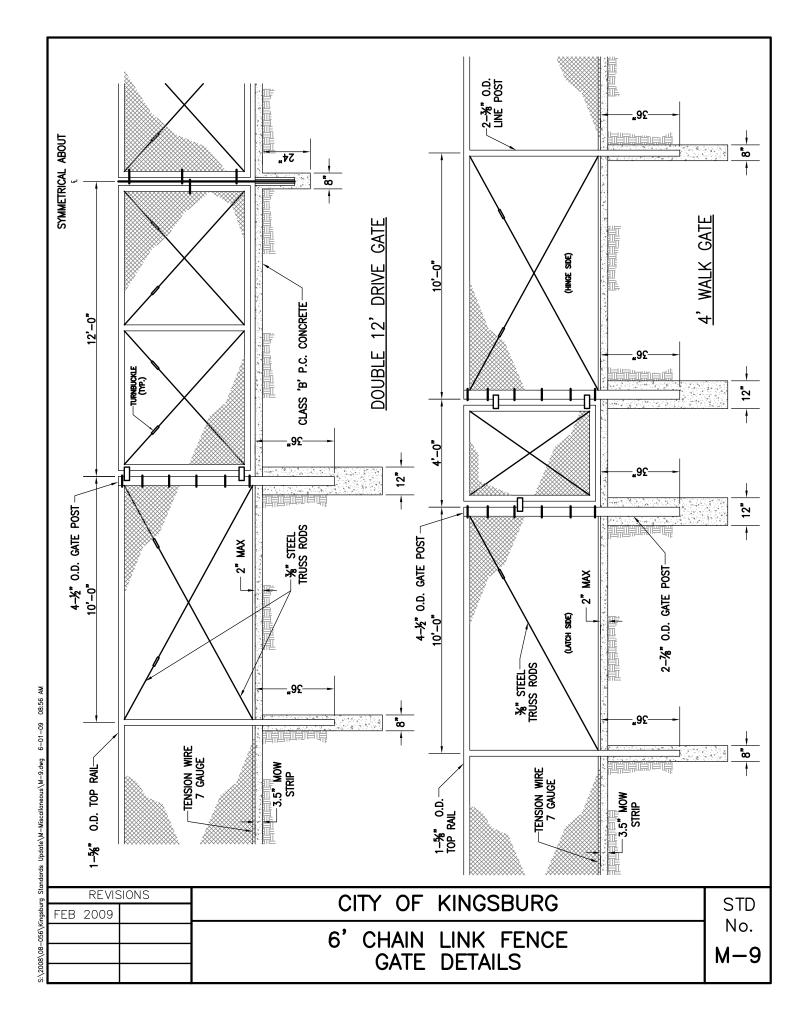
#### NOTES

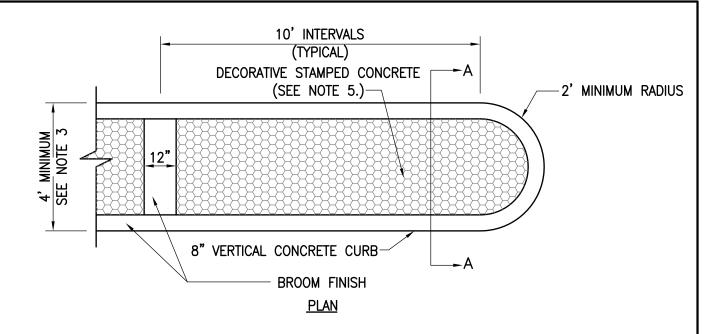
- ALL BULBS SHALL BE 70 WATT HIGH PRESSURE SODIUM VAPOR EMITTING A SOFT YELLOW LIGHT PATTERN. DECORATIVE LIGHTING SHALL ONLY BE USED WHEN APPROVED BY CITY. LIGHTING INTENSITY SHALL MATCH THE EQUIVALENT OF TRADITIONAL STREET LIGHT AS SHOWN IN STD. DWG. E-1 AND E-2. ALL CAST IRON AND STEEL LIGHT PARTS ARE TO BE FACTORY POWDER COATED BLACK PER CITY SPECIFICATIONS.
- SPECIFICATIONS.

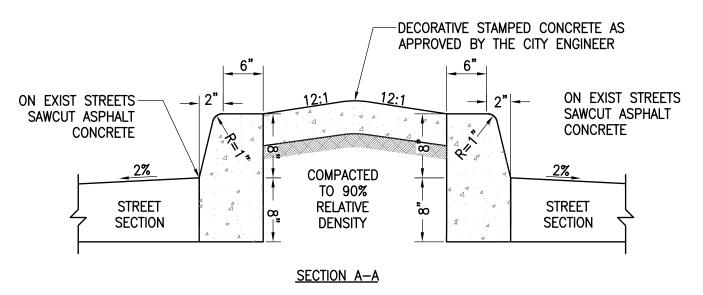
REVISIONS		CITY OF KINGSBURG	STD
FEB 09		CITT OF KINGSDONG	
		DECORATIVE	No.
			E-15
		LIGHTING	







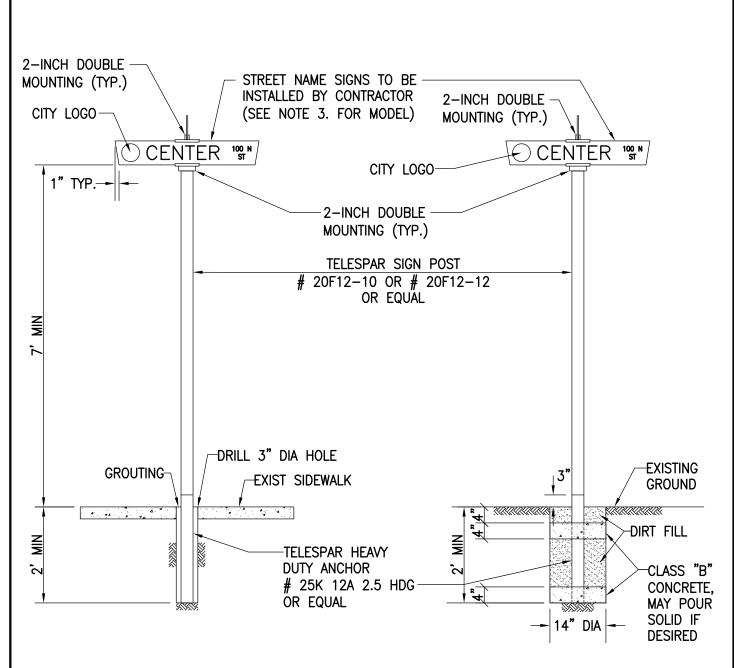




#### **NOTES:**

- 1. ON LANDSCAPED MEDIANS, CURB SHALL EXTEND TO BOTTOM OF AGGREGATE BASE.
- 2. PROVIDE WEAKENED PLANE JOINTS AT END OF RETURNS.
- 3. MEDIANS GREATER THAN 6 -FEET SHALL BE LANDSCAPED.
- 4. MEDIANS SHALL BE CONTINUOUS FROM START AT AN INTERSECTION FOR A MINIMUM DISTANCE OF 300 FEET. ALL DRIVEWAYS WITHIN THIS DISTANCE SHALL BE RIGHT—IN AND RIGHT—OUT ONLY. MEDIANS SHALL EXTEND A MINIMUM OF 100 FEET FROM THE FURTHEST EDGE OF ANY DRIVEWAY LOCATED WITHIN THE FIRST 300 FEET OF A STREET MEASURED FROM THE START POINT OF THE MEDIAN AT AN INTERSECTION.
- 5. MEDIANS ON ARTERIALS LESS THAN 6-FEET IN WIDTH SHALL BE PAVED WITH COLORED STAMPED CONCRETE WITHOUT 12-INCH BROOM FINISH AREAS.

REVIS	SIONS	CITY OF KINGSBURG	
FEB 09		CITT OF KINGSDONG	STD
			No.
		MEDIAN DETAIL	ST_Q
			31-3



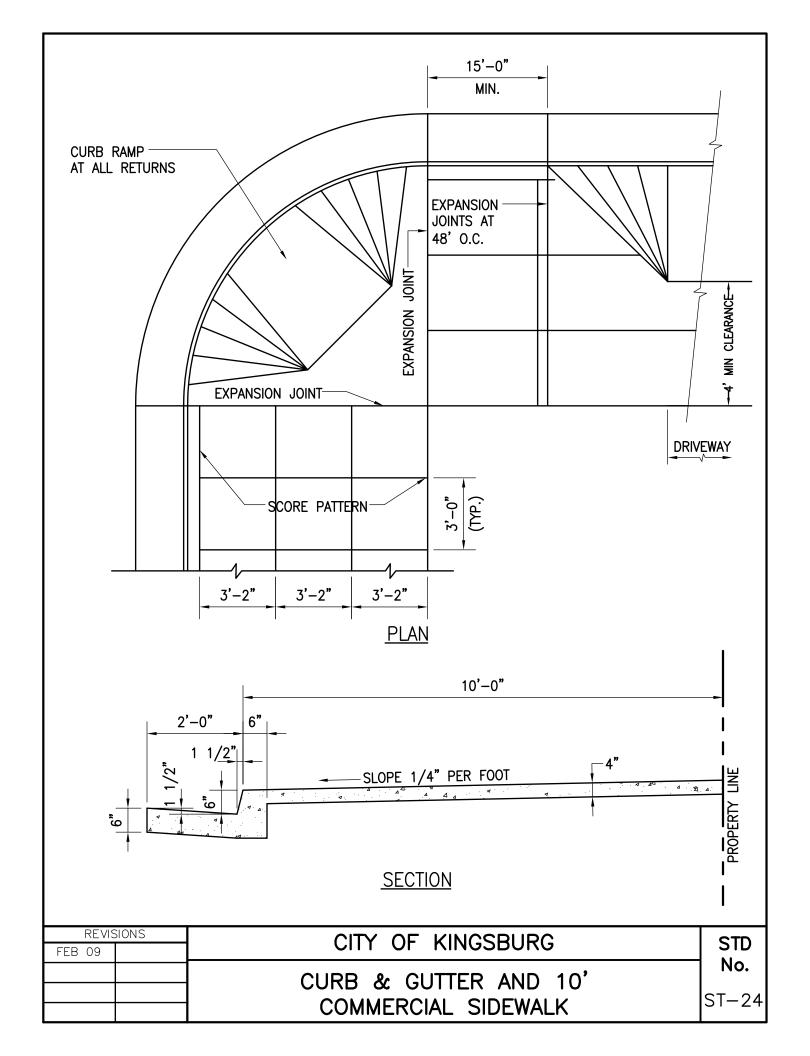
## IN EXISTING SIDEWALK AREA

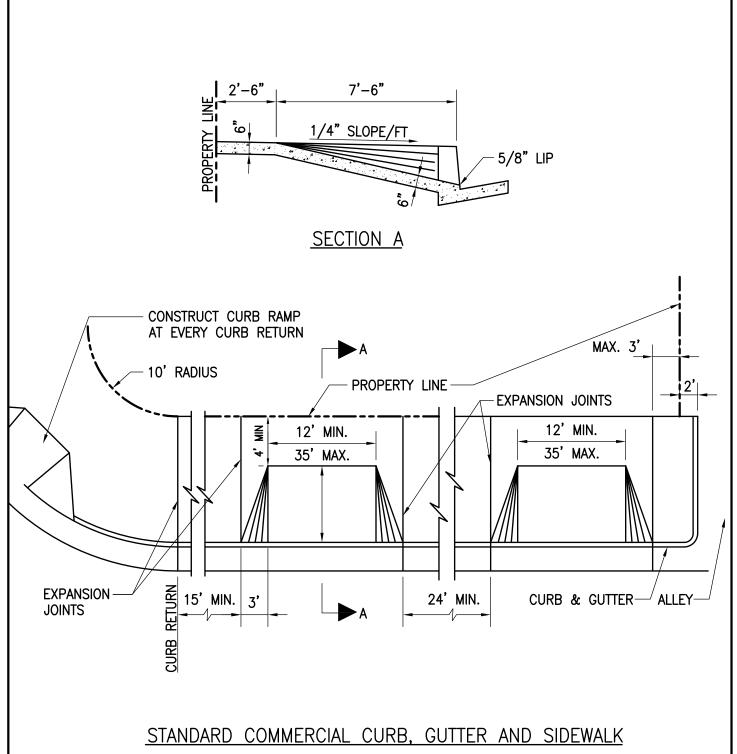
IN PLANT AREA

### NOTE:

- 1. SEE DRAWING OF STANDARDS FOR LOCATION OF STREET NAME SIGNS.
- 2. ANCHOR TO BE DRIVEN OR PLACED WITH 3" MAXIMUM ABOVE GROUND LEVEL.
- 3. STREET SIGNS SHALL BE WESTERN HIGHWAY PRODUCTS, INC. MODEL NO. P9FL—BLUE OR EQUAL ENAMELED WITH GOLD BEADED LETTERS AND CITY LOGO.

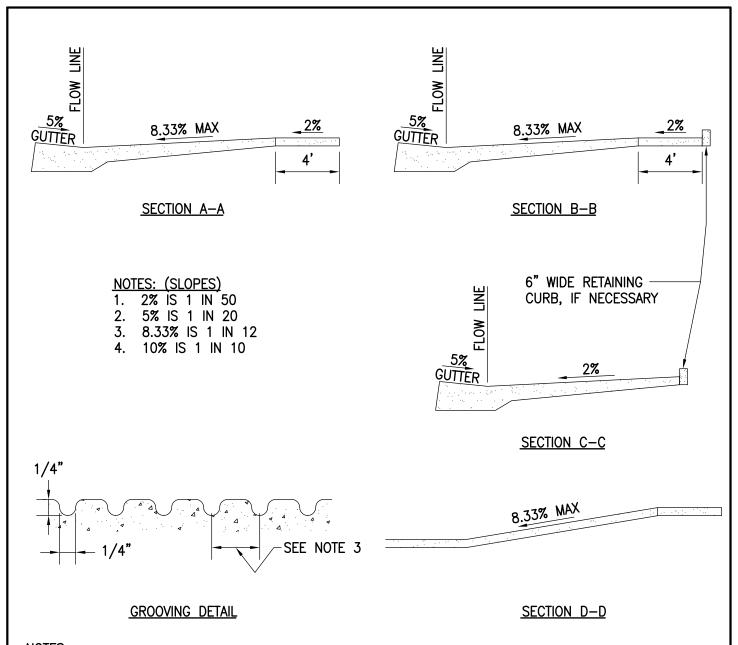
REVISIONS		CITY OF KINGSBURG	STD
FEB 09		CITT OF KINGSDONG	
			No.
		STREET NAME SIGN	ST-18
			5





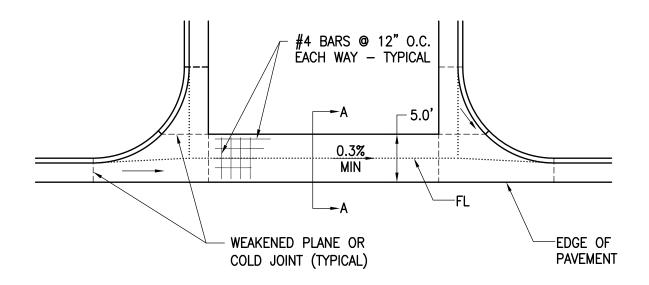
NOTE: DRIVEWAYS SHALL NOT OCCUPY MORE THAN 40% OF LOT FRONTAGE.

REVISIONS		CITY OF KINGSBURG	CTD
FEB 09		CITT OF KINGSDONG	טוט
		COMMERCIAL	No.
			ST-26
		DRIVE APPROACH	

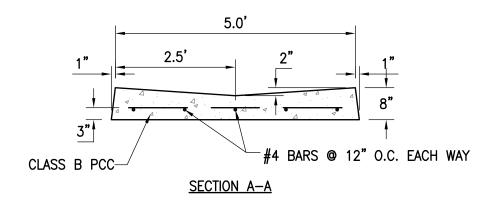


- 1. THE LOWER END OF EACH RAMP SHALL BE FLUSH WITH GUTTER.
- 2. WHEN THE RAMP IS LOCATED IN THE CENTER OF THE CURB RETURN, CROSS WALK CONFIGURATION MUST BE SIMILAR TO THAT SHOWN ON THE PLAN TO ACCOMODATE WHEELSCHAIRS.
- 3. THE RAMP SHALL HAVE A 12" WIDE BORDER WITH ¼" GROOVES APPROXIMATELY ¾" O.C. (SEE GROOVING DETAIL) AT LOCATIONS INDICATED ON THE PLANS. THE SURFACE OF THE RAMP SHALL HAVE A TRANSVERSE BROOMED SURFACE TEXTURE ROUGHER THAN THE SURROUNING SIDEWALK EXCEPT WHEN LOCATED IN THE CENTER OF CURB RETURN.
- 4. THE RAMPS SHALL HAVE TRUNCATED DOME TILES AS DETECTABLE WARNINGS AT THE END OF THE RUNNING SLOPE OF THE RAMP, AS INDICATED IN THE PLANS AND SPECIFICATIONS.

REVISIONS		CITY OF KINGSBURG	STD
FEB 09		CITT OF KINGSDONG	
		CURB RAMP	No.
			ST-30
		NOTES AND DETAILS	51 50

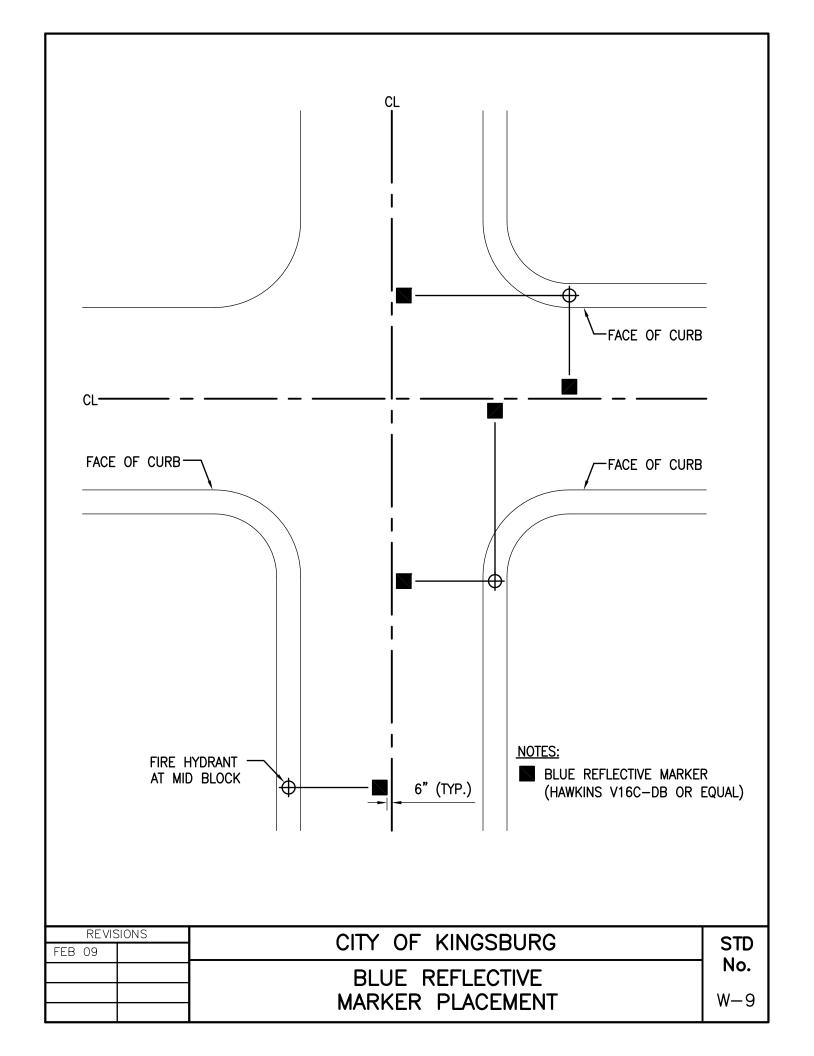


#### PLAN VIEW

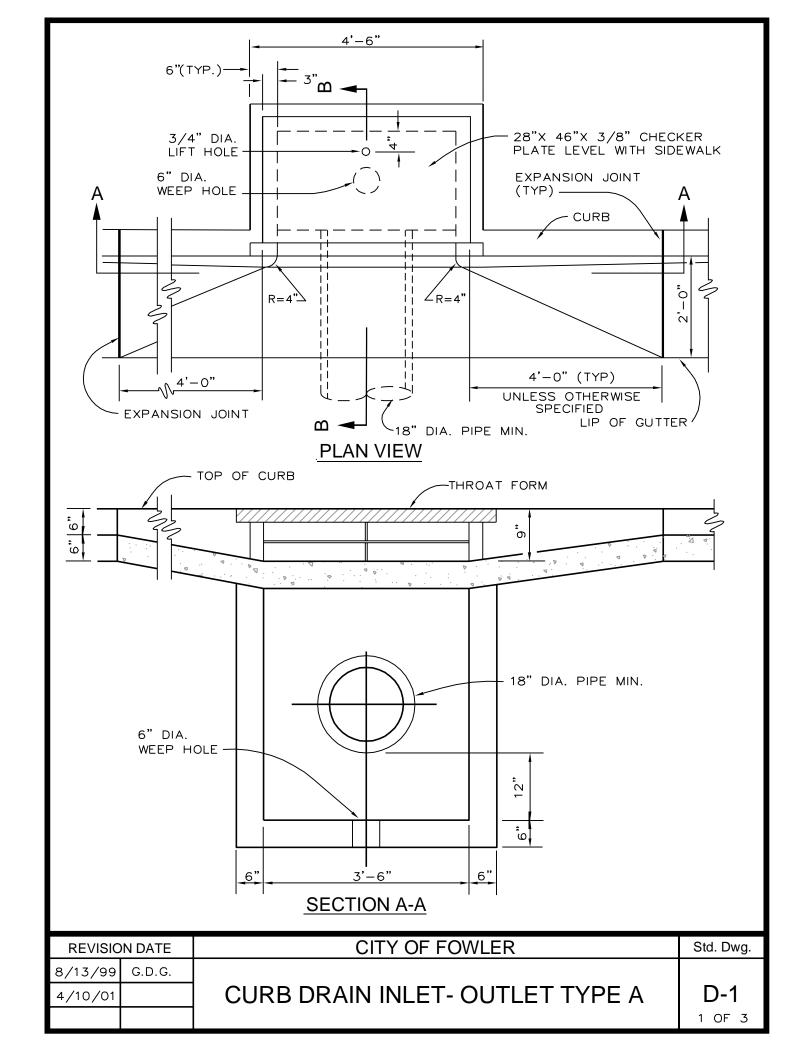


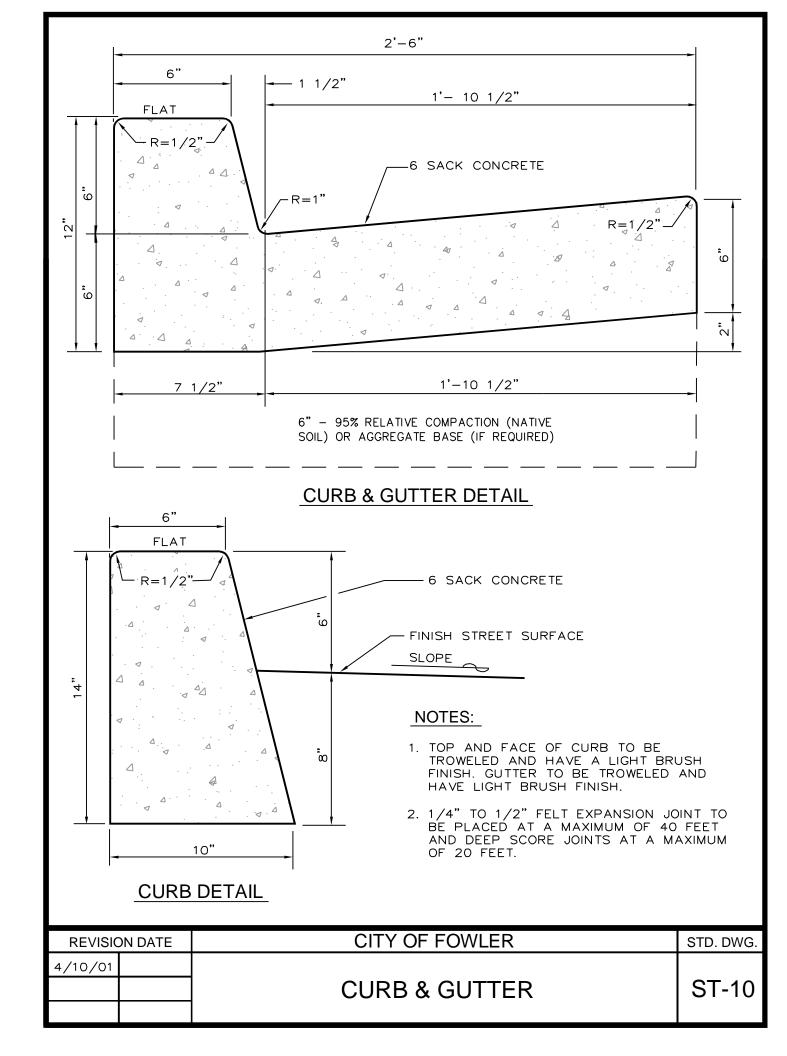
- 1. ADDITIONAL WEAKENED PLANE JOINTS IN ACCORDANCE WITH THE CITY OF KINGSBURG STANDARD SPECIFICATION SECTION 11.
- 2. IF APPROVED BY THE CITY ENGINEER, VALLEY GUTTER MAY BE USED IN IN-FILL AREAS.
- 3. VALLEY GUTTERS WILL NOT BE APPROVED ACROSS STREETS IN NEWLY DEVELOPED AREAS, EXCEPT CUL-DE-SACS.
- 4. CONSTRUCT CURB RAMPS PER CITY OF KINGSBURG STANDARDS OR AS APPROVED BY THE CITY ENGINEER.
- 5. SPECIFY CURB RADIUS AS REQUIRED BY APPLICABLE STANDARD DETAILS FOR STREET DESIGN, OR AS REQUIRED BY CITY ENGINEER.

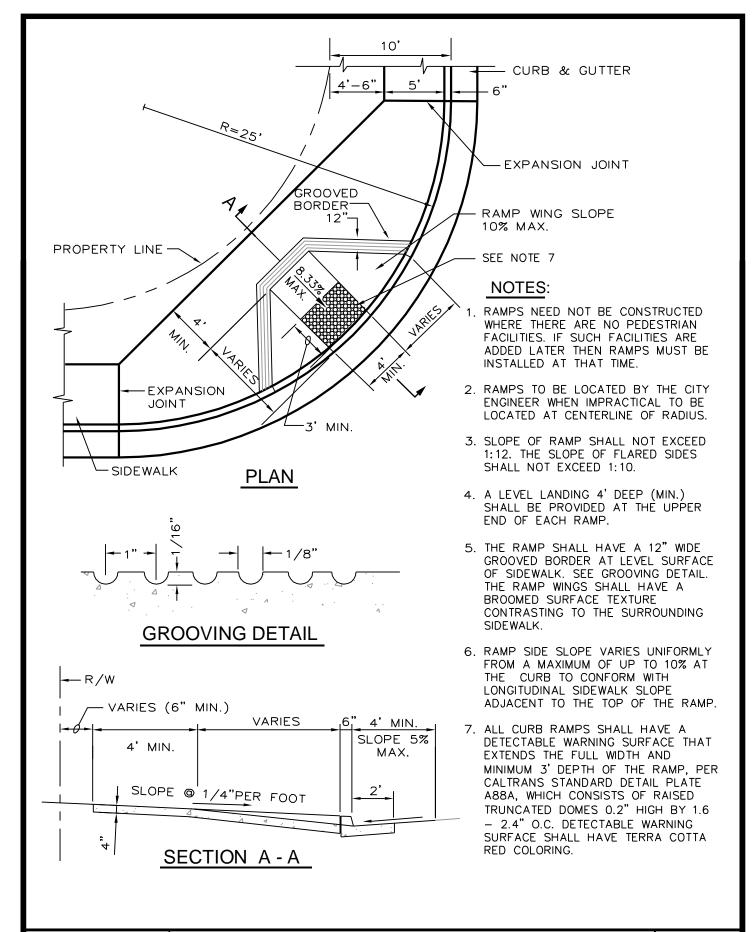
REVISIONS		CITY OF KINGSBURG	STD
FEB 09		CITT OF KINGSDONG	
		VALLEY GUTTER	No.
		VALLET GOTTER	ST-46
			51 +0



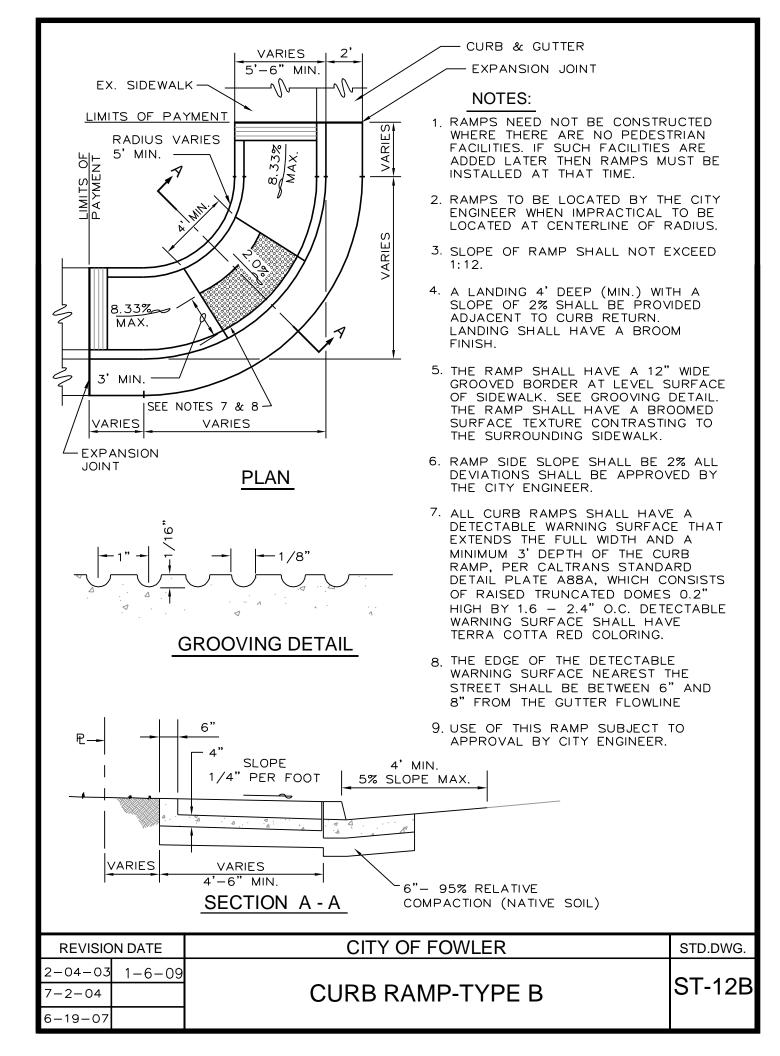
## CITY OF FOWLER STANDARD DRAWINGS AND SPECIFICATIONS

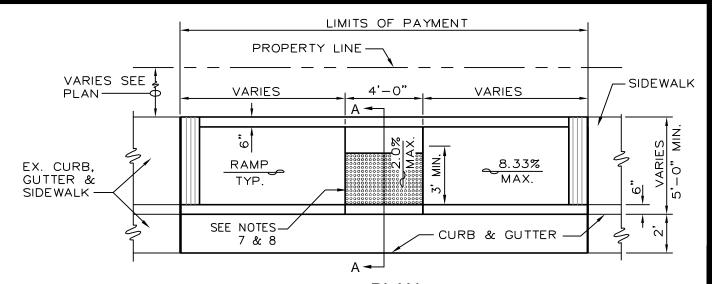






REVISION DATE	CITY OF FOWLER	STD.DWG.
2-04-03 1-6-0	9	OT 40A
7-2-04	CURB RAMP-TYPE A	ST-12A
6-19-07		

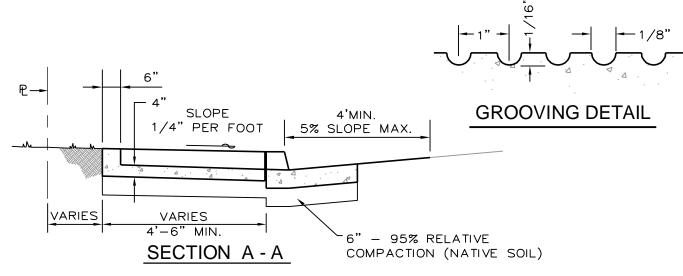




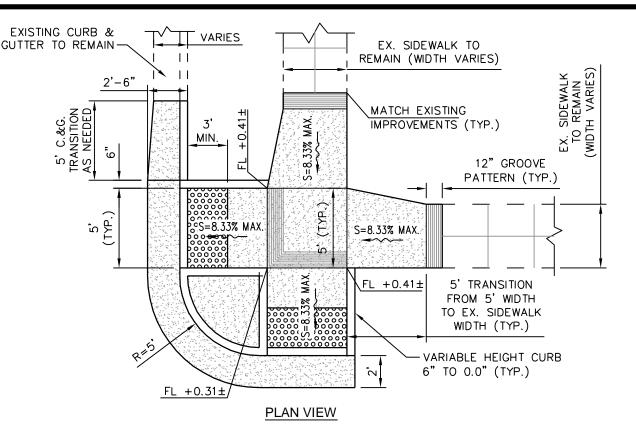
- 1. RAMPS NEED NOT BE CONSTRUCTED WHERE THERE ARE NO PEDESTRIAN FACILITIES. IF SUCH FACILITIES ARE ADDED LATER THEN RAMPS MUST BE INSTALLED AT THAT TIME.
- 2. RAMPS TO BE LOCATED BY THE CITY ENGINEER.
- 3. SLOPE OF RAMP SHALL NOT EXCEED 1:12.
- 4. A LANDING 4' DEEP (MIN.) WITH A SLOPE OF 2% SHALL BE PROVIDED ADJACENT TO CURB. LANDING SHALL HAVE A BROOM FINISH.
- 5. THE RAMP SHALL HAVE A 12" WIDE GROOVED BORDER AT LEVEL SURFACE OF SIDEWALK. SEE GROOVING DETAIL. THE RAMP SHALL HAVE A BROOMED SURFACE TEXTURE CONTRASTING TO THE SURROUNDING SIDEWALK.

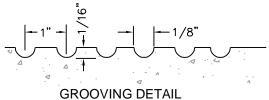
### PLAN

- 6. RAMP SIDE SLOPE SHALL BE 2%. ALL DEVIATIONS SHALL BE APPROVED BY THE CITY ENGINEER.
- 7. ALL CURB RAMPS SHALL HAVE A DETECTABLE WARNING SURFACE THAT EXTENDS THE FULL WIDTH AND A MINIMUM 3' DEPTH OF THE CURB RAMP, PER CALTRANS STANDARD DETAIL PLATE A88A, WHICH CONSISTS OF RAISED TRUNCATED DOMES 0.2" HIGH BY 1.6 2.4" O.C. DETECTABLE WARNING SURFACE SHALL HAVE TERA COTTA RED COLOR.
- 8. THE EDGE OF THE DETECTABLE WARNING SURFACE NEAREST THE STREET SHALL BE BETWEEN 6" AND 8" FROM THE GUTTER FLOWLINE
- 9. USE OF THIS RAMP SUBJECT TO APPROVAL BY CITY ENGINEER.



REVISION DATE		CITY OF FOWLER	STD.DWG.
1-23-03	1-6-09		
7-2-04		CURB RAMP-TYPE C	ST-12C
6-19-07			



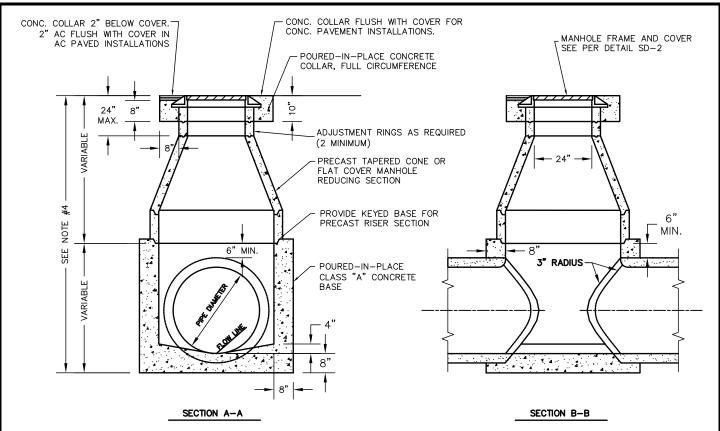


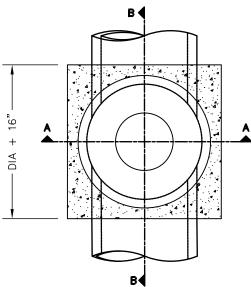
- 1. SLOPE OF RAMP SHALL NOT EXCEED 1:12.
- 2. RAMPS THAT CHANGE DIRECTION AT LANDINGS SHALL HAVE A LEVEL LANDING 5'X5' AT THE TOP OF RAMP. LANDINGS SHALL HAVE A SLOPE OF 2% (MAX.) AND SHALL HAVE A BROOM FINISH.
- 3. THE RAMP SHALL HAVE A 12"
  WIDE GROOVED BORDER AT LEVEL
  SURFACE OF SIDEWALK. SEE
  GROOVING DETAIL. THE RAMP
  SHALL HAVE A BROOMED SURFACE
  TEXTURE CONTRASTING TO THE
  SURROUNDING SIDEWALK.
- 4. RAMP SIDE SLOPE SHALL BE 2% ALL DEVIATIONS SHALL BE APPROVED BY THE CITY ENGINEER.

- 5. ALL CURB RAMPS SHALL HAVE A DETECTABLE WARNING SURFACE THAT EXTENDS THE FULL WIDTH AND A MINIMUM 3' DEPTH OF THE CURB RAMP, PER CALTRANS STANDARD DETAIL PLATE A88A, WHICH CONSISTS OF RAISED TRUNCATED DOMES 0.2" HIGH BY 1.6 2.4" O.C. SURFACE SHALL HAVE TERRA COTTA RED COLORING.
- 6. THE EDGE OF THE DETECTABLE
  WARNING SURFACE NEAREST THE
  STREET SHALL BE BETWEEN 6" AND
  8" FROM THE GUTTER FLOW LINE
- 7. USE OF THIS RAMP SUBJECT TO APPROVAL BY CITY ENGINEER.

REVISION DATE		CITY OF FOWLER	STD.DWG.
1-6-09			OT 40D
		CURB RAMP-TYPE D	ST-12D

## CITY OF SELMA STANDARD DRAWINGS AND SPECIFICATIONS

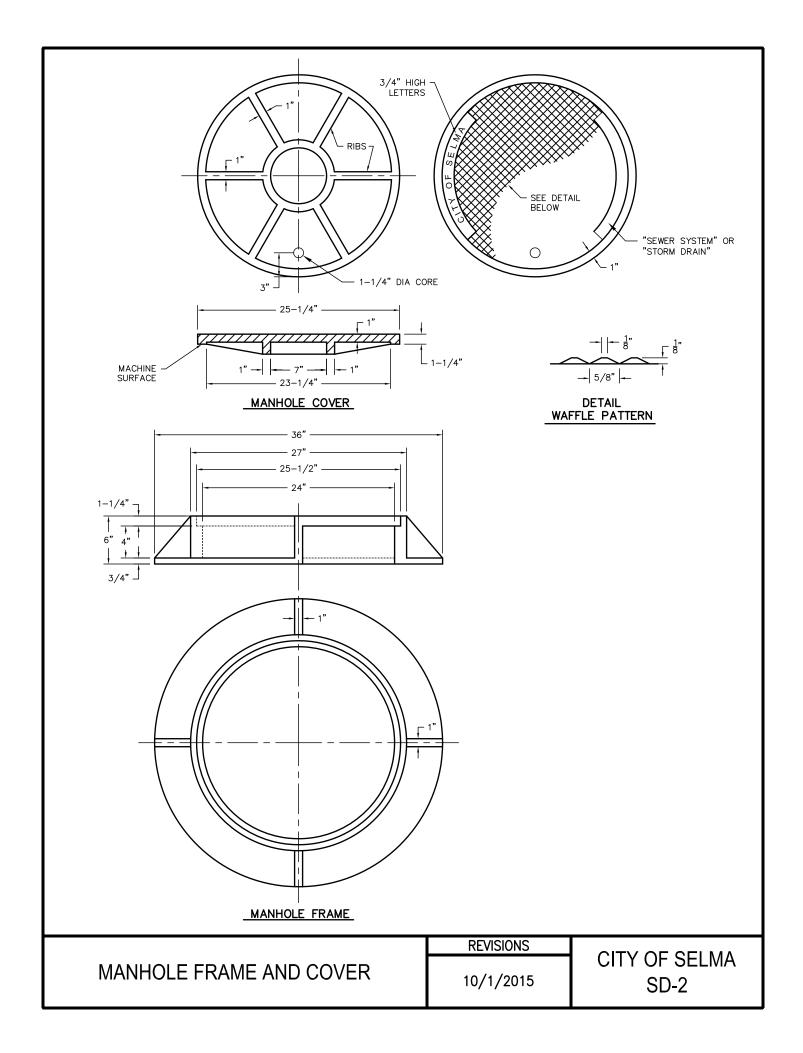


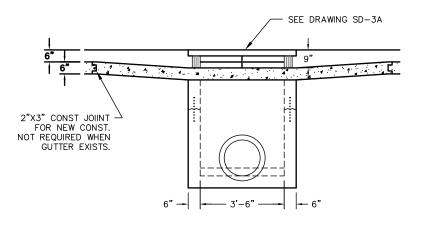


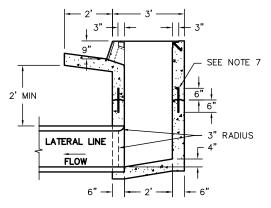
- PRECAST PIPE, ADJUSTING RINGS AND TAPERED SECTIONS SHALL BE CONSTRUCTED IN ACCORDANCE WITH 1. A.S.T.M. C-478, USING TYPE II CEMENT.
- ALL JOINTS SHALL BE GROUTED SMOOTH INSIDE AND OUT.
- 3.
- INTERIOR OF THE MANHOLE SHALL HAVE A SMOOTH TROWELED SURFACE.

  IF THE DISTANCE BETWEEN THE FLOW LINE OF THE MANHOLE AND THE FINISH GRADE OF THE LID IS 4. GREATER THAN OR EQUAL TO 12 FEET, THE MANHOLE IS TO BE CONSTRUCTED WITH STEPS AND AN ECCENTRIC CONE TAPERED SECTION.
- CONTRACTOR SHALL EMPLOY ALL MEASURES NECESSARY TO ENSURE THAT THE MINIMUM COMPACTION REQUIREMENTS ARE MET FOR ALL BACKFILL ASSOCIATED WITH THE MANHOLE CONSTRUCTION. 5.
- TAPERED SECTION TO BE ACCORDING TO APPROVED MANUFACTURER'S DIMENSIONS. 6.

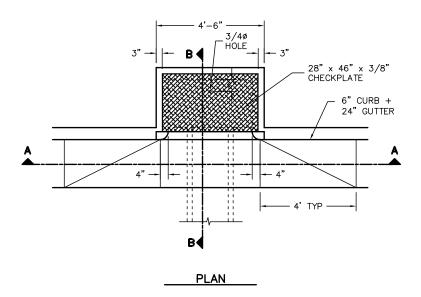
	REVISIONS	
STORM DRAIN MANHOLE	10/1/2015	CITY OF SELMA SD-1





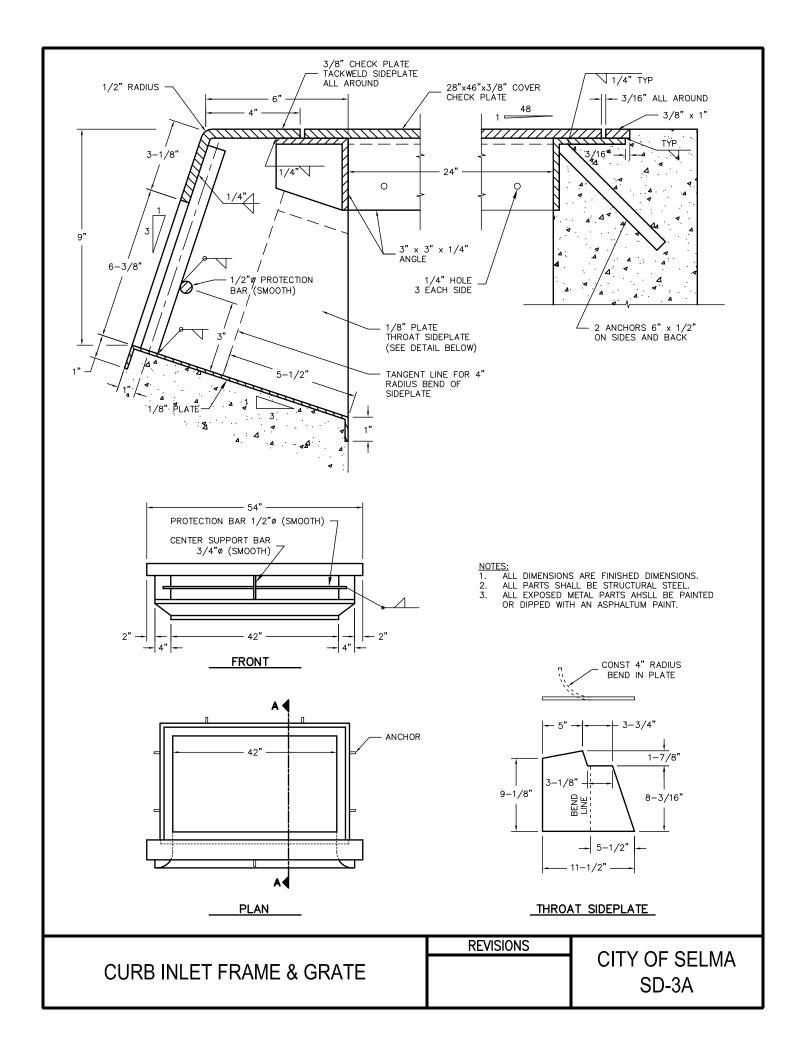


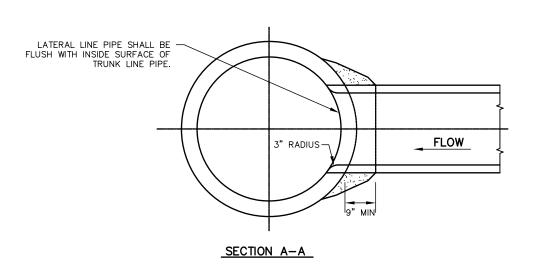
SECTION A-A SECTION B-B

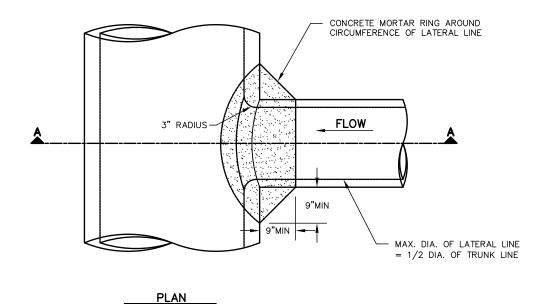


- 1. THE INLET MAY BE MODIFIED SLIGHTLY TO MATCH EXISTING IMPROVEMENTS, AS DIRECTED BY THE ENGINEER.
- 2. STRUCTURE SHALL BE CLASS 'A' CONCRETE. EXPOSED SURFACES SHALL BE FINISHED AS PER CURB SPECIFICATIONS.
- 3. COST OF FRAME AND GRATE AND THROAT SHALL BE INCLUDED IN PRICE OF INLET.
- 4. CURB AND GUTTER SHALL BE CONSTRUCTED OR RECONSTRUCTED ON EACH SIDE OF BOX AS INDICATED ON THE PLANS AND COST THEREOF SHALL BE INCLUDED IN PRICE OF THE INLET.
- FLOOR OF INLET SHALL SLOPE FROM ALL WALLS TO THE LATERAL LINE AND SHALL BE GIVEN A STEEL—TROWELED FINISH.
- 6. AT THE CONTACT POINT BETWEEN THE LATERAL LINE AND THE INLET WALL A SMOOTH 3" RADIUS CURVE SHALL BE CONSTRUCTED.
- 7. IF INLET IS CONSTRUCTED IN A TWO STAGE POUR, PROVIDE A ROUGHENED CONSTRUCTION JOINT AND PLACE ONE NO. 4 BAR 12" LONG IN EACH OF THE FOUR WALLS, AS SHOWN.

	REVISIONS	
STANDARD DRAIN INLET	10/1/2015	CITY OF SELMA SD-3



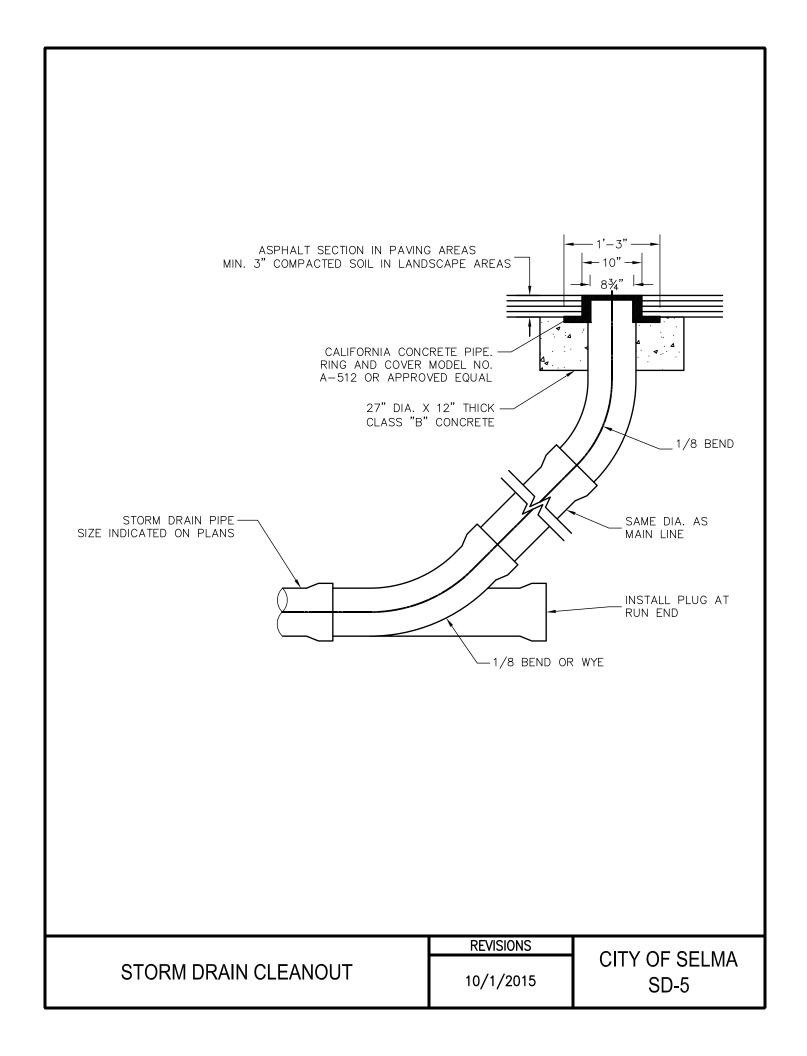


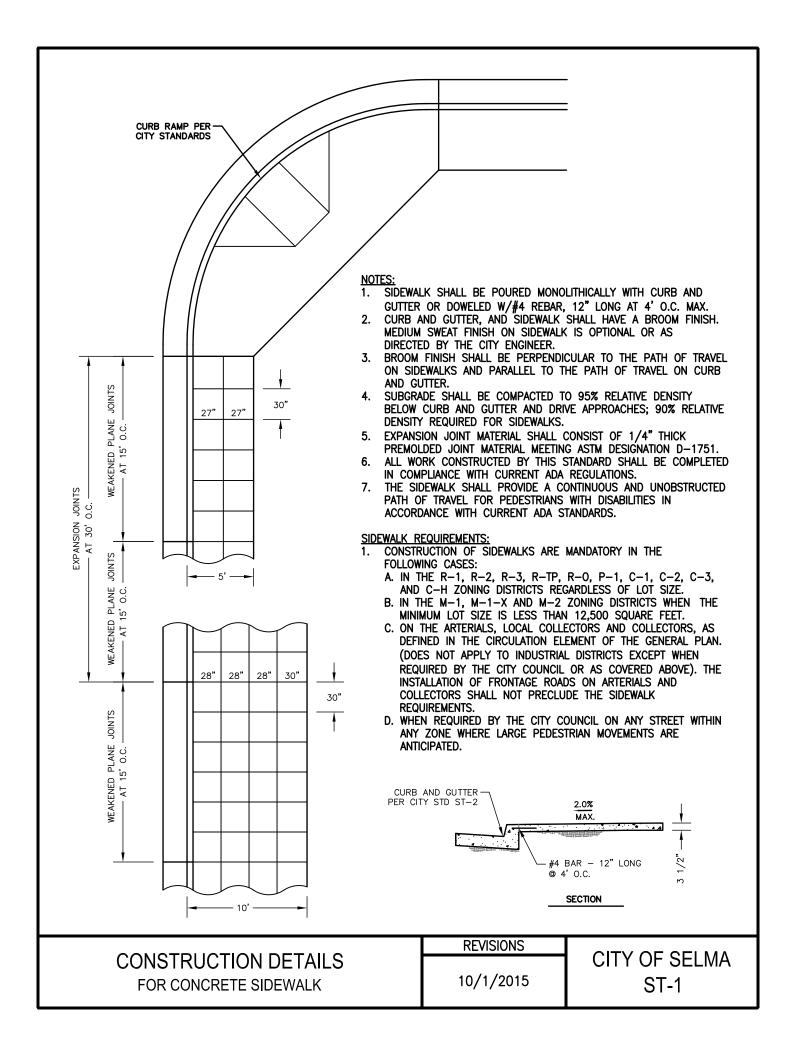


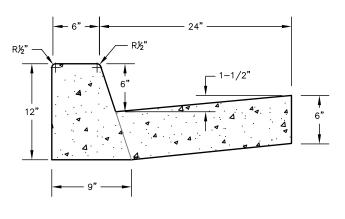
LATERAL LINE CONNECTION

REVISIONS 10/1/2015

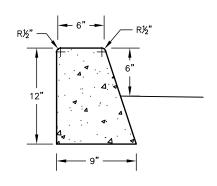
CITY OF SELMA SD-4



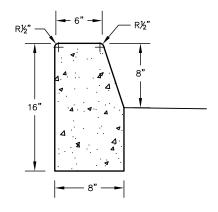




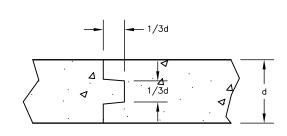
CURB & GUTTER DETAIL



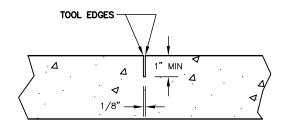
STANDARD CURB DETAIL



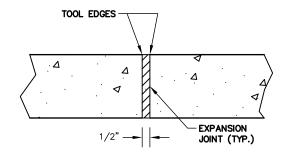
MEDIAN CURB DETAIL



CONSTRUCTION JOINT DETAIL



WEAKENED PLANE JOINT DETAIL



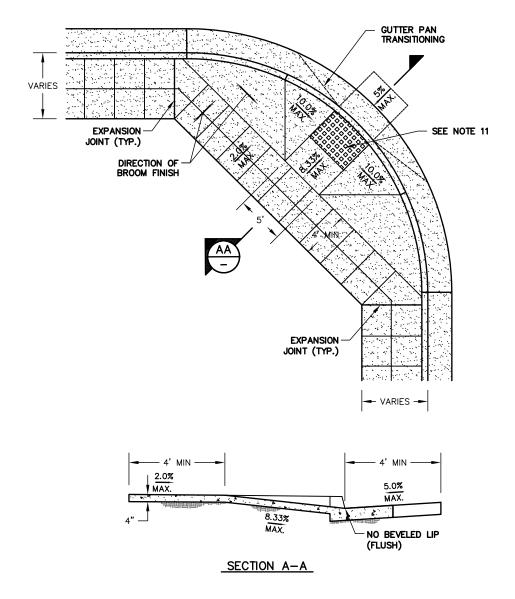
EXPANSION JOINT DETAIL

CONCRETE CONSTRUCTION DETAILS

REVISIONS

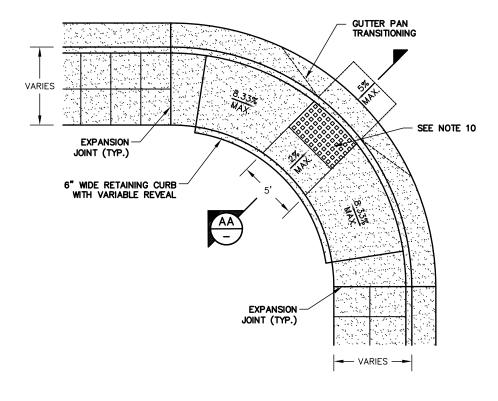
10/1/2015

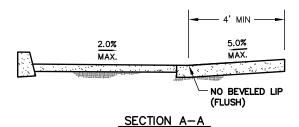
CITY OF SELMA ST-2



- 1. TRANSITION FROM RAMP TO LANDINGS SHALL BE FLUSH AND FREE FROM ABRUPT CHANGES.
- 2. THE SURFACE OF THE CURB RAMP AND FLARED SIDES SHALL HAVE A SLIP RESISTANT BROOM FINISH TRANSVERSE TO THE PATH OF TRAVEL AND SHALL HAVE A CONTRASTING FINISH TO THAT OF THE ADJACENT SIDEWALK.
- 3. THE RAMP SLOPE SHALL NOT EXCEED 1:12 (8.33%).
- 4. THE SLOPE OF THE ADJOINING GUTTERS, ROAD SURFACE OR ACCESSIBLE PATH OF TRAVEL WITHIN 4' OF THE BOTTOM OF THE RAMP SHALL NOT EXCEED 1:20 (5%). THE GUTTER PLAN SLOPE TRANSITION SHALL OCCUR OUTSIDE OF THE LANDING.
- 5. PROVIDE A LEVEL LANDING OF AT LEAST 48" ON UPPER END AND OVER FULL WIDTH OF RAMP.
- 6. THE 4' CLEAR SPACE AT THE BOTTOM OF THE RAMP SHALL BE WITHIN THE CROSSWALK LIMIT LINES.
- 7. THE RAMP SHALL BE A MINIMUM OF 4' WIDE AND SHALL LIE GENERALLY IN A SINGLE SLOPED PLANE WITH A MINIMUM OF SURFACE WARPING AND CROSS SLOPE NOT EXCEEDING 2%.
- 8. THE FLARED SIDES SHALL NOT EXCEED 1:10 (10%) SLOPE.
- 9. CURB RAMPS SHALL BE LOCATED OR PROTECTED TO PREVENT OBSTRUCTION BY PARKED CARS.
- 10. THE DETECTABLE WARNING SURFACE SHALL MEET AND BE INSTALLED IN ACCORDANCE WITH CURRENT ADA STANDARDS.
- 11. ALL WORK CONSTRUCTED BY THIS STANDARD SHALL BE IN COMPLIANCE WITH CURRENT ADA REGULATIONS.

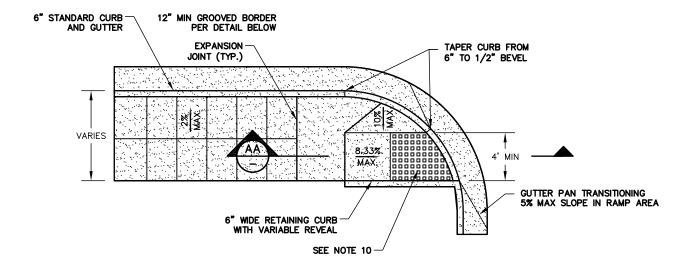
	REVISIONS	
CURB RAMP (TYPE 1)	10/1/2015	CITY OF SELMA ST-3

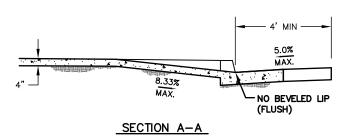




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- 5. PROVIDE A LEVEL LANDING OF AT LEAST 48" ON UPPER END AND OVER FULL WIDTH OF RAMP.
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- CURB RAMPS SHALL BE LOCATED OR PROTECTED TO PREVENT OBSTRUCTION BY PARKED CARS.
- THE DETECTABLE WARNING SURFACE SHALL MEET AND BE INSTALLED IN ACCORDANCE WITH CURRENT ADA STANDARDS.
- 10. CURB RAMPS PLACED AT SIGNALIZED INTERSECTIONS SHALL HAVE A PEDESTRIAN POST FOR BUTTON PLACEMENT AT THE LOWER LANDING AREA IN CONFORMANCE WITH ADA REQUIREMENTS.
- 11. THIS RAMP TYPE SHALL ONLY BE USED WHEN NECESSARY DUE TO RIGHT OF WAY OR PHYSICAL CONSTRAINTS.
- 12. ALL WORK CONSTRUCTED BY THIS STANDARD SHALL BE IN COMPLIANCE WITH CURRENT ADA REGULATIONS.

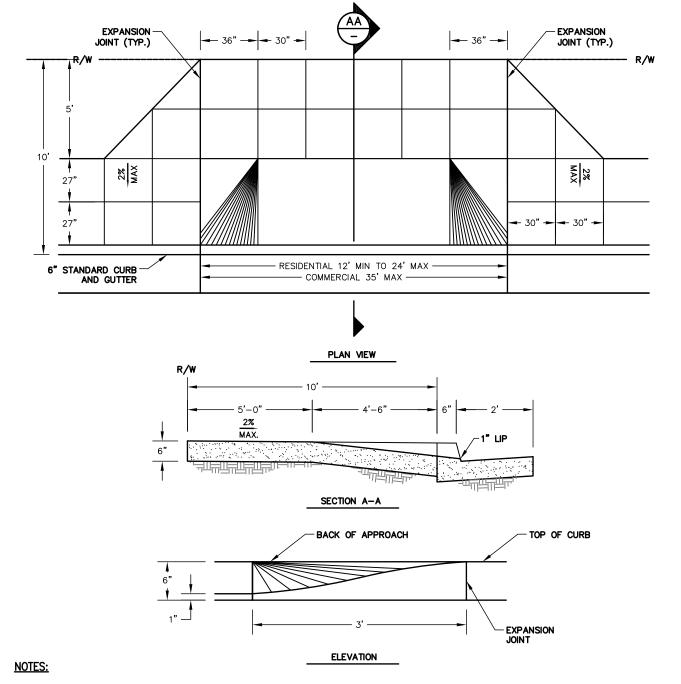
	REVISIONS	
CURB RAMP (TYPE 2)	10/1/2015	CITY OF SELMA ST-4





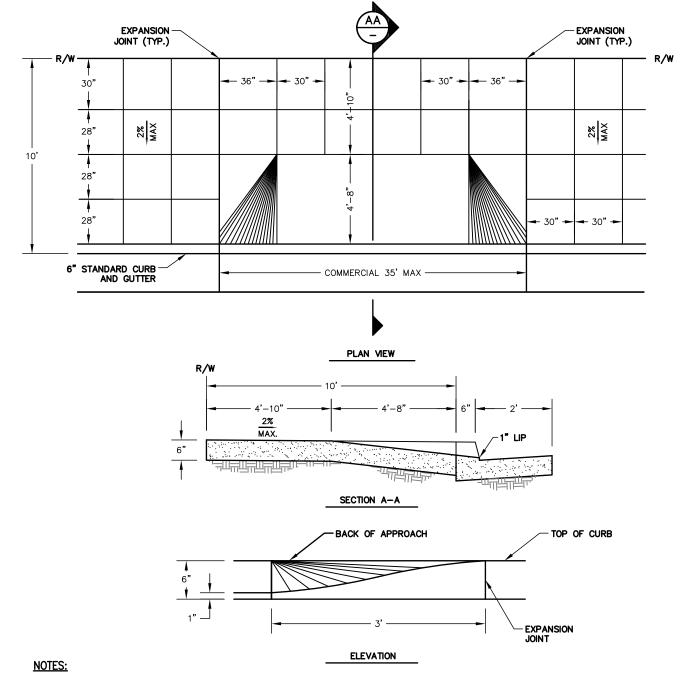
- 1. TRANSITION FROM RAMP TO LANDINGS SHALL BE FLUSH AND FREE FROM ABRUPT CHANGES.
- 2. THE SURFACE OF THE CURB RAMP AND FLARED SIDES SHALL HAVE A SLIP RESISTANT BROOM FINISH TRANSVERSE TO THE PATH OF TRAVEL AND SHALL HAVE A CONTRASTING FINISH TO THAT OF THE ADJACENT SIDEWALK.
- 3. THE RAMP SLOPE SHALL NOT EXCEED 1:12 (8.33%).
- 4. THE SLOPE OF THE ADJOINING GUTTERS, ROAD SURFACE OR ACCESSIBLE PATH OF TRAVEL WITHIN 4' OF THE BOTTOM OF THE RAMP SHALL NOT EXCEED 1:20 (5%). THE GUTTER PLAN SLOPE TRANSITION SHALL OCCUR OUTSIDE OF THE LANDING.
- 5. PROVIDE A LEVEL LANDING OF AT LEAST 48" ON UPPER END AND OVER FULL WIDTH OF RAMP.
- 6. THE 4' CLEAR SPACE AT THE BOTTOM OF THE RAMP SHALL BE WITHIN THE CROSSWALK LIMIT LINES.
- 7. THE RAMP SHALL BE A MINIMUM OF 4' WIDE AND SHALL LIE GENERALLY IN A SINGLE SLOPED PLANE WITH A MINIMUM OF SURFACE WARPING AND CROSS SLOPE NOT EXCEEDING 2%.
- 8. CURB RAMPS SHALL BE LOCATED OR PROTECTED TO PREVENT OBSTRUCTION BY PARKED CARS.
- 9. THE DETECTABLE WARNING SURFACE SHALL MEET AND BE INSTALLED IN ACCORDANCE WITH CURRENT ADA STANDARDS.
- 10. THIS RAMP TYPE SHALL ONLY BE USED WHEN NECESSARY DUE TO RIGHT OF WAY OR PHYSICAL CONSTRAINTS.
- 11. ALL WORK CONSTRUCTED BY THIS STANDARD SHALL BE IN COMPLIANCE WITH CURRENT ADA REGULATIONS.

	REVISIONS	
CURB RAMP (TYPE 3)	10/1/2015	CITY OF SELMA ST-5



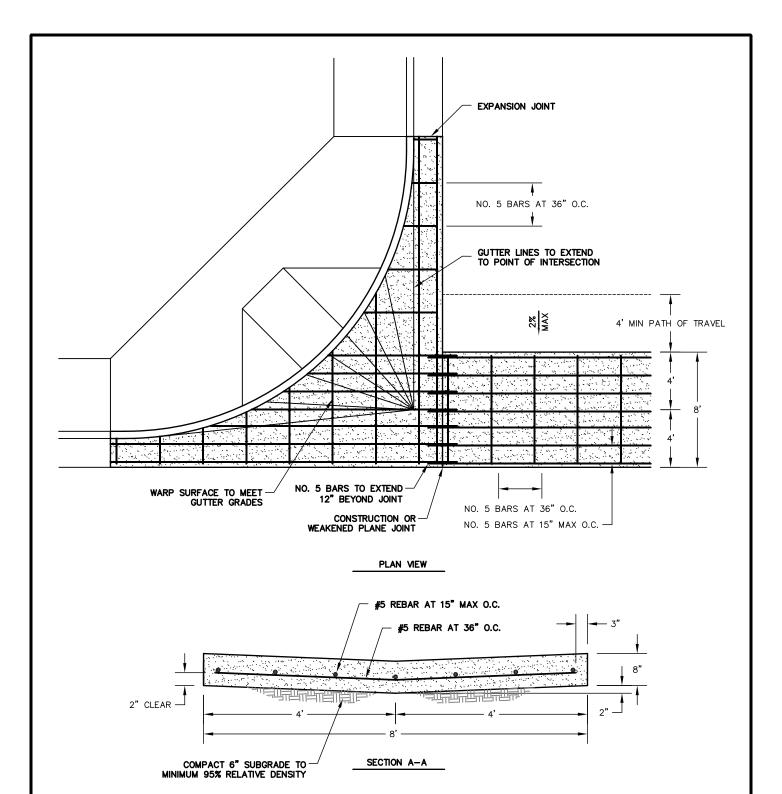
- SUBGRADE SHALL BE COMPACTED TO 95% RELATIVE DENSITY BELOW CURB AND GUTTER AND DRIVE APPROACHES;
   90% RELATIVE DENSITY REQUIRED FOR SIDEWALKS.
- 2. CURB AND GUTTER, SIDEWALK AND DRIVE APPROACH SHALL HAVE A BROOM FINISH. MEDIUM SWEAT FINISH ON SIDEWALK IS OPTIONAL OR AS DIRECTED BY THE CITY ENGINEER. DEEP SCORE MARK IN CENTER OF DRIVE APPROACH WHEN THROAT IS 20' OR WIDER.
- 3. BROOM FINISH SHALL BE PERPENDICULAR TO THE PATH OF TRAVEL ON SIDEWALKS AND PARALLEL TO THE PATH OF TRAVEL ON CURB AND GUTTER.
- 4. DRIVEWAYS SHALL NOT OCCUPY MORE THAN 40% OF THE LOT FRONTAGE.
- 5. EXPANSION JOINT MATERIAL SHALL CONSIST OF 1/4" THICK PREMOLDED JOINT MATERIAL MEETING ASTM DESIGNATION D-1751.
- 6. ALL WORK CONSTRUCTED BY THIS STANDARD SHALL BE COMPLETED IN COMPLIANCE WITH CURRENT ADA REGULATIONS.
- 7. THE SIDEWALK SHALL PROVIDE A CONTINUOUS AND UNOBSTRUCTED PATH OF TRAVEL FOR PEDESTRIANS WITH DISABILITIES IN ACCORDANCE WITH CURRENT ADA STANDARDS.

	REVISIONS		
DRIVEWAY APPROACH		CITY OF SELMA	
5' SIDEWALK PATTERN	10/1/2015	ST-6	



- 1. SUBGRADE SHALL BE COMPACTED TO 95% RELATIVE DENSITY BELOW CURB AND GUTTER AND DRIVE APPROACHES; 90% RELATIVE DENSITY REQUIRED FOR SIDEWALKS.
- 2. CURB AND GUTTER, SIDEWALK AND DRIVE APPROACH SHALL HAVE A BROOM FINISH. MEDIUM SWEAT FINISH ON SIDEWALK IS OPTIONAL OR AS DIRECTED BY THE CITY ENGINEER. DEEP SCORE MARK IN CENTER OF DRIVE APPROACH WHEN THROAT IS 20' OR WIDER.
- 3. BROOM FINISH SHALL BE PERPENDICULAR TO THE PATH OF TRAVEL ON SIDEWALKS AND PARALLEL TO THE PATH OF TRAVEL ON CURB AND GUTTER.
- 4. DRIVEWAYS SHALL NOT OCCUPY MORE THAN 40% OF THE LOT FRONTAGE.
- 5. EXPANSION JOINT MATERIAL SHALL CONSIST OF 1/4" THICK PREMOLDED JOINT MATERIAL MEETING ASTM DESIGNATION D-1751.
- 6. ALL WORK CONSTRUCTED BY THIS STANDARD SHALL BE COMPLETED IN COMPLIANCE WITH CURRENT ADA REGULATIONS.
- 7. THE SIDEWALK SHALL PROVIDE A CONTINUOUS AND UNOBSTRUCTED PATH OF TRAVEL FOR PEDESTRIANS WITH DISABILITIES IN ACCORDANCE WITH CURRENT ADA STANDARDS.

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COMMERCIAL DRIVEWAY APPROACH		CITY OF SELMA
10' CURB PATTERN	10/1/2015	ST-7



- 1. IN NEW CONSTRUCTION AREAS, VALLEY GUTTERS SHALL BE DESIGNED TO PROVIDE A MINIMUM FALL OF 0.35' FROM END OF RETURN TO END OF RETURN.
- 2. SURFACE SHALL BE A ROUGH BROOM FINISH.
- 3. VALLEY GUTTERS SHALL BE CONSTRUCTED USING A MINIMUM 6 SACK, 3000 PSI CONCRETE.

CONCRETE VALLEY GUTTER	REVISIONS	CITY OF SELMA ST-9
	10/1/2015	

# CITY OF FRESNO STANDARD DRAWINGS AND SPECIFICATIONS

#### **SECTION 23 – TRAFFIC SIGNALS AND STREET LIGHTING**

#### 23-1 TECHNICAL SPECIFICATIONS FOR TRAFFIC SIGNALS

#### 23-1.1 **General**

Traffic Signal Poles & Standards shall be in accordance with State Standard Specifications, 1997 Edition, (113 km rating/70 mph rating).

Furnishing and installing traffic signals and highway lighting and payment therefore shall conform to the provisions in Section 86 and 87 of the State Standard Specifications and the State Standard Drawings, the City Standard Drawings, Plans and Specifications.

Signals and lighting Work is to be performed at the locations shown on the Plans.

Existing electrical systems, or approved temporary replacements thereof, shall be kept in effective operation during the progress of the Work, except when shutdown is permitted.

Work or equipment not specified or shown on the Plans which is necessary for the proper operation of the traffic signal in this section shall be provided and installed at no additional cost to the City.

The locations of foundations, poles, standards, services, pull boxes and other appurtenances shown on the Plans are approximate. Exact locations and grades will be established as necessary by either the Traffic Engineer and/or City CM Engineer in the field.

All work shall be completed in a neat and workmanlike manner.

#### 23-1.2 Materials

Attention is directed to Section 6 of the State Standard Specifications and SECTION 4 these Specifications.

All materials required to complete the Work under this contract shall be furnished by the Contractor after receiving approved submittals from City of Fresno Traffic Signal and Street Lights (TSSL) Division.

The materials furnished and used shall be new, except such used materials as may be specifically provided for on the Plans.

All Work and materials shall be in full accordance with the latest rules and regulations of the National Board of Fire Underwriters, and local or State laws and regulations, the State of California Industrial Accident Commission's Safety Orders,

and Regulations of the Pacific Gas and Electric Company pertaining to service equipment and installations thereof. All Work shall comply with Section 11-104 of the City of Fresno Municipal Code, the National Electrical Manufacturer's Association Standards and all regulations and codes as stated in Section 86-1.01D of the State Standard Specifications. Nothing in these Plans and Specifications shall be construed to permit Work not complying with these codes.

#### 23-1.3 Equipment List

Equipment list and drawings shall conform to the provisions in Section 86-1.01C, of the State Standard Specifications and these Specifications.

All equipment and materials that the Contractor proposes to install shall conform to these Specifications and the contract Plans. A list of substitute equipment and/or materials, along with a written descriptive summary, describing the functions of the components which the Contractor proposes to install shall be submitted along with his/her Proposal. The list shall be complete as to the name of the manufacturer, size and identifying number of each item. The list shall be supplemented by such other data as may be required.

In all cases, the judgment of the Electrical Superintendent shall be final as to whether substitute equipment and/or material recommended by the Contractor conforms to the intent of these Specifications and is acceptable for use.

#### 23-1.4 Warranties, Guarantees and Instruction Sheets

Warranties, guarantees and instruction sheets shall conform to the provisions in Section 5-1.47 of the State Standard Specifications and these Specifications.

All equipment furnished shall be guaranteed to the City by the manufacturers for a period of not less than one (1) year, unless otherwise indicated, following the date of acceptance of the signal installation of such equipment. If any part(s) is found to be defective in materials or workmanship within the one-year period, and it is determined by the Electrical Superintendent, or by an authorized manufacturer's representative, that said part(s) cannot be repaired on the Site, the manufacturer shall provide a replacement part(s) of equal kind and/or type during the repair period and shall be responsible for the removal, handling, repair or replacement and reinstallation of the part(s) until such time as the traffic signal or Street lighting equipment is functioning as specified and as intended herein; the repair period shall in no event exceed 72 hours, including acquisition of parts.

The one-year guarantee on the repaired or replaced parts shall again commence with the date of reassembly of the system.

All Work done by the Contractor shall be guaranteed in writing to the City CM Engineer for the 12 months from the date of acceptance.

#### 23-1.5 Maintaining Existing and Temporary Electrical Systems

Existing traffic signal systems, including detection, and/or safety lighting, shall remain operational during construction, unless otherwise authorized in writing by the City Engineer.

The Contractor shall notify the City CM Engineer at least two full working days (not less than 48 hours) prior to the shutdown of any traffic signal and lighting system. The Contractor may use temporary splices and wiring as approved by the City CM Engineer to maintain existing and temporary traffic signal and lighting systems. Shutdowns of traffic signal and lighting systems shall be limited to the period from 9 a.m. to 4 p.m. of normal working days, excluding legal holidays, weekends, and non-working days as determined by the City CM Engineer.

#### 23-1.6 Scheduling of Work

Scheduling of Work shall conform to the provisions in Section 8-1.02 of the State Standard Specifications and these Specifications.

The Contractor shall notify the City CM Engineer at least two working days in advance of any electrical work and also at least two working days in advance of any Work done intermittently to facilitate inspection.

#### 23-1.7 Foundations

Foundations shall conform to the provisions in Section 56-3 of the 1997 State Standard Specifications and these Specifications.

Concrete for reinforced pile foundations shall contain not less than 590 pounds of cement per cubic yard.

Foundation concrete shall be placed in a single pour except that pouring of the top six inches may be postponed when prior approval has been obtained. Exact location for controller cabinet shall be designated by the Traffic Engineer and approved by Electrical Superintendent, 48-hour notice required.

No Utilities shall be permitted to run through any foundations.

PVC wire-ways in pole foundations shall be installed as detailed in City Standard Drawing No. E-27. Foundations shall be poured against undisturbed earth where practicable. The exposed portion shall be formed and finished to present a neat appearance. Where obstructions or other conditions prevent construction of planned foundations, the Contractor shall construct an effective foundation satisfactory to the City CM Engineer.

The bottom of concrete foundations shall rest on firm ground. When placing the foundations, the Contractor shall place all conduit ends in their proper position, at the correct heights and shall securely hold them in position during the pouring of concrete. Conduits exiting the controller foundation and entering into the controller cabinet shall be aligned to enter within the TEES specified cabinets without any modifications to the cabinet base. Conduit shall be capped before any concrete is poured. Both forms and earth to be in contact with foundations shall be thoroughly moistened before placing concrete.

Anchor bolts shall be galvanized and shall extend above the finished base as needed to ensure a minimum extension above the top nut of 3 threads. The maximum extension above the top nut is 1 inch. Each bolt shall be supplied with 2 nuts and 2 flat washers to facilitate leveling. The distance between the bottom nut and the top of the finished foundation shall vary depending on the diameter of the anchor bolt being used. For anchor bolts 1" or less in diameter this distance is 1" minimum and 1-1/2" maximum. For anchor bolts greater than 1" in diameter the distance is 1-1/2" minimum and 2" maximum.

The anchor bolts and conduits shall be held in place by means of a template until the concrete sets.

Locations shown on the Plans are schematic.

Poles, standards and pedestals shall not be erected until the foundation concrete has set at least seven Days and shall be plumbed or raked as directed by the City CM Engineer. Top of concrete foundations shall be finished relative to curb or sidewalk grade or as shown on the Plans or as directed by the City CM Engineer.

The top of controller cabinet foundation shall be 12 inches above the surrounding grade or sidewalk, as shown in City Standard Drawingg. E-37.

#### 23-1.8 Standards, Steel Pedestal and Posts

Standards, steel pedestals and posts shall conform to the provisions in Section 56-3 of the 1997 State Standard Specifications and these Specifications.

If relocation of Utilities is required, immediate notification shall be given to the appropriate Utility Company by the Contractor.

The Contractor may install all underground electrical components, including foundations for signal standards and controller cabinet at the site of the project; however, no traffic signal standards shall be erected until all controlling equipment is available to the Contractor for installation.

All nuts, washers, screws and other post hardware shall be galvanized.

Signal mast arms shall not have mid-arm tenons. Signal heads shall be installed with Astro-Bracket, or approved equal.

#### 23-1.9 Conduit

Conduit shall conform to the provisions in Section 86-1.02B of the State Standard Specifications and these Specifications.

Nonmetallic-type conduit shall not be used, unless specifically called for on Plans, with the exception of conduits between standards and adjacent pull boxes which shall be installed per City Standard Drawing No. E-27.

Conduit shall be of rigid type, conforming to Article 346 of the National Electrical Code. All conduit and fittings shall be hot dip galvanized. Each length shall bear the labels of Underwriters Laboratories, Inc. Installation shall conform to appropriate Articles of the Code.

All couplings shall be tightened to provide a good electrical and mechanical connection throughout the entire length of the conduit run. All conduit ends shall be threaded and joined with City TSSL Division approved fittings. The use of threadless or set screw fittings is not allowed. No running threads are permitted. Three piece, Erickson type, couplings shall not be used without prior authorization from City TSSL Division and will be only allowed under special circumstances necessitating their use.

Conduit threads cut in the field and damaged conduit surfaces on metal conduit shall be thoroughly painted with zinc rich paint conforming to Military Specification DOD-P-21035A.

All conduit ends shall be threaded and capped with standard conduit caps until wiring is started. When the caps are removed the threaded ends shall be provided with approved insulated hot dipped galvanized malleable iron bushings with cast integral lay-in lugs.

It shall be the privilege of the Contractor, at his/her own expense, to use larger size conduit than indicated on the plans if desired, and where larger size conduit is used, it shall be for the entire length of the run from outlet to outlet. No reducing couplings will be permitted.

All conduit shall be laid to a depth of not less than twenty-four inches, nor greater than thirty-six inches below the curb grade in the sidewalk areas and from the finished surface in Street areas. Conduits in sidewalk areas parallel to the curb shall not be installed more than twenty-four inches from inside of curb line toward property line unless approved by the City CM Engineer. Conduits not able to be placed under concrete sidewalk, or roadway, shall be encased in at least 6" of two-sack slurry.

Conduit shall be placed under existing pavement by directional boring and jacking method. Pavement shall not be disturbed without the written permission of the City CM Engineer and then only in the event insurmountable obstructions are encountered. Excessive use of water, such that pavement might be undermined, or subgrade softened, will not be permitted.

Conduit in pull boxes shall not extend more than two inches inside the box wall. No conduit may enter the pull box from the bottom unless approved by the City CM Engineer. No conduit or Utility shall pass through a signal, controller or Street light base or pull box except the conduit which terminates within the base or pull box.

No 90° elbows shall be installed unless specified or approved by City of Fresno, Construction Management.

After the installation of all conductors and cables, the ends of conduits terminating in pull boxes, the controller cabinet and service pedestal shall be sealed with an approved duct seal material. In as much as possible, conduit shall be run in a straight line from one pull box or pole to the next, maintaining a consistent setback from the curb. Any variation from this requirement shall be approved by the City CM Engineer.

#### 23-1.10 Pull Boxes

Concrete pull boxes shall conform to the provisions in Section 86-1.02C of the State Standard Specifications and these Specifications.

All pull boxes shall be No. 5 unless otherwise noted on the Plans. See City Standard Drawings No. E-4A through E-4C, regarding requirements for grouting, drain hole, etc.

All pull boxes shall be installed with extensions. The pull box lid at the Pacific Gas & Electric Company's point of connection shall be marked "PG&E." All others shall be inscribed "Traffic Signal," "Interconnect," "Electrical" or "Street Lights" as appropriate.

Pull boxes on long runs shall be installed and spaced at not over 200-foot intervals, and shall be required in all conduit change of directions.

All pull boxes shall be wrapped with 15lb. roofing paper prior to backfilling.

Pull boxes installed in non-concrete areas shall be surrounded by a one (1) foot wide concrete collar and to a depth equal to the pull box and extension. The collar shall be sloped to drain away from the pull box.

Existing pull boxes accessed during the course of work shall be cleaned, drain holes opened, bonding and grounding connections secured, conduits duct sealed and grout repaired. Any pull boxes broken in the course of work shall be replaced.

Vandal resistant locking lids shall be installed by the contractor at final inspection. Contractor shall provide temporary lids during construction. Locking lids shall be galvanized steel diamond plate, minimum thickness 3/16 inches, with minimum two (2) clamping jaws and be keyed to the City of Fresno key. Locking lids shall be torqued to 25ft pounds (lbs) prior to installing buttons.

For concrete fiber optic vaults, refer to SECTION 31 of the City Standard Specifications.

#### 23-1.11 Conductors and Wiring/Cables

Conductors and wiring shall conform to the provisions in Section 86-1.02F of the State Standard Specifications and these Specifications.

All 7-conductor, 5-conductor and 3-conductor cables shall conform to the latest International Municipal Signal Association (IMSA) Specification 20-1. The cable conductors shall be 14 AWG solid copper.

When cables are pulled into the conduit, all ends of the cables shall be taped to exclude moisture, and shall be so kept until connected to terminals.

A minimum of three feet of slack in each single conductor and cable run shall be left at each each pull box.

No splices shall be allowed in multi-conductor cables. They shall run from the controller terminal strip to the appropriate TS-4 terminal block. No splicing of underground conductors is allowed.

All single conductor wire shall be copper and of stranded construction with THWN type insulation. All conductors shall have insulation colors appropriate to their use and all applicable codes. The use of colored phase tape is not allowed.

Splices in single conductor wire shall be limited to the load side of the service pedestal breakers and to tap type splices located in pull boxes. These splices shall be made using either split bolts or c-tap connectors. The c-taps shall be properly sized for the wires being joined and installed with the proper tooling. The splice shall be insulated as follows: minimum 2 layers of rubber tape, 1 layer--½ lapped plastic tape, 1 layer friction tape and then coated with an approved electrical sealing compound.

Pedestrian push button circuits shall utilize a 3-conductor cable between the controller and a pedestrian TS-4 terminal assembly. The individual buttons shall be

connected to the terminal assembly using DLC (Reference City Standard Drawing No. E-20).

At the pushbutton end, the conductors shall be attached using an insulated fork terminal properly sized for the wire and screw. The terminal shall be installed using the proper tooling and tinned with solder.

At the terminal assembly end, the wire shall be stripped, loose strands of individual conductors twisted neatly and tinned with solder prior to installation into the box type pressure connector.

Conductors within the 3, 5 and 7 conductor cables shall be connected within the terminal assemblies as shown on the "Terminal Location," City Standard Drawing Nos. E-19 and E-20.

The single conductor #14 AWG THWN stranded copper wire installed between the TS-4 terminal block and the individual signal heads terminal block shall be terminated as follows:

a) At the signal head end, it will be installed using an insulated spade terminal properly sized for the wire and the screw. The terminal shall be installed using the proper tooling. At the terminal assembly end, the wire shall be stripped, loose strands twisted neatly and tinned with solder prior to installation into the box type pressure connector.

All multi-conductor cable conductors connected to the load bay shall be terminated at the controller cabinet using the AMP/TYCO 320359 spade terminals.

All multi conductor cable conductors connected to the input terminal blocks shall be terminated at the controller cabinet using a fork terminal properly sized for the wire and the screw.

The lugs used to connect with controller field terminals shall be soldered after being properly crimped. Soldering shall be by means of an iron or gun. No open flame torch may be used.

Optical Detector Cable shall meet the requirements of IPCEA-S-61-402/NEMA WC5, Section 7.4, 600 volt control cable, 75°C., Type B, and the following:

a) The cable shall contain 3 conductors, each of which shall be No. 20 (7x28) stranded, tinned copper with low-density polyethylene insulation.

Minimum average insulation thickness shall be 25 mils. Insulation of individual conductors shall be color coded: 1-yellow, 1-blue, 1-orange.

- b) The shield shall be either tinned copper braid or aluminized polyester film with a nominal 20 percent overlap. Where the film is used, a No. 20 (7x28) stranded tinned, bare drain wire shall be placed between the insulated conductors and in contact with the conductive surface of the shield.
- c) The jacket shall be black polyvinyl chloride with a minimum rating of 600 volts and 80° C (176°F) and a minimum average thickness of 45 mils. The jacket shall be marked as required by IPCEA/NEMA.
- d) The finished outside diameter of the cable shall not exceed 10 mm (0.35 inch).
- e) The capacitance, as measured between any conductor and the other conductors and the shield, shall not exceed 48 picofarads per foot at 1,000 Hz.
- f) The cable run between each detector and the controller shall be continuous without splices or shall be spliced only as directed by the detector manufacturer and approved by the City.

Optical detector cable shall be connected within the terminal assemblies as shown on the "Opticom Connections" City Standard Drawing No. E-34A.

The optical detector cable installed between the controller cabinet and the individual 721 detectors shall be terminated as follows:

- a) At the 721 detector end, the conductors shall be stripped; loose strands twisted neatly and tinned with solder prior to installation into the box type pressure connector.
- b) At the controller terminal assembly end, it will be installed using an insulated space terminal properly sized for the wire and the screw. The terminal shall be installed using the proper tooling and tinned with solder.

#### 23-1.12 Fused Splice Connectors

Fuses for safety lights and street lights will no longer be allowed in the pole hand hole. Each luminaire shall be internally fused per subsection 23-3.16.

#### 23-1.13 Bonding and Grounding

Bonding and grounding shall conform to the provisions in Section 87-1.03(O) of the State Standard Specifications and these Specifications.

Ground will be obtained by installation of a ground rod within the service pedestal foundation. This ground rod shall be bonded to all metallic conduits within the

controller cabinet and all pull boxes shall be bonded in a similar manner. Within the service pedestal, controller cabinet and pull boxes adjacent to signal standards, one end of the solid #8 bonding conductor shall be extended to and attached to the pedestal, controller cabinet or signal standard using the grounding point as furnished. For signal standards not supplied with a hand hole, the grounding conductor shall be terminated on an anchor bolt between two washers installed above a leveling nut.

A green #8 stranded wire may be used for pole grounding if a ring terminal, appropriately sized for the grounding bolt, is installed.

All ground connections shall be left visible and accessible until the final acceptance inspection is complete.

To ensure proper ground distribution, a #8 stranded copper conductor with green THWN insulation shall be installed in all conduits. The ends shall be attached to the bonding jumper at each end using split bolt or c-tap splices.

## 23-1.14 Testing

Testing shall conform to the provisions in Sections 86 and 87 of the State Standard Specifications and these Specifications.

When controller equipment is not supplied by the City, the Contractor shall provide the controller equipment to Traffic Signal Maintenance, 2101 'G' Street, Building E, Fresno, CA 93706. Ten working days will be allowed for testing and programming of the controller equipment.

Note: Refer to these Specifications regarding Controllers, Cabinets and Ancillary devices.

The controller equipment shall be capable of passing the "self-evaluation program" utilized by the City.

Should any equipment fail to pass or be rejected as not complying with the Specifications, the Contractor shall remove said equipment within 3 working days after Notice of rejection is given. Should the equipment fail to be removed, it may be removed by City and shipped to the Contractor at his/her expense.

The Contractor shall allow ten working days for evaluation, testing and programming of all replacement equipment. The ten working days will start when the new equipment is delivered to the City.

The cost of all retesting and evaluation shall be the responsibility of the Contractor.

## 23-1.15 **Painting**

All paint shall be furnished and applied by the Contractor. Minor touch-up painting on all material whose surface is damaged or not protected from rusting shall be painted as directed by the City CM Engineer. Cold galvanized zinc-rich paint, Military Specifications DOD-P-21035 A, shall be used on all damaged galvanized surfaces.

#### 23-1.16 Service

Service shall conform to the provisions in Section 87-1.03L of the State Standard Specifications and these Specifications. Electrical service pedestal installation and wiring shall be as detailed in City Standard Drawing Nos. E-15 and E-17. The underground conduit between the service pedestal and the P.G. & E. point of service shall be galvanized rigid conduit. Service feeders shall be sized to accommodate the full load amperage rating of the electrical service pedestal. Voltage drop shall be taken into consideration when sizing conductors.

## 23-1.17 Signal Faces and Signal Heads

Signal faces, signal heads and auxiliary equipment as shown on the Plans, and the installation thereof, shall conform to the provisions in Section 86-1.02R of the State Standard Specifications and these Specifications.

All signal sections shall be provided with 12" (300mm) diameter Light Emitting Diode (LED) modules conforming to the requirements of the Institute of Transportation Engineers (ITE) publication ST-017B and listed in the Qualified Products List (QPL). Green LED modules shall have clear lenses.

Visors on vehicular signals shall be "tunnel" type with open slot at bottom.

All signal heads, visors, and backplates shall be metallic. Signal heads shall be painted gloss dark green and backplates shall be painted flat black. Visors shall be black.

Backplates shall be provided for all signal heads except on median mounted lower left turn signal.

Mounting framework shall consist of 1.5" steel pipe, ductile iron fittings, and bronze terminal compartments. Slipfitter attachments, MAS/MAT, shall be bronze. After installation of the signal mounting framework, any through bolts that extend more than 1" beyond the nut shall be cut to three threads beyond the nut and painted with a zinc rich cold galvanizing compound.

All set screws exposed to weather shall be zinc, stainless steel or cadmium plated and have square heads.

When a mast arm is not equipped with a mid-tenon, the Contractor shall provide a City approved Signal Mounting Bracket to install the MAS signals. The standard bracket is supplied with 29" mounting bands. Longer lengths are available and may be needed depending on the particular mast arm used. The bracket shall be installed using the manufacturers detailed installation instructions. Prior to mounting the bracket, the Contractor shall drill a 1" diameter hole in the mast arm corresponding to the desired signal placement. All burrs and sharp edges shall be removed. The area will be cleaned of any oil or drilling compound. A zinc-rich cold galvanizing compound will be applied to the bare metal. A 1" grommet will be installed in the drilled hole to protect the wiring. After the bands are adjusted and tightened, the tenon shall be marked and drilled to accept the MAS through bolt. After mounting and plumbing of the signal, the set screws shall be secured.

Traffic Signal Head Modules (LED'S) shall conform to 86-1.02R of the State Standard Specifications, the State Department of Transportation QPL, and to City requirements. Green LEDs to have clear lens only.

## 23-1.18 Pedestrian Signals

Pedestrian signals shall conform to the provisions in Sections 86-1.02S of the State Standard Specifications and these Specifications.

Pedestrian signals shall be Type A. International type symbols shall be used.

All pedestrian signal housings shall be metallic. The lenses and egg crate type visors shall be polycarbonate.

Mounting framework shall consist of 1-1/2" steel pipe, ductile iron fittings and bronze terminal compartments.

Clam shell mounting hardware shall not be used.

After installation of the signal mounting framework, any through bolts that extend more than 1" beyond the nut shall be cut to three threads beyond the nut and painted with a zinc rich cold galvanizing compound.

All set screws exposed to weather shall be zinc or cadmium plated and have square heads.

The signal shall have an LED Hand and White Walking Man with a countdown feature.

When allowed, reused pedestrian signals shall have an LED countdown retrofit kit installed. The installation shall not require any special tools or the drilling of any holes in the reflector or housing. If existing pedestrian housing will not

accommodate an LED retrofit kit, the Contractor shall furnish and install a new pedestrian housing.

The luminous intensity, quantity and color of the LEDs shall be such that the intent of the current ITE specification for Pedestrian Traffic Control Signal Indications is satisfied.

### 23-1.19 **Detection**

Detectors shall be supplied by an approved manufacturer and conform to provisions in Section 87-1.03V of the State Standard Specifications and these Specifications.

Pavement saw cut detector loop wire shall be type 2.

Loop Detector Lead-in Cable (DLC) shall be Type "C" IMSA spec. 50-2. Cable shall not be spliced between the termination pull box and the controller terminals.

DLC drain wires shall be terminated in the cabinet as individual wires (Not twisted into groups) to allow for ease of future relocation.

Loops in adjacent lanes shall be polarized and the loop conductor ends identified as detailed in State Standard Drawing, ES-5A note #8 and the 'winding Details'.

Loops locations shall be per City Standard Drawing No. E-14.

The loop wire when spliced to the lead-in cable shall be insulated using Method 'C' Handcrafted Insulation or by using approved heavy wall shrink tubing. All splices shall be made using uninsulated inline connectors, crimped and soldered.

Resistance: max =  $0.51 + 0.35\Omega/c$  of DLC.

Insulation: min = 100 meg  $\Omega$ .

The loop test measurements as detailed in the State Standard Drawing, ES-5A note # 17, shall be documented on the "Detector Loop Test Results" form provided in the controller cabinet and a copy is provided at the end of these Specifications. The form will be signed and dated by the individual performing the tests.

The sealant for filling slots shall be Elastomeric Sealant or Hot-melt Rubberized Asphalt Sealant, and shall conform to State Standard Specification Section 87-1.03W.

#### 23-1.20 Pedestrian Push Buttons

Pedestrian push buttons shall conform to the provisions in Section 86-1.02U of the State Standard Specifications, latest edition of California MUTCD, and these Specifications.

Pedestrian push buttons shall meet or exceed the 2010 Americans with Disabilities Act Standards for Accessible Design as specified in <u>The Federal Register</u>, as printed on September 15, 2010.

Pedestrian push buttons, housing and sign shall be pre-approved by the City CM Engineer.

Pedestrian push buttons shall be Type "B" with sign and housing. Housing shall be metallic and sign shall be international symbol and arrow. <u>Push buttons shall be 2" diameter and mounted at a height of 40".</u> Push buttons mounted on 2 ½" diameter posts shall have integrated post caps, or caps from the push button manufacturer which attach to the pushbutton housing.

The housing shall be adjusted to conform tightly to the curvature of the pole.

## 23-1.21 Audible Pedestrian Signal Specification

When specified, the contractor shall furnish and install an Accessible (Audible) Pedestrian Signal (APS) system (2-wire Polara iNavigator2 or approved equal) in conformance with the city's Standard Specifications. The APS shall provide both a vibrating arrow button and audible sounds during the "Walk" interval as well as a locating tone during the pedestrian clearance and don't walk intervals. The APS shall meet current ADA and MUTCD requirements.

The contractor shall supply the latest means of programming the APS system and digital copies of the "custom messages" to the City of Fresno TSSL Division.

# 23-1.22 Emergency Vehicle Priority Control System

The priority control system shall offer the capability of identifying two levels of priority vehicles at signalized intersections and one level of probe vehicle. High priority for emergency vehicles and low priority for other authorized users will request the traffic signal controller to advance to and/or hold a desired traffic signal display selected from phases normally available. A Probe Vehicle Mode must be available for traffic engineering, run time analysis and response time data gathering. The probe vehicle mode will not preempt the traffic signal. The Probe Mode will record of the probe vehicle's presence at a Priority Controlled intersection. The system will only allow users with flash rates of 14.0359Hz +/-0.05% for high priority and 9.63855Hz +/-0.05% for low priority activation of the system. The system shall also be capable of identifying up to 10,000 individual vehicles by the coded light signal of the vehicle emitter for security and vehicle logging.

The system will have non-authorized vehicle control with the capability of only allowing use of the system to authorized users with valid identification codes. The system must be fully compatible with existing vehicle emitters currently installed on

City-owned fire apparatus, and City-owned signalized traffic signals, as well as contractually obligated mutual aid providers.

The system will record up to 1000 activations, on a continuous basis. The latest preemption will replace the oldest preemption. The system must record the date and time of the preemption, the duration of the preemption, the direction from which the call was received, the vehicle identification number (class and ID), intersection name, log entry number, priority of vehicle and duration of call. Further, the system must record approximate distance of each emitter recorded during last moment of detection. This data is to be recorded in the phase selector located inside the cabinet. Information is to be easily accessible via RS232 port and software. The phase selector shall also have the capability to assign a relative priority to a call request within high or low priority based on the received vehicle ID class.

The system shall offer automated signal intensity threshold settings. Activation range to be set by downloading a code through the software and by using a combination of the software and a special range setting emitter. The system range shall be capable of precise settings using 1200 increments; and actuating between 100 feet and up to 2500 feet passage of 8 separate emergency vehicles, individually approaching the test intersection. Each equipped emergency vehicle will be required to activate the test intersection at 1800 feet with a variance of 100 (+-) feet. The system must be able to set separate ranges on any detector; one for low priority and one for high priority.

The system will be a matched component system with all components from one manufacturer consisting of:

- a) A Data-Encoded Emitter. The data-encoded emitter will trigger the system. It will send the infrared signal to the detector. It will be located on the priority or probe vehicle.
- b) Phase Selectors to be located in the controller cabinet with green sense harnesses wired into the traffic controller per manufacturer specifications. Phase selectors shall have two channels.
- c) Detector cable with four conductors yellow, blue, orange and bare.
- d) Vehicle detectors shall be dual input single output.

The system shall offer the capability of detector diagnostics through connecting a lap top computer to the phase selector and reading electrical line noise between the traffic signal cabinet and detector mounted in the intersection. System must display information, such as optical noise levels, so as to confirm proper operation of detector and therefore reduce inspection time and effort.

Detectors shall be mounted with an Astro-Mini-Brac, or other approved bracket, on the traffic signal mast arm and aligned with the number one through traffic lane. Prior to mounting the bracket, the contractor shall drill a 1" diameter hole in the mast arm at the desired bracket location. All burrs and sharp edges shall be removed. The area will be cleaned of any oil or drilling compound and a zinc-rich cold galvanizing compound will be applied to the bare metal. A 1" grommet will be installed in the drilled hole to protect the wiring.

Phase selectors shall be a two channel type. (Opticom 762 or approved equivalent.)

# 23-1.23 Traffic Signal Luminaires

Luminaires at Traffic Signals shall be light emitting diode (LED) light source luminaires for new signal construction. The City Engineer maintains a list of approved luminaire products that meet the minimum illumination standards using typical signal pole spacing ranges. Approved traffic signal luminaires for the three Intersection size categories may be used in lieu of a specific design meeting the criteria in the remaining parts of this section.

<u>Small Traffic Signal Luminaire (STS)</u> – Use small traffic signal luminaires when the maximum diagonal distance between the four signal pole bases with luminaires is 135 feet or less.

<u>Medium Traffic Signal Luminaire (MTS)</u> – Use medium traffic signal luminaires when the maximum diagonal distance between the four signal pole bases with luminaires is more than 135 feet but less than 165 feet.

<u>Large Traffic Signal Luminaire (LTS)</u> – Use large traffic signal luminaires when the maximum diagonal distance between the four signal pole bases with luminaires is more than 165 feet but less than 200 feet.

Expressway Traffic Signal Luminaire (ETS) – Use expressway traffic signal luminaires when the maximum diagonal distance between the two farthest signal pole bases with luminaires is greater than 200 feet but less than 220 feet.

Diagonal pole spacing greater than 220 feet requires an illuminance based photometric design to select the correct luminaire. The submitted traffic signal or street light plans shall include computer-generated point-by-point photometric analysis of maintained illumination levels. Analysis areas should be conducted on proposed roadways, sidewalks, intersections and crosswalks. This analysis that matches the submitted plans, should list all input parameters and reference files. The hardcopy and computer design shall be provided to the City engineering staff, amended as necessary by the lighting professional, and approved by the City Engineer prior to the approval of the luminaires.

The Public Works Technical Library on the following City website provides the most current list of approved luminaires for the three intersection size categories.

http://www.fresno.gov/Government/DepartmentDirectory/PublicWorks/DeveloperDoorway/Technical+Library/StandardSpecificationsandDrawings.htm

These luminaires may be utilized for installation if listed at the time of installation or award of construction contract only if the installation is to be performed under a City Construction Contract.

A photometric design will be required to demonstrate that proposed luminaires will provide the minimum signal/intersection illuminance if any of the following criteria are met.

- a. The new traffic signal will not have the standard signal lighting pole layout, i.e. all four corners with a luminaire over the signal mast arm;
- b. The maximum pole to pole diagonal distance is more than 220 feet;
- c. A luminaire different from the City Engineer approved list is proposed;
- d. The location has increased potential for night time vehicle or pedestrian conflicts as determined by the City Engineer necessitating an increase in the minimum illuminance values for signalized intersection listed below.

## <u>Signalized Intersection Photometric Design Requirements</u>

When photometric design is required, the submitted traffic signal plans shall include computer-generated point-by-point photometric analysis of maintained illumination levels. Analysis areas should be conducted on proposed intersection and crosswalk configurations. This analysis that matches the submitted lighting plans, should list all input parameters and reference files. The hardcopy and computer design shall be provided to the City engineering Staff, amended as necessary by the lighting professional, and approved by the City Engineer prior to construction of the lighting system.

### **TABLE NO. 23-1.23 A**

LED TRAFFIC SIGNAL LUMINAIRE						
LUMINAIRE		60W Max				
MAXIMUM INPUT	Major/Major Intersection Small	Utility Label				
POWER	Less than 135 feet diagonal between signal poles	6100 (+/- 5%)				
(Note: the lowest		Lumen				
power luminaires that	Major/Major Intersection <b>Medium</b>	80W Max				
can provide minimum	Greater than 135 feet diagonal between signal poles and	Utility Label				
illumination are	less than 165 feet	9300 (+/-5%)				
encouraged)	iess than 103 rect	Lumen				
	Major/Major Intersection Large	100W Max				
	Greater than 165 feet diagonal between signal poles and	Utility Label				
	less than 200 feet	12000 (+/-5%)				
	1035 than 200 feet	Lumen				
	Expressway/Major Intersection Expressway, Greater	110 W				
	than 200 feet diagonal between signal poles and less	(MAX.)				
	than 220 feet	13,400 (+/-				
		5%) Lumen.				
VOLTAGE	Nominal luminaire input voltage (or range as applicable)	120 to 277 V				
WARRANTY	Minimum luminaire warranty	10 years†				
NOMINAL CCT	Rated correlated color temperature	4000 K				
BUG RATINGS	Maximum nominal for Small Major Street Intersection	B1-U0-G2				
(backlight-uplight-	Maximum nominal for Medium/Large/Expressway					
glare)	Major Street Intersection	B2-U0-G2				
	Luminaire housing finish color	Gray				
WEIGHT	Luminaire weight	30 lb. Max				
EPA	Max. effective projected area	$0.7 \text{ ft}^2$				

<sup>† -</sup> City requires extended warrantee certificates from manufacturer's that do not offer a standard 10 year warrantee.

The values in the table below represent minimum illuminance levels for typical City of Fresno major intersections with low night time pedestrian and vehicle conflict conditions. Where night time pedestrian and vehicle conflicts are anticipated to be higher than typical conditions, the minimum values provided may be increased at the discretion of the City Engineer depending on the expected site or facility use, and night time activity. In those cases a specific lighting design will be required for review and approval.

**TABLE NO. 23-1.23 B** 

SINGNALIZED INTERSECTION ILLUMINANCE CRITERIA				
MAINTAINED MAJOR/MAJOR INTERSECTION ILLUMINATION				
All Roadway Area from curb return				
Average horizontal luminance at pavement 0.75 fc				
Average to minimum uniformity ratio 3				
Maximum to minimum uniformity ratio 6				
MAINTAINED CROSSWALK ILLUMINATION				
Average horizontal at pavement 0.75 fc				
Average to minimum uniformity ratio (horizontal) 5				

All Manufacture and Installation Requirements listed in Section 23-3.16 shall apply to luminaires on traffic signals under this section.

After installation and plumbing of the pole, the luminaire shall be leveled on both the long and transverse axis by use of spirit level.

The street light numbers shall be installed on the poles using minimum 2 1/2" high numerals in accordance to City Standard Drawing No. E-25. Numbers shall be adhesive backed Almetek PS-2.5 or approved equivalent. The numbers shall be black on a contrasting background. Pole numbers shall be shown on the as-built plans.

# 23-1.24 Traffic Signal Photoeletric Control and Shorting Caps

If the service pedestal is equipped with a lighting contactor and no master photo control is installed, the Contractor shall install one atop the traffic signal mast arm pole adjacent to the service pedestal or atop the nearest streetlight pole. The master photo control shall be wired back to the service pedestal using three #12 AWG stranded copper wires color matched to the PEC. The PEC will be mounted using hardware manufactured for that purpose or fabricated and approved by the Electrical Superintendent.

All streetlights and safety lights fed from a pedestal equipped with a contactor shall be switched by that contactor and their PEC's replaced with shorting caps.

Photoelectric Controls and Shorting Caps shall be "Listed" by OSHA Nationally Recognized Testing Laboratory, such as, UL, CSA, ETL, and comply with City Specifications for Street Lighting, subsection 23-3.17.

## 23-1.25 Signal Turn-On Requirements

a) The Traffic Engineer, TSSL Supervisor, and the Traffic Operations Center Supervisor shall be notified in writing, seven (7) working days in advance of proposed turn-on.

- b) All turn-ons will have a pre-inspection one (1) day prior to turn-on.
- c) All wiring shall have passed the test for shorts and continuity. Detector loops shall have been "Meggered" and meet Specifications.
- d) All "field" connections shall be made and verified, including the pedestrian push buttons and the vehicular and pedestrian signal heads.
- e) All signal heads shall be properly aimed as directed by the City CM Engineer.
- f) All signal poles and heads shall have been in place a minimum of seven (7) Days.
- g) All auxiliary functions (e.g., safety lights, etc.) shall be operational.
- h) The "service" shall be complete, including the utility company meter.
- i) All signing and striping (including sign removal) shall be in place before signal can be turned on.

When all of the above are complete and the intersection ready for turn-on, the Contractor shall notify the City CM Engineer. The City CM Engineer will then arrange with the Electrical Supervisor to meet with the Contractor at the Site to perform an initial inspection of the installation. If satisfactory, the signal may be placed in operation. Any items needing additional Work or correction will be listed and that list provided to City Construction Management and the Contractor. City Construction Management will ensure that these items are corrected as needed. The initial turn on shall be made between 9:00 a.m. and 2:00 p.m. unless otherwise specified. Functional tests shall start on any working day except Monday, Friday or the Day preceding a legal holiday. The Contractor is cautioned not to attempt turn-on prematurely. Time spent by the City's Traffic Signals and Streetlights staff at the Site in excess of two hours due to Work not completed by the Contractor prior to turn-on will be paid by the Contractor. Any inspections in excess of 2 re-inspections after a punch list has been generated will be paid by the Contractor.

### 23-1.26 Traffic Control

Traffic control shall be provided in accordance with the latest Caltrans adopted California "Manual on Uniform Traffic Control Devices" (CAMUTCD), subsections 7-10.4 and 7-10.5 of these specifications.

A traffic control plan shall be provided in accordance with the latest Caltrans adopted California "Manual on Uniform Traffic Control Devices" (CAMUTCD), subsections 7-10.4 and 7-10.5 of these specifications.

Payment shall be included in lump sum bid for signals and lighting.

## 23-1.27 **Payment**

Payment for new signals, lighting and modifications shall conform to the provisions in Section 9 of the State Standard Specifications and these Specifications.

The Contract Price shall include traffic signal and safety lighting and no additional payment will be allowed.

## 23-2 TRAFFIC CONTROLLERS, CABINETS AND ANCILLARY DEVICES

### **23-2.1** General

- a) It is the purpose and intent of these Specifications to describe the minimum requirements for traffic signal controllers, cabinets, and other ancillary devices to be used by the City Traffic Engineering and Street Maintenance Divisions.
- b) All items not specifically mentioned which are required for a complete 8phase unit shall be included in the unit.
- c) All equipment and accessories to be furnished must be new and in current production. All products shall conform in design, strength, quality of material and workmanship to current industry standards.
- d) Each item shall be accompanied by two (2) sets of the manufacturer's illustrated descriptive literature and specifications. A copy of the manufacturer's standard warranty shall also be attached to the equipment.

All equipment and accessories shall comply with:

- a) Regulations of the Federal Occupational Safety and Health Administration (OSHA) and/or the California Occupational Safety and Health Administration (Cal/OSHA), whichever is more restrictive.
- b) Title 49, Code of Federal Regulations, Chapter III, Federal Highway Administration Department of Transportation.
- c) California Vehicle Code.
- d) State Standard Specifications, the most recent Traffic Signal Control Equipment Specifications, and all subsequent addenda.

### Technical Specifications:

All material and equipment supplied must comply with the State Standard Specifications, except for those exceptions allowed herein, and must be manufactured by companies on CALTRANS' Qualified Products List (QPL). The

most recent QPL will be the list used to determine the qualification of the products offered. Any submittal with any products not on the QPL will be rejected. Any changes occurring in subsequent QPL's shall be considered in effect on all subsequent orders.

## Model 2070L Controller Assemblies:

New Model 2070LX controller assembly or assemblies shall be furnished by the Contractor, as shown on Plans, and shall conform to Section 86-1.02Q of the State Standard Specifications and all addenda thereto, current at the time of project advertising, and these Specifications. The controller shall accompany manufacturer written verification and certification that the 2070LX controller meets or exceeds the requirements set for in the current Caltrans Transportation Electrical Specifications (TEES) – March 12, 2009 and all Errata. The City will not accept the 2070LX controller without the certification. The certification shall have documentation from the Manufacturer indicating that the 2070LX controller has gone through Quality Assurance testing of all components; this will ensure the City receives a quality product.

The Contractor shall provide the Model 2070LX unit as a complete, operational assembly, with local intersection-control software that is 100% compatible with current City of Fresno's Traffic Management System. The controller software shall be able to fully integrate into Traffic Management System without any additional hardware or software. The software license registration sticker shall be attached alongside the hardware serial number plate inside the front panel. The Firmware version for the Model 2070LX shall be V76.13P minimum or greater.

The controller shall be the "lite" version Model 2070LX (California Transportation Department Rack Mount type) ATC traffic controller per State Standard Specifications, shall conform to the Transportation Electrical Equipment Specifications (TEES) Errata 2. The controller shall be equipped with the following modules:

- a) 2070-1C CPU with 64MB DRAM, 128MB Flash, Linux Operating System, 3 each - 10/100 Ethernet Ports, USB 2.0 full-speed port for memory, Nonvolatile SRAM, C13S connector, 3.3v/5v data key, TEES 2009 compatible, Freescale PowerQuick Processor and ATC 5.2b compliant
- b) 2070-2A I/O Module for 332 cabinets
- c) 2070-3B 8x40 Line Display and dual keyboard panel
- d) 2070-4B Heavy-Duty 3A Power Supply Module
- e) 2070-7A Dual Serial Port Card, RS-232

- f) Patriot V76.13P Firmware installed in Controller
- g) 2070LX shall be 100% compatible with the City's existing Trafficware/Naztec Advanced Transportation Management System (ATMS.NOW) without any hardware or software additions and/or modifications.

### 332L Cabinet:

Shall meet all California Transportation Department and Federal Highway Administration requirements. The Model 332L Cabinets shall be anodized aluminum (0.125" thick).

The 332L cabinet suppliers shall be qualified 332L suppliers.

The cabinet shall include the power supply, two Model 204 flashers, all necessary relays, the Conflict Monitor, a red interface adaptor, a thermostatically controller fan, a door switch operated fluorescent light(s), a slide out shelf/drawer storage unit and four anchor bolts. All crimp type terminals between the Lower Input Panel and the Input files shall be soldered. For matching purposes, the City will accept the Corbin 3-point locking system lock, which shall be keyed alike to the City Standard Specifications, (No Substitutions).

# Model 332L Traffic Signal Controller Cabinet Modifications:

Modify to City Standard Drawing No. E-34A for preemption and E-34B for the C-11 cable connections. Upgrade service panel Traffic Signal circuit breaker to 40A. Upgrade signal bus circuit breaker to 30A, flasher breaker to 15A and label PDA #2L breakers accordingly. Furnish and install any and all equipment for proper operation of traffic signals and cabinet as described in this Section 23-2 of the City Standard Specifications.

### 200 Load Switch:

The load switch is a tri-pack, modular, solid state relay designed specifically to meet NEMA specifications, as well as California and New York Model 200 specifications. Each load switch contains 3 individually replaceable modules that are enclosed in a dust resistant metal enclosure. The load switch shall integrate with the Model 332 cabinet output file as well as with any NEMA loadbay. Quantities shall be supplied for an 8-phase operation. 12 shall be required installed at time of delivery. 222 Two Channel Loop Monitor:

The loop inputs incorporate lightening and transient protection devices and the loop oscillator circuitry is transformer isolated. The lightening protection will withstand the discharge of a 10uF capacitor charged to 2,000V across the loop inputs or between any loop input and earth ground. The transformer isolation allows operation with

loops which are grounded at a single point. 22 shall be required installed at time of delivery.

## 242 Two-Channel D.C. Isolator:

Two-channel dual change (DC) Isolator is designed to comply with CALTRANS Model 242 specifications. Each channel of the D.C. Isolator shall present a true signal (ground closure) at the input voltage of less than 8 VDC, for longer than 5 milliseconds. The D.C. Isolator shall integrate with the model 332 cabinet input file. 3 shall be required installed at time of delivery.

## 204 Flasher Unit:

The flasher unit shall integrate with the model 332 cabinet. It has a dual circuit flasher designed for the traffic control industry, specifically to meet the CALTRANS Model 204 specifications. This unit is rated up to a 15 A per circuit. The flash rate is 56.25 flashes per minute and does not vary due to voltage or temperature variations. Two shall be required installed at time of delivery.

## Conflict Monitor 2010ECL Series + features:

The Conflict/Voltage Signal Monitor unit is exempt from QPL qualification and shall be a Model 2010ECL, as manufactured by Solid State Devices or Eberle Designs Inc. The interface for the conflict/voltage signal monitor shall be installed in the cabinet output file at the factory per the conflict/voltage signal monitor manufacturer's instructions. The unused channel programming of the interface shall be configured for full quad 8-phase operation. Modification of the programming shall be possible without the use of any tools. For conflict monitors ordered as individual units, the interface provided shall be the monitor manufacturer's generic interface complete with all cables and hardware necessary to provide complete operation of the monitor. Conflict Monitor shall be installed at time of delivery.

### Testing:

Prior to installation the Contractor must be able to deliver to the City facilities for testing and inspection all equipment. The controllers, cabinets and ancillary devices will be evaluated for performance. The Model 2070LX controller must pass the City diagnostic test. The City diagnostic is essentially identical to the CALTRANS Diagnostic and Acceptance Test Program, version 2.4, dated 1/04/95. A sample Detection Loop Test sheet is provided below. The purpose of the testing is to ensure that the equipment will work in the field, and as stated above meet all requirements.

The City reserves the right during the testing process to contact the Contractor for additional information. Any equipment found to be defective will be rejected and shall be replaced by the Contractor within 30 Days of the date of notification by the

City and at no cost to the City. Testing of replacement equipment will be at the Contractor's expense. Any equipment not approved by the City because of testing failure shall be picked up by the Contractor at the Contractor's expense. The Contractor shall have 48 hours to remove equipment failures after notification by the Electrical Superintendent. The City will not accept or have installed any rejected equipment.

# Approved Manufacturer Equipment and Brands

- a) Cabinets and Ancillary Devices
  - 1. Precision Design Company (PDC)
  - 2. Eberle Design Inc. (EDI)
  - 3. Solid State Devices
  - 4. McCain Traffic Supply
  - 5. Traffic Safety Supply
  - 6. Safetran Traffic Systems, Inc.
  - 7. Global Traffic Technologies (GTT)
  - 8. Polara Engineering
  - 9. Rene A&E

	Detector Loop Test Results																
													Agcy-Int.#				
	Lo	cat	tion:									PW	#-Fund-Org:				
	Te	est	Ву:										Date:				
	<b>✓</b>	a	Det. Slot	Movement	TB #	5	Loop Ω	Insulation Meg Ω		✓	ø	Det. Slot	Movement	TB #	Term #	Loop Ω	Insulation Meg Ω
1			I1U		2			9	2			J1U	Wieverneric	3	1-2		
3			I1L		2	3-4			4			J1L		3	3-4		
5			I2U		2	5-6			6			J2U		3	5-6		
7		••••	I2L		<del>_</del>	7-8			8			J2L	•••••	3	7-8		
9			I3U		2	9-10			10			J3U		3	9-10		
11			I3L		2	11-12			12			J3L			11-12		***************************************
13		2	I4U		4	1-2			14		6	J4U		5	1-2		
15		2	I4L		4	3-4			16		6	J4L		5	3-4		
17		3	I5U		4	5-6			18			J5U		5	5-6		
19		3	I5L		4	7-8	***************************************		20		7	J5L		5	7-8		***************************************
21		4	I6U		4	9-10			22		8	J6U		5	9-10		
23		4	I6L		4	11-12			24		8	J6L		5	11-12		
25		4	I7U		6	1-2			26		8	J7U		7	1-2		
27		4	I7L		6	3-4			28		8	J7L		7	3-4		
29		4	I8U		6	5-6			30		8	J8U		7	5-6		
31		4	I8L		6	7-8			32		8	J8L		7	7-8		
33		1	I9U		6	9-10			34		5	J9U		7	9-10		
35		3	I9L		6	11-12			36		7	J9L		7	11-12		
37			I10U		10	5-6			38			J10U		10	9-10		
39			I10L		10	7-8			40			J10L		10	11-12		
41		2	I11U		10	1-2			42		6	J11U		10	3-4		
43		4	I11L		8	2-3			44		8	J11L		9	2-3		
45			J14U	RR-1	9	10-12			46	<b>√</b> -		J14L	RR-2	9	11-12		
				mmeter readin	ıg ac	ross loop	o, in Ohms	s. (Max. 0.50	2 pe					DLO	C or 1.05 <b>0</b>	2 per 100'	#16 DLC)
	<b>Insulation Meg</b> $\Omega$ = Megohm Meter reading, loop to ground @ 500 volts, in Megohms. (Min. 100 Meg $\Omega$ )																

### 23-3 CITY SPECIFICATIONS FOR STREET LIGHTING

### 23-3.1 **General**

Furnishing and installing streetlights and payment therefore shall conform to the provisions in Section 86 and 87 of the State Standard Specifications and the State Standard Drawings, most recent version; City Standard Drawings as applicable; and the Specifications and the Plans.

Streetlight Work is to be performed at the locations shown on the Plans.

Existing electrical systems, or approved temporary replacements thereof, shall be kept in effective operation during the progress of the Work, except when shutdown is permitted.

Work or equipment not specified or shown on the Plans which is necessary for the proper operation of the Work in this section shall be provided and installed at no additional cost to the City.

The locations of foundations, poles, services, pull boxes and other appurtenances shown on the Plans are approximate. Exact locations and grades will be established as necessary by either the Traffic Engineer and/or engineer in the field.

All work shall be completed in a neat and workmanlike manner.

#### 23-3.2 Materials

Attention is directed to Section 6 of the State Standard Specifications and these Specifications.

All materials required to complete the Work under this contract shall be furnished by the Contractor after receiving approved submittals from City of Fresno Traffic Signal and Street Lights (TSSL) Division.

The materials furnished and used shall be new, except such used materials as may be specifically provided for on the Plans.

All Work and materials shall be in full accordance with the latest rules and regulations of the National Board of Fire Underwriters, local and State laws and regulations, the State of California Industrial Accident Commission's Safety Orders, and Regulations of the Pacific Gas and Electric Company pertaining to service equipment and installations thereof. All Work shall comply with Section 11-104 of the City of Fresno Municipal Code, the National Electrical Manufacturer's Association Standards and all regulations and codes as stated in Section 86-1.01D

of the State Standard Specifications. Nothing in these Plans and Specifications shall be construed to permit Work not complying with these codes.

## 23-3.3 Equipment List

Equipment list and drawing shall conform to the provisions in Section 86-1.01C of the State Standard Specifications and these Specifications.

All equipment and materials that the Contractor proposes to install shall conform to these Specifications and the contract Plans. A list of substitute equipment and/or material, along with a written descriptive summary, describing the functions of the components which the Contractor proposes to install shall be submitted along with his/her Proposal. The list shall be complete as to the name of the manufacturer, size and identifying number of each item. The list shall be supplemented by such other data as may be required.

In all cases, the judgment of the Electrical Superintendent shall be final as to whether substitute equipment and/or material recommended by the Contractor conforms to the intent of these Specifications and is acceptable for use.

### 23-3.4 Warranties, Guarantees and Instruction Sheets

Warranties, guarantees and instruction sheets shall conform to the provisions in Section 5-1.47 of the State Standard Specifications and these Specifications.

All equipment furnished shall be guaranteed to the City by the manufacturers for a period of not less than one (1) year, unless otherwise indicated, following the date of acceptance of such equipment. If any part(s) is found to be defective in materials or workmanship within the one-year period, and it is determined by the Electrical Superintendent, or by an authorized manufacturer's representative that said part(s) cannot be repaired on the Site, the manufacturer shall provide a replacement part(s) of equal kind and/or type during the repair period and shall be responsible for the removal, handling, repair or replacement and reinstallation of the part(s) until such time as the street lighting equipment, is functioning as specified and as intended herein; the repair period shall in no event exceed 72 hours, including acquisition of parts.

The one-year guarantee on the repaired or replaced parts shall again commence with the date of reassembly of the system.

All Work done by the Contractor shall be guaranteed in writing to the City CM Engineer for the 12 months from the date of acceptance.

# 23-3.5 Maintaining Existing and Temporary Electrical Systems

Existing lighting systems shall remain operational during construction, unless otherwise authorized in writing by the City Engineer.

The Contractor shall notify the City CM Engineer at least one full working day (not less than 24 hours) prior to the shutdown of any street lighting system. The Contractor may use temporary splices and wiring as approved by the City CM Engineer to maintain existing and temporary street lighting systems.

## 23-3.6 Scheduling of Work

Scheduling of Work shall conform to the provisions in Section 8-1.02 of the State Standard Specifications and these Specifications.

The Contractor shall notify the City CM Engineer at least one working day in advance of any electrical Work and also at least one working day in advance of any Work done intermittently to facilitate inspection.

#### 23-3.7 Foundations

Foundations shall conform to the provision in Section 86-2.03 of the 1997 State Standard Specifications and these Specifications.

Portland cement concrete shall conform to Section 90-2 of the State Standard Specifications.

Foundation concrete shall be placed in a single pour except that pouring of the top six (6) inches may be postponed when prior approval has been obtained. All dirt and debris shall be cleaned from the top of the foundation prior to pouring the top 6".

No utilities shall be permitted to run through a foundation.

Foundations shall be poured against undisturbed earth where practicable. The exposed portion shall be formed and finished to present a neat appearance. Where obstructions or other conditions prevent construction of planned foundations, the Contractor shall construct an effective foundation satisfactory to the City CM Engineer.

The bottom of concrete foundations shall rest on firm ground. When placing the foundations, the Contractor shall place all conduit ends in their proper position, at the correct heights and shall securely hold them in position during the pouring of concrete. The conduit ends shall be capped before any concrete is poured.

Both forms and earth to be in contact with foundations shall be thoroughly moistened before placing concrete.

Anchor bolts shall be galvanized and shall extend above the finished base as needed to ensure a minimum extension above the top nut of 3 threads. The maximum extension above the top nut is 1 inch. The distance below the base plate allowed for leveling shall not be less than 1.5 times nor more than 2 times the thickness of the leveling nut. Each bolt shall be supplied with 2 nuts and 2 flat washers to facilitate leveling. The anchor bolts and conduits shall be held in place by means of a template until the concrete sets.

Poles shall not be erected until the foundation concrete has set at least seven days and shall be plumbed as directed by the City CM Engineer. The top of concrete foundations shall be finished relative to curb or sidewalk grade as shown on the Plans or as directed by the City CM Engineer.

When grouting the base of the pole, the Contractor shall take care not to allow grout to enter or foul the conduit within the foundation.

Locations shown on the Plans are schematic.

#### 23-3.8 Poles

Poles shall conform to the provisions in Section 56-3 of the 1997 State Standard Specifications and these Specifications.

All hand hole covers must be of steel construction to allow welding after installation.

Embedded Steel poles shall conform to PG&E specifications for pole type 35-7274.

If relocation of Utilities is required, immediate notification shall be given to the appropriate Utility company by the Contractor.

The Contractor may install all underground electrical components, including foundations at the Site of the project; however, no streetlight poles shall be erected until underground conduit is in place.

Street light numbers shall be installed on the poles using minimum 2 ½" high numerals in accordance to City Standard Drawing No. E-25. Numbers shall be adhesive backed Almetek PS-2.5 or approved equivalent. The numbers shall be black on a contrasting background. Pole numbers shall be shown on the as-built plans.

All nuts, washers, screws and other post hardware shall be galvanized.

#### 23-3.9 Conduit

Conduit shall conform to the provisions in Section 86-1.02B of the State Standard Specifications and these Specifications.

Nonmetallic-type conduit may be used on minor/local and major Streets as shown on the Plans for Street Lights. All Street crossings using nonmetallic conduit shall be Schedule 80 conduit.

Rigid Conduit shall conform to Article 346 of the National Electrical Code. All conduit and fittings shall be hot dip galvanized. Each length shall bear the UL label. Installation shall conform to appropriate Articles of the such Code.

All couplings shall be tightened to provide a good electrical and mechanical connection throughout the entire length of the conduit run. All conduit ends shall be threaded and joined with approved fittings. The use of threadless or set-screw type fittings is not allowed. No running threads are permitted. Three piece, Erickson type, couplings shall not be used without prior authorization from TSSL Division and will only be allowed under special circumstances necessitating their use.

Conduit threads cut in the field and damaged conduit surfaces on metal conduit shall be thoroughly painted with zinc rich paint conforming to Military Specifications DOD-P-21023A.

All conduit ends shall be threaded and capped with standard conduit caps until wiring is started. When the caps are removed the threaded ends shall be provided with approved insulated hot dipped galvanized malleable iron bushings with cast integral lay-in lugs.

The size of conduit used shall be as shown on the Plans.

It shall be the privilege of the Contractor, at his/her own expense, to use larger size conduit if desired, and where large size conduit is used, it shall be for the entire length of the run from outlet to outlet. No reducing couplings will be permitted.

All conduit shall be laid to a depth of not less than twenty-four inches nor greater than thirty-six inches below the curb grade in the sidewalk areas and from the finished surface in Street areas. Conduits in sidewalk areas and parallel to the curb shall not be installed more than twenty-four inches back of curb unless approved by the City CM Engineer. Conduits not able to be placed under concrete sidewalk, or roadway, shall be encased in at least 6" of two-sack slurry.

Conduit shall be placed under existing pavement by approved jacking or boring methods. The pavement shall not be disturbed without the written permission of the City CM Engineer and then only in the event insurmountable obstructions are

encountered. Excessive use of water, such that pavement might be undermined, or subgrade softened, will not be permitted.

Conduit ends terminating in pole foundations shall extend 2" vertically above the top of the foundation. Conduit in direct buried poles shall extend to within 2" of the bottom of the hand hole and may not extend above the lowest part of the hand hole opening.

Attention is called to City Standard Drawing No. E-27 with regard to the requirements of conduit within the foundation.

Conduit in pull boxes shall not extend more than two inches inside the box wall. With the exception of pull boxes in non-concrete areas, all conduit entering the pull box from the bottom shall be approved by the City CM Engineer. No conduit or Utility shall pass through a streetlight foundation or pull box except the conduit which terminates within the foundation or pull box.

After the installation of all conductors the ends of conduits terminating in pull boxes and service pedestals shall be sealed with an approved duct seal material.

Where shown on the Plans, conduit will be extended to the limits of the project for future use. The end of such conduits shall be threaded and capped.

In as much as possible, conduit shall be run in a straight line from one pull box or pole to the next maintaining a consistent setback from the curb. Any variation from this requirement shall be approved by the City CM Engineer or Electrical Superintendent.

#### 23-3.10 Pull Boxes

Concrete pull boxes shall conform to the provisions in Section 86-1.02C of the State Standard Specifications and these Specifications. Nonconcrete pull boxes shall not be used.

All pull boxes shall be #3-1/2 unless otherwise noted on the Plans. See City Standard Drawings No. E-4A through E-4C, regarding requirements for grouting, drain hole, etc.

All pull boxes shall be installed with extensions. The pull box lid at PG&E's point of connection shall be marked 'PG&E'. All others shall be marked "Street Lights."

Pull boxes on long runs shall be installed and spaced at not over 200-foot intervals, and shall be required in all conduit change of directions.

All pull boxes shall be wrapped with 15lb. roofing paper prior to backfilling.

Pull boxes installed in non-concrete areas shall be surrounded by a one (1) foot wide concrete collar, and to a depth equal to the pull box and extension. All conduits shall enter these pull boxes through the bottom, using 90 degree elbows and extend 3-5 inches above the finished grout in the bottom of the pull box. The collar shall be sloped to drain away from the pull box.

Vandal resistant locking lids shall be installed by the contractor at final inspection for the point of service pull box. Contractor shall provide temporary lids during construction. Locking lids shall be galvanized steel diamond plate, minimum thickness 3/16 inches, with minimum two (2) clamping jaws and be keyed to the City of Fresno key. Locking lids shall be torqued to 25 ft-lbs prior to installing buttons.

Existing pull boxes accessed during the course of work shall be cleaned, drain holes opened, bonding and grounding connections secured, conduits duct sealed and grout repaired. Any pull boxes broken in the course of work shall be replaced.

## 23-3.11 Conductors and Wiring/Cables

Conductors and wiring shall conform to the provisions in Section 86-1.02F of the State Standard Specifications and these Specifications.

All wiring and wiring methods shall conform to the provisions of the applicable Codes.

All circuit conductors shall be stranded copper with THWN insulation and be of the gauge as shown on the Plans. All conductors shall have insulation colors appropriate to their use and all applicable codes. The use of colored phase tape is not allowed.

A minimum of three feet of slack in each conductor shall be left at each streetlight standard and in each pull box.

No splicing of underground conductors is allowed.

City Standard Drawing No. E-5 details the field connections of the circuit conductors. With the exception of "Point Of Service" pull boxes, no current carrying conductors shall be spliced in Street light pull boxes.

Conductors within the pole shall be #10 awg Type THWN stranded copper.

Splices in single conductor wire shall be limited to the load side of the service. These splices shall be made using either split bolts or c-tap connectors. The c-tap shall be properly sized for the wires being joined and installed with the proper tooling.

The splice shall be insulated to be waterproof as follows:

- a) Minimum 2 layers of rubber tape,
- b) 1 layer 1/2 lapped plastic tape,
- c) 1 layer friction tape, and then
- d) Coated with an approved electrical sealing compound.

Should splices between existing aluminum and new copper conductors be required, the splice shall be made using a split bolt designed for that purpose. The conductors and split bolt shall have an appropriate joint compound, designed to prevent oxidation, liberally applied prior to installation.

# 23-3.12 Fused Splice Connectors

Fuses for street lights and safety lights will no longer be allowed in the pole hand hole. Each luminaire shall be internally fused per subsection 23-3.16 of these specifications.

At service points other than pedestals, a fuse holder and fuse shall be installed in each ungrounded current carrying conductor. The fuse holder shall be a TRON HEJ type with an SC fuse; 40 amp for #8 awg wire, 60 amp for #4 or #6 awg wire. The holder shall be crimped to the wire using the proper tooling and insulated as described above for tape type splices.

### 23-3.13 Bonding and Grounding

Bonding and grounding shall conform to the provisions in Section 87-1.03O of the State Standard Specifications and these Specifications.

Ground will be obtained by installation of a ground rod within the service. This ground rod shall be bonded to all metallic conduits within the service by means of a bare #8 solid copper conductor. The metallic conduits within all pull-boxes shall be bonded in a similar manner.

Within pull-boxes adjacent to streetlight standards, one end of the solid #8 bonding conductor shall be extended to and attached to the standard using the grounding point as furnished.

A green #8 stranded wire may be used for pole grounding if a ring terminal, appropriately sized for the grounding bolt, is installed.

When a grounding lug is present, a green #8 standard wire shall be used for pole grounding if the wire is stripped loose strands twisted neatly and tinned with solder

prior to installation. Soldering shall be by means of an iron or gun. No open flame torch shall be used.

Within all conduits, a #8 stranded copper conductor with green THWN insulation shall be installed. It shall be connected to the ground rod at the service and connected to all pole grounding connections. Tap splices at pull boxes shall be made using either split bolts or c-taps.

## 23-3.14 **Painting**

All paint shall be furnished by the Contractor. Minor touch-up painting on all material whose surface has been damaged or not protected from corrosion shall be accomplished as directed by the City CM Engineer. Cold galvanizing zinc-rich paint, MILSPEC DOD-P-21035 A, shall be used on all damaged galvanized surfaces.

#### 23-3.15 Service

The service shall conform to the provisions in Section 87-1.03L of the State Standard Specifications and these Specifications.

All services for multiple streetlight circuits shall be 120/240 volt, 3 wire single phase. This will also be required for installations that have probable expansion adjacent to the current installation. Single street light installations shall be 120 volt 2 wire. Service feeders shall be sized to accommodate the full load amperage rating of the electrical service pedestal. Voltage drop shall be taken into consideration when sizing conductors.

The service pedestal for street light installations shall be as detailed in City Standard Drawing No. E-18.

If designed to feed from a Combination Traffic Signal and Streetlight service pedestal it shall be as detailed in City Standard Drawing E-15. The Contractor shall be responsible for any modification necessary to existing pedestals not in conformance with the current standard. The Electrical Superintendent shall be contacted for component information as needed.

The underground service if used shall be as detailed in City Standard Drawing Nos. E-4C and E-6. The conductors from the service pull box to the PG&E pull box shall be a minimum #6 awg.

#### 23-3.16 **Luminaire**

The following sections provide design parameters as well as product and installation requirements for standard cobra head style light emitting diode (LED) light source luminaires for new street light construction. See Section 23-4.17 for luminaire requirements Ornamental or non-cobra head style luminaires.

The City Engineer maintains a list of approved cobra head style luminaire products that meet the minimum illumination standards listed herein mounted on standard E-1 or E-2 poles, and maximum pole spacing indicated in these City Standards. In a standard lighting design approved luminaires for the six lighting configurations described below and on the Standard Drawings may be used in lieu of a specific design meeting the criteria in the remaining parts of this section.

- a) Mid-Block/Local Roadway (MBLR) Utilized to illuminate local roadways and intersections, as well as the mid-block roadways of major streets.
- b) <u>Local Cul-De-Sac (LCDS)</u> Utilize this luminaire at local roadway knuckles or cul-de-sacs where typical Mid-Block/Local elongated roadway lights could provide nuisance level light pollution of adjacent residences.
- c) <u>Major/Local Intersection (MLI)</u>— Use a Major/Local Safety luminaire at the intersections for local streets and major streets where the intersection conflict zone extends less than 70 feet across the major street (see Standard Drawing E-8a)
- d) 4 through 6 <u>Traffic Signal Intersection</u> see subsection 23-1.23 for definitions for Small, Medium and Large Traffic signal luminaires.

The Public Works Technical Library, published at the following City website provides the most current list of approved luminaires for the six category uses.

http://www.fresno.gov/Government/DepartmentDirectory/PublicWorks/DeveloperDoorway/Technical+Library/StandardSpecificationsandDrawings.htm

These luminaires may be utilized for installation if listed at the time of installation or award of construction contract only if the installation is to be performed under a City Construction Contract.

A photometric design will be required to demonstrate that proposed luminaires will provide the minimum roadway and non-signal intersection luminance if <u>any</u> of the following criteria are met.

- a) The roadway will not have the standard lighting pole heights or arm lengths (per Standard Drawing E-1 or E-2).
- b) The roadway geometrics have non-typical layout, i.e. horizontal or vertical curves where standard luminaires and poles may not provide adequate coverage.

- c) The pole-to-pole distances will exceed the maximum values, or street lights cannot be placed within the layout requirement indicated on the standard drawings (E-7 through E-12), or the standard roadway geometry is changed.
- d) A luminaire different from the City Engineer approved list is proposed.
- e) The location has increased potential for night time vehicle or pedestrian conflicts as determined by the City Engineer necessitating an increase in the minimum illuminance values listed in the Photometric Design Section below.

# Roadway Photometric Design Requirements

When photometric design is required, the submitted street light plans shall include computer-generated point-by-point photometric analysis of maintained illumination levels. Analysis areas should be conducted on proposed roadways, sidewalks, intersections, and crosswalks. This analysis that matches the submitted lighting plans, should list all input parameters and reference files. The hardcopy and computer design shall be provided to the City engineering staff, amended as necessary by the lighting professional, and approved by the City Engineer prior to construction of the lighting system.

Table 23-3.16 A

LED LUMINAIRE		
LUMINAIRE MAXIMUM INPUT POWER	Local and Major Mid-Block, 165 foot max Spacing for Major Street; 250 foot max spacing for Local	30 W Max Utility Label, 3400 (+/- 5%) Lumen
	Major/Local Intersection Depth of intersection conflict zone is less than 50 feet and width less than 80 feet from pole	75W Max Utility Label, 9300 (+/- 5%) Lumen
VOLTAGE	Nominal luminaire input voltage (or range as applicable)	120 to 277 V
WARRANTY	VARRANTY Minimum luminaire warranty	
NOMINAL CCT	Rated correlated color temperature	4000 K
BUG RATINGS (backlight-uplight- glare)	Maximum nominal for Local/Residential Street; and Mid-Block Major Street	B1-U0-G1
	Maximum nominal for Major/Local Street Intersection (without back light shield).  Maximum nominal for Major/Local Street Intersection (with back light shield)	B2-U0-G2 B1-U0-G2
FINISH	Luminaire housing finish color	Gray
WEIGHT	Luminaire weight	30 lb. Max
EPA	0.7 ft <sup>2</sup>	

MOUNTING	Arm Length	E-1 or E-2			
	Tenon nominal pipe size (NPS)	2-3/8 inch OD			
VIBRATION	Pole founded in-ground (ANSI C136.31) or Caltrans 611	Level 1			
VIBRATION	Pole founded on Bridge or overpass (ANSI C136.31) or Caltrans 611	Level 2			
THERMAL	Typical min. ambient temperature during operation	-20 °C			
ENVIRONMENT	Typical max. ambient temperature during operation	40 °C			
ELECTRICAL IMMUNITY	ANSI C136.2 Comb. Wave Test Level	Basic (6kV / 3kA)			
CONTROL	ANSI C136.41,	,			
INTERFACE					
LED DRIVER					
	(IEC 60929)				

<sup>† -</sup> City requires extended warrantee certificates from manufacturer's that do not offer a standard 10 year warranty.

The values in the tables below represent minimum illuminance levels for typical City of Fresno streets with low night time pedestrian and vehicle conflict conditions. Where night time pedestrian and vehicle conflicts are anticipated to be higher than typical conditions, the minimum values provided may be increased at the discretion of the City Engineer depending on the expected site or facility use, and night time activity. In those cases a specific lighting design will be required for review and approval.

Table 23-3.16 B

LOCAL/RESIDENTIAL STREET PERFORMANCE CRITERIA				
MAINTAINED ROADWAY ILLUMINATION All Roadway Area from Curb to Curb				
Average horizontal illuminance at pavement 0.2 fc				
Average to minimum uniformity ratio 20				
MAINTAINED SIDEWALK ILLUMINATION All Sidewalk area from back of curb to ROW line or back of sidewalk				
Average horizontal illuminance at sidewalk 0.15 fc				
Average to minimum uniformity ratio 15				

MAINTAINED LOCAL/LOCAL INTERSECTION or LOCAL PREDSTRIAN CROSSING ILLUMINATION (see Drawing E-8a for computation area)			
Average horizontal illuminance on pavement 0.3 fc			
Average to minimum uniformity ratio 5			
Maximum to minimum uniformity ratio			

MAJOR STREET PERFORMANCE CRITERIA				
MAINTAINED ROADWAY ILLUMINATION				
All Roadway Area from Curb to Curb (Do not include median)				
Average horizontal illuminance at pavement	0.2 fc			
Average to minimum uniformity ratio	20			
MAINTAINED SIDEWALK ILLUMINATION All Sidewalk area from back of Curb to ROW line or back of sidewalk				
Average horizontal illuminance at sidewalk	0.15 fc			
Average to minimum uniformity ratio				
MAINTAINED MAJOR/LOCAL INTERSECTION ILLUMINATION See Drawing E-9 for Area				
Average horizontal illuminance at pavement	0.50fc			
Average to Minimum uniformity ratio	6			
Maximum to Minimum uniformity ratio	20			
MAINTAINED CROSSWALK ILLUMINATION				
Average horizontal at pavement along Major Street	0.75 fc			
Average horizontal at pavement along Minor Street	0.3 fc			
Average to Minimum uniformity ratio along Major Street	35			
Average to Minimum uniformity ratio along Minor Street	4			

The street light plans as submitted shall include the photometric analysis of the proposed poles, luminaires and layout that demonstrates the lighting system will provide the minimum illumination for the roadways. The photometric analysis shall include calculation zones for all of the defined illumination conditions in these Specifications. Analysis should provide all geometric and photopic parameters, including but not limited to the following:

Calculations shall be for maintained values, i.e. Light Loss Factor (LLF) < 1.0, where LLF = LLD. Lamp Lumen Depreciation (LLD) shall be the value as a % of initial output at 50,000 hours operation @ 25°C.

Locked IES LM-63 format electronic file containing luminous intensity data associated with submitted LM-79 report(s) must be submitted for each proposed luminaire used for point-by-point calculations. (.ies files). Mesopic multipliers (i.e., effective luminance factors) shall not be used. All values shall assume photopic visual adaptation.

Analysis shall be provided to and reviewed by City engineering staff. Analyses comments will be provided to the designer, the design shall be amended as necessary by the lighting professional. The final design shall be approved by the City Engineer prior to construction of the lighting system. Any field adjustments to the lighting design, either by product change or light location adjustments shall be approved by the lighting designer and the City Engineer prior to final installation.

# Manufacturer and Installation Requirements

LED light source(s) and driver(s) shall be RoHS compliant. Nominal luminaire input wattage shall account for nominal applied voltage and any reduction in driver efficiency due to sub-optimal driver loading. Luminaire shall accept the voltage or voltage range specified at 50/60 Hz, and shall operate normally for input voltage fluctuations ranging from 95 volts to 277 volts. All internal components shall be assembled and pre-wired using modular electrical connections.

The following shall be in accordance with corresponding sections of ANSI C136.37.

- a) Wiring and grounding
- b) Terminal blocks for incoming AC lines (electrical mains wires)
- c) Photocontrol receptacle
- d) Latching and hinging
- e) Mounting provisions
- f) Ingress protection

Painted or finished luminaire surfaces exposed to the environment shall exceed a rating of six per ASTM D1654 after 1000 hours of testing per ASTM B117. Also the coating shall exhibit no greater than 30% reduction of gloss per ASTM D523, after 500 hours of QUV testing at ASTM G154 Cycle 6.

Thermal management - Luminaire shall start and operate in ambient temperature range specified. Maximum rated case temperature of driver and other internal components shall not be exceeded when luminaire is operated in ambient temperature range specified. Mechanical design of protruding external surfaces (heat sink fins) shall facilitate hose-down cleaning and discourage debris accumulation. Liquids or other moving parts shall be clearly indicated in submittals, shall be consistent with product testing, and shall be subject to review by City Engineer. A completed ENERGY STAR TM-21 Calculator as an electronic Excel file will be required for luminaires to demonstrate Lumen Maintenance % and ambient temperature requirements.

LED driver, photo control receptacle, and control interface - Luminaire designation(s) indicated "ANSI C136.41, 7-pin" shall be fully prewired and shall incorporate an ANSI C136.41 compliant receptacle. If a dimmable LED driver is specified, its 0-10V or DALI control wires shall be connected to the receptacle pads as specified in ANSI C136.41; connection of the two remaining pads shall be by Supplier, as directed by Owner.

Electrical Safety Testing - Luminaire shall be "Listed" for wet locations by a U.S. Occupational Safety Health Administration (OSHA) Nationally Recognized Testing Laboratory (NRTL). Luminaire shall have locality-appropriate governing mark and certification. Luminaire shall meet the performance requirements specified in ANSI C136.2 for dielectric withstand, using the DC test level and configuration.

Electrical Immunity - Luminaire shall meet the performance requirements specified in ANSI C136.2 for electrical immunity, using the combination wave test level. Manufacturer shall indicate on submittal form whether failure of the electrical immunity system can possibly result in disconnect of power to luminaire.

Interference and power quality - Luminaire shall comply with FCC 47 CFR part 15 interference criteria for Class A (non-residential) digital devices. Luminaire shall comply with section 5.2.5 (luminaires rated for outdoor use) of ANSI C82.77 at full input power and across specified voltage range.

Color attributes - Color Rendering Index (CRI) shall be no less than 70. Nominal Correlated Color Temperature (CCT) shall be as specified in the Luminaire Designation Tables. If submitted nominal CCT is listed in the table below, measured CCT and Duv shall be as listed.

Allowable CCT and Duv (adapted from ANSI C78.377)

Manufacturer-	Allowable	IES LM-79
Rated	Chromatici	ty Values
Nominal CCT	Measured	Measured
(K)	CCT (K)	Duv

3000	2870 3220	to	-0.006 to 0.006
4000	3710	to	-0.005 to
4000	4260		0.007

If submitted nominal CCT is not listed in the above table, measured CCT and Duv shall be as per the criteria for Flexible CCT defined in ANSI C78.377.

Identification - Luminaire shall have an external label per ANSI C136.15. Luminaire shall have an internal label per ANSI C136.22.

Fusing – New Luminaires shall be protected from unanticipated current spikes using a slow burn fuse. Fuses are required in the Luminaire (not in the pole base). A fuse with a maximum rating of 5 amps (or less if recommended by the manufacturer) shall be installed. The fuse within the Luminaire housing can be either: 1) a manufacturer installed mounted fuse holder; or 2) an in-line fuse on the supply lead before it is connected to the terminal block (Buss HLR Fuse Holder with a Buss GMF Time Delay fuse, or approved equivalent).

The street light numbers will be installed on the poles in accordance to City Standard Drawing No. E-25. They shall be stenciled or use adhesive backed numbers suitable for outdoor use. The numbers shall be black on a contrasting background.

After installation and plumbing of the light standard, the luminaire shall be leveled on both the long and transverse axis by use of a spirit level.

### Required Submittals

If a specific model Luminaire to be provided appears on the City of Fresno approved Luminaire Products at the time of installation (or the time of bid if a City Construction Contract), then a submittal package is not required. If an "or equal" luminaire is proposed for installation, the submittals listed below, with the completed submittal form will be required for review and approval prior to installation.

#### Submittals must include:

The submittal shall include OSHA Nationally Recognized Test Laboratory (NRTL) luminaire "Listing Report" or "Listed" to Standard for Safety UL1598 Luminaires. The required Listing Report shall demonstrate compliance to various construction and test requirements in the City's Standard Specifications, including all NRTL Certified components to the appropriate Standards for Safety, such as, UL 8750 Standard for Light Emitting Diode Equipment for Use in Lighting Products; UL 1449 Standard for Surge Protective Devices; UL 746C Standard for Safety Polymeric Materials; among other Certified components, as applicable, Coatings for Steel Enclosures for Outdoor

Use Electrical Equipment, Wiring, Terminal Blocks, Fuses, Photo Electric Control, Shorting Caps, Gaskets, Marking and Labeling System.

The submittal shall include product cut sheets for Luminaire; LED light source(s); LED driver(s) and surge protection device. If dimmable LED driver is specified, provide diagrams illustrating light output and input power as a function of control signal.

The Submittal shall include instructions for installation and maintenance, and, summary of luminaire recycled content and recyclability shall be in accordance with the FTC Green Guides, expressed as a percentage of luminaire weight.

The submittal shall include LED Lighting Facts, CALiPER, or NVLAP accredited testing laboratory IES LM-79 Report, Approved Method Electrical and Photometric Measurements of Solid State Lighting Products; and IES LM-80 Report, Approved Method for Measuring Lumen Maintenance of LED Light Sources. The LM79 and LM80 reports shall include the following:

- a) Name of test laboratory
- b) Report number
- c) Date of testing
- d) Complete luminaire catalog number
- e) Description of luminair, LED light source(s), and LED drivier(s)
- f) Goniophotometry
  - 1. IES TM-15 Backlight-Uplight-Glare (BUG)rating shall be for initial (worst-case) values, i.e., Light Loss Factor (LLF) = 1.0
  - 2. If luminaires are tilted upward, BUG ratings shall correspond to the same angle(s) of tilt.
- g) Lumen maintenance calculations and supporting test data shall be in accordance with LED Lighting Facts guidance. Exception: calculations shall be based on the cumulative hours of operation specified in the appropriate Luminaire Designation Table.
- h) Completed ENERGY STAR TM-21 Calculator as an electronic Excel file.

- i) Computer-generated point-by-point photometric analysis of maintained illumination levels shall be provided for review and approval for new street lighting systems. See previous paragraphs of this section for requirements.
- j) Fusing method, including manufacturer, model types, and specifications if not constructed by the Luminaire manufacturer.
- k) Summary of Joint Electron Devices Engineering Council (JEDEC) or Japan Electronics and Information Technology Industries (JEITA) reliability testing performed for LED packages
- I) Summary of reliability testing performed for LED driver(s)
- m) Written product warranty as per Warrantee, and/or extended warrantee certification if the manufacturer does not provide the minimum term

The submittal shall include OSHA NRTL, NVLAP, CALiPER, LED Lighting Facts accredited testing laboratory Certification of compliance to American National Standard for Roadway Lighting Equipment, ANSI C136.31-2010, Luminaire Vibration, or Certification of compliance to California Test 611.

The submittal shall include documentation supporting any U.S. origin claims for the product, in accordance with FTC guidance.

## <u>Warranty</u>

Warranty shall be of the minimum duration specified in the Luminaire Designation Tables and shall cover maintained integrity and functionality of the following: Luminaire housing, wiring, and connections; LED light source(s) (Negligible light output from more than 10 percent of the LED packages constitutes luminaire failure); and LED driver(s) Warranty period shall begin 90 days after date of invoice, or as negotiated by City such as in the case of an auditable asset management system.

If the standard manufacturer's warrantee does not meet the minimum requirements listed above, the City will accept an extended warrantee certificate from the manufacturer to meet the minimum requirements at no additional charge to the City.

### Normative References

The publications listed below form a part of this specification to the extent referenced. Publications are referenced within the text by their basic designation only. Versions listed shall be superseded by updated versions as they become available.

## American National Standards Institute (ANSI)

- a) C78.377-2011 (or latest), American National Standard for the Chromaticity of Solid State Lighting Products
- b) C82.77-2002 (or latest), American National Standard for Harmonic Emission Limits Related Power Quality Requirements for Lighting Equipment
- c) C136.2-2014 (or latest), American National Standard for Roadway and Area Lighting Equipment – Dielectric Withstand and Electrical Immunity Requirements
- d) C136.10-2010 (or latest), American National Standard for Roadway and Area Lighting Equipment – Locking-Type Photocontrol Devices and Mating Receptacles— Physical and Electrical Interchangeability and Testing
- e) C136.15-2011 (or latest), American National Standard for Roadway and Area Lighting Equipment Luminaire Field Identification
- f) C136.22-2004 R2009 (or latest), American National Standard for Roadway and Area Lighting Equipment Internal Labeling of Luminaires
- g) C136.31-2010 (or latest), American National Standard for Roadway Lighting Equipment Luminaire Vibration
- h) C136.37-2011 (or latest), American National Standard for Roadway and Area Lighting Equipment Solid State Light Sources Used in Roadway and Area Lighting
- i) C136.41-2013 (or latest), American National Standard for Roadway and Area Lighting Equipment—Dimming Control Between an External Locking Type Photocontrol and Ballast or Driver

# American Society for Testing and Materials International (ASTM):

- a) B117-11 (or latest), Standard Practice for Operating Salt Spray (Fog)
   Apparatus
- b) D523-08 (or latest), Standard Test Method for Specular Gloss
- c) D1654-08 (or latest), Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments
- d) G154-06 (or latest), Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials

### **ENERGY STAR:**

a) ENERGY STAR TM-21 Calculator, rev. 020712 (or latest, <a href="https://www.energystar.gov/TM-21Calculator">www.energystar.gov/TM-21Calculator</a>)

### Federal Communications Commission (FCC)

a) 47 CFR Part 15, Telecommunication – Radio Frequency Devices

### Federal Trade Commission (FTC)

- a) Complying with the Made in USA Standard, December 1998 (http://business.ftc.gov/advertising-and-marketing/made-usa)
- b) Green Guides, 16 CFR Part 260, Guides for the Use of Environmental Marketing Claims

### Illuminating Engineering Society of North America (IESNA or IES)

- a) LM-50-13 (or latest), IES Approved Method for Photometric Measurement of Roadway and Street Lighting Installations
- b) LM-61-06 (or latest), IESNA Approved Guide for Identifying Operating Factors Influencing Measured Vs. Predicted Performance for Installed Outdoor High Intensity Discharge (HID) Luminaires
- c) LM-63-02 (R2008 or latest), ANSI/IESNA Standard File Format for the Electronic Transfer of Photometric Data and Related Information
- d) LM-79-08 (or latest), IESNA Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products
- e) LM-80-08 (or latest), IESNA Approved Method for Measuring Lumen Maintenance of LED Light Sources
- RP-8-00 (or latest), ANSI / IESNA American National Standard Practice for Roadway Lighting
- g) RP-16-10 (or latest), ANSI/IES Nomenclature and Definitions for Illuminating Engineering
- h) TM-15-11 (or latest), Luminaire Classification System for Outdoor Luminaires
- i) TM-21-11 (or latest), Projecting Long Term Lumen Maintenance of LED Light Sources

### International Electrotechnical Commission (IEC)

- a) 60929 Annex E, Control Interface for Controllable Ballasts (0-10V)
- b) 62386, Digital Addressable Lighting Interface (DALI)

### **LED Lighting Facts**

a) Submission Requirements
 (<a href="http://www.lightingfacts..com/About/Content/Manufacturers/SubmissionRequirements">http://www.lightingfacts..com/About/Content/Manufacturers/SubmissionRequirements</a>)

### Municipal Solid-State Street Lighting Consortium (MSSLC)

a) Model Specification for Networked Outdoor Lighting Control Systems, V2.0 (or latest)

### National Electrical Manufacturers Association (NEMA)

a) LSD 63-2012, Measurement Methods and Performance Variation for Verification Testing of General Purpose Lamps and Systems

### Underwriters Laboratories (UL)

- a) Standard for Safety, UL 1598 Third Edition (or latest), Standard for Luminaires
- b) Standard for Safety, UL 8750 Standard for Light Emitting Diode Equipment for Use in Lighting Products
- c) Standard for Safety, UL1449 Standard for Surge Protective Devices
- d) Standard for Safety, UL 746C Standard for Standard for Polymeric Materials

### 23-3.17 Photoelectric Control (PEC) and Photocell Bypass (Shorting Cap)

Photoelectric controls (PEC) shall be "Listed" for the application by Occupational Safety and Health Administration (OSHA) Nationally Recognized Test Laboratory (NRTL) such as UL, CSA, or ETL. PEC shall meet ANSI C136.10 and C136.24 Standards and must be RoHS compliant.

PEC shall be compatible with the selected LED luminaires. The PEC shall be rated 120-270 Volt AC, 1,000 Watt/1,800VA, 15 Amps; PEC relay shall be tested to 15,000 cycle operations; surge protection MOV minimum shall be 600 Jewels;

temperature rating shall be -20°C +70°C; enclosure shall be UV stabilized; failure mode shall be fail-on; color shall be ANSI/UL standard blue; PEC turn-on level shall be 1.0 foot-candles and turn-off shall be 1.5 foot candles. The PEC shall have a manufacturer Warranty of 10 years.

Shorting caps shall be "Listed" for the application by Occupational Safety and Health Administration (OSHA) Nationally Recognized Test Laboratory (NRTL) such as UL, CSA, or ETL. The shorting cap shall install on an ANSI C136-10 NEMA style 3-pin receptacle to connect load pins to bypass local photocell control. The shorting cap shall have a rating of 120-270 Volt AC, 15 Amp. The shorting cap shall be constructed with UV stabilized polypropylene cap, black polypropylene base and neoprene blended gasket. The shorting cap shall meet all environmental and electrical requirements of ANSI C136.10. The Shorting Cap shall have a manufacturer Warranty of 10 years.

If the service pedestal is equipped with a lighting contactor and no master photo control is installed, the Contractor shall install a pec atop the traffic signal mast arm pole adjacent to the service pedestal or atop the nearest streetlight pole. The master photo control shall be wired back to the service pedestal using three #12 AWG stranded copper wires color matched to the PEC. The PEC will be mounted using hardware manufactured for that purpose or fabricated and approved by the Electrical Superintendent.

All streetlights and safety lights fed from a pedestal equipped with a contactor shall be switched, by that contactor and their PEC's replaced with shorting caps.

### 23-3.18 Traffic Control

Traffic control shall be provided in accordance with the latest Caltrans adopted California "Manual on Uniform Traffic Control Devices" (CAMUTCD), sections 7-10.4 and 7-10.5 of these specifications.

A traffic control plan shall be provided in accordance with the latest Caltrans adopted California "Manual on Uniform Traffic Control Devices" (CAMUTCD), sections 7-10.4 and 7-10.5 of these specifications.

Payment shall be included in lump sum bid for signals and lighting.

### 23-4 ORNAMENTAL STREET LIGHTING

### 23-4.1 INTENT

It is the intent of these Specifications to describe the minimum acceptable parameters for ornamental streetlight installation in the City. It should be noted that the City only allows Ornamental Street Lighting in designated Downtown areas (see Drawing E-29) to match existing Historical Street Lights. The City will also allow Ornamental Lights in new areas that don't have existing Ornamental Street Lights

only if the new lights are included in one of the City's Community Facilities Districts for the added maintenance. The City will not accept, nor maintain Ornamental Streetlights not in the Downtown area and not included in a Community Facilities District.

Due to the wide variety of luminaire and pole configurations for ornamental (non-standard cobra head) street lights, the City does not provide a list of approved products for use in a standard design. So all new ornamental street lights will require photometric illumination analysis to demonstrate that the ornamental street light system will provide the minimum illumination requirements for the street(s).

Photometric design is required; the submitted street light plans shall include computer-generated point-by-point photometric analysis of maintained illumination levels. Analysis areas should be conducted on proposed roadways, sidewalks, yards (front, side, and/or rear) intersections, and crosswalks. This analysis that matches the submitted lighting plans, shall list all input parameters and reference files. The hardcopy and computer design shall be provided to City Engineering Staff, amended as necessary by the lighting professional, and approved by the City Engineer prior to approval of the lighting system.

### 23-4.2 **GENERAL**

Each project may select a pole, color, luminaire and ornamentation as provided by this standard. To provide adequate individualization the following variety is provided as an example of style only:

a) Pole Height: 16 feet minimum for major streets and 12 feet

minimum for residential streets

b) Colors: 2 (black, dark green)

c) Configurations: 2 (single/double-may be mixed)

d) Cross Arms: 2 designs

e) Luminaries:

1. Capitals: 2 designs

2. Globes: 2 designs/2 sizes

3. Wattage: LED 30 to 40 Watt Maximum (See Ornamental

Design Luminaire Criteria Table) and per approved

Lighting Design by City Engineer

4. Ornamentation: Final and/or Band

To minimize future costs to the City in view of the wide range of design options, each installer must provide to the City spares of all components in quantities dependent upon the number of poles installed in the project.

Poles Installed	<u>Spares</u>
12 or less	2
13-30	3
31 or more	4

### 23-4.3 SPECIFICATIONS

Furnishing and installing streetlights shall conform to the provisions of these Specifications and the streetlight Plan(s). Specifically, the ornamental street lights will comply with all the requirements of section 23-3 of these specifications that are not amended by this section for Ornamental Street Lights.

### 23-4.4 STREETLIGHT PLAN

The designer shall submit to the City Engineering Division for review a detailed plan of the proposed installation. This plan shall include proposed locations of the streetlights, existing streetlights in or adjacent to the project, location of electrical service, photo electric control, pull boxes and routing of conduit.

The street light plans as submitted shall include a photometric analysis of the proposed poles, luminaires and layout that demonstrates the lighting system will provide the minimum illumination for the roadways. Analysis requirements are detailed in subsection 23-3.16 and amended for Ornamental luminaires in subsection 23-4.10. Analysis shall be reviewed by City engineering Staff, amended as necessary by the lighting professional, and approved by the City Engineer prior to construction of the lighting system.

After any required changes are made, the plan(s) will be approved and signed. No installation Work shall be undertaken until the plans are signed.

Work or equipment not specified or shown on the Plan(s) which is necessary for the proper operation of the installation shall be provided and installed at no additional cost to the City.

The locations of foundations, poles, services, pull boxes and other appurtenances shown on the Plan(s) are approximate. Exact locations and grades will be established if necessary by either the Project inspector or the TSSL Supervisor or his/her authorized representative.

When the project is complete and all lights are working, a final inspection has been made and all punch list items are corrected, the Contractor shall provide an "as-built" drawing to the City.

### 23-4.5 MATERIALS

All materials required to complete the Work under this contract shall be furnished by the Contractor after receiving approved submittals from City of Fresno Traffic Signal and Street Lights (TSSL) Division.

The materials furnished and used shall be new, except such used materials as may be specifically provided for on the Plans.

All Work and materials shall be in full accordance with the latest rules and regulations of the National Board of Fire Underwriters, local and State laws and regulations, the State Industrial Accident Commission's Safety Orders, and the regulations of the Pacific Gas and Electric Company pertaining to service equipment and installations thereof. All Work shall comply with Section 11-104 of the City of Fresno Municipal Code, the National Electrical Manufacturer's Association Standards and all regulations and codes as stated in Section 86-1.01D of the State Standard Specifications. Nothing in these Plans and Specifications shall be construed to permit work not complying with these codes.

### 23-4.6 EQUIPMENT LIST

All equipment and materials that the Contractor proposes to install shall conform to these Specifications and the Plans. A list of substitute equipment and/or materials, along with a written descriptive summary, describing the functions of the components which the Contractor proposes to install shall be submitted along with his/her streetlight plan. The list shall be complete as to the name of the manufacturer, size and identifying number of each item. The list shall be supplemented by such other data as may be required. In all cases, the judgment of the TSSL Supervisor shall be final as to whether substitute equipment and/or material recommended by the Contractor conforms to the intent of these Specifications and is acceptable for use.

The wattage and spacing of the streetlights shall be such that the appropriate average maintained illuminance is provided per ANSI/IES RP-8, Table 2(b).

### 23-4.7 WARRANTIES, GUARANTEES AND INSTRUCTION SHEETS

All equipment furnished shall be guaranteed to the City by the manufacturers for a period of not less than one (1) year, unless otherwise indicated, following the date of acceptance of such equipment. If any part(s) is found to be defective in materials or workmanship within the one-year period, and it is determined by the TSSL Supervisor or by an authorized manufacturer's representative that said part(s) cannot be repaired on the Site, the manufacturer shall provide a replacement part(s) of equal kind and/or type during the repair period and shall be responsible for the removal, handling, repair or replacement and reinstallation of the part(s) until such time as the street lighting equipment is functioning as specified and as intended

herein; the repair period shall in no event exceed 72 hours, including acquisition of parts.

The one-year guarantee on the repaired or replaced parts shall again commence with the date of reassembly of the system.

All Work done by the Contractor shall be guaranteed in writing to the Engineer for the one-year period from the date of acceptance.

Copies of all operating instructions, parts lists, assembly diagrams, etc., shall be provided to the City with the "As-Built" plan(s).

### 23-4.8 FOUNDATIONS

The foundation shall be set back 30 inches on center from the face of the curb.

Foundation concrete shall contain not less than 590 pounds of cement per cubic yard. It shall be placed in a single pour against undisturbed earth where practicable. The top portion shall be formed and finished to present a neat appearance. The top of the finished foundation shall be level. The use of leveling nuts to plumb a pole will not be permitted.

No Utilities shall be permitted to run through a foundation.

Where obstructions or other conditions prevent construction of planned foundations, the Contractor shall construct an effective foundation satisfactory to the Engineer.

The bottom of concrete foundations shall rest on firm ground. When placing the foundations, the Contractor shall place all conduit ends in their proper position and at the correct heights and shall securely hold them in position during the pouring of concrete. The conduits ends shall be capped before any concrete is poured.

Both forms and earth to be in contact with foundations shall be thoroughly moistened before placing concrete.

Anchor bolts shall be galvanized and shall extend above the finished base as needed to ensure the proper installation of anchoring hardware. The anchor bolts and conduits shall be held in place by means of a template until the concrete sets.

Poles shall not be installed until the foundation concrete has set at least five Days.

### 23-4.9 POLES

In order to reduce the possibility of wire theft, all poles must be of steel construction and approved by City of Fresno TSSL Division prior to installation. All hardware shall be tamper resistant stainless steel. The color of the poles shall be black or

gray. The poles shall be engineered to withstand 110 mph wind forces per the AASHTO standards including a 30% gust factor.

If relocation of Utilities is required, immediate notification shall be given to the appropriate Utility Company by the Contractor.

The Contractor may install all underground electrical components, including foundations at the site of the project; however, no streetlight poles shall be installed until underground conduit is in place.

The anchor bolts and associated hardware shall be hot dipped galvanized. The anchor bolts shall be 3/4" x 18", "L" type.

The top of the pole shall be provided with a 3 inch outside diameter tenon to facilitate mounting of the luminaire assembly or cross arm.

The two way cross arm assembly, if and where used, shall be galvanized steel or cast aluminum. The finish shall be a premium polyurethane coating and shall match the color of the pole.

Pole height shall be a minimum of 12 feet for residential areas or minimum 16 feet for non-residential areas or major streets.

### 23-4.10 ORNAMENTAL LUMINAIRE

Ornamental Luminaires shall be light emitting diode (LED) light sources for new street light construction. All ornamental luminaires shall comply with the requirements listed in subsection 23-3.16. However, the following tables provide amendments to the standard luminaire requirements for ornamental luminaires.

# Ornamental Luminaire Design Criteria (amendments to Table in Section 23-3.16)

ORNAMENTAL LED LUMINAIRE		
LUMINAIRE	Local and Major Mid-Block Single Luminaire	30 W (MAX)
MAXIMUM INPUT	Non-Residential/Downtown	
POWER	Major Mid-Block Dual Luminaire	40 W (MAX.) -
(Note: the lowest	Wajor Wid-Block Duar Eurimaire	EACH
power luminaires		
that can provide		
minimum		
illumination are		
encouraged)		
VOLTAGE	Nominal luminaire input voltage (or range as applicable)	120 to 277 V
WARRANTY	Minimum luminaire warranty	10 years†

NOMINAL CCT	correlated color temperature	
NOMINAL CCT		
BUG RATINGS (backlight-uplight-	Maximum nominal for Local/ Street, and Downtown/Non-Residential.	
glare)	Maximum nominal for Major Street	

Since many ornamental luminaires provide more backlight, uplight and glare than typical cobra head style luminaries, ornamental lighting systems are more likely to promote light pollution on adjacent private properties. This is a concern of the City particularly near residential properties. Therefore, the following additional design requirements are provided for photometric design of Ornamental Street Lighting systems adjacent to residential properties or mixed use properties with upper floor residential units. The City shall require the use of shields to provide additional protection from light pollution when Ornamental Street Lighting systems are placed adjacent to residential properties.

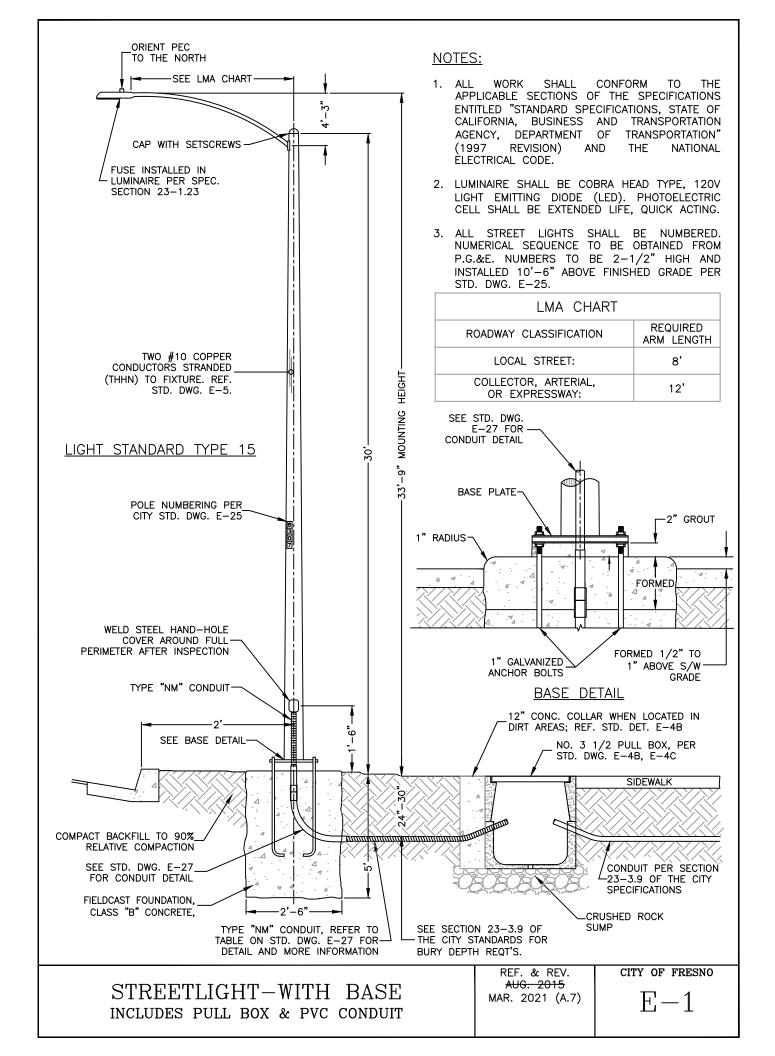
Maximum illuminance at any point on private property		
(beyond Right-if Way) from a street light		
Maximum Average horizontal illuminance of yard or		
landscape area		
Maximum Vertical illuminance at any point on a residence		
Maximum Vertical illuminance on a residence window		
Maximum Average vertical illuminance on residential		
balcony		

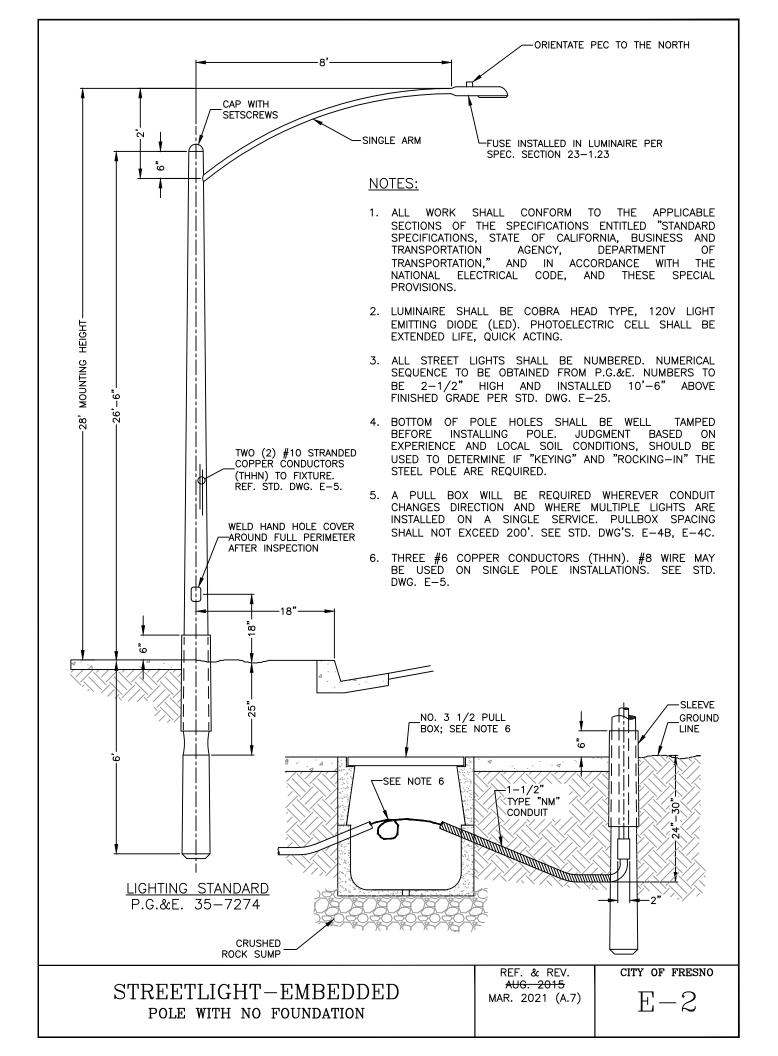
The capital portion of the luminaire assembly shall be cast aluminum. The finish shall be a premium polyurethane coating and shall match the color of the pole.

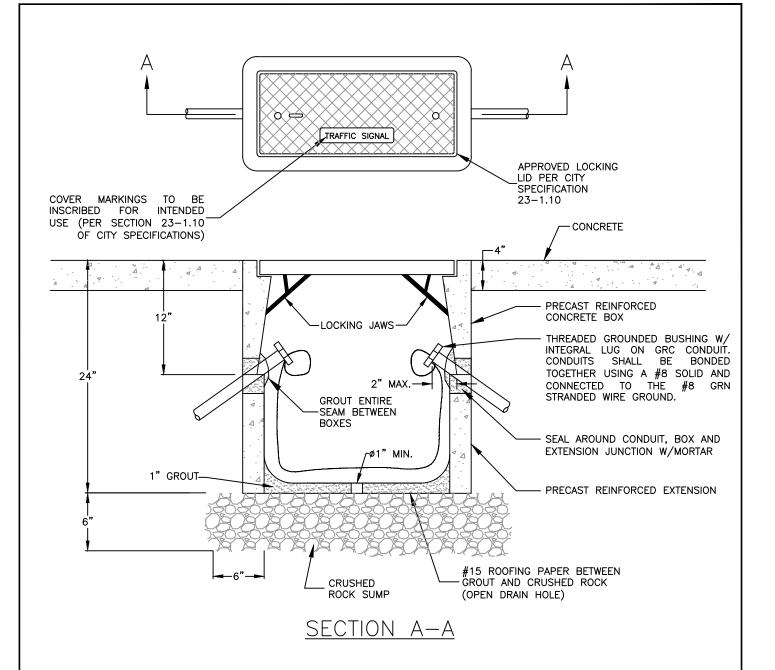
### 23-4.11 ORNAMENTAL PHOTOELECTRIC CONTROL

The Photoelectric Control (PEC) shall be a twist lock, long life type installed in the capital portion of the pole. The PEC shall meet the requirements listed in subsection 23-3.17 for standard luminaires. If controlled from a service pedestal, the PEC shall be installed at the pole nearest the service pedestal. The PEC shall be OSHA NRTL "Listed" rated at 1000 watts minimum. It shall be wired back to the service pedestal with 3 #12 AWG stranded copper conductors color coded to match the PEC.

If controlled from a Combination Traffic Signal/Streetlight service pedestal, no additional PEC is required. The associated safety light PEC will control the lighting contactor.





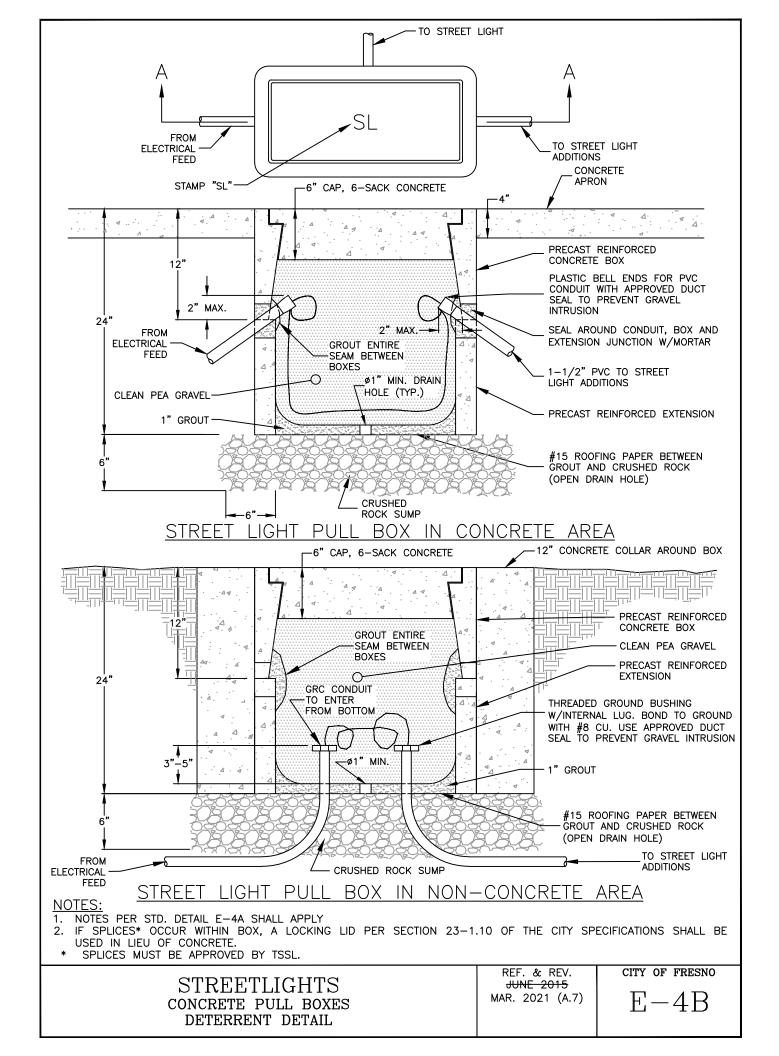


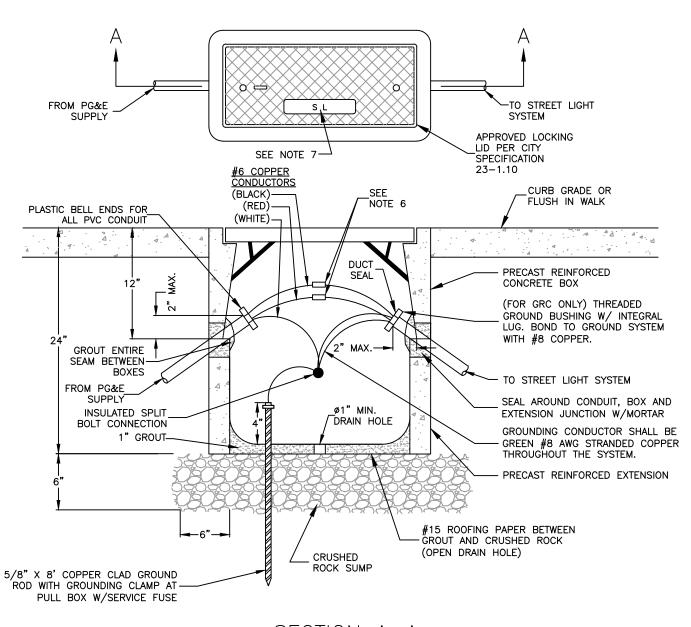
- 1. PULL BOXES SHALL BE #5 UNLESS OTHERWISE NOTED ON PLANS.
- 2. WRAP ENTIRE PULL BOX WITH #15 ROOFING PAPER BEFORE BACKFILLING.
- 3. INSTALL A ONE—FOOT RING OF CONCRETE, 24" DEEP, AROUND THE WRAPPED PULL BOXES INSTALLED IN NON— CONCRETE AREAS, SLOPED TO DRAIN AWAY FROM THE PULL BOX. PULL BOXES IN SIDEWALKS MUST BE SET AT FINISHED GRADE WITH TEMPORARY CONCRETE APRON OR SECTION OF SIDEWALK POURED.
- 4. PULL BOXES SHALL BE GROUTED PRIOR TO INSTALLATION OF CONDUCTORS, SLOPED TOWARD THE DRAIN HOLE. PLACE A LAYER OF ROOFING PAPER BETWEEN THE CRUSHED ROCK AND THE GROUT, OPEN AT THE DRAIN HOLE.
- 5. AN APPROVED LOCKING LID SHALL BE INSTALLED ON ALL TRAFFIC SIGNAL PULL BOXES PER SECTION 23-1.10 OF THE CITY STANDARDS.
- 6. PROVIDE 3' MIN. SLACK ON ALL CONDUCTORS.

TRAFFIC SIGNALS CONCRETE PULL BOXES

REF. & REV. <del>JUNE 2015</del> MAR. 2021 (A.7) CITY OF FRESNO

E-4A





### SECTION A-A

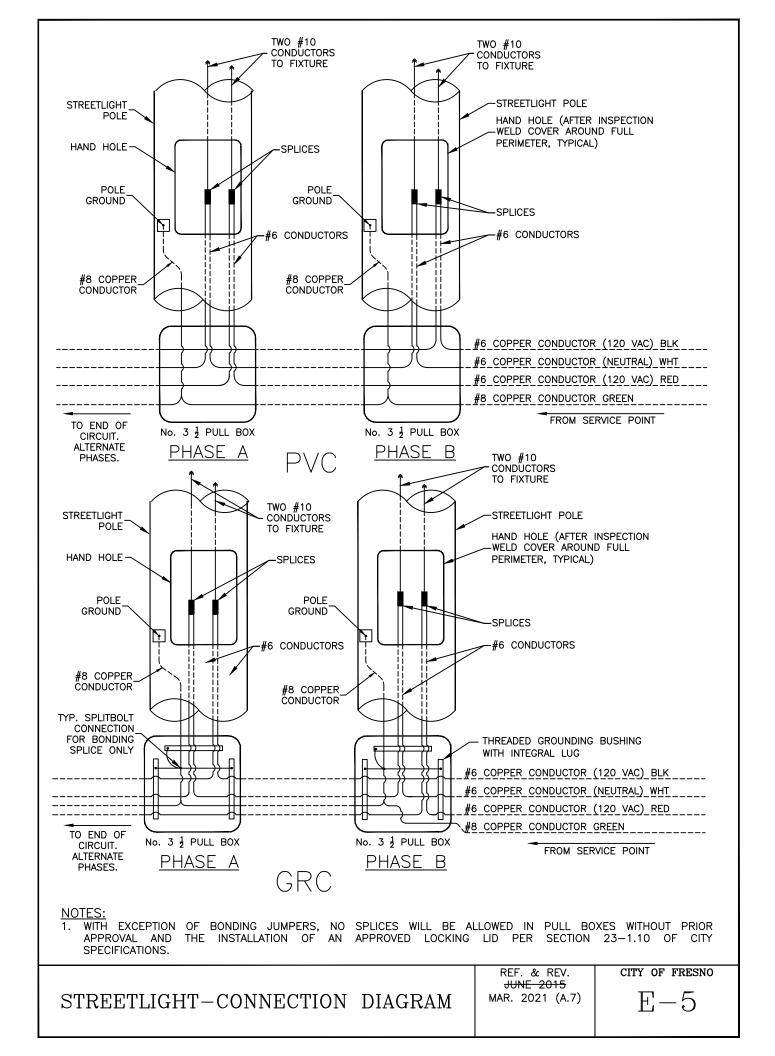
### **NOTES:**

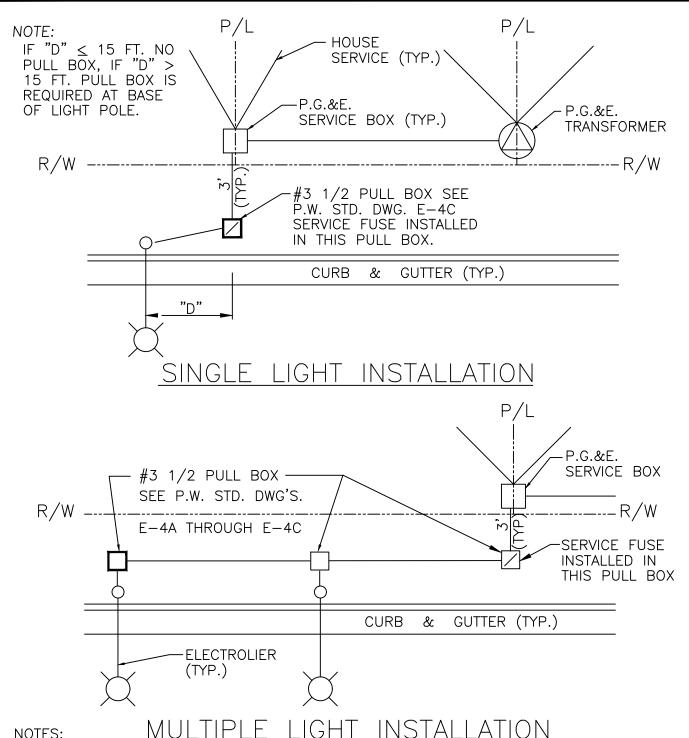
- 1. PULL BOXES SHALL BE #3-1/2 UNLESS OTHERWISE NOTED ON PLANS.
- 2. SERVICE PULL BOX SHALL BE WITHIN THE STREET R.O.W. AND NOT PRIVATE PROPERTY.
- 3. WRAP ENTIRE PULL BOX WITH #15 ROOFING PAPER BEFORE BACKFILLING.
- INSTALL A ONE-FOOT CONCRETE COLLAR, 24" DEEP, AROUND THE WRAPPED PULL BOXES WHEN INSTALLED IN DIRT OR TURF AREAS, SLOPED TO DRAIN AWAY FROM THE PULL BOX. PULL BOXES IN SIDEWALKS MUST BE SET AT FINISHED GRADE WITH A TEMPORARY CONCRETE APRON OR SECTION OF SIDEWALK POURED.
- PULL BOXES SHALL BE GROUTED PRIOR TO INSTALLATION OF CONDUCTORS, SLOPED TOWARD THE DRAIN HOLE. PLACE A LAYER OF ROOFING PAPER BETWEEN THE CRUSHED ROCK AND THE GROUT, OPEN AT THE DRAIN HOLE.
- 6. FUSE AT POINT OF SERVICE SHALL BE 60A FOR #6 CONDUCTOR AND SHALL HAVE A TRON HEJ TYPE FUSE HOLDER (SINGLE POLE). INSULATE WIRE CONNECTION SAME AS SPLICES (23-3.12).
- 7. AN APPROVED LOCKING LID SHALL BE PROVIDED AND INSCRIBED "SL" PER SECTION 23-1.10 OF THE CITY SPECIFICATIONS.

STREETLIGHT POINT OF SERVICE JUNE 2015 MAR. 2021 (A.7) CONCRETE PULL BOX LOCAL STREETS ONLY (RESIDENTIAL)

REF. & REV.

CITY OF FRESNO E-4C



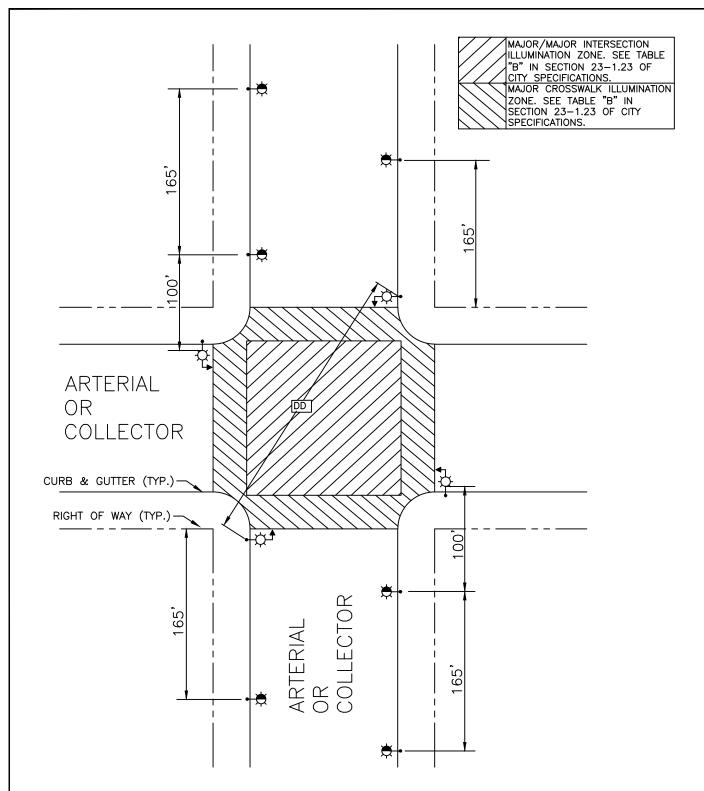


- 1. CONDUIT SHALL BE SCHEDULE 40 PVC ON LOCAL STREETS AND SCHEDULE 80 PVC ON MAJOR STREETS. LOCAL STREET CROSSINGS SHALL BE SCHEDULE 80 PVC, AND MAJOR STREETS CROSSINGS SHALL BE GALVANIZED RIGID CONDUIT (GRC). CONDUIT NOT PLACED UNDERNEATH CONCRETE SIDEWALK OR UNDERNEATH ROADWAYS SHALL BE GRC ENCASED IN A MINIMUM 4" WIDE TWO SACK CONCRETE SLURRY MIX.
- 2. LOCATE STREET LIGHTS ON THE SAME SIDE OF THE STREET AS THE P.G.&E. SERVICE WHEN POSSIBLE.
- 3. DO NOT LOCATE THE PULL BOXES ABOVE THE JOINT TRENCH.
- 4. PULL BOX SPACING SHALL NOT EXCEED 200' AND SHALL BE REQUIRED IN ALL CONDUIT CHANGE OF DIRECTION.
- 5. STREET LIGHT(S) INSTALLED ON MAJOR STREETS SHALL BE FED FROM A SERVICE PEDESTAL WITH A MASTER PHOTO CONTROL AS DETAILED IN SECTION 3-3.17 OF THE CITY SPECIFICATIONS AND STD. DWG'S. E-15, E-18, OR AS APPROVED BY CITY ENGINEER.

LOCAL STREETLIGHT LAYOUT

REF. & REV. NOV. 2007 MAR. 2021 (A.7) CITY OF FRESNO

E-6



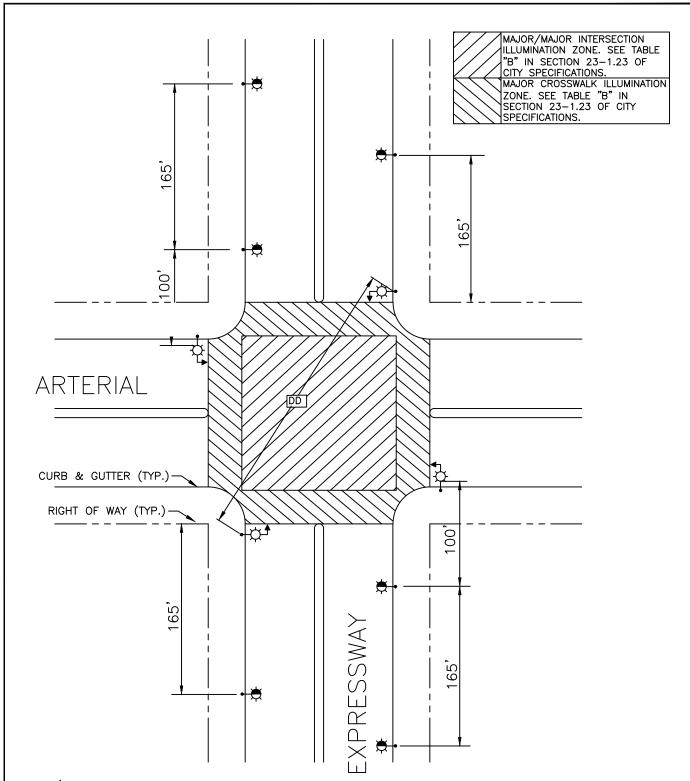
- SMALL, MEDIUM, OR LARGE\* TRAFFIC SIGNAL LUMINAIRE PER SECTION 23-1.23 OF CITY SPECIFICATIONS. \*SIZE BASED ON MAXIMUM POLE TO POLEDIAGONAL DISTANCE "DD" AS SHOWN ABOVE.
- LOCAL LUMINAIRE PER "APPROVED LED STREETLIGHT FIXTURES LIST" & SECTION 23-3.16 OF CITY SPECIFICATIONS

- 1. TRAFFIC SIGNAL LUMINARIES, MAJOR-LOCAL, & LOCAL LUMINARIES LIGHTS (ENTRANCE & EXIT) TO BE ON SEPARATE BREAKERS OF SAME CONTACTOR.
- 2. ALL DIMENSIONS SHOWN ARE MAXIMUM UNLESS OTHERWISE NOTED.

STREETLIGHT-PLACEMENT SIGNALIZED INTERSECTIONS

REF. & REV. MAR. 2021 (A.7) CITY OF FRESNO

E-8

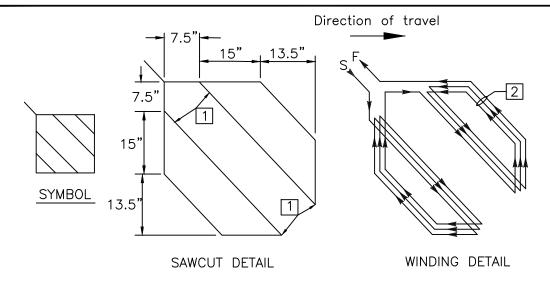


- IF THE POLE TO POLE DIAGONAL DISTANCE "DD" IS GREATER THAN 200 FEET, PROVIDE PHOTOMETRIC ANALYSIS.
- ► DOCAL LUMINAIRE PER "APPROVED LED STREETLIGHT FIXTURES LIST" & SECTION 23-3.16 OF CITY SPECIFICATIONS

- 1. TRAFFIC SIGNAL LUMINARIES, MAJOR-LOCAL, & LOCAL LUMINARIES LIGHTS (ENTRANCE & EXIT) TO BE ON SEPARATE BREAKERS OF SAME CONTACTOR.
- 2. ALL DIMENSIONS SHOWN ARE MAXIMUM UNLESS OTHERWISE NOTED.

STREETLIGHT-PLACEMENT EXPRESSWAY

REF. & REV. AUG. 2015 MAR. 2021 (A.7) CITY OF FRESNO

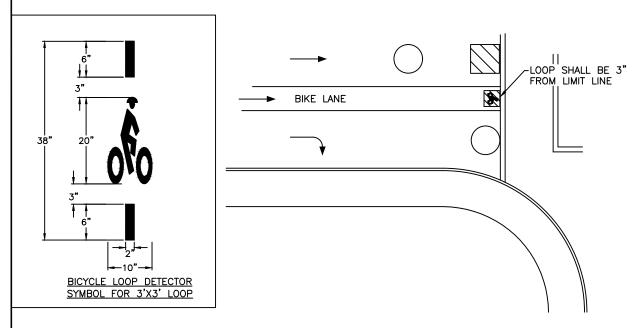


BIKE LOOP (3'X3')
DETECTOR CONFIGURATION

- ROUND CORNERS OF ACUTE ANGLE SAWCUTS TO PREVENT DAMAGE TO CONDUCTORS.
- INSTALL 3 TURNS WHEN ONLY ONE BIKE LOOP IS ON A SENSOR UNIT CHANNEL. INSTALL 5 TURNS WHEN ONE BIKE LOOP IS CONNECTED IN SERIES WITH 3 ADDITIONAL 6'X6' LOOPS ON A SENSOR UNIT CHANNEL.



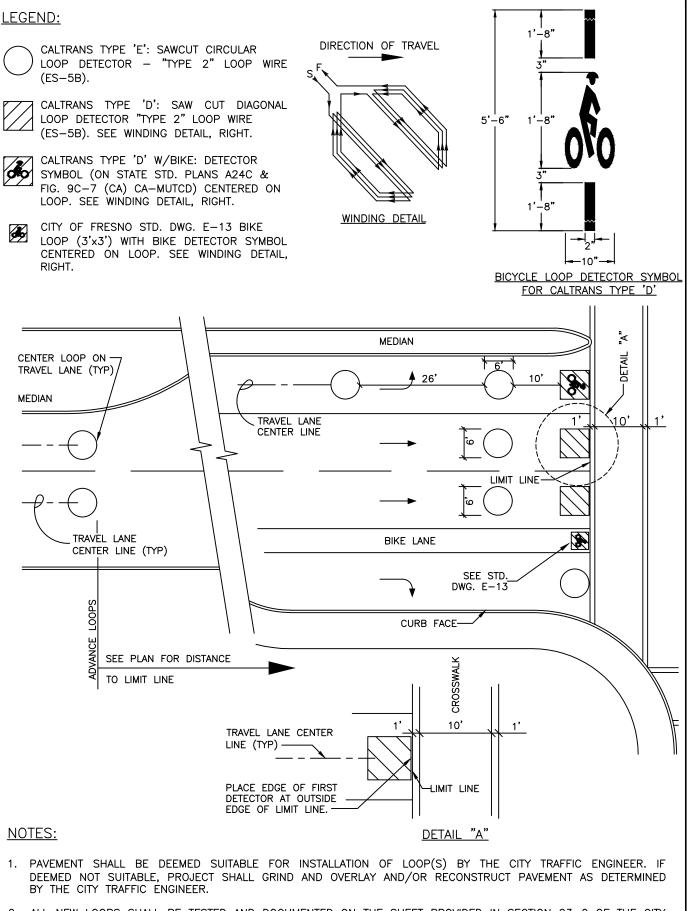
CITY OF FRESNO BIKE LOOP WITH BIKE LOOP DETECTOR SYMBOL 9C-7 OF THE CA-MUTCD, CENTERED ON LOOP.



### NOTES:

- 1. LOOP SEALANT SHALL BE CALTRANS APPROVED ELASTOMERIC SEALANT OR HOT MELT RUBBERIZED ASPHALT SEALANT.
- 2. ALL NEW LOOPS SHALL BE TESTED AND DOCUMENTED ON SHEET PROVIDED IN SECTION 23-2; TESTING SHALL BE PER CALTRANS STANDARD SPECIFICATIONS.
- 3. REFER TO STD. DWG. E-14 FOR LOOP PLACEMENT.

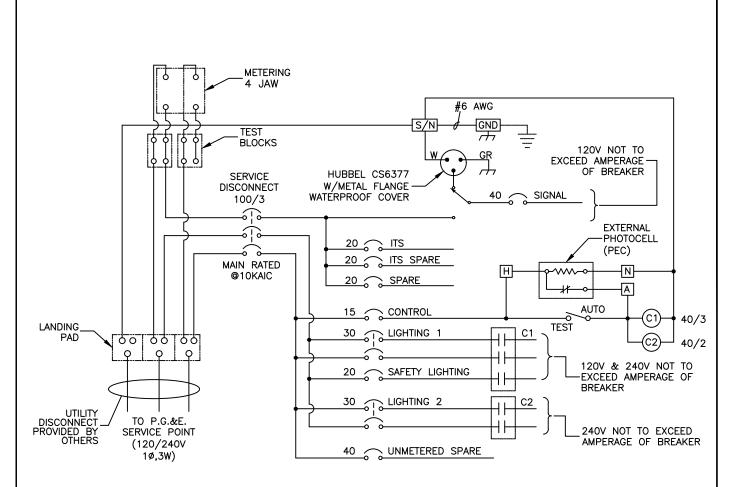
SIGNAL LIGHTS	REF. & REV.	CITY OF FRESNO
SIGNAL LIGITIS	<del>JUNE 2015</del>	
BIKE LOOP DETECTOR DETAIL (3'X3')	MAR. 2021 (A.7)	F 19
DIKE LOOF DETECTOR DETAIL (5 X5)		L — ТО



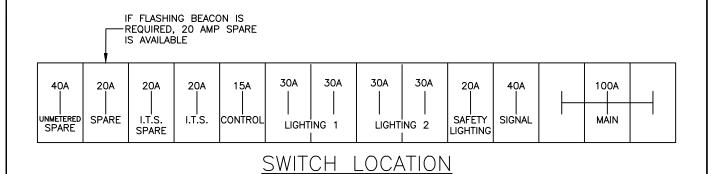
2. ALL NEW LOOPS SHALL BE TESTED AND DOCUMENTED ON THE SHEET PROVIDED IN SECTION 23-2 OF THE CITY SPECIFICATIONS. TESTING SHALL BE TO CALTRANS STATE STANDARD PLANS.

SIGNAL LIGHTS LOOP DETECTOR PLACEMENT

REF. & REV. <del>JUNE 2015</del> MAR. 2021 (A.7) CITY OF FRESNO



## SERVICE PEDESTAL SCHEMATIC

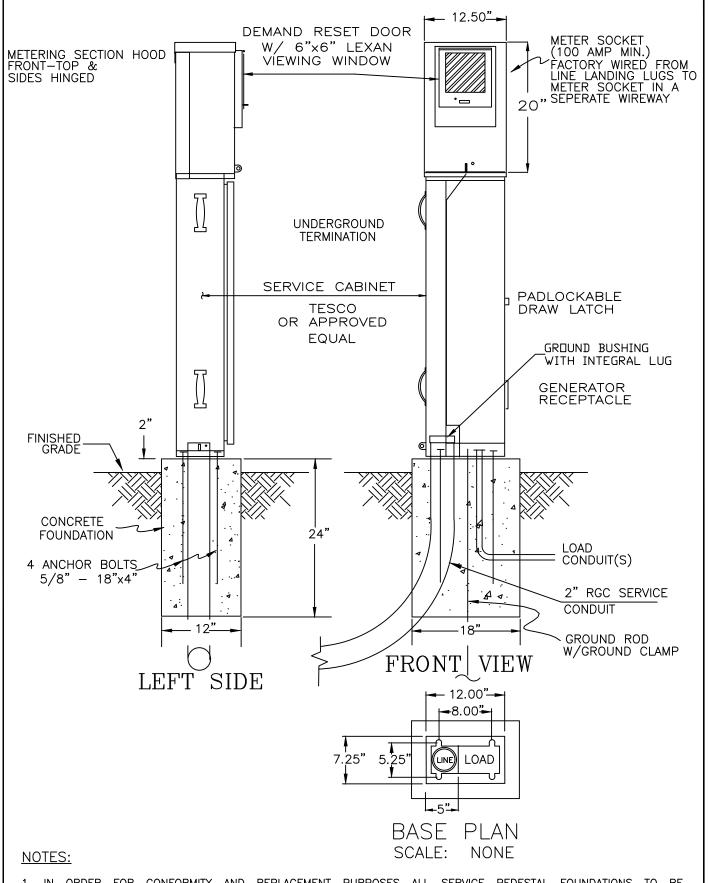


**NOTES:** 

1. SERVICE CABINET SHALL BE TESCO 26-100 LBS METERED/UNMETERED OR APPROVED EQUAL.

SIGNAL LIGHT
WIRING NEW INSTALLATIONS 26-100 CABINETS

REF. & REV. <del>JUNE 2015</del> MAR. 2021 (A.7) CITY OF FRESNO

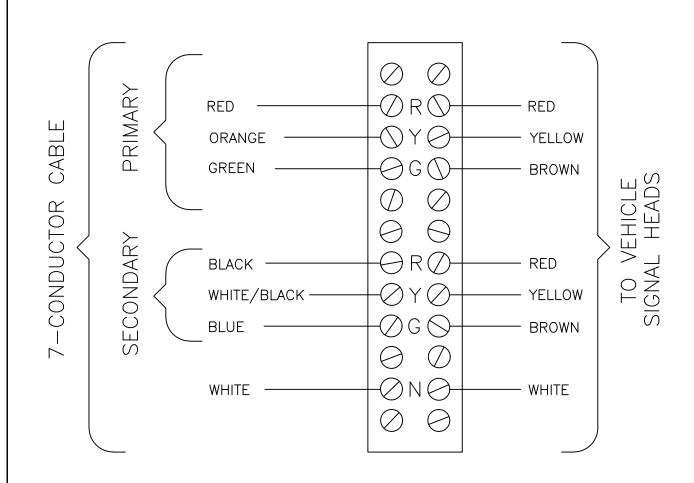


1. IN ORDER FOR CONFORMITY AND REPLACEMENT PURPOSES ALL SERVICE PEDESTAL FOUNDATIONS TO BE CONSTRUCTED TO THESE SPECIFICATIONS. ANY DEVIATIONS FROM THESE REQUIREMENTS SHALL HAVE THE APPROVAL OF THE ELECTRICAL SUPERINTENDENT.

2. FRONT OF CABINET SHALL FACE ACCESSIBLE RIGHT OF WAY.

SIGNAL LIGHT SERVICE FOUNDATION DETAIL

REF. & REV. JUNE 2015 CITY OF FRESNO

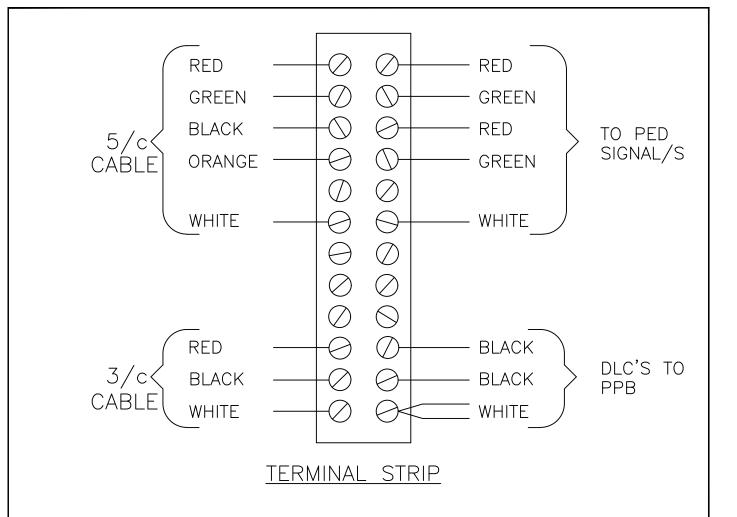


### VEHICLE TERMINAL COMPARTMENT

### **NOTES:**

- 1. INSTALL SINGLE CONDUCTOR COLOR CODED #14 THWN COPPER WIRE BETWEEN TERMINAL STRIP AND EACH SIGNAL ASSEMBLY AND CONNECT.
- 2. ALL STRANDED CONDUCTORS SHALL HAVE ALL LOOSE STRANDS TIGHTLY TWISTED TOGETHER AND INDIVIDUAL CONDUCTORS TINNED WITH SOLDER.
- 3. WITHIN INDIVIDUAL CABLES THE ASSIGNMENTS OF PRIMARY OR SECONDARY COLORS ARE BASED UPON THE TABLE BELOW:

_PRI	SEC
NB	EB or SB or WB
EB	SB or WB
SB	WB
THRU	TURN



3-COND. CABLE TO PEDESTRIAN
TERMINAL COMPARTMENT.

MAST ARM
POLE

CURB
RETURN

1-A POLE OR PED PB POST

### TYPICAL CORNER CONNECTIONS

### **NOTES:**

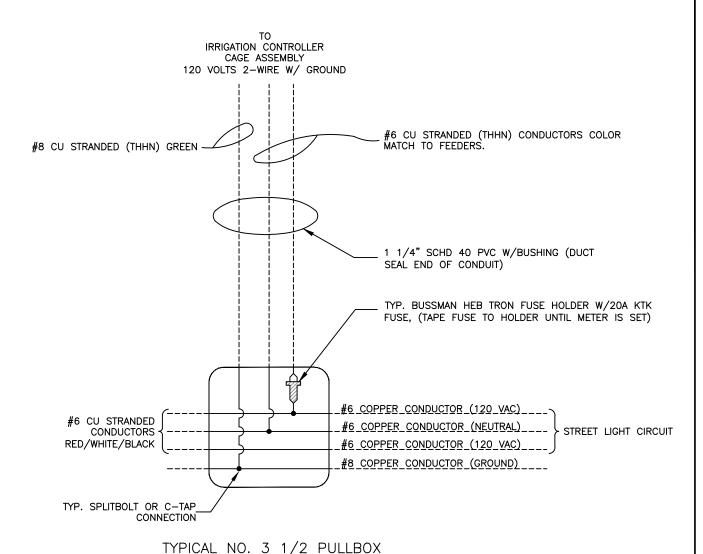
- 1. INSTALL SINGLE CONDUCTOR COLOR CODED #14 THWN COPPER WIRE BETWEEN TERMINAL STRIP AND EACH SIGNAL ASSEMBLY AND CONNECT.
- 2. ALL STRANDED CONDUCTORS SHALL HAVE ALL LOOSE STRANDS TIGHTLY TWISTED TOGETHER AND INDIVIDUAL CONDUCTORS TINNED WITH SOLDER.

PEDESTRIAN	SIGNAL,	&	PPB
TERMINAL	LOCATI	ONS	S

REF. & REV. JUNE 2015

MEDIAN ISLAND

CITY OF FRESNO



### TIPICAL NO. 3 1/2 PULLBUA

### **NOTES:**

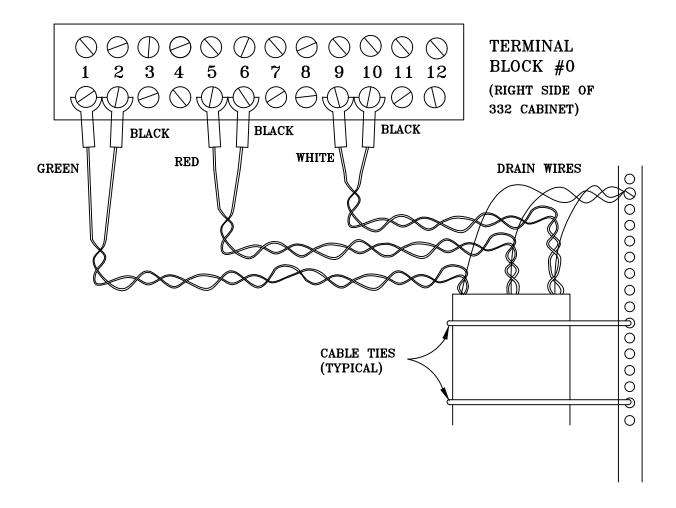
- 1. GROUT BOX AT CONDUIT ENTRANCE. RESTORE ANY GROUT DAMAGED BY INSTALLATION.
- 2. INSULATE HOT/NEUTRAL SPLICES AS FOLLOWS:
  COVER WITH 2-LAYERS RUBBER TAPE-FILLING VOIDS.
  APPLY 1-LAYER 1/2 LAPPED PVC TAPE.
  APPLY 1-LAYER FRICTION TAPE & COAT WITH AN APPROVED ELECTRICAL SEALING COMPOUND.
- 3. AN APPROVED LOCKING LID PER SECTION 23-1.10 OF CITY SPECIFICATIONS SHALL BE INSTALLED AT THE "IRRIGATION SERVICE" PULLBOX.

STREETLIGHT IRRIGATION SERVICE INSTALLATION

REF. & REV. <del>JUNE 2015</del> MAR. 2021 (A.7) CITY OF FRESNO

## COORDINATION CABLE TERMINATION

(ONE OR MORE CABLES AS APPROPRIATE)

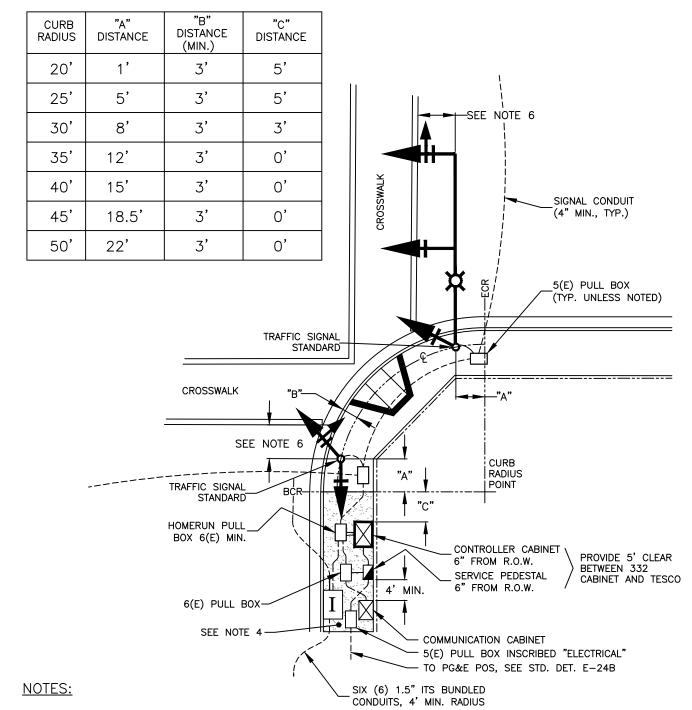


### NOTES:

- 1. TERMINATE TWISTED PAIRS AS SHOWN USING APPROPRIATE SOLDERLESS INSULATED FORK TERMINALS.
- 2. TERMINATE DRAIN WIRES WITH A SINGLE INSULATED RING TERMINAL TO RACK SIDE FRAME (GROUND) USING 10-32 MACHINE SCREW ON ONE END ONLY OF EACH CABLE. FOR STANDARDIZATION. ONLY CABLE ENDS FROM SOUTH OR EAST OF INTERSECTION ARE GROUNDED. UNUSED DRAIN WIRES ARE FOLDED BACK ALONG JACKET MINIMUM 1" & TAPED.
- 3. UNDERGROUND INLINE SPLICES ARE NOT PERMITTED. CONDUCTORS & DRAIN WIRES SHALL BE SPLICED USING UNINSULATED CRIMP CONNECTORS. THE CONNECTION SHALL BE STAGGERED AND SOLDERED (FLAMELESS METHOD) EACH INDIVIDUAL CONDUCTOR SPLICE SHALL HAVE HEAT SHRINK TUBING APPLIED. THE ENTIRE SPLICE ASSY. SHALL HAVE TWO (2) LAYERS OF HEAT SHRINK TUBING APPLIED. TUBING SHALL BE 3M I.T.C.S.N. OR APPROVED EQUAL. ALL HEAT SHRINK TUBING SHALL BE APPLIED USING A FLAMELESS METHOD.

SIGNAL LIGHT COORDINATION CABLE TERMINATION

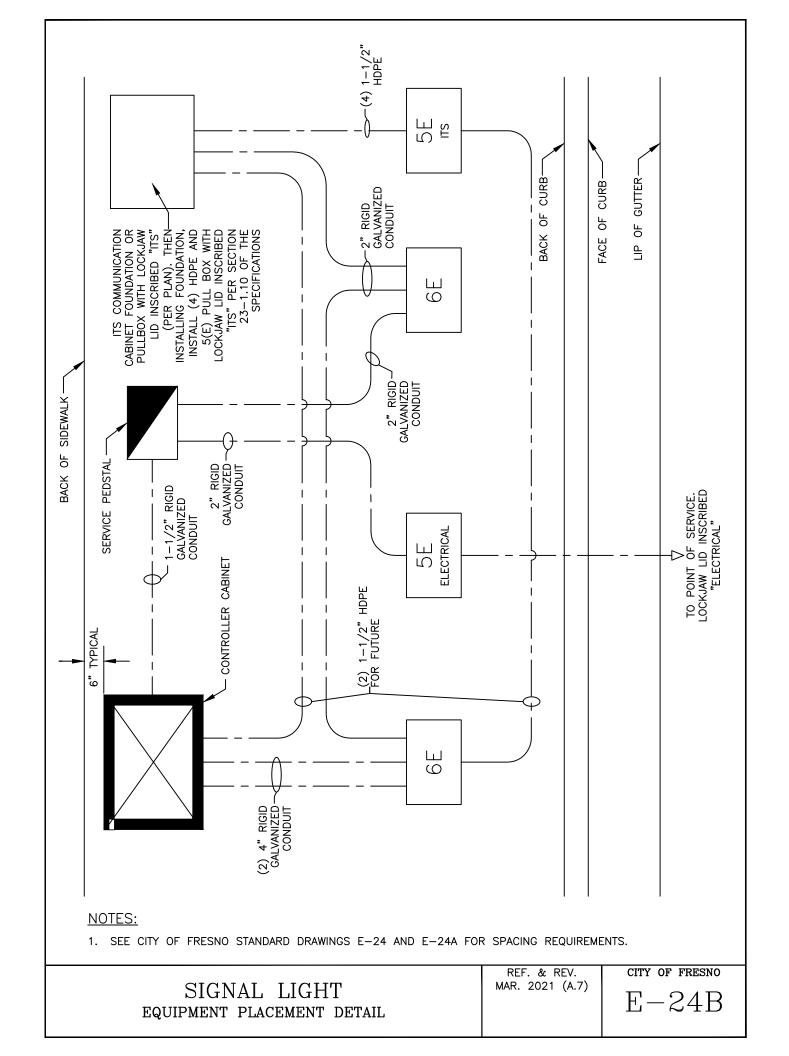
REF. & REV. JULY 2011 CITY OF FRESNO

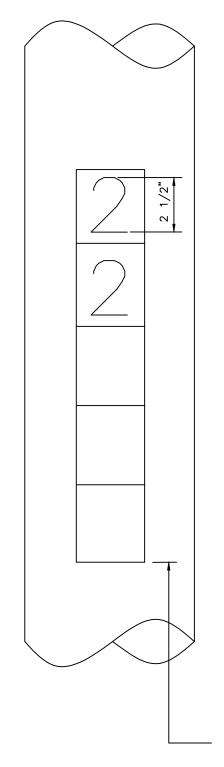


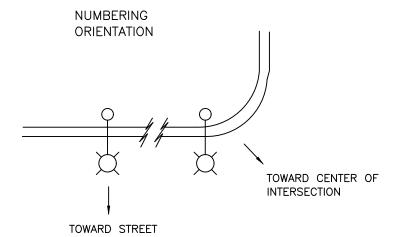
- 1. ALL EQUIPMENT SHALL BE LOCATED ACCORDING TO CITY OF FRESNO APPROVED PLANS. ANY VARIATION TO THE PLANS SHALL HAVE THE APPROVAL OF THE CITY TRAFFIC ENGINEER.
- 2. ALL EQUIPMENT SHALL BE LOCATED ACCORDING TO THE ULTIMATE STREET WIDTH AND CURB RETURNS.
- 3. ULTIMATE AND EXISTING CURB RETURN ARE/SHALL BE SHOWN ON CONSTRUCTION PLANS.
- 4. ADDITIONAL SIDEWALK TO BE INSTALLED PER CITY STANDARDS AS APPLICABLE TO MAINTAIN A 4' MINIMUM ADA CLEAR PATH ADJACENT TO EQUIPMENT.
- 5. DISTANCE "C" SHALL BE ADJUSTED AS NECESSARY FOR THE 4' ADA CLEARANCE REQUIREMENT.
- 6. DISTANCE "A" HAS BEEN CALCULATED TO PLACE A PEDESTRIAN PUSH BUTTON APPROXIMATELY 5' FROM CROSSWALK. IF UNFORESEEN CONDITIONS DO NOT ALLOW SIGNAL STANDARD OR CROSSWALK PLACEMENT AS SHOWN, A PEDESTRIAN PUSH BUTTON POST SHALL BE INSTALLED TO MEET ADA GUIDELINES.
- 7. LOCATE PULLBOXES FOR TESCO & TS COMBINED 3' FROM FACE OF CURB TO EDGE OF PULLBOX

SIGNAL LIGHT EQUIPMENT PLACEMENT GUIDELINE

REF. & REV. NOV. 2007 MAR. 2021 (A.7) CITY OF FRESNO



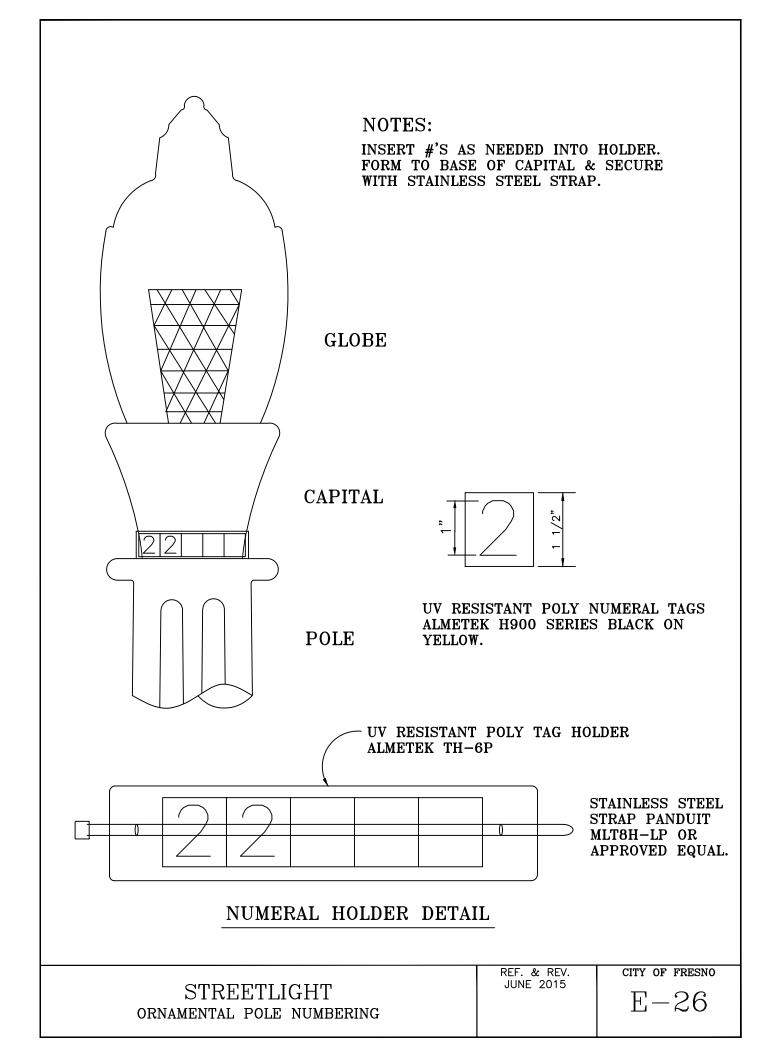


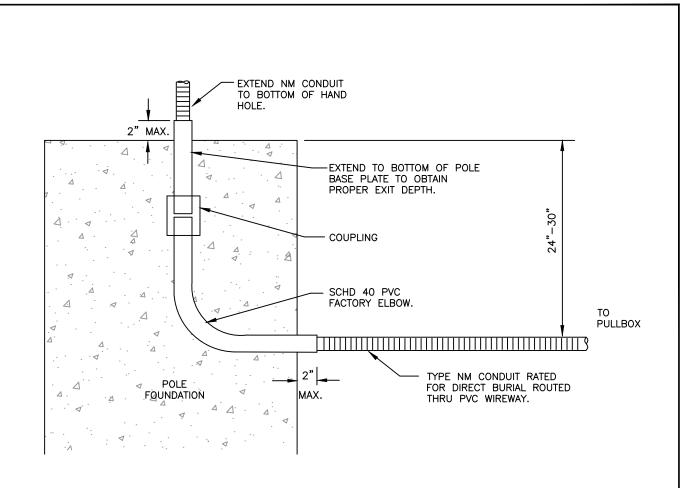


- 1. NUMERALS SHALL BE ALMETEK PS-2.5 SERIES, OR APPROVED EQUAL, BLACK ON WHITE PRESSURE SENSITIVE MARKERS OF REFLECTIVE SCOTCHLITE.
- 2. FOR METAL POLES, APPLY TO CLEAN SURFACE.
- 3. FOR WOOD POLES, USE EMBOSSED ALUMINUM BACKING PLATE SECURED WITH 1-1/2" ALUMINUM ROOFING NAILS. BACKING PLATE SHALL BE ALMETEK PS-2.5V5 OR APPROVED EQUAL.

10'6" FROM GRADE/SIDEWALK ELEVATION, ADJUST AS NEEDED TO CLEAR HARDWARE OR APPURTENANCES.

REF. & REV. NOV. 2007 CITY OF FRESNO

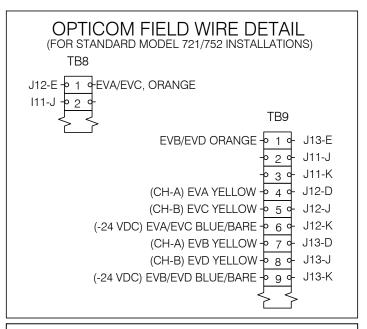




POLE TYPE	PVC	NM	GRC
PPBP			1"
POLE TYPE 1A	2.5"	1.5"	
POLE TYPE 15	2.5"	1.5"	-
POLE TYPES 16-61	3"	2"	

SIGNAL LIGHT FOUNDATION WIRE-WAY DETAIL

REF. & REV. JUNE 2015 CITY OF FRESNO

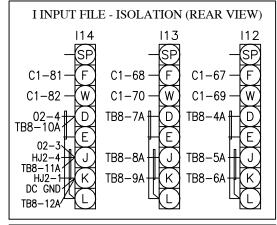


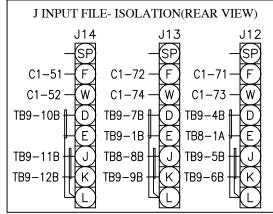
332 CABINET MODIFICATIONS FOR OPTICOM MODEL 762 DISCRIMINATORS (TWO-CHANNEL, DUAL PRIORITY, ENCODED) AND MODEL 721 DETECTORS (TWO DIRECTION, SINGLE CHANNEL).

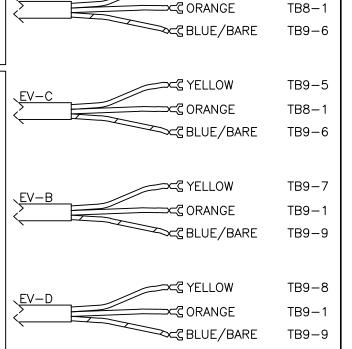
#### **CAUTION:**

CONNECT TERMINAL K OF THE INPUT FILE SLOTS J12&J13 TO THE EARTH GROUND TO ALLOW DISSIPATION OF STATIC CHARGES ON THE DETECTOR CABLE. FAILURE TO CONNECT TERMINAL K TO THE EARTH GROUND MAY DAMAGE THE EQUIPMENT. IF DETECTORS HAVE BEEN MOUNTED BUT NOT CONNECTED TO THE PHASE SELECTOR, STRIP INSULATION FROM EACH DETECTOR CABLE AND CONNECT ALL THE WIRES TO EARTH GROUND UNTIL THE INSTALLATION CAN BE COMPLETED.

#### LOWER INPUT PANEL TB10 TB8 **TB9** J12-E-111-D J13-E 1 111-E 2 J11-J 111-J 2 2 111-K 3 J11-D 3 3 J11-K 112-D 4 J11-E + 4 4 J12-D 110-D + 5 5 112-J J12-J 112-K 6 110-E 6 6 J12-K 7 7 7 113-D 110-J J13-D 8 8 8 J13-J 113-J 110-K + J10-D + 9 113-K 9 9 J13-K 114-D 10 J10-E + 10 10 ·J14-D 11 11 11 J14-J 114-J J10-J-12 J10-K → 12 12 & J14-K 114−K →







≍द YELLOW

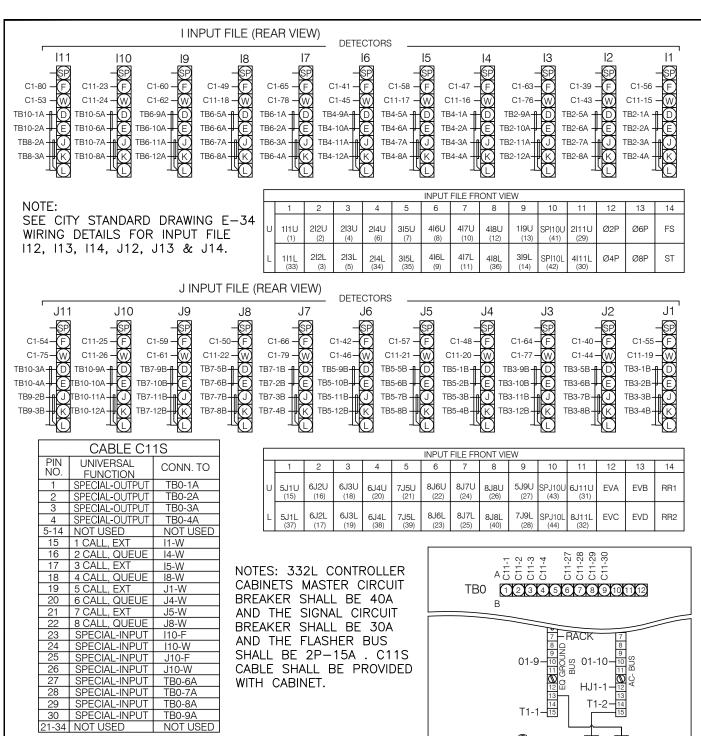
TB9-4

TB10 HD30A SERIES TERMINAL BLOCK OR EQUAL.

EMERGENCY VEHICLE PREEMPTION
OPTICOM CONNECTIONS
721 DETECTOR AND TERMINAL BLOCK CONNECTIONS

REF. & REV. <del>JUNE 2015</del> MAR. 2021 (A.7) CITY OF FRESNO

E-34A



PDA #2L FRONT VIEW  $\Theta$ SCB1 SCB<sub>2</sub> SCB3 SCB4 SCB5 SCB6 FCB1 FCB2 10A 10A 10A 10A 10A 10A 15A 15A FLASHER BUS SIGNAL BUS CLEAN CB CB CB GFI 15A 30A 15A AUTO  $(\Gamma)$ (L) EQUIP CLEAN SIGNAL FLASH

SIGNAL CB CLEAN CB-**SERVICE** 40A **PANEL** TBS BBS MCB

332L CABINET/2070L DETECTION C11S CABLE CONNECTIONS AND MASTER/SIGNAL CB

15A

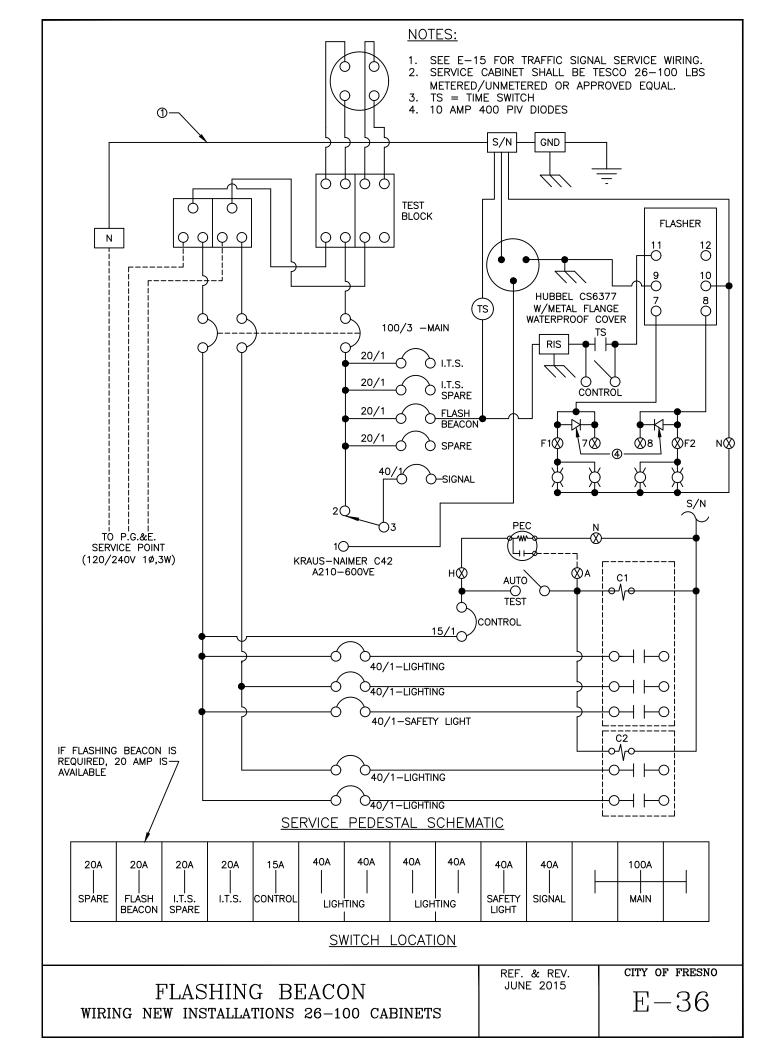
30A

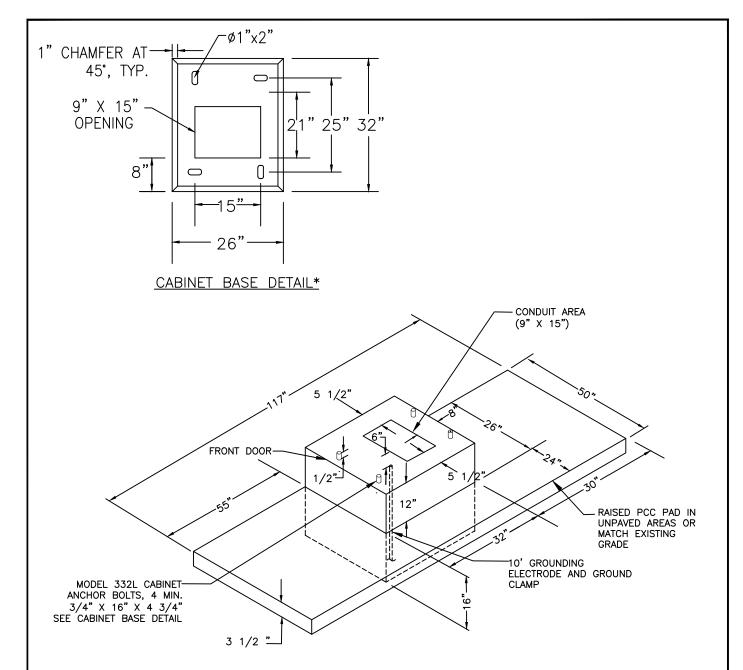
15A

REF. & REV. JUNE 2015

CITY OF FRESNO

E-34B



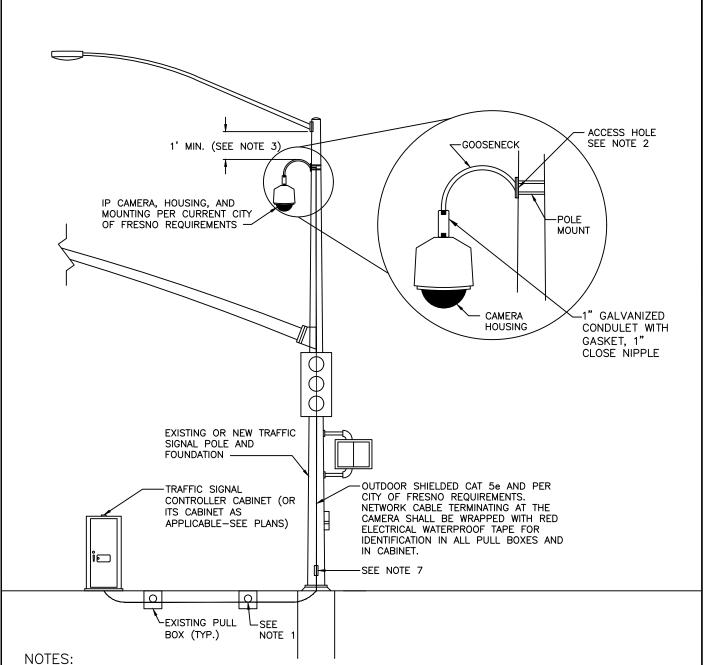


### 332L FOUNDATION DETAILS

### **NOTES:**

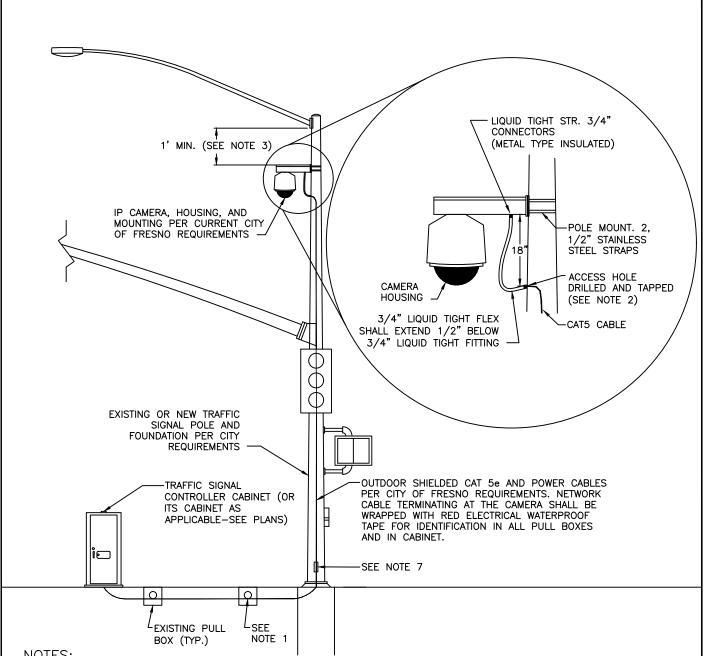
- 1. TOP OF FOUNDATION SHALL BE 12" ABOVE FINISHED GRADE.
- 2. CONDUITS EXITING THE CONTROLLER FOUNDATION AND ENTERING INTO THE CONTROLLER CABINET SHALL BE ALIGNED TO ENTER WITHIN THE TEES SPECIFIED CABINETS WITHOUT ANY MODIFICATIONS TO THE CABINET BASE.
- 3. FOUNDATION SHALL CONFORM TO SECTION 23-1.7 OF THE CITY OF FRESNO STANDARD SPECIFICATIONS AND ES-3C STATE OF CALIFORNIA STANDARD PLANS, WITH THE EXCEPTION OF THE FOUNDATION HEIGHT.
- 4. AN APPROVED MASTIC OR CAULKING COMPOUND SHALL BE PLACED ON THE FOUNDATION PRIOR TO PLACING THE CABINET TO SEAL OPENINGS BETWEEN BOTTOM OF CABINET AND FOUNDATION.
- 5. SEE CITY STD. DWG. E-24B FOR LOCATION OF SERVICE PEDESTAL AND ITS CABINET.
- \* DIMENSIONS ROUNDED TO THE NEAREST 0.1".

	REF. & REV.	CITY OF FRESNO
332L CABINET FOUNDATION	<del>JUNE 2015</del> MAR. 2021 (A.7)	E-37



- 1. EXTEND CABLES THROUGH TRAFFIC SIGNAL CONDUIT AND PULL BOXES. COIL MAX. 2' OF SLACK IN EACH PULL BOX. NETWORK CABLE TERMINATING AT THE CAMERA SHALL BE WRAPPED WITH RED ELECTRICAL WATERPROOF TAPE FOR IDENTIFICATION IN ALL PULL BOXES AND IN CABINET.
- 2. DRILL MAX 34" BEVELED HOLE. USE RUBBER GROMMET TO SEAL.
- CAMERA SHALL BE MOUNTED TO ATTAIN MAXIMUM HEIGHT UNLESS OTHERWISE NOTED ON PLANS, OR DIRECTED BY ENGINEER.
- 4. CAMERA SHALL BE MOUNTED WITH BRACKET AND CAMERA HOUSING FACING CENTER OF INTERSECTION OR AS DIRECTED BY ENGINEER.
- BOND ALL CONNECTIONS PER CURRENT NEC STANDARD.
- SHIELDED AND APPROVED RJ-45 CONNECTOR SHALL BE USED FOR GROUNDING TO OUTDOOR SHIELDED CAT5e CABLE.
- 7. POLE HAND HOLE SHALL BE WELDED IN PLACE AFTER ALL PROPOSED WORK ON EXISTING POLE IS COMPLETED AND INSPECTED. CONTRACTOR SHALL PROTECT CONDUCTORS FROM DAMAGE DURING WELDING.

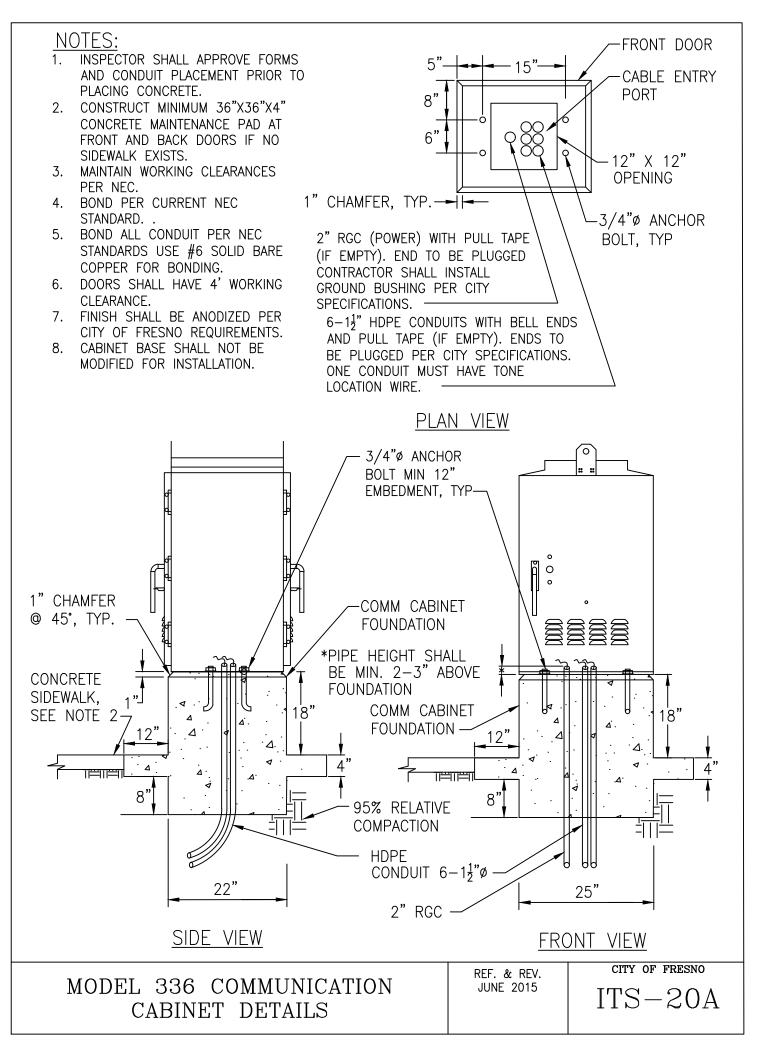
CITY OF FRESNO REF. & REV. TRAFFIC SIGNAL MOUNTED IP JUNE 2015 ITS-18A CAMERA (GOOSENECK)

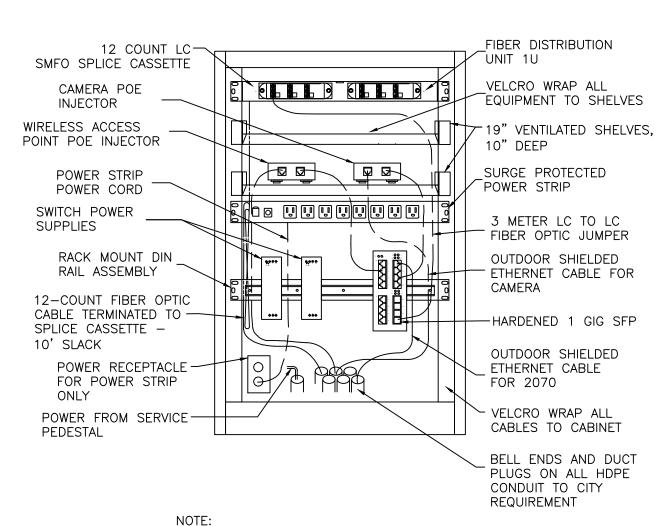


# **NOTES:**

- 1. EXTEND CABLES THROUGH TRAFFIC SIGNAL CONDUIT AND PULL BOXES. COIL MAX. 2' OF SLACK IN EACH PULL BOX. NETWORK CABLE TERMINATING AT THE CAMERA SHALL BE WRAPPED WITH RED ELECTRICAL WATERPROOF TAPE FOR IDENTIFICATION IN ALL PULL BOXES AND IN CABINET.
- 2. DRILL MAX 34" BEVELED HOLE. WEATHERPROOF FLEX CONDUIT CONNECTOR SHALL BE THREADED INTO POLE.
- CAMERA SHALL BE MOUNTED TO ATTAIN MAXIMUM HEIGHT UNLESS OTHERWISE NOTED ON PLANS, OR DIRECTED BY ENGINEER.
- CAMERA SHALL BE MOUNTED WITH BRACKET AND CAMERA HOUSING FACING CENTER OF INTERSECTION OR AS DIRECTED BY ENGINEER.
- 5. BOND ALL CONNECTIONS PER CURRENT NEC STANDARD.
- 6. APPROVED AND SHIELDED RJ-45 CONNECTOR SHALL BE USED FOR GROUNDING TO OUTDOOR SHIELDED CAT5e CABLE.
- 7. POLE HAND HOLE SHALL BE WELDED IN PLACE AFTER ALL PROPOSED WORK ON EXISTING POLE IS COMPLETED AND INSPECTED. CONTRACTOR SHALL PROTECT CONDUCTORS FROM DAMAGE DURING WELDING.

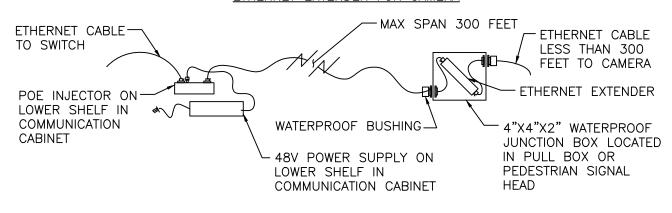
CITY OF FRESNO REF. & REV. JUNE 2015 TRAFFIC SIGNAL MOUNTED IP ITS-18B CAMERA





NOTE:
MINIMUM 4" VERTICAL SPACING ABOVE 19" SHELF

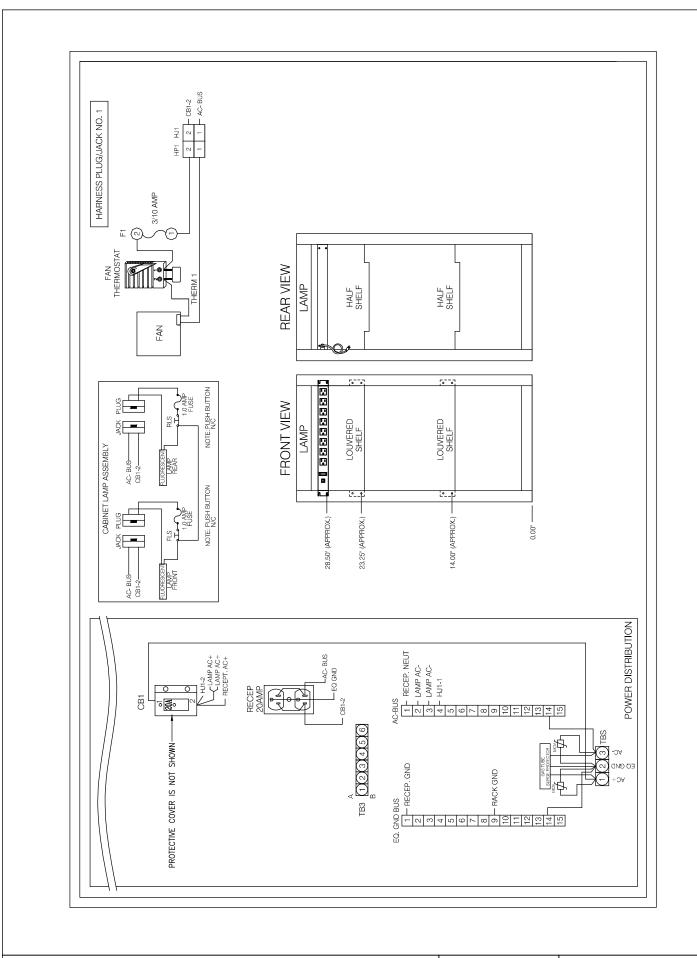
# (ONLY FOR ETHERNET RUNS LONGER THAN 300') ETHERNET EXTENDER FOR CAMERA



MODEL 336 COMMUNICATION CABINET EQUIPMENT ASSEMBLIES

REF. & REV. <del>JUNE 2015</del> MAR. 2021 (A.7) CITY OF FRESNO

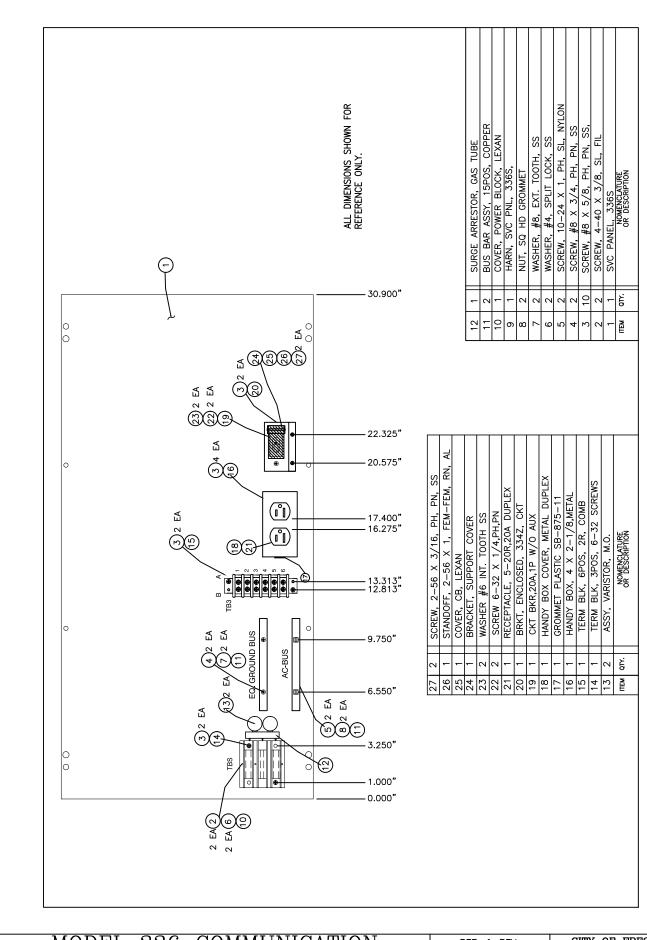
ITS-21B



336 COMMUNICATION CABINET WIRING DIAGRAM, 1 OF 2

REF. & REV. JUNE 2015 CITY OF FRESNO

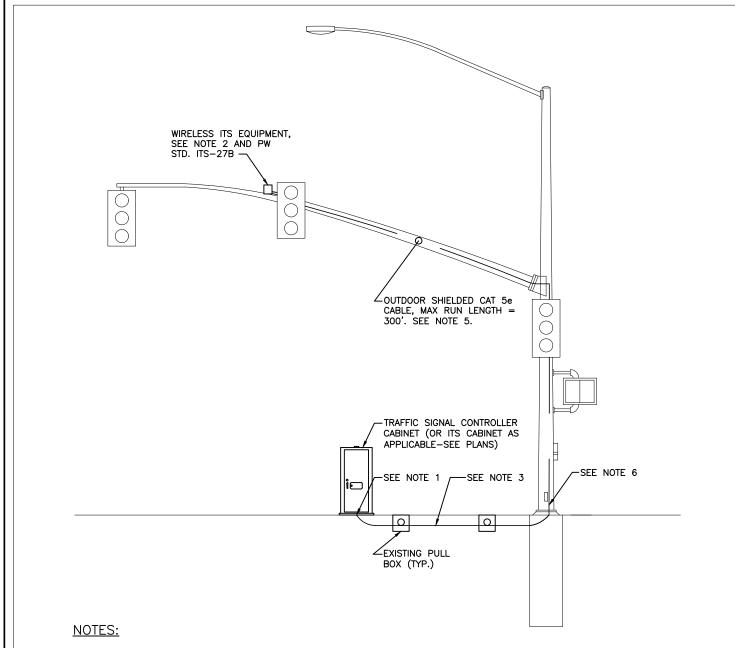
ITS-21C



MODEL 336 COMMUNICATION
CABINET POWER DISTRIBUTION,
2 OF 2

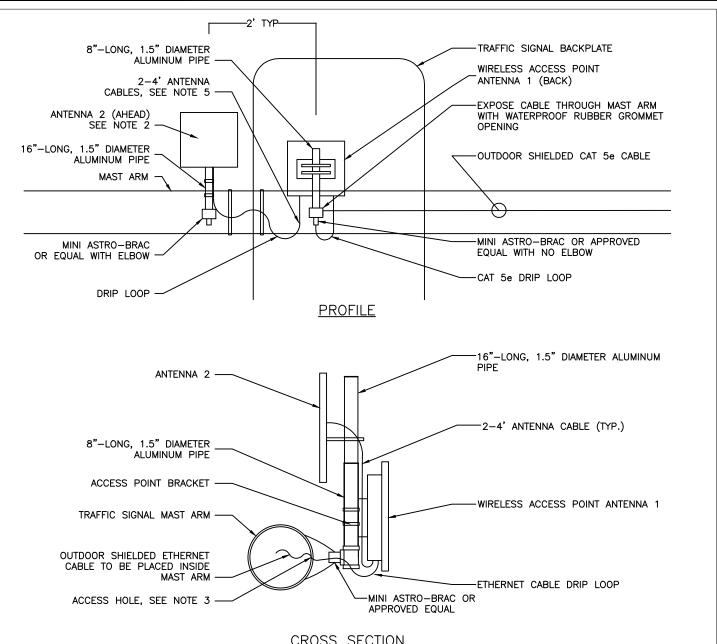
REF. & REV. JUNE 2015 CITY OF FRESNO

ITS-21D



- 1. FOR NETWORKING CONNECTIONS, SEE SPECIFICATIONS. NETWORK CABLE TERMINATING AT ACCESS POINT SHALL BE WRAPPED WITH BLUE TAPE FOR IDENTIFICATION IN ALL PULL BOXES AND IN CABINET. NETWORK CABLE SHIELDING SHALL BE GROUNDED IN CONTROLLER CABINET.
- 2. CONTRACTOR SHALL PERFORM A FIELD SURVEY WITH A BUCKET TRUCK TO LOCATE OPTIMAL POSITION OF EQUIPMENT ON MAST ARM IN THE PRESENCE OF THE CITY ENGINEER PRIOR TO INSTALLATION.
- 3. EXTEND CABLES THROUGH TRAFFIC SIGNAL CONDUIT AND PULL BOXES. COIL MIN. 6' OF SLACK IN EACH PULL BOX.
- 4. CABLE SHALL BE INSTALLED INSIDE SIGNAL MAST ARM FOR TRAFFIC SIGNAL POLES CONFORMING TO CALTRANS STANDARDS DATED 1977 OR NEWER. FOR TRAFFIC SIGNAL POLES CONFORMING TO OLDER STANDARDS SEE PLANS.
- 5. CONTRACTOR MAY ULTILIZE YELLOW WIRE AS A PULL TAPE TO BRING CAT 5e CABLE INTO PROPOSED WIRELESS EQUIPMENT (NOTE; YELLOW WIRE TO RE—INSTALL BACK IN GOOD CONDITION). CONTRACTOR SHALL COORDINATE THEIR SCHEDULE WITH CITY TSSL TO PLACE SIGNAL IN TEMPORARY FLASHING PRIOR TO INSTALLATION.
- 6. POLE HAND HOLE SHALL BE WELDED IN PLACE AFTER ALL PROPOSED WORK IS COMPLETED AND INSPECTED ON SIGNAL POLE. CONTRACTOR SHALL PROTECT CONDUCTORS FROM DAMAGE DURING WELDING.

REF. & REV. <del>JULY 2011</del> MAR. 2021 (A.7) CITY OF FRESNO



# **CROSS SECTION**

#### NOTES:

- 1. ANTENNA 2 WILL BE REQUIRED FOR ALL INTERSECTIONS FOR EXTENSION OF WIRELESS CORRIDOR, SEE PLANS.
- 2. ANTENNA 2 MOUNTING IS SIMILAR TO THAT SHOWN IN THE CROSS SECTION ABOVE, BUT NO HOLES ARE DRILLED IN THE MAST ARM, A 16"-LONG ALUMINUM PIPE IS USED, AN ACCESS POINT IS NOT INSTALLED.
- 3. DRILL MAX 34" BEVELED HOLE. GROMMET SHALL FORM A TIGHT SEAL BETWEEN POLE AND CABLE.
- 4. ANTENNA 1 AND ANTENNA 2 SHALL HAVE A MINIMUM 2' OF SEPARATION.
- 5. SECURELY STRAP ANTENNA CABLE TO MAST ARM WITH STAINLESS STEEL NYLON COATED STRAPS (FOLLOW NEC STANDARD FOR SPACING).
- 6. ALL ELECTRICAL CONNECTIONS SHALL CONFORM TO MANUFACTURER REQUIREMENTS TO ENSURE WEATHER PROOF CONNECTIONS.

WIRELESS ITS INSTALLATION **DETAILS** 

REF. & REV. JULY 2011 MAR. 2021 (A.7)

CITY OF FRESNO ITS-27B

# **SELF-DEALING TRANSACTION DISCLOSURE FORM**

(1)	Company Board Member Information:				
	Name:	Date:			
	Job Title:	<u>-</u>			
(2)	Company/Agency Name and Address:				
(3)	Disclosure (Please describe the nature of the self-dealing	transaction you are a party to)			
(4)	Explain why this self-dealing transaction is consistent with Code 5233 (a)	n the requirements of Corporations			
(5)	Authorized Signature				
	Signature:	Date:			

#### SELF-DEALING TRANSACTION DISCLOSURE FORM INSTRUCTIONS

In order to conduct business with the County of Fresno (hereinafter referred to as "County"), members of a contractor's board of directors (hereinafter referred to as "County Contractor"), must disclose any self-dealing transactions that they are a party to while providing goods, performing services, or both for the County. A self-dealing transaction is defined below:

"A self-dealing transaction means a transaction to which the corporation is a party and which one or more of its directors has a material financial interest"

The definition above will be utilized for purposes of completing the disclosure form.

- (1) Enter board member's name, job title (if applicable), and date this disclosure is being made.
- (2) Enter the board member's company/agency name and address.
- (3) Describe in detail the nature of the self-dealing transaction that is being disclosed to the County. At a minimum, include a description of the following:
  - a. The name of the agency/company with which the corporation has the transaction; and
  - b. The nature of the material financial interest in the Corporation's transaction that the board member has.
- (4) Describe in detail why the self-dealing transaction is appropriate based on applicable provisions of the Corporations Codes.
- (5) Form must be signed by the board member that is involved in the self-dealing transaction described in Sections (3) and (4).

# REVISED STANDARD SPECIFICATIONS DATED 09-02-16

# **ORGANIZATION**

Revised standard specifications are under headings that correspond with the main-section headings of the *Standard Specifications*. A main-section heading is a heading shown in the table of contents of the *Standard Specifications*. A date under a main-section heading is the date of the latest revision to the section.

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*.

# DIVISION I GENERAL PROVISIONS 1 GENERAL

07-15-16

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

07-15-16

APCD	air pollution control district
AQMD air quality management district	
CISS	cast-in-steel shell
CSL	crosshole sonic logging
GGL	gamma-gamma logging

# 7 LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

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07-15-16

Replace the paragraphs in section 7-1.02I(2) with:

05-06-16

Under 2 CA Code of Regs § 11105:

1. During the performance of this contract, the recipient, contractor, and its subcontractors shall not deny the contract's benefits to any person on the basis of race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, genetic information, marital status, sex, gender, gender identity, gender expression, age, sexual orientation, or military and veteran status, nor shall they discriminate unlawfully against any employee or applicant for employment because of race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, genetic information, marital status, sex, gender, gender identity, gender

- expression, age, sexual orientation, or military and veteran status. Contractor shall insure that the evaluation and treatment of employees and applicants for employment are free of such discrimination.
- Contractor shall comply with the provisions of the Fair Employment and Housing Act (Gov. Code, § 12900 et seq.), the regulations promulgated thereunder (Cal. Code Regs., tit. 2, § 11000 et seq.), the provisions of Article 9.5, Chapter 1, Part 1, Division 3, Title 2 of the Government Code (Gov. Code, §§ 11135-11139.5), and the regulations or standards adopted by the awarding state agency to implement such article.
- 3. Contractor or recipient shall permit access by representatives of the Department of Fair Employment and Housing and the awarding state agency upon reasonable notice at any time during the normal business hours, but in no case less than 24 hours' notice, to such of its books, records, accounts, and all other sources of information and its facilities as said Department or Agency shall require to ascertain compliance with this clause.
- 4. Recipient, contractor and its subcontractors shall give written notice of their obligations under this clause to labor organizations with which they have a collective bargaining or other agreement.
- 5. The contractor shall include the nondiscrimination and compliance provisions of this clause in all subcontracts to perform work under the contract.

Under 2 CA Code of Regs § 11122:

# STANDARD CALIFORNIA NONDISCRIMINATION CONSTRUCTION CONTRACT SPECIFICATIONS (GOV. CODE SECTION 12990)

These specifications are applicable to all state contractors and subcontractors having a construction contract or subcontract of \$5,000 or more.

- 1. As used in the specifications:
  - a. "Act" means the Fair Employment and Housing Act.
  - b. "Administrator" means Administrator, Office of Compliance Programs, California Department of Fair Employment and Housing, or any person to whom the Administrator delegates authority;
- 2. Whenever the contractor or any subcontractor subcontracts a portion of the work, it shall include in each subcontract of \$5,000 or more the nondiscrimination clause in this contract directly or through incorporation by reference. Any subcontract for work involving a construction trade shall also include the Standard California Construction Contract Specifications, either directly or through incorporation by reference.
- 3. The contractor shall implement the specific nondiscrimination standards provided in paragraphs 6(a) through (e) of these specifications.
- 4. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the contractor has a collective bargaining agreement, to refer members of any group protected by the Act shall excuse the contractor's obligations under these specifications, Government Code section 12990, or the regulations promulgated pursuant thereto.5. In order for the nonworking training hours of apprentices and trainees to be counted, such apprentices and trainees must be employed by the contractor during the training period, and the contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor or the California Department of Industrial Relations.
- 5. In order for the nonworking training hours of apprentices and trainees to be counted, such apprentices and trainees must be employed by the contractor during the training period, and the contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor or the California Department of Industrial Relations.
- 6. The contractor shall take specific actions to implement its nondiscrimination program. The evaluation of the contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The contractor must be able to demonstrate fully its efforts under steps a. through e. below:
  - a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and at all facilities at which the contractor's employees are assigned to work. The contractor shall specifically ensure that all foremen, superintendents, and other on-site

- supervisory personnel are aware of and carry out the contractor's obligations to maintain such a working environment.
- b. Provide written notification within seven days to the director of the DFEH when the referral process of the union or unions with which the contractor has a collective bargaining agreement has impeded the contractor's efforts to meet its obligations.
- c. Disseminate the contractor's equal employment opportunity policy by providing notice of the policy to unions and training, recruitment and outreach programs and requesting their cooperation in assisting the contractor to meet its obligations; and by posting the company policy on bulletin boards accessible to all employees at each location where construction work is performed.
- d. Ensure all personnel making management and employment decisions regarding hiring, assignment, layoff, termination, conditions of work, training, rates of pay or other employment decisions, including all supervisory personnel, superintendents, general foremen, on-site foremen, etc., are aware of the contractor's equal employment opportunity policy and obligations, and discharge their responsibilities accordingly.
- e. Ensure that seniority practices, job classifications, work assignments, and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the equal employment opportunity policy and the contractor's obligations under these specifications are being carried out.
- 7. Contractors are encouraged to participate in voluntary associations that assist in fulfilling their equal employment opportunity obligations. The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under these specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on equal employment opportunity in the industry, ensures that the concrete benefits of the program are reflected in the contractor's workforce participation, and can provide access to documentation that demonstrates the effectiveness of actions taken on behalf of the contractor. The obligation to comply, however, is the contractor's.
- 8. The contractor is required to provide equal employment opportunity for all persons. Consequently, the contractor may be in violation of the Fair Employment and Housing Act (Government Code section 12990 et seq.) if a particular group is employed in a substantially disparate manner.
- 9. The contractor shall not use the nondiscrimination standards to discriminate against any person because race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, genetic information, marital status, sex, gender, gender identity, gender expression, age, sexual orientation, or military and veteran status.
- 10. The contractor shall not enter into any subcontract with any person or firm decertified from state contracts pursuant to Government Code section 12990.
- 11. The contractor shall carry out such sanctions and penalties for violation of these specifications and the nondiscrimination clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Government Code section 12990 and its implementing regulations by the awarding agency. Any contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Government Code section 12990.
- 12. The contractor shall designate a responsible official to monitor all employment related activity to ensure that the company equal employment opportunity policy is being carried out, to submit reports relating to the provisions hereof as may be required by OCP and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, status, (e.g., mechanic, apprentice trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in any easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

# Add to the end of the 2nd sentence in the 1st paragraph of section 7-1.02K(1):

04-22-16

, and hauling and delivery of ready-mixed concrete.

# Add between the 4th and 5th paragraphs of section 7-1.02K(3):

04-22-16

Submitted certified payrolls for hauling and delivering ready-mixed concrete must be accompanied by a written time record. The time record must include:

- 1. Truck driver's full name and address
- 2. Name and address of the factory or batching plant
- 3. Time the concrete was loaded at the factory or batching plant
- 4. Time the truck returned to the factory or batching plant
- 5. Truck driver's signature certifying under penalty of perjury that the information contained in this written time record is true and correct

#### Add between the 9th and 10th paragraphs of section 7-1.03:

07-15-16

If a height differential of more than 0.04 foot is created by construction activities at a joint transverse to the direction of traffic on the traveled way or a shoulder subject to public traffic, construct a temporary taper at the joint with a slope complying with the requirements shown in the following table:

**Temporary Tapers** 

Height differential	Slope (horizontal:vertical)	
(foot)	Taper use of 14 days or less	Taper use of more than 14 days
Greater than 0.08	100:1 or flatter	200:1 or flatter
0.04-0.08	70:1 or flatter	70:1 or flatter

For a taper on existing asphalt concrete or concrete pavement, construct the taper with minor HMA under section 39-2.07.

Grind existing surfaces to accommodate a minimum taper thickness of 0.10 foot under either of the following conditions:

- 1. HMA material such as rubberized HMA, polymer-modified bonded wearing course, or open-graded friction course is unsuitable for raking to a maximum 0.02 foot thickness at the edge
- 2. Taper will be in place for more than 14 days

For a taper on a bridge deck or approach slab, construct the taper with polyester concrete under section 60-3.04B.

The completed surface of the taper must be uniform and must not vary more than 0.02 foot from the lower edge of a 12-foot straightedge when placed on its surface parallel and perpendicular to traffic.

If authorized, you may use alternative materials or methods to construct the required taper.

# Replace § 337.15 in the 3rd item in the list in the paragraph of section 7-1.06B with:

05-06-16

§ 337.1

#### Add between the 1st and 2nd paragraphs of section 7-1.11A:

02-12-16

Comply with 46 CFR 381.7(a)–(b).

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#### 8 PROSECUTION AND PROGRESS

07-15-16

Replace the table in the 3rd paragraph of section 8-1.10A with:

07-15-16

Liquidated Damage	es
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Total bid		Liquidated damages
From over	То	per day
\$0	\$60,000	\$1,400
\$60,000	\$200,000	\$2,900
\$200,000	\$500,000	\$3,200
\$500,000	\$1,000,000	\$3,500
\$1,000,000	\$2,000,000	\$4,000
\$2,000,000	\$5,000,000	\$4,800
\$5,000,000	\$10,000,000	\$6,800
\$10,000,000	\$20,000,000	\$10,000
\$20,000,000	\$50,000,000	\$13,500
\$50,000,000	\$100,000,000	\$19,200
\$100,000,000	\$250,000,000	\$25,300

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#### 9 PAYMENT

01-15-16

Replace may withhold in the 1st paragraph of section 9-1.16E(4) with:

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01-15-16

withholds

# DIVISION II GENERAL CONSTRUCTION 10 GENERAL

04-15-16 **Replace section 10-1.02B with:** 

04-15-16

#### 10-1.02B Traffic Elements

Before starting the operational test of a traffic management system that directly impacts traffic, the system must be ready for operation, and all signs, pavement delineation, and pavement markings must be in place at the system's location.

If maintaining existing traffic management system elements during construction is shown on the Bid Item List, a list of the systems shown within the project limits and their operational status is included in the *Information Handout*. Before starting job site activities, conduct a preconstruction operational status check of the existing system's elements and each element's communication status with the transportation management center to which it communicates. If an existing system element is discovered and has not been identified, the Department adds the element to the list of systems. The pre- and postconstruction operational status check of the discovered elements is change order work.

If maintaining existing traffic management system elements during construction is not shown on the Bid Item List and an existing system element is discovered during the work, notify the Engineer. The Engineer orders a pre- and postconstruction operational status check of the discovered elements. The status check of the discovered elements is change order work.

Conduct the status check with the Engineer and an electrical representative from the traffic operations office of the district in which the work is located. The Department provides you a list of the preconstruction operational status-check results, including:

- 1. Existing traffic management system elements and their locations within the project limits
- 2. Fully functioning elements
- 3. Nonoperational elements

Before Contract acceptance, conduct a postconstruction operational status check of all elements shown on the list with the Engineer and an electrical representative from the traffic operations office of the district in which the work is located.

# Replace 10-3 of section 10 with:

04-15-16

#### 10-2-10-3 RESERVED

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# 12 TEMPORARY TRAFFIC CONTROL

07-15-16 **Replace section 12-3.32 with:** 

04-15-16

#### 12-3.32 PORTABLE CHANGEABLE MESSAGE SIGNS

12-3.32A General

12-3.32A(1) Summary

Section 12-3.32A includes specifications for placing portable changeable message signs.

#### 12-3.32A(2) Definitions

Reserved

#### 12-3.32A(3) Submittals

If requested, submit a certificate of compliance for each PCMS.

Submit your cell phone number before starting the first activity that requires a PCMS.

#### 12-3.32A(4) Quality Assurance

Reserved

#### 12-3.32B Materials

Each PCMS must have a message board, controller unit, power supply, and a structural support system. The unit must be assembled to form a complete self-contained PCMS that can be delivered to the job site and placed into immediate operation. The sign unit must be capable of operating at an ambient air temperature from -4 to 158 degrees F and must be unaffected by mobile radio transmissions other than those required to control the PCMS.

A PCMS must be permanently mounted on a trailer, truck bed, or truck cab under the manufacturer's instructions. The PCMS must be securely mounted on the support vehicle such that it remains attached during any impact to the vehicle. If it is mounted on a trailer, the trailer must be capable of being leveled and plumbed.

A minimum of 3 feet of retroreflective material must be permanently affixed on all 4 sides of the trailer. The retroreflective material need not be continuous but must be visible on the same plane.

The sign panel must be capable of displaying a 3-line message with at least 7 characters per line. The characters must be at least 18 inches in height where the useable shoulder area is at least 15 feet wide.

To prevent encroachment onto the traveled way where the useable shoulder area is less than 15 feet wide, you may use a smaller message panel with at least 12-inch-high characters.

The message displayed on the sign must be visible from a distance of 1,500 feet and legible from a distance of 750 feet at noon on a cloudless day and during the night by persons with 20/20 vision or vision corrected to 20/20.

The characters on a sign panel may be 10 inches in height if:

- 1. PCMS is mounted on a service patrol truck or other incident response vehicle or used for traffic control operations on a highway facility where the posted speed limit is less than 40 mph
- 2. Message is legible from a distance of at least 650 feet at noon on a cloudless day and during the night by persons with 20/20 vision or vision corrected to 20/20

A matrix sign must provide a complete alphanumeric selection.

A PCMS must automatically adjust its brightness under varying light conditions to maintain the legibility of the message. The sign must be equipped with an automatic-dimming mode that automatically compensates for the influence of temporary light sources or abnormal lighting conditions. The sign must have 3 or more manual dimming modes of different intensities.

During the hours of darkness, a matrix sign not using lamps must be either internally or externally illuminated.

The controller must be an all solid-state unit containing the necessary circuitry for the storage of at least 5 preprogrammed messages. The controller must be installed at a location that allows the operator to perform all functions from a single position. The controller must have a keyboard entry system that allows the operator to generate an infinite number of additional messages in addition to the preprogrammed stored messages. The keyboard must be equipped with a security lockout feature to prevent unauthorized use of the controller.

The controller must have:

- 1. Nonvolatile memory that stores keyboard-created messages during periods when the power is not activated
- 2. Variable display rate that allows the operator to match the information display to the speed of approaching traffic
- 3. Screen upon which messages may be reviewed before being displayed on the sign

The flashing-off time must be adjustable from within the control cabinet.

#### 12-3.32C Construction

Place a PCMS as far from the traveled way as practicable where it is legible to approaching traffic without encroaching on the traveled way. Where the vertical roadway curvature restricts the sight distance of approaching traffic, place the sign on or before the crest of the curvature where it is most visible to the approaching traffic. Where the horizontal roadway curvature restricts the sight distance of approaching traffic, place the sign at or before the curve where it is most visible to approaching traffic. Where practicable, place the sign behind guardrail or Type K temporary railing.

Make a taper consisting of 9 traffic cones placed 25 feet apart to delineate the location of a PCMS except where the sign is placed behind guardrail or Type K temporary railing.

When in full operation, the bottom of a sign must be at least 7 feet above the roadway in areas where pedestrians are anticipated and 5 feet above the roadway elsewhere, and the top of the sign must be not more than 14.5 feet above the roadway.

Operate the PCMS under the manufacturer's instructions.

Keep the PCMS clean to provide maximum visibility.

If multiple signs are needed, place each sign on the same side of the road at least 1,000 feet apart on freeways and expressways and at least 500 feet apart on other types of highways.

If more than one PCMS is simultaneously visible to traffic, only 1 sign may display a sequential message at any time. Do not use dynamic message displays, such as animation, rapid flashing, dissolving, exploding, scrolling, horizontal movement, or vertical movement of messages. The message must be centered within each line of the display.

You may use an additional PCMS if more than 2 phases are needed to display a message.

Display only messages shown or ordered.

Repeat the entire message continuously in not more than 2 phases of at least 3 seconds per phase. The sum of the display times for both of the phases must be a maximum of 8 seconds. If more than 2 phases are needed to display a message, use an additional PCMS.

You must be available by cell phone during activities that require a sign. Be prepared to immediately change the displayed message if ordered. You may operate the sign with a 24-hour timer control or remote control if authorized.

After the initial placement, move a sign from location to location as ordered.

When a PCMS is not in use, move it to an area at least 15 feet from the edge of the traveled way or remove it from the job site away from traffic.

#### **12-3.32D Payment**

Not Used

# Add between the 1st sentence and 2nd sentences in the 1st paragraph of section 12-4.02A(3)(a):

07-15-16

For a project in District 7, submit the request at least 15 days before the proposed closure date.

#### Replace section 12-4.02C(2) with:

01-15-16

# 12-4.02C(2) Lane Closure System 12-4.02C(2)(a) General

The Department provides LCS training. Request the LCS training at least 30 days before submitting the 1st closure request. The Department provides the training within 15 days after your request.

LCS training is web-based or held at a time and location agreed upon by you and the Engineer. For web-based training, the Engineer provides you the website address to access the training.

With 5 business days after completion of the training, the Department provides LCS accounts and user IDs to your assigned, trained representatives.

Each representative must maintain a unique password and current user information in the LCS.

04-15-16

The project is not accessible in LCS after Contract acceptance.

01-15-16

#### 12-4.02C(2)(b) Status Updates for Authorized Closures

Update the status of authorized closures using the LCS Mobile web page.

For a stationary closure, use code:

- 1. 10-97 immediately before you place the 1st advance warning sign
- 2. 10-98 immediately after you remove all of the advance warning signs

For a moving closure, use code:

- 1. 10-97 immediately before the actual start time of the closure
- 2. 10-98 immediately after the actual end time of the closure

Cancel an authorized closure by using code 10-22 within 2 hours after the authorized start time.

If you are unable to access the LCS Mobile web page, immediately notify the Engineer of the closure's status.

# Replace the 1st sentence in the 3rd paragraph of section 12-6.03A with:

07-15-16

When the Engineer determines the temporary pavement delineation is no longer required for the direction of traffic, remove the temporary pavement delineation, including any underlying adhesive for temporary pavement markers, from the final layer of surfacing and from the pavement to remain in place.

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# 13 WATER POLLUTION CONTROL

09-02-16

Replace *General Industrial Permit* in the 2nd item in the list in the paragraph of section 13-1.01C(3) with:

05-06-16

Industrial General Permit

# Replace the 2nd paragraph of section 13-1.01D(2) with:

05-06-16

Discharges from manufacturing facilities, such as batch plants and crushing plants, must comply with the discharge requirements in the NPDES General Permit for Storm Water Discharges Associated with Industrial Activities; Order No. 2014-0057-DWQ, CAS000001 (Industrial General Permit), issued by the SWRCB. For the Industrial General Permit, go to the SWRCB website.

# Replace General Industrial Permit in the 3rd paragraph of section 13-1.01D(2) with:

05-06-16

Industrial General Permit

# Replace the 2nd paragraph of section 13-3.01D(2) with:

09-02-16

For a project in the Lake Tahoe Hydrologic Unit, discharges of stormwater from the project must comply with the NPDES General Permit for General Waste Discharge Requirements and National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity in the Lake Tahoe Hydrologic Unit, Counties of Alpine, El Dorado, and Placer, (Order No. R6T-2016-0010 and NPDES No. CAG616002). You may view the General Permit for the Lake Tahoe Hydrologic Unit at the Construction Storm Water Program page of the SWRCB website.

# Replace the 2nd paragraph of section 13-8.01D(2) with:

09-02-16

For a project within the Lake Tahoe Hydrologic Unit, the design, installation, operation, and monitoring of the temporary ATS and monitoring of the treated effluent must comply with Attachment E of the NPDES General Permit for General Waste Discharge Requirements and National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity in the Lake Tahoe Hydrologic Unit, Counties of Alpine, El Dorado, and Placer, (Order No. R6T-2016-0010 and NPDES No. CAG616002). You may view the General Permit for the Lake Tahoe Hydrologic Unit at the Construction Storm Water Program page of the SWRCB website.

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#### 16 TEMPORARY FACILITIES

04-15-16

# Add between the 1st and 2nd sentences of section 16-2.03A(1):

04-15-16

Constructing a high-visibility fence includes the installation of any signs specified in the special provisions.

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# DIVISION III EARTHWORK AND LANDSCAPE 20 LANDSCAPE

07-15-16

Replace 86 in the 1st paragraph of section 20-2.01C(2) with:

04-15-16

# Replace the 8th paragraph of section 20-2.01C(2) with:

07-15-16

Trenches for irrigation supply lines and conduits 3 inches and larger in diameter must be a minimum of 18 inches below the finished grade, measured to the top of the installed pipe.

#### Replace 86 in the 1st paragraph of section 20-2.01C(3) with:

87

87

04-15-16

#### Replace section 20-2.04A(4) with:

04-15-16

Perform conductors test. The test must comply with the specifications in section 87.

Where the conductors are installed by trenching and backfilling, perform the test after a minimum of 6 inches of backfill material has been placed and compacted over the conductors.

#### Replace the 1st paragraph of section 20-2.04C(4) with:

04-15-16

Splice low voltage control and neutral conductors under section 87, except do not use Method B.

#### Replace the 3rd paragraph of section 20-2.05B with:

07-15-16

The impeller must be glass reinforced nylon on a tungsten carbide shaft.

#### Replace 86 in the 2nd paragraph of section 20-2.06C with:

04-15-16

87

# Replace section 20-2.07B(5) with:

04-15-16

#### 20-2.07B(5) PVC Pipe Conduit Sleeve

PVC pipe conduit sleeves must be schedule 40 complying with ASTM D1785.

Fittings must be schedule 80.

#### Replace section 20-2.07C(3) with:

04-15-16

#### 20-2.07C(3) PVC Pipe Conduit Sleeve

Where PVC pipe conduit sleeves 2 inches or less in outside diameter is installed under surfacing, you may install by directional boring under section 20-2.07C(2)(b).

For sleeves 2 inches or less in diameter, the top of the conduit must be a minimum of 18 inches below surfacing.

Extend sleeves 6 inches beyond surfacing. Cap ends of conduit until used.

#### Replace sections 20-2.09B and 20-2.09C with:

07-15-16

# 20-2.09B Materials 20-2.09B(1) General

Swing joints must match the inlet connection size of the riser.

Where shown, a sprinkler assembly must include a check valve.

Threaded nipples for swing joints and risers must be schedule 80, PVC 1120 or PVC 1220 pipe, and comply with ASTM D1785. Risers for sprinkler assemblies must be UV resistant.

Fittings for sprinkler assemblies must be injection-molded PVC, schedule 40, and comply with ASTM D2466.

Flexible hose for sprinkler assemblies must be leak-free, non-rigid and comply with ASTM D2287, cell Type 6564500. The hose must comply with ASTM D2122 and have the thickness shown in the following table:

Nominal hose diameter	Minimum wall thickness
(inch)	(inch)
1/2	0.127
3/4	0.154
1	0.179

Solvent cement and fittings for flexible hose must comply with section 20-2.08B(5).

#### 20-2.09B(2) Pop-Up Sprinkler Assemblies

Each pop-up sprinkler assembly must include a body, nozzle, swing joint, pressure reducing device, fittings, and sprinkler protector where shown.

# 20-2.09B(3) Riser Sprinkler Assemblies

Each riser sprinkler assembly must include a body, flexible hose, threaded nipple, nozzle, swing joint (except for a Type V riser), pressure reducing device, fittings, and riser support where shown.

# 20-2.09B(4) Tree Well Sprinkler Assemblies

Each tree well sprinkler assembly must include a threaded nipple, nozzle, swing joint, fittings, perforated drainpipe, and drain grate.

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.

The drain grate must be a commercially-available, 1-piece, injection-molded 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. The gravel must be clean, washed, dry, and free from clay or organic material.

#### 20-2.09C Construction

Where shown, install a flow shut-off device under the manufacturer's instructions, unless you use equipment with a preinstalled flow shut-off device.

Where shown, install a pressure reducing device under the manufacturer's instructions, unless you use equipment with a preinstalled pressure reducing device.

Install pop-up and riser sprinkler assembly:

- 1. From 6-1/2 to 8 feet from curbs, dikes, and sidewalks
- 2. At least 10 feet from paved shoulders
- 3. At least 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.

# Replace the paragraph of section 20-2.10B(3) with:

07-15-16

Each check valve must be one of the following:

- 1. Schedule 80 PVC with a factory setting to withstand a minimum 7-foot head on risers
- 2. Class 200 PVC if used on a nonpressurized plastic irrigation supply line
- 3. Internal to the sprinkler body with a factory setting to withstand a minimum 7-foot head

# Replace the paragraph of section 20-2.10C(3) with:

07-15-16

Install check valves as necessary to prevent low-head drainage.

# Replace the paragraphs of section 20-3.01B(10) with:

07-15-16

Each plant stake for vines must be nominal 1 by 1 inch and 18 inches long.

Each plant stake for trees must be nominal 2 by 2 inches or nominal 2 inches in diameter and long enough to keep the tree in an upright position.

# Replace the paragraph of section 20-3.01B(11) with:

07-15-16

Each plant tie for vines must be extruded vinyl-based tape, 1 inch wide and at least 8 mils thick.

Each plant tie for trees must be a (1) minimum 3/4-inch-wide, UV-resistant, flexible vinyl tie complying with ASTM D412 for tensile and elongation strength, or (2) lock-stitch, woven polypropylene with a minimum 900 lb tensile strength.

# Add between the 7th and 8th paragraphs of section 20-3.02C(3)(b):

07-15-16

Spread the vine shoots and tie them with a plant tie to each stake above the crossing point.

# Replace the 8th paragraph of section 20-3.02C(3)(b) with:

07-15-16

Tie trees to the stakes with 2 tree ties, 1 tie to each stake. Each tie must form a figure eight by crossing the tie between the tree and the stake. Install ties at the lowest position that will support the tree in an upright position. Install the ties such that they provide trunk flexibility but do 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 or nail it to the stake.

# Replace the 1st paragraph of section 20-5.02C(1) with:

07-15-16

Where edging is used to delineate the limits of inert ground cover or wood mulch areas, install the edging before installing the inert ground cover or wood mulch.

07-15-16

Delete AND MULCHES in the heading of section 20-5.03.

07-15-16

Delete and mulches in the paragraph of section 20-5.03A(1)(a).

# Replace the paragraph of section 20-5.03A(3)(a) with:

07-15-16

Before installing inert ground cover, remove plants and weeds to the ground level.

07-15-16

Delete or mulch at each occurrence in sections 20-5.03A(3)(c) and 20-5.03A(3)(d).

Replace section 20-5.03E with:

20-5.03E Reserved

Replace section 20-5.04 with:

07-15-16

07-15-16

20-5.04 WOOD MULCH

20-5.04A General

20-5.04A(1) Summary

Section 20-5.04 includes specifications for placing wood mulch.

20-5.04A(2) Definitions

Reserved

#### 20-5.04A(3) Submittals

Submit a certificate of compliance for wood mulch.

Submit a 2 cu ft mulch sample with the mulch source shown on the bag. Obtain authorization before delivering the mulch to the job site.

#### 20-5.04A(4) Quality Assurance

Reserved

#### 20-5.04B Materials

#### 20-5.04B(1) 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 chemical residues harmful to plant or animal life.

# 20-5.04B(2) Tree Bark Mulch

Tree bark mulch must be derived from cedar, Douglas fir, or redwood species.

The mulch must be ground such that at least 95 percent of the material by volume is less than 2 inches long in any dimension and no more than 30 percent by volume is less than 1 inch long in any dimension.

#### 20-5.04B(3) 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 by volume of wood chips with a width and thickness from 1/16 to 3/8 inch and a length from 1/2 to 3 inches

# 20-5.04B(4) 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 by volume of wood strands with a width and thickness from 1/8 to 1-1/2 inches and a length from 2 to 8 inches

# 20-5.04B(5) 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 by volume of material less than 3 inches long for any dimension and not more than 30 percent by volume of material less than 1 inch long for any dimension

#### 20-5.04B(6)-20-5.04B(11) Reserved

#### 20-5.04C Construction

Before placing wood mulch, remove plants and weeds to the ground level.

Maintain the planned flow lines, slope gradients, and contours of the job site. Grade the subgrade to a smooth and uniform surface.

Place mulch after the plants have been planted.

Place mulch in the plant basin at the rate described. Mulch must not come in contact with the plant crown and stem.

Place mulch as shown in areas outside of plant basins to a uniform thickness.

Spread mulch from the outside edge of the plant basin to the adjacent edges of shoulders, paving, retaining walls, dikes, edging, curbs, sidewalks, walls, fences, and existing plantings. If the plant is 12 feet or more from the adjacent edges of any of these elements, spread the mulch 6 feet beyond the outside edge of the plant 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

#### 20-5.04D Payment

The payment quantity for wood mulch is the volume measured in the vehicle at the point of delivery.

^^^^^

# 21 EROSION CONTROL

07-15-16

Add between tube and 12 in the 1st paragraph of section 21-2.02Q:

07-15-16

8 or

# DIVISION IV SUBASES AND BASES 23 GENERAL

07-15-16

Replace the headings and paragraphs in section 23 with:

07-15-16

23-1 GENERAL

#### 23-1.01 GENERAL

#### 23-1.01A Summary

Section 23 includes general specifications for constructing subbases and bases.

#### 23-1.01B Definitions

Reserved

#### 23-1.01C Submittals

Submit a QC plan for the types of subbases or bases where described.

#### 23-1.01D Quality Assurance

23-1.01D(1) General

# 23-1.01D(1)(a) General

Take samples under California Test 125.

# 23-1.01D(1)(b) Test Result Disputes

You and the Engineer must work together to avoid potential conflicts and to resolve disputes regarding test result discrepancies. Notify the Engineer within 5 business days of receiving the test result if you dispute the test result.

If you or the Engineer dispute each other's test results, submit your test results and copies of paperwork including worksheets used to determine the disputed test results. An independent third party performs referee testing. Before the independent third party participates in a dispute resolution, it must be qualified under AASHTO Materials Reference Laboratory program and the Department's Independent Assurance Program. The independent third party must have no prior direct involvement with this Contract. By mutual agreement, the independent third party is chosen from:

- 1. Department laboratory in a district or region not in the district or region the project is located
- 2. Transportation Laboratory
- 3. Laboratory not currently employed by you or your material producer

If split acceptance samples are not available, the independent third party uses any available material representing the disputed material for evaluation.

If the independent third party determines the Department's test results are valid, the Engineer deducts the independent third party testing costs from payments. If the independent third party determines your test results are valid, the Department pays the independent third party testing costs.

#### 23-1.01D(2) Quality Control

# 23-1.01D(2)(a) General

Provide a QC manager when the quantity of subbase or base is as shown in the following table:

#### **QC Manager Requirements**

Subbase or base	Requirement
Stabilized soil (sq yd)	≥ 20,000
Aggregate subbases (cu yd)	≥ 20,000
Aggregate bases (cu yd)	≥ 20,000
CTB (cu yd)	≥ 10,000
Lean concrete base (cu yd)	≥ 2,000
Rapid strength concrete base (cu yd)	≥ 1,000
Lean concrete base rapid setting (cu yd)	≥ 1,000
Concrete base (cu yd)	≥ 1,000
Treated permeable bases (cu yd)	≥ 2,000
Reclaimed pavements (sq yd)	≥ 10,000

Provide a testing laboratory to perform quality control tests. Maintain sampling and testing equipment in proper working condition.

You are not entitled to compensation for the suspension of work resulting from noncompliance with quality control requirements, including those identified within the QC plan.

# 23-1.01D(2)(b) Quality Control Plan

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 outside of those limits. Suspension limits must not exceed specified acceptance criteria.

The QC plan must describe how test results will be submitted including times for sampling and testing for each quality characteristic.

#### 23-1.01D(2)(c) Qualifications

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

Personnel performing sampling and testing must be qualified under the Department's Independent Assurance Program for the sampling and testing performed.

# 23-1.01D(3) Department Acceptance

Reserved

#### **23-1.02 MATERIALS**

Not Used

#### 23-1.03 CONSTRUCTION

Not Used

#### 23-1.04 PAYMENT

Not Used

#### 23-2-23-7 RESERVED

#### ^^^^^

# 24 STABILIZED SOILS

07-15-16

Add to section 24-1.01C(1):

07-15-16

Submit a stabilized soil quality control plan.

# Add to section 24-1.01D(1):

07-15-16

Construct test pads for compaction tests by scraping away material to the depth ordered. If a compaction test fails, corrective action must include the layers of material already placed above the test pad elevation.

# Replace section 24-1.01D(2) with:

07-15-16

24-1.01D(2) Quality Control 24-1.01D(2)(a) General

Reserved

24-1.01D(2)(b) Quality Control Plan

Reserved

24-1.01D(2)(c) Qualifications

Reserved

# 24-1.01D(2)(d) Preparing Basement Material

After preparing an area for soil stabilization, verify the surface grades.

#### 24-1.01D(2)(e) Mixing

Except for clods larger than 1 inch, randomly test the adequacy of the mixing with a phenolphthalein pH indicator solution.

# Replace the 1st paragraph of section 24-1.03C with:

07-15-16

The Engineer orders the application rate as pounds of stabilizing agent per square yard of basement material to be stabilized.

07-15-16

Delete section 24-2.01D(1)(c)

# Replace 250 in the 2nd sentence in the 2nd paragraph of section 24-2.01D(2)(c) with:

07-15-16

500

07-15-16

# 24-2.01D(2)(d) Quality Control Testing

Lime stabilized soil quality control must include testing the quality characteristics at the frequencies shown in the following table:

# **QC Testing Frequencies**

Quality characteristic	Test method	Sampling location	Minimum frequency
Ground surface temperature before adding lime and full depth ground temperature during mixing operations		Each temperature location	1 test per 20,000 sq ft, minimum 1 per day
Lime application rate	Calibrated tray or equal	Roadway	1 test per 40,000 sq ft, minimum 2 per day
Gradation on mixed material	California Test 202	Roadway	1 per 500 cu yd, minimum 1 per day
Moisture content	California Test 226	Roadway	1 per 500 cu yd on each layer, each day during mixing and mellowing periods, minimum 1 per day
Relative compaction	California Test 231	Roadway	1 per 500 cu yd on each layer, minimum 1 per day

^^^^^

# **25 AGGREGATE SUBBASES**

07-15-16

Replace Reserved in section 25-1.01C with:

07-15-16

Submit an aggregate subbase QC plan.

# Replace Reserved in section 25-1.01D(2) with:

07-15-16

25-1.01D(2)(a) General

Reserved

25-1.01D(2)(b) Quality Control Plan

Reserved

25-1.01D(2)(c) Qualifications

Reserved

# 25-1.01D(2)(d) Quality Control Testing

AS quality control must include testing the quality characteristics at the frequencies shown in the following table:

QC Testing Frequencies				
Quality characteristic	Test method	Sampling location	Minimum frequency	
R-value	California Test 301	Stockpiles, transportation units, windrows, or roadways	1 test before beginning work and every 2000 cu yd thereafter <sup>a</sup>	
Aggregate gradation	California Test 202	Stockpiles, transportation units, windrows, or roadways	1 per 500 cu yd but at least one per	
Sand equivalent	California Test 217	Stockpiles, transportation units, windrows, or roadways	day of placement	
Relative compaction	California Test 231	Roadway	1 per 500 sq yd on each layer	

<sup>&</sup>lt;sup>a</sup>Additional R-value frequency testing will not be required when the average of 4 consecutive sand equivalent tests is 4 or more above the specified operating range value.

# Add between the 2nd and 3rd paragraphs of section 25-1.01D(3):

07-15-16

The Engineer takes aggregate subbase samples for R-value, aggregate gradation, and sand equivalent from any of the following locations:

- 1. Windrow
- 2. Roadway

07-15-16

Delete for each noncompliant test result in the 4th paragraph of section 25-1.01D(3).

07-15-16

Delete a in the 5th paragraph of section 25-1.01D(3).

^^^^^

# **26 AGGREGATE BASES**

07-15-16

Replace Reserved in section 26-1.01C with:

Submit an aggregate base QC plan.

07-15-16

# Replace Reserved in section 26-1.01D(1) with:

07-15-16

Aggregate samples must not be treated with lime, cement, or chemicals before testing for durability index. Aggregate from untreated reclaimed processed AC, PCC, LCB, or CTB is not considered treated.

07-15-16

26-1.01D(2)(a) General

Reserved

26-1.01D(2)(b) Quality Control Plan

Reserved

26-1.01D(2)(c) Qualifications

Reserved

# 26-1.01D(2)(d) Quality Control Testing

AB quality control must include testing the quality characteristics at the frequencies shown in the following table:

**QC Testing Frequencies** 

Quality characteristic	Test method	Sampling location	Minimum frequency
R-value	California Test 301	Stockpiles, transportation units, windrows, or roadways	1 test before starting work and every 2,000 cu yd thereafter <sup>a</sup>
Aggregate gradation	California Test 202	Stockpiles, transportation units, windrows, or roadways	1 per 500 cu yd but at least one per day of placement
Sand equivalent  Durability index <sup>b</sup>	California Test 217  California Test 229	Stockpiles, transportation units, windrows, or roadways Stockpiles, transportation units, windrows, or roadways	1 per project
Relative compaction	California Test 231	Roadway	1 per 500 sq yd on each layer

<sup>&</sup>lt;sup>a</sup>Additional R-value frequency testing will not be required when the average of 4 consecutive sand equivalent tests is 29 or greater for Class 2 AB or 25 or greater for Class 3 AB.

# Add between requirements, and and in the 1st paragraph of section 26-1.01D(3):

07-15-16

durability,

# Add between the 2nd and 3rd paragraphs of section 26-1.01D(3):

07-15-16

The Engineer takes aggregate base samples for R-value, aggregate gradation, sand equivalent, and durability index from any of the following locations:

- 1. Windrow
- Roadway

07-15-16

Delete the 3rd paragraph of section 26-1.01D(3).

<sup>&</sup>lt;sup>b</sup>Applies if section 26-1.02 contains an applicable requirement for durability index

#### ^^^^^^

# **27 CEMENT TREATED BASES**

07-15-16
Add to section 27-1.01C:

Submit cement treated base QC plan.

07-15-16

# Replace the headings and paragraphs in section 27-1.01D with:

07-15-16

# 27-1.01D Quality Assurance 27-1.01D(1) General

After the CTB has been spread on the subgrade and before initial compaction, the cement content of the completed mixture of CTB must not vary from the specified cement content by more than 0.6 percent of the weight of the dry aggregate when tested under California Test 338.

For Class A CTB, compaction is tested under California Test 312 or 231.

The relative compaction of CTB must be at least 95 percent. Each layer of CTB may be tested for compaction, or all layers may be tested together at the option the Engineer. If all layers are tested together, you are not relieved of the responsibility to achieve the required compaction in each layer placed.

# 27-1.01D(1)(a) Aggregate

When tested under California Test 301, aggregate for Class B CTB must have (1) an R-value of at least 60 before mixing with cement and (2) an R-value of at least 80 when aggregate is mixed with an amount of cement that does not exceed 2.5 percent by weight of the dry aggregate.

Before sand equivalent testing, aggregate samples must not be treated with lime, cement, or chemicals.

If the aggregate gradation test results, the sand equivalent test results, or both comply with contract compliance requirements but not operating range requirements, you may continue placing CTB for the remainder of the work day. Do not place additional CTB until you demonstrate to the Engineer that the CTB to be placed complies with the operating range requirements.

If the aggregate gradation test results, sand equivalent test results, or both do not comply with contract compliance requirements, remove the CTB or request a payment deduction. If your request is authorized, \$2.50/cu yd is deducted. If CTB is paid for by weight, the Engineer converts tons to cubic yards for the purpose of reducing payment for noncompliant CTB left in place. An aggregate gradation and a sand equivalent test represents up to (1) 500 cu yd or (2) 1 day's production if less than 500 cu yd.

#### 27-1.01D(1)(b) Road-Mixed Cement Treated Base Moisture Content

Just before initial compaction the moisture content of the completed mixture must be at least the optimum moisture content less 1 percent. The moisture content is determined under California Test 226 and optimum moisture content is determined under California Test 312.

#### 27-1.01D(1)(c) Plant-Mixed Cement Treated Base Moisture Content

At the point of delivery to the work, the moisture content of the completed mixture must be at least the optimum moisture content less 1 percent. The moisture content is determined under California Test 226 and optimum moisture content under California Test 312.

27-1.01D(2) Quality Control 27-1.01D(2)(a) General

Reserved

27-1.01D(2)(b) Quality Control Plan

Reserved

# 27-1.01D(2)(c) Qualifications

Reserved

# 27-1.01D(2)(d) Quality Control Testing

CTB quality control must include testing the quality characteristics at the frequencies shown in the following table:

**QC Testing Frequencies** 

Quality characteristic	Test method	Sampling location	Minimum frequency
Aggregate gradation	California Test 202 modified	Stockpiles, plant, transportation units, windrow, or roadway	1 per 500 cu yd but at
Sand equivalent	California Test 217	Stockpiles, plant, transportation units, windrow, or roadway	least one per day of placement
R-value <sup>a</sup>	California Test 301	Stockpiles, plant, transportation units, windrows, or roadway	1 test before starting work and every 2000 cu yd thereafter <sup>b</sup>
Optimum moisture content	California Test 312	Plant, transportation units, windrow, or roadway	1 per day of placement
Moisture content	California Test 226	Roadway	1 per 500 cu yd but at least one per day of placement
Cement content	California Test 338	Windrows or roadway	1 per 1000 cu yd but at least one per day of placement
Relative compaction	California Test 312 or 231	Roadway	1 per 2000 sq yd but at least one per day of placement
Compressive strength <sup>c</sup>	California Test 312	Windrow or roadways	1 per day of placement

<sup>&</sup>lt;sup>a</sup>R-value is required for Class B CTB only

# 27-1.01D(3) Department Acceptance

The Department's acceptance testing includes testing the CTB quality characteristics shown in the following table:

**CTB Requirements for Acceptance** 

Quality characteristic	Test method
Aggregate gradation	California Test 202 modified
Sand equivalent	California Test 217
R-value <sup>a</sup>	California Test 301
Optimum moisture content	California Test 312
Moisture content	California Test 226
Cement content	California Test 338
Relative compaction	California Test 312 or 231
Compressive strength <sup>b</sup>	California Test 312

<sup>&</sup>lt;sup>a</sup>R-value is required for Class B CTB only

The Engineer takes samples for aggregate gradation and sand equivalent from any of the following locations:

1. Plant

<sup>&</sup>lt;sup>b</sup>Additional R-value frequency testing will not be required while the average of 4 consecutive sand equivalent tests is 4 or more above the specified operating range value.

<sup>&</sup>lt;sup>c</sup>Compressive strength is required for Class A CTB only when specified

<sup>&</sup>lt;sup>b</sup>Compressive strength is required for Class A CTB only when specified

- 2. Truck
- 3. Windrow, for road-mixed only
- 4. Roadbed, for road-mixed only

#### Add to section 27-1.02:

07-15-16

Water must comply with section 90-1.02D.

#### Add to section 27-1.03F:

07-15-16

The relative compaction of CTB must be at least 95 percent.

^^^^^

# **28 CONCRETE BASES**

07-15-16

Replace the headings and paragraphs in section 28-1.01D with:

07-15-16

# 28-1.01D Quality Assurance 28-1.01D(1) General

Aggregate samples must not be treated with lime, cement, or chemicals before testing for sand equivalent.

Stop concrete base activities and immediately notify the Engineer whenever:

- 1. Any QC or QA test result does not comply with the specifications
- 2. Visual inspection shows a noncompliant concrete base

If concrete base activities are stopped, before resuming activities:

- 1. Notify the Engineer of the adjustments you will make
- 2. Remedy or replace the noncompliant concrete base
- 3. Field qualify or construct a new test strip as specified for the concrete base involved to demonstrate compliance with the specifications
- 4. Obtain authorization

28-1.01D(2) Quality Control

28-1.01D(2)(a) General

Reserved

28-1.01D(2)(b) Quality Control Plan

Reserved

28-1.01D(2)(c) Qualifications

Reserved

28-1.01D(3) Department Acceptance

Reserved

#### Add to section 28-2.01C(1):

07-15-16

Submit a lean concrete base QC plan.

#### Replace the headings and paragraphs in section 28-2.01D with:

07-15-16

28-2.01D Quality Assurance 28-2.01D(1) General 28-2.01D(1)(a) General

The molds for compressive strength testing under ASTM C31 or ASTM C192 must be 6 by 12 inches.

If the aggregate gradation test results, sand equivalent test results or both comply with the contract compliance requirements but not the 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.

#### 28-2.01D(1)(b) Qualifications

Field qualification tests and calculations must be performed by an ACI certified "Concrete Laboratory Technician, Grade I.

# 28-2.01D(1)(c) Aggregate Qualification Testing

Qualify the aggregate for each proposed aggregate source and gradation. The qualification tests include (1) a sand equivalent and (2) an average 7-day compressive strength under ASTM C39 of 3 cylinders manufactured under ASTM C192 except cure cylinders in molds without lids after initial curing.

For the compressive strength test, the cement content for each cylinder must be 300 lb/cu yd. The 7-day average compressive strength must be at least 610 psi. The cement must be Type II portland cement.

LCB must have from 3 to 4 percent air content during aggregate qualification testing.

#### 28-2.01D(1)(d) 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 the authorized mix designs.

Notify the Engineer at least 5 business days before field qualification. Perform the field qualification at the job site or an authorized location.

Field qualification testing includes tests for compressive strength, air content, and penetration or slump.

For compressive strength field qualification testing:

- Prepare 12 cylinders under ASTM C31 except final cure cylinders in molds without lids 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 C39. 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 the LCB for compressive strength at 3 days. Prepare the compressive strength cylinders under ASTM C31 except final cure cylinders in molds without lids 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(2) Quality Control 28-2.01D(2)(a) General

Reserved

28-2.01D(2)(b) Quality Control Manager

Reserved

# 28-2.01D(2)(c) Quality Control Testing

Test the LCB under the test methods and at the locations and frequencies shown in the following table:

**LCB Sampling Location and Testing Frequencies** 

Quality characteristic	Test method	Sampling location	Minimum sampling and testing frequency	
Sand equivalent	ASTM D2419	Source	1 per 500 cubic yards but at least 1 per day of	
Aggregate gradation	ASTM C136			
Air content	ASTM C231			
Penetration <sup>a</sup>	ASTM C360			
Slump <sup>a</sup>	ASTM C143	Job site	production	
Compressive strength	ASTM C39 <sup>b</sup>			

<sup>&</sup>lt;sup>a</sup>Test for either penetration or slump

# 28-2.01D(3) Department Acceptance

The Department accepts LCB based on compliance with the requirements shown in the following table:

**LCB Requirements for Acceptance** 

Quality characteristic	Test method	Requirement
Compressive strength (min, psi at 7 days)	ASTM C39 <sup>a</sup>	530 b
		<u> </u>

<sup>&</sup>lt;sup>a</sup> Cylinders prepared under ASTM C31 except final cure cylinders in molds without lids.

# Replace section 28-2.01D(4) in item 3 of the 5th paragraph in section 28-2.03D with:

07-15-16

section 28-2.01D(1)(c)

# Replace the 1st paragraph in section 28-2.03F with:

07-15-16

After finishing LCB, cure LCB with pigmented curing compound under section 90-1.03B(3) and 40-1.03I. Apply curing compound:

- 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
- 4. At a rate of 1 gal/200 sq ft for the second application

#### Replace Reserved in section 28-3.01C(3) with:

07-15-16

Submit a rapid strength concrete base QC plan.

# Replace the headings and paragraphs in section 28-3.01D with:

07-15-16

28-3.01D Quality Assurance 28-3.01D(1) General 28-3.01D(1)(a) General

At the preconstruction meeting be prepared to discuss the project specifications and methods of performing each item of work. Items discussed must include the processes for:

- 1. Production
- 2. Transportation

<sup>&</sup>lt;sup>b</sup>Prepare cylinders under ASTM C31 except final cure cylinders in molds without lids.

<sup>&</sup>lt;sup>b</sup> 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.

- 3. Placement
- 4. QC plan, if specified in the special provisions
- 5. Contingency plan
- 6. QC sampling and testing
- 7. Acceptance criteria

Beams for modulus of rupture testing must be fabricated and tested under California Test 524. The beams may be fabricated using an internal vibrator under ASTM C31. For each test, 3 beam must be fabricated and the test results averaged. No single test represents more than that day's production or 130 cu yd, whichever is less.

For early age testing, beams must be cured so the monitored temperatures in the beams and the test strip are always within 5 degrees F. The internal temperatures of the RSC base and early age beams must be monitored and recorded at intervals of at least 5 minutes. Thermocouples or thermistors connected to strip-chart recorders or digital data loggers must be installed to monitor the temperatures. Temperature recording devices must be accurate to within ±2 degrees F. Until early age testing is completed, internal temperatures must be measured at 1 inch from the top, 1 inch from the bottom, and no closer than 3 inches from any edge.

For other age testing, beams must be cured under California Test 524 except beams must be placed into sand at a time that is the earlier of either from 5 to 10 times the final set time, or 24 hours.

RSC base must have an opening age modulus of rupture of not less than 400 psi and a 7-day modulus of rupture of not less than 600 psi.

#### 28-3.01D(1)(b) Preconstruction Meeting

Reserved

28-3.01D(1)(c) Test Strip

Reserved

28-3.01D(2) Quality Control 28-3.01D(2)(a) General

Reserved

28-3.01D(2)(b) Quality Control Manager

Reserved

#### 28-3.01D(2)(c) Quality Control Testing

Test the rapid strength concrete base under the test methods and at the locations and frequencies shown in the following table:

Rapid Strength Concrete Base Sampling Location and Testing Frequencies

Quality characteristic	Test method	Sample Location	Minimum testing frequency <sup>a</sup>
Cleanness value	California Test 227		1 per 500 cubic yards but at
Sand equivalent	California Test 217	Source	least 1 per shift
Aggregate gradation	California Test 202		
Air content	California Test 504		1 per 130 cu yd but at least 1 per shift
Yield	California Test 518		1 per shift
Slump or penetration	ASTM C143 or California		1 per 2 hours of placement
	Test 533	Job site	
Density	California Test 518	Job Sile	1 per shift
Aggregate moisture	California Test 223 or		1 per shift
meter calibration <sup>b</sup>	California Test 226		
Modulus of rupture	California Test 524		1 per 130 cu yd but at least 1 per
			shift

Test at the most frequent interval.

Notify the Engineer at least 2 business days before any sampling and testing. Submit testing results within 15 minutes of testing completion. Record inspection, sampling, and testing on the forms accepted with the QC plan and submit them within 48 hours of completion of each day of production and within 24 hours of 7-day modulus of rupture tests.

During the placement of RSC base, fabricate beams and test for the modulus of rupture:

- 1. At opening age
- 2. At 7 days after placing the first 30 cu yd
- 3. At least once every 130 cu yd
- 4. Within the final truckload

Opening age tests must be performed in the presence of the Engineer.

#### 28-3.01D(3) Department Acceptance

The Department accepts RSC base based on compliance with the requirements shown in the following table:

**RSC Base Requirements for Acceptance** 

Quality characteristic	Test method	Requirement
Modulus of rupture (min, psi at 7 days)	California Test 524	600

The Engineer adjust payment for RSC base for the 7-day modulus of rupture as follows:

- Payment for a base with a modulus of rupture of 600 psi or greater is not adjusted.
- 2. Payment for a base with a modulus of rupture of less than 600 and greater than or equal to 550 psi is reduced by 5 percent.
- 3. Payment for a base with a modulus of rupture of less than 550 and greater than or equal to 500 psi is reduced by 10 percent.
- 4. Payment for a base with a modulus of rupture of less than 500 psi is not adjusted and no payment is made. Remove and replace this base.

## Add to section 28-4.01C(1):

07-15-16

Submit a lean concrete base rapid setting QC plan.

<sup>&</sup>lt;sup>b</sup>Check calibration of the plant moisture meter by comparing moisture meter readings with California Test 223 or California Test 226 test results.

#### Replace the headings and paragraphs in section 28-4.01D with:

07-15-16

## 28-4.01D Quality Assurance

28-4.01D(1) General

## 28-4.01D(1)(a) General

For compressive strength testing, prepare 6 cylinders under California Test 540. Test cylinders must be 6 by 12 inches. As an alternative to rodding, a vibrator may be used under California Test 524. Test cylinders under California Test 521 and perform 3 tests with each test consisting of 2 cylinders. The test result is the average from the 2 cylinders.

#### 28-4.01D(1)(b) Field Qualification

Before placing lean concrete base rapid setting, 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 base represented by those mix designs. The technician performing the field test must hold current ACI certification as a Concrete Field Testing Technician-Grade I.

Notify the Engineer at least 5 days before field qualification. Perform field qualification within the job site or a location authorized.

Field qualification testing includes compressive strength, air content, and penetration or slump in compliance with the table titled "Lean Concrete Base Rapid Setting Requirements."

Field qualification must comply with the following:

- 1. Test for compressive strength at opening age and 7 days of age
- 2. At opening age, the compressive strength for each test must be at least 180 psi and the average strength for the 3 tests must be at least 200 psi
- 3. At 7 days age, the compressive strength for each test must be at least 600 psi and the average strength for the 3 tests must be at least 725 psi

## 28-4.01D(2) Quality Control 28-4.01D(2)(a) General

Reserved

## 28-4.01D(2)(b) Quality Control Manager

Reserved

## 28-4.01D(2)(c) Quality Control Testing

Test the base under the test methods and at the locations and frequencies shown in the following table:

LCB Rapid Setting Sampling Location and Testing Frequencies

202 Mapia Cotting Camping 200ation and 100ting 110quenties				
Quality characteristic	Test method	Sampling location	Minimum sampling and testing frequency	
Sand equivalent	ASTM D2419	Source	1 per 500 cu yd, minimum 1 per day	
Aggregate gradation	ASTM C136	Source	of production	
Air content	ASTM C231			
Penetration <sup>a</sup>	ASTM C360		1 per 4 hours of placement work, plus	
Slump <sup>a</sup>	ASTM C143	Job site	one in the last hour of placement work	
Compressive strength	California Test 521		one in the last flour of placement work	

<sup>&</sup>lt;sup>a</sup>Test either penetration or slump

During placement of lean concrete base rapid setting, fabricate cylinders and test compressive strength for opening age and 7 days. Opening age tests must be performed in the presence of the Engineer.

## 28-4.01D(3) Department Acceptance

The Department accepts LCB rapid setting based on compliance with the requirement shown in the following table:

## **LCB Rapid Setting Requirements for Acceptance**

Quality characteristic	Test method	Requirement
Compressive strength (min, psi at 7 days)	California Test 521 <sup>a</sup>	725

<sup>&</sup>lt;sup>a</sup>Cylinders made under California Test 540

## Replace the 2nd and 3rd paragraphs in section 28-4.03A with:

07-15-16

Concrete paving operations with equipment not supported by the base may start before opening age. Do not open pavement for traffic before opening age of the LCB rapid setting.

Any other paving operations must start after the final set time of the base. The base must have a compressive strength of at least 450 psi under California Test 521 before:

- 1. Placing HMA
- 2. Placing other base material
- 3. Operating equipment on the base

## Replace Reserved in section 28-5.01C with:

07-15-16

Submit a concrete base QC plan.

## Replace the headings and paragraphs in section 28-5.01D(2) with:

07-15-16

28-5.01D(2) Quality Control 28-5.01D(2)(a) General

Reserved

## 28-5.01D(2)(b) Quality Control Manager

Reserved

## 28-5.01D(2)(c) Quality Control Testing

Test the concrete base under the test methods and at the locations and frequencies shown in the following table:

**Concrete Base Sampling Location and Testing Frequencies** 

Quality characteristic	Test method	Sample location	Minimum testing frequency <sup>a</sup>		
Cleanness value	California Test 227		1 per 500 cubic yards but at		
Sand equivalent	California Test 217	Source	least 1 per shift		
Aggregate gradation	California Test 202				
Air content	California Test 504		1 per 500 cu yd but at least 1 per shift		
Yield	California Test 518		1 per shift		
Slump or penetration	ASTM C143 or California		1 per 2 hours of placement		
	Test 533	Job site			
Density	California Test 518	Job Sile	1 per shift		
Aggregate moisture	California Test 223 or		1 per shift		
meter calibration <sup>b</sup>	California Test 226				
Modulus of rupture	California Test 524		1 per 500 cu yd but at least 1 per shift		

Test at the most frequent interval.

## 28-5.01D(3) Department Acceptance

The Department accepts a concrete base based on compliance with the requirements shown in the following table:

**Concrete Base Requirements for Acceptance** 

Quality characteristic	Test method	Requirement
Modulus of rupture (min, psi at 28 days)	California Test 523	570

Acceptance for the modulus of rupture is on a lot basis. The Department provides the molds and machines for the modulus of rupture acceptance testing. Provide any material and labor the Engineer may require for the testing.

## 29 TREATED PERMEABLE BASES

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07-15-16

Replace the headings and paragraphs in section 29-1.01 with:

07-15-16

#### 29-1.01 GENERAL

## 29-1.01A Summary

Section 29-1 includes general specifications for constructing treated permeable bases.

#### 29-1.01B Definitions

Reserved

#### 29-1.01C Submittals

Submit a treated permeable base quality control plan.

## 29-1.01D Quality Assurance

29-1.01D(1) General

Reserved

<sup>&</sup>lt;sup>b</sup>Check calibration of the plant moisture meter by comparing moisture meter readings with California Test 223 or California Test 226 test results.

29-1.01D(2) Quality Control 29-1.01D(2)(a) General

Reserved

29-1.01D(2)(b) Quality Control Plan

Reserved

29-1.01D(2)(c) Qualifications

Reserved

29-1.01D(3) Department Acceptance

Reserved

## Replace the headings and paragraphs in section 29-2.01D with:

07-15-16

## 29-2.01D Quality Assurance

#### 29-2.01D(1) General

The Engineer determines the asphalt content of the asphalt mixture under California Test 382. The bitumen ratio, pounds of asphalt per 100 lb of dry aggregate, must not vary more than 0.5 lb of asphalt above or below the quantity designated by the Engineer. Samples used to determine the bitumen ratio are obtained from trucks at the plant or from the mat behind the paver before rolling. If the sample is taken from the mat behind the paver, the bitumen ratio must not be less than the quantity designated by the Engineer, less 0.7 lb of asphalt per 100 lb of dry aggregate.

## 29-2.01D(2) Quality Control

29-2.01D(2)(a) General

Reserved

## 29-2.01D(2)(b) Quality Control Testing

ATPB quality control must include testing the quality characteristics at the frequencies shown in the following table:

**QC Testing Frequencies** 

Quality characteristic	Test method	Sampling location	Minimum frequency
Gradation	California Test 202	Stockpiles or plant	1 for every 4 hours of production but at least one per day of placement
Cleanness value	California Test 227	Stockpiles or plant	1 for every 4 hours of production but at least one per day
Percentage of crushed particles	California Test 205	Stockpiles or plant	1 test before production and one every 5,000 cu yd thereafter
Los Angeles rattler loss at 500 rev	California Test 211	Stockpiles or plant	1 test before production and one every 5,000 cu yd thereafter
Film stripping	California Test 302	Plant	1 test before production and one every 5000 cu yd thereafter
Asphalt content of the asphalt mixture	California Test 382	Plant, transportation units, windrows, or roadway	1 for every 4 hours of production but at least one per day

## 29-2.01D(3) Department Acceptance

The Department accepts ATPB based on aggregate gradation, cleanness value, percent of crushed particles, Los Angeles rattler, film stripping and asphalt content requirements specified in section 29-2.02 and section 29-2.01D(1).

The Engineer takes samples for aggregate gradation, cleanness value, percent of crushed particles, Los Angeles rattler, and film stripping from the plant.

The Engineer takes samples for asphalt content of the asphalt mixture from any of the following locations:

- 1. Plant
- 2. Truck
- 3. Windrow
- 4. Roadbed

## Replace the headings and paragraphs in section 29-3.01 with:

07-15-16

#### 29-3.01 GENERAL

## 29-3.01A Summary

Section 29-3 includes specifications for constructing cement treated permeable bases.

#### 29-3.01B Definitions

Reserved

#### 29-3.01C Submittals

Reserved

29-3.01D Quality Assurance

29-3.01D(1) General

Reserved

29-3.01D(2) Quality Control

29-3.01D(2)(a) General

Reserved

## 29-3.01D(2)(b) Quality Control Testing

CTPB quality control must include testing the quality characteristics at the frequencies shown in the following table:

**QC Testing Frequencies** 

Quality characteristic	Test method	Sampling location	Minimum frequency
Gradation	California Test 202	Stockpiles or plant	1 for every 4 hours of production but at least one per day of placement
Cleanness value	California Test 227	Stockpiles or plant	1 for every 4 hours of production but at least one per day
Los Angeles rattler loss at 500 rev	California Test 211	Stockpiles or plant	1 test before production and one every 5,000 cu yd thereafter
Soundness	California Test 214	Stockpiles or plant	1 test before production and one every 5,000 cu yd thereafter

## 29-3.01D(3) Department Acceptance

Water must comply with section 90-1.02D.

The Department accepts CTPB based on aggregate gradation, cleanness value, Los Angeles rattler and soundness requirements in section 29-3.02.

The Engineer takes samples for aggregate gradation, cleanness value, Los Angeles rattler and soundness from the plant.

#### Add to section 29-3.02A:

07-15-16

Replace 3rd in the 2nd paragraph in section 29-3.03 with:

07-15-16

4th

^^^^^

## **30 RECLAIMED PAVEMENT**

07-15-16

Replace section 30-1.01C(2)(c) in the 1st paragraph of section 30-3.01C(2)(c) with:

07-15-16

section 30-1.01C(3)(c)

## Replace the table in section 30-3.02A with:

07-15-16

FDR—Foamed Asphalt Quality Characteristic Requirements

Quality characteristic	Test method	Requirement
Moisture content before HMA paving	California Test 226	< 50% of OMC
Asphalt binder expansion ratio (min, %)	Note a	10
Asphalt binder half-life (seconds, min)	- Note a	12
Gradation (%, passing) Sieve Size: 3 inch 2 inch 1-1/2 inch	California Test 202	100 95–100 85–100
Moisture content Maximum Minimum	California Test 226	OMC OMC - 2%
In-place wet density (lb/cu ft)	California Test 216	Report only
Relative compaction (min, %) Indirect dry tensile strength (psi) <sup>b</sup> Indirect wet tensile strength (psi) <sup>b</sup>	California Test 231 California Test 371 California Test 371	98 90% of mix design value 90% of mix design value
Tensile strength ratio (%)	California Test 371	90% of mix design value

Test at the foaming temperature and percentage of foaming water by dry weight of FDR—foamed asphalt material designated in the mix design. To test asphalt binder expansion ratio and half-life, use a pail of known volume and a dipstick calibrated for the pail. From the inspection nozzle on the asphalt binder spray bar, inject foamed asphalt into the pail without exceeding the pail's capacity. With the dipstick, immediately measure and record the level of foamed asphalt in the pail. Record the half-life in seconds from the time the injection of foamed asphalt in the pail is turned off to half the dip stick reading after peak. Calculate the expansion ratio as the volume of the foamed asphalt upon injection divided by the volume of the unfoamed asphalt binder.

<sup>b</sup>From material passing the 1-inch sieve, compact 6 specimens under California Test 304, Part 2. Cure the specimens at 100 °F for 72 hours and allow the specimens to cool to room temperature. Test 3 specimens for dry tensile strength under California Test 371. Test 3 specimens for wet tensile strength under California Test 371 after moisture conditioning.

Replace section 30-4.01D(3) in the 2nd paragraph of section
---

07-15-16 section 30-4.01D(4)

Replace section 30-4.01D(1)(a) in the table in section 30-4.02A with:

07-15-16

section 30-4.01D(2)

^^^^^^

# DIVISION V SURFACINGS AND PAVEMENTS 37 BITUMINOUS SEALS

07-15-16 Replace section 37 with:

07-15-16

## 37 SEAL COATS 37-1 GENERAL

## **37-1.01 GENERAL**

## 37-1.01A Summary

Section 37-1 includes general specifications for applying seal coats.

#### 37-1.01B Definitions

Reserved

#### 37-1.01C Submittals

At least 10 days before the preconstruction meeting submit a list of participants in the preconstruction meeting. Provide each participant's name, employer, title, and role in the production and placement of the seal coats.

At least 10 days before starting seal coat activities, submit the names of the authorized laboratories for quality control testing.

For each delivery of asphalt binder or asphaltic emulsion to the job site, submit a certificate of compliance and a copy of the specified test results.

For a seal coat that uses crumb rubber modifier, submit a Crumb Rubber Usage Report form monthly and at the end of project.

#### 37-1.01D Quality Assurance

## 37-1.01D(1) General

For aggregate testing, quality control laboratories must be in compliance with the Department's Independent Assurance Program to be an authorized laboratory. Quality control personnel must be qualified under the Department's Independent Assurance Program.

For emulsion testing, quality control laboratories must participate in the AASHTO Material's Reference Laboratory proficiency sample program.

#### 37-1.01D(2) Preconstruction Meeting

Hold a preconstruction meeting within 5 days before start of seal coat work at a mutually agreed time and place with the Engineer and your:

- 1. Project superintendent
- 2. Project foreman
- 3. Traffic control foreman

Make arrangements for the conference facility. Preconstruction meeting participants must sign an attendance sheet provided by the Engineer. Be prepared to discuss:

- 1. Quality control testing
- 2. Acceptance testing
- 3. Seal coat placement
- 4. Proposed application rates for asphaltic emulsion or asphalt binder and aggregate.
- 5. Training on placement methods
- 6. Checklist of items for proper placement
- 7. Unique issues specific to the project, including:
  - 7.1. Weather
  - 7.2. Alignment and geometrics
  - 7.3. Traffic control requirements

- 7.4. Haul distances
- 7.5. Presence and absence of shaded areas
- 7.6. Any other local conditions
- 8. Contingency plan for material deliveries, equipment breakdowns, and traffic handling
- 9. Who in the field has authority to adjust application rates and how adjustments will be documented
- 10. Schedule of sweepings

#### **37-1.02 MATERIALS**

Not Used

#### 37-1.03 CONSTRUCTION

#### 37-1.03A General

If seal coat activities affect access to public parking, residential property, or commercial property, post signs at 100-foot intervals on the affected streets. Signs must display *No Parking – Tow Away*. Signs must state the dates and hours parking or access will be restricted. Notify residents, businesses, and local agencies at least 24 hours before starting activities. The notice must:

- 1. Describe the work to be performed
- 2. Detail streets and limits of activities
- 3. Indicate dates and work hours
- 4. Be authorized

Asphaltic emulsion or asphalt binder for seal coats may be reheated if necessary. After loading the asphaltic emulsion or asphalt binder into a truck for transport to the job site, do not heat asphaltic emulsion above 160 degrees F and asphalt rubber binder above 425 degrees F. During reheating, circulate or agitate the asphaltic emulsion or asphalt binder to prevent localized overheating.

Except for fog seals, apply quick setting Grade 1 asphaltic emulsions at a temperature from 75 to 130 degrees F and apply quick setting Grade 2 asphaltic emulsions at a temperature from 110 to 185 degrees F

You determine the application rates for asphaltic emulsion or asphalt binder and aggregate and the Engineer authorizes the application rates.

#### 37-1.03B Equipment

A self-propelled distributor truck for applying asphaltic emulsion or asphalt binder must be equipped with:

- 1. Pressure-type system with insulated tanks with circulating unit
- Spray bars:
  - 2.1. With minimum length of 9 feet and full-circulating type
  - 2.2. With full-circulating-type extensions if needed to cover a greater width
  - 2.3. Adjustable to allow positioning at various heights above the surface to be treated
  - 2.4. Operated by levers such that 1 or all valves may be quickly opened or closed in one operation
- 3. Devices and charts to provide for accurate and rapid determination and control of asphaltic emulsion or asphalt binder quantities being applied. Include an auxiliary wheel type meter that registers:
  - 3.1. Speed in ft/min
  - 3.2. Trip by count
  - 3.3. Total distance in feet
- 4. Distribution system:
  - 4.1. Capable of producing a uniform application of asphaltic emulsion or asphalt binder in controlled quantities ranging from 0.02 to 1 gal/sq yd of surface and at a pressure ranging from 25 to 75 psi
  - 4.2. Pumps that spray asphaltic emulsion or asphalt binder within 0.02 gal/sq yd of the set rate
  - 4.3. With a hose and nozzle for application of asphaltic emulsion to areas inaccessible to the spray bar
  - 4.4. With pressure gauges and a thermometer for determining temperatures of the asphaltic emulsion or asphalt binder

You may use cab-controlled valves for the application of asphaltic emulsion or asphalt binder. The valves controlling the flow from nozzles must act positively to provide a uniform unbroken application of asphaltic emulsion or asphalt binder.

Maintain distributor and storage tanks at all times to prevent dripping.

#### **37-1.04 PAYMENT**

Not Used

#### 37-2 CHIP SEALS

#### **37-2.01 GENERAL**

#### **37-2.01A General**

#### 37-2.01A(1) Summary

Section 37-2.01 includes general specifications for applying chip seals.

#### 37-2.01A(2) Definitions

Reserved

#### 37-2.01A(3) Submittals

At least 15 days before starting placement of chip seal, submit:

- 1. Samples for:
  - 1.1. Asphaltic emulsion chip seal, two 1-quart wide mouth plastic containers with screw top lid of asphaltic emulsion
  - 1.2. Polymer modified asphaltic emulsion chip seal, two 1-quart wide mouth plastic containers with screw top lid of polymer modified asphaltic emulsion
  - 1.3. Asphalt rubber binder chip seal, two 1-quart cans of base asphalt binder
  - 1.4. Asphalt rubber binder chip seal, five 1-quart cans of asphalt rubber binder
- Asphaltic emulsion, polymer modified asphaltic emulsion, asphalt binder or asphalt rubber binder data as follows:
  - 2.1. Supplier and Type/Grade of asphaltic emulsion or asphalt binder
  - 2.2. Type of modifier used including polymer or crumb rubber or both
  - 2.3. Percent of crumb rubber, if used as modifier
  - 2.4. Copy of the specified test results for asphaltic emulsion or asphalt binder
- 3. 50 lb of uncoated aggregate
- 4. Aggregate test results for the following:
  - 4.1. Gradation
  - 4.2. Los Angeles Rattler
  - 4.3. Percent of crushed particles
  - 4.4. Flat and elongated particles
  - 4.5. Film stripping
  - 4.6. Cleanness value
  - 4.7. Durability
- 5. Vialit test results

Submit quality control test results for the quality characteristics within the reporting times allowance after sampling shown in the following table:

## **Quality Control Test Result Reporting**

Quality characteristic	Maximum reporting time allowance
Los Angeles Rattler loss (max, %)	48 hours
Percent of crushed particles (min, %)	48 hours
Flat and elongated particles (max by weight at 3:1, %)	48 hours
Film stripping (max, %)	48 hours
Durability (min)	48 hours
Gradation (percentage passing)	24 hours
Cleanness value (min)	24 hours
Asphaltic emulsion spread rate (gal/sq yd)	24 hours

Within 3 days after taking asphaltic emulsion or asphalt binder quality control samples, submit the authorized laboratory's test results.

37-2.01A(4) Quality Assurance 37-2.01A(4)(a) General

Reserved

37-2.01A(4)(b) Quality Control 37-2.01A(4)(b)(i) General

Reserved

#### 37-2.01A(4)(b)(ii) Aggregate

All tests must be performed on uncoated aggregate except for film stripping which must be performed on precoated aggregate.

For aggregate, the authorized laboratory must perform sampling and testing at the specified frequency and location for the following quality characteristics:

## **Aggregate Quality Control Requirements**

Quality characteristic	Test method	Minimum sampling and testing frequency	Location of sampling
Los Angeles Rattler loss (max, %) At 100 revolutions At 500 revolutions	California Test 211	1st day of production	See California Test 125
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	AASHTO T 335	1st day of production	See California Test 125
Flat and elongated particles (max by weight at 3:1, %)	ASTM D4791	1st day of production	See California Test 125
Film stripping (max, %)	California Test 302	1st day of production	See California Test 125
Durability (min)	California Test 229	1st day of production	See California Test 125
Gradation (% passing)	California Test 202	2 per day	See California Test 125
Cleanness value (min)	California Test 227	2 per day	See California Test 125

## 37-2.01A(4)(b)(iii) Chip Seals

For a chip seal, the authorized laboratory must perform sampling and testing at the specified frequency and location for the following quality characteristics:

**Chip Seal Quality Control Requirements** 

Quality characteristic	Test method	Minimum sampling and testing frequency	Location of sampling
Asphaltic emulsion binder spread rate (gal/sq yd)	California Test 339	1 per day per distributor truck	Pavement surface

## 37-2.01A(4)(c) Department Acceptance

Department Acceptance shall not apply to identified areas where the existing surfacing before application of chip seal, contains defective areas as determined by the Engineer and Contractor. At least 7 days

before starting placement of the chip seal, the Contractor shall submit a written list of existing defective areas, identifying the lane direction, lane number, starting and ending highway post mile locations, and defect type. The Engineer must agree on which of the identified areas are defective.

Defective areas are defined as one of the following:

- 1. Areas with wheel path rutting in excess of 3/8 inch when measured by placing a straightedge 12 feet long on the finished surface perpendicular to the center line and measuring the vertical distance between the finished surface and the lower edge of the straightedge
- 2. Areas exhibiting flushing

For a chip seal, acceptance is based on visual inspection for the following:

- 1. Uniform surface texture
- 2. Raveling, which consists of the separation of the aggregate from the asphaltic emulsion or asphalt binder
- Flushing, which consists of the occurrence of a film of asphaltic material on the surface of the chip seal.
- 4. Streaking, which consists of alternating longitudinal bands of asphaltic emulsion or asphalt binder without uniform aggregate retention, approximately parallel with the lane line.

Areas of raveling, flushing or streaking that are greater than 0.5 sq ft shall be considered defective and must be repaired.

Raveling and streaking must be repaired by placing an additional layer of chip seal over the defective area.

For asphaltic emulsion or asphalt binder, acceptance is based on the Department's sampling and testing for compliance with the requirements for the quality characteristics specified.

For aggregate, acceptance is based on the Department's sampling and testing for compliance with the requirements shown in the following table:

**Chip Seal Aggregate Acceptance Criteria** 

Quality characteristic	Test method	Requirements
Los Angeles Rattler loss (max, %)		
At 100 revolutions	California Test 211	10
At 500 revolutions		40
Percent of crushed particles:	AASHTO T 335	
Coarse aggregate (min, %)		
One-fractured face		95
Two-fractured faces		90
Fine aggregate (min, %)		
(Passing No. 4 sieve and retained on No. 8 sieve)		
One fractured face		70
Flat and elongated particles (max by weight at 3:1, %)	ASTM D4791	10
Film stripping (max, %)	California Test 302	25
Durability (min)	California Test 229	52
Gradation (% passing by weight)	California Test 202	Aggregate Gradation
		table shown under
		Materials for the chip
		seal type specified.
Cleanness value (min)	California Test 227	80

If test results for the aggregate gradation do not comply with specifications, you may remove the chip seal represented by these tests or request that it remain in place with a payment deduction. The deduction is \$1.75 per ton for the aggregate represented by the test results.

If test results for aggregate cleanness value do not comply with the specifications, you may remove the chip seal represented by these tests or you may request that the chip seal remain in place with a pay deduction corresponding to the cleanness value shown in the following table:

**Chip Seal Cleanness Value Deductions** 

Cleanness value	Deduction
80 or over	None
79	\$2.00 /ton
77–78	\$4.00 /ton
75–76	\$6.00 /ton

If the aggregate cleanness value is less than 75, remove the chip seal.

37-2.01B Materials

37-2.01B(1) General

Reserved

37-2.01B(2) Asphaltic Emulsions and Asphalt Binders

Reserved

37-2.01B(3) Aggregate

37-2.01B(3)(a) General

Aggregate must be broken stone, crushed gravel, or both.

Aggregate must comply with the requirements shown in the following table:

**Chip Seal Aggregate Requirements** 

Quality characteristic	Test method	Requirements
Los Angeles Rattler loss (max, %)		
At 100 revolutions	California Test 211	10
At 500 revolutions		40
Percent of crushed particles	AASHTO T 335	
Coarse aggregate (min, %)		
One-fractured face		95
Two-fractured faces		90
Fine aggregate (min, %)		
(Passing No. 4 sieve and retained on No. 8 sieve)		
One fractured face		70
Flat and elongated particles (max by weight at 3:1, %)	ASTM D4791	10
Film stripping (max, %)	California Test 302	25
Durability (min)	California Test 229	52
Gradation (% passing by weight)	California Test 202	Aggregate Gradation
		table shown under
		Materials for the chip
		seal type specified.
Cleanness value (min)	California Test 227	80

The authorized laboratory must conduct the Vialit test using the proposed asphaltic emulsion or asphalt binder and aggregate for compliance with the requirements shown in the following table:

**Chip Retention Requirements** 

Quality characteristic	Test method	Requirement
Chip retention (%)	Vialit test method for aggregate in chip seals,  French chip (Modified) <sup>a</sup>	95

<sup>&</sup>lt;sup>a</sup>The asphaltic emulsion or asphalt binder must be within the field placement temperature range and application rate during specimen preparation. For asphalt binder cure the specimen for first 2 hours at 100 °F.

### 37-2.01B(3)(b) Precoated Aggregate

Precoating of aggregate must be performed at a central mixing plant. The plant must be authorized under the Department's MPQP.

When precoating aggregate, do not recombine fine materials collected in dust control systems.

Precoated aggregate 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. The asphalt must be from 0.5 to 1.0 percent by weight of dry aggregate. You determine the exact asphalt rate for precoating of aggregate.

Do not stockpile precoated aggregate.

#### 37-2.01C Construction

#### 37-2.01C(1) General

For chip seals on 2-lane, 2-way roadways, place a W8-7 (LOOSE GRAVEL) sign and a W13-1 (35) plaque at 2,000-foot maximum intervals along each side of the traveled way where aggregate is spread on a traffic lane and at public roads or streets entering the chip seal area. Place the 1st W8-7 sign in each direction where traffic first encounters the loose aggregate, regardless of which lane the aggregate is spread on. A W13-1 (35) plaque is not required where the posted speed limit is less than 40 mph.

For chip seals on freeways, expressways, and multilane conventional highways, place a W8-7, (LOOSE GRAVEL) sign and a W13-1 (35) plaque at 2,000-foot maximum intervals along the outside edge of the traveled way nearest to the lane worked on, at on ramps, and at public roads or streets entering the chip seal area. Place the 1st W8-7 sign where the aggregate starts with respect to the direction of travel on that lane. A W13-1 (35) plaque is not required where the posted speed limit is less than 40 mph.

Pilot cars must have cellular or radio contact with other pilot cars and personnel in the work zone. The maximum speed of the pilot cars convoying or controlling traffic through the traffic control zone must be 15 mph on 2-lane, two-way highways and 25 mph on multilane divided and undivided highways. Pilot cars must only use traffic lanes open to traffic.

On the days that closures are not allowed, you may use a moving closure to maintain the seal coat surface. The moving closure is only allowed during daylight hours when traffic will be the least inconvenienced and delayed. The Engineer determines the hours for the moving closure.

Maintain signs in place at each location until the final sweeping of the chip seal surface for that location is complete. Signs may be set on temporary portable supports with the W13-1 sign below the W8-7 sign or on barricades with the W13-1 sign alternating with the W8-7 sign.

Schedule chip seal activities so that the chip seals are placed on both lanes of the traveled way each work shift.

If traffic is routed over a surface where a chip seal application is intended, the chip seal must not be applied to more than half the width of the traveled way at a time, and the remaining width must be kept free of obstructions and open to traffic until the previously applied width is ready for traffic use.

Wherever maintenance sweeping of the chip seal 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 chip seal work completed that has not received permanent traffic stripes and pavement markings.

## 37-2.01C(2) Equipment

Equipment for chip seals must include and comply with the following:

- 1. Aggregate haul trucks must have:
  - 1.1. Tailgate that discharge aggregate
  - 1.2. Device to lock onto the rear aggregate spreader hitch
  - 1.3. Dump bed that will not push down on the spreader when fully raised
  - 1.4. Dump bed that will not spill aggregate on the roadway when transferred to the spreader hopper
  - 1.5. Tarpaulin to cover precoated aggregate when haul distance exceeds 30 minutes or ambient temperature is less than 65 degrees F
- Self-propelled aggregate spreaders must have:
  - 2.1. Aggregate hopper in the rear
  - 2.2. Belt conveyor that carries the aggregate to the front
  - 2.3. Spreading hopper capable of providing a uniform aggregate spread rate over the entire width of the traffic lane in 1 application.
- 3. Self-propelled power brooms must:
  - 3.1. Not be steel-tined brooms on emulsion chip seals
  - 3.2. Be capable of removing loose aggregate adjacent to barriers that prevent aggregate from being swept off the roadway, including curbs, gutters, dikes, berms, and railings
- 4. Pneumatic or foam filled rubber tired rollers must:
  - 4.1. Be an oscillating type at least 4 feet wide
  - 4.2. Be self-propelled and reversible
  - 4.3. Have tires of equal size, diameter, type, and ply
  - 4.4. Carry at least 3,000 lbs of load on each wheel
  - 4.5 Have tires with an air pressure of  $100 \pm 5$  psi or be foam filled

#### 37-2.01C(3) Surface Preparation

Before applying chip seals, 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 enough control points to relocate the facilities after the application of the chip seal.

Immediately before applying chip seals, clean the surface to receive a chip seal by removing any extraneous material affecting adhesion of the chip seal with the existing surface and drying. Use self-propelled power brooms to clean the existing pavement.

## 37-2.01C(4) Placement

## 37-2.01C(4)(a) General

Schedule the operations so that chip seals are placed on both lanes of the traveled way each work shift. At the end of the work shift, the end of the chip seals on both lanes must generally match.

## 37-2.01C(4)(b) Applying Asphaltic Emulsions or Asphalt Binders

Prevent spraying on existing pavement not intended for chip seals or on previously applied chip seals using a material such as building paper. Remove the material after use.

Align longitudinal joints between chip seal applications with designated traffic lanes.

For asphaltic emulsion or asphalt binder, 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:

- 1. Asphaltic emulsions by hand spraying
- 2. Asphalt binders with a squeegee or other authorized means

You may overlap the asphaltic emulsion or asphalt binder applications before the application of aggregate at longitudinal joints.

Do not apply the asphaltic emulsion or asphalt binder unless there is sufficient aggregate at the job site to cover the asphaltic emulsion or asphalt binder.

Discontinue application of asphaltic emulsion or asphalt binder early enough to comply with lane closure requirements. Apply to 1 lane at a time and cover the lane width entirely in 1 operation.

## 37-2.01C(4)(c) Spreading Aggregates

#### 37-2.01C(4)(c)(i) General

Prevent vehicles from driving on asphaltic emulsion or asphalt binder before spreading aggregate.

Spread aggregate within 10 percent of your determined rate.

Spread aggregate at a uniform rate over the full lane width in 1 application. Apply to 1 lane at a time.

Sweep excess aggregate at joints before spreading adjacent aggregate.

Operate the spreader at speeds slow enough to prevent aggregate from rolling over after dropping.

If the spreader is not moving, aggregate must not drop. If you stop spreading and aggregate drops, remove the excess aggregate before resuming activities.

## 37-2.01C(4)(c)(ii) Precoated Aggregate Application

During transit, cover precoated aggregate with tarpaulins if the ambient air temperature is below 65 degrees F or the haul time exceeds 30 minutes.

When applied, precoated aggregate must be from 225 to 325 degrees F.

## 37-2.01C(4)(d) Finishing

## 37-2.01C(4)(d)(i) General

Remove piles, ridges, or unevenly distributed aggregate. Repair permanent ridges, bumps, streaks or depressions in the finished surface. Spread additional aggregate and roll if aggregate is picked up by rollers or vehicles.

Chip seal joints between adjacent applications of a chip seal must be smooth, straight, uniform, and completely covered.

A coverage is 1 roller movement over the entire width of lane. A pass is 1 roller movement parallel to the chip seal 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 new coverage until completing the previous coverage.

Before opening to traffic, finish the chip seals in the following sequence:

- 1. Perform initial rolling consisting of 1 coverage with a pneumatic-tired roller
- Perform final rolling consisting of 2 coverages with a pneumatic-tired roller
- 3. Sweep excess aggregate from the roadway and adjacent abutting areas
- 4. Apply a flush coat if specified
- 5. Remove covers from the facilities

#### 37-2.01C(4)(d)(ii) Traffic Control With Pilot Car

For 2-lane 2-way roadways under 1-way traffic control, upon completion of final rolling, traffic must be controlled with pilot cars and routed over the new chip seal for a period of 2 to 4 hours before opening the lane to traffic not controlled with pilot cars.

For multilane roadways, when traffic is controlled with pilot cars, a maximum of 1 lane in the direction of travel must be open to traffic. Traffic must be controlled with pilot cars and be routed on the new chip seal surface of the lane for a minimum of 2 hours after completion of the initial sweeping and before opening the lane to traffic not controlled with pilot cars. Once traffic controlled with pilot cars is routed over the chip seal at a particular location, continuous control must be maintained at that location until the chip seal placement and sweeping on adjacent lanes to receive a chip seal is completed.

#### 37-2.01C(4)(d)(iii) Sweeping

Sweeping must be performed after the chip seal has set and there is no damage or dislodging of aggregate from the chip seal surface. As a minimum, sweeping is 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 chip seal
- 2. On multilane roadways, from 2 to 4 hours after aggregate have been placed
- 3. In addition to previous sweeping, perform final sweeping immediately before opening any lane to public traffic, not controlled with pilot cars

#### 37-2.01C(4)(d)(iv) Excess Aggregate

Dispose of excess aggregate. If ordered, salvaging and stockpiling of excess aggregate is change order work.

## 37-2.01C(4)(e) Chip Seal Maintenance

Perform sweeping on the morning following the application of aggregate on any lane that has been open to traffic not controlled with pilot cars and before starting any other activities.

Chip seal surfaces must be maintained for 4 consecutive days from the day aggregate is applied. Maintenance must include sweeping to maintain a surface free of loose aggregate and to prevent formation of corrugations. Sweeping must not dislodge aggregate set in asphaltic emulsion or asphalt binder.

After 4 consecutive days, excess aggregate must be removed from the paved areas.

## 37-2.01D Payment

If there is no bid item for traffic control system, furnishing and using a pilot car is included in the various items of the work involved in applying the chip seal.

The payment quantity for precoated aggregate is the weight measured after the aggregate is preheated and precoated with asphalt binder.

If recorded batch weights are printed automatically, the payment quantity for aggregate is the weight determined from the printed batch weights if:

- 1. Total weight for the precoated aggregate per batch is printed
- 2. Total asphalt binder weight per batch is printed
- Zero tolerance weight is printed before weighing the first batch and after weighing the last batch for each truckload
- 4. Time, date, mix number, load number, and truck identification are correlated with a load slip
- 5. Copy of the recorded batch weights is certified by a licensed weighmaster

#### 37-2.02 ASPHALTIC EMULSION CHIP SEALS

#### 37-2.02A General

## 37-2.02A(1) Summary

Section 37-2.02 includes specifications for applying asphaltic emulsion chip seals. An asphaltic emulsion chip seal includes applying an asphaltic emulsion, followed by aggregate, and then a flush coat.

A double asphaltic emulsion chip seal is the application of an asphaltic emulsion followed by aggregate, applied twice in sequence and then a flush coat.

## 37-2.02A(2) Definitions

Reserved

#### 37-2.02A(3) Submittals

Immediately after sampling, submit two 1-quart plastic containers of asphaltic emulsion taken in the presence of the Engineer. Samples must be submitted in insulated shipping container.

37-2.02A(4) Quality Assurance 37-2.02A(4)(a) General

Reserved

37-2.02A(4)(b) Quality Control 37-2.02A(4)(b)(i) General

Reserved

## 37-2.02A(4)(b)(ii) Asphaltic Emulsions

Circulate 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. In the presence of the Engineer, take two 1-quart samples in a plastic container with lined sealed lid for acceptance testing.

For asphaltic emulsion, the authorized laboratory must perform quality control sampling and testing at the specified frequency and location for the following quality characteristics:

**Asphaltic Emulsion** 

7.69.1.1.10				
Quality characteristic	Test method	Minimum sampling and testing frequency	Sampling location	
Saybolt Furol Viscosity, at 25 °C (Saybolt Furol seconds) Sieve Test (%) Storage stability, 1 day (%)	AASHTO T 59	Minimum 1 per day per delivery truck	Distributor truck	
Residue by distillation (%) Particle charge <sup>a</sup>		delivery truck		
Tests on Residue from Distillation T	est:			
Penetration, 25 °C	AASHTO T 49	AASHTO T 49 Minimum 1 per day per		
Ductility	AASHTO T 51	delivery truck	Distributor truck	
Solubility in trichloroethylene	AASHTO T 44	delivery truck		

<sup>&</sup>lt;sup>a</sup>If the result of the particle charge is inconclusive, the asphaltic emulsion must be tested for pH under ASTM E70. Grade QS1h asphaltic emulsion must have a minimum pH of 7.3. Grade CQS1h asphaltic emulsion must have a maximum pH of 6.7.

#### 37-2.02A(4)(c) Department Acceptance

Aggregate acceptance is based on the Department's sampling and testing for compliance with the requirements shown in the following table:

## **Aggregate Gradation Acceptance Criteria**

Quality characteristic	Test method		Requirement	
Gradation (% passing by weight) Sieve size:		3/8"	5/16"	1/4"
3/4"				
1/2"	California Test 202	100		
3/8"		85–100	100	100
No. 4		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

37-2.02B Materials37-2.02B(1) General

Reserved

## 37-2.02B(2) Asphaltic Emulsions

Reserved

## 37-2.02B(3) Aggregate

Aggregate gradation for an asphaltic emulsion chip seal must comply with the requirements shown in the following table:

**Asphaltic Emulsion Chip Seal Aggregate Gradation** 

Quality characteristic	Test method	R	equirement	
Gradation (% passing by weight) Sieve size:		3/8"	5/16"	1/4"
3/4"			-	
1/2"		100	-	
3/8"	California Test	85–100	100	100
No. 4	202	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

#### 37-2.02C Construction

## 37-2.02C(1) General

Reserved

## 37-2.02C(2) Asphaltic Emulsions

Asphaltic emulsions must be applied within the application rate ranges shown in the following table:

**Asphaltic Emulsion Application Rates** 

Aggregate gradation	Application rate range (gal/sq yd)
3/8"	0.30-0.45
5/16"	0.25-0.35
1/4"	0.20-0.30

For double asphaltic emulsion chip seals, the asphaltic emulsions must be applied within the application rates shown in the following table:

**Asphaltic Emulsion Application Rates** 

Double chip seals	Application rate range (gal/sq yd)
1st application	0.30–0.45
2nd application	0.20–0.30

When applied, the temperature of the asphaltic emulsions must be from 130 to 180 degrees F.

Apply asphaltic emulsions 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 emulsions when weather forecasts predict the ambient air temperature will fall below 39 degrees F within 24 hours after application.

## 37-2.02C(3) Spreading Aggregates

Aggregate must be spread within the spread rate ranges shown in the following table:

**Aggregate Spread Rates** 

Aggregate gradation	Spread rate range (lb/sq yd)
3/8"	20-30
5/16"	16–25
1/4"	12–20

For double asphaltic emulsion chip seals, aggregate must be spread within the spread rate ranges shown in the following table:

**Aggregate Spread Rates** 

Double chip seal	Spread rate range (lb/sq yd)
1st application	23–30
2nd application	12–20

Remove excess aggregate on the 1st application before the 2nd application of asphaltic emulsion.

You may stockpile aggregate for asphaltic emulsion chip seals if you prevent contamination. Aggregate must have a damp surface at spreading. If water visibly separates from the aggregate, do not spread. You may re-dampen aggregate in the delivery vehicle.

Spread aggregate before an asphaltic emulsion sets or breaks.

Do not spread aggregate more than 2,500 feet ahead of the completed initial rolling.

#### 37-2.02D Payment

Not Used

#### 37-2.03 POLYMER MODIFIED ASPHALTIC EMULSION CHIP SEALS

#### 37-2.03A General

#### 37-2.03A(1) Summary

Section 37-2.03 includes specifications for applying polymer modified asphaltic emulsion chip seals. A polymer modified asphaltic emulsion chip seal includes applying a polymer modified asphaltic emulsion, followed by aggregate, and then a flush coat.

A double polymer modified asphaltic emulsion chip seal is the application of a polymer modified asphaltic emulsion followed by aggregate, applied twice in sequence and then a flush coat.

#### 37-2.03A(2) Definitions

Reserved

#### 37-2.03A(3) Submittals

Immediately after sampling, submit two 1-quart cans of polymer modified asphaltic emulsion taken in the presence of the Engineer. A sample must be submitted in an insulated shipping container.

#### 37-2.03A(4) Quality Assurance

37-2.03A(4)(a) General

Reserved

## 37-2.03A(4)(b) Quality Control

37-2.03A(4)(b)(i) General

Reserved

#### 37-2.03A(4)(b)(ii) Polymer Modified Asphaltic Emulsions

Circulate polymer modified asphaltic emulsions 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. In the presence of the Engineer, take two 1-quart samples for acceptance testing.

For polymer modified asphaltic emulsions, the authorized laboratory must perform quality control sampling and testing at the specified frequency and location for the following quality characteristics:

**Polymer Modified Asphaltic Emulsion** 

Quality characteristic	Test method	Minimum sampling and testing frequency	Sampling location
Saybolt Furol Viscosity, at 50 °C (Saybolt Furol seconds) Settlement, 5 days (max, %) Storage stability test, 1 day (max, %)	AASUTO T EO	Minimum	
Sieve test (max, %)  Demulsibility (min, %)  Particle charge	AASHTO T 59	Minimum 1 per day per delivery truck	Distributor truck
Ash content (max, %)	ASTM D3723		
Residue by evaporation (min, %)	California Test 331		
Tests on residue from evaporation test:	_		
Penetration, 25 °C	AASHTO T 49		
Penetration, 4 °C, 200g for 60 seconds	AASHTO T 49	Minimum 1	Distributor
Ductility, 25 °C (min, mm)	AASHTO T 51	per day per	truck
Torsional recovery (min, %)	California Test 332	delivery truck	HUCK
Ring and Ball Softening Point (min, °F)	AASHTO T 53		

## 37-2.03A(4)(c) Department Acceptance

Aggregate acceptance is based on the Department's sampling and testing for compliance with the requirements shown in the following table:

**Aggregate Gradation Acceptance Criteria** 

Quality characteristic	Test method	R	equirement	
Gradation (% passing by weight) Sieve size:		3/8"	5/16"	1/4"
3/4"				
1/2"		100		
3/8"	California Test	85–100	100	100
No. 4	202	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

#### 37-2.03B Materials

## 37-2.03B(1) General

Reserved

## 37-2.03B(2) Polymer Modified Asphaltic Emulsions

A polymer modified asphaltic emulsion must include elastomeric polymer.

A polymer modified asphaltic emulsion must be Grade PMRS2, PMRS2h, PMCRS2, or PMCRS2h. Polymer content in percent by weight does not apply.

A polymer modified asphaltic emulsion must comply with section 94 and the quality characteristic requirements in the following table:

## **Polymeric Asphaltic Emulsion**

Quality characteristic	Test method	Requirement
Penetration, 4 °C, 200g for 60 seconds (min)	AASHTO T 49	6
Ring and Ball Softening Point (min, °F)	AASHTO T 53	135

## 37-2.03B(3) Aggregate

The aggregate gradation for a polymer modified asphaltic emulsion chip seal must comply with the requirements shown in the following table:

### **Asphaltic Emulsion Chip Seal Aggregate Gradation**

Quality characteristic	Test method	Requirement		
Gradation (% passing by weight) Sieve Size		3/8"	5/16"	1/4"
3/4"				
1/2"	Oalifamaia Taat	100		
3/8"	California Test	85–100	100	100
No. 4	202	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

#### 37-2.03C Construction

Polymer modified asphaltic emulsions must be applied within the application rate ranges shown in the following table:

## **Polymer Modified Asphaltic Emulsion Application Rates**

Aggregate gradation	Application rate range (gal/sq yd)
3/8"	0.30-0.45
5/16"	0.25-0.35
1/4"	0.20-0.30

For double polymer modified asphaltic emulsion chip seals, polymer modified asphaltic emulsions must be applied within the application rates shown in the following table:

**Polymer Modified Asphaltic Emulsion Application Rates** 

- 7	<b> </b>
Double application	Application rate range
	(gal/sq yd)
1st application	0.30-0.45
2nd application	0.20-0.30

Apply polymer modified asphaltic emulsions when the ambient air temperature is from 60 to 105 degrees F and the pavement surface temperature is at least 80 degrees F.

Do not apply polymer modified asphaltic emulsions when weather forecasts predict the ambient air temperature will fall below 39 degrees F within 24 hours after application.

Aggregate must be spread within the spread rate ranges shown in the following table:

## **Aggregate Spread Rates**

Chip seal type	Spread rate range (lb/sq yd)
3/8"	20–30
5/16"	16–25
1/4"	12–20

For double chip seals, aggregate must be spread within spread rate ranges shown in the following table:

#### **Aggregate Spread Rates**

Double application	Spread rate range
	(lb/sq yd)
1st application	23–30
2nd application	12–20

Remove excess aggregate on the 1st application before the 2nd application of asphaltic emulsion.

You may stockpile aggregate for the polymer modified asphaltic emulsion chip seals if you prevent contamination. Aggregate must have damp surfaces at spreading. If water visibly separates from the aggregate, do not spread. You may redampen aggregate in the delivery vehicle.

Spread aggregate before the polymer modified asphaltic emulsion sets or breaks.

Do not spread aggregate more than 2,500 feet ahead of the completed initial rolling.

## 37-2.03D Payment

Not Used

#### 37-2.04 ASPHALT RUBBER BINDER CHIP SEALS

#### 37-2.04A General

#### 37-2.04A(1) Summary

Section 37-2.04 includes specifications for applying asphalt rubber binder chip seals.

An asphalt rubber binder chip seal consists of applying asphalt rubber binder followed by heated aggregate precoated with asphalt binder followed by a flush coat.

#### 37-2.04A(2) Definitions

**crumb rubber modifier:** Combination of ground or granulated high natural scrap tire crumb rubber and scrap tire crumb rubber derived from waste tires described in Pub Res Code § 42703.

**descending viscosity reading:** Subsequent viscosity reading at least 5 percent lower than the previous viscosity reading.

high natural scrap tire crumb rubber: Material containing 40 to 48 percent natural rubber.

scrap tire crumb rubber: Any combination of vehicle tires or tire buffing.

## 37-2.04A(3) Submittals

At least 5 business days before use, submit the permit issued by the local air district for asphalt rubber binder field blending equipment and application equipment. If an air quality permit is not required by the local air district for producing asphalt rubber binder, submit verification from the local air district that an air quality permit is not required.

For each delivery of asphalt rubber binder ingredients to the job site, submit a certificate of compliance with a copy of the specified test results.

Submit a certified volume or weight slip for each delivery of asphalt rubber binder ingredients and asphalt rubber binder.

Submit a SDS for each asphalt rubber binder ingredient and the asphalt rubber binder.

At least 15 days before use, submit:

- 1. Samples of each asphalt rubber binder ingredient:
  - 1.1. 2 lbs of scrap tire crumb rubber
  - 1.2. 2 lbs of high natural scrap tire crumb rubber
  - 1.3. Two 1-quart cans of base asphalt binder
  - 1.4. Two 1-quart cans of asphalt modifier
- 2. Asphalt rubber binder formulation and data as follows:
  - 2.1. For asphalt modifier, include:
    - 2.1.1. Source of asphalt modifier
    - 2.1.2. Type of asphalt modifier
    - 2.1.3. Percentage of asphalt modifier by weight of asphalt binder
    - 2.1.4. Percentage of combined asphalt binder and asphalt modifier by weight of asphalt rubber binder
    - 2.1.5. Test results for the specified quality characteristics
  - 2.2. For crumb rubber modifier, include:
    - 2.2.1. Each source and type of scrap tire crumb rubber and high natural scrap tire crumb rubber
    - 2.2.2. Percentage of scrap tire crumb rubber and high natural scrap tire crumb rubber by total weight of asphalt rubber binder
    - 2.2.3. Test results for the specified quality characteristics
  - 2.3. For asphalt rubber binder, include minimum reaction time and temperature

Immediately after sampling, submit five 1-quart cans of asphalt rubber binder taken in the presence of the Engineer. Sample must be submitted in insulated shipping containers.

Submit notification 15 minutes before each viscosity test or submit a schedule of testing times.

Submit the log of asphalt rubber binder descending viscosity test results within 1 business day after sampling.

Submit asphalt rubber binder quality control viscosity test results within 1 business day after sampling.

#### 37-2.04A(4) Quality Assurance

#### 37-2.04A(4)(a) General

The equipment used in producing asphalt rubber binder and the equipment used in spreading asphalt rubber binder must be permitted for use or exempted by the local air district.

#### 37-2.04A(4)(b) Quality Control

## 37-2.04A(4)(b)(i) General

Reserved

#### 37-2.04A(4)(b)(ii) Asphalt Modifiers

For asphalt modifiers, the authorized laboratory must perform quality control sampling and testing at the specified frequency for the following quality characteristics:

#### **Asphalt Modifier for Asphalt Rubber Binder**

Quality characteristic	Test method	Frequency	
Viscosity Flash point	ASTM D445 ASTM D92	1 per shipment	
Molecular Analysis:			
Asphaltenes Aromatics	ASTM D2007 ASTM D2007	1 per shipment	

## 37-2.04A(4)(b)(iii) Crumb Rubber Modifiers

Sample and test scrap tire crumb rubber and high natural scrap tire crumb rubber separately.

Perform quality control sampling and testing at the specified frequency for the following quality characteristics:

#### **Crumb Rubber Modifier**

Quality characteristic	Test method	Frequency
Scrap tire crumb rubber gradation	California Test 385	1 per 10,000
High natural scrap tire crumb rubber gradation	California Test 385	1 per 3,400 lb
Wire in CRM	California Test 385	
Fabric in CRM	California Test 385	1 per 10,000 lb
CRM particle length		i per 10,000 ib
CRM specific gravity	California Test 208	
Natural rubber content in high natural scrap tire crumb rubber	ASTM D297	1 per 3,400 lb

## 37-2.04A(4)(b)(iv) Asphalt Rubber Binders

For asphalt rubber binders, the authorized laboratory must perform quality control sampling and testing at the specified frequency and location for the following quality characteristics:

## **Asphalt Rubber Binder Quality Control Requirements**

Quality characteristic	Test method	Sampling location	Frequency
Descending viscosity <sup>a</sup> at 375 °F (Pa•s x 10 <sup>-3</sup> )	ASTM D7741	Reaction vessel	1 per lot <sup>b</sup>
Viscosity at 375 °F (Pa•s x 10 <sup>-3</sup> )	ASTM D7741	Distribution truck	15 minutes before use per lot <sup>b</sup>
Cone penetration at 25 °C (0.10 mm)	ASTM D217		
Resilience at 25 °C (% rebound)	ASTM D5329	Distribution truck	1 per lot <sup>b</sup>
Softening point (°C)	ASTM D36		

<sup>&</sup>lt;sup>a</sup>Start taking viscosity readings 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 complies with the specification requirement.

<sup>b</sup>A lot is defined in the *MPQP*.

Retain samples from each lot. Test samples for cone penetration, resilience, and softening point for the first 3 lots and if all 3 lots pass, the testing frequency may be reduced to once for every 3 lots.

If QC test results indicate that the asphalt rubber binder does not comply with the specifications, take corrective action and notify the Engineer.

## 37-2.04A(4)(c) Department Acceptance

#### 37-2.04A(4)(c)(i) General

Reserved

#### 37-2.04A(4)(c)(ii) Asphalt Modifiers

The Department accepts asphalt modifier based on compliance with the requirements shown in the following table:

## **Asphalt Modifier for Asphalt Rubber Binder**

Quality characteristic	Test method	Requirement
Viscosity at 100 °C (m <sup>2</sup> /s x 10 <sup>-6</sup> )	ASTM D445	X ± 3 <sup>a</sup>
Flash point (min, °C)	ASTM D92	207
Molecular Analysis:		
Asphaltenes (max, % by mass)	ASTM D2007	0.1
Aromatics (min, % by mass)	ASTM D2007	55

<sup>&</sup>lt;sup>a</sup>The symbol "X" is the asphalt modifier viscosity.

## 37-2.04A(4)(c)(iii) Crumb Rubber Modifiers

Scrap tire CRM and high natural CRM are sampled and tested separately.

The Department accepts scrap tire CRM and high natural CRM based on compliance with the requirements shown in the following table:

**Crumb Rubber Modifier for Asphalt Rubber Binder** 

Quality characteristic	Test method	Requirement
Wire in CRM (max, %)	California Test 385	0.01
Fabric in CRM (max, %)	California Test 385	0.05
CRM particle length (max, in)		3/16
CRM specific gravity	California Test 208	1.1–1.2
Natural rubber content in high natural CRM (%)	ASTM D297	40.0–48.0

The Department accepts CRM gradation based on the requirements shown in the following table:

## **Crumb Rubber Modifier Gradation Requirements**

Quality characteristic	Test method	Requirement			
Gradation (% passing by weight) Sieve size:		Scrap tire c	rumb rubber	-	al scrap tire rubber
		Operating	Contract	Operating	Contract
	California	range	compliance	range	compliance
No. 8		100	100	-	
No. 10		95–100	90–100	100	100
No. 16	Test 385	35–85	32–88	92–100	85–100
No. 30		2–25	1–30	25–95	20–98
No. 50		0–10	0–15	6–35	2–40
No. 100		0–5	0–10	0–7	0–10
No. 200		0–2	0–5	0–3	0–5

If a test result for CRM gradation does not comply with the specifications, the Department deducts the corresponding amount for each gradation test as shown in the following table:

Material	Gradation test result <sup>a</sup>	Deduction
Scrap tire crumb rubber	Operating range < TR < Contract compliance	\$250
Scrap tire crumb rubber	TR > Contract compliance	\$1,100
High natural scrap tire crumb rubber	Operating range < TR < Contract compliance	\$250
High natural scrap tire crumb rubber	TR > Contract compliance	\$600

<sup>&</sup>lt;sup>a</sup>Test Result = TR

Each gradation test for scrap tire crumb rubber represents 10,000 lb or the quantity used in that day's production, whichever is less.

Each gradation test for high natural scrap tire crumb rubber represents 3,400 lb or the quantity used in that day's production, whichever is less.

## 37-2.04A(4)(c)(iv) Asphalt Rubber Binders

For Department acceptance testing, take a sample of asphalt rubber binder in the Engineer's presence every 5 lots or once a day, whichever is greater. Each sample must be in five 1-quart cans with an open top and friction lid.

For an asphalt rubber binder, acceptance is based on the Department's sampling and testing for compliance with the requirements shown in the following table:

## **Asphalt Rubber Binder**

Quality characteristic	Test method	Requirement
Cone penetration at 25 °C (0.10 mm)	ASTM D217	25–60
Resilience at 25 °C (% rebound)	ASTM D5329	18–50
Softening point (°C)	ASTM D36	55–88
Viscosity at 375 °F (Pa•s x 10 <sup>-3</sup> ) <sup>a</sup>	ASTM D7741	1,500-2,500

<sup>&</sup>lt;sup>a</sup>Prepare sample for viscosity test under California Test 388.

## 37-2.04A(4)(c)(v) Precoated Aggregate

The Department accepts precoated aggregate based on compliance with the requirements shown in the following table:

**Precoated Aggregate Gradation Acceptance Criteria** 

Quality Characteristic	Test method	Requirement
1/2" gradation (% passing by weight)	California Test 202	
Sieve size:		
3/4"		100
1/2"		85–90
3/8"		0–30
No. 4		0–5
No. 8		
No. 200		0–1
3/8" gradation (% passing by weight)	California Test 202	
Sieve size:		
3/4"		100
1/2"		95–100
3/8"		70–85
No. 4		0–15
No. 8		0–5
No. 200		0–1

## 37-2.04B Materials

## 37-2.04B(1) General

Reserved

## 37-2.04B(2) Asphalt Binders

Asphalt binder used as the base binder for asphalt rubber binder must comply with the specifications for asphalt binder. Do not modify asphalt binder with polymer.

## 37-2.04B(3) Asphalt Modifiers

An asphalt modifier must be a resinous, high flash point, and aromatic hydrocarbon. An asphalt modifier must comply with the requirements shown in the following table:

## Asphalt Modifier for Asphalt Rubber Binder

Quality characteristic	Test method	Requirement
Viscosity at 100 °C (m <sup>2</sup> /s x 10 <sup>-6</sup> )	ASTM D445	X ± 3 <sup>a</sup>
Flash point (min, CL.O.C., °C)	ASTM D92	207
Molecular analysis:		
Asphaltenes by mass (max, %)	ASTM D2007	0.1
Aromatics by mass (min, %)	ASTM D2007	55

<sup>&</sup>lt;sup>a</sup>X denotes the proposed asphalt modifier viscosity from 19 to 36. A change in X requires a new asphalt rubber binder submittal.

## 37-2.04B(4) Crumb Rubber Modifiers

The CRM to be used must be on the Authorized Materials List for crumb rubber modifier.

The CRM must be ground or granulated at ambient temperature.

Scrap tire crumb rubber and high natural scrap tire 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 CRM particles must be large enough to be ground or granulated.

The CRM must be dry, free-flowing particles that do not stick together. A maximum of 3 percent calcium carbonate or talc by weight of CRM may be added. The CRM must not cause foaming when combined with the asphalt binder and asphalt modifier.

The CRM must comply with the requirements shown in the following table:

## **Crumb Rubber Modifier for Asphalt Rubber Binder**

Quality characteristic	Test method	Requirement
Wire in CRM (max, %)	California Test 385	0.01
Fabric in CRM (max, %)	California Test 385	0.05
CRM particle length (max, in)		3/16
CRM specific gravity	California Test 208	1.1–1.2

The CRM must comply with the requirements shown in the following table:

**Crumb Rubber Modifier Requirements** 

Granb Rabber mounter Requirements				
		Requirement		
Quality characteristic	Test method	Scrap tire crumb rubber	High natural scrap tire crumb rubber	
Acetone extract (%)		6.0–16.0	4.0–16.0	
Rubber hydrocarbon (min, %)		42.0-65.0	50.0	
Natural rubber content (%)	ASTM D297	22.0-39.0	40.0–48.0	
Carbon black content (%)		28.0–38.0		
Ash content (max, %)		8.0		

Scrap tire crumb rubber gradation must comply with the gradation requirements shown in the following table:

**Scrap Tire Crumb Rubber Gradation** 

	ociap file orallib Rubber Oradation				
Quality characteristic	Test method	Requirement			
Gradation (% passing by weight) Sieve size:		Gradation limit	Operating range	Contract compliance	
No. 8	1	100	100	100	
No. 10	California	98–100	95–100	90–100	
No. 16	Test 385	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 scrap tire crumb rubber gradation must comply with the gradation requirements shown in the following table:

**High Natural Scrap Tire Crumb Rubber Gradation** 

Quality characteristic	Test method	Requirement		
Gradation (% passing by weight) Sieve size:		Gradation limit	Operating range	Contract compliance
No. 10	0-1101-	100	100	100
No. 16	California	95–100	92–100	85–100
No. 30	Test 385	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

## 37-2.04B(5) Asphalt Rubber Binders

An 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 MPQP.

The blending equipment must allow the determination of weight percentages of each asphalt rubber binder ingredient.

An asphalt rubber binder must be  $79 \pm 1$  percent by weight asphalt binder and  $21 \pm 1$  percent by weight of CRM. The minimum percentage of CRM must be 20.0 percent and lower values must not be rounded up.

The CRM must be  $75 \pm 2$  percent by weight scrap tire crumb rubber and  $25 \pm 2$  percent by weight high natural scrap tire crumb rubber.

An asphalt modifier and asphalt binder must be blended at the production site. An 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 before adding CRM, the asphalt binder must be from 375 to 440 degrees F when an asphalt modifier is added and the mixture must circulate for at least 20 minutes. An asphalt binder, asphalt modifier, and CRM may be proportioned and combined simultaneously.

The blend of an asphalt binder and an asphalt modifier must be combined with the CRM at the asphalt rubber binder production site. The asphalt binder and asphalt modifier blend must be from 375 to 440 degrees F when the CRM 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 comply with the requirements shown in the following table:

#### **Asphalt Rubber Binder**

Quality characteristic	Test method	Requirement
Cone penetration at 25 °C (0.10 mm)	ASTM D217	25–60
Resilience at 25 °C (% rebound)	ASTM D5329	18–50
Softening point (°C)	ASTM D36	55–88
Viscosity at 375 °F (Pa•s x 10 <sup>-3</sup> ) <sup>a</sup>	ASTM D7741	1,500-2,500

<sup>&</sup>lt;sup>a</sup>Prepare sample for viscosity test under California Test 388.

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, the asphalt rubber binder must be from 375 to 415 degrees F before use.

During reheating, you may add CRM. The CRM must not exceed 10 percent by weight of the asphalt rubber binder. Allow added CRM to react for at least 45 minutes. Reheated asphalt rubber binder must comply with the specifications for asphalt rubber binder.

## 37-2.04B(6) Precoated Aggregate

Before precoating with asphalt binder, aggregate for an asphalt rubber binder chip seal must comply with the gradation requirements shown in the following table:

## Asphalt Rubber Binder Chip Seal Aggregate Gradation

Quality characteristic	Test method	Requi	rement
Gradation (% passing by weight) Sieve size:		1/2"	3/8"
3/4"		100	100
1/2"	California Test	85–90	95–100
3/8"	202	0–30	70–85
No. 4		0–5	0–15
No. 8			0–5
No. 200		0–1	0–1

#### 37-2.04C Construction

#### 37-2.04C(1) General

Reserved

#### 37-2.04C(2) Equipment

Distributor trucks must be equipped with:

- 1. Mixing and heating unit
- 2. Observation platform on the rear of the truck for an observer on the platform to see the nozzles and unplug them if needed

#### 37-2.04C(3) Asphalt Rubber Binder Application

Apply the asphalt rubber binder when the ambient temperature is from 60 to 105 degrees F and the pavement surface temperature is at least 55 degrees F.

Do not apply the asphalt rubber binder unless enough aggregate is available at the job site 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 pavement is damp or during high wind conditions. If authorized, you may adjust the distributor bar height and distribution speed and use shielding equipment during high wind conditions.

When applied, the temperature of the asphalt rubber binder must be from 385 to 415 degrees F.

Apply the asphalt rubber binder at a rate from 0.55 to 0.65 gal/sq yd. You may reduce the application rate by 0.050 gal/sq yd in the wheel paths.

#### 37-2.04C(4) Precoated Aggregate Spreading

Spread aggregate at a rate from 28 to 40 lb/sq yd. Do not spread aggregate more than 200 feet ahead of the completed initial rolling.

## 37-2.04C(5) Rolling and Sweeping

Perform initial rolling within 90 seconds of spreading aggregate. If authorized for final rolling, you may use a steel-wheeled roller weighing from 8 to 10 tons in static mode only.

Perform a final sweeping before Contract acceptance. The final sweeping must not dislodge aggregate.

#### 37-2.04D Payment

Asphalt rubber binder is measured as specified for asphalt binder.

#### 37-2.05 STRESS ABSORBING MEMBRANE INTERLAYERS

#### 37-2.05A General

Section 37-2.05 includes specifications for placing stress absorbing membrane interlayers (SAMI).

Comply with section 37-2.04 except a flush coat is not required.

Traffic must not be allowed on a SAMI.

#### 37-2.05B Materials

For a SAMI, aggregate must comply with the 3/8-inch gradation.

#### 37-2.05C Construction

If a SAMI is overlaid in the same work shift, section 37-2.01C(4)(e) does not apply.

Final sweeping is not required for a SAMI.

#### 37-2.05D Payment

Not Used

#### 37-2.06 MODIFIED ASPHALT BINDER CHIP SEALS

Reserved

#### **37-2.07 SCRUB SEALS**

Reserved

#### 37-3 SLURRY SEALS AND MICRO-SURFACINGS

#### **37-3.01 GENERAL**

37-3.01A General

## 37-3.01A(1) Summary

Section 37-3.01 includes general specifications for applying slurry seals and micro-surfacings.

## 37-3.01A(2) Definitions

Reserved

#### 37-3.01A(3) Submittals

At least 15 days before starting placement of a slurry seal or micro-surfacing, submit:

- 1. Samples for:
  - 1.1. Asphaltic emulsion slurry seal, two 1-quart wide mouth plastic containers with screw top lid of asphaltic emulsion
  - 1.2 Polymer modified asphaltic emulsion slurry seal, two 1-quart wide mouth plastic containers with screw top lid of polymer modified asphaltic emulsion
  - 1.3. Micro-surfacing, two 1-quart wide mouth plastic containers with screw top lid of micro-surfacing emulsion
- Asphaltic emulsion, polymer modified asphaltic emulsion, or micro-surfacing emulsion data as follows:
  - 2.1. Supplier and Type/Grade of asphaltic emulsion
  - 2.2. Type of modifier polymer for polymer modified asphaltic emulsion or micro-surfacing emulsion
  - 2.3. Copy of the specified test results for asphaltic emulsion, polymer modified asphaltic emulsion, or micro-surfacing emulsion
- 3. 50 lb of aggregate
- 4. Aggregate test results for the followings:
  - 4.1. Gradation
  - 4.2. Los Angeles Rattler
  - 4.3. Percent of crushed particles

- 4.4 Sand equivalent
- 4.5 Durability

At least 10 days before starting placement of a slurry seal or micro-surfacing, submit a laboratory report of test results and the proposed mix design from an authorized laboratory. The authorized laboratory must sign the laboratory report and mix design.

The report must include:

- 1. Test results used in the mix design compared with specification requirements
- 2. Proportions based on the dry weight of aggregate, including ranges, for:
  - 2.1. Aggregate
  - 2.2. Water
  - 2.3. Additives
  - 2.4. Mineral filler
  - 2.5. Slurry seal emulsion or micro-surfacing emulsion residual asphalt content
- 3. Recommended changes to the proportions based on heating the mixture to 100 degrees F and mixing for 60 seconds, if atmospheric temperatures during application will be 90 degrees F or above, for:
  - 3.1. Water
  - 3.2. Additives
  - 3.3. Mineral filler
- 4. Quantitative moisture effects on the aggregate's unit weight determined under ASTM C29M

If the mix design consists of the same materials covered by a previous laboratory report, you may submit the previous laboratory report that must include material testing data performed within the previous 12 months for authorization.

If you change any of the materials in the mix design, submit a new mix design and laboratory report at least 10 days before starting slurry seal or micro-surfacing work.

Submit a certificate of compliance as specified for asphaltic emulsion in section 94-1.01C with each shipment of asphaltic emulsion, polymer modified asphaltic emulsion or micro-surfacing emulsion.

Submit quality control test results for the quality characteristics within the reporting times allowance after sampling shown in the following table:

**Quality Control Test Reporting Requirements** 

Quality characteristic	Maximum reporting time		
	allowance		
Los Angeles Rattler loss (max, %)	2 business days		
Percent of crushed particles (min, %)	2 business days		
Durability (min)	2 business days		
Resistance of fine aggregate to			
degradation by abrasion in the Micro-	2 business days		
Deval Apparatus (% loss by weight)			
Gradation (% passing by weight)	48 hours		
Sand equivalent (min)	48 hours		
Moisture content (%)	48 hours		

Within 3 days after taking asphaltic emulsion, polymer modified asphaltic emulsion or micro-surfacing emulsion quality control samples, submit the authorized laboratory's test results.

## 37-3.01A(4) Quality Assurance

## 37-3.01A(4)(a) General

Your authorized laboratory must be able to perform International Slurry Surfacing Association tests and mix design.

## 37-3.01A(4)(b) Quality Control 37-3.01A(4)(b)(i) General

Reserved

## 37-3.01A(4)(b)(ii) Aggregate

For aggregate, the authorized laboratory must perform sampling and testing at the specified frequency and location for the following quality characteristics:

## **Aggregate Quality Control**

Quality characteristic	Test method	Minimum sampling and testing frequency	Location of sampling
Los Angeles Rattler loss (max, %) At 500 revolutions	California Test 211	1st day of production	See California Test 125
Percent of crushed particles (min, %)	AASHTO T 335	1st day of production	See California Test 125
Sand equivalent (min)	California Test 217	1 per working stockpile per day	See California Test 125
Resistance of fine aggregate to degradation by abrasion in the Micro-Deval Apparatus (% loss by weight)	ASTM D7428	1 per working stockpile per day	See California Test 125
Gradation (% passing by weight)	California Test 202	1 per working stockpile per day	See California Test 125
Moisture content, from field stockpile (%)	AASHTO T 255 <sup>a</sup>	1 per working stockpile per day	See California Test 125

<sup>&</sup>lt;sup>a</sup>Test aggregate moisture at field stockpile every 2 hours if you are unable to maintain the moisture content to within a maximum daily variation of ±0.5 percent.

#### 37-3.01A(4)(b)(iii) Slurry Seals and Micro-surfacings

Reserved

## 37-3.01A(4)(c) Department Acceptance

Slurry Seal and micro-surfacing acceptance is based on:

- 1. Visual inspection for the following:
  - 1.1. Uniform surface texture throughout the work limits.
  - 1.2. Marks in the surface:
    - 1.2.1. Up to 4 marks in the completed slurry seal or micro-surfacing surface that are up to 1 inch wide and up to 6 inches long per 1000 square feet of slurry seal or micro-surfacing placed.
    - 1.2.2. No marks in the completed slurry seal or micro-surfacing surface that are over 1 inch wide or 6 inches long.
  - 1.3. Excessive raveling consisting of the separation of the aggregate from the asphaltic emulsion, polymer modified asphaltic emulsion or micro-surfacing emulsion.
  - 1.4. Bleeding consists of the occurrence of a film of asphaltic material on the surface of the slurry seal or micro-surfacing.
  - 1.5. Delaminating of slurry seal or micro-surfacing from the existing pavement.
  - 1.6. Rutting or wash-boarding.
- 2. Department's sampling and testing for compliance with the requirements for aggregate shown in the following table:

## **Aggregate Gradation Acceptance Criteria**

Quality characteristic	Test method	Requirements		
Gradation (% passing by weight) Sieve Size:	California Test 202	Type I	Type II	Type III
3/8"			100	100
No. 4		100	94–100	70–90
No. 8		90–100	65–90	45–70
No. 16		60–90	40–70	28–50
No. 30		40–65	25–50	19–34
No. 200		10–20	5–15	5–15

An aggregate gradation test represents 300 tons or 1 day's production, whichever is less.

If test results for aggregate gradation do not comply with the specifications, you may remove the slurry seal or micro-surfacing represented by the test results or request it remain in place with a payment deduction. If your request is authorized, the Department deducts:

- 1. \$1.75 per ton of slurry seal for each noncompliant aggregate gradation
- 2. \$2.00 per ton of micro-surfacing for each noncompliant aggregate gradation

#### 37-3.01B Materials

## 37-3.01B(1) General

Additional water must not cause separation of the asphaltic emulsion, polymer modified asphaltic emulsion or micro-surfacing emulsion from the aggregate before placement.

You may use an additive that does not adversely affect the slurry seal or micro-surfacing.

## 37-3.01B(2) Aggregate

Aggregate must be rock dust. Aggregate must be free from vegetable matter, deleterious substances, caked or clay lumps, and oversized particles.

Aggregate for a slurry seal and micro-surfacing must comply with the gradations shown in the following table:

#### **Aggregate Gradation**

Quality characteristic	Test method	Requirements			
Gradation (% passing by weight) Sieve size:	California Test 202	Type I	Type II	Type III	
3/8"			100	100	
No. 4		100	94-100	70-90	
No. 8		90-100	65-90	45-70	
No. 16		60-90	40-70	28-50	
No. 30		40-65	25-50	19-34	
No. 200		10-20	5-15	5-15	

#### 37-3.01C Construction

#### 37-3.01C(1) General

Before applying slurry seals or micro-surfacings, cover manholes, valve and monument covers, grates, and other exposed facilities located within the area of application using plastic or oil resistant construction paper secured by tape or adhesive to the facility being covered. Reference the covered facilities with enough control points to relocate the facilities after application of the slurry seals or micro-surfacings.

## 37-3.01C(2) Proportioning

Proportion slurry seal and micro-surfacing ingredients in compliance with the authorized mix design.

# 37-3.01C(3) Mixing and Spreading Equipment 37-3.01C(3)(a) General

Mixing and spreading equipment for slurry seals and micro-surfacings must proportion the asphaltic emulsions, water, aggregate, and any additives by volume and mix them in continuous pug mill mixers.

Introduce emulsions into the mixer with a positive displacement pump. If you use a variable-rate pump, the adjusting unit must be sealed in its calibrated position.

Introduce water into the mixer through a meter that measures gallons.

Choose a truck mounted mixer-spreader or continuous self-loading mixer spreader.

#### 37-3.01C(3)(b) Truck Mounted Mixer Spreaders

Truck mounted mixer spreaders must comply with:

- 1. Rotating and reciprocating equipment must be covered with metal guards.
- 2. Proportion aggregate using a belt feeder with an adjustable cutoff gate. The Engineer verifies the height of the gate opening.
- 3. Belt feeder must have a depth monitor device. The depth monitor device must automatically shut down power to the belt feeder when the aggregate depth is less than 70 percent of the target depth.
- 4. Separate monitor device must detect the revolutions of the belt feeder. This device must automatically shut down power to the belt feeder if it detects no revolutions. If the belt feeder is an integral part of the equipment's drive chain, the monitor device is not required.
- 5. Aggregate belt feeder must be connected directly to the drive on the emulsion pump. The aggregate feeder drive shaft must have a revolution counter reading the nearest 0.10 revolution for microsurfacing, and nearest 1 revolution for slurry seal.
- 6. Emulsion storage must be equipped with a device that automatically shuts down power to the emulsion pump and aggregate belt feeder when the level of stored emulsion is lowered. To allow for normal fluctuations, there may be a delay of 3 seconds between detection of low emulsion storage levels or low aggregate depths and automatic power shut down.
- 7. Emulsion storage must be located immediately before the emulsion pump.
- 8. Emulsion storage tank must have a temperature indicator at the pump suction level. The indicator must be accurate to ±5 degrees F.
- 9. No-flow and revolution warning devices must be in working condition. Low-flow indicators must be visible while walking alongside the equipment.

#### 37-3.01C(3)(c) Continuous Self-Loading Mixer Spreaders

Continuous self-loading mixer spreaders must be automatically sequenced and self-propelled. The mixing machine must deliver each material to a double shafted mixer and discharge the mixed material on a continuous flow basis. The mixing machines must have sufficient storage capacity to maintain a continuous supply of material to the proportioning controls. The mixing machine operators must have full control of forward and reverse speeds during placement.

## 37-3.01C(3)(d) Spreader Boxes

The spreader boxes used to spread slurry seals and micro-surfacings must be:

- 1. Capable of spreading the slurry seal or micro-surfacing a minimum of 12 feet wide and preventing the loss of slurry seal or micro-surfacing.
- 2. Equipped with flexible rubber belting on each side. The belting must contact the pavement to prevent the loss of slurry seal or micro-surfacing from the box.
- 3. Equipped to uniformly apply the slurry seal or micro-surfacing on superelevated sections and shoulder slopes. Micro-surfacing spreader box must be equipped with reversible motor driven augers.
- 4. Equipped with a series of strike-off devices at its rear.
  - 4.1. The leading strike off device must be:
    - 4.1.1. Fabricated of a suitable material such as steel or stiff rubber
    - 4.1.2. Designed to maintain close contact with the pavement during spreading
    - 4.1.3. Capable of obtaining the specified thickness
    - 4.1.4. Capable of being adjusted to the various pavement cross sections
  - 4.2. The final strike-off device must be:
    - 4.2.1. Fabricated of flexible material that produces a uniform texture in the finished surface

- 4.2.2. Cleaned daily and changed if longitudinal scouring occurs in the slurry seal of microsurfacing
- 5. Clean and free of slurry seal or micro-surfacing at the start of each work shift.

## 37-3.01C(3)(e) Shoulder Equipment

Spread the slurry seal or micro-surfacing on shoulders with a device such as an edge box that forms clean and straight joints and edges.

#### 37-3.01C(3)(f) Equipment Calibration

Equipment calibration must comply with the *MPQP*. Notify the Engineer at least 5 business days before calibrating.

If the Department authorizes a truck or continuous mixer spreader, its calibration is valid for 6 months provided you:

- 1. Use the same truck or continuous mixer spreader verified with a unique identifying number
- 2. Use the same materials in compliance with the authorized mix design
- 3. Do not perform any repair or alteration to the proportioning systems

Calibrate the adjustable cut-off gate settings of each truck or continuous mixer spreader on the project to achieve the correct delivery rate of aggregate and emulsion per revolution of the aggregate feeder under the *MPQP*.

Checks must be performed for each aggregate source using an authorized vehicle scale.

Individual checks of the aggregate belt feeder's delivery rate to the pug mill mixer must not vary more than 2 percent from the average of 3 runs of at least 3 tons each.

Before using a variable-rate emulsion pump, the pump must be calibrated and sealed in the calibrated condition under the *MPQP*.

Individual checks of the emulsion pump's delivery rate to the pug mill mixer must not vary more than 2 percent from the average of 3 runs of at least 500 gal each.

## 37-3.01C(4) Surface Preparation

Immediately before applying slurry seals or micro-surfacings, clean the surface to receive slurry seals or micro-surfacings by removing any extraneous material affecting adhesion of the slurry seal or micro-surfacing with the existing surface. Use self-propelled power brooms or other methods such as flushing to clean the existing pavement.

# 37-3.01C(5) Placement

# 37-3.01C(5)(a) General

If truck-mounted mixer-spreaders are used, keep at least 2 operational spreaders at the job site during placement.

Spread slurry seals and micro-surfacings uniformly and do not spot, rehandle, or shift the mixture. However in areas inaccessible to spreading equipment, spread the slurry seal or micro-surfacing mixtures with hand tools or other authorized methods. If placing with hand tools, lightly dampen the area first.

You may fog the roadway surface with water ahead of the spreader box. The fog spray must be adjusted for pavement:

- 1. Temperature
- 2. Surface texture
- 3. Dryness

You determine the application rates for slurry seals or micro-surfacings and the Engineer authorizes the application rates. Spread within 10 percent of authorized rate.

The mixtures must be uniform and homogeneous after spreading, and there must not be separation of the emulsion and aggregate after setting.

#### 37-3.01C(5)(b) Weather Conditions

Only place slurry seals or micro-surfacings if both the pavement and air temperatures are at least 50 degrees F and rising. The expected high temperature must be at least 65 degrees F within 24 hours after placement.

Do not place slurry seals or micro-surfacings if rain is imminent or the air temperature is expected to be below 36 degrees F within 24 hours after placement.

## 37-3.01C(5)(c) Joints

Transverse and longitudinal joints must be:

- 1. Uniform
- 2. Straight
- 3. Neat in appearance
- 4. Without material buildup
- 5. Without uncovered areas

Transverse joints must be butt-type joints.

Prevent double placement at transverse joints over previously placed slurry seals or micro-surfacings.

Place longitudinal joints:

- 1. On centerlines, lane lines, edge lines, or shoulder lines
- 2. With overlaps not more than 4 inches

You may request other longitudinal joint patterns if they do not adversely affect the slurry seals or microsurfacings.

The maximum difference between the pavement surface and the bottom edge of a 12-foot straightedge placed perpendicular to the longitudinal joint must be 0.04 foot.

#### 37-3.01C(5)(d) Finished Surfaces

Finished slurry seals or micro-surfacings must be smooth and free of irregularities such as scratch or tear marks. You may leave up to 4 marks that are up to 1 inch wide and 6 inches long per 75 linear feet of slurry seal or micro-surfacing placed. Do not leave any marks that are over 1 inch wide or 6 inches long.

## 37-3.01C(5)(e) Maintenance Sweeping

Sweep the slurry seals or micro-surfacings 24 hours after placement without damaging the slurry seals or micro-surfacings. For 4 days afterwards, sweep the slurry seals or micro-surfacings daily unless determined otherwise by the Engineer.

#### 37-3.01C(5)(f) Repair of Early Distress

The slurry seals or micro-surfacings must not show bleeding, raveling, separation, or other distresses for 15 days after placing. If bleeding, raveling, delaminating, rutting, or wash-boarding occurs after placing the slurry seals or micro-surfacings, make repairs using an authorized method.

## 37-3.01D Payment

Not Used

#### 37-3.02 SLURRY SEALS

#### 37-3.02A General

## 37-3.02A(1) Summary

Section 37-3.02 includes specifications for applying slurry seals.

Applying a slurry seal consists of spreading a mixture of asphaltic emulsion or polymer modified asphaltic emulsion, aggregate, additives, and water on a surface or pavement.

# 37-3.02A(2) Definitions

Reserved

#### 37-3.02A(3) Submittals

Immediately after sampling, submit two 1-quart wide mouth plastic containers of asphaltic emulsion or polymer modified asphaltic emulsion taken in the presence of the Engineer. Samples must be submitted in insulated shipping containers.

# 37-3.02A(4) Quality Assurance

# 37-3.02A(4)(a) General

Reserved

# 37-3.02A(4)(b) Quality Control

## 37-3.02A(4)(b)(i) General

Take samples of asphaltic emulsion and polymer modified asphaltic emulsion from the tank truck at mid load or from a sampling tap or thief. Before taking samples, draw and dispose of 1 gallon. In the presence of the Engineer take two 1-quart samples in wide mouth plastic containers with lined, sealed lids for acceptance testing.

## 37-3.02A(4)(b)(ii) Asphaltic Emulsion

For asphaltic emulsions, the authorized laboratory must perform quality control sampling and testing at the specified frequency and location for the following quality characteristics:

**Asphaltic Emulsion** 

Quality characteristic	Test method	Minimum sampling and testing frequency	Sampling location
Saybolt Furol Viscosity, at 25  °C (Saybolt Furol seconds)  Sieve Test (%)  Storage stability, 1 day (%)  Residue by distillation (%)  Particle charge <sup>a</sup>	AASHTO T 59	Minimum 1 per day per delivery truck	Delivery truck
Tests on Residue from Distillation	Test:		
Penetration, 25 °C	AASHTO T 49	Minimum 1 per devener	
Ductility	AASHTO T 51	Minimum 1 per day per delivery truck	Delivery truck
Solubility in tricloroethylene	AASHTO T 44	delivery truck	

<sup>&</sup>lt;sup>a</sup>If the result of the particle charge is inconclusive, the asphaltic emulsion must be tested for pH under ASTM E70. Grade QS1h asphaltic emulsion must have a minimum pH of 7.3. Grade CQS1h asphaltic emulsion must have a maximum pH of 6.7.

## 37-3.02A(4)(b)(iii) Polymer Modified Asphaltic Emulsion

For polymer modified asphaltic emulsions, the authorized laboratory must perform quality control sampling and testing at the specified frequency and location for the following quality characteristics:

**Polymer Modified Asphaltic Emulsion** 

Quality characteristic	Test method	Minimum sampling and testing frequency	Sampling Location
Tests on emulsion:			
Saybolt Furol Viscosity at 25 °C	AASHTO T 59		
(Saybolt Furol seconds)		Minimum 1 nor	
Sieve test (%)	AASHTO T 59	Minimum 1 per	Dolivorutruok
Storage stability after 1 day (%)	AASHTO T 59	day per delivery truck	Delivery truck
Residue by evaporation (min, %)	California Test 331	lluck	
Particle charge	AASHTO T 59		
Tests on residue by evaporation:			
Penetration at 25 °C	AASHTO T 49		
Ductility at 25 °C (min, mm)	AASHTO T 51		
Torsional recovery (min, %)	California Test 332	Minimum 1 per	
Or		day per delivery truck	Delivery truck
Polymer content based on residual asphalt (min, %)	California Test 401		

## 37-3.02A(4)(c) Department Acceptance

For a slurry seal asphaltic emulsion and polymer modified asphaltic emulsion, acceptance is based on the Department's sampling and testing for compliance with the requirements for the quality characteristics specified.

Aggregate acceptance is based on the Department's sampling and testing for compliance with the requirements shown in the following table:

**Aggregate Acceptance Criteria** 

00 0 1			
Quality characteristic	Test method	Requirement	
Los Angeles Rattler loss (max, %) At 500 revolutions	California Test 211 <sup>a</sup>	35	
Percent of crushed particles (min, %)	California Test 205	95	
Durability (min)	California Test 229	55	
Sand equivalent (min) Type I Type II Type III	California Test 217	45 55 60	

<sup>&</sup>lt;sup>a</sup>California Test 211 must be performed on the source aggregate before crushing.

A sand equivalent test represents 300 tons or 1 day's production, whichever is less.

If test results for sand equivalent do not comply with the specifications, you may remove the slurry seal represented by the test results or request it remain in place with a payment deduction. If your request is authorized, the Department deducts \$1.75 per ton of slurry seal for each noncompliant sand equivalent test.

37-3.02B Materials 37-3.02B(1) General

Reserved

#### 37-3.02B(2) Asphaltic Emulsions

An asphaltic emulsion must comply with the requirements in Section 94. The asphaltic emulsion must be Grade CQS1h.

# 37-3.02B(3) Polymer Modified Asphaltic Emulsions

A polymer modified asphaltic emulsion must:

- 1. Consist of an elastomeric polymer mixed with an asphaltic material uniformly emulsified with water and an emulsifying or stabilization agent.
- 2. Use either neoprene polymer or butadiene and styrene copolymer. The polymer must be homogeneous and milled into the asphaltic emulsion at the colloid mill.
- 3. Be Grade PMCQS1h and must comply with the requirements shown in the following table:

**Polymer Modified Asphaltic Emulsion Requirements** 

Quality characteristic	Test method	Requirement
Tests on emulsion:		-
Saybolt Furol Viscosity at 25 °C (Saybolt Furol	AASHTO T 59	15–90
seconds)		
Sieve test (%)	AASHTO T 59	0–0.3
Storage stability after 1 day (%)	AASHTO T 59	0–1
Residue by evaporation (min, %)	California Test 331	60
Particle charge	AASHTO T 59	Positive
Tests on residue by evaporation:		
Penetration at 25 °C	AASHTO T 49	40–90
Ductility at 25 °C (min, mm)	AASHTO T 51	400
Torsional recovery (min, %)	California Test 332	18
Or		
Polymer content based on residual asphalt (min, %)	California Test 401	2.5

# 37-3.02B(4) Aggregate

Aggregate must comply with the quality characteristic requirements shown in the following table:

#### **Aggregate Requirements**

Quality characteristic	Test method	Requirement
Los Angeles Rattler loss (max, %) At 500 revolutions	California Test 211 <sup>a</sup>	35
Percent of crushed particles (min, %)	California Test 205	95
Durability (min)	California Test 229	55
Sand equivalent (min)		
Type I	California Test 217	45
Type II	California 1650217	55
Type III		60

<sup>&</sup>lt;sup>a</sup>California Test 211 must be performed on the source aggregate before crushing. The aggregate supplier must certify that the crushed aggregate being used on the project is manufactured from the source aggregate complying with the LA rattler requirements.

## 37-3.02B(5) Slurry Seal Mix Design

The slurry seal mix design, using project source aggregate, an asphaltic emulsion, and set-control agents if any, must comply with the requirements shown in the following table:

**Slurry Seal Mix Design Requirements** 

Quality characteristic	Test method <sup>a</sup>	Requirement
Consistency (max, mm)	Technical Bulletin 106	30
Wet stripping	Technical Bulletin 114	Pass
Compatibility	Technical Bulletin 115	Pass⁵
Cohesion test, within 1 hour (min, kg-mm)	Technical Bulletin 139	200
Wet track abrasion (max, g/m <sup>2</sup> )	Technical Bulletin 100	810

<sup>&</sup>lt;sup>a</sup>Test methods are by the International Slurry Surfacing Association.

The mix design must have the percent of asphaltic residue, based on percentage by weight of the dry aggregate, within the ranges shown in the following table:

Slurry seal type	Residue range	
Type I	10–16	
Type II	7.5–13.5	
Type III	6.5–12.0	

Determine the exact percentage based on the design asphalt binder content and the asphalt residual content of the asphaltic emulsion furnished.

#### 37-3.02C Construction

#### 37-3.02C(1) General

Reserved

#### 37-3.02C(2) Proportioning

After proportioning, slurry seal mixtures must be workable.

#### 37-3.02C(3) Mixing and Spreading Equipment

Reserved

#### 37-3.02C(4) Placement

The slurry seal spread rates must be within the ranges shown in the following table:

#### **Slurry Seal Spread Rates**

Slurry seal type	Application range (lb of dry aggregate/sq yd)	
Type I	8–12	
Type II	10–18	
Type III	20–25	

Within 4 hours after placement, slurry seals must be set enough to allow traffic without pilot cars. Protect slurry seals from damage until it has set and will not adhere or be picked up by vehicle tires. Slurry seals must not exhibit distress from traffic such as bleeding, raveling, separation or other distresses.

#### **37-3.02D Payment**

The payment quantity for slurry seal is the weight determined by combining the weights of the aggregate and asphaltic emulsion or polymeric asphaltic emulsion. The payment quantity for slurry seal does not include the weights of the added water and set-control additives.

#### 37-3.03 MICRO-SURFACINGS

#### 37-3.03A General

#### 37-3.03A(1) Summary

Section 37-3.03 includes specifications for applying micro-surfacings.

<sup>&</sup>lt;sup>b</sup>Mixing test must pass at the maximum expected air temperature at the job site during placement.

Applying a micro-surfacing consists of spreading a mixture of a micro-surfacing emulsion, water, additives, mineral filler, and aggregate on the pavement.

## 37-3.03A(2) Definitions

Reserved

#### 37-3.03A(3) Submittals

Immediately after sampling, submit two 1-quart wide mouth plastic containers of micro-surfacing emulsion taken in the presence of the Engineer. Samples must be submitted in insulated shipping container.

# 37-3.03A(4) Quality Assurance

37-3.03A(4)(a) General

Reserved

# 37-3.03A(4)(b) Quality Control

37-3.03A(4)(b)(i) General

Reserved

# 37-3.03A(4)(b)(ii) Micro-surfacing Emulsions

Take samples from the truck tank at mid load from a sampling tap or thief. Before taking samples, draw and dispose of 1 gallon. In the presence of the Engineer, take two 1-quart wide mouth plastic containers for acceptance testing.

For a micro-surfacing emulsion, the authorized laboratory must perform quality control sampling and testing at the specified frequency and location for the quality characteristics shown in the following table:

#### **Micro-Surfacing Emulsion**

	•		
Quality characteristic	Test method	Minimum sampling and testing frequency	Sampling location
Tests on emulsion:			
Saybolt Furol Viscosity, at 25°C (Saybolt Furol seconds) Storage stability, 1 day (max, %) <sup>a</sup> Sieve test (max, %)	- AASHTO T 59	Minimum 1 per day per delivery truck	Delivery truck
Residue by evaporation (min, %)	California Test 331	Minimum 1 per day per delivery truck	Delivery truck
Tests on residue from evaporation test:			
Penetration at 25 °C	AASHTO T 49	Minimum 1 per day	Dolivorytruok
Softening point (min, °C)	AASHTO T 53	per delivery truck	Delivery truck

<sup>&</sup>lt;sup>a</sup>Storage stability test will be run if the storage exceeds 48 hours

# 37-3.03A(4)(c) Department Acceptance

For micro-surfacing emulsions, acceptance is based on the Department's sampling and testing for compliance with the requirements shown in the following table:

# Micro-surfacing Emulsion Acceptance Criteria

Quality characteristic	Test method	Requirement
Tests on emulsion:		
Saybolt Furol Viscosity at 25 °C	AASHTO T 59	15–90
(Saybolt Furol seconds)		
Sieve test (%)	AASHTO T 59	0.30
Storage stability, 1 day (max, %)	AASHTO T 59	0–1
Settlement <sup>a</sup> , 5 days (max, %)	ASTM D244	5
Residue by evaporation (min, %)	California Test 331	62
Tests on residue by evaporation:		
Penetration at 25 °C	AASHTO T 49	40–90
Softening point (min, °C)	AASHTO T 53	57

<sup>&</sup>lt;sup>a</sup>Settlement test on emulsion is not required if used within 48 hours of shipment.

Acceptance of aggregate, except mineral filler, is based on the Department's sampling and testing for compliance with the requirements shown in the following table:

#### **Aggregate Acceptance Criteria**

Quality characteristic	Test method	Requirement
Los Angeles Rattler loss (max, %) At 500 revolutions	California Test 211 <sup>a</sup>	35
Percent of crushed particles (min, %)	California Test 205	95
Durability (min)	California Test 229	65
Sand equivalent (min)	California Test 217	
Type II		65
Type III		65

<sup>&</sup>lt;sup>a</sup>California Test 211 must be performed on the aggregate before crushing. The aggregate supplier must certify that the crushed aggregate being used on the project is manufactured from the source aggregate complying with the LA rattler requirements.

An aggregate sand equivalent test represents 300 tons or 1 day's production, whichever is less.

If the test results for aggregate sand equivalent do not comply with the specifications, you may remove the micro-surfacing represented by the test results or request it remain in place with a payment deduction. If your request is authorized, the Department deducts \$2.00 per ton of micro-surfacing for each noncompliant aggregate sand equivalent test.

# 37-3.03B Materials

#### 37-3.03B(1) General

Reserved

# 37-3.03B(2) Micro-surfacing Emulsions

A micro-surfacing emulsion must be a homogeneous mixture of asphalt, an elastomeric polymer and an emulsifier solution.

Add an elastomeric polymer modifier to asphalt or emulsifier solution before emulsification. An elastomeric polymer solid must be a minimum of 3 percent by weight of the micro-surfacing emulsion's residual asphalt.

A micro-surfacing emulsion must comply with the requirements shown in the following table:

# Micro-surfacing Emulsion Requirements

Quality characteristic	Test method	Requirement
Tests on emulsion:		
Saybolt Furol Viscosity at 25 °C (Saybolt Furol	AASHTO T 59	15–90
seconds)		
Sieve test (%)	AASHTO T 59	0.30
Storage stability, 1 day (max, %)	AASHTO T 59	0–1
Settlement <sup>a</sup> , 5 days (max, %)	ASTM D244	5
Residue by evaporation (min, %)	California Test 331	62
Tests on residue by evaporation:		
Penetration at 25 °C	AASHTO T 49	40–90
Softening point (min, °C)	AASHTO T 53	57

<sup>&</sup>lt;sup>a</sup>Settlement test on emulsion is not required if used within 48 hours of shipment.

# 37-3.03B(3) Aggregate

Aggregate must comply with the quality characteristic requirements shown in the following table:

# **Aggregate Requirements**

Quality characteristic	Test method	Requirement
Los Angeles Rattler loss (max, %) At 500 revolutions	California Test 211ª	35
Percent of crushed particles (min, %)	California Test 205	95
Durability (min)	California Test 229	65
Sand equivalent (min)	California Test 217	
Type II		65
Type III		65

<sup>&</sup>lt;sup>a</sup>California Test 211 must be performed on the source aggregate before crushing. The aggregate supplier must certify that the crushed aggregate being used on the project is manufactured from the source aggregate complying with the LA rattler requirements.

# 37-3.03B(4) Mineral Fillers

If a mineral filler is used, it must be type I or type II Portland cement. A mineral filler used during mix design must be used during production.

## 37-3.03B(5) Micro-Surfacing Mix Designs

The micro-surfacing mix design must have the material proportion limits shown in the following table:

## **Micro-surfacing Mix Design Proportion Limits**

Material	Proportion limits
Micro-surfacing emulsion asphalt residual content (%	5.5–10.5
of dry weight of aggregate)	
Water and additives	As Required
Mineral filler (% of dry weight of aggregate)	0–3

The micro-surfacing mix design must comply with the requirements shown in the following table:

Micro-surfacing Mix Design Requirements

Quality characteristics	Test method <sup>a</sup>	Requirement
Wet cohesion		
At 30 minutes (set) (min, kg-cm)	Technical Bulletin 139	12
At 60 minutes (traffic) (min, kg-cm)		20
Excess asphalt (max, g/m²)	Technical Bulletin 109	540
Wet stripping (min, %)	Technical Bulletin 114	90
Wet track abrasion loss	Technical Bulletin 100	
6-day soak (max, g/m²)	Technical Bulletin 100	810
Displacement		
Lateral (max, %)	Technical Bulletin 147A	5
Specific gravity after 1000 cycles of 57 kg	Technical Bulletin 147A	2.10
(max)		
Classification compatibility (min, grade points)	Technical Bulletin 144	(AAA, BAA) 11
Mix time at 25 °C (min)	Technical Bulletin 113	Controllable to 120
		seconds

<sup>&</sup>lt;sup>a</sup>Test methods are by the International Slurry Surfacing Association.

## 37-3.03B(6) Tack Coats

If there is a bid item for tack coat, you must coat the pavement surface with an asphaltic emulsion mixed with additional water before applying a micro-surfacing. The maximum ratio of water to asphaltic emulsion must be 2 to 1. Apply the tack coat at a rate from 0.08 to 0.15 gal/sq yd. The exact rate must be authorized.

You determine the grade of slow-setting or guick setting asphaltic emulsion to be used.

## 37-3.03C Construction

#### 37-3.03C(1) General

Reserved

#### 37-3.03C(2) Proportioning

Field conditions may require adjustments to the proportions within the authorized mix design during construction.

## 37-3.03C(3) Mixing and Spreading Equipment

#### 37-3.03C(3)(a) General

Reserved

## 37-3.03C(3)(b) Scratch Course Boxes

Spread the scratch courses with the same type of spreader box used to spread micro-surfacings except use an adjustable steel strike-off device instead of a final strike-off device.

#### 37-3.03C(3)(c) Wheel Path Depression Boxes

Each wheel path depression box must have adjustable strike-off device between 5 and 6 feet wide to regulate depth. The wheel path depression box must also have devices such as hydraulic augers capable of:

- 1. Moving the mixed material from the rear to the front of the filling chamber
- 2. Guiding larger aggregate into the deeper section of the wheel path depression
- 3. Forcing the finer material towards the outer edges of the spreader box

## 37-3.03C(4) Test Strips

If micro-surfacing placement will require more than 1 day, you must construct a test strip. The test strip must be:

- 1. From 300 to 450 feet long
- 2. The same as the full production micro-surfacing
- 3. On 1 of the application courses specified at an authorized location

4. At the same time of day or night the full production micro-surfacing is to be applied

If multiple application courses are specified, you may construct test strips over 2 days or nights.

The Engineer evaluates the test strip after traffic has used it for 12 hours. If the Engineer determines the mix design or placement procedure is unacceptable, make modifications and construct a new test strip for the Engineer's evaluation.

37-3.03C(5) Placement 37-3.03C(5)(a) General

Reserved

## 37-3.03C(5)(b) Repair Wheel Path Depressions

If repairing wheel path depressions is shown in plans, fill wheel path depressions and irregularities with micro-surfacing material before spreading micro-surfacing. If the depressions are less than 0.04 foot deep, fill with a scratch course. If the depressions are 0.04 foot deep or more, fill the depressions using a wheel path depression box.

Spread scratch courses by adjusting the steel strike-off of a scratch course box until it is directly in contact with the pavement surface.

Spread micro-surfacings with a wheel path depression box leaving a slight crown at the surface. Use multiple applications to fill depressions more than 0.12 foot deep. Do not apply more than 0.12 foot in a single application.

Allow traffic to compact each filled wheel path depression for a minimum of 12 hours before placing additional micro-surfacings.

# 37-3.03C(5)(c) Micro-surfacing Pavement Surfaces

The micro-surfacing spread rates must be within the ranges shown in the following table:

Micro-surfacing type	Application range (Ib of dry aggregate/sq yd)
Tvpe II Type III <sup>a</sup>	10–20 20–32
Type III <sup>b</sup>	30–32

<sup>&</sup>lt;sup>a</sup>Over asphalt concrete pavement

Within 2 hours after placement, micro-surfacings must be set enough to allow traffic without pilot cars. Protect the micro-surfacings from damage until it has set and will not adhere or be picked up by vehicle tires. Micro-surfacings must not exhibit distress from traffic such as bleeding, raveling, separation or other distresses.

#### 37-3.03D Payment

The payment quantity for micro-surfacing is the weight determined by combining the weights of the aggregate and micro-surfacing emulsion. The payment quantity for micro-surfacing does not include the weights of added water, mineral filler, and additives.

#### 37-3.04 RUBBERIZED AND MODIFIED SLURRY SEALS

Reserved

#### 37-4 FOG SEALS AND FLUSH COATS

37-4.01 GENERAL 37-4.01A General 37-4.01A(1) Summary

Section 37-4.01 includes general specifications for applying fog seals and flush coats.

<sup>&</sup>lt;sup>b</sup>Over concrete pavement and concrete bridge decks

#### 37-4.01A(2) Definitions

Reserved

## 37-4.01A(3) Submittals

At least 15 days before use, submit:

- 1. Sample of asphaltic emulsion in two 1-quart plastic container with lined, sealed lid
- 2. Asphaltic emulsion information and test data as follows:
  - 2.1. Supplier
  - 2.2. Type/Grade of asphalt emulsion
  - 2.3. Copy of the specified test results for asphaltic emulsion

#### 37-4.01B Materials

Not Used

# 37-4.01C Construction

#### 37-4.01C(1) General

Reserved

#### 37-4.01C(2) Weather Conditions

Only place a fog seal or flush coat if both the pavement and ambient temperatures are at least 50 degrees F and rising. Do not place a fog seal or flush coat within 24 hours of rain or within 24 hours of forecast rain or freezing temperatures.

## 37-4.01D Payment

Not Used

#### **37-4.02 FOG SEALS**

#### 37-4.02A General

#### 37-4.02A(1) Summary

Section 37-4.02 includes specifications for applying fog seals.

Applying a fog seal includes applying a diluted slow-setting or quick setting asphaltic emulsion.

#### 37-4.02A(2) Definitions

Reserved

#### 37-4.02A(3) Submittals

Immediately after sampling, submit two 1-quart plastic container of asphaltic emulsion taken in the presence of the Engineer. Samples must be submitted in insulated shipping container.

#### 37-4.02A(4) Quality Assurance

#### 37-4.02A(4)(a) General

Reserved

# 37-4.02A(4)(b) Quality Control

#### 37-4.02A(4)(b)(i) General

Reserved

#### 37-4.02A(4)(b)(ii) Asphaltic Emulsions

Circulate asphaltic emulsions 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. In the presence of the Engineer, take asphalt emulsion sample in two 1-quart plastic container with lined, sealed lid.

For asphaltic emulsions, the authorized laboratory must perform quality control sampling and testing at the specified frequency and location for the following quality characteristics:

# **Asphaltic Emulsion**

Quality characteristic	Test Method	Minimum sampling and testing frequency	Sampling location
Saybolt Furol Viscosity, at 25 °C (Saybolt Furl seconds) Sieve Test (%)	AACHTO T CO	Minimum 1 per day per	Distributes to all
Storage stability, 1 day (%)	AASHTO T 59	delivery truck	Distributor truck
Residue by distillation (%)		_	
Particle charge <sup>a</sup>			
Tests on Residue from Distillat	ion Test:		
Penetration, 25 °C	AASHTO T 49	Minimum 1 per devener	
Ductility	AASHTO T 51	<ul> <li>Minimum 1 per day per delivery truck</li> </ul>	Distributor truck
Solubility in tricloroethylene	AASHTO T 44	delivery truck	

<sup>&</sup>lt;sup>a</sup>If the result of the particle charge is inconclusive, the asphaltic emulsion must be tested for pH under ASTM E70. Grade QS1h asphaltic emulsion must have a minimum pH of 7.3. Grade CQS1h asphaltic emulsion must have a maximum pH of 6.7.

# 37-4.02A(4)(b)(iii) Asphaltic Emulsion Spread Rates

For fog seals, the authorized laboratory must perform sampling and testing at the specified frequency and location for the following quality characteristics:

#### Fog Seal Quality Control Requirements

Quality characteristic	Test method	Minimum sampling and testing frequency	Location of sampling
Asphaltic emulsion spread rate (gal/sq yd)	California Test 339	2 per day	Pavement surface

#### 37-4.02A(4)(c) Department Acceptance

Fog seal acceptance is based on:

- 1. Visual inspection for the following:
  - 1.1. Uniform surface texture throughout the work limits
  - 1.2. Flushing consisting of the occurrence of a film of asphaltic material on the surface
  - 1.4 Streaking consisting of alternating longitudinal bands of asphaltic emulsion approximately parallel with the lane line
- 2. The Department's sampling and testing for compliance with the requirements for the quality characteristics specified in section 94 for asphaltic emulsion
- 3. Department's sampling and testing for compliance with the requirements for fog seal shown in the following table:

#### Fog Seal Acceptance Criteria

Quality Characteristic	Test Method	Requirement
Asphaltic emulsion spread rate (gal/sq yd)	California Test 339	TV ± 10%

#### 37-4.02B Materials

You determine the grade of slow-setting or quick setting asphaltic emulsion to be used.

# 37-4.02C Construction

Apply asphaltic emulsions for fog seals at a residual asphalt rate from 0.02 to 0.06 gal/sq yd.

If additional water is added to the asphaltic emulsions, the resultant mixture must not be more than 1 part asphaltic emulsion to 1 part water. You determine the dilution rate.

If the fog seals become tacky, sprinkle water as required.

If fog seals and chip seals are on the same project, the joint between the seal coats must be neat and uniform.

# 37-4.02D Payment

The Department does not adjust the unit price for an increase or decrease in the asphaltic emulsion quantity.

#### **37-4.03 FLUSH COATS**

#### 37-4.03A General

# 37-4.03A(1) Summary

Section 37-4.03 includes specifications for applying flush coats.

Applying a flush coat includes applying a fog seal coat followed by sand.

#### 37-4.03A(2) Definitions

Reserved

## 37-4.03A(3) Submittals

At least 15 days before use, submit:

- 1. Proposed target X values for sand gradation.
- 2. Gradation test results for sand

Submit quality control test results for sand gradation within 2 business days of sampling.

# 37-4.03A(4) Quality Assurance

# 37-4.03A(4)(a) General

Reserved

# 37-4.03A(4)(b) Quality Control

For sand, the authorized laboratory must perform sampling and testing at the specified frequency and location for the following quality characteristics:

# **Sand Quality Control**

Quality characteristic	Test method	Minimum sampling and testing frequency	Location of sampling
Gradation (% passing by weight)	California Test 202	1 per day	See California Test 125

# 37-4.03A(4)(c) Department Acceptance

Flush coat acceptance is based on fog seal acceptance and the following:

- 1. Visual inspection for uniform application of sand.
- 2. Sand acceptance is based on the Department's sampling and testing for compliance with the requirements shown in the following table:

# **Sand Gradation Acceptance Criteria**

Quality characteristic	Test method	Requirement
Gradation (% passing by weight) Sieve size: 3/8"		100
No. 4 No. 8 No. 16 No. 30	California Test 202	93–100 61–99 X ± 13 X ± 12
No. 50 No.100 No.200		X ± 9 1–15 0–10

NOTE: "X" is the gradation that you propose to furnish for the specific sieve size.

#### 37-4.03B Material

# 37-4.03B(1) General

Reserved

#### 37-4.03B(2) Sand

Sand must be free from deleterious coatings, clay balls, roots, bark, sticks, rags, and other extraneous material.

Sand for a flush coat must comply with the gradations shown in the following table:

## **Sand Gradation**

Quality characteristic	Test method	Requirement
Gradation (% passing by weight) Sieve size: 3/8" No. 4 No. 8 No. 16 No. 30 No. 50 No. 100	California Test 202	100 93–100 61–99 X ± 13 X ± 12 X ± 9 1–15
No.100 No. 200		1–15 0–10

NOTE: "X" is the gradation that you propose to furnish for the specific sieve size.

Fine aggregate sizes must be distributed such that the difference between the total percentage passing the No. 16 and No. 30 sieves is from 10 to 40, and the difference between the percentage passing the No. 30 and No. 50 sieves is from 10 to 40.

#### 37-4.03C Construction

## 37-4.03C(1) General

During flush coat activities, close adjacent lanes to traffic. Do not track asphaltic emulsion on existing pavement surfaces.

Apply sand immediately after applying asphaltic emulsions.

Spread sand aggregate 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. You determine the application rates for sand and the Engineer authorizes the application rate.

#### 37-4.03C(2) Sweeping

Sweep loose sand material remaining on the surface 24 hours after application.

#### 37-4.03D Payment

The Department does not adjust the unit price for an increase or decrease in the sand cover (seal) quantity.

#### 37-5 PARKING AREA SEALS

#### 37-5.01 GENERAL

## 37-5.01A Summary

Section 37-5 includes specifications for applying parking area seals. Sealing a parking area consists of spreading a mixture of asphaltic emulsion, aggregate, polymer, and water.

#### 37-5.01B Definitions

Reserved

#### 37-5.01C Submittals

At least 15 days before starting placement, submit a 20 lb sample of the aggregate to be used.

At least 10 days before starting placement, submit:

- 1. Name of the authorized laboratory to perform testing and mix design.
- Laboratory report of test results and a proposed mix design. The report and mix design must include
  the specific materials to be used and show a comparison of test results and specifications. The mix
  design report must include the quantity of water allowed to be added at the job site. The authorized
  laboratory performing the tests must sign the original laboratory report and mix design.
- 3. Manufacturer's data for oil seal primer and polymer.

If the mix design consists of the same materials covered by a previous laboratory report, you may submit the previous laboratory report that must include material testing data performed within the previous 12 months for authorization.

If you request substitute materials, submit a new laboratory report and mix design at least 10 days before starting placement.

Submit a certificate of compliance for the parking area seal material.

Immediately after sampling, submit two 1-quart plastic containers of parking area seal taken in the presence of the Engineer. Samples must be submitted in insulated shipping containers.

# 37-5.01D Quality Assurance

37-5.01D(1) General

Reserved

# 37-5.01D(2) Quality Control 37-5.01D(2)(a) General

Reserved

#### 37-5.01D(2)(b) Asphaltic Emulsions

For an asphaltic emulsion, the authorized laboratory must perform quality control sampling and testing at the specified frequency and location for the following quality characteristics:

# **Asphaltic Emulsion**

Quality characteristic	Test Method	Minimum sampling	Sampling
		and testing frequency	location
Saybolt Furol Viscosity, at 25 °C			
(Saybolt Furol seconds)			
Sieve Test (%)	A A CLITO T 50	Minimum 1 per day	Diotributortruck
Storage stability, 1 day (%)	AASHTO T 59	per delivery truck	Distributor truck
Residue by distillation (%)			
Particle charge <sup>a</sup>	1		
Tests on Residue from Distillation Test			
Penetration, 25 °C	AASHTO T 49	Minimum 1 por dov	
Ductility	AASHTO T 51	<ul> <li>Minimum 1 per day per delivery truck</li> </ul>	Distributor truck
Solubility in trichloroethylene	AASHTO T 44	per delivery truck	

<sup>&</sup>lt;sup>a</sup>If the result of the particle char is inconclusive, the asphaltic emulsion must be tested for pH under ASTM E70. Grade QS1h asphaltic emulsion must have a minimum pH of 7.3. Grade CQS1h asphaltic emulsion must have a maximum pH of 6.7.

## 37-5.01D(2)(c) Sand

For sand, the authorized laboratory must perform sampling and testing at the specified frequency and location for the following quality characteristics:

# **Sand Quality Control**

Quality characteristic	Test method	Minimum sampling and testing frequency	Location of sampling
Gradation (% passing by weight)	California Test 202	One per project	See California Test 125

# 37-5.01D(2)(d) Parking Area Seals

For a parking area seal, the authorized laboratory must perform quality control sampling and testing at the specified frequency for the following quality characteristics:

**Parking Area Seal Requirements** 

Quality characteristic	Test method	Frequency	
Mass per liter (kg)	ASTM D244		
Cone penetration (mm)	California Test 413		
Nonvolatile (%)	ASTM D2042 <sup>a</sup>		
Nonvolatile soluble in trichloroethylene (%)	AST W D2042	One per project	
Wet track abrasion (g/m²)	ASTM D3910		
Dried film color			
Viscosity (KU) <sup>b</sup>	ASTM D562		

 $<sup>^{</sup>a}$ Weigh 10 g of homogenous material into a previously tarred, small can. Place in a constant temperature oven at 165 ± 5  $^{\circ}$ C for 90 ± 3 minutes. Cool, reweigh, and calculate nonvolatile components as a percent of the original weight.

# 37-5.01D(3) Department Acceptance

Parking area seal acceptance is based on:

- 1. Visual inspection for:
  - 1.1. Uniform surface texture throughout the work limits
  - 1.2 Marks in the surface:
    - 1.2.1. Up to 4 marks in the completed parking area seal that are up to 1 inch wide and up to 6 inches long per 1,000 square feet of parking area seal placed.
    - 1.2.2. No marks in the completed parking area seal surface that are over 1 inch wide or 6 inches long.

bKrebs units

- 1.2. Raveling consisting of the separation of the aggregate from the asphaltic emulsion
- 1.3. Bleeding consisting of the occurrence of a film of asphaltic material on the surface of the parking area seal
- 1.4 Delaminating of the parking area seal from the existing pavement
- 1.5 Rutting or wash-boarding
- 2. The Department's sampling and testing of aggregate for compliance with 100 percent passing no. 16 sieve under California Test 202
- 3. The Department's sampling and testing for compliance with the requirements shown in the following table:

#### Parking Area Seal Acceptance Criteria

Quality characteristic	Test method	Requirement
Mass per liter (min, kg)	ASTM D244	1.1
Cone penetration (mm)	California Test 413	340–700
Nonvolatile (min, %)	ASTM D2042 <sup>a</sup>	50
Nonvolatile soluble in trichloroethylene (%)	7.6111.526.12	10–35
Wet track abrasion (max, g/m²)	ASTM D3910	380
Dried film color		Black
Viscosity (min, KU) <sup>b</sup>	ASTM D562	75

<sup>&</sup>lt;sup>a</sup>Weigh 10 g of homogenous material into a previously tared, small ointment can. Place in a constant temperature oven at  $165 \pm 5$  °C for  $90 \pm 3$  minutes. Cool, reweigh, and calculate nonvolatile components as a percent of the original weight.

#### **37-5.02 MATERIALS**

#### 37-5.02A General

Aggregate must be clean, hard, durable, uncoated, and free from organic and deleterious substances. One hundred percent of the aggregate must pass the no. 16 sieve.

Asphaltic emulsion must be either Grade SS1h or CSS1h, except the values for penetration at 25 degrees C for tests on residue from distillation must be from 20 to 60.

Polymer must be either neoprene, ethylene vinyl acetate, or a blend of butadiene and styrene.

Oil seal primer must be a quick-drying emulsion with admixtures. Oil seal primer must be manufactured to isolate the parking area seal from pavement with residual oils, petroleum grease, and spilled gasoline.

Crack sealant must comply with section 37-6.

Water must be potable and not separate from the emulsion before the material is placed.

# 37-5.02B Mix Design

The proposed mix design for a parking area seal must comply with the requirements shown in the following table:

<sup>&</sup>lt;sup>b</sup>Krebs units

#### Parking Area Seal Mix Design Requirements

Quality characteristic	Test method	Requirement
Mass per liter (min, kg)	ASTM D244	1.1
Cone penetration (mm)	California Test 413	340–700
Nonvolatile (min, %)	ASTM D2042 <sup>a</sup>	50
Nonvolatile soluble in trichloroethylene (%)	7.01W D2042	10–35
Wet track abrasion (max, g/m²)	ASTM D3910	380
Dried film color		Black
Viscosity (min, KU) <sup>b</sup>	ASTM D562	75

<sup>&</sup>lt;sup>a</sup>Weigh 10 g of homogenous material into a previously tarred, small ointment can. Place in a constant temperature oven at  $165 \pm 5$  °C for  $90 \pm 3$  minutes. Cool, reweigh, and calculate nonvolatile components as a percent of the original weight.

A parking area seal must contain a minimum of 2 percent polymer by volume of undiluted asphaltic emulsion.

# 37-5.02C Proportioning

Parking area seal ingredients must be mixed at a central plant. The plant must include mechanical or electronic controls that consistently proportion the ingredients. Mix an asphaltic emulsion with the other ingredients mechanically.

Store the parking area seal in a tank equipped with mixing or agitation devices. Keep stored materials thoroughly mixed. Protect stored materials from freezing conditions.

#### 37-5.03 CONSTRUCTION

#### 37-5.03A General

Request that the Engineer shut off the irrigation control system at least 5 days before placing the seal. Do not water plants adjacent to the seal at least 24 hours before and after the seal coat placement.

#### 37-5.03B Surface Preparations

If cracks in the existing pavement are from 1/4 to 1 inch wide, treat the cracks under section 37-6. Do not place the parking area seals until the Engineer determines that the crack treatments are cured.

If cracks in the existing pavement are greater than 1 inch wide, the Engineer orders the repair. This work is change order work.

After any crack treatment and before placing parking area seals, clean the pavement surface, including removal of oil and grease spots. Do not use solvents.

If cleaning the pavement with detergents, thoroughly rinse with water. Allow all water to dry before placing parking area seals.

You must seal oil and grease spots that remain after cleaning. Use an oil seal primer and comply with the manufacturer's instructions.

If the existing pavement has oil and grease spots that do not come clean and sealing is insufficient, the Engineer orders the repair of the pavement. This work is change order work.

Before placing the parking area seals, dampen the pavement surface using a distributor truck. Place the seal on the damp pavement but do not place it with standing water on the pavement.

#### 37-5.03C Placement

If adding water at the job site based on the manufacturer's instructions for consistency and spreadability, do not exceed 15 percent by volume of undiluted asphaltic emulsion.

Place the parking area seals in 1 or more application. The seals must be uniform and smooth, free of ridges or uncoated areas.

bKrebs units

If placing in multiple applications, allow the last application to thoroughly dry before the subsequent application.

Do not allow traffic on the parking area seals for at least 24 hours after placement.

Do not stripe over the parking area seals until it is dry.

#### **37-5.04 PAYMENT**

The payment quantity for parking area seal is the weight determined by combining the weights of the aggregate and asphaltic emulsion. The payment quantity for parking area seal does not include the added water and set-control additive.

#### **37-6 CRACK TREATMENTS**

#### **37-6.01 GENERAL**

# 37-6.01A Summary

Section 37-6 includes specifications for treating cracks in asphalt concrete pavement.

#### 37-6.01B Definitions

Reserved

#### 37-6.01C Submittals

If your selected crack treatment material is on the Authorized Material List for flexible pavement crack treatment material, submit a certificate of compliance including:

- 1. Manufacturer's name
- 2. Production location
- 3. Brand or trade name
- 4. Designation
- 5. Batch or lot number
- 6. Crack treatment material type
- 7. Contractor or subcontractor name
- 8. Contract number
- 9. Lot size
- 10. Shipment date
- 11. Manufacturer's signature

If your selected crack treatment material is not on the Authorized Material List for flexible pavement crack treatment material, submit a sample and test results from each batch or lot 20 days before use. Testing must be performed by an authorized laboratory and test results must show compliance with the specifications. Test reports must include the information specified for the certificate of compliance submittal. Each hot-applied crack treatment material sample must be a minimum of 3 lb and submitted in a silicone release container. Each cold-applied crack treatment material sample must be a minimum of 2 quarts and submitted in a plastic container.

At least 10 days before the start of work, submit sand gradation test results under California Test 202.

Submit the following with each delivery of crack treatment material to the job site:

- 1. Manufacturer's heating and application instructions
- 2. Manufacturer's SDS
- 3. Name of the manufacturer's recommended detackifying agent

#### 37-6.01D Quality Assurance

# 37-6.01D(1) General

Hot-applied crack treatment material must be sampled at least once per project in the Engineer's presence. Collect two 3-pounds-minimum samples of crack treatment material from the dispensing wand into silicone release boxes.

Cold-applied crack treatment material must be sampled at least once per project in the Engineer's presence. Collect 2 samples of crack treatment material from the dispensing wand into 1-quart containers.

#### 37-6.01D(2) Quality Control

Reserved

#### 37-6.01D(3) Department Acceptance

Crack treatment acceptance is based on:

- 1. Visual inspection for uniform filling of cracks throughout the work limits including:
  - 1.2. Crack treatment is not more than a 1/4 inch below the specified level
  - 1.3. Sealant failures
  - 1.4. Crack re-opening
  - 1.5. Crack overbanding is less than 3 inches wide
- The Department's sampling and testing for compliance with the requirements shown in the following table:

**Crack Treatment Acceptance Criteria** 

Quality characteristic <sup>a</sup>	Test method <sup>b</sup>	Requirement				
	restinethod	Type 1	Type 2	Type 3	Type 4	Type 5
Softening point (min, °C)	ASTM D36	102	96	90	84	84
Cone penetration at 77 °F (max)	ASTM D5329	35	40	50	70	90
Resilience at 77 °F, unaged (%)	ASTM D5329	20–60	25–65	30–70	35–75	40–80
Flexibility(°C) <sup>c</sup>	ASTM D3111	0	0	0	-11	-28
Tensile adhesion (min, %)	ASTM D5329	300	400	400	500	500
Specific gravity (max)	ASTM D70	1.25	1.25	1.25	1.25	1.25
Asphalt compatibility	ASTM D5329	Pass	Pass	Pass	Pass	Pass
Sieve test (% passing)	See note d	100	100	100	100	100

<sup>&</sup>lt;sup>a</sup>Cold-applied crack treatment material residue collected under ASTM D6943, Method B and sampled under ASTM D140 must comply with the grade specified.

# 37-6.02 MATERIALS 37-6.02A General

Reserved

#### 37-6.02B Crack Treatment Material

A crack treatment material must comply with the requirements shown in the following table:

<sup>&</sup>lt;sup>b</sup>Except for viscosity, cure each specimen at a temperature of  $23 \pm 2$  °C and a relative humidity of  $50 \pm 10$  percent for  $24 \pm 2$  hours before testing.

<sup>&</sup>lt;sup>c</sup>For the flexibility test, the specimen size must be  $6.4 \pm 0.2$  mm thick by  $25 \pm 0.2$  mm wide by  $150 \pm 0.5$  mm long. The test mandrel diameter must be  $6.4 \pm 0.2$  mm. The bend arc must be 180 degrees. The bend rate must be  $2 \pm 1$  seconds. At least 4 of 5 test specimens must pass at the specified test temperature without fracture, crazing, or cracking.

<sup>&</sup>lt;sup>d</sup>For hot-applied crack treatment, dilute with toluene and sieve through a no. 8 sieve. For cold-applied crack treatment, sieve the material as-received through a no. 8 sieve. If the manufacturer provides a statement that added components passed the no. 16 sieve before blending, this requirement is void.

#### **Crack Treatment Material**

Quality characteristic <sup>a</sup>	Test method <sup>b</sup>		R	Requireme	nt	
Quanty enaracterions	Tootmoulou	Type 1	Type 2	Type 3	Type 4	Type 5
Softening point (min, °C)	ASTM D36	102	96	90	84	84
Cone penetration at 77 °F (max)	ASTM D5329	35	40	50	70	90
Resilience at 77 °F, unaged (%)	ASTM D5329	20-60	25-65	30–70	35–75	40–80
Flexibility(°C) <sup>c</sup>	ASTM D3111	0	0	0	-11	-28
Tensile adhesion (min, %)	ASTM D5329	300	400	400	500	500
Specific gravity (max)	ASTM D70	1.25	1.25	1.25	1.25	1.25
Asphalt compatibility	ASTM D5329	Pass	Pass	Pass	Pass	Pass
Sieve test (% passing)	See note d	100	100	100	100	100

<sup>&</sup>lt;sup>a</sup>Cold-applied crack treatment material residue collected under ASTM D6943, Method B and sampled under ASTM D140 must comply with the grade specifications.

A crack treatment material must be delivered to the job site with the information listed below. If crack treatment material is delivered to the job site in containers, each container must be marked with the following information.

- 1. Manufacturer's name
- 2. Production location
- 3. Brand or trade name
- 4. Designation
- 5. Crack treatment trade name
- 6. Batch or lot number
- 7. Maximum heating temperature
- 8. Expiration date for cold application only

Hot-applied crack treatment must be delivered to the job site premixed in cardboard containers with meltable inclusion liners or in a fully meltable package.

Cold-applied crack treatment must have a minimum shelf life of 3 months from the date of manufacture.

# 37-6.02C Sand

Sand applied to tacky crack treatment material must be clean, free of clay, and comply with the gradation shown in the following table:

#### Sand Gradation

Quality characteristic	Test method	Requirement
Gradation (% passing by weight)		
Sieve size:		
No. 4	California Test 202	100
No. 50		0–30
No. 200		0–5

#### 37-6.03 CONSTRUCTION

Treat cracks from 1/4 to 1 inch in width for the entire length of the crack. Fill or repair cracks wider than 1 inch as ordered. Filling cracks wider than 1 inch is change order work.

Except for viscosity, cure each specimen at a temperature of  $23 \pm 2$  °C and a relative humidity of  $50 \pm 10$  percent for  $24 \pm 2$  hours before testing.

For the flexibility test, the specimen size must be  $6.4 \pm 0.2$  mm thick by  $25 \pm 0.2$  mm wide by  $150 \pm 0.5$  mm long. The test mandrel diameter must be  $6.4 \pm 0.2$  mm. The bend arc must be 180 degrees. The bend rate must be  $2 \pm 1$  seconds. At least 4 of 5 test specimens must pass at the specified test temperature without fracture, crazing, or cracking.

<sup>&</sup>lt;sup>d</sup>For hot-applied crack treatment, dilute with toluene and sieve through a no. 8 sieve. For cold-applied crack treatment, sieve the material as-received through a no. 8 sieve. If the manufacturer provides a statement that added components passed the no. 16 sieve before blending, this requirement is void.

If treating cracks on a traffic lane adjacent to a shoulder, treat the cracks on the shoulder.

For hot-applied crack treatment material, rout cracks or saw cut to form a reservoir.

Cracks must be clean and dry before treating. Before treating, blast cracks with oil-free compressed air at a pressure of at least 90 psi.

If the pavement temperature is below 40 degrees F or if there is evidence of moisture in the crack, use a hot air lance immediately before applying crack treatment. The hot air lance must not apply flame directly on the pavement.

Heat and apply hot-applied crack treatment material under with the manufacturer's instructions.

Apply cold-applied crack treatment material with a distributor kettle, a piston, or a diaphragm barrel pump that can deliver from 50 to 75 psi. The application line must have a pressure gauge and a filter. The pressure in the application line must not exceed 20 psi. The pressure gauge must have a regulator. Use a high-pressure hose with a 1/2-inch NPT swivel connection and a dispensing wand.

Apply crack treatment with a nozzle inserted into the crack. Fill the crack flush. If after 2 days the crack treatment is more than 1/4 inch below the specified level, the sealant fails, or the crack re-opens, re-treat the crack.

Immediately remove crack treatment material that is spilled or deposited on the pavement surface.

Before opening to traffic, apply sand or the manufacturer's recommended detackifying agent to tacky crack treatment material on the traveled way.

Sweep up excess sand before opening to traffic.

#### **37-6.04 PAYMENT**

The payment quantity for crack treatment is the length measured in lane miles along the edge of each paved lane parallel to the pavement's centerline. The payment for a lane includes crack treatment of the adjacent shoulder.

37-7-37-10 RESERVED

^^^^^

# 39 ASPHALT CONCRETE

07-15-16

Replace SP-2 at each occurrence in section 39 with:

01-15-16

MS-2

#### Replace the 3rd paragraph of section 39-2.01A(1) with:

07-15-16

WMA technologies must be on the Authorized Material List for WMA authorized technologies.

#### Add between the 3rd and 4th paragraphs of section 39-2.01A(1):

04-15-16

For HMA that uses asphalt binder containing crumb rubber modifier, submit a Crumb Rubber Usage Report form monthly and at the end of the project.

# Add to the table in the 4th paragraph of section 39-2.01A(1):

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01-15-16

Add to item 8 in the 4th paragraph of section 39-2.01A(3)(b)(i):

, except lime supplier and source

07-15-16

Replace the headings and paragraphs of section 39-2.01A(3)(i) with:

01-15-16

39-2.01A(3)(i) Reserved

Replace the 2nd sentence in the 3rd paragraph of section 39-2.01A(4)(b) with:

01-15-16

Submit 3 parts and keep 1 part.

Add between single and test in the 7th paragraph of section 39-2.01A(4)(i)(i):

07-15-16

aggregate or HMA

## Replace the 1st paragraph of section 39-2.01B(2)(b) with:

07-15-16

If the proposed JMF indicates that the aggregate is being treated with dry lime or lime slurry with marination, or the HMA with liquid antistrip, then testing the untreated aggregate under AASHTO T 283 and AASHTO T 324 is not required.

If HMA treatment is required or being used by the Contractor, determine the plasticity index of the aggregate blend under California Test 204.

Add between aggregate and with dry lime in the 3rd and 4th paragraphs of section 39-2.01B(2)(b):

07-15-16

blend

## Replace the 9th through 11th paragraphs of section 39-2.01B(8)(a) with:

07-15-16

HMA must be produced at the temperatures shown in the following table:

# **HMA Production Temperatures**

HMA compaction	Temperature (°F)		
HMA			
Density based	≤ 325		
Method	305–325		
HMA with WMA technology			
Density based	240–325		
Method	260–325		

## Delete the 1st paragraph of section 39-2.01B(11).

#### Add after the 2nd paragraph of section 39-2.01B(11):

04-15-16

For miscellaneous areas and dikes:

- 1. Choose the aggregate gradation from:
  - 1.1. 3/8-inch Type A HMA aggregate gradation
  - 1.2. 1/2-inch Type A HMA aggregate gradation
  - 1.3. 1/2-inch dike mix aggregate gradation
- 2. Choose asphalt binder Grade PG 64-10, PG 64-16 or PG 70-10.
- 3. Minimum asphalt binder content must be:
  - 3.1. 6.40 percent for 3/8-inch Type A HMA aggregate gradation
  - 3.2. 5.70 percent for 1/2-inch Type A HMA aggregate gradation
  - 3.3. 6.40 percent for 1/2-inch dike mix aggregate gradation

If you request and the Engineer authorizes, you may reduce the minimum asphalt binder content.

Aggregate gradation for 1/2-inch dike mix must be within the TV limits for the specified sieve size shown in the following table:

# Aggregate Gradation for 1/2-inch Dike Mix (Percentage Passing)

	` 5	
Sieve size	Target value limit	Allowable tolerance
3/4"	100	-
1/2"	90–95	TV ± 5
No. 4	70–75	TV ± 5
No. 8	23–25	TV ± 5
No. 50	15–35	TV ± 5
No. 200	7.0–13.0	TV ± 2.0

# Replace item 4 in the 2nd paragraph of section 39-2.01C(1) with:

07-15-16

- 4. For method compaction:
  - 4.1. The temperature of the HMA and the HMA produced with WMA water injection technology in the windrow does not fall below 260 degrees F
  - 4.2. The temperature of the HMA produced using WMA additive technology in the windrow does not fall below 250 degrees F

07-15-16

Delete item 3 in the 8th paragraph of section 39-2.01C(1).

## Replace 39-2.01A(3)(m)(iv) in the 6th paragraph of section 39-2.01C(3)(e) with:

01-15-16

36-3.01C(3)

## Replace 2.06 in the 4th paragraph of section 39-2.01C(3)(f) with:

07-15-16

2.05

# Add to the end of section 39-2.01C(15)(b):

07-15-16

The compacted lift thickness must not exceed 0.25 foot.

Add between rectangles and with in the 4th paragraph of section 39-2.01C(16):

, half the lane width,

04-15-16

Add between to and the in item 1 of the 4th paragraph of section 39-2.01C(16):

and along

04-15-16

Delete coat in the 5th paragraph of section 39-2.01C(16).

07-15-16

Replace 37 in the 5th paragraph of section 39-2.01C(16) with:

07-15-16

37-4.02

#### Replace section 39-2.02A(3)(b) with:

01-15-16

The JMF must be based on the superpave HMA mix design as described in MS-2 Asphalt Mix Design Methods by the Asphalt Institute.

## Add between the 1st and 2nd paragraphs of section 39-2.02C:

07-15-16

If the ambient air temperature is below 60 degrees F, cover the loads in trucks with tarpaulins. If the time for HMA discharge to truck at the HMA plant until transfer to paver's hopper is 90 minutes or greater and if the ambient air temperature is below 70 degrees F, cover the loads in trucks with tarpaulins, unless the time from discharging to the truck until transfer to the paver's hopper or the pavement surface is less than 30 minutes. The tarpaulins must completely cover the exposed load until you transfer the mixture to the paver's hopper or the pavement surface.

# Replace the table in the 2nd paragraph of section 39-2.02C with:

07-15-16

**Minimum Ambient Air and Surface Temperatures** 

Millimum Ambient Air and Surface remperatures						
Lift thickness	Ambient air (°F)		Surface (°F)			
(feet)	Unmodified	Modified asphalt	Unmodified asphalt	Modified asphalt		
	asphalt binder	binder	binder	binder		
Type A HMA and Type A HMA produced with WMA water injection technology						
< 0.15	55	50	60	55		
≥0.15	45	45	50	50		
Type A HMA produ	Type A HMA produced with WMA additive technology					
<0.15	45	45	50	45		
≥0.15	40	40	40	40		

#### Delete the 3rd paragraph of section 39-2.02C.

# Add between HMA and placed in the 1st sentence of the 4th paragraph of section 39-2.02C:

and Type A HMA produced with WMA water injection technology

07-15-16

#### Add between the 4th and the 5th paragraphs of section 39-2.02C:

07-15-16

For Type A HMA produced with WMA additive technology placed under method compaction, if the asphalt binder is:

- 1. Unmodified, complete:
  - 1.1 1st coverage of breakdown compaction before the surface temperature drops below 240 degrees F
  - Breakdown and intermediate compaction before the surface temperature drops below 190 degrees F
  - 1.3. Finish compaction before the surface temperature drops below 140 degrees F
  - 1.4 You may continue static rolling below 140 degrees F to remove roller marks.
- 2. Modified, complete:
  - 1st coverage of breakdown compaction before the surface temperature drops below 230 degrees F
  - 2.2. Breakdown and intermediate compaction before the surface temperature drops below 170 degrees F
  - 2.3. Finish compaction before the surface temperature drops below 130 degrees F
  - 2.4. You may continue static rolling below 130 degrees F to remove roller marks.

#### Replace the 2nd paragraph of section 39-2.03A(3)(b) with:

01-15-16

The JMF must be based on the superpave HMA mix design as described in MS-2 Asphalt Mix Design Methods by the Asphalt Institute.

# Replace the requirement in the row for *Voids in mineral aggregate on plant produced HMA* in the 2nd table in section 39-2.03A(4)(e)(i) with:

01-15-16

18.0-23.0

## Add before the 1st paragraph of section 39-2.03A(4)(e)(ii)(C):

04-15-16

CRM used must be on the Authorized Materials List for Crumb Rubber Modifier.

CRM must be a ground or granulated combination of scrap tire crumb rubber and high natural scrap tire crumb rubber, CRM must be  $75.0 \pm 2.0$  percent scrap tire crumb rubber and  $25.0 \pm 2.0$  percent high natural scrap tire crumb rubber by total weight of CRM. Scrap tire crumb rubber and high natural scrap tire crumb rubber must be derived from waste tires described in Pub Res Code § 42703.

#### Replace the row for Hamburg wheel track in the table in section 39-2.03B(2) with:

01-15-16

Hamburg wheel track (min, number of passes at the inflection	AASHTO T 324	
point)	(Modified) <sup>a</sup>	
Binder grade:		
PG 58		10,000
PG 64		12,500
PG 70		15,000

# Replace RHMA-G in the 3rd and 5th paragraphs of section 39-2.03C with:

07-15-16

RHMA-G and RHMA-G produced with WMA water injection technology

#### Add between the 5th and 6th paragraphs of section 39-2.03C:

07-15-16

For RHMA-G produced with WMA additive technology placed under method compaction:

- Complete the 1st coverage of breakdown compaction before the surface temperature drops below 260 degrees F
- Complete breakdown and intermediate compaction before the surface temperature drops below 230 degrees F
- 3. Complete finish compaction before the surface temperature drops below 180 degrees F
- 4. You may continue static rolling below 140 degrees F to remove roller marks

#### Replace the 6th and 7th paragraphs of section 39-2.04C with:

07-15-16

For HMA-O and HMA-O produced with WMA water injection technology:

- 1. With unmodified asphalt binder:
  - 1.1. Spread and compact only if the atmospheric temperature is at least 55 degrees F and the surface temperature is at least 60 degrees F.
  - Complete the 1st coverage using 2 rollers before the surface temperature drops below 240 degrees F.
  - 1.3. Complete all compaction before the surface temperature drops below 200 degrees F.
- 2. With modified asphalt binder, except asphalt rubber binder:
  - 2.1. Spread and compact only if the atmospheric temperature is at least 50 degrees F and the surface temperature is at least 50 degrees F.
  - 2.2. Complete the 1st coverage using 2 rollers before the surface temperature drops below 240 degrees F.
  - 2.3. Complete all compaction before the surface temperature drops below 180 degrees F.

# For HMA-O produced with WMA additive technology:

- 1. With unmodified asphalt binder:
  - 1.1. Spread and compact only if the atmospheric temperature is at least 45 degrees F and the surface temperature is at least 50 degrees F.
  - 1.2. Complete the 1st coverage using 2 rollers before the surface temperature drops below 230 degrees F.
  - 1.3. Complete all compaction before the surface temperature drops below 190 degrees F.
- 2. With modified asphalt binder, except asphalt rubber binder:
  - 2.1. Spread and compact only if the atmospheric temperature is at least 40 degrees F and the surface temperature is at least 40 degrees F.
  - 2.2. Complete the 1st coverage using 2 rollers before the surface temperature drops below 230 degrees F.

2.3. Complete all compaction before the surface temperature drops below 170 degrees F.

# Replace RHMA-O and RHMA-O-HB in the 8th paragraph of section 39-2.04C with:

07-15-16

RHMA-O and RHMA-O produced with WMA water injection technology, and RHMA-O-HB and RHMA-O-HB produced with WMA water injection technology

# Add between the 8th and 9th paragraphs of section 39-2.04C:

07-15-16

For RHMA-O produced with WMA additive technology and RHMA-O-HB produced with WMA additives technology:

- Spread and compact if the ambient air temperature is at least 45 degrees F and the surface temperature is at least 50 degrees F
- Complete the 1st coverage using 2 rollers before the surface temperature drops below 270 degrees F
- 3. Complete all compaction before the surface temperature drops below 240 degrees F

## Add to the 2nd paragraph of section 39-2.05A(3)(b):

01-15-16

The material transfer vehicle must receive HMA directly from the truck.

#### Replace Table 6.1 at each occurrence in the table in section 39-2.05B(2) with:

01-15-16

Table 8.1

# Replace SP-2 Asphalt Mixture in the 1st footnote in the table in the 2nd paragraph of section 39-2.05B(2)(b) with:

01-15-16

MS-2 Asphalt Mix Design Methods

# Replace *Manual Series No. 2 (MS-2)* in the 1st footnote in the table in the 2nd paragraph of section 39-2.05B(2)(b) with:

01-15-16

MS-2 Asphalt Mix Design Methods

#### Replace 39-3.05 in the 1st paragraph of section 39-3.04A with:

01-15-16

39-3.04

#### Add to the end of section 39-3.04A:

07-15-16

Schedule cold planing activities such that the pavement is cold planed, the HMA is placed, and the area is opened to traffic during the same work shift.

07-15-16

Delete the 2nd sentence of the 1st paragraph in section 39-3.04C(4).

39-3.05

^^^^^

# DIVISION VI STRUCTURES 47 EARTH RETAINING SYSTEMS

07-15-16

# Replace the 6th paragraph in section 47-2.02A with:

07-15-16

Rock for rock slope protection at drain pipe outlets must be small-rock slope protection and must comply with the gradation specified for 7-inch-thick layer in section 72-4.02.

#### ^^^^^

#### 49 PILING

07-15-16

04-15-16

Delete the 2nd paragraph of section 49-1.01A.

# Replace the 1st sentence in the 5th paragraph of section 49-1.01D(3) with:

07-15-16

Load test and anchor piles must comply with the specifications for piling as described and Class N steel pipe piling.

#### Add to the list in 7th paragraph of section 49-1.01D(3):

07-15-16

5. Welds that connect the anchor pile and the anchor pile head must be tested under section 49-2.02A(4)(b)(iii)(C)

# Replace the 10th paragraph of section 49-1.01D(3) with:

07-15-16

Furnish labor, materials, tools, equipment, and incidentals as required to assist the Department in the transportation, installation, operation, and removal of Department-furnished steel load test beams, jacks, bearing plates, drills, and other test equipment. This is change order work.

#### Replace the 7th paragraph of section 49-1.01D(4) with:

07-15-16

Piles to be dynamically monitored must:

- 1. Have an additional length of 2 times the pile diameter plus 2 feet.
- 2. Be available to the Department at least 2 business days before driving.
- 3. Be safely supported at least 6 inches off the ground in a horizontal position on at least 2 support blocks. If requested, rotate the piles on the blocks.
- 4. Be positioned such that the Department has safe access to the entire pile length and circumference for the installation of anchorages and control marks for monitoring.

07-15-16 Delete business in item 6 in the list in the 8th paragraph of section 49-1.01D(4). Add to the list in 9th paragraph of section 49-1.01D(4): 07-15-16 3. Cut pile to the specified cut-off elevation after bearing acceptance criteria is provided by the Department 04-15-16 Delete the 3rd paragraph of section 49-1.03. 04-15-16 Delete the 2nd paragraph of section 49-1.04. 01-15-16 Delete the 4th paragraph of section 49-2.01C(5). Replace item 3 in the list in the 2nd paragraph of section 49-3.01A with: 07-15-16 3. CISS concrete piles Add between undisturbed material and in a dry in the 1st paragraph of section 49-3.01C: 07-15-16 , casing, or steel shell Replace the 2nd and 3rd paragraphs of section 49-3.01C with: 07-15-16 Place and secure reinforcement. Securely block the reinforcement to provide the minimum clearance shown between the reinforcing steel cage and the sides of the drilled hole, casing, or steel shell. Steel shells, casings, and drilled holes must be clean and free of debris before reinforcement and concrete are placed. Replace dewatered in the 4th paragraphs of section 49-3.01C with: 07-15-16 drilled Add to section 49-3.02A(1): 07-15-16 Permanent steel casing and driven steel shell must comply with section 49-2.02. Replace the paragraph of section 49-3.02A(2) with: 07-15-16 **dry hole:** A drilled hole that requires no work to keep it free of water. dewatered hole: A drilled hole that:

1. Accumulates no more than 12 inches of water at the bottom during a 1 hour period without any

pumping from the hole.

- 2. Has no more than 3 inches of water at the bottom immediately before placing concrete.
- 3. Does not require temporary casing to control the groundwater.

# Replace item 8 in the list in the 1st paragraph of section 49-3.02A(3)(b) with:

07-15-16

- 8. Drilling plan and sequence
- 9. Concrete sequence and placement plan
- 10. If inspection pipes are required, methods for ensuring the inspection pipes remain straight, undamaged, and properly aligned during concrete placement

# Replace 1 business day in the paragraph of section 49-3.02A(3)(d) with:

2 business days

07-15-16

# Add to section 49-3.02A(3)(d):

07-15-16

The log must:

- 1. Show the pile location, tip elevation, cutoff elevation, dates of excavation and concrete placement, total quantity of concrete placed, length and tip elevation of any casing, and details of any hole stabilization method and materials used.
- 2. Include an 8-1/2 by 11 inch graph of concrete placed versus depth of hole filled as follows:
  - 2.1. Plot the graph continuously throughout concrete placement. Plot the depth of drilled hole filled vertically with the pile tip at the bottom and the quantity of concrete placed horizontally.
  - 2.2. Take readings at each 5 feet of pile depth, and indicate the time of the reading on the graph.

#### Add after the sentence in the paragraph of section 49-3.02A(3)(e):

07-15-16

Allow 10 days for the review.

# Replace the 3rd sentence in the paragraph of section 49-3.02A(3)(f) with:

07-15-16

Allow 10 days for the review and analysis of this report.

# Add after rejected pile in the 1st sentence in the 1st paragraph of section 49-3.02A(3)(g):

07-15-16

to be mitigated

07-15-16

#### Delete the 2nd paragraph of section 49-3.02A(3)(g).

#### Replace item 3 in the list in the 3rd paragraph of section 49-3.02A(3)(g) with:

07-15-16

# Replace the 2nd sentence in the paragraph of section 49-3.02A(3)(i) with:

Allow 10 days for the review.

07-15-16

# Add to section 49-3.02A(3):

07-15-16

# 49-3.02A(3)(j) Certifications

If synthetic slurry is used, submit as an informational submittal the names and certifications of your employees who are trained and certified by the synthetic slurry manufacturer.

## Add after excavated hole in the 1st sentence in the 3rd paragraph of section 49-3.02A(4)(c):

07-15-16

lined with plastic

# Replace the 1st paragraph of section 49-3.02A(4)(d)(i) with:

07-15-16

Section 49-3.02A(4)(d) applies to CIDH concrete piles except for piles (1) less than 24 inches in diameter or (2) constructed in dry or dewatered holes.

#### Replace gamma-gamma logging in the 2nd paragraph of section 49-3.02A(4)(d)(i) with:

GGL

07-15-16

# Replace the 1st sentence in the 3rd paragraph of section 49-3.02A(4)(d)(i) with:

07-15-16

After notification by the Engineer of pile acceptance, fill the inspection pipes and cored holes with grout.

#### Replace gamma-gamma logging in section 49-3.02A(4)(d)(ii) with:

07-15-16

**GGL** 

## Replace the 3rd and 4th paragraphs of section 49-3.02A(4)(d)(iii) with:

07-15-16

The Department may perform CSL to determine the extent of the anomalies identified by GGL and to further evaluate a rejected pile for the presence of anomalies not identified by GGL. The pile acceptance test report will indicate if the Department intends to perform CSL and when the testing will be performed. Allow the Department 20 additional days for a total of 50 days to perform CSL and to provide supplemental results.

If authorized, you may perform testing on the rejected pile.

07-15-16

#### Delete the 8th paragraph of section 49-3.02A(4)(d)(iii).

#### Add to the end of section 49-3.02A(4)(d)(iii):

07-15-16

If the Engineer determines it is not feasible to repair the rejected pile, submit a mitigation plan for replacement or supplementation of the rejected pile.

## Add to section 49-3.02A(4):

07-15-16

#### 49-3.02A(4)(e) Certifications

If synthetic slurry is used, your employees who will be providing technical assistance in the slurry activities must be trained and certified by the synthetic slurry manufacturer to show their competency to perform inspection of slurry operations.

# Replace section 49-3.02B(4) with:

07-15-16

# 49-3.02B(4) Reserved

Replace near in the 3rd, 4th, and 5th paragraphs of section 49-3.02B(6)(b) with:

07-15-16

within 2 feet of

Replace twice per shift in item 2 in the 3rd paragraph of section 49-3.02B(6)(b) with:

07-15-16

every 4 hours

07-15-16

Delete the 7th and 8th paragraphs of section 49-3.02B(6)(b).

07-15-16

Delete the 3rd paragraph of section 49-3.02B(6)(c).

Replace *near* in item 2 in the 4th paragraph of section 49-3.02B(6)(c) with:

within 2 feet of

07-15-16

## Replace item 5 in the 4th paragraph of section 49-3.02B(6)(c) with:

5. After final cleaning and immediately before placing concrete.

07-15-16

## Replace section 49-3.02B(9) with:

#### 49-3.02B(9) Inspection Pipes

07-15-16

Inspection pipes must be schedule 40 PVC pipe complying with ASTM D1785 with a nominal pipe size of 2 inches.

Watertight PVC couplers complying with ASTM D2466 are allowed to facilitate pipe lengths in excess of those commercially available.

## Add to the beginning of section 49-3.02C(1):

07-15-16

Unless otherwise authorized, drilling the hole and placing reinforcement and concrete in the hole must be performed in a continuous operation.

# Replace the 5th paragraph of section 49-3.02C(2) with:

07-15-16

If slurry is used during excavation, maintain the slurry level at a height required to maintain a stable hole, but not less than 10 feet above the piezometric head.

# Replace the 1st sentence in the 9th paragraph of section 49-3.02C(2) with:

07-15-16

Remove water that has infiltrated the dewatered hole before placing concrete, as required for dewatered hole.

#### Replace the 1st sentence in the 10th paragraph of section 49-3.02C(2) with:

07-15-16

If authorized, to control caving or water seepage, you may enlarge portions of the hole, backfill the hole with slurry cement backfill, concrete, or other material, and redrill the hole to the diameter shown.

#### Replace the 4th paragraph of section 49-3.02C(3) with:

07-15-16

Remove the temporary casing during concrete placement. Maintain the concrete in the casing at a level required to maintain a stable hole, but not less than 5 feet above the bottom of the casing, to prevent displacement of the concrete by material from outside the casing.

## Replace the 5th paragraph of section 49-3.02C(4) with:

07-15-16

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 in diameter than the column cage:
  - 2.1. Maintain a clear horizontal distance of at least 3.5 inches between the two cages, if the concrete is placed under dry conditions
  - 2.2. Maintain a clear horizontal distance of at least 5 inches between the two cages if the concrete is placed under slurry
  - 2.3. The offset between the centerlines of the two cages must not exceed 6 inches

# Replace the paragraphs in section 49-3.02C(5) with:

07-15-16

For acceptance testing, install and test vertical inspection pipes as follows:

- 1. Log the location of the inspection pipe couplers with respect to the plane of pile cutoff.
- 2. Cap each inspection pipe at the bottom. Extend the pipe from 3 feet above the pile cutoff to the bottom of the reinforcing cage. Provide a temporary top cap or similar means to keep the pipes clean before testing. If pile cutoff is below the ground surface or working platform, extend inspection pipes to 3 feet above the ground surface or working platform.
- 3. If any changes are made to the pile tip, extend the inspection pipes to the bottom of the reinforcing cage.
- 4. Install inspection pipes in a straight alignment and parallel to the main reinforcement. Securely fasten inspection pipes in place and provide protective measures to prevent misalignment or damage to the inspection pipes during installation of the reinforcement and placement of concrete in the hole. Construct CIDH concrete piles such that the relative distance of inspection pipes to vertical steel reinforcement remains constant.
- 5. After concrete placement is complete, fill inspection pipes with water to prevent debonding of the pipe.
- 6. Provide safe access to the tops of the inspection pipes.

- 7. After placing concrete and before requesting acceptance testing, test each inspection pipe in the Engineer's presence by passing a rigid cylinder through the length of pipe. The rigid cylinder must be 1-1/4-inch diameter by 4.5-foot long, weigh 12 pounds or less, and be able to freely pass down through the entire length of the pipe under its own weight and without the application of force.
- 8. When performing acceptance testing, inspection pipes must provide a 2-inch-diameter clear opening and be completely clean, unobstructed, and either dry or filled with water as authorized.
- 9. After acceptance testing is complete, completely fill the inspection pipes with water.

If the rigid cylinder fails to pass through the inspection pipe:

- 1. Completely fill the inspection pipes in the pile with water immediately.
- 2. Core a nominal 2-inch-diameter hole through the concrete for the entire length of the pile for each inspection pipe that does not pass the rigid cylinder. Coring must not damage the pile reinforcement.
- 3. Locate cored holes as close as possible to the inspection pipes they are replacing and no more than 5 inches clear from the reinforcement.

Core holes using a double wall core barrel system with a split tube type inner barrel. Coring with a solid type inner barrel is not allowed.

Coring methods and equipment must provide intact cores for the entire length of the pile.

Photograph and store concrete cores as specified for rock cores in section 49-1.01D(5).

The coring operation must be logged by an engineering geologist or civil engineer licensed in the State and experienced in core logging. Coring logs must comply with the Department's *Soil and Rock Logging, Classification, and Presentation Manual* for rock cores. Coring logs must include core recovery, rock quality designation of the concrete, locations of breaks, and complete descriptions of inclusions and voids encountered during coring.

The Department evaluates the portion of the pile represented by the cored hole based on the submitted coring logs and concrete cores. If the Department determines a pile is anomalous based on the coring logs and concrete cores, the pile is rejected.

# Replace item 2 in the list in the 2nd paragraph of section 49-3.02C(7) with:

07-15-16

Extend at least 5 feet below the construction joint. If placing casing into rock or a dry hole, the casing must extend at least 2 feet below the construction joint.

# Add to the beginning of section 49-3.02C(9):

07-15-16

## 49-3.02C(9)(a) General

# Replace the 2nd sentence of the 3rd paragraph of section 49-3.02C(9) with:

04-15-16

Do not vibrate the concrete.

# Add after concrete pump in the 8th paragraph of section 49-3.02C(9):

07-15-16

and slurry pump

#### Replace item 3 in the list in the 11th paragraph of section 49-3.02C(9) with:

07-15-16

3. Maintain the slurry level at a height required to maintain a stable hole, but not less than 10 feet above the piezometric head.

### Replace the 13th paragraph of section 49-3.02C(9) with:

07-15-16

Maintain a log of concrete placement for each drilled hole.

# Replace 14th and 15th paragraphs of section 49-3.02C(9) with:

07-15-16

If a temporary casing is used, maintain concrete placed under slurry at a level required to maintain a stable hole, but not less than 5 feet above the bottom of the casing. The withdrawal of the casing must not cause contamination of the concrete with slurry.

The equivalent hydrostatic pressure inside the casing must be greater than the hydrostatic pressure on the outside of the casing to prevent intrusion of water, slurry, or soil into the column of freshly placed concrete.

Remove scum, laitance, and slurry-contaminated concrete from the top of the pile.

### Add to section 49-3.02C(9):

07-15-16

# 49-3.02C(9)(b) Mineral Slurry

Remove any caked slurry on the sides or bottom of hole before placing reinforcement.

If concrete is not placed immediately after placing reinforcement, the reinforcement must be removed and cleaned of slurry, the sides of the drilled hole must be cleaned of caked slurry, and the reinforcement again placed in the hole for concrete placement.

### 49-3.02C(9)(c) Synthetic Slurry

A manufacturer's representative must:

- 1. Provide technical assistance for the use of their material
- 2. Be at the job site before introduction of the synthetic slurry into the drilled hole
- 3. Remain at the job site until released by the Engineer

After the manufacturer's representative has been released by the Engineer, your employee certified by the manufacturer must be present during the construction of the pile under slurry.

# Replace the heading of section 49-3.03 with:

07-15-16

# **CAST-IN-STEEL SHELL CONCRETE PILING**

### Replace the 1st paragraph of section 49-3.03A(1) with:

07-15-16

Section 49-3.03 includes specifications for constructing CISS concrete piles consisting of driven openended or closed-ended steel shells filled with reinforcement and concrete.

# Add to the end of section 49-3.03A(1):

07-15-16

CISS concrete piles include Class 90 Alternative V and Class 140 Alternative V piles.

### Add to section 49-3.03A(3):

01-15-16

Submit a Pile and Driving Data Form under section 49-2.01A(3)(a) if specified in the special provisions.

# Replace the paragraph of section 49-3.03D with:

07-15-16

Furnish piling is measured along the longest side of the pile from the specified tip elevation shown to the plane of pile cutoff.

### Replace section 49-4.03 with:

01-15-16

49-4.03 CONSTRUCTION 49-4.03A General

Reserved

### 49-4.03B Drilled Holes

Drill holes for steel soldier piles into natural foundation material. Drilled holes must be accurately located, straight, and true.

Furnish and place temporary casings or tremie seals where necessary to control water or to prevent caving of the hole.

Before placing the steel soldier pile, remove loose materials existing at the bottom of the hole after drilling operations have been completed.

Do not allow surface water to enter the hole. Remove all water in the hole before placing concrete.

If temporary casings are used, they must comply with section 49-3.02C(3).

### 49-4.03C Steel Soldier Piles

Plumb and align the pile before placing concrete backfill and lean concrete backfill. The pile must be at least 2 inches clear of the sides of the hole for the full length of the hole to be filled with concrete backfill and lean concrete backfill. Ream or enlarge holes that do not provide the clearance around steel piles.

Maintain alignment of the pile in the hole while placing backfill material.

Clean and prepare piles in anticipated heat affected areas before splicing steel piles or welding concrete anchors.

^^^^^

### **50 PRESTRESSING CONCRETE**

07-15-16

Add to the end of section 50-1.01C:

07-15-16

# 50-1.01C(8) Post-tensioning Jack Calibration Chart

Submit the post-tensioning jack calibration plot.

### 50-1.01C(9) Pretensioning Jack Calibration Chart

For any pretensioning jack calibrated by an authorized laboratory, submit a certified calibration plot.

### Replace section 50-1.01D(2)(b) with:

07-15-16

50-1.01D(2)(b) Equipment and Calibration 50-1.01D(2)(b)(i) General

Each jack body must be permanently marked with the ram area.

Each pressure gauge 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.

Each load cell must be calibrated and have an indicator that can be used to determine the force in the prestressing steel.

The range of each load cell must be such that the lower 10 percent of the manufacturer's rated capacity is not used in determining the jacking force.

Each jack must be calibrated equipped with its gauges.

Mechanically calibrate the gauges with a dead weight tester or other authorized means before calibration of the jacking equipment.

# 50-1.01D(2)(b)(ii) Post-tensioning

Equip each hydraulic jack used to tension prestressing steel with 2 pressure gauges or 1 pressure gauge and a load cell. Only 1 pressure gauge must be connected to the jack during stressing.

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. Verify that the jack and supporting systems are complete, with proper components, and are in good operating condition.
- 3. 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.
- 4. 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 180 days of use and after each repair.

### 50-1.01D(2)(b)(iii) Pretensioning

Each jack used to pretension prestressing steel must be calibrated, equipped with its gauges, by a laboratory on the Authorized Laboratory List within 1 year of use and after each repair.

Calibrate pretensioning jacks:

- 1. Under ASTM E4 using an authorized laboratory. Certification that the calibration is performed to ASTM accuracy is not required.
- In the presence of the Engineer. Notify the Engineer at least 2 business days before calibrating the jack.
- 3. Using 3 test cycles. Average the forces from each test cycle at each increment.
- 4. To cover the load range used in the work.

Gauges for pretensioning jacks may:

- 1. Be electronic pressure indicators that display either:
  - 1.1. Pressure in 100 psi increments or less
  - 1.2. Load to 1 percent of the maximum sensor/indicator capacity or 2 percent of the maximum load applied, whichever is smaller
- 2. Have a dial less than 6 inches in diameter

Gauges displaying pressure must have been calibrated within 1 year of the jack calibration.

Each hydraulic jack used for pretensioning must be equipped with either 2 gauges or 1 gauge and a load cell or you must have a calibrated standby jack with its gauge present on site during stressing.

^^^^^^

### 51 CONCRETE STRUCTURES

07-15-16

# Add to the list in the 2nd paragraph of section 51-1.01A:

8. Pile extensions

9. Drainage inlets

07-15-16

# Add to the list in the 6th paragraph of section 51-1.01A:

7. Drainage inlets

07-15-16

### Add to section 51-1.02I:

07-15-16

Metal frames, covers, grates, and other miscellaneous iron and steel used with drainage inlets must comply with section 75-2.

### Add to section 51-1.03B:

07-15-16

You may use PC drainage inlets as an alternative to CIP drainage inlets.

# Add between the 10th and 11th paragraphs of section 51-1.03C(2)(a):

07-15-16

For drainage inlets, extend the outside forms at least 12 inches below the top of the inlet. You may place concrete against excavated earth below this depth except:

- 1. You must use full-depth outside forms or other protection when work activities or unstable earth may cause hazardous conditions or contamination of the concrete.
- 2. You must increase the wall thickness 2 inches if placing concrete against the excavated surface. The interior dimensions must be as shown.

### Add to section 51-1.03C(2)(b):

07-15-16

For drainage inlets, remove exterior forms to at least 12 inches below the final ground surface. Exterior forms below this depth may remain if their total thickness is not more than 1 inch.

# Add to the list in the 2nd paragraph of section 51-1.03F(2):

07-15-16

4. Interior and top surfaces of drainage inlets

### Add to section 51-1.04:

07-15-16

The payment quantity for structural concrete, drainage inlet is the volume determined from the dimensions shown for CIP drainage inlets.

# Add to section 51-4.01C(1):

07-15-16

For PC drainage inlets, submit field repair procedures and a patching material test sample before repairs are made. Allow 10 days for the Engineer's review.

### Add to section 51-4.01C(2)(a):

07-15-16

For drainage inlets with oval or circular cross sections, submit shop drawings with calculations. Shop drawings and calculations must be sealed and signed by an engineer who is registered as a civil engineer in the State. Allow 15 days for the Engineer's review.

# Add to section 51-4.01D(3):

07-15-16

The Engineer may reject PC drainage inlets exhibiting any of the following:

- 1. Cracks more than 1/32 inch wide
- 2. Nonrepairable honeycombed or spalled areas of more than 6 square inches
- 3. Noncompliance with reinforcement tolerances or cross sectional area shown
- 4. Wall, inlet floor, or lid less than minimum thickness
- 5. Internal dimensions less than dimensions shown by 1 percent or 1/2 inch, whichever is greater
- 6. Defects affecting performance or structural integrity

### Add to section 51-4.02C:

07-15-16

Materials for PC drainage inlets must comply with the following:

- 1. Preformed flexible joint sealant must be butyl-rubber complying with ASTM C990
- 2. Resilient connectors must comply with ASTM C923
- 3. Sand bedding must comply with section 19-3.02F(2)
- 4. Bonding agents must comply with ASTM C1059/C1059, Type II

### Add to section 51-4.02D:

07-15-16

### 51-4.02D(8) Drainage Inlets

PC units for drainage inlets must be rectangular, round, or oval in cross section, or any combination. Transitions from a rectangular grate opening to a round or oval basin must be made in not less than 8 inches. Provide means for field adjustment to meet final grade, paving, or surfacing.

If oval or circular shape cross-sections are furnished, they must comply with AASHTO LRFD Bridge Design Specifications, Sixth Edition with California Amendments.

Wall and slab thicknesses may be less than the dimensions shown by at most 5 percent or 3/16 inch, whichever is greater.

Reinforcement placement must not vary more than 1/2 inch from the positions shown.

### Add to section 51-4.03:

07-15-16

# 51-4.03H Drainage Inlets

Repair PC drainage inlet sections to correct damage from handling or manufacturing imperfections before installation.

Center pipes in openings to provide a uniform gap. Seal gaps between the pipe and the inlet opening with nonshrink grout under the grout manufacturer's instructions. For systems designated as watertight, seal these gaps with resilient connectors.

Match fit keyed joints to ensure uniform alignment of walls and lids. Keys are not required at the inlet floor level if the floor is precast integrally with the inlet wall. Seal keyed joint locations with preformed butyl rubber joint sealant. You may seal the upper lid and wall joint with nonshrink grout.

Clean keyed joint surfaces before installing sealant. Joint surfaces must be free of imperfections that may affect the joint. Use a primer if surface moisture is present. Use a sealant size recommended by the sealant manufacturer. Set joints using sealant to create a uniform bearing surface.

Flat drainage inlet floors must have a field-cast topping layer at least 2 inches thick with a slope of 4:1 (horizontal:vertical) toward the outlet. Use a bonding agent when placing the topping layer. Apply the bonding agent under the manufacturer's instructions.

# Replace the 2nd paragraph of section 51-7.01A with:

Minor structures include structures described as minor structures.

07-15-16

Delete the 4th paragraph of section 51-7.01B.

07-15-16

Delete the 1st and 3rd paragraphs of section 51-7.01C.

07-15-16

Delete the heading and paragraph of section 51-7.02.

07-15-16

^^^^^

### **52 REINFORCEMENT**

01-15-16

### Replace the 3rd paragraph of section 52-6.03B with:

01-15-16

For uncoated and galvanized reinforcing bars complying with ASTM A615/A615M, Grade 60, ASTM A706/A706M, or ASTM A767/A767M, Class 1, the length of lap splices must be at least:

- 1. 45 diameters of the smaller bar spliced for reinforcing bars no. 8 or smaller
- 2. 60 diameters of the smaller bar spliced for reinforcing bars nos. 9, 10, and 11

For epoxy-coated reinforcing bars and alternatives to epoxy-coated reinforcing bars complying with ASTM A775/A775M, ASTM A934/A934M, ASTM A1035/A1035M, or ASTM A1055/A1055M, the length of lap splices must be at least:

- 1. 65 diameters of the smaller bar spliced for reinforcing bars no. 8 or smaller
- 2. 85 diameters of the smaller bar spliced for reinforcing bars nos. 9, 10, and 11

\*

# **53 SHOTCRETE**

01-15-16

Replace 632 in item 1 in the list in the 3rd paragraph of section 53-1.02 with:

01-15-16

675

### Replace item 2 in the list in the 3rd paragraph of section 53-1.02 with:

01-15-16

2. You may substitute a maximum of 30 percent coarse aggregate for the fine aggregate. Coarse aggregate must comply with section 90-1, except section 90-1.02C(4)(d) does not apply. The gradation for the coarse aggregate must comply with the gradation specified in section 90-1.02C(4)(b) for the 1/2 inch x No. 4 or the 3/8 inch x No. 8 primary aggregate nominal size.

Replace shotcrete in the 2nd sentence of the 4th paragraph of section 53-1.02 with:

01-15-16

concrete

^^^^^

# 56 OVERHEAD SIGN STRUCTURES, STANDARDS, AND POLES

07-15-16

Replace section 56-1.01 with:

07-15-16

**56-1.01 GENERAL** 

**56-1.01A Summary** 

Section 56-1 includes general specifications for constructing overhead sign structures, standards, and poles.

56-1.01B Definitions

Reserved

56-1.01C Submittals

Reserved

56-1.01D Quality Assurance

56-1.01D(1) General

Reserved

56-1.01D(2) Quality Control

56-1.01D(2)(a) General

Reserved

56-1.01D(2)(b) Nondestructive Testing

56-1.01D(2)(b)(i) General

Perform NDT of steel members under AWS D1.1 and the requirements shown in the following table:

# Nondestructive Testing for Steel Standards and Poles

Weld location	Weld type	Minimum required NDT	
Circumferential splices around the perimeter of tubular sections, poles, and arms	CJP groove weld with backing ring	100% UT or RT	
Longitudinal seam	CJP or PJP groove weld	Random 25% MT	
Longitudinal seam within 6 inches of a circumferential splice	CJP groove weld	100% UT or RT	
Welds attaching base plates, flange plates, pole	CJP groove weld with backing ring and reinforcing fillet	t≥ 5/16 inch: 100% UT and 100% MT t< 5/16 inch: 100% MT after root weld pass and final weld pass	
plates, or mast arm plates to poles or arm tubes	External (top) fillet weld for socket-type connections	100% MT	
Hand holes and other appurtenances	Fillet and PJP welds	MT full length on random 25% of all standards and poles	

NOTE: t = pole or arm thickness

# **Nondestructive Testing for Overhead Sign Structures**

Weld location	Weld type	Minimum required NDT
Base plate to post	CJP groove weld with backing ring and reinforcing fillet	100% UT and 100% MT
Base plate to gusset plate	CJP groove weld	100% UT
Circumferential splices of pipe or tubular sections	CJP groove weld with backing ring	100% UT or RT
Split post filler plate welds	CJP groove weld with backing bar	100% UT or RT
Longitudinal seam weld for pipe posts	CJP groove weld	t < 1/4 inch: 100% MT t ≥ 1/4 inch: 100% UT or RT
	PJP groove weld	Random 25% RT
Chord angle splice weld	CJP groove weld with backing bar	100% UT or RT
Truss vertical, diagonal, and wind angles to chord angles	Fillet weld	Random 25% MT
Upper junction plate to chord (cantilever type truss)	Fillet weld	Random 25% MT
Bolted field splice plates (tubular frame type)	CJP groove weld	100% UT and 100% MT
Cross beam connection plates (lightweight extinguishable message sign)	Fillet weld	Random 25% MT
Arm connection angles (lightweight extinguishable message sign)	Fillet weld	100% MT
Mast arm to arm plate (lightweight extinguishable message sign)	CJP groove weld with backing ring	t ≥ 5/16 inch: 100% UT and 100% MT t < 5/16 inch: 100% MT after root weld pass and final weld pass
Post angle to post (lightweight extinguishable message sign)	Fillet weld	100% MT
Hand holes and other appurtenances	Fillet and PJP welds	MT full length on random 25% of all sign structures

NOTE: t = pole or arm thickness

### 56-1.01D(2)(b)(ii) Ultrasonic Testing

For UT of welded joints with any members less than 5/16 inch thick or tubular sections less than 13 inches in diameter, the acceptance and repair criteria must comply with Clause 6.13.3.1 of AWS D1.1.

For UT of other welded joints, the acceptance and repair criteria must comply with Table 6.3 of AWS D1.1 for cyclically loaded nontubular connections.

After galvanization, perform additional inspection for toe cracks along the full length of all CJP groove welds at tube-to-transverse plate connections using UT.

When performing UT, use an authorized procedure under AWS D1.1, Annex S.

### 56-1.01D(2)(b)(iii) Radiographic Testing

The acceptance criteria for radiographic or real time image testing must comply with AWS D1.1 for tensile stress welds.

### 56-1.01D(2)(b)(iv) Longitudinal Seam Welds

The Engineer selects the random locations for NDT.

Grind the cover pass smooth at the locations to be tested.

If repairs are required in a portion of a tested weld, perform NDT on the repaired portion and on 25 percent of the untested portions of the weld. If more repairs are required, perform NDT on the entire weld.

56-1.01D(3) Department Acceptance
Reserved

Replace section 56-2.01D(2)(b) with:

Reserved

07-15-16

Replace the 2nd sentence of the 1st paragraph of section 56-2.02F with:

Manufactured pipe posts must comply with one of the following:

07-15-16

Add to the list in the 1st paragraph of section 56-2.02F:

4. ASTM A1085, Grade A

07-15-16

Replace the 2nd paragraph of section 56-2.02F with:

07-15-16

You may fabricate pipe posts from structural steel complying with ASTM A36/A36M, ASTM A709/A709M, Grade 36, or ASTM A572/A572M, Grades 42 or 50.

07-15-16

Delete the last sentence in the 1st paragraph of section 56-2.02K(2).

07-15-16

Delete the 3rd paragraph of section 56-2.02K(2).

Replace the 2nd paragraph of section 56-2.02K(4) with:

07-15-16

Safety cable at walkways must not be kinked, knotted, deformed, frayed, or spliced.

Replace the 1st sentence of the paragraph in section 56-2.02K(5) with:

07-15-16

The edges of handholes and other large post and arm openings must be ground smooth.

07-13-10

Replace the heading of section 56-3 with:

56-3 STANDARDS, POLES, PEDESTALS, AND POSTS

07-15-16

Replace the paragraph in section 56-3.01A with:

07-15-16

Section 56-3 includes general specifications for fabricating and installing standards, poles, pedestals, and posts.

# Replace section 56-3.01B(2)(b) with:

07-15-16

Standards with handholes must comply with the following:

- 1. Include a UL-listed lug and 3/16-inch or larger brass or bronze bolt for attaching the bonding jumper for non-slip-base standards.
- 2. Attach a UL-listed lug to the bottom slip base plate with a 3/16-inch or larger brass or bronze bolt for attaching the bonding jumper for slip-base standards.

### Replace the 1st sentence of the 3rd paragraph of section 56-3.01C(2)(a) with:

07-15-16

After each standard, pole, pedestal, and post is properly positioned, place mortar under the base plate.

### Replace the 2nd sentence of the 4th paragraph of section 56-3.01C(2)(a) with:

07-15-16

The top of the foundation at curbs or sidewalks must be finished to curb or sidewalk grade.

### Replace the 10th paragraph of section 56-3.01C(2)(a) with:

07-15-16

Except when located on a structure, construct foundations monolithically.

# Replace the 13th paragraph of section 56-3.01C(2)(a) with:

07-15-16

Do not erect standards, poles, pedestals, or posts until the concrete foundation has cured for at least 7 days.

### Replace the 14th paragraph in section 56-3.01C(2)(a) with:

07-15-16

The Engineer selects either the plumbing or raking technique for standards, poles, pedestals, and posts. Plumb or rake by adjusting the leveling nuts before tightening nuts. Do not use shims or similar devices. After final adjustments of both top nuts and leveling nuts on anchorage assemblies have been made and each standard, pole, pedestal, and post on the structure is properly positioned, tighten nuts as follows:

- 1. Tighten leveling nuts and top nuts, following a crisscross pattern, until bearing surfaces of all nuts, washers, and base plates are in firm contact.
- Use an indelible marker to mark the top nuts and base plate with lines showing relative alignment of the nut to the base plate.
- 3. Tighten top nuts following a crisscross pattern:
  - 3.1. Additional 1/6 turn for anchor bolts greater than 1-1/2 inches in diameter.
  - 3.2. Additional 1/3 turn for other anchor bolts.
  - 3.3. Tightening tolerance for all top nuts is  $\pm 1/8$  turn.

### Replace the 1st sentence of the 4th paragraph of section 56-3.01C(2)(b) with:

07-15-16

If shown, use sleeve nuts on Type 1 standards.

### Add to section 56-3.01C(2)(b):

07-15-16

Spiral reinforcement must be continuous above the bottom of the anchor bolts. The top termination must be either:

- 1. 1'-6" lap beyond the end of pitch with a 90-degree hook extending to the opposite side of the cage, or
- 2. 1'-6" lap beyond the end of pitch with 2 evenly spaced authorized mechanical couplers

# Replace the 1st sentence of the paragraph in section 56-3.02A(4)(b) with:

07-15-16

For cast slip bases for standards and poles with shaft lengths of 15 feet or more, perform RT on 1 casting from each lot of a maximum of 50 castings under ASTM E94.

# Replace the 2nd paragraph of section 56-3.02B(1) with:

07-15-16

Material for push button posts, pedestrian barricades, and guard posts must comply with ASTM A53/A53M or ASTM A500/A500M.

### Add to section 56-3.02B(1):

07-15-16

Steel pipe standards and mast arms must be hot dip galvanized after manufacturing. Remove spikes from galvanized surfaces.

# Replace the 2nd paragraph of section 56-3.02B(2) with:

07-15-16

HS anchor bolts, nuts, and washers must comply with section 55-1.02D(1) and the following:

- 1. Bolt threads must be rolled
- Hardness of HS anchor bolts must not exceed 34 HRC when tested under ASTM F606
- 3. Galvanization must be by mechanical deposition
- 4. Nuts must be heavy-hex type
- 5. Each lot of nuts must be proof load tested

### Replace the 2nd sentence of the 9th paragraph of section 56-3.02B(2) with:

07-15-16

During manufacturing, properly locate the position of the luminaire arm on the arm plate to avoid interference with the cap screw heads.

### Add to section 56-3.02B(3)(a):

07-15-16

Steel having a nominal thickness greater than 2 inches that is used for tube-to-transverse plate connections must have a minimum CVN impact value of 20 ft-lb at 20 degrees F when tested under ASTM E23.

### Add to section 56-3.02B(3)(c):

07-15-16

The length of telescopic slip-fit splices must be at least 1.5 times the inside diameter of the exposed end of the female section.

For welds connecting reinforced handholes or box-type pole plate connections to a tubular member, the start and stop points must be at points located on a longitudinal axis of symmetry of the tube coinciding with the axis of symmetry of the hand hole or pole plate.

# Replace the table in the 1st paragraph of section 56-3.02C with:

**Slip Base Bolt Tightening Requirements** 

Onp Bass Boil in	giitoiniig itoquii oiliolito
Standard type	Torque (ft-lb)
15-SB	150
15-SBF	150
30	150
31	200

# Replace the 1st sentence of the 2nd paragraph of section 56-3.02C with:

07-15-16

07-15-16

Bolted connections attaching signal or luminaire arms to standards, poles, and posts are considered slip critical.

#### Add to section 56-3.06B:

07-15-16

Manufacture the mast arm from standard pipe, free from burrs. Each mast arm must have an insulated wire inlet and wood pole mounting brackets for the mast arm and tie-rod cross arm. Manufacture tie rod from structural steel and pipe.

07-15-16

Delete the 2nd paragraph of section 56-3.06C.

# Replace the 1st sentence of the 3rd paragraph of section 56-3.06C with:

07-15-16

Mount the mast arm for luminaires to provide a 34-foot mounting height for a 165 W LED luminaire and a 40-foot mounting height for a 235 W LED luminaire.

^^^^^

### 59 STRUCTURAL STEEL COATINGS

07-15-16

Replace *Type* S in the 2nd paragraph of section 59-1.02A with:

01-15-16

Type M or Type S

Add to the list in the 2nd paragraph of section 59-1.02B:

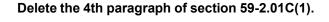
07-15-16

5. Manufactured abrasives.

### Replace *Mineral and slag* in the 3rd paragraph of section 59-1.02B with:

07-15-16

Mineral, manufactured, and slag



^^^^^^

# **60 EXISTING STRUCTURES**

07-15-16

07-15-16

Delete the 2nd sentence in the 11th paragraph of section 60-3.04B(3)(c).

^^^^^

### **64 PLASTIC PIPE**

07-15-16 Replace Reserved in section 64-3 with:

07-15-16

# 64-3.01 GENERAL 64-3.01A Summary

Section 64-3 includes specifications for constructing slotted plastic pipe.

Slotted plastic pipe includes structure excavation, concrete backfill, connecting new pipe to new or existing facilities, concrete collars, reinforcement, and other connecting devices.

### 64-3.01B Definitions

Reserved

### 64-3.01C Submittals

If an *or* equal slotted plastic pipe is being considered, it must be submitted 30 days before installation for approval.

If RSC is used for concrete backfill for slotted plastic pipe, submit the concrete mix design and test data from an authorized laboratory 10 days before excavating the pipe trench. The laboratory must specify the cure time required for the concrete mix to attain 2,000 psi compressive strength when tested under California Test 521.

Heel-resistant grates if specified must be submitted 30 days before installation for approval. Anchorage details must be included in the submittal.

### 64-3.01D Quality Assurance

Reserved

64-3.02 MATERIALS 64-3.02A General

Not Used

### 64-3.02B Slotted Plastic Pipes

Slotted plastic pipe must be one of the following or equal:

### **Slotted Plastic Pipe**

12" diameter	18" diameter		
Zurn Z888-12	Zurn Z888-18		
ACO Qmax 350	ACO Qmax 365		
ADS Duraslot-12	ADS Duraslot-18		

### 64-3.02C Concrete Backfill

Concrete for concrete backfill for slotted plastic pipe must comply with the specifications for minor concrete. You may use RSC instead of minor concrete for concrete backfill.

If RSC is used for concrete backfill, the RSC must:

- 1. Contain at least 590 pounds of cementitious material per cubic yard
- 2. Comply with section 90-3.02A, except section 90-1 does not apply
- 3. Comply with section 90-2

# 64-3.02D Heel-Resistant Grates

Heel-resistant grate must:

- 1. Be designed to carry traffic loadings
- 2. Comply with ADA requirements
- 3. Be constructed of steel or cast iron
- 4. Be provided by the same manufacturer of the slotted plastic pipe
- 5. Comply with the manufacturer's instructions

### 64-3.02E Bar Reinforcement

Bar reinforcement must comply with ASTM A615/A615M, Grade 60 or ASTM A706/A706M, Grade 60.

### 64-3.02F Miscellaneous Metal

Ductile iron, nuts, bolts, and washers must comply with section 75.

### 64-3.02G Grout

Grout must be non-shrink grout complying with ASTM C1107/C1107M.

### 64-3.02H Curing Compound

Non-pigmented curing compound must comply with ASTM C309, Type 1, Class B.

### 64-3.02l End Caps

End cap must:

- 1. Be provided by the same manufacturer of the slotted plastic pipe
- 2. Prevent concrete backfill from entering the pipe

### 64-3.03 CONSTRUCTION

### 64-3.03A General

Cover the grate slots with heavy-duty tape or other authorized covering during paving and concrete backfilling activities to prevent material from entering the slots.

### 64-3.03B Preparation

Pave adjacent traffic lanes before installing slotted plastic pipes.

Excavation must comply with section 19-3.

#### 64-3.03C Installation

Lay and join slotted plastic pipes under the pipe manufacturer's instructions.

Lay pipes to line and grade with sections closely jointed and adequately secured to prevent separation during placement of the concrete backfill. If the pipes do not have a positive interlocking mechanism like a slot and tongue connection, secure the sections together with nuts, bolts, and washers before backfilling.

The top of slotted plastic pipes must not extend above the completed surface. Position the pipes so that the concrete backfill is flush with the surrounding grade and above the top of the grate from 1/8 to 1/4 inch.

Place channels with the male and female ends facing each other.

Place lateral support bar reinforcement on both sides of the grate slots. The support bar reinforcement must run the full length of the slots.

Anchor heel-resistant grates to the concrete backfill under the manufacturer's instructions.

### 64-3.03D Concrete Backfill

Wherever minor concrete is used for concrete backfill for slotted plastic pipe, do not allow traffic on top of the backfill within 7 days of placement.

Wherever RSC is used for concrete backfill for slotted plastic pipe, do not allow traffic on top of the backfill before the required cure time of 2,000 psi is achieved.

Place concrete backfill where shown.

Consolidate the concrete backfill with high-frequency internal vibrators.

Texture the concrete backfill surface with a broom or burlap drag to produce a durable skid-resistant surface.

Apply a non-pigmented curing compound to the exposed concrete backfill surface whenever the atmospheric temperature is 90 degrees F or greater after placement.

# **64-3.03E Transition Fittings**

Use transition fittings to connect slotted plastic pipes to drainage inlets. The transition fittings must be supplied by the same pipe manufacturer.

Where welds are required in transition fittings, welds must comply with the pipe manufacturer's instructions. The completed welds must not have visible pinholes. Fill the gaps around the pipes in the inlet structure wall with non-shrink grout where the pipes connect to an existing drainage structure. Install the grout under the pipe manufacturer's instructions.

Cut the pipes as shown after the grout used to seal the transition fitting has cured for at least 24 hours.

### **64-3.04 PAYMENT**

Slotted plastic pipe is measured along the centerline of the pipe and parallel with the slope line. If the pipe is cut to fit a structure or slope, the payment quantity is the length of pipe necessary to be placed before cutting, measured in 2-foot increments.

DIVISION VII DRAINAGE FACILITIES
71 EXISTING DRAINAGE FACILITIES

^^^^^^

01-15-16

Replace items 5 and 6 in the list in the 1st paragraph of section 71-3.01D with:

01-15-16

5. Performing postrehabilitation inspection

# Add after the 4th paragraph of section 71-3.01D:

01-15-16

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

71-5.03B Frames, Covers, Grates, and Manholes

\*

# DIVISION VIII MISCELLANEOUS CONSTRUCTION 72 SLOPE PROTECTION

07-15-16

### Replace the 1st and 2nd paragraphs of section 72-2.02B with:

07-15-16

For method A and B placement and the class of RSP described, comply with the rock gradation shown in the following table:

### **Rock Gradation**

by med	al RSP class dian particle ameter <sup>b</sup>	Nominal median particle	d <sub>15</sub> (inches)		d <sub>15</sub> (inches) d <sub>50</sub> (inches)		d <sub>100</sub> c (inches)	Placement
Class <sup>a</sup>	Diameter (inches)	weight W <sub>50</sub> <sup>c,d</sup>	Min	Max	Min	Max	Max	Method
1	6	20 lb	3.7	5.2	5.7	6.9	12.0	В
II	9	60 lb	5.5	7.8	8.5	10.5	18.0	В
III	12	150 lb	7.3	10.5	11.5	14.0	24.0	В
IV	15	300 lb	9.2	13.0	14.5	17.5	30.0	В
V	18	1/4 ton	11.0	15.5	17.0	20.5	36.0	В
VI	21	3/8 ton	13.0	18.5	20.0	24.0	42.0	A or B
VII	24	1/2 ton	14.5	21.0	23.0	27.5	48.0	A or B
VIII	30	1 ton	18.5	26.0	28.5	34.5	48.0	A or B
IX	36	2 ton	22.0	31.5	34.0	41.5	52.8	Α
Х	42	3 ton	25.5	36.5	40.0	48.5	60.5	Α
XI	46	4 ton	28.0	39.4	43.7	53.1	66.6	Α

<sup>&</sup>lt;sup>a</sup>For RSP Classes I–VIII, use Class 8 RSP fabric. For RSP Classes IX–XI, use Class 10 RSP fabric.

# Replace the table in section 72-2.02C with:

07-15-16

### **Fabric Class**

Class	Largest rock gradation class used in slope protection
8	Classes I–VIII
10	Classes IX-XI

<sup>&</sup>lt;sup>b</sup>Intermediate or B dimension (i.e., width) where A dimension is length and C dimension is thickness.

<sup>&</sup>lt;sup>c</sup>d%, where % denotes the percentage of the total weight of the graded material.

<sup>&</sup>lt;sup>d</sup>Values shown are based on the minimum and maximum particle diameters shown and an average specific gravity of 2.65. Weight will vary based on specific gravity of rock available for the project.

# Replace the table in the 1st paragraph of section 72-3.02C with:

07-15-16

### **Concreted-Rock Gradation**

median	SP class by particle leter <sup>b</sup>	Nominal median particle	d <sub>15</sub> °		d₅o <sup>c</sup>		d <sub>100</sub> <sup>c</sup>
Class <sup>a</sup>	Size (inches)	weight W <sub>50</sub> <sup>c,d</sup> Weight <sup>a</sup>	Min	Max	Min	Max	Max
I	6	20 lb	3.7	5.2	5.7	6.9	12.0
II	9	60 lb	5.5	7.8	8.5	10.5	18.0
III	12	150 lb	7.3	10.5	11.5	14.0	24.0
V	18	1/4 ton	11.0	15.5	17.0	20.5	36.0
VII	24	1/2 ton	14.5	21.0	23.0	27.5	48.0

<sup>&</sup>lt;sup>a</sup>Use Class 8 RSP fabric.

# Replace the table in section 72-3.03E with:

07-15-16

### **Minimum Concrete Penetration**

	Rock class					
	VII	٧	Ш		I	
Penetration (inches)	18	14	10	8	6	

# 73 CONCRETE CURBS AND SIDEWALKS

^^^^^^

07-15-16 **Replace section 73-3.01A with:** 

07-15-16

Section 73-3 includes specifications for constructing sidewalks, gutter depressions, island paving, curb ramps, and driveways.

# 74 PUMPING EQUIPMENT AND CONTROLS

^^^^^

04-15-16

Replace 87-1.03K in the 4th paragraph of section 74-3.03B(2) with:

04-15-16

87

<sup>&</sup>lt;sup>b</sup>Intermediate or B dimension (i.e., width) where A dimension is length and C dimension is thickness.

<sup>&</sup>lt;sup>c</sup>d%, where % denotes the percentage of the total weight of the graded material.

<sup>&</sup>lt;sup>d</sup>Values shown are based on the minimum and maximum particle diameters shown and an assumed specific gravity of 2.65. Weight will vary based on specific gravity of rock available for the project.

### **80 FENCES**

07-15-16

# Replace section 80-4 with:

**80-4 WILDLIFE EXCLUSION FENCES** 

07-15-16

### 80-4.01 GENERAL

# 80-4.01A General

Section 80-4 includes specifications for constructing wildlife exclusion fences.

Constructing a wildlife exclusion fence includes the installation of any signs specified in the special provisions.

### 80-4.01B Materials

Each T post must:

- 1. Comply with ASTM A702
- 2. Be metal and have an anchor plate
- 3. Be painted black or galvanized

### 80-4.01C Construction

Not Used

### 80-4.01D Payment

Not Used

### **80-4.02 DESERT TORTOISE FENCES**

### 80-4.02A General

Section 80-4.02 includes specifications for constructing desert tortoise fences.

### 80-4.02B Materials

### 80-4.02B(1) Permanent Desert Tortoise Fences

### 80-4.02B(1)(a) General

Each wire tie and hog ring for a permanent desert tortoise fence must comply with section 80-2.02F.

### Each hold down pin must:

- 1. Be U-shaped, with 2 minimum 6-inch long legs
- 2. Have pointed ends
- 3. Be at least 11-gauge wire
- 4 Be galvanized
- 5. Be commercial quality

# 80-4.02B(1)(b) Hardware Cloth

The hardware cloth must:

- 1. Comply with ASTM A740
- 2. Be welded or woven galvanized steel wire fabric
- 3. Be made of at least 14-gauge wire
- 4. Be 36 inches wide

### 80-4.02B(1)(c) Barbless Wire

The barbless wire must:

- 1. Comply with ASTM A641/A641M
- 2. Be at least 14-gauge wire
- 3. Have a Class 1 zinc coating

### 80-4.02B(1)(d) Posts

Each post must:

- 1. Comply with ASTM F1083
- 2. Be standard weight, schedule 40 steel pipe with a nominal pipe size of 1 inch
- 3. Be galvanized steel fence post conforming to ASTM A702

### 80-4.02B(2) Temporary Desert Tortoise Fences

The materials for a temporary desert tortoise fence must comply with section 80-4.02B(1), except the hardware cloth must be made of at least 16-gauge wire.

### 80-4.02C Construction

### 80-4.02C(1) General

Extend the hardware cloth a minimum of 24 inches above the ground.

Plumb the posts and pull the hardware cloth taut. Correct any alignment issues.

### 80-4.02C(2) Permanent Desert Tortoise Fences

Excavate the ground to form a trench before installing the posts and hardware cloth. Embed the posts at maximum 5-foot intervals into the ground. If T posts are used, use 5-foot lengths and embed the posts to match the above-ground height shown for the posts.

Securely fasten the hardware cloth to the posts with wire ties and to barbless wire with hog rings as shown. Pass the wire ties through the hardware cloth. Encircle the posts and barbless wire with the ties and tie them by twisting a minimum of 3 complete turns.

Bend the twisted ends of the ties down to prevent possible snagging. Close hog rings with their ends overlapping.

Bury the hardware cloth a minimum of 12 inches into the ground. Install the cloth in 1 continuous piece. You may cut the cloth into shorter segments if authorized.

Overlap the hardware cloth segments at posts, with a minimum overlap of 6 inches centered at a post. Wire tie the overlapped cloth to posts as shown. Prevent fraying by threading barbless wire along the vertical edges of the hardware cloth on either side of the post or use 3 equally spaced hog rings (6 hog rings per location) along each wire cloth edge.

Where bedrock or caliche substrate is encountered, use the bent hardware cloth detail if authorized. Transitions from buried-to-bent or bent-to-buried configuration must occur at a post location with a minimum 6-inch overlap of the hardware cloth as shown. The maximum spacing for hold down pins is 24 inches on center. Anchor in place with hold down pins the beginning and end corners of the hardware cloth placed on the ground.

Backfill the removed earth material into the trench created to install the hardware cloth and posts. Use an 8 lb or heavier hand tamper to compact the backfill around the posts and hardware cloth. Install a post at each corner of the cloth segments.

If a gate must be installed, attach the hardware cloth to the gate frame such that there is contact along the entire length of the gate between the finished ground surface and the lower edge of the cloth. Install the gate under section 80-10.

### 80-4.02C(3) Temporary Desert Tortoise Fences

Fold the horizontal edge of the hardware cloth at a 90° angle toward the tortoise habitat area. Ensure the clearance to the ground at the bend is from 0 to 2 inches.

Where the hardware cloth overlaps, secure the bend piece with one of the following:

- 1. Barbless wire threaded along the width of the cloth
- 2. Minimum of 4 hog rings equally spaced along the edge

Fasten the bent piece to the ground with hold down pins pushed completely into the ground.

When the temporary fence is no longer needed, compact soil into post holes with an 8 lb or heavier hand tamper.

### 80-4.02D Payment

Not Used

80-4.03-80-4.09 RESERVED

# DIVISION IX TRAFFIC CONTROL DEVICES

^^^^^^

# 83 RAILINGS AND BARRIERS

04-15-16

Delete to in the 4th paragraph of section 83-1.02B.

04-15-16

^^^^^

### 84 MARKINGS

07-15-16

Add to the beginning of section 84-8.03A:

07-15-16

Select the method and equipment for constructing ground-in indentations.

### Replace the 1st paragraph of section 84-8.03A with:

07-15-16

Do not construct rumble strips:

- 1. On structures, approach slabs, or concrete weigh-in-motion slabs
- 2. At intersections
- 3. Bordering two-way left turn lanes, driveways, or other high-volume turning areas
- 4. Within 6 inches of any concrete pavement joint

# Add between the 2nd and 3rd paragraphs of section 84-8.03A:

Modify rumble strip spacing to avoid locating a groove on a concrete pavement joint.

07-15-16

### Replace the 3rd paragraph of section 84-8.03A with:

Indentations must comply with the dimensions shown and not vary more than:

07-15-16

- 1. 10 percent in length
- 2. 0.06 inch in depth
- 3. 10 percent in width
- 4. 1 inch in center-to-center spacing between rumble strips

### Add to the end of section 84-8.03A:

07-15-16

The noise level created by the combined grinding activities must not exceed 86 dBA when measured at a distance of 50 feet at right angles to the direction of travel.

Break rumble strips before and after intersections, driveways, railroad crossings, freeway gore areas, and freeway ramps. Place breaks and break distances as shown. You may adjust breaks and the break distances as needed at low-volume driveways or other locations if authorized.

07-15-16

Delete new in the 1st paragraph of section 84-8.03B.

07-15-16

### Add to the end of section 84-8.03B:

Remove grinding residue under section 13-4.03E(7).

### Replace the 1st paragraph of section 84-8.03C with:

07-15-16

Construct rumble strips in the top layer of HMA and asphalt concrete surfacing by the ground-in method.

### Add between the 2nd and 3rd paragraphs of section 84-8.03C:

07-15-16

Dispose of the removed material.

07-15-16

Delete the 2nd paragraph of section 84-8.03C.

# Replace 37-2 in the 3rd paragraph of section 84-8.03C with:

07-15-16

37-4.02

# Replace section 84-8.04 with:

07-15-16

The payment quantity for any type of rumble strip is the length measured by the station along the length of the rumble strip without deductions for gaps between indentations.

### Replace the 2nd paragraph of section 84-9.03B with:

04-15-16

Completely remove traffic stripes and pavement markings, including any paint in the gaps, by methods that do not remove pavement to a depth of more than 1/8 inch.

### Add between the 2nd and 3rd paragraphs of section 84-9.03B:

04-15-16

Submit your proposed method for removing traffic stripes and pavement markings at least 7 days before starting the removal work. Allow 2 business days for the review.

Remove pavement marking such that the old message cannot be identified. Make any area removed by grinding rectangular. Water must not puddle in the ground areas. Fog seal ground areas on asphalt concrete pavement.

# 

# DIVISION X ELECTRICAL WORK

Replace section 86 with:

04-15-16

### **86 GENERAL**

04-15-16

# 86-1.01 GENERAL 86-1.01A Summary

Section 86 includes general specifications for furnishing electrical equipment and materials.

Electrical equipment and materials must comply with part 4 of the *California MUTCD* and 8 CA Code of Regs, chapter 4, subchapter 5, "Electrical Safety Orders."

Galvanized equipment and materials must comply with section 75-1.02B.

### 86-1.01B 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.

actuation: Actuation as defined in the California MUTCD.

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 accessible pedestrian signal speaker's volume.

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

channel: Discrete information path.

**CALIPER:** Commercially Available LED Product Evaluation and Reporting. A U.S. Department of Energy program that individually tests and provides unbiased information on the performance of commercially available LED luminaires and lights.

**controller assembly:** Assembly for controlling a system's operations, consisting of a controller unit and auxiliary equipment housed in a waterproof cabinet.

controller unit: Part of the controller assembly performing the basic timing and logic functions.

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

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.

**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.

**illuminance gradient:** Ratio of the minimum illuminance on a 1-foot square of sign panel to that on an adjacent 1-foot square of sign panel.

**inductive loop detector:** Detector capable of being actuated by an inductance change caused by a vehicle passing or standing over the loop. An inductive loop detector includes a loop or group of loops installed in the roadway and a lead-in cable installed and connected inside a controller cabinet.

**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 the initial values.

**lighting standard:** Pole and mast arm supporting the luminaire.

**LM-79:** Test method from the Illumination Engineering Society of North America specifying the 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 the test conditions, measurements, and report format for testing and estimating the long-term performance of LEDs for general lighting purposes.

luminaire: Assembly that houses the light source and controls the light emitted from the light source.

**National Voluntary Laboratory Accreditation Program:** U.S. Department of Energy program that accredits independent testing laboratories.

powder coating: Coating applied electrostatically using exterior-grade, UV-stable, polymer powder.

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

**pretimed controller assembly:** Assembly operating traffic signals under a predetermined cycle length.

programming mechanism: Device to program the accessible pedestrian signal operation.

**pull box:** Box with a cover that is installed in an accessible place in a conduit run to facilitate the pulling in of wires or cables.

**push button information message:** Push button information message as defined in the *California MUTCD.* 

push button locator tone: Push button locator tone as defined in the California MUTCD.

**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 with or without mast arms carrying 1 or more signal faces.

**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:** Subsystem or component that protects equipment against short-duration voltage transients in power line.

**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.

**traffic-actuated controller assembly:** Assembly for operating traffic signals under the varying demands of traffic as registered by detector actuation.

traffic phase: Traffic phase as defined in the California MUTCD.

vehicle: Vehicle as defined in the California Vehicle Code.

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

# 86-1.01C Submittals 86-1.01C(1) General

Within 15 days after Contract approval, submit a list of equipment and materials you propose to install.

Submit the list before shipping equipment and materials to the job site. The list must include:

- 1. Manufacturer's name
- 2. Make and model number
- 3. Month and year of manufacture
- 4. Lot and serial numbers
- 5. Contract number
- 6. Your contact information

Submit confirmation of the vendor's acceptance of the order for the electrical equipment and materials as an informational submittal.

Submit 3 sets of computer-generated, schematic wiring diagrams for each cabinet.

Diagrams, plans, and drawings must be prepared using graphic symbols in IEEE 315, "Graphic Symbols for Electrical and Electronic Diagrams."

Submit a schedule of values within 15 days after Contract approval.

Do not include costs for the traffic control system in the schedule of values.

Submit a manufacturer's maintenance manual or combined maintenance and operation manual as an informational submittal. The manual must have a master item index that includes:

- 1. Specifications
- 2. Design characteristics
- 3. General operation theory
- 4. Function of all controls
- 5. Troubleshooting procedure
- 6. Parts list, descriptions, stock numbers, and settings
- 7. Block circuit diagram
- 8. Layout of components
- 9. Schematic diagrams

### 86-1.01C(2) Pull Boxes

Submit the manufacturer's installation instructions for pull boxes, including:

- 1. Quantity and size of entries that can be made without degrading the strength of the pull box below the load rating
- 2. Locations where side entries can be made
- 3. Acceptable method for creating the entry

Submit load-rating test reports for pull boxes from a NRTL.

### 86-1.01C(3) LED Luminaires

Submit for an LED luminaire:

- 1. Maximum power in watts
- Maximum designed junction temperature
- 3. Heat sink area in square inches

- 4. Designed junction-to-ambient thermal resistance calculation with thermal resistance components clearly defined
- 5. L70 in hours when extrapolated for the average nighttime operating temperature
- 6. Life expectancy based on the junction temperature
- 7. Manufacturer's data sheet for the power supply, including the rated life

Submit the manufacturer's QC test data for LED luminaires as an informational submittal.

### 86-1.01C(4) Low-Pressure Sodium Luminaires

Submit the manufacturer's QC test data for low-pressure sodium luminaires as an informational submittal.

### 86-1.01C(5) Service Equipment Enclosures

Submit shop drawings for a service equipment enclosure to METS.

# 86-1.01C(6) Signal Heads

Submit a certificate of compliance and the manufacturer's QC test data for signal heads as an informational submittal.

### 86-1.01C(7) LED Signal Modules

Submit the manufacturer's QC test data for LED signal modules as an informational submittal.

# 86-1.01C(8) Visors

Submit a certificate of compliance and the manufacturer's QC test data for visors as an informational submittal.

# 86-1.01C(9) LED Countdown Pedestrian Signal Face Modules

Submit the manufacturer's QC test data for LED countdown pedestrian signal face modules as an informational submittal.

# 86-1.01C(10) Accessible Pedestrian Signals

Submit the manufacturer's QC test data for accessible pedestrian signals as an informational submittal.

### 86-1.01D Quality Assurance

# 86-1.01D(1) General

Electrical equipment must comply with one or more of the following standards:

- 1. ANSI
- 2. ASTM
- 3. EIA/ECIA
- 4. NEMA
- 5. NETA
- 6. UL/NRTL
- 7. TIA

Materials must comply with:

- 1. FCC rules
- 2. ITE standards
- 3. NEC
- 4. California Electrical Code

# 86-1.01D(2) Source Quality Control

Service equipment enclosures and cabinets must be inspected and tested at the source.

### 86-1.01D(3) Department Acceptance

Deliver material and equipment for testing to METS.

Allow 30 days for testing. The Department notifies you when testing is complete.

If the Department accepts the material or equipment, you must pick it up from the test site and deliver it to the job site.

If the Department rejects material or equipment, remove it within 5 business days after you are notified it is rejected. If it is not removed within that period, the Department may remove it and ship it to you and deduct the costs of labor, material and shipping.

Resubmit a new sample and allow 30 days for retesting. The retesting period starts when the replacement material or equipment is delivered to METS.

### **86-1.02 MATERIALS**

### 86-1.02A General

Anchor bolts, anchor bars or studs, and nuts and washers must comply with section 75-1.02.

Bolt threads must accept galvanized standard nuts without requiring tools or causing removal of protective coatings.

### 86-1.02B Conduit and Accessories

# 86-1.02B(1) General

Conduit and fittings must comply with the requirements shown in the following table:

**Conduit and Fitting Requirements** 

Type	Requirement				
1	Must be hot-dip galvanized rigid steel complying with UL 6 and ANSI C80.1. The zinc coating must comply with copper sulfate test requirements in UL 6. Fittings must be electrogalvanized and certified under UL 514B.				
2	Must comply with requirements for Type 1 conduit and be coated with PVC or polyethylene. The exterior thermoplastic coating must have a minimum thickness of 35 mils. The internal coating must have a minimum thickness of 2 mils. Coated conduit must comply with NEMA RN 1, or NRTL PVC-001.				
3	Must be Type A, extruded, rigid PVC conduit complying with UL 651 or must be HDPE conduit complying with UL 651A.				
4	Must have an inner, flexible metal core covered by a waterproof, nonmetallic, sunlight-resistant jacket, and must be UL listed for use as a grounding conductor. Fittings must be certified under UL 514B.				
5	Must be intermediate steel complying with UL 1242 and ANSI C80.6. The zinc coating must comply with copper sulfate test requirements specified in UL 1242. Fittings must be electrogalvanized and certified under UL 514B.				

Bonding bushings installed on metal conduit must be insulated and either a galvanized or zinc-alloy type.

# 86-1.02B(2) Structures Accessories

Steel hangers, steel brackets, and other fittings used to support conduit in or on a wall or bridge superstructure must comply with section 75-3.

Precast concrete cradles for conduit must be made of minor concrete and commercial-quality welded wire fabric. The minor concrete must contain a minimum of 590 lb of cementitious material per cubic yard. The cradles must be moist cured for a minimum of 3 days.

### 86-1.02C Pull Boxes

### 86-1.02C(1) General

Pull box cover must have a marking on the top that is:

- 1. Clearly defined
- 2. Uniform in depth
- 3. Parallel to either side
- 4. 1 to 3 inches in height

Cover marking must be:

- 1. SERVICE for service circuits between a service point and service disconnect
- 2. SERVICE IRRIGATION for circuits from a service equipment enclosure to an irrigation controller
- 3. SERVICE BOOSTER PUMP for circuits from a service equipment enclosure to the booster pump
- 4. TDC POWER for circuits from a service equipment enclosure to telephone demarcation cabinet
- 5. LIGHTING for a lighting system
- 6. SIGN ILLUMINATION for a sign illumination system
- 7. SIGNAL AND LIGHTING for a signal and lighting system
- 8. RAMP METER for a ramp metering system
- 9. TMS for a traffic monitoring station
- 10. FLASHING BEACON for a flashing beacon system
- 11. CMS for a changeable message sign system
- 12. INTERCONNECT for an interconnect conduit and cable system

The load rating must be stenciled on the inside and outside of the pull box and the cover.

If a transformer or other device must be placed in the pull box, include recesses for a hanger.

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

### 86-1.02C(2) Nontraffic Pull Boxes

A nontraffic 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 new pull box must have a cover with an electronic marker cast inside.

A pull box extension must be made of the same material as the pull box. The extension may be another pull box if the bottom edge of the pull box fits into the opening for the cover.

The bolts, nuts, and washers must be a captive design and galvanized. Captive bolts for securing the cover of nontraffic pull boxes must be capable of withstanding a torque from 55 to 60 ft-lb and a minimum pull-out strength of 750 lb.

### 86-1.02C(3) Traffic Pull Boxes

A traffic pull box and cover must comply with ASTM C857 for HS20-44 loading.

The frame must be anchored to the box with 2-1/4-inch-long concrete anchors with a 1/4 inch diameter. A no. 3-1/2(T) pull box must have 4 concrete anchors, one placed in each corner. No. 5(T) and no. 6(T) pull boxes must have 6 concrete anchors, one placed in each corner and one near the middle of each of the longer sides.

Nuts must be vibration-resistant, zinc-plated, carbon steel and have a wedge ramp at the root of the thread.

Before galvanizing a steel or cast iron cover, the manufacturer must apply the cover marking by one of the following methods:

- Use a cast iron strip at least 1/4 inch thick with letters raised a minimum of 1/16 inch. Fasten the strip
  to the cover with 1/4-inch, flathead, stainless steel machine bolts and nuts. Peen the bolts after
  tightening.
- Use a sheet steel strip at least 0.027 inch thick with letters raised a minimum of 1/16 inch. Fasten the strip to the cover by spot welding, tack welding, or brazing with 1/4-inch stainless steel rivets or 1/4inch, roundhead, stainless steel machine bolts and nuts. Peen the bolts after tightening.

The steel cover must be countersunk approximately 1/4 inch to accommodate the bolt head. When tightened, the bolt head must be no more than 1/8 inch above the top of the cover.

86-1.02C(4) Reserved 86-1.02D Tapes 86-1.02D(1) General Reserved

### 86-1.02D(2) Pull Tape

Pull tape must be a flat, woven, lubricated, soft-fiber, polyester tape with a minimum tensile strength of 1,800 lb. The tape must have sequential measurement markings every 3 feet.

86-1.02D(3) Reserved

86-1.02E Reserved

86-1.02F Conductors and Cables

86-1.02F(1) Conductors

86-1.02F(1)(a) General

Reserved

86-1.02F(1)(b) Reserved

86-1.02F(1)(c) Copper Conductors

86-1.02F(1)(c)(i) General

Copper wire must comply with ASTM B3 and B8.

Conductor must be clearly and permanently marked the entire length of its outer surface with:

- 1. Manufacturer's name or trademark
- 2. Insulation-type letter designation
- 3. Conductor size
- 4. Voltage
- 5. Temperature rating
- 6. Number of conductors for a cable

The minimum insulation thickness and color code requirements must comply with NEC.

A conductor must be UL listed or NRTL certified and rated for 600 V(ac).

Insulation for no. 14 to no. 4 conductors must be one of the following:

- 1. Type TW PVC under ASTM D2219
- 2. Type THW PVC
- 3. Type USE, RHH, or RHW cross-linked polyethylene

The insulation for no. 2 and larger conductors must be one of the above or THWN.

Conductors must be identified as shown in the following table:

# **Conductor Identification**

			Identification	ı	
		Insulation		İ	
Circuit	Signal phase or function	Base Stripe <sup>a</sup>		Band symbols	Size
Official	<u> </u>		Blk		14
	2, 6 4, 8	Red, yel, brn Red, yel, brn	Ora	2, 6 4, 8	14
Olemente		•	None	1, 5	14
Signals	1, 5	Red, yel, brn			14
(vehicle) <sup>a, b</sup>	3, 7	Red, yel, brn	Pur	3, 7	14
	Ramp meter 1	Red, yel, brn	None	NBR	
	Ramp meter 2	Red, yel, brn	Blk	NBR	14
D. L. G.	2p, 6p	Red, brn	Blk	2p, 6p	14
Pedestrian	4p, 8p	Red, brn	Ora	4p, 8p	14
signals	1p, 5p	Red, brn	None	1p, 5p	14
	3p, 7p	Red, brn	Pur	3p, 7p	14
	2p, 6p	Blu	Blk	P-2, P-6	14
Pedestrian	4p, 8p	Blu	Ora	P-4, P-8	14
push buttons	1p, 5p	Blu	None	P-1, P-5	14
	3p, 7p	Blu	Pur	P-3, P-7	14
Traffic signal	Ungrounded circuit				
controller	conductor	Blk	None	CON-1	6
cabinet	Grounded circuit				
	conductor	Wht	None	CON-2	6
Highway	Ungrounded - line 1	Blk	None	NBR	14
lighting pull box	Ungrounded - line 2	Red	None	NBR	14
to luminaire	Grounded	Wht	None	NBR	14
Multiple	Ungrounded - line 1	Blk	None	ML1	10
highway					
lighting	Ungrounded - line 2	Red	None	ML2	10
	Ungrounded - PEU	Blk	None	C1	14
Lighting control	Switching leg from PEU				
	unit or SM transformer	Red	None	C2	14
	Ungrounded - line 1				
Service	(signals)	Blk	None	NBR	6
Gervice	Ungrounded - line 2				
	(lighting)	Red	None	NBR	8
Sign lighting	Ungrounded - line 1	Blk	None	SL-1	10
Signingriding	Ungrounded - line 2	Red	None	SL-2	10
Flashing	Ungrounded between				
beacons	flasher and beacons	Red or yel	None	F-Loc. <sup>c</sup>	14
	Pedestrian push buttons	Wht	Blk	NBR	14
	Signals and multiple				
Grounded	lighting	Wht	None	NBR	10
circuit	Flashing beacons and				
conductor	sign lighting	Wht	None	NBR	12
	Lighting control	Wht	None	C-3	14
	Service	Wht	None	NBR	14
Railroad					
preemption		Blk	None	R	14
Spares		Blk	None	NBR	14

NBR = No band required

PEU=Photoelectric unit

<sup>&</sup>lt;sup>a</sup>On overlaps, the insulation is striped for the 1st phase in the designation, e.g., phase (2+3) conductor is striped as for phase 2.

Band for overlap and special phases as required

<sup>&</sup>lt;sup>c</sup>Flashing beacons having separate service do not require banding.

<sup>&</sup>lt;sup>d</sup>Color Code: Yel-Yellow, Brn-Brown, Blu-Blue, Blk-Black, Wht-White, Ora-Orange, Pur-Purple

The insulation color must be homogeneous throughout the full depth of the insulation. The identification stripe must be continuous throughout the length of the conductor.

# 86-1.02F(1)(c)(ii) Bonding Jumpers and Equipment Grounding Conductors

A bonding jumper must be copper wire or copper braid of the same cross-sectional area as a no. 8 conductor or larger.

An equipment grounding conductor may be bare or insulated.

# 86-1.02F(1)(c)(iii) Inductive Loop Conductors

Inductive loop conductor must comply with the requirements shown in the following table:

### **Conductor Requirements for Inductive Loop Detectors**

Loop wire	Requirement
Type 1	Type RHW-USE neoprene-jacketed or Type USE cross-linked polyethylene, insulated, no. 12, stranded copper wire with a minimum 40-mils insulation thickness at any point.
Type 2	Type THWN or Type XHHW, no. 14, stranded copper wire in a plastic tubing. The plastic tubing must be polyethylene or vinyl rated for use at 105 °C and resistant to oil and gasoline. The outside diameter of the tubing must be at most 0.27 inch with a wall thickness of at least 0.028 inch.

# 86-1.02F(1)(d) Reserved

Reserved

86-1.02F(2) Cables

86-1.02F(2)(a) General

Reserved

86-1.02F(2)(b) Reserved

Reserved

86-1.02F(2)(c) Reserved

86-1.02F(2)(d) Copper Cables

86-1.02F(2)(d)(i) General

The conductor wire size for a detector lead-in cable must comply with the requirements of ASTM B286.

Cable, except a detector lead-in cable, must be clearly and permanently marked the entire length of its outer surface with:

- 1. Manufacturer's name or trademark
- 2. Insulation-type letter designation
- 3. Conductor size
- 4. Voltage
- 5. Temperature rating
- 6. Number of conductors for a cable

# 86-1.02F(2)(d)(ii) Conductors Signal Cables

A conductors signal cable must have a black polyethylene jacket with an inner polyester binder sheath. The cable jacket must be rated for 600 V(ac) and 75 degrees C. Filler material, if used, must be polyethylene.

The individual conductors in the cable must be solid copper complying with ASTM B286 with Type THWN insulation. The minimum thickness of insulation must comply with NEC for conductor sizes no. 14 to no.10. The minimum thickness of the nylon jacket must be 4 mils.

Cable must comply with the requirements shown in the following table:

Cable type <sup>a</sup>	Conductor quantity and	quantity and (mils) nominal			Conductor color code
	type	Average	Minimum	outside diameter (inch)	
3CSC	3 no. 14	44	36	0.40	Blue/black, blue/orange, white/black stripe
5CSC	5 no. 14	44	36	0.50	Red, yellow, brown, black, white
9CSC	8 no. 14 1 no. 12	60	48	0.65	No. 12 - white, no. 14 - red, yellow, brown, black, and red/black, yellow/black, brown/black, white/black stripe
12CSC	11 no. 14 1 no. 12	60	48	0.80	No. 12 - white, no. 14 - red, yellow, brown, red/black stripe, yellow/black stripe, brown/black stripe, black/red stripe, black/white stripe, black, red/white stripe, brown/white stripe
28CSC	27 no. 14 1 no. 10	80	64	0.90	No. 10 - white no. 14 - red/black stripe, yellow/black stripe, brown/black stripe, red/orange stripe, yellow/orange stripe, brown/orange stripe, red/silver stripe, yellow/silver stripe, brown/silver stripe, red/purple stripe, yellow/purple stripe, yellow/purple stripe, trown/purple stripe, brown/purple stripe, brown/purple stripe, brown/2 black stripes, brown/2 orange stripes, brown/2 orange stripes, brown/2 silver stripes, red/2 purple stripes, brown/2 purple stripes, blue/black stripe, blue/orange stripe, blue/silver stripe, blue/purple stripe, white/black stripe, black/red stripe, black

# 86-1.02F(2)(d)(iii) Detector Lead-in Cables

Conductors for a loop detector lead-in cable must be two no. 16, 19-by-29, stranded, tinned copper wires with calculated cross-sectional areas complying with ASTM B286, table 1 and must comply with the requirements shown in the following table:

### Conductor Requirements for Loop Detector Lead-In Cables

Lead-in cable	Requirement
Type B	Insulated with 20 mils of high-density polyethylene. Conductors must be twisted together with at least 2 turns per foot, and the twisted pair must be protected with a copper or aluminum polyester shield. A minimum no. 20 copper drain wire must be connected to the equipment ground within the cabinet. Cable must have a high-density polyethylene or high-density polypropylene outer jacket with a nominal thickness of 32 mils. Include an amorphous, interior, moisture penetration barrier of nonhydroscopic polyethylene or polypropylene fillers.
Type C	Comply with International Municipal Signal Association Specification no. 50-2. A minimum no. 20 copper drain wire must be connected to the equipment ground within the cabinet.

# 86-1.02F(2)(d)(iv) Reserved

# 86-1.02F(2)(d)(v) Signal Interconnect Cables

A signal interconnect cable must be a 6-pair type with stranded, tinned, copper no. 20 conductors. The insulation for each conductor must be color-coded polypropylene with a minimum 13-mils nominal thickness. The conductors must be in color-coded, twisted pairs. Each pair must be wrapped with an aluminum polyester shield and have a no. 22 or larger, stranded, tinned, copper drain wire inside the shielded pair.

The cable jacket must be black HDPE rated for a minimum of 300 V(ac) and 60 degrees C. The jacket must have a minimum nominal wall thickness of 40 mils.

### 86-1.02F(2)(e) Reserved

# 86-1.02G Equipment Identification Characters

Equipment identification characters must be 2-1/2 inch, series D lettering, except on wood poles, they must be 3-inch lettering.

The characters must be self-adhesive reflective labels or paint, except on wood poles, they must be embossed on aluminum.

### 86-1.02H Splicing Materials

Splicing materials include:

- 1. Connectors
- Electrical insulating coating
- 3. PVC electrical tape
- 4. Butyl rubber stretchable tape
- 5. PVC pressure-sensitive adhesive tape
- 6. Heat shrink tubing

Connectors must be C-shaped compression or butt type.

Electrical insulating coating must be a fast drying sealant with low nontoxic fumes.

PVC electrical tape must have a minimum thickness of 80 mils.

Butyl rubber stretchable tape with liner must have a minimum thickness of 120 mils.

PVC pressure-sensitive adhesive electrical tape must have a minimum thickness of 6 mils.

Electrical tapes must be self-fusing, oil- and flame-resistant, synthetic rubber and be UL listed or NRTL certified.

Heat-shrink tubing must be made of irradiated polyolefin tubing with a minimum wall thickness of 40 mils before contraction and an adhesive mastic inner wall. When heated, the inner wall must melt and fill the crevices and interstices of the covered splice area and the outer wall must shrink to form a waterproof insulation.

Heat-shrink tubing must comply with the requirements for extruded, insulating tubing at 600 V(ac) specified in UL Standard 468D and ANSI C119.1 and the requirements shown in the following table:

**Heat-Shrink Tubing Requirements** 

Quality characteristic	Requirement
Shrinkage ratio of supplied diameter <sup>a</sup> (max, %)	33
Dielectric strength (min, kV/in)	350
Resistivity (min, Ω/in)	25 x 10 <sup>13</sup>
Tensile strength (min, psi)	2,000
Operating temperature (°C)	-40–90 (135 °C in emergency)
Water absorption (max, %)	0.5

<sup>&</sup>lt;sup>a</sup>When heated to 125 °C and allowed to cool to 25 °C

### 86-1.02l Connectors and Terminals

A connector and terminal must comply with SAE-AS7928 and be a crimp type, rated for 600 V(ac) and either UL listed or NRTL certified.

### 86-1.02J Standards, Poles, Pedestals, and Posts

Standards for signals, lighting, and flashing beacons, poles for closed circuit television, pedestals for cabinets, posts for extinguishable message sign and posts for pedestrian push button assemblies must comply with section 56-3.

### 86-1.02K Luminaires

### 86-1.02K(1) General

Luminaire must be either LED or low-pressure-sodium type.

### 86-1.02K(2) LED Luminaires

LED luminaire must be on the Authorized Material List for LED luminaires and must:

- 1. Be self-contained, not requiring assembly.
- 2. Comply with UL 1598 for luminaires in wet locations.
- 3. Have a power supply with:
  - 3.1. ANSI/IEC rating of at least IP65.
  - 3.2. 2 leads to accept standard 0-10 V(dc).
  - 3.3. Dimming control compatible with IEC 60929, Annex E. If the control leads are open or the analog control signal is lost, the circuit must default to 100-percent power.
  - 3.4. Case temperature self rise of 77 degrees F or less above ambient temperature in free air with no additional heat sinks.
- 4. Weigh no more than 35 lb.
- 5. Have a minimum operating life of 63,000 hours when operated for an average time of 11.5 hours at an average temperature of 70 degrees F.
- 6. Be designed to operate over a temperature range from -40 to 130 degrees F.
- 7. Be operationally compatible with photoelectric controls.
- 8. Have a correlated color temperature range from 3,500 to 6,500 K and a color rendering index of 65 or greater.
- 9. Have a maximum-effective projected area of 1.4 sq ft when viewed from either side or end.
- 10. Have a housing color that matches a color no. 26152 to 26440, 36231 to 36375, or 36440 of FED-STD-595.
- 11. Have an ANSI C136.41-compliant, locking-type, photocontrol receptacle with dimming connections and a watertight shorting cap.
- 12. Comply with LM-79, LM-80 and California Test 611.

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.

The luminaire must be permanently marked inside the unit and outside of its packaging box. Marking consists of:

Manufacturer's name or trademark

- 2. Month and year of manufacture
- 3. Model, serial, and lot numbers
- 4. Rated voltage, wattage, and power in VA

An LED luminaire's onboard circuitry must include a surge protection device to withstand high-repetition noise transients caused by utility line switching, nearby lightning strikes, and other interferences. The device 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 surge protection device must comply with UL 1449 and ANSI/IEEE C62.45 based on ANSI/IEEE C62.41.2 definitions for standard and optional waveforms for location category C-High.

An LED luminaire and its associated onboard circuitry must comply with the Class A emission limits under 47 CFR 15(B) for the emission of electronic noise.

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),  $60 \pm 3$  Hz. Luminaire must operate over the entire voltage range or the voltage range must be selected from one of the following:

- 1. Luminaire must operate over a voltage range from 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 from 347 to 480 V(ac). The operating voltage for this option is 480 V(ac).

LED luminaire must have a power factor of 0.90 or greater. The total harmonic distortion, current, and voltage induced into a power line by a luminaire must not exceed 20 percent. The L70 of the luminaire must be the minimum operating life or greater. Illuminance measurements must be calibrated to standard photopic calibrations.

The maximum power consumption and maintained illuminance of the LED luminaires must comply with the isofootcandle curves as shown.

LED luminaire must not allow more than 10 percent of the rated lumens to project above 80 degrees from vertical and 2.5 percent of the rated lumens to project above 90 degrees from vertical.

Luminaire must have passive thermal management with enough capacity to ensure proper heat dissipation and functioning of the luminaire over its minimum operating life. The maximum junction temperature for the minimum operating 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 for cooling the luminaire. The heat sink must be made of 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 temperature is 100 degrees F or greater.

The luminaire's housing must be fabricated from materials designed to withstand a 3,000-hour salt spray test under ASTM B117. 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. A chromate conversion undercoating must be used underneath a thermoplastic polyester powder coat.

The housing must be designed to prevent the buildup of water on its top surface. Exposed heat sink fins must be oriented to allow water to run off the luminaire and carry dust and other accumulated debris away from the unit. The optical assembly of the luminaire must be protected against dust and moisture intrusion to at least an UL 60529 rating of IP66. The power supply enclosure must be protected to at least an UL 60529 rating of IP43.

The housing must have a slip fitter capable of being mounted on a 2-inch-diameter pipe tenon. Slip fitter must:

- 1. Fit on mast arms with outside diameters from 1-5/8 to 2-3/8 inches
- 2. Be adjustable to a minimum of ±5 degrees from the axis of the tenon in a minimum of 5 steps: +5, +2.5, 0, -2.5, -5
- 3. Have clamping brackets that:

- 3.1. Are made of corrosion-resistant materials or treated to prevent galvanic reactions
- 3.2. Do not bottom out on the housing bosses when adjusted within the designed angular range
- 3.3. Do not permanently set in excess of 1/32 inch when tightened

Each refractor or lens must be made of UV-inhibiting high-impact plastic, such as acrylic or polycarbonate, or heat- and impact-resistant glass. The refractor or lens must be resistant to scratching. Polymeric materials, except for the lenses of enclosures containing either the power supply or electronic components of the luminaire, must be made of UL94 V-0 flame-retardant materials.

An LED luminaire and its internal components must be able to withstand mechanical shock and vibration.

If the components are mounted on a down-opening door, the door must be hinged and secured to the luminaire's housing separately from the refractor or flat lens frame. The door must be secured to the housing to prevent accidental opening. A safety cable must mechanically connect the door to the housing.

An LED luminaire must have a barrier-type terminal block secured to the housing to connect field wires. The terminal screws must be captive and equipped with wire grips for conductors up to no. 6.

The conductors and terminals must be identified and marked.

### 86-1.02K(3) Low-Pressure Sodium Luminaires

A low-pressure sodium luminaire must be an enclosed cutoff or semi-cutoff type and be self-contained, not requiring assembly.

The housing must be either (1) a minimum 1/16-inch-thick, corrosion-resistant, die-cast aluminum sheet and plate with concealed continuous welds or (2) a minimum 3/32-inch-thick, acrylonitrile-butadiene-styrene sheet material on a cast aluminum frame. The housing must provide mounting for all electrical components and a slip fitter. The housing must be divided into optical and power compartments that are individually accessible for service and maintenance.

The painted exterior surface of the luminaire must be finished with a fused coating of electrostatically applied polyester powder paint or other UV-inhibiting film. The color must be aluminum gray.

A sealing ring must be installed in the pipe tenon opening to prevent the entry of water and insects into the power and optical compartments. The ring must be made of high-temperature neoprene or equal material.

The power unit assembly must be accessible through a weather-tight, hinged cover secured to the housing with spring latches or captive screws.

The luminaire's hardware must be stainless steel or cadmium plated. Removable components must be secured with machine screws or bolts instead of sheet metal screws.

A semi-cutoff luminaire or a molded refractor-style cutoff luminaire must include a refractor. Other cutoff luminaires must include a flat lens. The refractor assembly and flat lens assembly must be designed to rigidly maintain their shape and be hinged and secured to the housing with spring latches.

The refractor must be either a 1-piece injection-molded polycarbonate with a minimum thickness of 3/32 inch or a 1-piece injection-molded acrylic with a minimum thickness of 1/8 inch. Alternate methods of manufacturing the refractor may be authorized provided minimum specified thicknesses are maintained.

The flat lens must be a 1-piece polycarbonate with a minimum thickness of 3/32 inch, mounted to a metal frame.

The lamp socket must be made of high-temperature, flame-retardant, thermoset material with self-wiping contacts or an equal. The socket must be rated for 660 W and 1,000 V(ac). The position of the socket and support must maintain the lamp in the correct relationship with the reflector and refractor for the designed light distribution pattern. The reflector may be an integral part of the housing.

The luminaire must comply with the isofootcandle curves as shown.

Low-pressure sodium lamp must:

1. Be a 180 W, single-ended, bayonet-base, tubular, gas-discharge lamp

- 2. Maintain a minimum of 93 percent of its initial lumens over its rated life
- 3. Reach 80 percent of its light output within 10 minutes
- 4. Restrike within 1 minute after a power outage or voltage drop at the lamp socket
- 5. Have ANSI L74/E designation

The lamp operating position must be at ±20 degrees from the horizontal.

Lamp must comply with the minimum performance requirements shown in the following table:

# **Minimum Performance Requirements**

Quality characteristic	Requirement
Initial lumens (lm)	33,000
Rated average life at 10 h/start (h)	18,000

The low-pressure sodium lamp ballast must be an autotransformer or high-reactance type. The power factor must be not less than 90 percent when the ballast is operated at the nominal line voltage with a nominally-rated reference lamp. The lamp wattage regulation spread must not vary by more than ±6 percent for ±10 percent input voltage variation from nominal through life.

At the line voltage, the ballast must have a lamp current crest factor not exceeding 1.8 and ballast loss not exceeding 24 percent for a 180 W ballast.

The ballast must include a multi-circuit connector for quick disconnection.

# 86-1.02K(4) Reserved

#### 86-1.02L Reserved

#### 86-1.02M Photoelectric Controls

Photoelectric control types are as shown in the following table:

# **Photoelectric Control Types**

Control type	Description
I	Pole-mounted photoelectric unit. Test switch housed in an enclosure.
II	Pole-mounted photoelectric unit. Contactor and test switch located in a service equipment enclosure.
III	Pole-mounted photoelectric unit. Contactor and a test switch housed in an enclosure.
IV	A photoelectric unit that plugs into a NEMA twist-lock receptacle, integral with the luminaire.
V	A photoelectric unit, contactor, and test switch located in a service equipment enclosure.

The pole-mounted adaptor for Type I, II, and III photoelectric controls must include a terminal block and cable supports or clamps to support the wires.

The enclosure for Type I and III photoelectric controls must be a NEMA 3R type. The enclosure must have a factory-applied, rust-resistant prime coat and finish coat. The enclosure must be hot-dip galvanized or painted to match the color of the lighting standard.

# Photoelectric unit must:

- 1. Have a screen to prevent artificial light from causing cycling.
- 2. Have a rating of 60 Hz, 105-130 V(ac), 210-240 V(ac), or 105-240 V(ac).
- 3. Operate at a temperature range from -20 to 55 degrees C.
- 4. Consume less than 10 W.
- 5. Be a 3-prong, twist-lock type with a NEMA IP 65 rating, ANSI C136.10-compliant
- 6. Have a fail-on state
- 7. Fit into a NEMA-type receptacle
- 8. Turn on from 1 to 5 footcandles and turn off from 1.5 to 5 times the turn-on level. Measurements must be made by procedures in *EEI-NEMA Standards for Physical and Electrical Interchangeability of Light-Sensitive Control Devices Used in the Control of Roadway Lighting.*

Type I, II, III, and V photoelectric controls must have a test switch to allow manual operation of the lighting circuit. Switch must be:

- 1. Single-hole mounting, toggle type
- 2. Single pole and single throw
- 3. Labeled Auto-Test on a nameplate

Photoelectric control's contactor must be:

- 1. Normally open
- 2. Mechanical-armature type with contacts of fine silver, silver alloy, or equal or better material
- 3. Installed to provide a minimum space of 2-1/2 inches between the contactor terminals and the enclosure's sides

The terminal blocks must be rated at 25 A, 600 V(ac), molded from phenolic or nylon material, and be the barrier type with plated-brass screw terminals and integral marking strips.

# 86-1.02N Fused Splice Connectors

The fused splice connector for 240 and 480 V(ac) circuits must simultaneously disconnect both ungrounded conductors. The connector must not have exposed metal parts except for the head of the stainless steel assembly screw. The head of the assembly screw must be recessed a minimum of 1/32 inch below the top of the plastic boss that surrounds the head.

The connector must protect the fuse from water or weather damage. Contact between the fuse and fuse holder must be spring loaded.

#### Fuses must:

- 1. Be standard, midget, ferrule type
- 2. Have a nontime-delay feature
- 3. Be 3/32 by 1-1/2 inches

#### 86-1.020 Grounding Electrodes

Grounding electrode must be:

- 1. 1 piece
- 2. Minimum 10-foot length of one of the following:
  - 2.1. Galvanized steel rod or pipe not less than 3/4 inch in diameter
  - 2.2. Copper clad steel rod not less than 5/8 inch in diameter

# 86-1.02P Enclosures

# 86-1.02P(1) General

The enclosures must be rated NEMA 3R and include a dead front panel and a hasp with a 7/16-inch-diameter hole for a padlock.

The enclosure's machine screws and bolts must not protrude outside the cabinet wall.

The fasteners on the exterior of an enclosure must be vandal resistant and not be removable. The exterior screws, nuts, bolts, and washers must be stainless steel.

#### 86-1.02P(2) Service Equipment Enclosures

A service equipment enclosure must be factory wired and manufactured from steel and galvanized or have factory-applied, rust-resistant prime and finish coats, except Types II and III.

Type II and III service equipment enclosures must:

- 1. Be made of 0.125-inch minimum thickness 5052-H32 aluminum sheet complying with ASTM B209.
- 2. Be manufactured using gas metal arc welding with bare aluminum welding electrodes. The electrodes must comply with AWS A5.10 Class ER5356.

- 3. Be manufactured using welding procedures, welders, and welding operators that comply with the requirements for welding procedures, welders, and welding operators in AWS B2.1, "Specification for Welding Procedure and Performance Qualification."
- 4. Have full-seal weld exterior seams.
- 5. Exterior welds must be ground smooth and edges filed to a radius of at least 0.03 inch.
- Have a surface finish that complies with MIL-A-8625 for a Type II, Class I coating, except the anodic coating must have a minimum thickness of 0.0007 inch and a minimum coating weight of 0.001 oz/sq in

If a Type III enclosure houses a transformer of more than 1 kVA, the enclosure must have effective screened ventilation louvers of no less than 50 sq. in for each louver. The framed screen must be stainless no. 304 with a no. 10 size mesh and secured with at least 4 bolts.

The dead front panel on a Type III service equipment enclosure must have a continuous stainless steel or aluminum piano hinge. The panel must be secured with a latch or captive screws. No live part must be mounted on the panel.

The enclosure must be watertight and marked as specified in NEC to warn of potential electric-arc flash hazards.

Internal conductors for the photoelectric control unit must be 600 V(ac), 14 AWG (THHN) stranded machine tool wire. Where subject to flexing, 19 stranded wire must be used.

The meter area must be have a sealable, lockable, weather-tight cover that can be removed without the use of tools.

For Type III-A, III-B, and III-C enclosures, the meter socket must be a 5-clip type, and the landing lug must be suitable for multiple conductors.

For a Type III-D enclosure, the meter socket must be a 7-clip type, and the landing lug must be suitable for multiple conductors. The pedestal must comply with the Electric Utility Service Equipment Requirements Committee drawing no. 308 or 309.

Landing lugs must be (1) sized for the incoming service utility conductors, (2) compatible with either copper or aluminum conductors, and (3) made of copper or tin-plated aluminum. Live parts of the electrical equipment must be guarded against accidental contact.

The main and neutral busses of the enclosure must be made of tin-plated copper, be rated for 125 A, and be suitable for copper or aluminum conductors.

Each service equipment enclosure must have up to 2 main circuit breakers that will simultaneously disconnect ungrounded service-entrance conductors.

Circuit breaker for a service equipment enclosure must:

- 1. Be guick-break on either automatic or manual operation
- 2. Be trip indicating
- 3. Be internal-trip type
- 4. Be UL listed or NRTL certified and comply with UL 489 or equal
- 5. Be clearly marked with the frame size
- 6. Have an operating mechanism that is enclosed and trip-free from the operating handle on overload
- 7. Have the trip rating clearly marked on the operating handle
- 8. Have an interior made of copper

Circuit breakers used as disconnects must have a minimum interrupting capacity of 10,000 A, rms.

The interior of the enclosure must accept plug-in circuit breakers. A minimum of 6 standard single-pole circuit breakers, 3/4" nominal, must be provided for branch circuits.

Identify each circuit breaker and component by description using an engraved phenolic nameplate attached with stainless steel rivets or screws.

Nameplate must be installed:

- 1. Adjacent to the breaker on the dead front panel. The characters must be a minimum of 1/8 inch high.
- 2. Adjacent to the component on the back panel. The characters must be a minimum of 1/8 inch high.
- 3. At the top exterior of the door panel. The nameplate must include the system number, voltage, and number of phases engraved in minimum 3/16-inch-high characters.

A plastic-laminated wiring diagram must be attached inside the enclosure with brass eyelets by a UL-listed or NRTL-certified method.

# 86-1.02P(3) Lighting and Sign Illumination Enclosures

A lighting and sign illumination enclosure must be manufactured from steel and either galvanized, cadmium plated, or powder coated.

#### 86-1.02Q Cabinets

# 86-1.02Q(1) General

Cabinets must be factory wired except for battery backup system cabinets.

The fasteners on the exterior of a cabinet, except for battery backup system cabinets, must be removable and vandal resistant. The exterior screws, nuts, bolts, and washers must be stainless steel.

Terminal blocks, circuit breakers, and a power supply must be UL approved.

# 86-1.02Q(2) Department-Furnished Controller Cabinets

A Department-furnished controller assembly consists of a Model 170E or 2070E controller unit, a wired controller cabinet, and all auxiliary equipment required to operate the system. The Department does not furnish anchor bolts.

# 86-1.02Q(3) Controller Cabinets

The controller cabinet must be a Model 334L, comply with TEES, and be on the Authorized Material List for traffic signal control equipment. The cabinet must have 3 drawer shelves. Each shelf must be attached to the tops of 2 supporting angles with 4 screws.

## 86-1.02Q(4) Telephone Demarcation Cabinets

#### 86-1.02Q(4)(a) General

The doors of a telephone demarcation cabinet must be attached using continuous stainless steel piano hinges.

# 86-1.02Q(4)(b) Type A Telephone Demarcation Cabinets

Reserved

# 86-1.02Q(4)(c) Type B Telephone Demarcation Cabinets

A Type B telephone demarcation cabinet consists of a mounting panel, outlets, circuit breaker, fan, dead front plates, and fuse.

The mounting panel must be made of 3/4-inch-thick ACX-grade plywood.

The mounting panel must be fastened to the cabinet with nuts, lock washers, and flat washers to 10 welded studs.

The cabinet must be made of 0.125-inch-thick anodized aluminum.

The cabinet door must be hung and secured with drawn latches, lockable with a padlock. The padlock latches must each have a minimum 7/16-inch-diameter hole.

Ventilation louvers must be located on the door.

The fan must be located in a ventilator housing and be controlled thermostatically. The thermostat control must have a range from 80 to 130 degrees F.

The thermostat and fan circuit must be protected with a fuse rated for 175 percent of the motor capacity. The fan capacity must be a minimum 25 cfm.

# 86-1.02Q(4)(d) Type C Telephone Demarcation Cabinets

Reserved

# 86-1.02Q(5) Battery Backup System Cabinets

The cabinet for a battery backup system must comply with TEES and be on the Authorized Material List for traffic signal control equipment.

# 86-1.02R Signal Heads

# 86-1.02R(1) General

A signal head consists of a signal mounting assembly, backplate, and signal face.

The head must have a terminal block attached to the back of one housing. The terminal block must have enough positions to accommodate all indications. Each position must be permanently labeled for the indications used.

The metal signal heads must not fracture or deflect more than half the lens diameter when tested under California Test 666.

The plastic signal heads must not fracture or deflect when tested under California Test 605.

The deflection must not be 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 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.

# 86-1.02R(2) Signal Mounting Assemblies

Signal mounting assembly must include:

- 1. 1-1/2-inch-diameter steel pipe or galvanized conduit
- 2. Pipe fitting made of ductile iron, galvanized steel, bronze, or aluminum alloy, Type AC-84B, no. 380
- 3. Mast arm and post-top slip fitters and terminal compartments made of cast bronze or hot-dip galvanized ductile iron

The horizontal distance between the vertical centerlines of the terminal compartment or slip fitter and of each signal face must not exceed 11 inches except where required for proper signal face alignment or to allow programming of programmed visibility signal sections.

The mounting assembly must be watertight and free of sharp edges or protrusions that might damage conductor insulation. The assembly must have positive-locking serrated fittings that prevent signal faces from rotating when the fittings are mated with similar fittings on the faces.

Each terminal compartment must be fitted with a terminal block having a minimum of 12 positions, each with 2 screw-type terminals. Each terminal must accommodate at least five no. 14 conductors. The terminal compartment must have a cover for easy access to the terminal block.

#### 86-1.02R(3) Backplates

The backplate material must be a homogeneous black color with a lusterless finish.

A metal backplate must be made of a minimum 1/16-inch-thick 3001-14 aluminum.

A plastic backplate must have a minimum thickness of 1/16 inch and be formed from sheet plastic or assembled from extruded, molded, or cast plastic sections. Sections must be factory joined using one of the following:

- 1. Appropriate solvent cement.
- 2. Aluminum rivets and washers painted or permanently colored to match the backplate.
- 3. No. 10 machine screws with flat washers, lock washers, and nuts painted to match the backplate.

Each plastic backplate must be secured to the plastic signal face such that it resists removal or permanent deformation.

#### 86-1.02R(4) Signal Faces

Signal face consists of signal sections with signal housings, LED modules, and visors.

#### Signal face must:

- Be adjustable and allow for 360-degree rotation about the vertical axis
- Comply with ITE publications ST-052-E, Vehicle Traffic Control Signal Heads: Light Emitting Diode (LED) Circular Signal Supplement and ST-054, Vehicle Traffic Control Signal Heads: Light Emitting Diode (LED) Vehicle Arrow Traffic Signal Supplement
- 3. Be sealed with a neoprene gasket at the top opening

A metal signal face must have a metal backplate and visor.

A plastic signal face must have a plastic backplate and visor.

If a signal face is supported by a Type MAS slip fitter, spacers are required between the 2 sections. The spacers must be made of the same material as the housing. The vertical dimension of the spacers must allow proper seating of the serrations between the slip fitter and the 2 sections. The 2 sections must be joined with at least two no. 10 minimum machine screws through holes near the front of the housing and the spacers and matching holes in a reinforcing plate installed in the housing.

# 86-1.02R(4)(a) Signal Sections

# 86-1.02R(4)(a)(i) General

Signal section must have:

- 1 Opening at the top and bottom for a 1-1/2-inch pipe
- 2. Maximum height of 10-1/4 inches for an 8-inch section and 14-3/4 inches for a 12-inch section
- 3. Hinge pins, door-latching devices, and other exposed hardware manufactured of Type 304/304L or 305 stainless steel
- 4. Interior screws and fittings manufactured of stainless steel or steel with a corrosion-resistant plating or coating
- 5. Gaskets made of a material that is not degraded if installed in a section with metal or plastic housing

Sections must be capable of being joined together to form a signal face in any combination. This interchangeability is not required between metal and plastic sections.

Each section must be joined to an adjacent section by one of the following:

- 1. Minimum of 3 machine screws for 8-inch sections and 4 machine screws for 12-inch sections, installed through holes near the front and back of the housing. Each screw must be a no. 10 and have a nut, flat washer, and lock washer.
- 2. 2 machine screws, each with a nut, flat washer, and lock washer, installed through holes near the front of the housing and a fastener through the 1-1/2-inch pipe opening. The fastener must have 2 large, flat washers to distribute the load around the pipe's opening and 3 carriage bolts, each with a nut and lock washer. The minimum screw size must be no. 10, and the carriage bolt size must be 1/4 inch.

The holes for the machine screws must be either cast or drilled during signal section fabrication. Each hole must be surrounded by a minimum 1/8-inch-wide boss to allow contact between signal sections about the axis of the hole.

A serrated nylon washer must be inserted between each plastic signal section and the metal mounting assembly. Each serrated nylon washer must be from 3/16 to 1/4 inch thick. The serrations must match those on the signal section and the mounting assembly.

# 86-1.02R(4)(a)(ii) Programmed Visibility Signal Sections

Programmed visibility signal section must have:

- 1. Nominal 12-inch-diameter circular or arrow indication
- 2. Cap visor
- 3. Adjustable connection that:
  - 3.1. Provides incremental tilting from 0 to 10 degrees above or below the horizontal
  - 3.2. Maintains a common vertical axis through couplers and mountings

The terminal connection must allow external adjustment about the mounting axis in 5-degree increments.

The visibility of each signal section must be capable of adjustment or programming within the section.

The adjustment for the section must be preset at 4 degrees below the horizontal.

#### 86-1.02R(4)(a)(iii) Signal Housings

The signal housing must:

- Be die-cast aluminum, permanent mold-cast aluminum, or if specified, structural plastic
- 2. Comply with ITE publications ST-052-E, Vehicle Traffic Control Signal Heads: Light Emitting Diode (LED) Circular Signal Supplement and ST-054, Vehicle Traffic Control Signal Heads: Light Emitting Diode (LED) Vehicle Arrow Traffic Signal Supplement if made of die-cast or permanent mold-cast aluminum
- 3. Have a 1-piece, hinged, square-shaped door that is:
  - 3.1. Designed to allow access for replacement of modules without the use of tools
  - 3.2. Secured such that it remains closed during loading tests
- 4. Have a watertight module or lens mounted in the door
- 5. Have a terminal block attached to the back, with the terminals permanently labeled for conductors to facilitate field wiring

Each housing must have reinforcement plates. Reinforcement plates must be either sheet aluminum, galvanized steel, or cast aluminum. Each plate must have a minimum thickness of 0.11 inch and a hole concentric with a 1-1/2-inch pipe-mounting hole in the housing. Reinforcement plates must be placed as specified in the following table:

#### Reinforcement Plate Placement

Material	Placement
Sheet aluminum	Inside and outside of housing
Galvanized steel	Inside of housing
Cast aluminum	Outside of housing

Reinforcement plates placed outside of the housing must be finished to match the signal housing color and be designed to allow a proper serrated coupling between the signal face and the mounting hardware. A minimum of three no. 10 machine screws must be installed through holes in each plate and matching holes in the housing. Each screw must have a round or binder head, a nut, and a lock washer.

A metal housing must have a metal visor.

Plastic housing must:

- 1. Be molded in a single piece or fabricated from 2 or more pieces joined into a single piece
- Be a black color throughout, including the door, matching color no. 17038, 27038, or 37038 of FED-STD-595
- 3. Have UV stability
- 4. Be self-extinguishing

If reinforcing webs are used to connect the back of the housing to the top, bottom, and sides of the adjacent housing, reinforcement plates are not required.

The exterior of the housing must be painted as specified in sections 78-4.08 and 59.

# 86-1.02R(4)(b) LED Signal Modules

An LED signal module must be on the Authorized Material List for LED traffic signal modules.

An LED signal module must comply with ITE publications ST-052-E, Vehicle Traffic Control Signal Heads: Light Emitting Diode (LED) Circular Signal Supplement and ST-054, Vehicle Traffic Control Signal Heads: Light Emitting Diode (LED) Vehicle Arrow Traffic Signal Supplement, except:

- 1. Maximum module weight must be 4 lb
- 2. Module must be a sealed unit with:

- 2.1. 2 color-coded conductors for the power connection except lane control modules must use 3 color-coded conductors
- 2.2. Printed circuit board that complies with TEES, chapter 1, section 6
- 2.3. Lens that is:
  - 2.3.1. Convex or flat with a smooth outer surface
  - 2.3.2. Made of UV-stabilized plastic or glass
- 2.4. 1-piece EPDM gasket
- 3. Module must include 3-foot-long conductors with attached quick-disconnect terminals
- 4. Identification must include:
  - 4.1. Month and year of manufacture
  - 4.2. 1-inch-diameter symbol of the module type with the module color written adjacent to the symbol in 0.50-inch-high letters
- 5 LED must be the ultra-bright type rated for 100,000 hours of continuous operation
- 6. Module must have an integral power supply

Individual LEDs must be wired such that a loss or failure of 1 LED will not result in a loss of more than 5 percent of the module's light output. Failure of an individual LED in a string must not result in a loss of an entire string or other indication.

The symbol for a 12-inch U-turn section must be a 15/16-inch-wide inverted *U* with an arrow on the left end.

A lane control section must be a combination module with a red *X* and green arrow. The conductor function and color code must be as shown in the following table:

#### **Conductor Function and Color Code**

Function	Color
Neutral	White
Red X	Red
Green arrow	Brown

The minimum power consumption for an LED signal module must be 5 W.

The maximum power consumption for an LED signal module must be as shown in the following table:

**Maximum Power Consumption** 

maximum ower consumption						
LED signal module	Power consumption (W)					
LED signal module	Red		Yellow		Green	
type	25 °C	74 °C	25 °C	74 °C	25 °C	74 °C
8-inch circular	8	13	13	16	12	12
12-inch circular	11	17	22	25	15	15
12-inch arrow	9	12	10	12	11	11
12-inch U-turn	9	12	10	12	11	11
Bicycle	11	17	22	25	15	15
Programmed visibility	11	17	22	25	15	15
Lane control (X)	9	12				
Lane control (Arrow)					11	11

Red and green LED signal modules operating over a temperature range from -40 to 74 degrees C and yellow LED signal modules operating at 25 degrees C must maintain the minimum illumination values for 48 months as shown in the following tables:

#### **Minimum Maintained Intensities for Circular Indications**

	Intensities (cd)					
	8-inch			12-inch		
Angle (v,h)	Red	Yellow	Green	Red	Yellow	Green
2.5, ±2.5	133	267	267	339	678	678
2.5, ±7.5	97	194	194	251	501	501
2.5, ±12.5	57	113	113	141	283	283
2.5, ±17.5	25	48	48	77	154	154
7.5, ±2.5	101	202	202	226	452	452
7.5, ±7.5	89	178	178	202	404	404
7.5, ±12.5	65	129	129	145	291	291
7.5, ±17.5	41	81	81	89	178	178
7.5, ±22.5	18	37	37	38	77	77
7.5, ±27.5	10	20	20	16	32	32
12.5, ±2.5	37	73	73	50	101	101
12.5, ±7.5	32	65	65	48	97	97
12.5, ±12.5	28	57	57	44	89	89
12.5, ±17.5	20	41	41	34	69	69
12.5, ±22.5	12	25	25	22	44	44
12.5, ±27.5	9	16	16	16	32	32
17.5, ±2.5	16	32	32	22	44	44
17.5, ±7.5	14	28	28	22	44	44
17.5, ±12.5	10	20	20	22	44	44
17.5, ±17.5	9	16	16	22	44	44
17.5, ±22.5	6	12	12	20	41	41
17.5, ±27.5	4	9	9	16	32	32

#### **Minimum Maintained Luminance for Indications**

Indication type		Luminance (fL	)
maiodilon type	Red	Yellow	Green
Arrow	1,610	3,210	3,210
U-turn	1,610	3,210	3,210
Bicycle	1,610	1,610	1,610
Lane control (X)	1,610		
Lane control ( <i>Arrow</i> )			1,610

# **Minimum Maintained Luminance for Programmed Visibility Indications**

	Luminance (cd)			
Indication type	Red Yellow Green			
PV at angle v=2.5, h=±2.5	314	314	314	

Conductors must be prewired to the terminal block.

# 86-1.02R(4)(c) Visors and Directional Louvers

The visor must be a tunnel type.

The visor must have a downward tilt from 3 to 7 degrees with a minimum length of 9-1/2 inches for nominal 12-inch round lenses and 7 inches for nominal 8-inch round lenses.

A metal visor must be formed from minimum 0.050-inch-thick aluminum alloy sheet.

A plastic visor must be either formed from sheet plastic or blow-molded. The plastic must be a black homogeneous color with a lusterless finish. A visor must withstand a wind load applied to its side for 24

hours without permanent deformation or removal from its door when tested under California Test 605 for plastic visors and California Test 666 for metal visors.

If directional louvers are used, the louvers must fit into full-circular signal visors. Louvers must consist of one of the following:

- 1. Outside cylinder constructed of sheet steel with a minimum nominal thickness of 0.030 inch and vanes constructed of sheet steel with a minimum nominal thickness of 0.016 inch.
- 2. Outside cylinder and vanes constructed of 5052-H32 aluminum alloy of equal thickness.

# 86-1.02S Pedestrian Signal Heads

# 86-1.02S(1) General

A pedestrian signal head consists of a pedestrian signal mounting assembly and a pedestrian signal face comprising of a pedestrian signal housing, an LED countdown pedestrian signal face module, and a front screen.

# 86-1.02S(2) Pedestrian Signal Mounting Assemblies

A pedestrian signal mounting assembly must comply with the specifications for a signal mounting assembly in section 86-1.02R, except mast arm slip fitters are not required.

# 86-1.02S(3) Pedestrian Signal Faces

#### 86-1.02S(3)(a) General

Each pedestrian signal face must include a light-duty terminal block rated at 5 A and have 12 positions with no. 6-by-1/8-inch binder head screws. Each position must have 1 screw-type terminal.

The wiring and terminal block must comply with ITE publication ST-055-E, *Pedestrian Traffic Control Signal Indicators: Light Emitting Diode (LED) Signal Modules*.

# 86-1.02S(3)(b) Pedestrian Signal Housings

Pedestrian signal housing must comply with the specifications for a signal housing in 86-1.02R(4)(a)(iii), except the maximum overall dimensions must be 18-1/2 inches wide, 19 inches high, and 11-1/2 inches deep and without:

- 1. Visor
- 2. Watertight module or lens mounted in the door
- 3. Reinforcement plates

The housing must have a terminal block attached to the back. The terminal block must have enough positions to accommodate all indications. Each position must be permanently labeled for the indications used.

# 86-1.02S(3)(c) LED Countdown Pedestrian Signal Face Modules

An LED countdown PSF module must comply with ITE publication ST-055-E, *Pedestrian Traffic Control Signal Indicators: Light Emitting Diode (LED) Signal Modules*, except the material must comply with ASTM D3935 and the module must have:

- 1. Ultra-bright-type LED rated for 100,000 hours of continuous operation.
- 2. Lot number and month and year of manufacture permanently marked on the back of the module
- 3. Prominent and permanent vertical markings for accurate indexing and orientation within the pedestrian 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*.
- 4. Circuit board complying with TEES, chapter 1, section 6.

Individual LEDs must be wired such that a loss or failure of 1 LED will not result in a loss of more than 5 percent of the module's light output. Failure of an individual LED in a string must not result in a loss of an entire string or other indication.

Each symbol must be at least 9 inches high and 5-1/4 inches wide. 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 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-	1,094
digit countdown timer (fL)	
Walking person (fL)	1,547

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

# 86-1.02S(3)(d) Front Screen

Pedestrian signal face must have a front screen that is one of the following types:

- 3/8-inch-thick aluminum honeycomb screen with 0.2-inch-wide cells or a 1/2-inch-thick plastic screen with 3/8-inch-wide squares with 1/16-inch wall thickness that:
  - 1.1. Is installed so it tilts downward at an angle of  $15 \pm 2$  degrees from the top and completely covers the message plate.
  - 1.2. Includes a clear front cover made of either a minimum 1/8-inch-thick acrylic plastic sheet or a minimum 1/16-inch-thick polycarbonate plastic.
  - 1.3. Is held firmly in place, including the cover, with stainless steel or aluminum clips or stainless steel metal screws.
- 2. Polycarbonate screen that:
  - 2.1. Has a nominal thickness of 1/32 inch.
  - 2.2. Is a 1-1/2-inch-deep eggcrate or Z-crate type.
  - 2.3. Is mounted in a frame constructed of aluminum alloy or polycarbonate with a minimum thickness of 0.040 inch.
  - 2.4. Is held in place with stainless steel screws.

The screen and frame of a pedestrian signal face must be made of either (1) plastic that is a flat black color or (2) anodized aluminum that is a flat black color or finished with lusterless, black, exterior-grade latex paint formulated for application to metal surfaces.

## 86-1.02T Accessible Pedestrian Signals

Accessible pedestrian signal must comply with the California MUTCD, chapter 4E, and have:

- Audible speech message that plays when the push button is actuated. The message must include the name of the street to be crossed. The accessible pedestrian signal must have at least 5 audible message options.
- 2. Push button locator tone that clicks or beeps.
- Feature that activates the pedestrian phase during a failure of the audible message, locator tone, or vibrotactile device.

An accessible pedestrian signal must function with the Department-furnished Model 170E/2070E controller assembly.

No part of the accessible pedestrian signal must be installed inside the controller cabinet. Power for the accessible pedestrian signal must be from the pedestrian signal housing terminal block.

The housing for the signal assembly must be made of corrosion-resistant material. Theft-proof bolts used for mounting the housing to the standard must be stainless steel with a content of 17 percent chromium and 8 percent nickel. The housing must be shaped to fit the pole's curvature.

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

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

Accessible pedestrian signal must:

- 1. Have electronic switches, a potentiometer, or an access port for a device for controlling and programming the volume level and messaging
- 2. Be weatherproof and shockproof

Enclosure for the accessible pedestrian signal must:

- 1. Weigh less than 7 lb
- 2. Measure less than 16 by 6 by 5 inches
- 3. Have a wiring hole with a diameter not exceeding 1-1/8 inches
- 5. Have a switch for a push button
- 6. Have a vibrotactile device on the push button or on the arrow
- 7. Have an internal weatherproof speaker and microphone that senses the ambient sound level

The separation between adjacent holes used for conductors and mounting must be at least twice the diameter of the larger hole.

The speaker grills must be located on the surface of the enclosure. The speakers must not interfere with the housing or its mounting hardware.

The conductor cable between the accessible pedestrian signal assembly and the pedestrian signal head must be a 9 no. 20 conductor cable complying with MIL-W-16878D.

#### 86-1.02U Push Button Assemblies

The housing for a push button assembly must be made of die-cast aluminum, permanent mold-cast aluminum, or UV-stabilized self-extinguishing structural plastic. The plastic housing must have a color throughout that matches color no. 17038, 27038, or 37038 of FED-STD-595.

If the push button is to be attached to a pole, the housing must be shaped to fit the pole's curvature.

The assembly must be waterproof and shockproof.

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).

Switch for the push button must have:

- 1. Plunger actuator and a U frame to allow recessed mounting in the push button housing
- 2. Operating force of 3.5 lb
- 3. Maximum pretravel of 5/64 inch
- 4. Minimum overtravel of 1/32 inch
- 5. Differential travel from 0.002 to 0.04 inch
- 6. Minimum 2-inch diameter actuator

# 86-1.02V Reserved

# 86-1.02W Loop Detector Sealants

#### 86-1.02W(1) General

Sealant for filling loop detector slots must be one of the following:

- 1. Asphaltic emulsion
- 2. Elastomeric sealant
- 3. Epoxy sealant for inductive loops
- 4. Hot-melt rubberized asphalt

## 86-1.02W(2) Asphaltic Emulsion Sealant

Asphaltic emulsion sealant must comply with the State Specification 8040-41A-15.

# 86-1.02W(3) Elastomeric Sealant

Elastomeric sealant must be a polyurethane material that cures only in the presence of moisture if used within the stated shelf life. The sealant must be suitable for use in both asphalt concrete and concrete pavement.

The cured elastomeric sealant must comply with the requirements shown in the following table:

**Cured Elastomeric Sealant Requirements** 

Quality characteristic	Test method	Requirement
Hardness	ASTM D2240 <sup>a</sup>	65–85
Tensile strength (min, MPa)	ASTM D412 <sup>b</sup>	3.45
Elongation (min, %)	A31WID412	400
Flex at -40 °C°		No cracks
Weathering resistance	ASTM D822 <sup>d</sup>	Slight chalking
Salt spray resistance:		
Tensile strength (min, MPa)	ASTM B117 <sup>e</sup>	3.45
Elongation (min, %)		400
Dielectric constant (%)	ASTM D150 <sup>†</sup>	<25

<sup>&</sup>lt;sup>a</sup>Indentation at 25 °C and 50% relative humidity (Rex. Type A, Model 1700 only)

# 86-1.02W(4) Hot-Melt Rubberized Asphalt Sealant

Hot-melt rubberized asphalt sealant must:

- 1. Be in solid form at room temperature and fluid at an application temperature range from 190 to 205 degrees C
- 2. Not produce toxic fumes
- 3. Be suitable for use in both asphalt concrete and concrete pavement
- 4. Be packaged in containers clearly marked *Detector Loop Sealant* with the manufacturer's batch and lot number.

The cured hot-melt rubberized asphalt sealant must comply with the requirements shown in the following table:

**Cured Hot-Melt Rubberized Asphalt Sealant Requirements** 

Quality characteristic	Test method	Requirement
Cone penetration (max, 1/10 mm)	ASTM D5329, sec. 6 <sup>a</sup>	35
Flow (max, mm)	ASTM D5329, sec. 8 <sup>b</sup>	5
Resilience (min, %)	ASTM D5329, sec. 12 <sup>c</sup>	25
Softening point (min, °C)	ASTM D36	82
Ductility (min, cm)	ASTM D113 <sup>d</sup>	30
Flash point, Cleveland Open Cup (min, °C)	ASTM D92	288
Viscosity (Pa·s)	ASTM D4402 <sup>e</sup>	2.5-3.5

<sup>&</sup>lt;sup>a</sup>At 25 °C, 150 g, 5 s

# 86-1.02X Reserved

#### 86-1.02Y Transformers

A transformer must be single-phase and may be a nonsubmersible or submersible type.

<sup>&</sup>lt;sup>b</sup>Die C pulled at 508 mm/minute

<sup>&</sup>lt;sup>c</sup>0.6-mm free film bend (180°) over 13-mm mandrel

<sup>&</sup>lt;sup>d</sup>Weatherometer 350 h, cured 7 days at 25 °C and 50% relative humidity

<sup>&</sup>lt;sup>e</sup>28 days at 38 °C with 5% NaCl, Die C, and pulled at 508 mm/minute)

<sup>&</sup>lt;sup>f</sup>Change over a temperature range from -30 to 50 °C

<sup>&</sup>lt;sup>b</sup>At 60 °C

<sup>&</sup>lt;sup>c</sup>At 25 °C

dAt 25 °C, 5 cm/minute

<sup>&</sup>lt;sup>e</sup>Brookfield Thermosel, no. 27 spindle, 20 rpm, 190 °C

A transformer must be a dry type designed for operation on a 60 Hz supply. The transformer must have a decal showing a connection diagram. The diagram must show either color coding or wire tagging with primary (H1, H2) or secondary (X1, X2) markers and the primary and secondary voltage and volt-ampere rating. A transformer must comply with the electrical requirements shown in the following table:

# **Transformer Electrical Requirements**

Quality characteristic	Requirement	
Rating (V(ac))	120/480, 120/240, 240/480, or	
	480/120	
Efficiency (%)	> 95	
Secondary voltage regulation and tolerance from half load to full	±3	
load (%)		

Secondary 240 and 480 V(ac) windings must be center tapped.

The transformer must withstand the application of 2,200 V(ac) from core to coils and from coil to coil for a 1-minute period when tested immediately after operation of the transformer at full load for 24 hours.

The external leads for the secondary connections must be no. 10 Type USE rated for 600 V(ac).

The transformer's leads must extend a minimum of 12 inches from the case.

The transformer's insulation must be NEMA 185 C or better.

#### Each transformer must:

- 1. Include metal half-shell coil protection.
- 2. Have moisture-resistant, synthetic-varnish-impregnated windings.
- 3. Be waterproof and suitable for outdoor operation.

#### Each submersible transformer must:

- 1. Include a handle and a hanger.
- 2. Be securely encased in a rugged, corrosion-resistant, watertight case.
- 3. Have leads that extend out through 1 or more sealed hubs.
- 4. Be manufactured to withstand a 5-day test with 12-hour on and off periods submerged in 2 feet of salt water that is 2 percent salt by weight. The operating periods must be at full load.

#### 86-1.02Z Batteries

# Battery must:

- 1. Be deep-cycle, sealed, prismatic, lead-calcium-based, absorbed-glass-mat, valve-regulated, lead-acid type
- 2. Be rated for 12 V
- 3. Be rated for a temperature range from -25 to 60 degrees C
- 4. Be group size 24
- 5. Be commercially available and stocked locally
- 6. Be marked with a date code, maximum recharge data, and recharge cycles
- 7. Be new and fully charged when furnished
- 8. Be free from damage or deformities
- 9. Have a carrying handle
- 10. Have 2 top-mounted, threaded-stud posts that include all washers and nuts
- 11. Include insulating rubber covers for protecting the lugs, posts, and wiring: red for the positive terminal and black for the negative terminal

If a battery is used for a battery backup system, it must accommodate 3/8-inch ring lugs of a Department-furnished battery harness.

#### 86-1.03 CONSTRUCTION

Not Used

Not Used

# Replace section 87 with:

04-15-16

# **87 ELECTRICAL SYSTEMS**

04-15-16 **87-1 GENERAL** 

## 87-1.01 GENERAL

# 87-1.01A Summary

Section 87 includes general specifications for constructing and installing electrical systems.

The Department deducts the cost for maintenance performed by the Department on new or portions of existing systems modified under the Contract.

## 87-1.01B Definitions

Reserved

# 87-1.01C Submittals

Reserved

# 87-1.01D Quality Assurance

# 87-1.01D(1) General

Reserved

# 87-1.01D(2) Quality Control

Before shipping the material to the job site, submit to METS test samples of:

- 1. Accessible pedestrian signals
- 2. LED countdown pedestrian signal face modules
- 3. LED signal modules
- 4. LED luminaires

Submit a sample size as shown in the following table:

#### **Electrical Material Sampling**

Contract quantity	Test sample size
1–8	1
9–15	2
16–25	3
26–90	5
91–150	8
151–280	13
281–500	20
501–1200	32

Before starting operation of an electrical system, perform a conductor test in the presence of the Engineer.

Conductor test consists of testing each conductor and the conductors in cables for:

- 1. Continuity.
- 2. Grounds.
- 3. Insulation resistance at 500 V(dc) between the circuit and ground. The insulation resistance must be a minimum of 10 M $\Omega$  on circuits, except it must be a minimum of 100 M $\Omega$  for inductive loop detector circuits.

Start the operational test of the system on any day except Friday or the day before a holiday. The operational test for signals must start from 9:00 a.m. to 2:00 p.m. Notify the Engineer 48 hours before starting the test.

An operational test consists of a minimum of 5 business days of continuous, satisfactory operation of the system. If the system fails, correct the problem and retest the system. A shutdown of the system caused by traffic, a power interruption, or unsatisfactory performance of Department-furnished materials does not constitute discontinuity of the test.

## **87-1.02 MATERIALS**

Not Used

#### 87-1.03 CONSTRUCTION

#### 87-1.03A General

The Engineer determines the final locations of electrical systems.

Verify the locations of electrical systems and the depths of existing detectors, conduits, and pull boxes.

Notify the Engineer before performing work on the existing system.

You may shut down the system for alteration or removal.

Where an existing Department underground facility is shown within 10 feet of any excavation, locate and field mark the facility before performing work that could damage or interfere with the existing facility.

If an existing facility is within 2 feet of an excavation, determine the exact location of the facility by excavating with hand tools before using any power-operated or power-driven excavating or boring equipment. A vacuum excavator may be used if authorized.

Notify the Engineer immediately if an existing facility is damaged by your activities.

If existing underground conduit is to be incorporated into a new system, clean it with a mandrel or cylindrical wire brush and blow it clean with compressed air.

Limit the shutdown of traffic signal systems to normal working hours. Notify the local traffic enforcement agency before shutting down the signal.

Place temporary W3-1 and R1-1 signs in each direction to direct traffic through the intersection during shutdown of the signal. Place two R1-1 signs for 2-lane approaches. The signs must comply with part 2 of the *California MUTCD*.

Cover signal faces when the system is shut down overnight. Cover temporary W3-1 and R1-1 signs when the system is turned on.

If you work on an existing lighting system and the roadway is to remain open to traffic, ensure the system is in operation by nightfall.

Replace detectors you damage within 72 hours, or the Department replaces them and deducts the cost.

Work performed on an existing system not described is change order work.

Do not use electrical power from existing highway facilities unless authorized.

Maintain a minimum 48-inch clearance for a pedestrian pathway when placing equipment.

Except for service installation or work on service equipment enclosures, do not work above ground until all materials are on hand to complete the electrical work at each location.

Bond all metal components to form a continuous grounded system as specified in NEC.

Ground metallic equipment mounted less than 8 feet above the ground surface on a wood pole.

If you damage any portion of a concrete curb, sidewalk, curb ramp, driveway, or gutter depression, replace the entire section between contraction or expansion joints under section 73.

Apply equipment identification characters.

Orient louvers, visors, and signal faces such that they are clearly visible to approaching traffic from the direction being controlled.

Test loops and the detector lead-in cable circuit for continuity, ground, and insulation resistance at the controller cabinet before connecting detector lead-in cable to the terminal block.

Perform an operational test of the systems.

Before starting the operational test for systems that impact traffic, the system must be ready for operation, and all signs, pavement delineation, and pavement markings must be in place at that location.

#### 87-1.03B Conduit Installation

# 87-1.03B(1) General

The installation of conduit includes installing caps, bushings, and pull tape and terminating the conduit in pull boxes, foundations, poles, or a structure.

Limit the number of bends in a conduit run to no more than 360 degrees between pull points.

Use conduit to enclose conductors except where they are installed overhead or inside standards or posts.

You may use a larger size conduit than specified for the entire length between termination points. Do not use a reducing coupling.

Extend an existing conduit using the same material. Terminate conduits of different materials in a pull box.

Install 2 conduits between a controller cabinet and the adjacent pull box.

Use a minimum trade size of conduit of:

- 1. 1-1/2 inches from an electrolier to the adjacent pull box
- 2. 1 inch from a pedestrian push button post to the adjacent pull box
- 3. 2 inches from a signal standard to the adjacent pull box
- 4. 3 inches from a controller cabinet to the adjacent pull box
- 5. 2 inches from an overhead sign to the adjacent pull box
- 6. 2 inches from a service equipment enclosure to the adjacent pull box
- 7. 1-1/2 inches if unspecified

#### Use Type 1 conduit:

- 1. On all exposed surfaces
- 2. In concrete structures
- 3. Between a structure and the nearest pull box

Ream the ends of shop-cut and field-cut conduit to remove burrs and rough edges. Make the cuts square and true. Do not use slip joints and running threads to couple conduit. If a standard coupling cannot be used for metal-type conduit, use a threaded union coupling. Tighten the couplings for metal conduit to maintain a good electrical connection.

Cap the ends of conduit to prevent debris from entering before installing the conductors or cables. Use a plastic cap for Type 1, 2, and 5 conduits and a standard pipe cap for all other types of conduit.

For Type 1, 2, and 5 conduits, use threaded bushings and bond them using a jumper. For other types of conduit, use nonmetallic bushings.

Do not install new conduit through foundations.

Cut Type 2 conduit with pipe cutters; do not use hacksaws. Use standard conduit-threading dies for threading conduit. Tighten conduit into couplings or fittings using strap wrenches or approved groove joint pliers.

Cut Type 3 conduit with tools that do not deform the conduit. Use a solvent weld for connections.

Protect shop-cut threads from corrosion under the standards shown in the following table:

# **Shop-Cut Thread Corrosion Protection**

Conduit	Standard
Types 1 and 2	ANSI C80.1
Type 5	ANSI C80.6

Apply 2 coats of unthinned, organic zinc-rich primer to metal conduit before painting. Use a primer on the Authorized Material List for organic zinc-rich primers. Do not use aerosol cans. Do not remove shopinstalled conduit couplings.

For conduits, paint:

- 1. All exposed threads
- 2. Field-cut threads, before installing conduit couplings to metal conduit
- 3. Damaged surfaces on metal conduit

If a Type 2 conduit or conduit coupling coating is damaged:

- 1. Clean the conduit or fitting and paint it with 1 coat of rubber-resin-based adhesive under the manufacturer's instructions
- 2. Wrap the damaged coating with at least 1 layer of 2-inch-wide, 20 mils-minimum-thickness, PVC tape under ASTM D1000 with a minimum tape overlap of 1/2 inch

You may repair damaged spots of 1/4 inch or less in diameter in the thermoplastic coating by painting with a brushing-type compound supplied by the conduit manufacturer.

If factory bends are not used, bend the conduit to a radius no less than 6 times its inside diameter without crimping or flattening it. Comply with the bending requirements shown in the following table:

#### **Conduit-Bending Requirements**

Type	Requirement
1	Use equipment and methods under the conduit manufacturer's instructions.
2	Use a standard bending tool designed for use on thermoplastic-coated conduit. The conduit must be free of burrs and pits.
3	Use equipment and methods under the conduit manufacturer's instructions. Do not expose the conduit to a direct flame.
5	Use equipment and methods under the conduit manufacturer's instructions.

Install pull tape with at least 2 feet of slack in each end of the conduit that will remain empty. Attach the tape's ends to the conduit.

Install conduit terminating in a standard or pedestal from 2 to 3 inches above the foundation. Slope the conduit toward the handhole opening.

Terminate conduit installed through the bottom of a nonmetallic pull box 2 inches above the bottom and 2 inches from the wall closest to the direction of the run.

# 87-1.03B(2) Conduit Installation for Structures

#### 87-1.03B(2)(a) General

Paint exposed Type 1 conduit the same color as the structure.

Install galvanized steel hangers, steel brackets, and other fittings to support conduit in or on a wall or bridge.

# 87-1.03B(2)(b) New Structures

Seal and make watertight the conduits which lead to soffits, wall-mounted luminaires, other lights, and fixtures located below the pull box grade.

If you place a conduit through the side of a nonmetallic pull box, terminate the conduit 2 inches from the wall and 2 inches above the bottom. Slope the conduit toward the top of the box to facilitate pulling conductors.

For ease of installation and if authorized, you may use Type 4 conduit instead of Type 1 conduit for the final 2 feet of conduit entering a pull box in a reinforced concrete structure.

Install an expansion fitting where a conduit crosses an expansion joint in a structure. Each expansion fitting for metal conduit must include a copper bonding jumper having the ampacity as specified in NEC.

Install an expansion-deflection fitting for an expansion joint 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.

For an expansion joint with a movement rating greater than 1-1/2 inches, install the expansion-deflection fitting as shown.

For conduit installed inside of bridge structures, you must:

- 1. Install precast concrete cradles made of minor concrete and commercial-quality welded wire fabric. The minor concrete must contain a minimum of 590 lb of cementitious material per cubic yard. The cradles must be moist cured for a minimum of 3 days.
- 2. Bond precast concrete cradles to a wall or bridge superstructure with one of the following:
  - 2.1. Epoxy adhesive for bonding freshly-mixed concrete to hardened concrete.
  - 2.2. Rapid-set epoxy adhesive for pavement markers.
  - 2.3. Standard-set epoxy adhesive for pavement markers.
- 3. Use a pipe sleeve or form an opening for a conduit through a bridge superstructure. The sleeve or opening through a prestressed member or conventionally reinforced precast member must be:
  - 3.1. Oriented transverse to the member.
  - 3.2. Located through the web.
  - 3.3. No more than 4 inches in size.
- 4. Wrap the conduit with 2 layers of asphalt felt building paper and securely tape or wire the paper in place for a conduit passing through a bridge abutment wall. Fill the space around the conduit with mortar under section 51-1, except the proportion of cementitious material to sand must be 1 to 3. Fill the space around the conduits after prestressing is completed.

Thread and cap a conduit installed for future use in structures. Mark the location of the conduit's end in a structure, curb, or wall directly above the conduit with a Ythat is 3 inches tall.

## 87-1.03B(2)(c) Existing Structures

Run surface-mounted conduit straight and true, horizontal or vertical on the wall, and parallel to walls on ceilings or similar surfaces. Support the conduit at a maximum of 5-foot intervals where needed to prevent vibration or deflection. Support the conduit using galvanized, malleable-iron, conduit clamps, and clamp backs secured with expansion anchorage devices complying with section 75-3.02C. Use the largest diameter of galvanized, threaded studs that will pass through the mounting hole in the conduit clamp.

# 87-1.03B(3) Conduit Installation Underground 87-1.03B(3)(a) General

Install conduit to a depth of:

- 1. 14 inches for the trench-in-pavement method
- 2. 18 inches, minimum, under sidewalk and curbed paved median areas
- 3. 42 inches, minimum, below the bottom of the rail of railroad tracks

4. 30 inches, minimum, everywhere else below grade

Place conduit couplings at a minimum of 6 inches from the face of a foundation.

Place a minimum of 2 inches of sand bedding in a trench before installing Type 2 or Type 3 conduit and 4 inches of sand bedding over the conduit before placing additional backfill material.

If installing conduit within the limits of hazardous locations as specified in NEC for Class I, division 1, install and seal Type 1 or Type 2 conduit with explosion-proof sealing fittings.

# 87-1.03B(3)(b) Conduit Installation under Paved Surfaces

You may lay conduit on existing pavement within a new curbed median constructed on top.

Install conduit under existing pavement by the jacking or drilling methods. You may use the trench-in-pavement method for either of the following conditions:

- 1. If conduit is to be installed behind the curb under the sidewalk
- 2. If the delay to vehicles will be less than 5 minutes

Do not use the trench-in-pavement method for conduit installations under freeway lanes or freeway-to-freeway connector ramps.

# 87-1.03B(3)(c) Reserved

# 87-1.03B(3)(d) Conduit Installation under Railroad Tracks

Install Type 1 or Type 2 conduit with a minimum diameter of 1-1/2 inches under railroad tracks. If you use the jacking or drilling method to install the conduit, construct the jacking pit a minimum of 13 feet from the tracks' centerline at the near side of the pit. Cover the jacking pit with planking if left overnight.

# 87-1.03B(4) Reserved

# 87-1.03B(5) Conduit Installation by the Jacking or Drilling Method

Keep the jacking or drilling pit 2 feet away from the pavement's edge. Do not weaken the pavement or soften the subgrade with excessive use of water.

If an obstruction is encountered, obtain authorization to cut small holes in the pavement to locate or remove the obstruction.

You may install Type 2 or Type 3 conduit under the pavement if a hole larger than the conduit's diameter is predrilled. The predrilled hole must be less than one and half the conduit's diameter.

Remove the conduit used for drilling or jacking and install new conduit for the completed work.

## 87-1.03B(6) Conduit Installation by the Trenching-In-Pavement Method

Install conduit by the trenching-in-pavement method using a trench approximately 2 inches wider than the conduit's outside diameter but not exceeding 6 inches in width.

Where additional pavement is to be placed, you must complete the trenching before the final pavement layer is applied.

If the conduit shown is to be installed under the sidewalk, you may install it in the street within 3 feet of and parallel to the face of the curb. Install pull boxes behind the curb.

Cut the trench using a rock-cutting excavator. Minimize the shatter outside the removal area of the trench.

Dig the trench by hand to the required depth at pull boxes.

Place conduit in the trench.

Backfill the trench with minor concrete to the pavement's surface by the end of each work day. If the trench is in asphalt concrete pavement and no additional pavement is to be placed, backfill the top 0.10 foot of the trench with minor HMA within 3 days after trenching.

# 87-1.03C Installation of Pull Boxes

#### 87-1.03C(1) General

Install pull boxes no more than 200 feet apart.

You may install larger pull boxes than specified or shown and additional pull boxes to facilitate the work except in structures.

Install a pull box on a bed of crushed rock and grout it before installing conductors. The grout must be from 0.5 to 1 inch thick and sloped toward the drain hole. Place a layer of roofing paper between the grout and the crushed rock sump. Make a 1-inch drain hole through the grout at the center of the pull box.

Set the pull box such that the top is 1-1/4 inches above the surrounding grade in unpaved areas and leveled with the finished grade in sidewalks and other paved areas.

Place the cover on the box when not working in it.

Grout around conduits that are installed through the sides of the pull box.

Bond and ground the metallic conduit before installing conductors and cables in the conduit.

Bond metallic conduits in a nonmetallic pull box using bonding bushings and bonding jumpers.

Do not install pull boxes in concrete pads, curb ramps, or driveways.

Reconstruct the sump of a pull box if disturbed by your activities. If the sump was grouted, remove and replace the grout.

# 87-1.03C(2) Nontraffic Pull Boxes

If you bury a nontraffic pull box, set the box such that the top is 6 to 8 inches below the surrounding grade. Place a 20-mil-thick plastic sheet made of HDPE or PVC virgin compounds to prevent water from entering the box.

Place mortar between a nontraffic pull box and a pull box extension.

Where a nontraffic pull box is in the vicinity of curb in an unpaved area, place the box adjacent to the back of the curb if practical.

Where a nontraffic pull box is adjacent to a post or standard, place the box within 5 feet upstream from traffic if practical.

If you replace the cover on a nontraffic pull box, anchor it to the box.

#### 87-1.03C(3) Traffic Pull Boxes

Place minor concrete around and under a traffic pull box.

Bolt the steel cover to the box when not working in it.

Bond the steel cover to the conduit with a jumper and bolt it down after installing the conductors and cables.

## 87-1.03C(4) Structure Pull Boxes

Bond metallic conduit in a metal pull box in a structure using locknuts, inside and outside of the box, bonding bushings, and bonding jumpers connected to bonding wire running in the conduit system.

#### 87-1.03D Reserved

#### 87-1.03E Excavating and Backfilling for Electrical Systems

## 87-1.03E(1) General

Notify the Engineer at least 72 hours before starting excavation activities.

Dispose of surplus excavated material.

Restrict closures for excavation on a street or highway to 1 lane at a time unless otherwise specified.

#### 87-1.03E(2) Trenching

Dig a trench for the electrical conduits or direct burial cables. Do not excavate until the conduit or direct burial cable will be installed.

Place excavated material in a location that will not interfere with traffic or surface drainage.

After placing the conduit or direct burial cable, backfill the trench with the excavated material. Compact the backfill placed outside the hinge point of slopes and not under pavement to a minimum relative compaction of 90 percent.

Compact the backfill placed within the hinge points and in areas where pavement is to be constructed to a minimum relative compaction of 95 percent.

Restore the sidewalks, pavement, and landscaping at a location before starting excavation at another location.

#### 87-1.03E(3) Concrete Pads, Foundations, and Pedestals

Construct foundations for standards, poles, metal pedestals, and posts under section 56-3.

Construct concrete pads, foundations, and pedestals for controller cabinets, telephone demarcation cabinets, and service equipment enclosures on firm ground.

Install anchor bolts using a template to provide proper spacing and alignment. Moisten the forms and ground before placing the concrete. Keep the forms in place until the concrete sets for at least 24 hours to prevent damage to the surface.

Use minor concrete for pads, foundations, and pedestals.

In unpaved areas, place the top of the foundation 6 inches above the surrounding grade, except place the top:

- 1. 1 foot 6 inches above the grade for Type M and 336L cabinets
- 2. 1 foot 8 inches above the grade for Type C telephone demarcation cabinets
- 3. 2 inches above the grade for Type G and Type A cabinets and Type III service equipment enclosures

The pad must be 2 inches above the surrounding grade.

In and adjacent to the sidewalk and other paved areas, place the top of the foundation 4 inches above the surrounding grade, except place the top:

- 1. 1 foot 6 inches above the grade for Type M and 336L cabinets
- 2. 1 foot 8 inches above the grade for Type C telephone demarcation cabinets
- 3. Level with the finished grade for Type G and Type A cabinets and Type III service equipment enclosures

The pad must be level with the finished grade.

Apply an ordinary surface finish under section 51-1.03F.

Allow the foundation to cure for at least 7 days before installing any equipment.

# 87-1.03F Conductors and Cable Installations

# 87-1.03F(1) General

The installation of conductors and cables includes splicing conductors and attaching the terminals and connectors to the conductors.

Clean the conduit and pull all conductors and cables as a unit.

If new conductors or cables are to be added in an existing conduit:

- 1 Remove the content
- 2. Clean the conduit
- 3. Pull both old and new conductors and cables as a unit

Wrap conductors and secure cables to the end of the conduit in a pull box.

Seal the ends of conduits with a sealing compound after installing conductors or cables.

Neatly arrange conductors and cables inside pull boxes and cabinets. Tie the conductors and cables together with self-clinching nylon cable ties or enclose them in a plastic tubing or raceway.

Identify conductors and cables by direct labeling, tags, or bands fastened in such a way that they will not move. Use mechanical methods for labeling.

Provide band symbol identification on each conductor or each group of conductors comprising a signal phase in each pull box and near the end of terminated conductors.

Tape the ends of unused conductors and cables in pull boxes to form a watertight seal.

Do not connect the push-button or accessible pedestrian signal neutral conductor to the signal neutral conductor.

87-1.03F(2) Cables 87-1.03F(2)(a) General Reserved

87-1.03F(2)(b) Reserved 87-1.03F(2)(c) Copper Cables 87-1.03F(2)(c)(i) General Reserved

# 87-1.03F(2)(c)(ii) Detector Lead-in Cables

Install a Type B or C detector lead-in cable in conduit.

Waterproof the ends of the lead-in cable before installing it in the conduit to prevent moisture from entering the cable.

Splice loop conductors for each direction of travel for the same phase, terminating in the same pull box, to a separate lead-in cable running from the pull box adjacent to the loop detector to a sensor unit mounted in the controller cabinet. Install the lead-in cable without splices except at the pull box.

Verify in the presence of the Engineer that the loops are operational before making the final splices between loop conductors and the lead-in cable.

Identify and tag each lead-in cable with the detector designation at the cabinet and pull box adjacent to the loops.

# 87-1.03F(2)(c)(iii) Conductors Signal Cables

Do not splice signal cables except for a 28-conductor cable.

Provide identification at the ends of terminated conductors in a cable as shown.

Provide identification for each cable in each pull box showing the signal standard to which it is connected except for the 28-conductor cable.

Connect conductors in a 12-conductor cable as shown in the following table:

# **12CSC Color Code and Functional Connection**

Color code	Termination	Phase
Red	Red signal	2, 4, 6, or 8
Yellow	Yellow signal	2, 4, 6, or 8
Brown	Green signal	2, 4, 6, or 8
Red/black stripe	Red signal	1, 3, 5, or 7
Yellow/black stripe	Yellow signal	1, 3, 5, or 7
Brown/black stripe	Green signal	1, 3, 5, or 7
Black/red stripe	Spare or as required for red or DONT	
	WALK	
Black/white stripe	Spare or as required for yellow	
Black	Spare or as required for green or WALK	
Red/white stripe	Pedestrian signal DONT WALK	
Brown/white stripe	Pedestrian signal WALK	
White	Terminal block	Neutral

Provide identification for each 28-conductor cable C1 or C2 in each pull box. The cable labeled *C1* must be used for signal phases 1, 2, 3, and 4. The cable labeled *C2* must be used for signal phases 5, 6, 7, and 8.

Connect conductors in a 28-conductor cable as shown in the following table:

**28CSC Color Code and Functional Connection** 

Color code	Termination	Phase
Red/black stripe	Red signal	2 or 6
Yellow/black stripe	Yellow signal	2 or 6
Brown/black stripe	Green signal	2 or 6
Red/orange stripe	Red signal	4 or 8
Yellow/orange stripe	Yellow signal	4 or 8
Brown/orange stripe	Green signal	4 or 8
Red/silver stripe	Red signal	1 or 5
Yellow/silver stripe	Yellow signal	1 or 5
Brown/silver stripe	Green signal	1 or 5
Red/purple stripe	Red signal	3 or 7
Yellow/purple stripe	Yellow signal	3 or 7
Brown/purple stripe	Green signal	3 or 7
Red/2 black stripes	Pedestrian signal DONT WALK	2 or 6
Brown/2 black stripes	Pedestrian signal WALK	2 or 6
Red/2 orange stripes	Pedestrian signal DONT WALK	4 or 8
Brown/2 orange stripes	Pedestrian signal WALK	4 or 8
Red/2 silver stripes	Overlap A, C	OLA <sup>a</sup> ,
		OLC <sup>a</sup>
Brown/2 silver stripes	Overlap A, C	OLA <sup>c</sup> , OLC <sup>c</sup>
Red/2 purple stripes	Overlap B, D	OLB <sup>a</sup> ,
		OLD <sup>a</sup>
Brown/2 purple stripes	Overlap B, D	OLB <sup>c</sup> , OLD <sup>c</sup>
Blue/black stripe	Pedestrian push button	2 or 6
Blue/orange stripe	Pedestrian push button	4 or 8
Blue/silver stripe	Overlap A, C	OLA <sup>b</sup> ,
		OLC <sub>p</sub>
Blue/purple stripe	Overlap B, D	OLB <sup>b</sup> ,
		OLD <sup>6</sup>
White/black stripe	Pedestrian push button common	
Black/red stripe	Railroad preemption	
Black	Spare	
White	Terminal block	Neutral

OL = Overlap; A, B, C, and D = Overlapping phase designation

Use the neutral conductor only with the phases associated with that cable. Do not intermix neutral conductors from different cables except at the signal controller.

# 87-1.03F(2)(c)(iv) Signal Interconnect Cable

For a signal interconnect cable, provide a minimum of 6 feet of slack inside each controller cabinet.

Do not splice the cable unless authorized.

If splices are authorized, insulate the conductor splices with heat-shrink tubing and overlap the insulation at least 0.6 inch. Cover the splice area of the cable with heat-shrink tubing and overlap the cable jacket at least 1-1/2 inches. Provide a minimum of 3 feet of slack at each splice.

# 87-1.03F(3) Conductors

# 87-1.03F(3)(a) General

Do not run conductors to a terminal block on a standard unless they are to be connected to a signal head mounted on that standard.

Provide 3 spare conductors in all conduits containing ramp metering and traffic signal conductors.

<sup>&</sup>lt;sup>a</sup>For red phase designation

<sup>&</sup>lt;sup>b</sup>For yellow phase designation

<sup>&</sup>lt;sup>c</sup>For green phase designation

Install a separate conductor for each terminal of a push button assembly and accessible pedestrian signal.

Provide conductor slack to comply with the requirements shown in the following table:

# **Conductor Slack Requirements**

Location	Slack (feet)
Signal standard	1
Lighting standard	1
Signal and lighting standard	1
Pull box	3
Splice	3
Standards with slip base	0

# 87-1.03F(3)(b) Reserved

# 87-1.03F(3)(c) Copper Conductors

# 87-1.03F(3)(c)(i) General

Install a minimum no. 8, insulated, grounding copper conductor in conduit and connect it to all-metal components.

Where conductors from different service points occupy the same conduit or standard, enclose the conductors from one of the services in flexible or rigid metal conduit.

# 87-1.03F(3)(c)(ii) Inductive Loop Conductors

Install a Type 1 or 2 inductive loop conductor except use Type 2 for Type E loop detectors.

Install the conductor without splices except at the pull box.

# 87-1.03F(4) Manual Installation Method

Use an inert lubricant for placing conductors and cables in conduit.

Pull the conductors and cables into the conduit by hand using pull tape.

# 87-1.03G Equipment Identification Characters

The Engineer provides you with a list of the equipment identification characters.

Stencil the characters or apply the reflective self-adhesive labels to a clean surface.

Treat the edges of self-adhesive characters with an edge sealant.

Place the characters on the side facing traffic on:

- 1. Front doors of cabinets and service equipment enclosures.
- 2. Wood poles, fastened with 1-1/4-inch aluminum nails, for pole mounted enclosures
- 3. Adjacent bent or abutment at approximately the same station as an illuminated sign or soffit luminaire
- Underside of the structure adjacent to the illuminated sign or soffit luminaire if no bent or abutment exists nearby
- 5. Posts of overhead signs
- 6. Standards

Before placing new characters on existing or relocated equipment, remove the existing characters.

#### 87-1.03H Conductor and Cables Splices

## 87-1.03H(1) General

You may splice:

- 1. Grounded conductors in a pull box
- 2. Accessible pedestrian signal and push bottom conductors in a pull box
- 3. Ungrounded signal conductors in a pull box if signals are modified

- 4. Ungrounded signal conductors to a terminal compartment or a signal head on a standard with conductors of the same phase in the pull box adjacent to the standard
- 5. Ungrounded lighting circuit conductors in a pull box if lighting circuits are modified

Solder all splices using the hot iron, pouring, or dipping method. Do not perform open-flame soldering.

# 87-1.03H(2) Splice Insulation Methods

Insulate splices in a multiconductor cable to form a watertight joint and to prevent moisture absorption by the cable.

Use heat-shrink tubing or Method B to insulate a splice.

Use heat-shrink tubing as follows:

- 1. Cover the splice area completely with an electrical insulating coating and allow it to dry.
- 2. Place mastic around each conductor before placing them inside the tubing. Use the type of mastic specified in the tubing manufacturer's instructions.
- 3. Heat the area under the manufacturer's instructions. Do not perform open-flame heating. After contraction, each end of the heat-shrink tubing or the open end of the tubing's end cap must overlap the conductor insulation at least 1-1/2 inches.
- 4. Cover the entire splice with an electrical insulating coating and allow it to dry.

#### Use Method B as follows:

- 1. Cover the splice area completely with an electrical insulating coating and allow it to dry.
- 2. Apply 3 layers of half-lapped, 80-mils, PVC tape.
- 3. Apply 2 layers of 120-mils, butyl-rubber, stretchable tape with liner.
- 4. Apply 3 layers of half-lapped, 6-mils, PVC, pressure-sensitive, adhesive tape.
- 5. Cover the entire splice with an electrical insulating coating and allow it to dry.

#### 87-1.03I Connectors and Terminals

Apply connectors and terminals to cables and conductors using a crimping compression tool under the manufacturer's instructions. The tool must prevent opening of the handles until the crimp is completed.

Install crimp-style terminal lugs on stranded conductors smaller than no. 14.

Solder no. 8 and smaller conductors to connectors and terminal lugs.

#### 87-1.03J Standards, Poles, Pedestals, and Posts

Install standards, poles, pedestals, and posts under section 56-3.

Ground standards with a handhole by attaching a bonding jumper from the bolt or lug inside the standard to a metal conduit or to the grounding wire in the adjacent pull box. The bonding jumper must be visible when the handhole cover is removed.

Ground standards without a handhole or standards with a slip base by attaching a bonding jumper to all anchor bolts using ground clamps and connecting it to a metal conduit or to the grounding wire in the adjacent pull box. The bonding jumper must be visible after mortar has been placed on the foundation.

# 87-1.03K Reserved

# 87-1.03L Utility Service

#### 87-1.03L(1) General

Install the service equipment early enough to allow the utility to complete its work before completion of the electrical work.

At least 15 days before permanent electrical and telecommunication service is required, request the service connections for permanent installations. The Department arranges with the utilities for completion of the connections and pays all costs and fees required by the utilities.

#### 87-1.03L(2) Electric Service

# 87-1.03L(2)(a) General

If service equipment is to be installed on a utility-owned pole, furnish and install the conduit, conductors, pull boxes, and other necessary material to complete the service installation. The service utility decides the position of the riser and equipment on the pole.

# 87-1.03L(2)(b) Electric Service for Irrigation

Establishing electric service for irrigation includes installing conduit, conductors, and pull boxes and making connections from the service point to the irrigation controllers.

#### 87-1.03L(2)(c) Electric Service for Booster Pumps

Establishing electric service for a booster pump includes installing conduit, conductors, and pull boxes and making connections from the service point to the booster pump enclosure.

# 87-1.03L(3) Telecommunications Service

Establishing telecommunication service includes installing conduit, conductors, and pull boxes and making connections from the service point to the telephone demarcation cabinet.

#### 87-1.03M Photoelectric Controls

Mount the photoelectric unit on the top of the pole for Type I, II, and III photoelectric controls. Use mounting brackets where pole-top mounting is not possible. Orient the photoelectric unit to face north.

Mount the enclosure at a height of 6 feet above finished grade on the same standard as the photoelectric unit.

Install a minimum 100 VA, 480/120 V(ac) transformer in the contactor enclosure to provide 120 V(ac) for the photoelectric control unit when switching 480 V(ac), 60 Hz circuits.

# 87-1.03N Fused Splice Connectors

Install a fuse splice connector in each ungrounded conductor for luminaires mounted on standards. The connector must be located in the pull box adjacent to the standard.

Crimp the connector terminals onto the ungrounded conductors using a tool under the manufacturer's instructions. Insulate the terminals and make them watertight.

#### 87-1.030 Grounding Electrodes

Install a grounding electrode for each cabinet, service equipment enclosure, and transformer.

Attach a grounding conductor from the electrode using either a ground clamp or exothermic weld. Connect the other end of the conductor to the cabinet, service equipment enclosure, and transformer.

#### 87-1.03P Service Equipment Enclosures

Installing a service equipment enclosure includes constructing the foundation and pad and installing conduit, adjacent pull boxes, and grounding electrode.

Locate the foundation such that the minimum clearance around the front and back of the enclosure complies with NEC, article 110.26, "Spaces About Electrical Equipment, (600 V, nominal or less)."

Bond and ground metal conduit as specified in NEC and by the service utility except the grounding electrode conductor must be no. 6 or larger.

If circuit breakers and components do not have a description on engraved phenolic nameplates, install them using stainless steel rivets or screws under section 86-1.02P(2).

## 87-1.03Q Cabinets

# 87-1.03Q(1) General

Installing a cabinet includes constructing the foundation and pad and installing conduit, adjacent pull boxes, and grounding electrode.

Apply a mastic or caulking compound before installing the cabinet on the foundation to seal the openings.

Connect the field wiring to the terminal blocks in the cabinet. Neatly arrange and lace or enclose the conductors in plastic tubing or raceway. Terminate the conductors with properly sized captive or spring spade terminals. Apply a crimp-style connector and solder them.

Install and solder a spade-type terminal on no. 12 and smaller field conductors and a spade-type or ring-type terminal on conductors larger than no. 12.

# 87-1.03Q(2) Department-Furnished Controller Cabinets

Arrange for the delivery of Department-furnished controller cabinets.

# 87-1.03Q(3) Reserved

# 87-1.03Q(4) Telephone Demarcation Cabinets

Installing a telephone demarcation cabinet includes installing conduit, cable, and pull boxes to the controller cabinet.

Install the cabinet with the back toward the nearest lane of traffic.

## 87-1.03R Signal Heads

#### 87-1.03R(1) General

Installing a signal head includes mounting the heads on standards and mast arms, installing backplates and visors, and wiring conductors to the terminal blocks.

Keep the heads covered or direct them away from traffic until the system is ready for operation.

# 87-1.03R(2) Signal Faces

Use the same brand and material for the signal faces at each location.

Program the programmable visibility signal faces under the manufacturer's instructions. The indication must be visible only in those areas or lanes to be controlled.

# 87-1.03R(3) Backplates

Install backplates using at least six 10-24 or 10-32 self-tapping and locking stainless steel machine screws and flat washers.

If a plastic backplate requires field assembly, attach each joint using at least four no.10 machine screws. Each machine screw must have an integral or captive flat washer, a hexagonal head slotted for a standard screwdriver, and either a locking nut with an integral or captive flat washer or a nut, flat washer, and lock washer. Machine screws, nuts, and washers must be stainless steel or steel with a zinc or black oxide finish.

If a metal backplate has 2 or more sections, fasten the sections with rivets or aluminum bolts peened after assembly to avoid loosening.

Install the backplate such that the background light is not visible between the backplate and the signal face or between sections.

#### 87-1.03R(4) Signal Mounting Assemblies

Install a signal mounting assembly such that its members are arranged symmetrically and plumb or level. Orient each mounting assembly to allow maximum horizontal clearance to the adjacent roadway.

For a bracket-mounted assembly, bolt the terminal compartment or pole plate to the pole or standard.

In addition to the terminal compartment mounting, attach the upper pipe fitting of Type SV-1-T with 5 sections or a SV-2-TD to the standard or pole using the mounting detail for signal heads without a terminal compartment.

Use a 4-1/2-inch slip fitter and set screws to mount an assembly on a post top.

After installing the assembly, clean and paint the exposed threads of the galvanized conduit brackets and bracket areas damaged by the wrench or vise jaws. Use a wire brush to clean and apply 2 coats of unthinned, organic zinc-rich primer. Do not use an aerosol can to apply the primer.

Install the conductors in the terminal compartment and secure the cover.

# 87-1.03S Pedestrian Signal Heads

Installing a pedestrian signal head includes mounting the heads on standards and wiring conductors to the terminal blocks.

Install the pedestrian signal mounting assembly under section 87-1.03R(4).

Use the same brand and material for the pedestrian signal faces at each location.

Install a pedestrian signal face such that its members are arranged symmetrically and plumb or level.

#### 87-1.03T Accessible Pedestrian Signals

Use the same brand for the accessible pedestrian signals at each location.

Install an accessible pedestrian signal and the R10 series sign on the crosswalk side of the standard.

Attach the accessible pedestrian signal to the standard with self-tapping screws.

Attach the sign to the standard using 2 straps and saddle brackets.

Point the arrow on the accessible pedestrian signal in the same direction as the corresponding crosswalk.

Furnish the equipment and hardware to set up and calibrate the accessible pedestrian signal.

Arrange to have a manufacturer's representative at the job site to program the accessible pedestrian signal with an audible message or tone.

#### 87-1.03U Push Button Assemblies

Install the push button assembly and the R10 series sign on the crosswalk side of the standard.

Attach the sign to the assembly for Type B assemblies.

Attach the sign to the standard using 2 straps and saddle brackets for Type C assemblies.

You may use straps and saddle brackets to secure the push button to the standard.

Use a slip fitter to secure the assembly on top of a 2-1/2-inch-diameter post.

#### 87-1.03V Detectors

# 87-1.03V(1) General

Installing a detector includes installing inductive loop conductors, sealant, conduit, and pull boxes.

Center the detectors in the traffic lanes.

Do not splice the detector conductor.

# 87-1.03V(2) Inductive Loop Detectors

Mark the location of the inductive loop detectors such that the distance between the side of the loop and a lead-in saw cut from an adjacent detector is at least 2 feet. The distance between lead-in saw cuts must be at least 6 inches.

Saw cut the slots under section 13-4.03E(7). The bottoms of the slots must be smooth with no sharp edges. For Type E detector loops, saw the slots such that the sides are vertical.

Wash the slots clean using water and blow dry them with compressed air to remove all moisture and debris.

Identify the start of the conductor.

Waterproof the ends of a Type 2 loop conductor before installing it in the conduit to prevent moisture from entering the cable.

Install the loop conductor in the slots and lead-in saw cuts using a 3/16- to 1/4-inch-thick wood paddle. Hold the conductors in place at the bottom of the slot with wood paddles during placement of the sealant.

Wind adjacent loops on the same sensor unit channel in opposite directions.

Twist the conductors for each loop into a pair consisting of a minimum of 2 turns per foot before placing them in the lead-in saw cut and the conduit leading to the pull box. Do not install more than 2 twisted pairs of conductors per lead-in saw cut.

Provide 5 feet of slack in the pull box.

Test each loop for continuity, circuit resistance, and insulation resistance before filling the slots with sealant.

Remove excess sealant from the adjacent road surface before it sets. Do not use solvents to remove the excess.

Identify the loop conductor pair in the pull box, marking the start with the letter *S* and the end with the letter *F*. Band conductors in pairs by lane in the pull box adjacent to the loops and in the cabinet. Identify each pair with the detector designation and loop number.

Install the conductors in a compacted layer of HMA immediately below the uppermost layer if more than one layer will be placed. Install the loop conductors before placing the uppermost layer of HMA. Fill the slot with a sealant flush to the surface.

Install the conductors in the existing pavement if one layer of HMA is to be placed. Install the loop conductors before placing the layer of HMA. Fill the slot with a sealant flush to the surface.

# 87-1.03V(3) Preformed Inductive Loop Detectors

Construct a preformed inductive loop detector consisting of 4 turns in the loop and a lead-in conductor pair twisted at least 2 turns per foot all encased in conduit and sealed to prevent water penetration. The detector must be 6-foot square unless shown otherwise.

Construct the loop detector using a minimum 3/8-inch Schedule 40 or Schedule 80 PVC or polypropylene conduit and no. 16 or larger conductor with Type THWN or TFFN insulation.

In new roadways, place the detector in the base course with the top of the conduit flush with the top of the base. Cover with HMA or concrete pavement. Protect the detector from damage before and during pavement placement.

In new reinforced concrete bridge decks, secure the detector to the top of the uppermost layer of reinforcing steel using nylon wire ties. Hold the detector parallel to the bridge deck using PVC or polypropylene spacers where necessary. Place conduit for lead-in conductors between the uppermost 2 layers of reinforcing steel.

Do not install detectors in existing bridge decks unless authorized.

Install a detector in existing pavement before placement of concrete or HMA as follows:

- 1. Saw cut slots at least 1-1/4 inches wide into the existing pavement.
- 2. Place the detector in the slots. The top of the conduit must be at least 2 inches below the top of the pavement.
- 3. Test each loop circuit for continuity, circuit resistance, and insulation resistance.
- 4. Fill saw cuts with elastomeric or hot melt rubberized asphalt sealant for asphalt concrete pavement and with epoxy sealant or hot melt rubberized asphalt sealant for concrete pavement.

# 87-1.03W Sealants 87-1.03W(1) General

Reserved

# 87-1.03W(2) Elastomeric Sealant

Apply an elastomeric sealant with a pressure feed applicator.

## 87-1.03W(3) Asphaltic Emulsion Sealant

Asphaltic emulsion sealant must:

- 1. Be used for filling slots in asphalt concrete pavement of a maximum width of 5/8 inch
- 2. Not be used on concrete pavement or where the slope causes the material to run from the slot
- 3. Be thinned under the manufacturer's instructions
- 4. Be placed when the air temperature is at least 45 degrees F

# 87-1.03W(4) Hot-Melt Rubberized Asphalt Sealant

Melt the sealant in a jacketed, double-boiler-type, melting unit. The temperature of the heat transfer medium must not exceed 475 degrees F.

Apply the sealant with a pressure feed applicator or a pour pot when the surface temperature of the pavement is greater than 40 degrees F.

#### 87-1.03X Reserved

#### 87-1.03Y Transformers

Installing a transformer includes placing the transformer inside a pull box, a cabinet, or an enclosure.

Wire the transformer for the appropriate voltage.

Ground the secondary circuit of the transformer as specified in the NEC.

# 87-1.03Z Reserved 87-1.04 PAYMENT

Not Used

#### **87-2 LIGHTING SYSTEMS**

#### 87-2.01 GENERAL

# 87-2.01A Summary

Section 87-2 includes specifications for constructing lighting systems.

Lighting system includes:

- 1. Foundations
- 2. Pull boxes
- 3. Conduit
- 4. Conductors
- 5. Standards
- 6. Luminaires
- 7. Service equipment enclosure
- 8. Photoelectric control
- 9. Fuse splice connectors
- 10. High mast lighting assemblies

The components of a lighting system are shown on the project plans.

#### 87-2.01B Definitions

Reserved

#### 87-2.01C Submittals

Submit a certificate of compliance and test data for the high mast lighting luminaires.

# 87-2.01D Quality Assurance

Reserved

#### **87-2.02 MATERIALS**

#### 87-2.02A General

Reserved

#### 87-2.02B High Mast Lighting Assemblies

A high mast lighting assembly includes the foundation, pole, lowering device system, luminaires, and control pedestal.

Each luminaire in a high mast lighting assembly must include a housing, an optical system, and a ballast.

The housing must be made of aluminum.

A painted or powder-coated housing for a high mast lighting luminaire must be able to withstand a 1,000-hour salt spray test as specified in ASTM B117.

The optical system, consisting of the reflector, refractor or lens, lamp socket, and lamp, must be in a sealed chamber. The chamber must be sealed by a gasket between the reflector and refractor or lens and a gasket between the reflector and lamp socket. The chamber must have a separate filter or filtering gasket for flow of air.

An asymmetrical luminaire must have a refractor or reflector that is rotatable 360 degrees around a vertical axis to orient the distribution of light.

The luminaire must have a slip fitter for mounting on a 2-inch horizontal pipe tenon and must be adjustable ±3 degrees from the axis of the tenon.

The reflector must have a specular surface made of silvered glass or aluminum protected by either an anodized finish or a silicate film. The reflector must be shaped such that a minimum of light is reflected through the arc tube of the lamp.

The refractor and lens must be made of heat-resistant glass.

The lamp socket must be a porcelain-enclosed, mogul-multiple type. The shell must contain integral lamp grips to ensure electrical contact under conditions of normal vibrations. The socket must be rated for 1,500 W, 600 V(ac) and 4,000 V(ac) pulse for a 400 W lamp and 5,000 V(ac) pulse for a 1,000 W lamp.

The luminaire must have a dual fuse holder for 2 fuses rated at 5 A, 480 V(ac). The fuses must be 13/32 inch by 1-1/2 inches, standard midget ferrule type with a nontime-delay feature.

The lamps must be vertical burning, protected from undue vibration, and prevented from backing out of the socket by a stainless steel clamp attached to the luminaire.

A 1,000 W metal halide lamp must have an initial output of 100,000 lumens and an average rated life of 12,000 hours based on 10 hours per start.

A 400 W high-pressure sodium lamp must have an initial output of 50,000 lumens. A 1,000 W high-pressure sodium lamp must have an initial output of 140,000 lumens.

The ballast for the luminaire must be a regulator type and have a core and coils, capacitors, and starting aid.

#### Ballast must be:

- 1. Mounted within a weatherproof housing that integrally attaches to the top of a luminaire support bracket and lamp support assembly
- 2. Readily removable without removing the luminaire from the bracket arm
- 3. Electrically connected to the optical assembly by a prewired quick disconnect

The ballast for a metal halide luminaire must comply with luminaire manufacturer's specifications.

The wattage regulation spread at any lamp voltage, from nominal through the life of the lamp, must vary no more than 22 percent for a 1,000 W lamp and a ±10 percent input voltage variation. The ballast's starting line current must be less than its operating current.

# 87-2.02C Soffit and Wall-Mounted Luminaires 87-2.02C(1) General

Soffit and wall-mounted luminaires must be weatherproof and corrosion resistant.

Each luminaire must include a 70 W high-pressure sodium lamp with a minimum average rated life of 24,000 hours. The lamp socket must be positioned such that the light center of the lamp is located within 1/2 inch of the designed light center of the luminaire.

Luminaire wiring must be SFF-2.

Flush-mounted soffit luminaire must have:

- Metal body with two 1-inch-minimum conduit hubs and a means of anchoring the body into the concrete
- 2. Prismatic refractor made of heat-resistant polycarbonate:
  - 2.1. Mounted in a door frame
  - With the street side identified
- 3. Aluminum reflector with a specular anodized finish
- 4. Ballast located either within the housing or in a ceiling pull box if shown
- 5. Lamp socket

The door frame assembly must be hinged, gasketed, and secured to the luminaire body with at least 3 machine screws.

A pendant soffit luminaire must be enclosed and gasketed and have an aluminum finish. Luminaire must have:

- 1. Aluminum reflector with a specular anodized finish
- 2. Refractor made of heat-resistant polycarbonate
- 3. Optical assembly that is hinged and latched for lamp access and a device to prevent dropping
- 4. Ballast designed for operation in a raintight enclosure
- 5. Galvanized metal box with a gasketed cover, 2 captive screws, and 2 chains to prevent dropping and for luminaire mounting

Wall-mounted luminaire must have:

- 1. Cast metal body
- 2. Prismatic refractor:
  - 2.1. Made of glass
  - 2.2. Mounted in a door frame
- 3. Aluminum reflector with a specular anodized finish
- 4. Integral ballast
- 5. Lamp socket
- 6. Gasket between the refractor and the body
- 7. At least 2 mounting bolts of minimum 5/16-inch diameter

A cast aluminum body of a luminaire to be cast into or mounted against concrete must have a thick coat of alkali-resistant bituminous paint on all surfaces to be in contact with the concrete.

# 87-2.02C(2) High-Pressure Sodium Lamp Ballasts 87-2.02C(2)(a) General

A high-pressure sodium lamp ballast must operate the lamp for its rated wattage.

Starting aids for a ballast must be interchangeable between ballasts of the same wattage and manufacturer without adjustment.

The ballast must be provided with a heat-generating component to serve as a heat sink. The capacitor must be placed at the maximum practicable distance from the heat-generating components or thermally shielded to limit the case temperature to 75 degrees C.

The transformer and inductor must be resin impregnated for protection against moisture. Capacitors, except for those in starting aids, must be metal cased and hermetically sealed.

The ballast must have a power factor of 90 percent or greater.

For the nominal input voltage and lamp voltage, the ballast design center must not vary more than 7.5 percent from the rated lamp wattage.

# 87-2.02C(2)(b) Regulator-Type Ballasts

A regulator-type ballast must be designed such that a capacitance variance of ±6 percent does not cause more than ±8 percent variation in the lamp wattage regulation.

The ballast must have a current crest factor not exceeding 1.8 for an input voltage variation of  $\pm 10$  percent.

The lamp wattage regulation spread for a lag-type ballast must not vary by more than 18 percent for ±10 percent input voltage variations. The primary and secondary windings must be electrically isolated.

The lamp wattage regulation spread for a constant-wattage, autoregulator, lead-type ballast must not vary by more than 30 percent for ±10 percent input voltage variations.

# 87-2.02C(2)(c) Nonregulator-Type Ballasts

A nonregulator-type ballast must have a current crest factor not exceeding 1.8 for an input voltage variation of ±5 percent.

The lamp wattage regulation spread for an autotransformer or high reactance type ballast must not vary by more than 25 percent for ±5 percent input voltage variations.

#### 87-2.03 CONSTRUCTION

#### 87-2.03A General

Set the foundations for standards such that the mast arm is perpendicular to the centerline of the roadway.

Tighten the cap screws of the luminaire's clamping bracket to 10 ft-lb for LED and low-pressure luminaires.

Label the month and year of the installation inside the luminaire housing's door.

Perform the conductor and operational tests for the system.

## 87-2.03B High Mast Lighting Assemblies

Mount and connect the luminaires to the accessory support ring. Aim the asymmetrical luminaire to orient the distribution of light.

#### 87-2.03C Soffit and Wall-Mounted Luminaires

For a flush-mounted soffit luminaire:

- 1. Prevent concrete from getting into the housing during pouring of the concrete for the structure
- 2. Install the luminaire with the axis vertical and the street side of the refractor oriented as indicated
- 3. Locate the luminaire to provide a minimum 2-foot clearance from the inside surface of the girders and 1-foot clearance from the near face of the diaphragm
- 4. Install the bridge soffit and ceiling pull box over the same lane

For a pendant soffit luminaire:

- 1. Cast in place the inserts for the no. 8 pull box during concrete placement for a new structure
- 2. Drill holes for expansion anchors to support the no. 8 pull box on existing structures
- 3. Bond the suspension conduit and luminaire to the pull box

For a wall-mounted luminaire, provide:

- 1. Extension junction box or ring on a new structure
- 2. 4 external mounting taps on an existing structure

Place the soffits or wall-mounted luminaires in operation as soon as practicable after the falsework has been removed from the structure.

If the Engineer orders soffit or wall-mounted luminaires to be activated before permanent power service is available, installing and removing the temporary power service is change order work.

#### **87-2.04 PAYMENT**

Not Used

#### 87-3 SIGN ILLUMINATION SYSTEMS

#### 87-3.01 GENERAL

# 87-3.01A Summary

Section 87-3 includes specifications for constructing sign illumination systems.

Sign illumination system includes:

- 1. Foundations
- 2. Pull boxes
- 3. Conduit
- 4. Conductors
- 5. Sign lighting fixtures
- 6. Enclosure for the disconnect circuit breaker
- 7. Service equipment enclosure
- 8. Photoelectric control

The components of a sign illumination system are shown on the project plans.

#### 87-3.01B Definitions

Reserved

#### 87-3.01C Submittals

Submit the manufacturer's test data for the induction sign-lighting fixtures.

# 87-3.01D Quality Assurance

Reserved

#### **87-3.02 MATERIALS**

An induction sign-lighting fixture must include a housing with a door, reflector, refractor or lens, lamp, socket assembly, power coupler, high-frequency generator, fuse block, and fuses.

The fixture must comply with the isofootcandle curves as shown.

Fixture must weigh no more than 44 lb, be rated for 87 W at 120/240 V(ac), and have a mounting assembly made of one of the following materials:

- 1. Cast aluminum
- 2. Hot-dip galvanized steel plate
- 3. Galvanized steel plate finished with one of the following:
  - 3.1. Polymeric coating
  - 3.2. Same finish used for the housing

#### Housing must:

- 1. Be corrosion resistant and suitable for wet locations
- 2. Be above the top of the mounting rails at a maximum height of 12 inches
- 3. Have weep holes

#### Door must:

- 1. Hold a refractor or lens
- 2. Open without the use of special tools
- 3. Have a locking position at 50 degrees minimum from the plane of the door opening
- 4. Be hinged to the housing on the side of the fixture away from the sign panel
- 5. Have 2 captive latch bolts or other latching device

When the door is opened, it must lock in the 50 degrees position when an 85 mph, 3-second wind-gust load strikes the door from either side.

The housing and door must be manufactured of sheet or cast aluminum and have a gray powder coat or polyester paint finish. The sheet aluminum must comply with ASTM B209 or B209M for 5052-H32 aluminum sheet. External bolts, screws, hinges, hinge pins, and door closure devices must be corrosion resistant.

The housing and door must be gasketed. The thickness of the gasket must be a minimum of 1/4 inch.

Reflector must not be attached to the outside of the housing and must be:

- 1. Made of a single piece of aluminum with a specular finish
- 2. Protected with an electrochemically applied anodized finish or a chemically applied silicate film
- 3. Designed to drain condensation away from it
- 4. Secured to the housing with a minimum of 2 screws
- 5. Removable without removing any fixture parts

Refractor or lens must have a smooth exterior and must be manufactured from the materials shown in the following table:

#### **Refractor and Lens Material Requirements**

Component	Material				
Flat lens	Heat-resistant glass				
Convex lens	Heat-resistant, high-impact-resistant tempered glass				
Refractor	Borosilicate heat-resistant glass				

The refractor and convex lens must be designed or shielded such that no luminance is visible if the fixture is approached directly from the rear and viewed from below. If a shield is used, it must be an integral part of the door casting.

#### Lamp must:

- 1. Be an 85 W induction type with a fluorescent, phosphor-coated, interior wall
- 2. Have a minimum 70 percent light output of its original lumen output after 60,000 hours of operation
- 3. Have a minimum color-rendering index of 80
- 4. Be rated at a color temperature of 4,000K
- 5. Be removable with common hand tools.

The lamp socket must be rated for 1,500 W and 600 V(ac) and be a porcelain-enclosed mogul type with a shell that contains integral lamp grips to ensure electrical contact under normal vibration conditions. The shell and center contact must be made of nickel-plated brass. The center contact must be spring loaded.

The power coupler must be removable with common hand tools.

High-frequency generator must:

- 1. Start and operate lamps at an ambient temperature of -25 degrees C or greater for the rated life of the lamp
- 2. Operate continuously at ambient air temperatures from -25 to 55 degrees C without a reduction in the generator life
- 3. Have a design life of at least 100,000 hours at 55 degrees C
- 4. Have an output frequency of 2.65 MHz ± 10 percent
- Have radio frequency interference that complies with 47 CFR 18 regulations regarding harmful interference
- 6. Have a power factor greater than 90 percent and total harmonic distortion less than 10 percent

The high frequency generator must be mounted such that the fixture can be used as a heat sink and be replaceable with common hand tools.

Each fixture must include a barrier-type fuse block for terminating field connections. Fuse block must:

- 1. Be rated 600 V(ac)
- 2. Have box terminals
- 3. Be secured to the housing and accessible without removal of any fixture parts
- 4. Be mounted to leave a minimum of 1/2 inch of air space from the sidewalls of the housing
- 5. Be designed for easy removal of fuses with a fuse puller

The fixture's fuses must be 13/32-inch-diameter, 1-1/2-inch-long ferrule type and UL listed or NRTL certified. For a 120 V(ac) fixture, only the ungrounded conductor must be fused and a solid connection must be provided between the grounded conductor and the high frequency generator.

The fixture must be permanently marked with the manufacturer's brand name, trademark, model number, serial number, and date of manufacture on the inside and outside on the housing. The same information must be marked on the package.

If a wire guard is used, it must be made of a minimum 1/4-inch-diameter galvanized steel wire. The wires must be spaced to prevent rocks larger than 1-1/2-inch diameter from passing through the guard. The guard must be either hot-dip galvanized or electroplated zinc-coated as specified in ASTM B633, service condition SC4, with a clear chromate dip treatment.

#### 87-3.03 CONSTRUCTION

Perform the conductor and operational tests for the system.

#### **87-3.04 PAYMENT**

Not Used

#### 87-4 SIGNAL AND LIGHTING SYSTEMS

#### 87-4.01 GENERAL

#### 87-4.01A Summary

Section 87-4 includes specifications for constructing signal and lighting systems.

Signal and lighting system includes:

- 1. Foundations
- 2. Pull boxes
- 3. Conduit
- 4. Conductors
- 5. Cables
- 6. Standards
- 7. Signal heads
- 8. Internally illuminated street name signs
- 9. Service equipment enclosure
- 10. Department-furnished controller assembly
- 11. Detectors
- 12. Telephone demarcation cabinet
- 13. Accessible pedestrian signals
- 14. Push button assemblies
- 15. Pedestrian signal heads
- 16. Luminaires
- 17. Photoelectric control
- 18. Fuse splice connectors
- 19. Battery backup system
- 20. Flashing beacons
- 21. Flashing beacon control assembly

The components of a signal and lighting system are shown on the project plans.

#### 87-4.01B Definitions

Reserved

#### 87-4.01C Submittals

Submit shop drawings showing the message for each internally illuminated street sign, including the size of letters, symbols, and arrows.

### 87-4.01D Quality Assurance

87-4.01D(1) General

Reserved

87-4.01D(2) Quality Control 87-4.01D(2)(a) General

Reserved

#### 87-4.01D(2)(b) Battery Backup System

Notify the Engineer 48 hours before testing the battery backup system.

Test the system in the presence of the Engineer by turning off the power to the signal system at the service equipment enclosure. The signal system must run continuously for 30 minutes. If the battery backup system fails, correct the problem and retest the system for another 30 minutes. After successful completion of the test, turn the power on for the signal system.

#### **87-4.02 MATERIALS**

#### 87-4.02A General

Reserved

#### 87-4.02B Battery Backup System

A battery backup system includes the cabinet, batteries, and the Department-furnished electronics assembly.

The electronics assembly includes the inverter/charger unit, power transfer relay, and the battery harness.

#### 87-4.02C Internally Illuminated Street Name Signs

An internally illuminated street name sign includes housing, brackets, sign panels, gaskets, ballast, lampholder, terminal blocks, conductors, and fuses.

An internally illuminated street sign must be designed and constructed to prevent deformation or failure when subjected to an 85 mph, 3-second wind-gust load as specified in the AASHTO publication, "Standard Specifications for Structural Supports of Highway Signs, Luminaires and Traffic Signals."

#### Sign must:

- 1. Be Types A or B
- 2. Have galvanized or cadmium-plated ferrous parts
- 3. Have screened weep holes
- 4. Have fasteners, screws, and hardware made of passive stainless steel, Type 302 or 304, or aluminum Type 6060-T6
- 5. Operate at a temperature from -20 to 74 degrees C

Photoelectric unit sockets are not allowed.

The housing must be constructed to resist torsional twist and warp. The housing must be designed such that opening or removing the panels provides access to the interior of the sign for lamp, ballast, and fuse replacement.

The top and bottom of the sign must be manufactured from formed or extruded aluminum and attached to formed or cast aluminum end fittings. The top, bottom, and end fittings must form a sealed housing.

For a Type A sign, both sides of the sign must be hinged at the top to allow installation or removal of the sign panel.

For a Type B sign, the sign panel must be slide mounted into the housing.

The top of the housing must have 2 free-swinging mounting brackets. Each bracket must be vertically adjustable for leveling the sign to either a straight or curved mast arm. The bracket assembly must allow the lighting fixture to swing perpendicular to the sign panel.

The reflectors must be formed aluminum and have an acrylic, baked-white-enamel surface with a minimum reflectance of 0.85.

Sign panel must be translucent, high-impact-resistant, and made of one of the following plastic materials:

- 1. Glass-fiber-reinforced, acrylated resin
- 2. Polycarbonate resin
- 3. Cellulose acetate butyrate

The sign panel must be designed not to crack or shatter if a 1-inch-diameter steel ball weighing 2.4 ounces is dropped from a height of 8.5 feet above the sign panel to any point on the panel. For this test, the sign panel must be lying in a horizontal position and supported within its frame.

The sign panel's surface must be evenly illuminated. The brightness measurements for the letters must be a minimum of 150 foot-lamberts, average. The letter-to-background brightness ratio must be from 10:1 to 20:1. The background luminance must not vary by more than 40 percent from the average background brightness measurement. The luminance of letters, symbols, and arrows must not vary by more than 20 percent from their average brightness measurement.

The sign panel's white or green color must not fade or darken if exposed to an accelerated test of UV light equivalent to 2 years of outdoor exposure.

The sign panel's legend, symbols, arrows, and border on each face must be white on a green background. The background must comply with color no. 14109 of FED-STD-595.

The message must appear on both sides of the sign and be protected from UV radiation. The letters must be 8-inch upper case and 6-inch lower case, series E.

A Type A sign must have a closed-cell, sponge-neoprene gasket installed between the sign panel frame to prevent the entry of water. The gasket must be uniform and even textured.

The sign ballast must be a high-power-factor type for outdoor operation from 110 to 125 V(ac) and 60 Hz and must comply with ANSI C82.1 and C82.2.

The ballast for a Type A sign must be rated at 200 mA. The ballast for a Type B sign must be rated at 430 mA.

Sign lampholder must:

- 1. Be the spring-loaded type
- 2. Have silver-coated contacts and waterproofed entrance leads
- 3. Have a heat-resistant, circular cross section with a partially recessed neoprene ring

Removal of the lamp from the socket must de-energize the primary of the ballast.

The springs for the lampholders must not be a part of the current-carrying circuit.

The sign's wiring connections must terminate on a molded, phenolic, barrier-type, terminal block rated at 15 A, 1,000 V(ac). The connections must have a white, integral, waterproof marking strip. The terminal screws must not be smaller than a no. 10.

The terminal block must be insulated from the fixture to provide protection from the line-to-ground flashover voltage.

A sectionalized terminal block must have an integral barrier on each side and must allow rigid mounting and alignment.

Fixture's conductors must:

1. Be stranded copper wire with a minimum thermoplastic insulation of 28 mils

- 2. Be rated at 1,000 V(ac) and for use up to 90 degrees C
- 3. Be a minimum of no. 16
- 4. Match the color coding of the ballast leads
- 5. Be secured with spring cross straps, installed 12 inches apart or less in the chassis or fixture

Stranded copper conductors connected to screw-type terminals must terminate in crimp-type ring connectors.

No splicing is allowed within the fixture.

The sign's fuse must be the Type 3AG, miniature, slow-blow type.

The fuse holder must be a panel-mounting type with a threaded or bayonet knob that grips the fuse tightly for extraction. Each ballast must have a separate fuse.

#### 87-4.03 CONSTRUCTION

#### 87-4.03A General

Set the foundations for standards such that the mast arm is perpendicular to the centerline of the roadway.

Tighten the cap screws of the luminaire's clamping bracket to 10 ft-lb for LED and low-pressure luminaires.

Label the month and year of the installation inside the luminaire housing's door.

Perform the conductor and operational tests for the system.

#### 87-4.03B Battery Backup System Cabinets

Install the battery backup system cabinet to the right of the Model 332L cabinet.

If installation on the right side is not feasible, obtain authorization for installation on the left side.

Provide access for power conductors between the cabinets using:

- 1. 2" nylon-insulated, steel chase nipple
- 2. 2" steel sealing locknut
- 3. 2" nylon-insulated, steel bushing

Remove the jumper between the terminals labeled *BBS-1* and *BBS-2* in the 5 position terminal block in the controller cabinet before connecting the Department-furnished electronics assembly.

#### 87-4.03C Internally Illuminated Street Name Signs

Mount the internally illuminated street name sign to the signal mast arm using the adjustable brackets. Connect the conductors to the terminal blocks in the signal head mounting terminal block.

#### **87-4.04 PAYMENT**

Not Used

#### 87-5 RAMP METERING SYSTEMS

#### 87-5.01 GENERAL

Section 87-5 includes specifications for constructing ramp metering systems.

Ramp metering system includes:

- 1. Foundations
- 2. Pull boxes
- 3. Conduit
- 4. Conductors
- 5. Standards
- 6. Signal heads
- 7. Service equipment enclosure
- 8. Department-furnished controller assembly

- 9. Detectors
- 10. Telephone demarcation cabinet

The components of a ramp metering system are shown on the project plans.

#### **87-5.02 MATERIALS**

Not Used

#### 87-5.03 CONSTRUCTION

Connect the field wiring to the terminal blocks in the controller cabinet. The Engineer provides you a list of field conductor terminations for each controller cabinet.

Perform the conductor and operational tests for the system.

#### **87-5.04 PAYMENT**

Not Used

#### 87-6 TRAFFIC MONITORING STATION SYSTEMS

#### 87-6.01 GENERAL

Section 87-6 includes specifications for constructing traffic monitoring station systems.

Traffic monitoring station system includes:

- 1. Foundations
- 2. Pull boxes
- 3. Conduit
- 4. Cables
- 5. Conductors
- 6. Service equipment enclosure
- 7. Controller cabinet
- 8. Detectors
- 9. Telephone demarcation cabinet

The components of a traffic monitoring station system are shown on the project plans.

#### **87-6.02 MATERIALS**

Not Used

#### 87-6.03 CONSTRUCTION

Connect the field wiring to the terminal blocks in the controller cabinet. The Engineer provides you a list of field conductor terminations for the controller cabinet.

Perform the conductor and operational tests for the system.

#### **87-6.04 PAYMENT**

Not Used

#### 87-7 FLASHING BEACON SYSTEMS

#### 87-7.01 GENERAL

Section 87-7 includes specifications for constructing flashing beacon systems.

Flashing beacon system includes:

- 1. Foundations
- 2. Pull boxes
- 3. Conduit
- 4. Conductors
- 5. Standards
- 6. Service equipment enclosure
- 7. Signal heads
- 8. Flashing beacon control assembly

The components of a flashing beacon system are shown on the project plans.

The flash rate for the flashing beacon must comply with chapter 4L, "Flashing Beacons," of the *California MUTCD*.

The flashing beacon must allow alternating flashing wig-wag operation.

The flashing beacon must have a separate flasher unit installed in the flashing beacon control assembly.

#### **87-7.02 MATERIALS**

Flashing beacon control assembly must:

- 1. Have a NEMA 3R enclosure with a dead front panel and a hasp with a 7/16-inch hole for a padlock. The enclosure must have one of the following finishes:
  - 1.1. Powder coating.
  - 1.2. Hot-dip galvanized coating.
  - 1.3. Factory-applied, rust-resistant prime coat and finish coat.
- 2. Have barrier-type terminal blocks rated for 25 A, 600 V(ac), made of molded phenolic or nylon material and have plated-brass screw terminals and integral marking strips.
- 3. Include a solid state flasher complying with section 8 of NEMA standards publication no. TS 1 for 10 A, dual circuits.

#### 87-7.03 CONSTRUCTION

Perform the conductor and operational tests for the system.

#### **87-7.04 PAYMENT**

Not Used

#### 87-8-87-11 RESERVED 87-12 CHANGEABLE MESSAGE SIGN SYSTEMS

#### 87-12.01 GENERAL

Section 87-12 includes specifications for constructing changeable message sign systems.

Changeable message sign system includes:

- 1. Foundations
- 2. Pull boxes
- 3. Conduit
- 4. Conductors
- 5. Service equipment enclosure
- 6. Department-furnished controller cabinet
- 7. Department-furnished changeable message sign
- 8. Department-furnished wiring harness
- 9. Service equipment enclosure
- 10. Sign disconnect

The components of a changeable message sign system are shown on the project plans.

#### **87-12.02 MATERIALS**

Not Used

#### 87-12.03 CONSTRUCTION

Install the changeable message sign.

Connect the field wiring to the terminal blocks in the sign assembly and controller cabinet.

The Engineer provides you a list of field conductor terminations for each sign cabinet and controller cabinet.

The Department maintains the sign assemblies.

#### 87-12.04 PAYMENT

Not Used

#### 87-13-87-17 RESERVED 87-18 INTERCONNECTION CONDUIT AND CABLE

#### 87-18.01 GENERAL

Section 87-18 includes specifications for constructing interconnection conduit and cable.

Interconnection conduit and cable includes:

- 1. Pull boxes
- 2. Conduit
- 3. Signal interconnect cables

The components of an interconnection conduit and cable are shown.

#### **87-18.02 MATERIALS**

Not Used

#### 87-18.03 CONSTRUCTION

Test the signal interconnect cable.

Connect the signal interconnect cable to the terminal block in the controller cabinets. The Engineer provides you a list of terminations for each controller cabinet.

#### **87-18.04 PAYMENT**

Not Used

#### 87-19 RESERVED 87-20 TEMPORARY ELECTRICAL SYSTEMS

#### 87-20.01 GENERAL

Section 87-20 includes specifications for providing temporary electrical systems.

Obtain the Department's authorization for the type of temporary electrical system and its installation method.

A temporary system must operate on a continuous, 24-hour basis.

#### **87-20.02 MATERIALS**

#### 87-20.02A General

Material and equipment may be new or used.

The components of a temporary system are shown on the project plans.

If you use Type UF-B cable, the minimum conductor size must be no. 12.

#### 87-20.02B Temporary Flashing Beacon Systems

A temporary flashing beacon system consists of a flashing beacon system, wood post, generator, and photovoltaic system.

The system must comply with the specifications for a flashing beacon system in section 87-7, except it may be mounted on a wood post or a trailer.

#### 87-20.02C Temporary Lighting Systems

A temporary lighting system consists of a lighting system, generator, and wood poles.

The system must comply with the specifications for a lighting system in section 87-2, except it may be mounted on a wood pole or a trailer.

#### 87-20.02D Temporary Signal Systems

A temporary signal system consists of a signal and lighting system, wood poles and posts, and a generator.

System must comply with the specifications for a signal and lighting system in section 87-4, except:

- 1. Signal heads may be mounted on a wood pole, mast arm, tether wire, or a trailer
- 2. Flashing beacons may be mounted on a wood post, or a trailer

#### 87-20.03 CONSTRUCTION

#### 87-20.03A General

Provide electrical and telecommunication services for temporary systems. Do not use existing services unless authorized.

Provide power for the temporary electrical systems under section 12-3.33, except you may use a photovoltaic system for the temporary flashing beacon system.

Install conductors and cables in a conduit, suspended from wood poles at least 25 feet above the roadway, or use direct burial conductors and cables.

You may saw slots across paved areas for burial conductors and cables.

Install conduit outside the paved area at a minimum of 12 inches below grade for Type 1 and 2 conduit and at a minimum of 18 inches below grade for Type 3 conduit.

Install direct burial conductors and cables outside the paved area at a minimum depth of 24 inches below grade.

Place the portions of the conductors installed on the face of wood poles in either Type 1, 2, or 3 conduit between the point 10 feet above grade at the pole and the pull box. The conduit between the pole and the pull box must be buried at a depth of at least 18 inches below grade.

Place conductors across structures in a Type 1, 2, or 3 conduit. Attach the conduit to the outside face of the railing.

Mount the photoelectric unit at the top of the standard or wood post.

You may abandon in place conductors and cables in sawed slots or in conduit installed below the ground surface.

#### 87-20.03B Temporary Flashing Beacon Systems

Install a fused-splice connector in the pull box adjacent to each flashing beacon. Wherever conductors are run overhead, install the splice connector in the line side outside of the control assembly.

#### 87-20.03C Temporary Lighting Systems

Wherever conductors are run overhead, install the fuse splice connectors in the line side before entering the mast arm.

#### 87-20.03D Temporary Signal Systems

You may splice conductors that run to a terminal compartment or a signal head on a pole to the through conductors of the same phase in a pull box adjacent to the pole. Do not splice conductors or cables except in a pull box or in a NEMA 3R enclosure.

The Department provides the timing for the temporary signal.

Maintain the temporary signal except for the Department-furnished controller assembly.

#### **87-20.04 PAYMENT**

Not Used

#### 87-21 EXISTING ELECTRICAL SYSTEMS

#### 87-21.01 GENERAL

Section 87-21 includes general specifications for performing work on existing electrical systems.

#### **87-21.02 MATERIALS**

Not Used

#### 87-21.03 CONSTRUCTION

#### 87-21.03A General

You may abandon unused underground conduit after pulling out all conductors and removing conduit terminations from the pull boxes.

If standards are to be salvaged, remove:

- 1. All components
- 2. Mast arms from the standards
- 3. Luminaires, signal heads, and signal mounting assemblies from the standards and mast arms

If the existing material is unsatisfactory for reuse and the Engineer orders you to replace it with new material, replacing the existing material with new material is change order work.

If the removed electrical equipment is to be reinstalled, supply all materials and equipment, including signal mounting assemblies, anchor bolts, nuts, washers, and concrete, needed to complete the new installation.

#### 87-21.03B Maintaining Existing Electrical Systems

#### 87-21.03B(1) General

Maintain the existing electrical system in working order during the progress of the work. Conduct your operations to avoid damage to the elements of the systems.

#### 87-21.03B(2) Maintaining Existing Traffic Management System Elements During Construction

Section 87-21.02B(2) applies if a bid item for maintaining existing traffic management system elements during construction is shown on the Bid Item List.

Traffic management system elements include:

- 1. Ramp metering system
- 2. Traffic monitoring stations
- 3. Microwave vehicle detection system
- 4. Changeable message sign system
- 5. Extinguishable message sign system
- 6. Highway advisory radio system
- 7. Closed circuit television camera system
- 8. Roadway weather information system

Obtain authorization at least 72 hours before interrupting communication between an existing system and the traffic management center.

If the Engineer notifies you that an existing system is not fully operational due to your activities, repair or replace the system within 72 hours. If the system cannot be fixed within 72 hours or it is located on a structure, provide a temporary system within 24 hours until the system can be fixed. Perform a functional test of the system in the presence of the Engineer. If you fail to perform the necessary repair or replacement work, the Department may perform the repair or replacement work and deduct the cost.

If you damage an existing fiber optic cable, install a new cable such that the length of cable slack is the same as before the damage, measured from an original splice point or termination. All splices must be made using the fusion method.

You may interrupt the operation of traffic monitoring stations:

1. For 60 days if another operational traffic monitoring station is located within 3 miles

2. For 15 days if another operational traffic monitoring station is located more than 3 miles away

If a traffic monitoring station must be interrupted for longer periods than specified, provide a temporary detection system. Obtain the Department's authorization for the type of temporary system and its installation method.

#### 87-21.03C Modifying Existing Electrical Systems

Modify electrical systems as shown.

#### 87-21.03D Removing Existing Electrical Systems

The components to be removed are shown on the project plans.

#### **87-21.04 PAYMENT**

Not Used

# DIVISION XI MATERIALS

90 CONCRETE

^^^^^^

07-15-16
Replace *Method 1* in the 4th paragraph of section 90-1.01D(5)(a) with:

07-15-16

Method 2

Replace section 90-9 with:

07-15-16

#### 90-9 RETURNED PLASTIC CONCRETE

#### 90-9.01 GENERAL 90-9.01A Summary

Section 90-9 includes specifications for incorporating returned plastic concrete (RPC) into concrete.

RPC must be used only where the specifications allow its use. Do not use RPC in pavement or structural concrete.

#### 90-9.01B Definitions

**returned plastic concrete (RPC):** Excess concrete that is returned to a concrete plant in a plastic state and that has not attained initial set.

**hydration stabilizing admixture (HSA):** Extended set retarding admixture that controls and predictably reduces the hydration rate of the cementitious material.

#### 90-9.01C Submittals

Submit the following with the weighmaster certificate:

- 1. Weight or volume of RPC
- 2. Type, brand, and dosage of HSA
- Time of adding HSA
- 4. Copy of the original weighmaster certificate for the RPC
- 5. Temperature of RPC

When requested, submit the HSA manufacturer's instructions, including dosage tables.

#### 90-9.01D Quality Assurance

The material plant producing concrete containing RPC must be authorized under the MPQP.

For volumetric proportioning of RPC:

- 1. The volumetric container must be imprinted with manufacturer's name, model number, serial number, the as-calibrated volume and date of the last calibration. Cross sectional dimensions of the container must remain the same as those during its calibration.
- The device must be re-calibrated monthly and at any time when the container shape has been deformed from its original condition or there is evidence of material build-up on the inside of the device.
- 3. The device must be held in a level condition during filling. Fill the device to the measure or strike-off line. Each measurement must be filled to within 1.0% of the device as-calibrated volume.
- 4. The device interior must be cleaned after each measurement to maintain a zero condition.

For weight proportioning, proportion RPC with a weigh hopper attached to the plant at a position which allows the addition of the RPC to the mixer truck with the conventional PCC ingredients. The plant process controller must control the proportioning of RPC to within 1.0% of its target weight.

#### **90-9.02 MATERIALS**

#### 90-9.02A General

The quantity of RPC added to the concrete must not exceed 15 percent.

The cementitious material content of the RPC must be at least that specified for the concrete that allows the use of RPC.

Water must not be added to the RPC after batching, including in the truck mixer.

Use HSA for controlling and reducing the hydration rate of RPC.

Incorporate RPC by mixing into the concrete before arriving at the jobsite.

#### 90-9.02B Returned Plastic Concrete

The RPC must not exceed 100 degrees F at any time.

If HSA is not used, RPC must be incorporated into the concrete before attaining initial set or within 4 hours after batching of RPC, whichever is earlier.

If HSA is used:

- 1. Add HSA to RPC within 4 hours after original batching.
- 2. Measure and record the time, dosage of HSA, and temperature of RPC when HSA is added.
- 3. Mix the RPC under the HSA manufacturer's instructions after adding HSA or at least 30 revolutions, whichever is greater.
- 4. Incorporate RPC into the concrete within 4 hours after adding HSA.

#### RPC must not contain:

- 1. Accelerating admixture
- 2. Fiber
- 3. Pigment
- 4. Lightweight aggregate
- 5. Previously returned RPC
- 6. Any ingredient incompatible with the resultant concrete

#### 90-9.02C Hydration Stabilizing Admixture

HSA must comply with ASTM C494 admixture Type B or Type D.

HSA must have a proven history of specifically maintaining and extending both plasticity and set.

HSA dosage must comply with the manufacturer's instructions.

#### 90-9.02D Production

Proportion concrete containing RPC under section 90-2.02E.

Proportion RPC by weight or by volume.

#### 90-9.03 CONSTRUCTION

Not Used

#### **90-9.04 PAYMENT**

Not Used

\*

#### 92 ASPHALT BINDERS

04-15-16

04-15-16

#### Replace the 4th paragraph of section 92-1.02B with:

Crumb rubber modifier used must be on the Authorized Materials List for crumb rubber modifier.

Production equipment for PG modified asphalt binder with crumb rubber modifier must be authorized under the Department's *MPQP*.

Crumb rubber must be derived from waste tires described in Pub Res Code § 42703 and must be free from contaminants including fabric, metal, minerals, and other nonrubber substances.

^^^^^

#### **96 GEOSYNTHETICS**

01-15-16

Replace *product name, manufacturing source, and date of manufacture* in the 2nd sentence of the 1st paragraph of section 96-1.01D with:

01-15-16

manufacturing source code

# **BID BOOK**

# GOLDEN STATE BOULEVARD PHASE 1 AMERICAN AVENUE TO MISSION STREET

**BUDGET / ACCOUNT: 4510 / 7370** 



Department of Public Works and Planning

**CONTRACT NUMBER 22-14-C** 

## BID BOOK TABLE OF CONTENTS

# GOLDEN STATE BOULEVARD PHASE 1 CONTRACT NUMBER 22-14-C

PROPOSAL NUMBER(S)	TITLE
NOT APPLICABLE	INSTRUCTIONS FOR COMPLETING THE BID BOOK
1	PROPOSAL TO THE BOARD OF SUPERVISORS OF THE COUNTY OF FRESNO
2	BID ITEM LIST
3	EVALUATION OF BID ITEM LIST
4	BID SECURITY
5	Non-collusion Declaration
6	PUBLIC CONTRACT CODE SECTION 10285.1 STATEMENT
7	PUBLIC CONTRACT CODE SECTION 10162 QUESTIONNAIRE AND PUBLIC CONTRACT CODE 10232 STATEMENT
8(A) - 8(I)	SUBCONTRACTORS
9 - 15	NOT USED
16	OPT OUT OF PAYMENT ADJUSTMENTS FOR PRICE INDEX FLUCTUATIONS
17	GUARANTY

# INSTRUCTIONS FOR COMPLETING THE BID BOOK FOR NON-FEDERAL AID PROJECTS

#### General

Complete forms in the Bid book.

Submit an electronic bid online at http://www.BidExpress.com (Section 2-1.33D) or submit a hardcopy bid:

- 1. Under sealed cover addressed to the Department and labeled with the name of the bidder, the name of the project and the statement 'Do Not Open Until The Time Of Bid Opening.'
- 2. Marked as a bid
- 3. Identifying the contract number and the bid opening date

Certain bid forms must be submitted with the bid and properly executed.

Certain other forms and information must be submitted either with the bid or within the prescribed period after bid opening as specified elsewhere in these special provisions.

Failure to submit the forms and information as specified results in a nonresponsive bid.

If an agent other than the authorized corporation officer or a partnership member signs the bid, file a Power of Attorney with the Department either before opening bids or with the bid. Otherwise, the bid may be nonresponsive.

#### **Bid Item List and Bid Comparison**

Submit a bid based on the bid item quantities the Department shows on the Bid Item List. Bids will be evaluated and the low bidder determined as indicated in the *Notice to Bidders*.

#### **Bid Document Completion**

Proposal items are identified by title and by the word "Proposal" followed by the number assigned to the proposal item in question. Proposal items are included in the *Bid Book*.

#### Proposal to the Board of Supervisors of Fresno County - Proposal 1

Provided for information.

#### Bid Item List - Proposal 2

One or more sheet(s) or list(s) upon which the bidder completes the bid.

Fill out completely including a unit price and total for each unit price-based item and a total for each lump sum item.

Do not make any additions such as "plus tax", "plus freight", or conditions such as "less 2% if paid by 15th".

Use ink or typewriter for paper bids.

#### Evaluation of Bid Item List - Proposal 3

Describes how inconsistences and irregularities are evaluated and corrected when Design Services reviews the Bid Item List.

#### Bid Security and Signature - Proposal 4

Submit one of the following forms of bidder's security equal to at least 10 percent of the bid:

- Cash
- Cashier's check
- Certified check

INSTRUCTIONS FOR COMPLETING THE BID BOOK FOR NON-FEDERAL AID PROJECTS: Page 2 of 4

Signed bidder's bond by an admitted surety insurer

Indicate type of bid security provided.

- Cash Acceptable but not recommended. Cash is deposited in a clearing account and is returned to bidders by County warrant. This process may take several weeks.
- Cashier's or Certified Checks. This type of security is held until the bid is no longer under consideration. If submitted by a potential awardee, they will be returned when the contract is fully executed by the bidder and bonds and insurance have been approved.
- Bid Bonds Must be signed by the bidder and by the attorney-in-fact for the bonding company. Provide
  notarized signature of attorney-in-fact accompanied by bonding company's affidavit authorizing attorneyin-fact to execute bonds. An unsigned bid bond will be cause for rejection.

#### Acknowledge Addenda

Provide contractor's license information.

State business name and if business is a:

- Corporation list officers
- Partnership list partners
- Joint Venture list members; if members are corporations or partnerships, list their officers or partners.
- Individual list Owner's name and firm name style

Signature of Bidder - the following lists types of companies and corresponding authorized signers.

- Corporation by an officer
- Partnership by a partner
- Joint Venture by a member
- Individual by the Owner

If signature is by a Branch Manager, Estimator, Agent, etc., the bid must be accompanied by a power of attorney authorizing the individual to sign the bid in question or to sign bids more generally, otherwise the bid may be rejected.

- Business Address Firm's Street Address
- Mailing Address P.O. Box or Street Address
- Complete, sign, and return with bid.

#### **Noncollusion Declaration - Proposal 5**

Must be completed, signed, and returned with bid.

#### Public Contract Code Section 10285.1 Statement - Proposal 6

Select "has" or "has not" in accordance with instructions on form, return completed form with bid. Note that signing the bid constitutes signing this statement.

## Public Contract Code Section 10162 Questionnaire And Public Contract Code 10232 Statement – Proposal 7

Select "yes" or "no" accordance with instructions on form, include explanation if "yes" is selected. Return completed form with bid. Note that signing the bid constitutes signing this questionnaire and statement.

#### Subcontractors - Proposal 8(a) through Proposal 8(i)

Sheet(s) or spaces where bidders list subcontractors. 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* submitted with the bid must show the name, location of business, work portions to be performed, the contractor's license number and the public works contractor registration number issued pursuant to Labor Code Section 1725.5, for each listed subcontractor.

- Use subcontractor's business name style as registered with the License Board.
- Specify the city in which the subcontractor's business is located and the state if other than California.
- Description of the work to be performed by the subcontractor. Indicate with bid item numbers from the bid item list and/or work descriptions similar to those on bid item list.
- List license number for each subcontractor.

Upon request from Design Services, provide the following additional information within 24 hours of bid opening if not included on the *Subcontractor List* submitted with the bid:

- Complete physical address for each subcontractor listed.
- Percentage of the total bid or dollar amount associated with each subcontractor listed.
- Department of Industrial Relations registration number.

#### Proposal 9 - Proposal 15 - Not Used

#### Proposal 16 - Opt out of payment adjustments for price index fluctuations

You may opt out of the payment adjustments for price index fluctuations specified in section 9-1.07. To opt out, submit a completed *Opt Out of Payment Adjustments for Price Index Fluctuations* form with your bid.

#### **Guaranty - Proposal 17**

This document may, but does not need to be, submitted with the bid. It is part of the contract documents and must be separately signed and submitted by the contractor to whom the award is made, together with the executed Agreement.

#### PROPOSAL TO THE BOARD OF SUPERVISORS OF THE COUNTY OF FRESNO

\_\_\_\_

hereinafter called the Owner

### **GOLDEN STATE BOULEVARD PHASE 1**

#### AMERICAN AVENUE TO MISSION STREET

The work embraced herein shall be done in accordance with the 2015 Standard Specifications and with the 2015 Standard Plans, of the State of California, Department of Transportation insofar as the same may apply and in accordance with these special provisions.

Except to the extent that they may conflict with these special provisions, revised Standard Specifications apply to the extent included in the section entitled "Project Details" of the book entitled "Specifications."

The work to be done is shown on three sets of Plans, Department File No. 11296, entitled:

"Golden State Boulevard - Kingsburg Region Phase 1"

"Golden State Boulevard - Selma Region Phase 1"

"Golden State Boulevard - Fowler Region Phase 1"

The undersigned, as bidder, declares that the only persons, or parties interested in this proposal as principals are those named herein, that this proposal is made without collusion with any other person, firm or corporation; that they have carefully examined the location of the proposed work, the annexed proposed form of contract, and the plans therein referred to; and they propose and agrees if this proposal is accepted, that they will contract with the Owner to provide all necessary machinery, tools, apparatus and other means of construction, and to do all the work and furnish all the materials specified in the contract in the manner and time therein prescribed, and according to the requirements of the Engineer as therein set forth, and that they will take in full payment therefor the following unit prices, to-wit:

# Fresno County Department of Public Works and Planning Bid Item List - Proposal 2

Contract 22-14-C

Description Golden State Boulevard Phase 1Location American Avenue to Mission Street

## **Project Items**

Line Number	Item ID	Quantity	Unit	Unit Price	Total				
Section: 1 Des	Section: 1 Description								
0010	1	1.000	LS	\$	\$				
Lead Compliand	ce Plan								
0020	2	250,000.000	\$	\$ 1.00	\$ 250,0000.00				
Compensation f	for Adjustmer	nts for Price Fluc	tuations						
0030	3	500,000.000	\$	\$ 1.00	\$ 500,000.00				
Supplemental V	Vork								
0040	4	1.000	LS	\$	\$				
Mobilization									
0050	5	1.000	LS	\$	\$				
Furnish Field O	ffice								
0060	6	2.000	EA	\$	\$				
Construction Pr	oject Fundinç	g Sign							
0070	7	1.000	LS	\$	\$				
Temporary Traffic Control									
0800	8	1.000	LS	\$	\$				
Job Site Manag	ement								
0090	9	1.000	LS	\$	\$				
Prepare Storm	Prepare Storm Water Pollution Prevention Plan								

Bid Item List:

Line Number	Item ID	Quantity	Unit	Unit Price	Total
0100	10	27.000	EA	\$	\$
Rain Event Action	on Plan				
0110	11	1.000	LS	\$	\$
SWPPP Implem	entation				
0120	12	17.000	EA	\$	\$
Storm Water Sa	mpling and Ana	lysis Day			
0130	13	1,000.000	EA	\$ 1.00	\$ 1,000.00
State Water Res	sources Control	Board NOI Fi	ling Fee		
0140	14	1.000	EA	\$	\$
Storm Water An	nual Report				
0150	15	1.000	LS	\$	\$
Dust Control Pla	an				
0160	16	2.000	EA	\$	\$
Relocate Fire H	ydrant				
0170	17	10.000	EA	\$	\$
Adjust Utility Bo	x to Grade				
0180	18	83.000	EA	\$	\$
Adjust Valve Bo	x Frame and Co	over to Grade			
0190	19	1.000	CY	\$	\$
Remove Concre	ete Valley Gutter	-			
0200	20	500.000	LF	\$	\$
Temporary High	-Visibility Fence	(Type ESA)			
0210	21	17.000	EA	\$	\$
Remove Tree				_	
0220	22	1.000	LS	\$	\$
Clearing and Gr	ubbing				
0230	23	23,600.000	CY	\$	\$
Roadway Excav	ration - Final Pa	y Item			

Line Number	Item ID	Quantity	Unit	Unit Price	Total			
0240	24	9,000.000	CY	\$	\$			
Roadway Excavation (Type Z-2) (Aerially Deposited Lead) - Final Pay Item								
0250	25	12,200.000	CY	\$	\$			
Aggregate Base	(Class II) - Fi	nal Pay Item						
0260	26	269,000.000	SF	\$	\$			
Full Depth Recla	amation - Cem	nent (FDR-C)						
0270	27	16,800.000	SY	\$	\$			
Crack and Seat								
0280	28	60.000	TON	\$	\$			
Slurry Seal								
0290	29	97,900.000	TON	\$	\$			
Hot Mix Asphalt	(Type A)							
0300	30	2,170.000	TON	\$	\$			
Rubberized Hot	Mix Asphalt							
0310	31	217,000.000	SY	\$	\$			
Stress Absorbin	g Membrane I	nterlayer						
0320	32	130.000	TON	\$	\$			
Tack Coat								
0330	33	620.000	LF	\$	\$			
Place Hot Mix A	sphalt Dike (T	ype A)						
0340	34	45.000	LF	\$	\$			
Place Hot Mix A	sphalt Dike (T	ype D)						
0350	35	140.000	LF	\$	\$			
Place Hot Mix A	sphalt Dike (T	ype E)						
0360	36	190.000	LF	\$	\$			
Place Hot Mix A	sphalt Dike (T	ype F)						
0370	37	620.000	LF	\$	\$			
Remove HMA D	ike							

Line Number	Item ID	Quantity	Unit	Unit Price	Total
0380	38	227,000.000	SY	\$	\$
Cold Plane Aspl	nalt Concrete	Pavement			
0390	39	248,000.000	SY	\$	\$
Cold In-Place R	ecycling				
0400	40	6,940.000	CY	\$	\$
Remove Base a	nd Surfacing	- Final Pay Item	1		
0410	41	2,230.000	CY	\$	\$
Remove Concre	te Pavement	and Base - Fina	al Pay Item		
0420	42	4.000	EA	\$	\$
COK Manhole (	Гуре А)				
0430	43	2.000	EA	\$	\$
City of Selma In	let (Std SD-3)	)			
0440	44	2.000	EA	\$	\$
COK Curb Inlet					
0450	45	59.000	LF	\$	\$
12" Reinforced (	Concrete Pipe	9			
0460	46	640.000	LF	\$	\$
18" Reinforced (	Concrete Pipe	e			
0470	47	430.000	LF	\$	\$
24" Reinforced (	Concrete Pipe	9			
0480	48	2.000	EA	\$	\$
18" Steel Flared	End Section				
0490	49	1.000	EA	\$	\$
Inlet (Type GMF	Steel Pipe)				
0500	50	1.000	EA	\$	\$
Drainage Inlet (	Гуре G1)				
0510	51	1.000	EA	\$	\$
Abandon Pipe					

Line Number	Item ID	Quantity	Unit	Unit Price	Total
0520	52	30.000	LF	\$	\$
Remove Storm	Drain				
0530	53	1.000	EA	\$	\$
Remove Inlet					
0540	54	2.000	EA	\$	\$
Remove OMPI I	nlet				
0550	55	2.000	EA	\$	\$
Remove Headw	all				
0560	56	162.000	EA	\$	\$
Adjust Manhole	to Grade				
0570	57	7.000	CY	\$	\$
Rock Slope Pro	tection (Class I	I, Method B)			
0580	58	20.000	SY	\$	\$
Rock Slope Pro	tection Fabric (	(Class 8)			
0590	59	1,820.000	SF	\$	\$
Detectable Warı	ning Surface				
0600	60	8,930.000	LF	\$	\$
Minor Concrete	- Median Curb				
0610	61	70.000	LF	\$	\$
Minor Concrete	- Valley Gutter				
0620	62	200.000	LF	\$	\$
Minor Concrete	- Valley Gutter	(Modified)			
0630	63	10,900.000	LF	\$	\$
Minor Concrete	- Curb and Gu	tter			
0640	64	740.000	LF	\$	\$
Minor Concrete	- Retaining Cu	rb			
0650	65	790.000	SY	\$	\$
Minor Concrete	- Driveway				

Line Number	Item ID	Quantity	Unit	Unit Price	Total
0660	66	320.000	SY	\$	\$
Minor Concrete	- Stamped Con	crete			
0670	67	4,000.000	SY	\$	\$
Minor Concrete	- Sidewalk				
0680	68	85.000	CY	\$	\$
Minor Concrete	-Curb Ramp				
0690	69	10,100.000	LF	\$	\$
Remove Concre	te Curb				
0700	70	5,020.000	LF	\$	\$
Remove Concre	te Curb and Gu	tter			
0710	71	3,060.000	SY	\$	\$
Remove Concre	te Sidewalk				
0720	72	40.000	LF	\$	\$
Chain Link Fenc	e (Type CL-6)				
0730	73	54.000	EA	\$	\$
Remove Roadsi	de Sign				
0740	74	44.000	EA	\$	\$
Relocate Roadsi	de Sign				
0750	75	95.000	EA	\$	\$
Roadside Sign					
0760	76	8,510.000	LF	\$	\$
Midwest Guardra	ail System (Wo	od Post)			
0770	77	41.000	LF	\$	\$
Strengthened Mi	dwest Guardra	il System			
0780	78	108.000	EA	\$	\$
End Anchor Ass	embly (Type SF	T)			
0790	79	108.000	EA	\$	\$
Alternative Flare	d Terminal Sys	tem			

Line Number	Item ID	Quantity	Unit	Unit Price	Total			
0800	80	49,700.000	LF	\$	\$			
4" White 2-Coat Paint Traffic Striping (Detail 8, 12,27B)								
0810	81	195,000.000	LF	\$	\$			
6" White 2-Coat	Paint Traffic S	Striping (Detail 3	39, 39A)					
0820	82	25,000.000	LF	\$	\$			
4" Yellow 2-Coa	t Paint Traffic	Striping (Detail	21, 22, 24,	25 29, 31, 32)				
0830	83	23,300.000	LF	\$	\$			
4" White Thermo	oplastic Traffic	Striping (Detai	l 12, 27B)					
0840	84	22,300.000	LF	\$	\$			
4" Yellow Therm	noplastic Traffi	ic Striping (Deta	il 21, 25, 27	7, and 35A)				
0850	85	3,760.000	LF	\$	\$			
8" White 2-Coat	Paint Traffic S	Striping (Detail 3	38, 38A, Ch	evron Striping)				
0860	86	350.000	LF	\$	\$			
8" Yellow 2-Coa	t Paint Traffic	Striping (Chevr	on Striping)					
0870	87	1,340.000	LF	\$	\$			
8" White Thermo	oplastic Traffic	Striping (Detai	1 37, 38, 38,	A and Chevron Striping)				
0880	88	890.000	LF	\$	\$			
8" Yellow Therm	noplastic Traffi	ic Striping (Che	vron Stripin	g)				
0890	89	20,700.000	SF	\$	\$			
Thermoplastic P	avement Mar	king						
0900	90	30,200.000	LF	\$	\$			
6" Yellow 2-Coa	t Paint Traffic	Striping Detail						
0910	91	7,560.000	SF	\$	\$			
Green Paint Pav	ement Markir	ng						
0920	92	640.000	SF	\$	\$			
2-Coat Paint Pa	vement Marki	ng						
0930	93	17,151.000	LF	\$	\$			
Trenching/Cond	uit							

Line Number	Item ID	Quantity	Unit	Unit Price	Total
0940	94	43,634.000	LF	\$	\$
Conductors - #6					
0950	95	13,930.000	LF	\$	\$
Conductors - #8					
0960	96	195.000	LF	\$	\$
Conductors - #2					
0970	97	4.000	EA	\$	\$
Foundations - Po	otholing				
0980	98	4.000	EA	\$	\$
Street Lighting -	Foundations -	Type III-CF (T	ESCO 26-1	00) Service Enclosure	
0990	99	4.000	EA	\$	\$
Street Lighting -	Foundations -	Mast Arm Pol	es		
1000	100	64.000	EA	\$	\$
Street Lighting -	Foundations -	15TS Poles			
1010	101	1.000	EA	\$	\$
Street Lighting -	Foundations -	15D Poles			
1020	102	45.000	EA	\$	\$
Street Lighting -	Foundations -	Ornamental L	ight Poles		
1030	103	132.000	EA	\$	\$
Street Lighting -	Pull Boxes - N	lo.3 1/2			
1040	104	1.000	EA	\$	\$
Street Lighting -	Pull Boxes - N	lo. 5E with Ext	ension		
1050	105	1.000	EA	\$	\$
Street Lighting -	Pull Boxes - N	lo. 5E with Ext	ension & 12	" Concrete Collar	
1060	106	7.000	EA	\$	\$
Street Lighting -	Pull Boxes - N	lo. 6E with Ext	ension		
1070	107	8.000	EA	\$	\$
Street Lighting -	Pull Boxes - F	G&E Approve	d No. 2 PB		

Line Number	Item ID	Quantity	Unit	Unit Price	Total
1080	108	1.000	LS	\$	\$
Street Lighting -	Installed and Sp	oliced			
1090	109	1.000	EA	\$	\$
Street Lighting -	Poles - 17-3-100	0, No Mast A	rm		
1100	110	1.000	EA	\$	\$
Street Lighting -	Poles - 24-3-100	0, No Mast A	rm		
1110	111	2.000	EA	\$	\$
Street Lighting -	Poles - 26-3-100	0, No Mast A	rm		
1120	112	64.000	EA	\$	\$
Street Lighting -	Poles - 15TS				
1130	113	1.000	EA	\$	\$
Street Lighting -	Poles - 15D				
1140	114	45.000	EA	\$	\$
Street Lighting -	Poles - Decorati	ive Pole			
1150	115	70.000	EA	\$	\$
Street Lighting -	Signal Hardware	e - Luminaire	:S		
1160	116	90.000	EA	\$	\$
Street Lighting -	Signal Hardware	e - Decorativ	e Luminaire	es	
1170	117	4.000	EA	\$	\$
Street Lighting -	Control - Type II	II-AF (TESC	O 26-100) S	Service Enclosure	
1180	118	4.000	EA	\$	\$
Street Lighting -	Demolition - Rei	move Pull Bo	oxes		
1190	119	1.000	EA	\$	\$
Street Lighting -	Demolition - Rei	move PG&E	Pole and S	ervice Wire	
1200	120	7.000	EA	\$	\$
Street Lighting -	Demolition - Rei	move Lumina	aires		
1210	121	1.000	EA	\$	\$
Street Lighting -	Demolition - Rei	move PG&E	Luminaire	_	

Line Number	Item ID	Quantity	Unit	Unit Price	Total				
1220	122	9.000	EA	\$	\$				
Street Lighting -	Street Lighting - Demolition - Remove Street Light with Foundation								
1230	123	1.000	LS	\$	\$				
Signal Modificati	ons (Floral Ave	enue at Whitso	n Street)						
1240	124	1.000	LS	\$	\$				
Signal Modificati	ons (Thompso	n Avenue at W	/hitson Stre	et)					
1250	125	1.000	LS	\$	\$				
Signal Modificati	ons (Golden S	tate Blvd at Sa	n Antonio [	Orive)					
1260	126	1.000	LS	\$	\$				
Signal Modificati	ons (Golden S	tate Blvd at Ju	g Handle to	Clovis Avenue)					
1270	127	1.000	LS	\$	\$				
Service Irrigation	ı								
1280	128	15,294.000	EA	\$	\$				
Packet Fertilizer									
1290	129	2,513.000	EA	\$	\$				
Plant (Group A)									
1300	130	768.000	EA	\$	\$				
Plant (Group B)									
1310	131	435.000	EA	\$	\$				
Plant (Group U)									
1320	132	1.000	LS	\$	\$				
Plant Establishm	nent Work								
1330	133	761.000	CY	\$	\$				
Wood Mulch									
1340	134	4,217.000	LF	\$	\$				
Root Barrier									
1350	135	1.000	LS	\$	\$				
Control And Neu	itral Conductor	S							

Line Number	Item ID	Quantity	Unit	Unit Price	Total
1360	136	18.000	EA	\$	\$
1" Remote Cont	rol Valve				
1370	137	4.000	EA	\$	\$
2" Remote Cont	rol Valve				
1380	138	4.000	EA	\$	\$
Two-Wire Irrigat	ion Controller				
1390	139	55,596.000	LF	\$	\$
5/8" Drip Irrigation	on Tubing - Fi	nal Pay Item			
1400	140	4.000	EA	\$	\$
Irrigation Contro	ller Enclosure	Cabinet			
1410	141	4.000	EA	\$	\$
2" Backflow Pre	venter Assem	bly			
1420	142	4.000	EA	\$	\$
Backflow Prever	nter Enclosure	)			
1430	143	4.000	EA	\$	\$
Backflow Prever	nter Blanket				
1440	144	4.000	EA	\$	\$
Flow Sensor					
1450	145	932.000	EA	\$	\$
Tree Well Sprinl	kler Assembly				
1460	146	18.000	EA	\$	\$
Drip Valve Asse	mbly				
1470	147	4.000	EA	\$	\$
1" Gate Valve					
1480	148	10,757.000	LF	\$	\$
3/4" Plastic Pipe	(Schedule 40	) (Supply Line)	) - Final Pa	y Item	
1490	149	1,402.000	LF	\$	\$
1" Plastic Pipe (	Schedule 40)	(Supply Line) -	Final Pay	Item	

		Unit	Unit Price	Total		
150	1,059.000	LF	\$	\$		
1 1/4" Plastic Pipe (Schedule 40) (Supply Line) - Final Pay Item						
151	571.000	LF	\$	\$		
1 1/2" Plastic Pipe (Schedule 40) (Supply Line) - Final Pay Item						
152	8,410.000	LF	\$	\$		
2" Plastic Pipe (Schedule 40) (Supply Line) - Final Pay Item						
153	2,111.000	LF	\$	\$		
6" Plastic Pipe (Class 315) (Supply Line) - Final Pay Item						
154	16.000	EA	\$	\$		
155	114.000	CY	\$	\$		
Concreted-Rock Slope Protection (Cobble, Method A) (CY) - Final Pay Item						
156	20.000	EA	\$	\$		
Survey Monument						
	(Schedule 40) 151 (Schedule 40) 152 Chedule 40) (Subseque 40) 153 ass 315) (Supplementation 155 Slope Protection 156	(Schedule 40) (Supply Line) 151 571.000 (Schedule 40) (Supply Line) 152 8,410.000 (Schedule 40) (Supply Line) - 153 2,111.000 (ass 315) (Supply Line) - Fir 154 16.000 (Slope Protection (Cobble, Model) 156 20.000	(Schedule 40) (Supply Line) - Final Part 151 571.000 LF (Schedule 40) (Supply Line) - Final Part 152 8,410.000 LF Chedule 40) (Supply Line) - Final Pay Item 153 2,111.000 LF Cass 315) (Supply Line) - Final Pay Item 154 16.000 EA  155 114.000 CY Clope Protection (Cobble, Method A) (Compared to the part 156 20.000 EA	(Schedule 40) (Supply Line) - Final Pay Item  151		

Total: \$

#### **EVALUATION OF BID PROPOSAL ITEM LIST**

Abbreviations used in the bid proposal sheet are identified in Section 1-1.06, "Abbreviations," of these special provisions.

Bids are required for the entire work. Bids will be compared on the basis indicated in the Notice to Bidders. The bidder shall set forth for each unit basis item of work a unit price and a total for the item, and for each lump sum item a total for the item, all in clearly legible figures in the respective spaces provided for that purpose. In the case of unit basis items, the amount set forth under the "Item Total" column shall be the product of the unit price bid and the estimated quantity for the item.

In case of discrepancy between the unit price and the total set forth for a unit basis item, the unit price shall prevail, except as provided in (a) or (b), as follows:

- (a) If the amount set forth as a unit price is unreadable or otherwise unclear, or is omitted, or is the same as the amount as the entry in the item total column, then the amount set forth in the item total column for the item shall prevail and shall be divided by the estimated quantity for the item and the price thus obtained shall be the unit price;
- (b) (Decimal Errors) If the product of the entered unit price and the estimated quantity is exactly off by a factor of ten, one hundred, etc., or one-tenth, or one-hundredth, etc. from the entered total, the discrepancy will be resolved by using the entered unit price or item total, whichever most closely approximates percentage-wise the unit price or item total in the Owner's Final Estimate of cost

If both the unit price and the item total are unreadable or otherwise unclear, or are omitted, the bid may be deemed irregular. Likewise, if the item total for a lump sum item is unreadable or otherwise unclear, or is omitted, the bid may be deemed irregular unless the project being bid has only a single item and a clear, readable total bid is provided.

Symbols such as commas and dollar signs will be ignored and have no mathematical significance in establishing any unit price or item total or lump sums. Written unit prices, item totals and lump sums will be interpreted according to the number of digits and, if applicable, decimal placement. Cents symbols also have no significance in establishing any unit price or item total since all figures are assumed to be expressed in dollars and/or decimal fractions of a dollar. Bids on lump sum items shall be item totals only; if any unit price for a lump sum item is included in a bid and it differs from the item total, the items total shall prevail.

The foregoing provisions for the resolution of specific irregularities cannot be so comprehensive as to cover every omission, inconsistency, error or other irregularity which may occur in a bid. Any situation not specifically provided for will be determined in the discretion of the Owner, and that discretion will be exercised in the manner deemed by the Owner to best protect the public interest in the prompt and economical completion of the work. The decision of the Owner respecting the amount of a bid, or the existence or treatment of an irregularity in a bid, shall be final.

If this proposal shall be accepted and the undersigned shall fail to contract, as aforesaid, and to give the two bonds in the sums to be determined as aforesaid, with surety satisfactory to the Owner, within eight (8) days not including Saturdays, Sundays and legal holidays, after the bidder has received notice of award of the contract, the Owner, at its option, may determine that the bidder has abandoned the contract, and thereupon this proposal and the acceptance thereof shall be null and void, and the forfeiture of such security accompanying this proposal shall operate and the same shall be the property of the Owner.

#### **BID SECURITY AND SIGNATURE**

Accompanying this proposal is security (check one only) in amount equal to at least (10%) of the total amount of the bid:	ten percent
Bid Bond ( ); Certified Check ( ); Cashier's Check ( ); Cash (\$	)
Bidder has and acknowledges the following addenda:	
The names of all persons interested in the foregoing proposal as principals are as for	ollows:
IMPORTANT NOTICE: If bidder or other interested person is a corporation, state of corporation, also names of the president, secretary, treasurer and manager there partnership, state true name of firm, also names of all individual co-partners composidder or other interested person is an individual, state first and last name in full.	eof; if a co-
FIRM NAME	_
Licensed in accordance with an act providing for the registration of Contractors,	
Class License No Expires	
DIR Registration Number	_
Signature of Bidder Dated	
<b>NOTE</b> : If bidder is a corporation, the legal name of the corporation shall be set fogether with the signature of the officer or officers authorized to sign contracts on be corporation; if bidder is a co-partnership, the true name of the firm shall be set together with the signature of the partner or partners authorized to sign contracts of the co-partnership; and if bidder is an individual, his signature shall be placed signature is by an agent, other than an officer of a corporation or a member of a partner of Attorney must be on file with the Owner prior to opening bids or submitt bid; otherwise, the bid will be disregarded as irregular and unauthorized.	ehalf of the forth above on behalf of above. If rtnership, a
BUSINESS ADDRESS: Zip Code	_
·	
MAILING ADDRESS: Zip Code	_
BUSINESS PHONE: ()FAX NUMBER: ()	_
EMAIL ADDRESS	

Proposal 4 Contract Number 22-14-C To the Board of Supervisors, County of Fresno:

#### **NONCOLLUSION DECLARATION**

#### TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID\*

The undersigned declares:
I am the of (Owner, Partner, Corporate Officer (list title), Co-Venturer)
foregoing bid, the party making the
The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder. All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, and has not paid, and will not pay, any person or entity for that purpose.
Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.
I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on, 2022,
at" " "
(Signature)
(See Title 23 United States Code Section 112; Calif Public Contract Code Section 7106)

\*NOTE: Completing, signing, and returning the Non-Collusion Declaration is a required part of the Proposal. Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

#### PUBLIC CONTRACT CODE

#### **Public Contract Code Section 10285.1 Statement**

In conformance with Public Contract Code Section 10285.1 (Chapter 376, Stats. 1985), the bidder hereby declares under penalty of perjury under the laws of the State of California that the bidder has \_\_\_\_\_, has not \_\_\_\_\_been convicted within the preceding three years of any offenses referred to in that section, including any charge of fraud, bribery, collusion, conspiracy, or any other act in violation of any state or Federal antitrust law in connection with the bidding upon, award of, or performance of, any public works contract, as defined in Public Contract Code Section 1101, with any public entity, as defined in Public Contract Code Section 1100, including the Regents of the University of California or the Trustees of the California State University. The term "bidder" is understood to include any partner, member, officer, director, responsible managing officer, or responsible managing employee thereof, as referred to in Section 10285.1.

Note: The bidder must place a check mark after "has" or "has not" in one of the blank spaces provided. The above Statement is part of the Bid. Signing this Bid on the signature portion thereof shall also constitute signature of this Statement. Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

#### **Public Contract Code Section 10162 Questionnaire**

In conformance with Public Contract Code Section 10162, the Bidder shall complete, under penalty of perjury, the following questionnaire:

Has the bidder, any officer of the bidder, or any employee of the bidder who has a proprietary interest in the bidder, ever been disqualified, removed, or otherwise prevented from bidding on, or completing a federal, state, or local government project because of a violation of law or a safety regulation?

162	NO			
If the answer	is yes, explain	the circumstances	in the following spa	ace.

#### **Public Contract Code 10232 Statement**

Voc

NIA

In conformance with Public Contract Code Section 10232, the Contractor, hereby states under penalty of perjury, that no more than one final unappealable finding of contempt of court by a federal court has been issued against the Contractor within the immediately preceding two-year period because of the Contractor's failure to comply with an order of a federal court which orders the Contractor to comply with an order of the National Labor Relations Board.

Note: The above Statement and Questionnaire are part of the Bid. Signing this Bid on the signature portion thereof shall also constitute signature of this Statement and Questionnaire.

Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

BIDDER:			
•			

### SUBCONTRACTORS:

The following named subcontractor(s) will perform with labor, or otherwise render services to the general contractor in or about the construction of the work or improvement in an amount in excess of one-half of one percent of the total bid presented herewith **or** \$10,000, **whichever is greater**. Each listed subcontractor's name, location of business and description of work, and both their contractor's license number and public works contractor registration number, issued pursuant to Section 1725.5 of the Labor Code, are REQUIRED, by Section 4104 of the California Public Contract Code, to be submitted prior to bid opening. (The "location of business" must specify the city in which the subcontractor's business is located, and the state if other than California.) All other requested information shall be submitted, either with the bid or within 24 hours after bid opening.

Please fill out as completely as possible when submitting your bid. Use subcontractor's business name style as registered with the License Board.

FAILURE TO LIST SUBCONTRACTORS AS DIRECTED MAY RENDER THE BID NON-RESPONSIVE, OR MAY RESULT IN ASSESSMENT OF A PENALTY AGAINST THE BIDDER IN ACCORDANCE WITH SECTION 4110 OF THE CALIFORNIA PUBLIC CONTRACT CODE.

SUBCONTRACTOR:	
Class License No	DIR Registration No
Item No. or Description of Work:	
Dollar Amount	OR Percentage of Total Bid
Email Address:	
SUBCONTRACTOR:	
Business Address:	
	DIR Registration No
Item No. or Description of Work:	
Dollar Amount	OR Percentage of Total Bid
Email Address:	

Proposal 8(a)
Contract Number 22-14-C

SUBCONTRACTOR:		
Business Address:		
Class License No	DIR Registration No	
Item No. or Description of Work:		
Dollar Amount	OR Percentage of Total Bid	
Email Address:		
CURCONTRACTOR		
SUBCONTRACTOR:		
Business Address:		
Class License No		
Item No. or Description of Work:		
Dollar Amount		
Email Address:		
SUBCONTRACTOR:		
Business Address:		
Class License No	DIR Registration No	
Item No. or Description of Work:		
Dollar Amount	OR Percentage of Total Bid	
Email Address:		
SUBCONTRACTOR:		
Business Address:		
Class License No		
Item No. or Description of Work:		
Dollar Amount		
Email Address:		-
SUBCONTRACTOR:		
Business Address:		
Class License No	DIR Registration No _	
Item No. or Description of Work:		
Dollar Amount	OR Percentage of Total Bid	
Email Address:		_

SUBCONTRACTOR:		
Business Address:		
Class License No	DIR Registration No.	
Item No. or Description of Work:		
Dollar Amount	OR Percentage of Total Bid	
Email Address:		
SUBCONTRACTOR:		
Business Address:		
Class License No		
Item No. or Description of Work:		
Dollar Amount		
Email Address:		
SUBCONTRACTOR:		
Business Address:		
Class License No		
Item No. or Description of Work:		
Dollar Amount	OR Percentage of Total Bid	
Email Address:		
SUBCONTRACTOR:		
Business Address:		
Class License No	DIR Registration No _	
Item No. or Description of Work:		
Dollar Amount	OR Percentage of Total Bid _	
Email Address:		
SUBCONTRACTOR:		
Business Address:		
Class License No		
Item No. or Description of Work:	· ·	
Dollar Amount		
Email Address:		

SUBCONTRACTOR:	
Business Address:	
	DIR Registration No
Item No. or Description of Work:	
Dollar Amount	OR Percentage of Total Bid
Email Address:	
SUBCONTRACTOR:	
Business Address:	
	DIR Registration No
	OR Percentage of Total Bid
Email Address:	
SUBCONTRACTOR:	
	DID Devictorian No.
	DIR Registration No
	<b>25</b> 5 4 4 5 1 5 1
	OR Percentage of Total Bid
Email Address:	
SUBCONTRACTOR:	
Class License No	DIR Registration No
Item No. or Description of Work:	
Dollar Amount	OR Percentage of Total Bid
Email Address:	
Business Address:	
Class License No	DIR Registration No
Item No. or Description of Work:	
Dollar Amount	OR Percentage of Total Bid
Email Address:	

SUBCONTRACTOR:		
Business Address:		
Class License No	DIR Registration No	
Item No. or Description of Work:		
Dollar Amount	OR Percentage of Total Bid	
Email Address:		
OUDGONTDA OTOD		
		_
Business Address:		_
	DIR Registration No	
	OR Derechtage of Total Rid	
	OR Percentage of Total Bid	
Email Address.		
SUBCONTRACTOR:		
Business Address:		
Class License No	DIR Registration No	
Item No. or Description of Work:		
Dollar Amount	OR Percentage of Total Bid	
Email Address:		
SUBCONTRACTOR:		
	DIR Registration No	
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## OPT OUT OF PAYMENT ADJUSTMENTS FOR PRICE INDEX FLUCTUATIONS

You may opt out of the payment adjustments for price index fluctuations as specified in Section 2-1.31, "OPT OUT OF PAYMENT ADJUSTMENTS FOR PRICE INDEX FLUCTUATIONS," of the special provisions.

You can only elect to opt out of payment adjustments for price index fluctuations of if you complete this form and submit it with your bid. The individual signing this form must be duly authorized to sign a bid.

By signing this form, I hereby opt out of the payment adjustments for price index fluctuations for the above-named project.

Bidder:		
Name (Printed):		
Signature:		
Title·		

Proposal 16 Contract Number 22-14-C (This guaranty shall be executed by the successful bidder in accordance with instructions in the special provisions. The bidder may execute the guaranty on this page at the time of submitting his bid.)

### GUARANTY

To the Owner: County of Fresno

#### **CONTRACT NUMBER 22-14-C**

The undersigned guarantees the construction and installation of the following work included in this project:

#### **ALL WORK**

Should any of the materials or equipment prove defective or should the work as a whole prove defective, due to faulty workmanship, material furnished or methods of installation, or should the work or any part thereof fail to operate properly as originally intended and in accordance with the plans and specifications, due to any of the above causes, all within twelve (12) months after date on which this contract is accepted by the Owner, the undersigned agrees to reimburse the Owner, upon demand, for its expenses incurred in restoring said work to the condition contemplated in said project, including the cost of any such equipment or materials replaced and the cost of removing and replacing any other work necessary to make such replacement or repairs, or, upon demand by the Owner, to replace any such material and to repair said work completely without cost to the Owner so that said work will function successfully as originally contemplated.

The Owner shall have the unqualified option to make any needed replacement or repairs itself or to have such replacements or repairs done by the undersigned. In the event the Owner elects to have said work performed by the undersigned, the undersigned agrees that the repairs shall be made and such materials as are necessary shall be furnished and installed within a reasonable time after the receipt of demand from the Owner.

 Name (Printed):	
Signature:	
 Title:	
Contractor:	Date:

Proposal – 17 Contract Number 22-14-C

# AGREEMENT

THIS AGREEMENT made at Fresno, in Fresno County, California, by and between hereinafter called the Contractor, and the County of Fresno hereinafter called the Owner.

WITNESSETH: That the Contractor and the Owner, for the consideration hereinafter named, agree as follows:

**ARTICLE I.** The Contractor agrees to furnish all labor and materials, including tools, implements, and appliances required, but excluding such materials as are mentioned in the specifications to be furnished by the Owner, and to perform all the work in a good and workmanlike manner, free from any and all liens and claims of mechanics, materialmen, teamsters, subcontractors, artisans, machinists, and laborers required for:

#### **GOLDEN STATE BOULEVARD PHASE 1**

#### AMERICAN AVENUE TO MISSION STREET

**CONTRACT NUMBER: 22-14-C** 

All in strict compliance with the plans, drawings and specifications therefor prepared by the Owner, and other contract documents relating thereto.

**ARTICLE II.** The Contractor and the Owner agree that the Notice to Bidders and Special Provisions, the Wage Scale (Prevailing Wages), the Plans and Drawings, Addenda and Bulletins thereto, and the Proposal (Bid Book) hereto attached, together with this Agreement, form the contract, and they are as fully a part of the contract as if hereto attached or herein repeated.

All portions of the Standard Specifications of the State of California, Department of Transportation, dated 2015, which are not in conflict with this contract shall be deemed a part of the specifications as though fully therein set forth; provided, however, that revisions to the said Standard Specifications shall apply only to the extent, if any, included in the Project Details of these specifications or as otherwise incorporated directly herein. No part of said specifications which is in conflict with any portion of this agreement, or which is not actually descriptive of the work to be done thereunder, or of the manner in which said work is to be executed, shall be considered as any part of this agreement, but shall be utterly null and void.

**ARTICLE IV.** If the Contractor should be adjudged a bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed on account of his insolvency, or if he or any of his subcontractors should persistently violate any of the provisions of the contract, or if he should persistently or repeatedly refuse or should fail, except in cases for which extension of time is provided, to supply enough properly skilled workmen or proper materials, or if he

should fail to make prompt payment to subcontractors or for material or labor, or persistently disregard laws, ordinances or the instructions of the Engineer, then the Owner may, upon certificate of the Engineer when sufficient cause exists to justify such action, serve written notice upon the Contractor and his surety of its intention to terminate the contract, and unless within five days after the serving of such notice, such violations shall cease and satisfactory arrangements for correction thereof be made, the contract shall, upon the expiration of said five days, cease and terminate.

In the event of any such termination, the Owner shall immediately serve written notice thereof upon the surety and the Contractor, and the surety shall have the right to take over and perform the contract, provided, however, that if the surety within ten (10) days after the serving upon it of notice of termination does not give the Owner written notice of its intention to take over and perform the contract or does not commence performance thereof within the ten (10) days stated above from the date of the serving of such notice, the Owner may take over the work and prosecute the same to completion by contract or by any other method it may deem advisable, for the account and at the expense of the Contractor, and the Contractor and his surety shall be liable to the Owner for any excess cost occasioned the Owner thereby, and in such event the Owner may without liability for so doing, take possession of and utilize in completing the work such materials, appliances, plant and other property belonging to the Contractor as may be on the site of the work and necessary therefor. In such case the Contractor shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the contract price shall exceed the expenses of finishing the work, including compensation for additional managerial and administrative services, such excess shall be paid to the Contractor. If such expense shall exceed such unpaid balance, the Contractor shall pay the difference to the Owner. The expense incurred by the Owner, as herein provided and damage incurred through the Contractor's default, shall be certified by the Engineer.

ARTICLE V. To the fullest extent permitted by law with respect to any work required to be done under this contract, the Contractor will indemnify and hold harmless the COUNTY OF FRESNO, CITY OF FOWLER, CITY OF KINGSBURG, CITY OF SELMA, FRESNO COUNTY TRANSPORTATION AUTHORITY, FRESNO COUNCIL OF GOVERNMENTS, UNION PACIFIC RAILROAD, and all other participating public agencies, whether or not said agencies are named herein, who have jurisdiction within the areas in which the work is to be performed, and all officers and employees of the Owner, the County, the State, the United States and said other participating agencies, from any and all costs and expenses, attorney fees and court costs, damages, liabilities, claims and losses occurring or resulting to COUNTY in connection with the performance, or failure to perform, by CONTRACTOR, its officers, agents or employees under this Agreement, and from any and all costs and expenses, attorney fees and court costs, damages, liabilities, claims and losses occurring or resulting to any person, firm or corporation who may be injured or damaged by the performance, or failure to perform, of CONTRACTOR, its officers, agents or employees under this Agreement. In addition, CONTRACTOR agrees to indemnify COUNTY for Federal, State of California and/or local audit exceptions resulting from non-compliance herein on the part of CONTRACTOR.

CONTRACTOR agrees to indemnify, save, hold harmless, and at COUNTY'S request, defend the COUNTY, its officers, agents, and employees from any and all costs and expenses, damages, liabilities, claims, and losses occurring or resulting to COUNTY in connection with the performance, or failure to perform, by CONTRACTOR, its officers, agents, or employees under this Agreement, and from any and all costs and expenses, damages, liabilities, claims, and losses occurring or resulting to any person, firm, or corporation who may be injured or damaged by the performance, or failure to perform, of CONTRACTOR, its officers, agents, or employees under this Agreement.

The Certificate of Insurance shall be issued in duplicate, to the COUNTY OF FRESNO, CITY OF FOWLER, CITY OF KINGSBURG, CITY OF SELMA, FRESNO COUNTY TRANSPORTATION AUTHORITY, FRESNO COUNCIL OF GOVERNMENTS, UNION PACIFIC RAILROAD, and all other participating agencies, whether or not said agencies are named herein, who contribute to the cost of the work or have jurisdiction over areas in which the work is to be performed and all officers and employees of said agencies while acting within the course and scope of their duties and responsibilities.

In the event CONTRACTOR fails to keep in effect at all times insurance coverage as herein provided, the COUNTY may, in addition to other remedies it may have, suspend or terminate this Agreement upon the occurrence of such event.

All policies shall be with admitted insurers licensed to do business in the State of California. Insurance purchased shall be purchased from companies possessing a current A.M Best Company rating of A FSC VII or better.

Without limiting the COUNTY'S right to obtain indemnification from CONTRACTOR or any third parties, CONTRACTOR, at its sole expense, shall maintain in full force and effect, the following insurance policies or a program of self-insurance, including but not limited to, an insurance pooling arrangement or Joint Powers Agreement (JPA) throughout the term of the Agreement:

### A. Commercial General Liability

Commercial General Liability Insurance with limits not less than those shown in the following table:

**Liability Insurance Requirements** 

Total bid	For each occurrence <sup>a</sup>	Aggregate for products/completed operation	General aggregate <sup>b</sup>	Umbrella or excess liability <sup>c</sup>
≤ \$1,000,000	\$1,000,000	\$2,000,000	\$2,000,000	\$5,000,000
> \$1,000,000				
≤ \$10,000,000	\$1,000,000	\$2,000,000	\$2,000,000	\$10,000,000
> \$10,000,000				
≤ \$25,000,000	\$2,000,000	\$2,000,000	\$4,000,000	\$15,000,000
> \$25,000,000	\$2,000,000	\$2,000,000	\$4,000,000	\$25,000,000

<sup>&</sup>lt;sup>a</sup>Combined single limit for bodily injury and property damage.

This policy shall be issued on a per occurrence basis. COUNTY may require specific coverages including completed operations, products liability, contractual liability, Explosion-Collapse-Underground, fire legal liability, or any other liability insurance deemed necessary because of the of the nature of this contract.

Such Commercial General Liability insurance shall name the County of Fresno, its officers, agents, and employees, individually and collectively, as additional insured, but only insofar as the operations under this Agreement are concerned. Such coverage for additional insured shall apply as primary insurance and any other insurance, or self-insurance, maintained by COUNTY, its officers, agents and employees shall be excess only and not contributing with insurance provided under CONTRACTOR's policies herein. This insurance shall not be cancelled or changed without a minimum of thirty (30) days advance written notice given to COUNTY. CONTRACTOR shall obtain endorsements to the Commercial General Liability insurance policy naming COUNTY as an additional insured and providing for a thirty (30) day prior written notice of cancellation or change in terms or coverage.

Within eight (8) days from date CONTRACTOR executes this Agreement, CONTRACTOR shall provide certificates of insurance and endorsement as stated above for all of the foregoing policies, as required herein, to the County of Fresno or to <a href="mailto:designservices@fresnocountyca.gov">designservices@fresnocountyca.gov</a>, stating that such insurance coverages have been obtained and are in full force; that the County of Fresno, its officers, agents and

<sup>&</sup>lt;sup>b</sup>This limit must apply separately to your work under this Contract.

<sup>&</sup>lt;sup>c</sup>The umbrella or excess policy must contain a clause stating that it takes effect (drops down) in the event the primary limits are impaired or exhausted.

employees will not be responsible for an premiums on the policies; that such Commercial General Liability insurance names the County of Fresno, its officers, agents, and employees, individually and collectively, as additional insured, but only insofar as the operations under this Agreement are concerned; that such coverage for additional insured shall apply as primary insurance an any other insurance, or self- insurance shall not be cancelled or changed without a minimum of thirty (30) days advance, written notice given to COUNTY.

CONTRACTOR shall obtain endorsements to the Commercial General Liability insurance naming the County of Fresno, its officers, agents, and employees, individually and collectively, as additional insured, but only insofar as the operations under this Agreement are concerned. Such coverage for additional insured shall apply as primary insurance and any other insurance, or self-insurance, maintained by COUNTY, its officers, agents, and employees shall be excess only and not contributing with insurance provided under CONTRACTOR'S policies herein. This insurance shall not be cancelled or changed without a minimum or thirty (30) days advance written notice given to COUNTY.

## B. Automobile Liability

Comprehensive Automobile Liability Insurance with limits of not less than One Million Dollars (\$1,000,000) per accident for bodily injury and property damage. Coverage should include owned and non-owned vehicles used in connection with this Agreement and all applicable endorsements.

### C. Professional Liability

If CONTRACTOR is a licensed professional or employs professional staff, (e.g., Architect, Engineer, Surveyor, etc.) in providing services, Professional Liability Insurance with limits of not less than One Million Dollars (\$1,000,000.00) per occurrence, Three Million Dollars (\$3,000,000.00) annual aggregate with a provision for 3 year tail coverage.

#### D. Worker's Compensation

A policy of Worker's Compensation insurance as may be required by the California Labor Code.

**ARTICLE VI.** Contractor represents that he has secured the payment of Worker's Compensation in compliance with the provisions of the Labor Code of the State of California and during the performance of the work contemplated herein will continue so to comply with said provisions of said Code. Contractor shall supply the Owner with certificates of insurance, in duplicate, evidencing that Worker's Compensation Insurance is in effect and providing that the Owner will receive ten days notice of cancellation. If Contractor self-insures Worker's Compensation, Certificate of Consent to Self-insure should be provided the Owner.

**ARTICLE VII.** The Contractor shall forthwith furnish in duplicate, a faithful performance bond in an amount equal to 100% of the contract price and a payment bond in an amount equal to 100% of the contract price, both bonds to be written by a surety company acceptable to the Owner and in the form prescribed by law.

The payment bond shall contain provisions such that if the Contractor or his subcontractors shall fail to pay (a) amounts due under the Unemployment Insurance Code with respect to work performed under the contract, or (b) any amounts required to be deducted, withheld and paid over to the Employment Development Department and to the Franchise Tax Board from the wages of the employees of the Contractor and subcontractors pursuant to Section 13020 of the Unemployment Insurance Code with respect to such work and labor, then the surety will pay these amounts. In case suit is brought upon the payment bond, the surety will pay a reasonable attorney's fee to be fixed by the court.

**ARTICLE VIII.** This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

Except as provided in Labor Code section 1725.5(f), no contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)].

Except as provided in Labor Code section 1725.5(f), no contractor or subcontractor may be awarded a contract for public work on a public works project or engage in the performance of work on any public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.

Contractor shall comply with all applicable laws and regulations relating to wages and employment, including all requirements imposed by the California Department of Industrial Relations (DIR). Contractor shall cooperate with County to furnish timely all information necessary for County's completion of the form required to be submitted by County when registering the Project on the DIR website; and County thereafter shall provide to Contractor the "Project ID Number" assigned by DIR in order to facilitate Contactor's submission to DIR of its certified payrolls for the Project, in the manner required and using such form as may be prescribed by DIR, in accordance with the provisions of Labor Code section 1771.4(a)(3).

**ARTICLE IX:** Governing Law – Venue for any action arising out of or relating to this Agreement shall be in Fresno County, California. This Agreement shall be governed by the laws of the State of California. This Contract, 22-14-C, was awarded by the Board of Supervisors on \_\_\_\_\_. It has been reviewed by the Department of Public Works and Planning and is in proper order for signature of the Chairman of the Board of Supervisors. IN WITNESS WHEREOF, they have executed this Agreement this \_\_\_\_\_ day of \_\_\_\_\_\_, 2022 COUNTY OF FRESNO (CONTRACTOR) (OWNER) (Taxpayer Federal I.D. No.) Brian Pacheco, Chairman of the Board of Supervisors of the County of Fresno ATTEST: Bernice E. Seidel Clerk of the Board of Supervisors County of Fresno, State of California